Draft Environmental Impact Statement

# Infrastructure Improvements at the Yap International Airport and the Yap Seaport

## Yap State, Federated States of Micronesia

APRIL 2026

ID# EISX-007-USN-1775813621



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**DRAFT**

# ENVIRONMENTAL IMPACT STATEMENT

**For**

# INFRASTRUCTURE IMPROVEMENTS AT THE YAP INTERNATIONAL AIRPORT AND THE YAP SEAPORT

## YAP STATE, FEDERATED STATES OF MICRONESIA

**APRIL 2026**

ID# EISX-007-USN-1775813621

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# Draft Environmental Impact Statement for Infrastructure Improvements at the Yap International Airport and the Yap Seaport Yap State, Federated States of Micronesia

ID# EISX-007-USN-1775813621

| | |
|---|---|
| **Designation:** | Environmental Impact Statement |
| **Title of Proposed Action:** | Infrastructure Improvements at the Yap International Airport and the Yap Seaport |
| **Project Location:** | Yap State, Federated States of Micronesia |
| **Joint Lead Agencies for the EIS:** | Department of the Navy<br>Department of the Air Force |
| **Action Proponent:** | U.S. Pacific Air Forces, U.S. Pacific Fleet, and U.S. Indo-Pacific Command |
| **Date:** | April 2026 |

## Abstract

The United States (U.S.) Department of War (DoW), including the U.S. Pacific Air Forces, U.S. Pacific Fleet, and U.S. Indo-Pacific Command, has prepared this Environmental Impact Statement (EIS) in accordance with Section 161 of the Compact of Free Association (CoFA) between the U.S. and the Federated States of Micronesia (FSM), the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code [U.S.C.] sections 4321-437, and the Department of Defense NEPA Implementing Procedures. The U.S. DoW proposes to perform various improvements, repairs, and upgrades to the Yap Airport and Seaport. The Proposed Action includes improvements and expansion of the Yap Airport; Airport-to-Seaport connector road; and upgrades to the Yap Seaport (including navigational channel, and navigational aids). The Proposed Action also includes related dredge material stockpiling and land reclamation. The improvements would improve the functionality of Yap's Airport and Seaport, extend their serviceable life, and enable their joint use by the Yap State and the U.S. DoW—including the ability to conduct annual training exercises at the Airport and Seaport and berth up to two large vessels simultaneously at the Seaport. Construction would begin in 2027 and is expected to be completed in 2035. This Environmental Impact Statement evaluates the potential environmental impacts associated with the Preferred Alternative (Alternative 1), Alternative 2, and the No Action Alternative to the following resource areas: topography, geology, and soils; water resources; air quality and greenhouse gases; marine biological resources; terrestrial biological resources; cultural resources; noise; land use; airspace; infrastructure and utilities; transportation; public health and safety; hazardous materials and wastes; and socioeconomics.

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# Draft Environmental Impact Statement for Infrastructure Improvements at the Yap International Airport and the Yap Seaport Yap State, Federated States of Micronesia

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# Abbreviations and Acronyms

| Acronym | Definition |
|---|---|
| AAD | Annual Average Day |
| AADNL | Annual Average Day-Night Average Sound Level |
| AAFB | Andersen Air Force Base |
| AAQS | Ambient Air Quality Standards |
| ACAM | Air Conformity Applicability Model |
| ACM | Asbestos Containing Material |
| ADCP | acoustic doppler current profiler |
| AED | Average Exercise Day |
| AFFF | Aqueous Film Forming Foam |
| AFPMG TG-31 | Armed Forces Pest Management Board Technical Guide No. 31 |
| AGL | above ground level |
| AICUZ | Air Installation Compatible Use Zone |
| APE | Area of Potential Effects |
| APZ | Accident Potential Zone |
| ARFF | Aircraft rescue and firefighting |
| AST | aboveground storage tank |
| ASTM | American Society for Testing and Materials |
| ATC | Air Traffic Control |
| ATFP | Antiterrorism Force Protection |
| ATONs | aids to navigation |
| BESS | battery energy storage systems |
| BMP | best management practice |
| BSAP | Biodiversity Strategy and Action Plan |
| C&D | construction and demolition |
| CAA | Clean Air Act |
| CBD | Convention on Biological Diversity |
| CCD | Coastal Consistency Determination |
| CDL | Container Deposit Legislation |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| $CH_4$ | methane |
| CITES | Convention on International Trade in Endangered Species of Wild Flora and Fauna |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| COFA | Compact of Free Association |
| COM-FSM | College of Micronesia-FSM |
| CTAF | Common Traffic Advisory Frequency |
| CWA | Clean Water Act |
| CWD | Central Water District |
| CY | cubic yards |
| CZMA | Coastal Zone Management Act |
| DAF | U.S. Department of the Air Force |
| dB | decibel |
| dBA | A-weighted sound level |
| DD | Data Deficient |
| DIPNOTE | Diplomatic Note |
| DMMP | Dredged Material Management Plan |
| DNL | day-night average sound level |
| DoD | Department of Defense |
| DoN | Department of the Navy |
| DoW | Department of War |
| DPS | Distinct Population Segment |
| DPW&T | Department of Public Works and Transportation |
| E | Endangered |
| EA | Environmental Assessment |
| EBS | Environmental Baseline Survey |
| ECP | environmental compliance plan |
| EFH | Essential Fish Habitat |
| EIS | Environmental Impact Statement |
| EMS | emergency medical service |

| Acronym | Definition |
|---|---|
| ENSO | El Niño Southern Oscillation |
| EPA | Environmental Protection Agency |
| EPCRA | Emergency Planning and Community Right-to-Know Act |
| ESA | Endangered Species Act |
| ESCP | Erosion and Sediment Control Plan |
| ESQD | explosive safety quantity distance |
| EVA | Extreme Value Analysis |
| FAA | Federal Aviation Administration |
| FAR | Federal Aviation Regulations |
| FBD | food borne disease |
| FEMA | Federal Emergency Management Agency |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FOD | foreign object debris |
| FONSI | Finding of No Significant Impact |
| FSM | Federated States of Micronesia |
| FSMTC | FSM Telecommunications Corporation |
| ft | feet/foot |
| FY | Fiscal year |
| GC | General Conformity |
| GDP | gross domestic product |
| GHG | Greenhouse gas |
| GPD | Gallons per day |
| GTWA | Gagil-Tomil Water Authority |
| GWP | global warming potential |
| HADR | humanitarian assistance/disaster response |
| HAP | hazardous air pollutant |
| HAPC | habitat areas of particular concern |
| HDPE | high-density polyethylene |
| HVAC | heating, ventilation and air conditioning |
| IALA | International Association of Marine Aids to Navigation and Lighthouse Authorities |
| ICAO | International Civil Aviation Organization |
| IDP | Installation Development Plan |
| IRP | Installation Restoration Program |
| IUCN | International Union for Cooperation Agency |
| Jet A-1 | Commercial-grade aircraft fuel |
| JICA | Japan International Cooperation Agency |
| JP-8 | Military-grade aircraft fuel |
| kW | kilowatt |
| $L_{Aeq}$ | A-weighted Equivalent Continuous Sound Level |
| $L_{AMax}$ | A-weighted Maximum Sound Level |
| LBP | lead based paint |
| LC | Least Concern |
| LED | light emitting diode |
| $L_{eq}$ | Equivalent Continuous Sound Level |
| LF | linear feet |
| LFA | little fire ant |
| LHD | landing helicopter dock |
| LID | low impact development |
| LiDAR | light detection and ranging |
| $L_{Max}$ | Maximum Sound Level |
| LOS | level of service |
| LTO | landing and takeoff cycles |
| LUC | Land Use Compatibility |
| MAAS | mobile aircraft arresting systems |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MBTA | Migratory Bird Treaty Act |
| MCO | Marine Corps Order |
| MEC | Munitions and Explosives of Concern |
| MGD | million gallons per day |
| MHHW | mean higher high water |
| MI | made land |
| MLLW | mean lower low water |

| Acronym | Definition |
|---|---|
| MMPA | Marine Mammal Protection Act |
| MPPEH | Material potentially presenting an explosive hazard |
| MPRSA | Marine Protection, Research, and Sanctuaries Act |
| MSAT | Mobile Source Air Toxics |
| MSFCMA | Magnuson-Stevens Fishery Conservation and Management Act |
| MSL | mean sea level |
| MvA | Megavolt amperes |
| N/A | not applicable |
| NA | Number of Events Above a Threshold |
| NAAQS | National Ambient Air Quality Standards |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NAVAIDs | navigation aids |
| NAVFAC | Naval Facilities Engineering Systems Command |
| NC | no criteria |
| NDC | Nationally Determined Contribution |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NHPA | National Historic Preservation Act |
| NIOSH | National Institute for Occupational Safety and Health |
| NM | nautical miles |
| NMFS | National Marine Fisheries Service |
| $NO_2$ | nitrogen dioxide |
| NOA | notice of availability |
| NOAA | National Oceanic and Atmospheric Administration |
| NOI | Notice of Intent |
| NOTAM | Notice to Air Missions |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NT | Near Threatened |
| $O_3$ | ozone |
| OEA | Overseas Environmental Assessment |
| OEIS | Overseas Environmental Impact Statement |
| OFA | object free area |
| OINRL | outdoor-to-indoor noise reduction level |
| OPNAV | Office of the Chief of Naval Operations |
| OPNAVINST | Office of the Chief of Naval Operations Instruction |
| OSHA | Occupational Safety and Health Administration |
| P | Proposed |
| PAN | Protected Area Network |
| Pb | lead |
| PCB | polychlorinated biphenyl |
| PFAS | per- and polyfluoroalkyl substances |
| $PM_{10}$ | particulate matter less than or equal to 10 microns in diameter |
| $PM_{2.5}$ | particulate matter less than or equal to 2.5 microns in diameter |
| PMA | Pacific Missionary Aviation |
| ppm | parts per million |
| ppt | parts per thousand |
| PSD | Prevention of Significant Deterioration |
| PSU | practical salinity units |
| PTS | permanent threshold shift |
| pTy | Yap Formation |
| Ql | Coralline Limestone |
| RCRA | Resource Conservation and Recovery Act |
| RMS | root mean square |

| Acronym | Definition |
|---|---|
| RO/RO | roll-on/roll-off |
| ROD | Record of decision |
| ROI | Region of influence |
| RONA | Record of Non-Applicability |
| ROV | remotely operated vehicle |
| RPZ | runway protection zone |
| RSA | runway safety area |
| RSP | Runway Safety Program |
| SCAT | Secondary containment aboveground tank |
| SDA | Seventh-day Adventist |
| SEL | sound exposure level |
| SELcum | cumulative sound exposure level |
| SF | square feet |
| SHPO | State Historic Preservation Officer |
| SIP | State Implementation Plan |
| SLR | Sea level rise |
| $SO_2$ | sulfur dioxide |
| SOC | Species of Concern |
| SOFA | Status of Forces Agreement |
| SOP | Standard Operating Procedures |
| spp. | species |
| SPCC | Spill Prevention, Control, and Countermeasures |
| SPLpeak | peak sound pressure level |
| SSP | Shared Socioeconomic Pathways |
| SUA | Special Use Airspace |
| SWPPP | Stormwater Pollution Prevention Plan |
| SYWA | Southern Yap Water Authority |
| T | Threatened |
| TCP | Traditional Cultural Place(s) |
| TPESL | Tropical Pacific Environmental Screening Levels |
| TSCA | Toxic Substances Control Act |
| TSDM | Transportation Stormwater Drainage Manual |
| TSS | Total suspended solids |
| TTS | temporary threshold shift |

| Acronym | Definition |
|---|---|
| U.S. | United States |
| U.S.C. | United States Code |
| UFC | Unified Facilities Criteria |
| UHSLC | University of Hawaii Sea Level Center |
| ULSD | ultra-low sulfur diesel |
| UNEP | United Nations Environment Programme |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| USINDOPACOM | United States Indo-Pacific Command |
| USMC | U.S. Marine Corps |
| UXO | Unexploded Ordnance |
| V | Vulnerable |
| VBD | vector borne disease |
| VES | vapor encroachment screening |
| VOC | Volatile organic comp |
| WBD | waterborne disease |
| WHO | World Health Organization |
| WWII | World War II |
| WWTP | wastewater treatment plant |
| YDHS | Yap Department of Health Services |
| YIA | Yap International Airport |
| YIST | Yap Invasive Species Taskforce |
| YSC | Yap State Code |
| YSH | Yap State Hospital |
| YSPSC | Yap State Public Service Corporation |
| µPa | 1 microPascal |

# 1 Purpose of and Need for the Proposed Action

The United States (U.S.) Department of War (DoW) proposes to construct improvements and conduct military training at Yap International Airport (Airport) and Yap Seaport (Seaport), located in Yap State, Federated States of Micronesia (FSM). The Compact of Free Association (CoFA) governs the relationship between FSM and the U.S. and commits the U.S. to protect FSM militarily. The proposed Airport and Seaport improvements would support the U.S. in fulfilling its defense responsibilities under CoFA and recapitalize aging infrastructure for long-term use by Yap State. The improvements would also support U.S.-led multi-national military training including contingency response, and humanitarian assistance training in the region.

Improvements at the Airport include runway extensions, aircraft parking apron, parallel taxiway, roadway improvements, fuel storage, support buildings, and ancillary facilities and infrastructure. Seaport improvements include reconstructing the existing wharf and bulkhead, constructing a pile-supported wharf extension, dredging at the wharf berth and turning basin, dredging/widening Waneday Channel entrance to accommodate larger draft ships, replacement/repair of aids to navigations (ATONs) in the Waneday Channel, and roadway improvements. Other improvements include repairing and repaving the Airport-to-Seaport connector road. Airport improvements construction is projected to begin in early 2027 and be completed in 2035. Construction of the Seaport improvements is projected to commence in 2027 and be completed in 2031. Airport improvements (including the Airport-to-Seaport connector road) are expected to take 7.25 years to construct utilizing a maximum workforce of 200 personnel; Seaport improvements are expected to take three years to construct utilizing a maximum workforce of 75 personnel.

The DoW anticipates conducting one to two military training events per year, which may involve either or both the Airport and Seaport. Each training event could last up to 14 days, or a total of up to 28 training days per year. No permanent personnel, full-time aircraft basing, munitions use, or airspace modifications are included in the Proposed Action. While emergency scenarios such as actual Humanitarian Assistance/Disaster Response (HADR) actions are not part of the Proposed Action, the infrastructure improvements would support training for such missions.

## 1.1 Location

Yap State is part of the Caroline Islands archipelago stretching from Kosrae State in the east to the Republic of Palau in the west. It is the westernmost state in the FSM and includes several main islands and smaller outer islands that span over 100,000 square miles. Yap's four main islands, Yap Island, Tamil-Gagil, Maap, and Rumung, are collectively called Yap Proper or Wa'ab (Figure 1-1). Both the Airport and Seaport are located on Yap Island.

The Seaport is located on the southeast coast of Yap Island in Colonia Harbor. The project areas for the proposed Seaport improvements are focused at the Nungoch peninsula, the public roadway that encircles Chamorro Bay, and various locations within Colonia Harbor and the Colonia Harbor Entrance Channel (referred to as Waneday Channel), a deepwater channel through the island's fringing outer reef (Figure 1-1). The Seaport is located in Weloy Municipality. The Municipality of Rull is located along the west side of the Waneday Channel.

The Municipality of Tamil is located along the east side of Colonia Harbor and Waneday Channel. The Airport project area is located approximately three miles southwest of Seaport in the upland area of Rull Municipality.

## 1.2 Background

An old Japanese-built airfield, located 0.7-miles south of the current Airport, served as Yap's only commercial airfield until the new Yap International Airport was completed and activated in 1983 under the former Trust Territory of the Pacific Islands. The new Airport officially opened in 1983, though the term "1988" is sometimes cited in reference to subsequent developments or full operational status. The Airport is operated by Yap State Department of Public Works and Transportation (DPW&T) with oversight from the FSM Division of Civil Aviation. It hosts twice weekly commercial flights from Guam, a once weekly cargo flight, and flights from a local commercial airline with routes to the Yap Outer Islands, FSM, and Palau. The airfield has several terrain defects including gullies at each end of the 6,000-foot runway and steep terrain on the north side of the runway. The airfield also does not meet current Federal Aviation Administration (FAA) runway safety area standards. The airfield property was deliberately sized longer on the east end to accommodate future runway lengthening.

Since the late 1980s, the Seaport has been operated through the Yap State DPW&T. The existing wharf is an 825-foot (ft) long infill marginal wharf that was first constructed in 1982 and extended in 1991. The Seaport includes a 6.2-acre fenced area, managed by the Wa'ab Transportation Company (stevedores) and DPW&T's Division of Sea Transportation, providing four berths servicing local and international cargo vessels, fuel tankers, an inter-island ferry, and longline fishing vessels. There are three existing buildings within the fenced area: a warehouse and administrative office for Wa'ab Transportation Company (under renovation), a maintenance shop for the Division of Sea Transportation, and a structurally deteriorated facility formerly used for tuna canning operations. The remaining Nungoch peninsula area outside the fenceline (approximately 14 acres) encompasses governmental structures, a recycling facility, a prior automotive salvage yard, and a wastewater treatment facility.

The Waneday Channel consists of a deep southeast facing entrance channel that transitions to the interior channel at a turn that is bounded by shallow fringing reefs on either side. Vessels maneuver from the interior channel to the wharf through a turning basin that lies directly east of the Seaport wharf. In 1991, improvements were made to widen the entrance/interior channel and turning basin. Specifically, dredge areas included the northeast perimeter of the turning basin, the western side of the interior channel at both the entrance turn and interior turn, and along the wharf. Based on 1991 construction drawings, these areas were dredged to a depth of approximately -35 ft mean lower low water (MLLW).

## 1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to improve the functionality, capacity and capabilities of the Airport and Seaport (including the entrance channel), extend their serviceable life, and enable their joint use by the Government of Yap and the DoW—including the ability to conduct annual training exercises at the Airport and berth two large vessels simultaneously at the Seaport. The Proposed Action would increase logistics capabilities for the U.S. Navy, U.S. Air

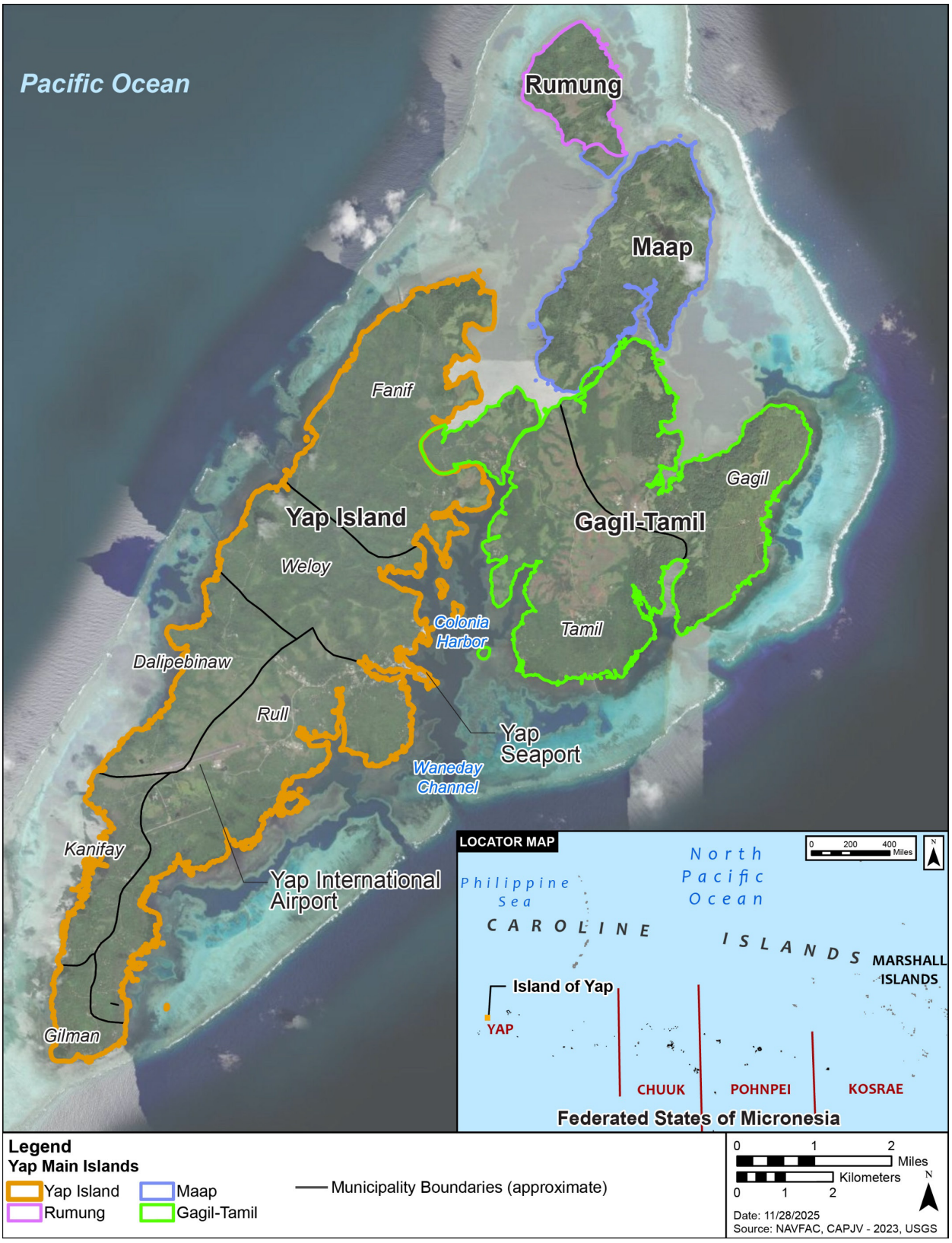



**Figure 1-1 Yap Location Map**

Force, and Yap State by adding capacity to support military defense, humanitarian aid, and military exercises in FSM, without interfering with commercial airport and seaport operations. This project would help enable personnel, equipment, and supplies to be transported for engagements and exercises, and provide infrastructure to support increased capabilities in FSM to allow DoW to better meet its defense obligations.

The Proposed Action is needed to allow U.S. military aircraft, vessels, and personnel improved use and functionality of the Airport and Seaport to meet U.S. national security objectives and fulfill U.S. obligations to provide for the defense of the FSM per Title Three of the CoFA between the U.S. and FSM. It is also needed for the DoW to fulfill its responsibilities mandated by Title 10 USC 9062 and 8062, to ensure readiness, and in alignment with DoW strategic initiatives for the Indo-Pacific region. In addition, the improved capabilities resulting from the Proposed Action are needed to allow the DoW to respond more effectively to crises in the region (e.g., natural disasters, humanitarian response, etc.). The existing Airport does not meet the operational requirements of the aircraft platforms participating in training activities to improve the strategic, operational, and tactical advancement of DoW and its allies. The existing Seaport wharf length and depth are insufficient to accommodate larger Navy surface vessels (e.g., cargo logistics ships) and the existing mooring bollards and fenders do not have sufficient capacity to safely berth vessels of that size. The proposed improvements would be designed for simple maintenance and would enhance operational flexibility while avoiding disrupting existing commercial activities. The Proposed Action is also needed to enhance DoW training, transit, support, and other related activities conducted pursuant to defense support commitments within Title Three of the CoFA between FSM and the U.S.

## 1.4 Scope of Environmental Analysis

This Environmental Impact Statement (EIS) includes an analysis of reasonably foreseeable potential environmental impacts associated with Alternative 1 (Preferred Alternative), Alternative 2, and the No Action Alternative. “Reasonably foreseeable” means sufficiently likely to occur such that a person of ordinary prudence would take it into account in reaching a decision (DoD, 2025). The environmental resource areas analyzed in this EIS include: topography, geology, and soils; water resources; air quality and greenhouse gases; marine biological resources; terrestrial biological resources; cultural resources; noise; land use; airspace; infrastructure and utilities; transportation; public health and safety; hazardous materials and wastes; and socioeconomics. The study area for each resource analyzed may differ due to how the Proposed Action interacts with or impacts the resource. For instance, the study area for geological resources may only include the construction footprint of a building whereas the noise study area would expand out to include noise sensitive areas that may be impacted by construction and/or operational noise.

## 1.5 Relevant Laws and Regulations

In accordance with the CoFA and the Yap State Operational Control Letter signed on March 25, 2025 conveyed via Diplomatic Note DFA-LSR-113-25 dated March 25, 2025, the FSM, the State of Yap, and the U.S. have agreed that for actions covered by this EIS, the Government of the United States will apply the NEPA of 1969 as amended as if the FSM were the U.S. Furthermore,

under the CoFA, the U.S. is also required to comply with standards substantively similar to those required by the Endangered Species Act of 1973, as amended; the Clean Air Act, as amended; the Clean Water Act, as amended (Federal Water Pollution Control Act); Title I of the Marine Protection, Research and Sanctuaries Act of 1972 (Ocean Dumping Act); the Toxic Substances Control Act, as amended; the Solid Waste Disposal Act, as amended, when constructing and using the military projects at the Airport and Seaport. The DoW, FSM, and Yap State are developing standard operating procedures (SOPs) to implement these requirements, as well as those of Section 402 of the U.S. National Historic Preservation Act. The U.S. will follow the standards and procedures outlined in the SOPs. All commercial vessels visiting the Seaport will have to meet the Micronesian Shipping Commission requirements, including International Maritime Organization conventions such as the International Convention for the Prevention of Pollution from Ships (also known as MARPOL). Civilian activities at the Airport must comply with International Civil Aviation Organization safety and security standards.

## 1.6 Public and Agency Participation and Intergovernmental Coordination

The DoW published the Notice of Intent to prepare this EIS on the FSM National Government website on June 24, 2025 and in Volume 25 Issue No. 14 of The Kaselehlie Press (June 25, 2025). The notice was published in both English and Yapese. The notice identified when and where a public scoping meeting would be held and notified the public that additional meetings would be scheduled locally during the week of July 7, 2025. The DoW held the first round of public scoping meetings in Yap on July 8, 2025 at the Small Business Development Center and July 10, 2025 in the Rull Community. Comments from the first round of public scoping were accepted from July 8 through August 15, 2025, which included a one-week extension.

The DoW held a second round of public scoping meetings in Yap during the week of September 8, 2025. The meetings were held on September 9, 2025 at the Colonia Early Childhood Education Conference Room (general meeting open to all Yap residents), on September 10, 2025 at the Council of Pilung Conference Room (Tamil Community meeting), on September 11, 2025 at the Council of Pilung Conference Room (Weloy Community meeting), and on September 11, 2025 at the Milew Community Center (Rull Community meeting). Public scoping comments from Round 2 were accepted between September 9 and September 29, 2025.

Comments received during the two rounds of scoping and responses to the comments are summarized in Appendix B.

In addition to the scoping meetings, the DoW also held briefings and discussions with the Yap State Legislature and Yap State agencies in July and September, coinciding with the scoping meetings. The DoW held meetings with the following Yap State agencies: Environmental Protection Agency (EPA), DPWT (including Divisions of Wastewater Management, Sea Transportation, Airports and Highways), Department of Youth and Civic Affairs (including the Historic Preservation Office), Department of Resources and Development (including Divisions of Agriculture and Forestry and Marine Resources Management), and the Yap State Public Services Corporation (YSPSC). Discussions were also held with FSM agencies including the Department of Justice, Department of Transportation, Communication, and Infrastructure, and the Department of Resource and Development.

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# 2 Proposed Action and Alternatives

## 2.1 Proposed Action

The DoW proposes to construct various improvements, repairs, and upgrades to the Airport and Seaport. The Proposed Action includes major improvements and expansion of the Airport; improvements to the Airport-to-Seaport connector road; and upgrades to the wharf, harbor, navigational channel, and navigational aids. The Proposed Action also includes related dredging and dredge material disposal on land and in nearshore areas. Construction of the Proposed Action would include the development and implementation of an Environmental Compliance Plan (ECP) to comply with the substantive provisions of the statutes made applicable to U.S. Government activities under Section 161(a)(3) of the CoFA and the associated Environmental SOPs developed by the DoW, FSM, and Yap State. The ECP will be enforceable and will apply to both construction and post-construction activities. Following construction, the Airport and Seaport would remain under the control of FSM and Yap State. The proposed improvements are being designed to be simple to maintain (i.e., no specialized labor or equipment required) and the U.S. will work with the FSM and Yap State to develop an appropriate approach to maintenance of new and expanded joint use facilities. The Proposed Action includes DoW training at both the Airport and Seaport, which would involve no more than two training events per year, each lasting up to 14 days (inclusive of set-up and tear-down).

## 2.2 Screening Factors

NEPA and the Department of Defense NEPA Implementing Procedures (June 2025) provide guidance on the consideration of alternatives to a proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only a reasonable range of alternatives determined by the DoW to be technically and economically feasible and to meet the purpose and need require detailed analysis.

Potential alternatives that meet the purpose and need were evaluated against screening factors identified in Table 2-1.

**Table 2-1 Reasonable Alternative Screening Factors**

| *Screening Factor* | *Description* |
|---|---|
| **Airport** | |
| A. Meets Requirements | Meets DoW and FSM/Yap State airport requirements (including but not limited to 9.100 ft runway, parking apron, fuel storage, and parallel taxi way) |
| B. Strategically Located | Is strategically located in the second island chain with proximity to a capable seaport |
| C. Minimizes Land Acquisition | Development minimizes acquisition of private lands to the extent feasible |
| D. Constructability | Construction of the Airport improvements is technically and economically feasible and schedule/cost efficient |
| E. Limited Environmental Constraints/Impacts | Avoids and/or minimizes potential environmental and community impacts to the extent feasible |
| F. Minimizes Impacts to Airport Operations | Airport is able to operate with limited interruption to the local community during the construction process |

| *Screening Factor* | *Description* |
|---|---|
| **Seaport** | |
| A. Meets Requirements | Meets DoW and FSM/Yap State seaport requirements |
| B. Strategically Located | Strategically located in the second island chain with proximity to a capable airport |
| C. Beneficial Reuse of Dredge Material | Improvements account for traditional ownership of coral reefs and prioritizes beneficial reuse of dredge material |
| D. Constructability | Construction of the Seaport improvements is technically and economically feasible and schedule/cost efficient |
| E. Limited Environmental Constraints/Impacts | Avoids and/or minimizes potential environmental and community impacts to the extent feasible |
| F. Minimizes Impacts to Seaport Operations | Seaport is able to operate with limited interruption to the local community during the construction process |

A range of potential alternatives were considered for the Proposed Action for both the Airport and Seaport. These alternatives were evaluated based on the above screening factors. Table 2-2 provides the screening evaluation of the Airport alternatives and Table 2-3 provides the screening evaluation of the Seaport alternatives. Section 2.3 describes the alternatives carried forward for analysis in this EIS and Section 2.7 discusses alternatives considered but not analyzed in this EIS and the reasons for their dismissal.

**Table 2-2 Airport Alternatives Screening Analysis**

| *Airport Alternatives* | *A. Meets Requirements* | *B. Strategically Located* | *C. Minimizes Land Acquisition* | *D. Constructability* | *E. Minimizes Environmental/ Community Impacts* | *F. Minimizes Impacts to Airport Operations* | *Carried Forward or Dismissed* |
|---|---|---|---|---|---|---|---|
| 1. No Action | No | No | Yes | Yes | No | Yes | Carried Forward* |
| 2. Preferred Alternative | Yes | Yes | Yes | Yes | Yes | Yes | Carried Forward |
| 3. Alternate Parking Apron Location | Yes | Yes | Yes | Yes | Yes | Yes | Carried Forward |
| 4. Reversed Runway Extension (2,000 ft west and 1,100 ft east) | Yes | Yes | No | No | No | Yes | Dismissed |
| 5. West Runway Extension (3,100 ft) | Yes | Yes | No | No | No | Yes | Dismissed |
| 6. East Runway Extension (3,100') | Yes | Yes | No | No | No | Yes | Dismissed |
| 7. Taxiway and Runway Reversal | Yes | Yes | No | No | No | Yes | Dismissed |
| 8. Reduced Length Parallel Taxiway | No | Yes | Yes | Yes | Yes | Yes | Dismissed |
| 9. Alternate Airport Location in FSM | No | No | Undetermined | Undetermined | Undetermined | Undetermined | Dismissed |

* Note: Despite not meeting the purpose and need for the Proposed Action, the No Action Alternative is carried forward for analysis to provide a comparison of baseline conditions.

**Table 2-3 Seaport Alternatives Screening Analysis**

| *Seaport Alternatives* | *A. Meets Requirements* | *B. Strategically Located* | *C. Beneficial Reuse of Dredge Material* | *D. Constructability* | *E. Limited Environmental/ Community Impacts* | *F. Minimizes Impacts to Seaport Operations* | *Carried Forward or Dismissed* |
|---|---|---|---|---|---|---|---|
| 1. No Action | No | No | No | Yes | No | Yes | Carried Forward* |
| 2. Preferred Alternative | Yes | Yes | Yes | Yes | Yes | Yes | Carried Forward |
| 3. In-channel Dredge Disposal | Yes | Yes | Some | Yes | Yes | Yes | Carried Forward |
| 4. Partial Wharf Improvements | No | Yes | Yes | Yes | Yes | No | Dismissed |
| 5. Alternate Wharf Expansion Construction | Yes | Yes | Yes | No | Yes | Yes | Dismissed |
| 6. Deeper Draft at Berth | Yes | Yes | Yes | No | No | Yes | Dismissed |
| 7. Offshore Mooring | No | No | No | Yes | Yes | Yes | Dismissed |
| 8. Wharf Improvements Without Dredging | No | No | No | Yes | Yes | Yes | Dismissed |
| 9. Alternate Seaport Location in FSM | No | No | Undetermined | Undetermined | Undetermined | Undetermined | Dismissed |

* Note: Despite not meeting the purpose and need for the Proposed Action, the No Action Alternative is carried forward for analysis to provide a comparison of baseline conditions.

## 2.3 Alternatives Carried Forward for Analysis

Based on the reasonable alternative screening factors in order to meet the purpose and need for the Proposed Action, two alternatives were identified as reasonable action alternatives and are carried through for further EIS analysis: Alternative 1 (the *Preferred Alternative),* and Alternative 2, which includes an alternate location for the proposed aircraft parking apron and disposal of Seaport entrance channel dredge material in entrance channel waters rather than via land reclamation/stockpiling. Although the No Action Alternative would not meet the purpose of and need for the Proposed Action, it is also carried forward for analysis in this EIS as required by NEPA to serve as the baseline for considering the effects of the Proposed Action and any reasonable alternatives.

## 2.4 No Action Alternative

Under the No Action Alternative, the Proposed Action would not take place. This means that no DoW funded improvements would be made to the existing Airport's runway, facilities, infrastructure, or any surrounding lands and Airport boundaries would not be expanded. Similarly, no alterations or improvements would occur at the Seaport's wharf, harbor, and entrance channel, nor to the ATONs or the connector road between the Airport and Seaport. The DoW would provide for the defense of the FSM with limited logistical support and its ability to provide support to Yap and FSM during emergent situations would also be limited. There would be no military training beyond what is currently authorized.

The No Action Alternative is included and analyzed in the EIS to establish a comparative baseline. This alternative represents the current state and the reasonably foreseeable future conditions without the implementation of the proposed projects. Its purpose is to provide a benchmark against which DoW decision-makers and the public can compare the environmental effects of the proposed action and other reasonable alternatives. By projecting the continuation of existing conditions, the No Action Alternative allows for a clear comparison of the magnitude of environmental effects of the other action alternatives.

Under the No Action alternative needed maintenance and improvements at both the Airport and Seaport would continue to be deferred and existing runway safety area deficiencies at the airport would continue.

## 2.5 Alternative 1 (Preferred Alternative)

The following section provides a description of the Proposed Action as the Preferred Alternative. The footprint of the Preferred Alternative project area is shown in Figure 2-1.

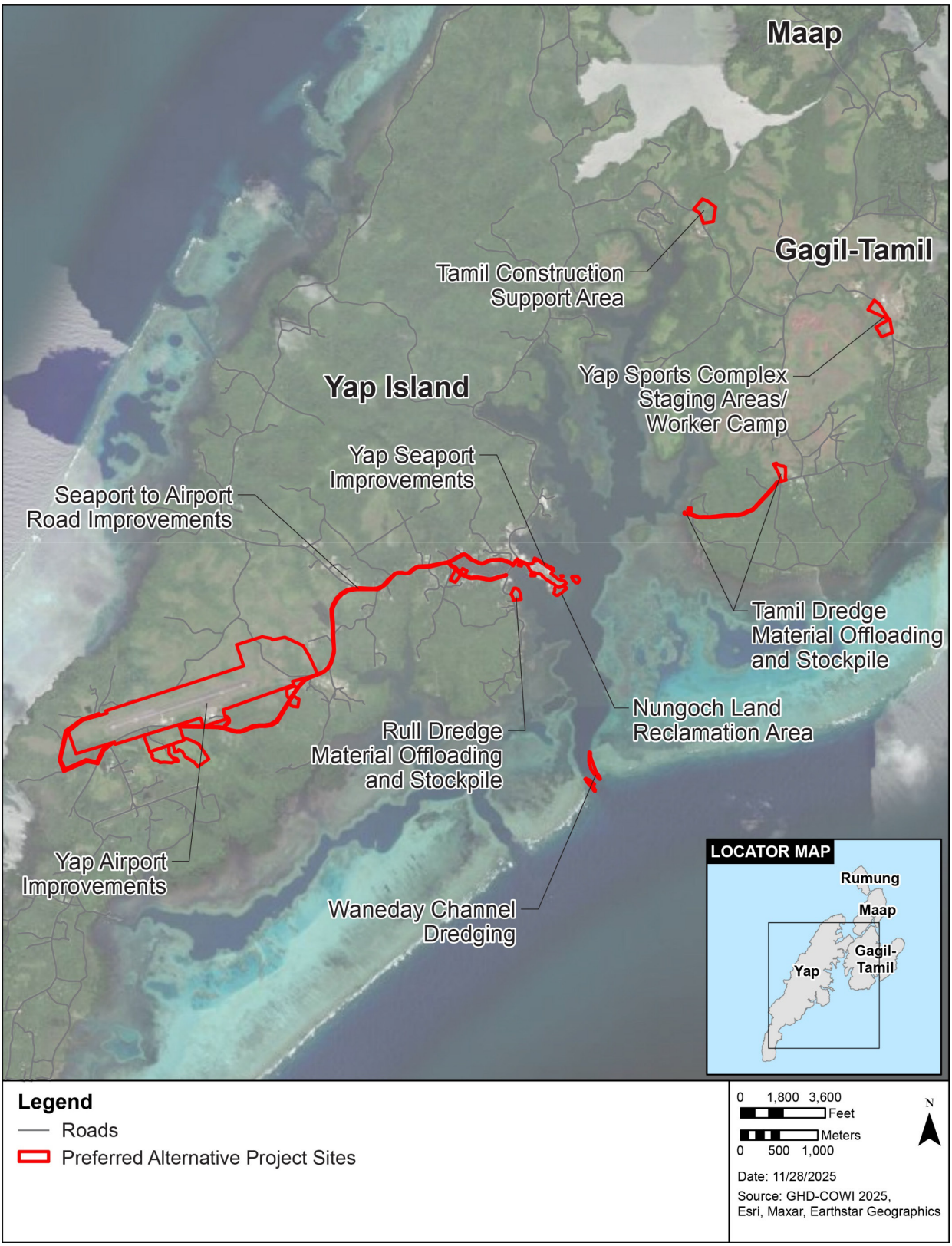



**Figure 2-1 Preferred Alternative Project Area Footprints**

### 2.5.1 Airport Improvements

Currently, the Airport has a single east-west running asphalt runway, Runway 07-25, that is 6,000 ft long and 150 ft wide (Figure 2-1). The runway has paved shoulders that are approximately 25 ft wide. In addition to the runway there is an asphalt taxiway that provides the only connection between the runway and the terminal concrete parking apron. Small asphalt turnaround areas are located at each end of Runway 07-25.

Proposed Airport improvements include the following facilities and infrastructure; detailed descriptions are provided in Sections 2.5.1.1 through 2.5.1.9. The airfield improvements would require an expansion of the existing Airport property boundary. The existing and proposed Airport boundaries are shown in Figure 2-2, and the proposed airport improvements are shown in Figure 2-3 and described in Table 2-4.

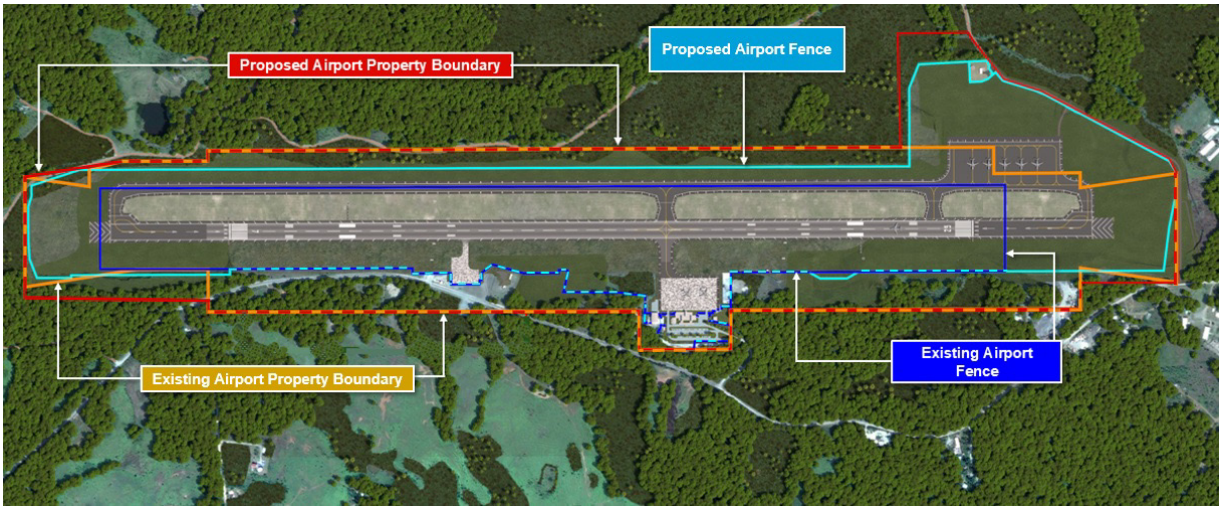



**Figure 2-2 Existing and Proposed Airport Boundary and Fence**

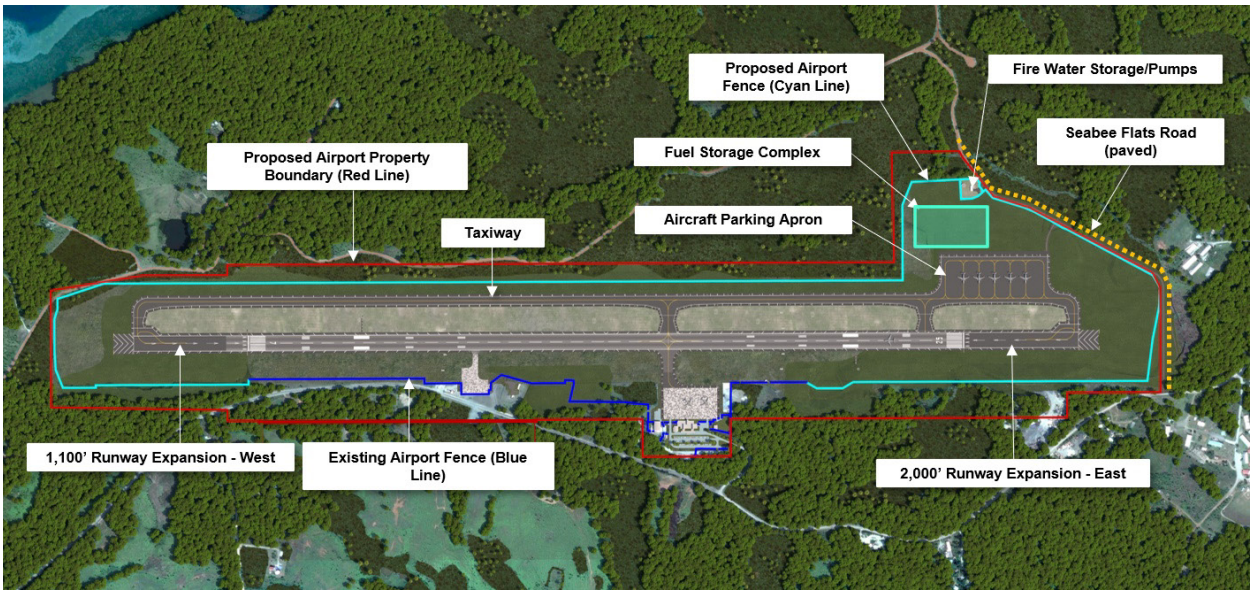



**Figure 2-3 Proposed Airport Improvements**

**Table 2-4 Proposed Improvements to Yap Airport**

| *Improvement* | *Description* |
|---|---|
| Runway Extension and Pavement Replacement | A 2,000 ft runway extension on the east end and a 1,100 ft runway extension on the west end of the existing runway (extending the existing 6,000-ft runway to 9,100 ft). |
| Aircraft Parking Apron | A 10.5-acre paved parking apron on the northeast end of the existing runway across from the Airport terminal building. |
| Parallel Taxiway | New 9,100-ft-long parallel taxiway north of the runway. The new taxiway will be served by four new connections to the runway. |
| Fuel Storage | Permanent fuel storage system with a capacity of approximately 840,000 gallons and use of an expeditionary fuel storage system during exercises before completion of the permanent fuel system with a maximum capacity of 250,000 gallons. |
| Buildings, Facilities, and Training Support Areas | Dedicated military storage facilities (approximately 25,000 square feet [SF] total), airfield damage repair warehouse (approximately 3,000 SF), maintenance facility (approximately 7,500 SF), laydown area (approximately 15,000 SF), and the following training support areas on improved surfaces: expeditionary camp area (approximately 4.5 acres), airfield operations area (approximately 3.2 acres), command and control area (approximately 5,000 SF) and fuel storage area (approximately 1.8 acres). Any buildings constructed on the airport property would be sized and located in accordance with an approved Airport Layout Plan. |
| Ancillary Facilities | Fire protection water systems, utility connections, stormwater management infrastructure, fencing, construction staging and laydown, and temporary construction worker camp for up to 200 workers (approximately 2 acres). Estimated construction period utility demands of up to 80,000 gallons per day (GPD) of potable water, 60,000 GPD of non-potable water, and wastewater generation of approximately 22,000 GPD. Peak electrical demand is estimated at up to 2.1 megavolt amperes (MvA). Stormwater system will meet current industry standards and address significant deficiencies in the existing stormwater system. |
| Offsite Roadway Improvements | Replacement of approximately 3,500 ft of Seabee Flats Road to the east of the airport to replace the portion that would be removed due to construction of the runway extension and aircraft parking apron. Repave the Airport-to-Seaport connector road (3.8 miles of repairs and asphalt overlay). Improve the community road to the west of the airfield for use as a construction haul route (approximately one mile of compacted aggregate base course). |

Construction would require clearing/grubbing, grading, trenching, excavating, filling, paving, and revegetating the project area; set-up and use of a concrete batch plant and an asphalt batch plant; installation of utilities infrastructure; construction of structures; transport of construction materials to the Airport; and transport of construction debris to appropriate offsite disposal locations if necessary (most debris would be reused onsite). Construction of the facilities and infrastructure is expected to take place over approximately eight years (calendar years 2027 through 2035). Approximately 265 acres would be disturbed during construction within the proposed Airport boundary, and an additional 61 acres could be disturbed at the proposed construction support areas located outside of the proposed Airport boundary. Detailed descriptions of the components are provided in the following sections.

#### 2.5.1.1 Runway Extension and Pavement Replacement

The runway extension includes a 3,100 ft runway extension with 25 ft wide asphalt paved shoulders, 200 ft long asphalt paved overruns, and infrastructure for mobile aircraft arresting systems (MAAS). The runway extension would occur on both ends of the runway, consisting of a 1,100 ft extension on the west end and a 2,000 ft extension on the east end for a total runway length of 9,100 ft. This would provide up to 8,000 ft of useable takeoff and landing length for Runways 7 and 25, meeting the operational requirements of the proposed fighter, cargo, tanker, and commercial aircraft (Airplane Design Group III [Boeing 737-800]). Existing 200 ft runway overruns and turnarounds at each end of the runway (106,500 SF) would be demolished and various navigation aids (NAVAIDs) such as runway lighting and signage would also be removed for the runway extension. New NAVAIDs would be installed upon completion.

The runway extensions would be constructed of asphalt pavement over an aggregate base, drainage layer, separation layer, and stabilized subgrade. Foundations with anchor bolts would be constructed to support MAAS pad installation at each end of the runway. The actual MAAS equipment would not be permanent but installed and used during some military readiness activities.

In order to meet runway slope and grade requirements, approximately three million cubic yards of earthwork would be required. The majority of the excavation would occur along the northwest length of the airfield and most of the fill would occur along its northeast and southwest ends.

#### 2.5.1.2 Aircraft Parking Apron

The aircraft parking apron (approximately 10.5 acres) with asphalt paved shoulders would be used to hold U.S. DoW aircraft during military readiness activities so military aircraft would not occupy the commercial aircraft parking apron. The parking apron would be available for civilian airport use when not in use for military readiness activities.

The aircraft parking apron would be connected to the parallel taxiway and constructed of a combination of portland cement concrete pavement and asphalt pavement with hot-mix asphalt shoulders. The aircraft parking apron would be sized to support five Boeing 737-type aircraft. The aircraft parking apron would include a fuel hydrant system (multiple fuel hydrant pits and underground piping to the fuel storage complex).

#### 2.5.1.3 Parallel Taxiway

A new parallel 9,100 ft long by 75 ft wide taxiway with 25 ft wide paved shoulders would be constructed on the northwest side of the runway and extend along the length of the runway. It would connect to the middle, both ends of the runway, and to the western edge of the proposed aircraft parking apron. The taxiway would be constructed of asphalt pavement over an aggregate base, drainage layer, separation layer, and stabilized subgrade.

#### 2.5.1.4 Fuel Storage Complex

A permanent fuel storage complex may be constructed at a later date than the main airport improvement project (i.e., runway extensions, apron, etc.). In the interim, an expeditionary fuel system would be used at the Airport to provide fuel support during exercises. Military aircraft

fuel is typically not the same fuel that is used for commercial aircraft. Therefore, the fueling facilities will likely only be used for military aircraft.

A permanent fuel storage complex could be constructed in support of aircraft operations, emergency generators, and ground power units. The fuel storage complex would have two permanent, double-wall, "cut and cover" storage tanks with a maximum capacity of 840,000 gallons to store JP-8 (military-grade aircraft fuel) or Jet A-1 (commercial-grade aircraft fuel). If the fuel storage complex stores Jet A-1, then the fuel storage complex would also include a hazardous materials storage area to store the corrosion inhibitor, static dissipator, and fuel system ice inhibitor required to convert Jet A-1 to JP-8. An additive injector system/cart would be used to add the additives to the fuel. The fuel storage complex would also include an approximately 5,000 SF building and facilities with secondary containment measures for loading/unloading and parking fuel trucks.

The fuel storage complex would be designed and constructed in accordance with appropriate federal, and DoW regulations for petroleum fuel facilities, including Unified Facilities Criteria (UFC) 3-460-01, Petroleum Fuel Facilities which ensure that fueling facilities are constructed in a manner that prevents damage to the environment by accidental discharge of fuels or their vapors or residues. A Spill Prevention, Control, and Countermeasures (SPCC) Plan would be in place prior to operation. The fuel storage complex would include secondary containment measures, a leak detection system, and be constructed in accordance with appropriate structural and tropical requirements, including those outlined in UFC 3-301-01, Structural Engineering, and UFC 3-440-05N, *Tropical Engineering*.

An expeditionary fuel storage system would be used to provide fuel support during exercises prior to the completion of the permanent fuel storage complex. The expeditionary system would be located north of the runway in the vicinity of the apron and fuel storage complex (Figure 2-3) and include fuel storage with no single container being larger than 50,000 gallons, be composed of no more than six containers and would have a maximum capacity of 250,000 gallons. Any system would either be double wall or single wall provided with a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Any expeditionary fuel system would have authorized secondary containment for leaks and spills, be covered by an appropriate spill containment plan, leak detection methods, spill/overfill protection, emergency response procedures, fire protection measures and be in compliance with all applicable regulations and industry standards. Various types of expeditionary fuel systems would be brought in and then removed after each exercise. If Secondary Containment Aboveground Tanks (SCAT) are used, then rigid tanks and components would remain at the Airport within the proposed fuel system area and would be inspected as required by regulations and industry standards.

#### 2.5.1.5 Buildings and Training Support Areas

The Proposed Action includes the construction of up to 25,000 SF of general warehousing, a 3,000 SF airfield damage repair warehouse, and a 7,500 SF maintenance facility. The areas under and around the buildings would be concrete pavement.

The Proposed Action also includes up to 10 acres of training support areas for use during exercises. These areas would be improved surfaces of gravel and/or vegetation. Graveled areas

would be separated from adjacent grass/vegetation areas via appropriate barriers, as available, to contain the gravel and prevent it from spreading into other areas during activities such as driving vehicles and vegetation management.

The following capabilities could be established within the training support areas:

- Expeditionary Camp Area (approximately 4.5 acres): An area to support temporary lodging, messing, and other life-support functions for personnel.
- Airfield Operations Area (approximately 3.2 acres): A stabilized area for the management and support of airfield and aviation-related activities.
- Command and Control Area (approximately 5,000 SF [0.12 acres]): A space to support the setup and operation of mission command and control equipment and facilities.
- Fuel Storage Complex (approximately 1.8 acres): An improved-surface complex to enable the safe storage and handling of bulk fuels.

The buildings and training support areas described above would be constructed within the expanded Airport boundary and would be connected to existing utility infrastructure (i.e., water, sewer, electricity, and communications). Utility service could be supplemented by additional temporary capacity (e.g., generators, portable toilets, etc.) if necessary.

#### 2.5.1.6 Ancillary Facilities

**Fire Protection Water Systems.** In accordance with the requirements in Section 322 of the FY 2020 U.S. National Defense Authorization Act, the DoW is committed to eliminating the use of fluorinated Aqueous Film Forming Foam (AFFF). Therefore, AFFF would not be used for fire suppression at the improved Airport. A 144,000-gallon fire protection water system (non-potable water), fire hydrants, and diesel-powered pumphouse would be constructed for fire suppression at the aircraft parking apron. A 100-gallon diesel storage tank will be included in the pumphouse to power the fire protection water pump engine. The diesel storage tank will be double walled construction for spill containment. Additional fire suppression water systems would be constructed for the fuel storage complex and the 7,500 SF maintenance facility.

**Utility Connections.** The Airport receives electricity, non-potable water, and sanitary sewer service from YSPSC, and potable water from the Southern Yap Water Authority (SYWA) for the western half of the Airport (i.e., aircraft rescue and firefighting [ARFF] facility and associated fire hydrants). Communication services would be secured from FSM Telecommunications Corporation (FSMTC). Water from the SYWA is potable but the water from the YSPSC is considered non-potable according to U.S. Environmental Protection Agency (USEPA) standards for potable water. The construction contractor would require an average of approximately 80,000 gallons per day (GPD) of potable water and an average of approximately 60,000 GPD of non-potable water for construction.

To the extent practicable, the construction contractor would connect to existing utilities for construction and the utility connections and associated infrastructure (e.g., meters, transformers) would remain post-construction to support the military readiness activities. Electrical lines would be extended underground from the new airfield lighting vault at the Airport terminal to the runway extensions, taxiway, and aircraft parking apron to power NAVAIDs, signage, and MAAS. Electrical lines also would be extended underground from a 15 kilowatt (kW) power pole along the proposed community road to new transformers at the

proposed fire protection water pumphouse at the fuel storage complex. Electrical lines would also be extended underground from an appropriate location to the expeditionary camp area. The asphalt and concrete batch plants could be served by the electrical utility or an on-site generator. The total estimated power demand for the worker camp and asphalt/concrete batch plants is 2.1 megavolt amperes (MvA).

The construction contractor would tie into the SYWA water line near the ARFF and trench new potable water pipes to the proposed expeditionary camp area. Non-potable water pipes would be trenched underground or installed aboveground from the YSPSC water connection point near the south side of the runway to the expeditionary camp, and the proposed 144,000-gallon water tank for the fire protection water system at the pumphouse. The non-potable water pipes for the expeditionary camp (shower and latrine only) and the fire protection water systems would be trenched along the Airport-to-Seaport connector road and the replaced Seabee Flats Road. The non-potable water tanks would be filled over time so that full capacity is available upon demand.

Sanitary sewer service would be extended underground from a YSPSC's 8-inch line near the Airport terminal to the expeditionary camp area to collect sewage (e.g., shower, latrine, laundry, and kitchen water). A lift station may be necessary for the sanitary sewer extension. The proposed worker camp would generate an estimated 22,000 GPD (based on 110 gallons per worker per day).

The construction contractor would pay FSMTC to extend copper cable and fiber-optic cable underground along the proposed community road to the proposed fire protection water pumphouse at the fuel storage complex. Construction contractors would also install conduit under the road from the Airport to the Seaport for potential future use for fiber-optic cable.

**Stormwater Management Infrastructure**. The three main culverts underneath the runway would remain because they have sufficient capacity for the proposed improvements. The proposed stormwater management improvements includes the addition of inlets with grates, pipes, culverts, ditches, swales, inlet and outlet headwall structures, and stormwater detention and water quality ponds to the existing drainage system (Figure 2-4). These areas are included within the approximately 326 acres of ground disturbance associated with the Airport improvements. The ditches and swales would be lined with grass, turf reinforcement mats, or concrete to prevent erosion. Stormwater control would be based on FAA Advisory Circular 150-5320-5D, UFC 3-201-01, and UFC 3-210-10, Low Impact Development (LID). LID is an approach to managing stormwater runoff that mimics natural hydrology through infiltration, evaporation, and detention to reduce pollution and control flow, mitigating impacts from construction.

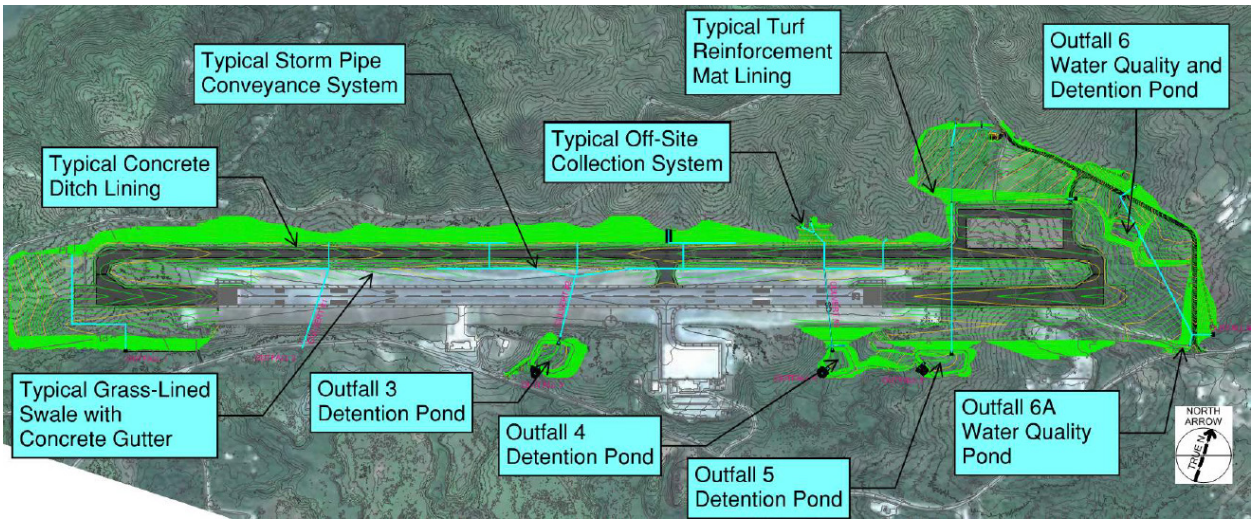



**Figure 2-4 Proposed Site Drainage Plan**

At the beginning of construction, the construction contractor would construct three stormwater detention ponds to detain peak discharge and two stormwater quality ponds to provide water quality treatment of the stormwater runoff associated with the runway extension, parallel taxiway, and aircraft parking apron. The stormwater detention ponds would be placed downstream of three major culverts crossing the runway (Figure 2-4) and have low-flow channels to allow the passage of base streamflow through the pond outlets, enabling continual flow that is vital for downstream vegetation. When storms come, the detention ponds would hold back stormwater and discharge runoff at lesser rates, in a controlled manner mimicking natural stream/floodplain conditions. The detention ponds will reduce post-development flow to less than pre-development flows for the 2-year through 100-year storms.

The stormwater quality basins would be located at the east end of the proposed runway extension (Figure 2-4) and would address multiple stages of stormwater detention where runoff from smaller storms would be detained for longer durations to promote settlement of sediments and water quality enhancement. The stormwater would be detained for up to 40 hours in these ponds to allow for optimum settling of suspended solids but limit ponding duration to less than that required by mosquito and other vector breeding as well as hazardous wildlife (i.e., wildlife that pose hazards to Airport operations).

The construction contractor would construct a stormwater detention pond and drainage swales with intermediary berms for stormwater runoff control associated with the warehouse areas. The stormwater would be detained for up to 40 hours. The proposed roads would be slightly sloped to drain stormwater to grade or stormwater drainage structures, as applicable. The Airport Stormwater Protection Report (Appendix D) provides additional detail on the proposed stormwater management improvements.

**Fencing.** The Proposed Action includes demolition of portions of the existing airfield perimeter fence (16,500 ft) and installation of new fencing (28,000 ft) to surround the airfield perimeter and separate fencing to enclose the warehouse areas, expeditionary camp area, airfield operations area, fuel storage complex, fire protection water systems, and associated generators. The new chain-link fencing would be a minimum of eight feet tall, including barbed wire outriggers, and

would include gates in appropriate locations. The ground disturbance for fencing removal and installation would be considered part of the project area site preparation, clearing, and grading effort.

**Construction Staging, Batch Plants, and Worker Camp.** Approximately 80 acres of relatively flat, useable space is required to support construction activities, including staging areas, a concrete batch plant, an asphalt batch plant, vegetation handling area, topsoil handling area, and a worker camp to house construction workers. Some of the construction support areas would be located within the proposed expanded airport boundary; however, some additional nearby areas would also be required (Figure 2-5).

The asphalt and concrete batch plants would likely be located in the northeast section of the proposed Airport boundary. Both the concrete and asphalt batch plants are expected to have a capacity of 100 cubic yards per hour and would be required to meet the substantive requirements of the U.S. Clean Air Act.

Construction of the proposed Airport improvements would require a substantial amount of vegetation removal, and therefore, the construction contractor would be required to develop and implement a Biomass Management Plan at least 30 days prior to the start of land clearing. The vegetation and soils handling areas would support the implementation of this plan which would address both timber management and green and brown waste management, use, and disposal. The Yap Department of Forestry or designated biologist would mark large diameter trees for timber harvest and smaller or less desirable tree species for salvage as firewood. Green and brown waste would be chipped or composted, and the stockpiles will be managed in accordance with the Biomass Management Plan and biosecurity protocols.

Construction support areas located within the proposed Airport boundary would likely be reused following construction for training support buildings and areas as discussed in Section 2.5.1.5. The construction support areas located outside the proposed Airport Boundary would be returned to the respective landowners in accordance with the respective agreements with the landowners.

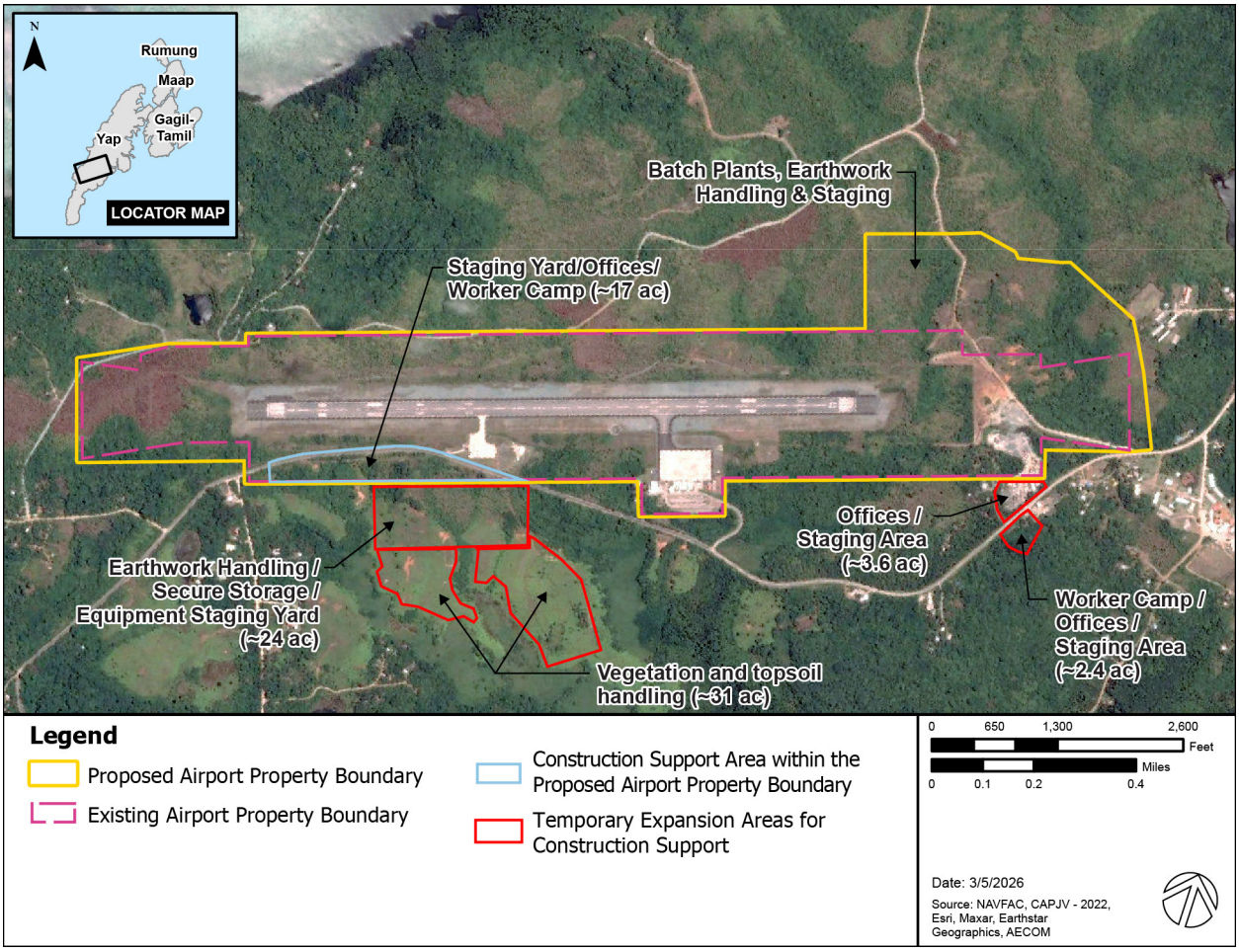



**Figure 2-5 Construction Support Areas**

### 2.5.1.7 Roads

The construction contractor would remove a portion of the existing unpaved, deteriorated, one-lane community road (i.e., one lane for both directions) that is east of the airfield within the area of the proposed runway extension and aircraft parking apron and replace it with a new, asphalt paved, two-lane Seabee Flats Road (i.e., one lane in each direction) that extends east of this area. Proposed demolition includes removing a portion of the existing unpaved Seabee Flats Road (approximately 3,300 ft of roadway). Additionally, a few private property buildings would require demolition at the intersection of the Seabee Flats Road and the Airport-to-Seaport connector road. Proposed construction includes grading and preparation of the roadbed and laying asphalt pavement for the proposed new two-lane Seabee Flats Road (approximately 3,300 ft long and 28 ft wide [24 ft two-lane road and 2 ft shoulders]). The new Seabee Flats Road tapers from a two-lane to a one-lane road at its northern terminus. See Figure 2-6 for proposed road improvements.

Access roads would connect the new Seabee Flats Road with gated access to the aircraft parking apron, fire protection water storage/pumphouse facilities, and the fuel storage complex. The asphalt pavement access roads would have a width of 28 ft (24 ft two-lane road and 2 ft shoulders).

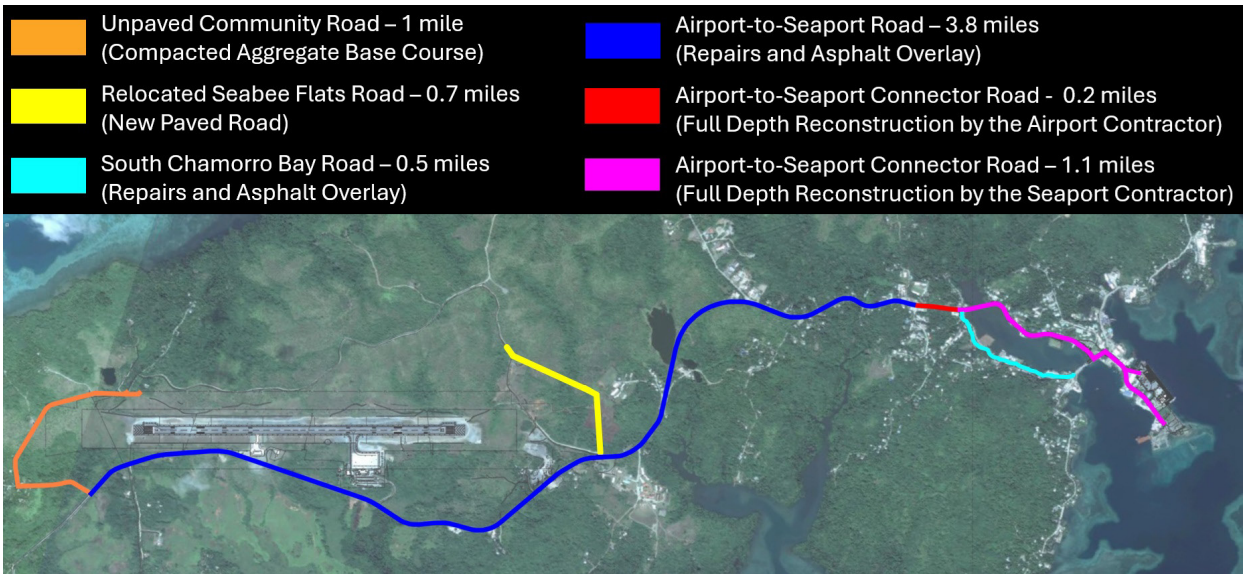



**Figure 2-6 Proposed Roadway Improvements**

Three one-lane maintenance roads (not shown in Figure 2-6) with turnaround areas would be constructed to provide access to the stormwater drainage structures (Figure 2-4). The 15-ft-wide maintenance roads would consist of a crushed aggregate base course sprayed with an asphalt binder.

The existing unpaved community road to the west of the airport would be improved (i.e., compacted aggregate base course) from its intersection with the Airport-to-Seaport connector road to the north side of the Airport boundary (approximately one mile).

The Airport construction contractor would improve the Airport-to-Seaport connector road from the community road to the west of the airport to the eastern edge of Chamorro (i.e., Aces Mart 2), a distance of 3.8 miles. The majority of this roadway would be repaved (i.e., overlayed with asphalt pavement). The approximately 1,000 feet nearest to Chamorro Bay would be improved via a full depth reconstruction. The remainder of the Airport-to-Seaport connector road improvements from Chamorro Bay to the Seaport would be completed as part of the Seaport construction project (See Section 2.5.3.5).

All of the improved roads would be used as construction haul routes and repaired if damaged during construction use. Yap State would resume its repair and maintenance responsibilities for these roads after their use as construction haul routes, however, designation as a defense site would allow DoW to make future repairs if determined to be necessary by DoW and could allow DoW to contribute toward the cost of maintenance and repair.

### 2.5.1.8 Earthwork and Change in Impervious Surface

Construction would require clearing/grubbing, grading, trenching, excavating, and filling within the project area. The construction contractor would be required to follow an Erosion and Sediment Control (ESC) plan to minimize potential erosion and sediment laden runoff from the site. Construction would disturb about 265 acres within the proposed airport boundary and approximately 61 acres of additional construction support areas outside the proposed airport boundary for a total of 326 acres of disturbance. The disturbed areas would either be

developed (e.g., warehouse), resurfaced with cover material (e.g., pavement, gravel), or revegetated with local grasses after construction is completed (areas not covered by new impervious surfaces or gravel to support future uses). The earthwork includes approximately 80,000 ft of trenching, and three million cubic yards of earthwork to be balanced on site. The earthwork is required to meet maximum allowable runway grade and runway safety area requirements. The general grading concept is to excavate material along the north side of the runway to construct the new taxiway and apron, and to place suitable cut material as fill along the south side of the runway (see Figure 2-7). Disturbed areas would be stabilized as soon as possible after the final grade or earthmoving has been completed within that section of the project area. Finished slopes would generally be three horizontal units to one vertical unit (3H:1V), with some steeper portions. All slopes 3H:1V and steeper will be protected with erosion control blankets and all areas disturbed other than paved and hard surfaced areas will be revegetated. Shallower slopes and flat areas would comply with standard erosion control measures. In accordance with Yap Environmental SOPs, the construction contractor would be required to implement an erosion and sediment control plan with best management practices to prevent erosion and sedimentation.

New paving will comprise approximately 40 additional acres of impervious surface (e.g., runway extensions, overruns, taxiway, aircraft parking apron, fuel storage complex, fire protection water pumphouse facility, Seabee Flats Road, and access roads). Stormwater from the majority of these areas will pass through one of five new stormwater detention ponds.

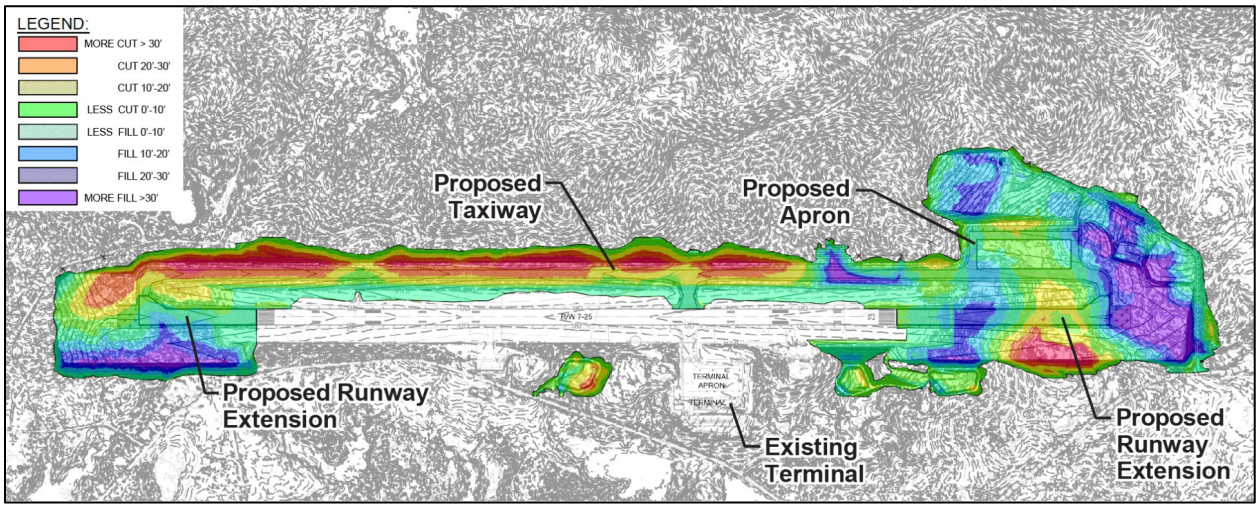



**Figure 2-7 Proposed Cut and Fill Areas**

### 2.5.1.9 Construction Activities and Assumptions

**Construction Workers, Housing, and Transportation.** Up to 200 construction workers would be on-site at any one time with some additional support staff (i.e., archaeological and biological monitors). The construction workers would be sourced from Yap and other areas within the FSM to the extent available. U.S. and/or foreign construction workers would likely make up the difference.

Construction workers from Yap would be expected to be housed in their homes, whereas construction workers from outside of Yap would be accommodated at a temporary

construction camp within the expeditionary camp area or another area within the immediate vicinity of the airport with the possible exception of some supervisors who might rent private accommodations. The construction contractor would be responsible for providing food, health services, solid waste management, electricity, potable and non-potable water, and sewage services at the construction camp and implementing required plans for the temporary construction camp.

Construction workers from Yap (estimated at 20% of the construction workforce) would commute daily to the project area in personal vehicles (estimated to be 20 to 40 vehicles), whereas foreign construction workers would generally stay on the construction site and shuttle to/from the worker camp and active construction site. In addition to worker travel, construction activities would generate additional traffic to and from the project area due to delivery of materials as well as other miscellaneous trips by inspectors, project managers, and other personnel visiting the project area. The average number of daily trips associated with deliveries and miscellaneous trips is estimated to be one round trip for every 25 workers on site, or eight round trips for 200 construction workers. Therefore, it is estimated that approximately 40 construction commuters and eight construction-associated vehicles would enter and exit the project area each day during construction. These vehicles would park within the 326-acre area of disturbance.

**Solid Waste.** Municipal solid waste (i.e., trash) would be collected by a local contractor during construction. Construction and demolition (C&D) waste from the proposed Airport improvements would include approximately 3 acres of asphalt pavement (overruns, turnarounds, community road) and 0.01-acres of structures would be removed. The Proposed Action also includes demolition (and replacement) of portions of the existing airfield perimeter fence (15,900 linear feet). These materials would need to be reused on-site (e.g., as fill for the Airport improvements), directed to an approved C&D waste disposal area, recycled, or shipped off island due to limited landfill capacity. Metal waste would be offered to Yap-based recyclers or shipped off island for recycling. The airport project includes a large area for collecting and composting green waste generated by construction activities that would subsequently be used as a soil additive to improve soil structure, fertility and water retention. All hazardous waste encountered during demolition and construction would be placed in appropriate temporary storage and shipped off island for disposal. All other items would be transported to the Yap main public landfill for disposal in coordination with the landfill operator. The construction contractor must have a backup plan for its solid waste if the landfill operator cannot receive it.

**Construction Utilities.** To support construction, the construction contractor would use electricity from YSPSC and diesel-powered generators as necessary, use potable water from SYWA, and draw non-potable water from the reservoir (fresh water) approximately 1.4 miles east of the Airport entrance along the Airport-to-Seaport connector road for construction period water (e.g., potable water for the worker camp and batch plants, and non-potable water for dust control). The construction contractor would need to provide backup potable water systems in the event Yap utility providers are unable meet demands, including during periods of drought. Additionally, the construction contractor would use sanitary sewer services from the YSPSC or rent portable toilets. The construction contractor would be responsible for utility

metering and use costs and would obtain approval (e.g., water right or permit) from the Yap State Environmental Protection Agency (EPA) to withdraw water from the reservoir.

**Equipment and Materials.** The DoW would use locally sourced construction equipment and materials to the extent available and would have foreign-sourced construction equipment and materials transported to Yap. Typical construction equipment at the airport would include but not be limited to chain saws, excavators, dump trucks, graders, backhoes, loaders, rock crushers, auger drills, compactors, water trucks, pavers, and concrete and asphalt batch plants. All construction equipment would be required to be capable of operating within applicable emissions standards. It is assumed that the majority of construction equipment and materials would need to be shipped to Yap from areas outside of the FSM such as the Philippines and Guam. Foreign-sourced construction equipment and materials would generally arrive by barge or commercial cargo carrier at the Seaport. It is estimated that airport-related construction aggregates would be shipped to Yap in approximately 40 barges from the Philippines (or other location determined by the construction contractor) over the course of the 6.5 years of construction. An additional 6-8 barges (likely from Guam) would be used to bring earthmoving equipment, prefabricated components, batch plants, etc. and then return to move some of the materials back to Guam at project completion. As appropriate, construction equipment and materials would be biosecurity inspected according to biosecurity procedures agreed upon by FSM and DoW (e.g., inspection and certification at point of origin, inspection and testing by FSM Quarantine Services at the Seaport, compliance with FSM import conditions, remediation if needed). The construction contractor would facilitate biosecurity inspections at the Seaport. Construction materials would be trucked from the Seaport to the project area via the proposed haul route. All construction laydown areas would be within the 326-acre area of disturbance.

The construction contractor would set up and use a concrete batch plant and an asphalt batch plant, temporary fuel area, equipment and material laydown area, and vehicle parking within the 326-acre area of disturbance to support construction. The concrete batch plant would require potable water (to be obtained from YSPSC or SYWA) and a 100-kilowatt diesel generator. The asphalt batch plant would require diesel fuel for the rotary drum dryer (approximately 15 million British thermal units per hour) and hot-oil heater (approximately 1 million British thermal units per hour) and a 150-kilowatt diesel generator to operate the plant. The construction contractor would be allowed to operate 24 hours per day, 7 days per week, except during regularly scheduled commercial and cargo flights. It is assumed that the concrete and asphalt batch plants would operate an average of 10 hours per day, 7 days a week during construction during peak construction phases. A dust control plan would be followed for construction, including operation of the concrete and asphalt batch plants.

### 2.5.2 Airport Post-Construction Activities

The Airport would continue to be controlled by Yap State with continued primary use by local users (e.g., private, commercial, and government entities). The U.S. DoW anticipates conducting one to two military training events per year, which may involve either or both the Airport and Seaport. Each training event could last up to 14 days (inclusive of set-up and tear-down), or a total of up to 28 training days per year involving up to approximately 200 military service members. No permanent personnel, full-time aircraft basing, munitions use, or airspace modifications are included in the Proposed Action.

#### 2.5.2.1 Training Activities

DoW training activities would be coordinated with FSM and Yap State authorities to minimize potential impacts to commercial activities at the Airport and Seaport. DoW training activities at the Airport could include multi-nation joint exercises that simulate combat operations, peacekeeping operations, and military-to-civilian HADR operations. There would be up to 15 DoW flights per day with aircraft activities occurring during the day and less frequently at night. Nighttime training and activities would be pre-coordinated with FSM and Yap State and are assumed to be less than 10% of total aircraft activities. These training exercises would improve the strategic, operational and tactical advancement of the DoW and its allies. These potentially semi-annual exercises may include any mix of cargo, tanker, and fighter aircraft. Multi-nation exercises may also involve periodic influxes of new aircraft types and potential changes to flight paths. Training activities originating from the Airport would be outside the FSM territorial jurisdiction, i.e., 12 nautical miles from shore, except for some minor air maneuverings such as short field takeoff and landing, touch and go operations, or airspace control. Should future military training be desired within the FSM territorial sea and its airspace, the U.S. would respect FSM's sovereignty and adhere to customary international maritime law and coordinate on any activity in FSM's territorial sea consistent with Article II of the Status of Forces Agreement between the U.S. and FSM.

HADR training, and other contingency response training would include several weekly landings of aircraft (e.g., Boeing 737-800 and larger cargo aircraft). It could include joint exercises with Yap State and FSM government agency counterparts and could include island wide activities involving seaport assets.

#### 2.5.2.2 Personnel Support

**Transient Lodging.** Up to 200 personnel would train and live at the Airport during each training exercise. During training exercises, military personnel may assemble, use, disassemble, and store modular, expandable, fabric-covered shelters and canvas tents (referred to hereafter as an expeditionary camp). The shelters and tents would be stored in proposed facilities at the Airport. In addition to the modular shelters, the expeditionary camp includes water distribution lines, latrines, showers, food service areas, lighting, and emergency generators. All ground activities at the Airport would occur within the areas designated as the Defense Site. In general, training exercise-related personnel would live at the expeditionary camp during exercises. However, there may be occasions where some training-related personnel may stay in local hotels during smaller exercises if they would not adversely affect the tourism industry.

**Flight Crew.** The ground activities for flight operations include changing air crews and refueling aircraft. For flight operations, all or some personnel may be housed at local hotels if available, in which case the expeditionary camp would not be used by those personnel. This would be precoordinated with Yap State authorities to ensure it does not compete with the tourism market.

**Utilities.** Based on a potable water requirement (i.e., drinking, personal hygiene, and food preparation) of approximately 55 gallons per person per day and a non-potable water requirement (i.e., showers and latrines) of 55 gallons per person per day an onsite exercise party of 200 persons, a total of approximately 11,000 GPD of potable water and 11,000 GPD of non-potable water would be needed for active training (up to 28 days per year). Potable water

would be obtained from the SYWA connection and non-potable water would be obtained from the YSPSC connection and both would be stored in appropriately sized ASTs, if necessary, for use at the expeditionary camp. Approximately 16,400 gallons per day of wastewater (e.g., shower, latrine, and kitchen water) would be discharged to the YSPSC sanitary sewer at the Airport.

The primary source of power during training exercises and flight operations would be electrical lines installed by the construction contractor. During emergencies, DoW personnel would use three 60-kilowatt emergency generators (diesel/JP-8-powered, 34.7-gallon fuel capacity with a 10-hour run time) and three 72-kilowatt ground power units (diesel/JP-8-powered, 46-gallon fuel capacity with an 8-hour run time). Oil and lubricants for the generators and ground power units would be stored in a hazardous materials cabinet.

**Warehouses and Maintenance Facility.** The warehouses and maintenance facility would be managed by a local contractor for cleaning and maintenance. The warehouses and maintenance facility would provide space for secure storage and aircraft maintenance to be utilized during the proposed Airport training exercises.

**Municipal Solid Waste.** Municipal solid waste (i.e., trash) generated on-island would be collected by a local contractor during and at the completion of each training exercise and flight operation, as applicable. All items that can be recycled would be separated and transported for recycling. All other items would be transported to the Yap main public landfill for disposal. However, international solid waste originating from visiting aircraft would be returned to Guam or another airport for disposal.

#### 2.5.2.3 Fuel Management and Use

The DoW would retain a local contractor to truck aviation fuel (i.e., JP-8 or Jet A-1) from the Seaport to the fuel storage complex using fuel trucks with 6,600-gallon storage tanks. Assuming five percent headspace for the fuel storage complex storage tanks and the fuel trucks, it would take approximately 128 truck roundtrips to fill the 840,000-gallon fuel storage tanks and 37 truck round-trips to fill the maximum capacity of the 250,000-gallon expeditionary fuel storage containers. If shipped by containers, it would take approximately 5-6 truck trips to supply the fuel for the expeditionary fuel system. The fuel storage complex would be used for fueling the aircraft, emergency generators, and ground power units.

Fighter aircraft would be fueled on the aircraft parking ramp via fuel trucks, whereas heavy aircraft would be fueled via the fuel hydrant pits in the aircraft parking apron (i.e., aviation fuel would flow through underground pipes from the fuel storage complex to the fuel hydrant pits). In the unlikely event that the aircraft parking apron would be constructed before the fuel storage system, then all aircraft would be fueled by fuel trucks.

A fuel hydrant dispenser, such as a fuel truck owned by a local fuel servicing company or the DAF, would be used to transfer the aviation fuel from the fuel hydrant pits to the heavy aircraft. It is assumed that one fuel hydrant dispenser would be sufficient, it would run on diesel fuel, and any DAF fuel hydrant dispensers would be stored in one of the proposed warehouses when not in use.

When YSPSC-provided electricity is unavailable, DoW personnel would use a fuel truck to collect JP-8 from the fuel storage complex to fill the three 60-kilowatt emergency generators and three ground power units.

The DAF would hire a local contractor to fill the diesel ASTs associated with the fire protection water systems. Secondary containment would be used during diesel fuel transfer. Both fire protection water systems would be tested once a year, and the test water would be discharged to the ground.

The safe, efficient, and economical operation of petroleum storage, distribution, and dispensing systems depends largely on an effective and proactive recurring maintenance program. For fuel infrastructure operation and maintenance, U.S. DoW would follow UFC 3-460-03, *Operation and Maintenance: Maintenance of Petroleum Facilities*; DAF Technical Order 37-1-1, *General Operations and Inspection of Installed Fuel Storage and Dispensing Systems;* AFI 23-201, *Fuels Management*; DAFMAN 32-1067, *Water and Fuels System*. Fuel tanks would be inspected monthly and annually. DoW personnel would enter the inspection results into the DAF database of record (i.e., STAR) no later than 14 calendar days after the end of the month in which the inspection was performed to document fuel tank condition and identify maintenance requirements (e.g., corrosion, control). Prior to operation of any fuel tank, an SPCC Plan would be developed to prevent the discharge of aircraft fuel and other stored oil products associated with the Proposed Action into navigable waters or adjoining shorelines. The SPCC Plan would require secondary containment, spill/overfill protection measures, leak detection monitoring and meeting other requirements outlined in regulations and industry standards.

**Fuel Use for Training Exercises.** The estimated fuel use during a 14-day training exercise for up to 12 fighters, 2 tankers, and 1 cargo aircraft per day is approximately 1,485,000 gallons of fuel. Based on two 14-day training exercises per year approximately 2,970,000 gallons of fuel would be used annually for aircraft activities during the training exercises.

**Fuel Use for Flight Operations.** For flight operations, it is assumed that the Boeing 737-type aircraft would be completely refueled each time they land. Based on five aircraft per month and an internal fuel capacity of approximately 75,000 gallons per aircraft, it is estimated that fuel use would be a maximum of approximately 375,000 gallons per month, which is 4,500,000 gallons annually.

**Maximum Fuel Use per Month.** The maximum monthly fuel use during a 14-day training exercise consisting of 12 fighter, two tanker, and one cargo/tanker aircraft would use approximately 1,485,000 gallons of fuel for the aircraft. Additionally, flight operations would use approximately 375,000 gallons of fuel each month. The total fuel used in that month would be approximately 1,860,000 gallons.

#### 2.5.2.4 Biosecurity

All cargo, equipment, containers, and vehicles associated with the military readiness activities would be required to meet the Armed Forces Pest Management Board Technical Guide No. 31 (AFPMB TG-31) cleanliness standards prior to arrival, prior to interisland movement, and prior to departing the FSM via military or commercial conveyances to ensure items are devoid of biological material (e.g., invertebrates, vertebrates, plant material including seeds) and soil (e.g., dirt, mud, sand, and gravel). Once offloaded from sovereign aircraft or vessels, cargo,

equipment or containers may be inspected. Items not meeting AFPMB TG-31 standards would be quarantined in a temporary biosecurity area throughout the duration of the military readiness activity or until necessary mitigation (e.g., washing, treatment) is conducted and the item passes inspection. The DoW is coordinating with FSM and Yap State to ensure mutually acceptable biosecurity procedures.

Hazardous materials and hazardous wastes associated with biosecurity treatment (e.g., pesticides, wash water treatment) would be stored at one of the general warehouses. The hazardous wastes would be periodically packaged, manifested, and transported off island for proper disposal.

### 2.5.3 Seaport Improvements

Proposed Seaport improvements are provided in Sections 2.5.3.1 through 2.5.3.6. In the context of this EIS, "Seaport improvements" is an umbrella term for all related components including wharf improvements, harbor and channel dredging, ATON installation, roadway improvements, worker camp, and dredge material disposal.

A separate DoW project is underway adjacent to and east of Seaport for the U.S. Navy Seabees that is unrelated to the Proposed Action and not analyzed in the EIS. This is a small compound consisting of two pre-fabricated buildings and hard stand area for Seabee construction equipment support for Yap State.

#### 2.5.3.1 Wharf Improvements

The existing wharf is an 825 ft long infill marginal wharf first constructed in 1982 and extended in 1991. The 1982 wharf was approximately 450-ft long, with the first 300 ft (starting from the easternmost end) consisting of a combi bulkhead wall with tie backs (i.e., a combination of large steel king piles interconnected by steel sheet piles). The king piles are socketed into bedrock. The remaining 150 ft consists of a sheet pile bulkhead wall with tie backs. The 1991 expansion to the west was approximately 375 ft long and consists of a steel sheet pile bulkhead wall with tiebacks. Both wharfs are topped with a concrete deck that extends approximately 65 ft inland from the face of the wharf. The 1991 extension also included a 33-ft wide roll-on/roll-off (RO/RO) ramp on the east end to accommodate landing craft vessels. The typical bulkhead elevation along existing wharf edge is at Elevation +8.9 ft above MLLW. Typical water depths at the existing bulkhead vary in elevation from -31.0 ft to –38.0 ft MLLW along the length of the wharf.

The Proposed Action at the wharf includes demolishing existing buildings and infrastructure and construction of a new berth (Figure 2-8). Major proposed improvements include:

1. Demolish the abandoned tuna warehouse and install a new storage and rinse down area
2. Reconstruct the existing wharf deck and repair the existing bulkhead
3. Construct a new mooring/breasting dolphin
4. Construct a new pile-supported wharf to extend the existing wharf by 460 ft
5. Install new fencing and gates to create a secure perimeter
6. Install general site and infrastructure improvements

Details of the proposed wharf improvements are described in Table 2-5.

**Table 2-5 Proposed Improvements to Yap Seaport**

| *Improvement* | *Description* |
|---|---|
| Demolition of the abandoned Tuna Warehouse and Provision of a Rinse Down Area and Additional Storage Area | The abandoned tuna warehouse (approximately 21,400 SF) will be demolished and replaced with a new pavement to create a rinse down area and additional storage area. The 35 ft by 80 ft rinse down area will be located south of the existing wharf deck. South of the rinse down area will be a paved area (approximately 28,200 SF) that can be used for storage or other purposes. |
| Replace the Wharf Deck and Increase Elevation | The existing pavements as well as the damaged wharf concrete slab would be removed. Imported fill would be used to elevate the wharf deck from its existing elevation of +8.9 ft MLLW to its proposed elevation of +9.5 ft MLLW. Site grading will be performed to tie in the increased wharf elevation to the surrounding site elevations. The existing wharf will be retrofitted with a single crane pad able to accommodate a 110-ton mobile crane. |
| New Pile-Supported Wharf | A new, pile-supported wharf would be constructed to extend the existing wharf. The new wharf structure would consist of approximately 271 steel pipe piles (102 temporary and 169 permanent) driven over approximately 111 days (an average of 2.4 piles per day), reinforced concrete caps, and a composite deck constructed of precast panels and cast-in-place concrete. The new pile-supported structure would include curbs, lighting foundations, and a seismic joint between the new pile-supported wharf and the reconstructed wharf deck. The seismic joint would allow for movement between the wharf deck and pile-supported wharf to help to prevent damage from an earthquake. Proposed pile sizes include 24- and 36-inch steel pipe piles. Vibratory and impact hammer pile drivers as well as rotary drilling are proposed for installation. Typically, the piles would be initially driven with the vibratory pile driver until the pile can be driven no further. The impact hammer is then utilized to finish driving the pile to the design depth. |
| New Mooring Dolphin | A new mooring dolphin would be constructed in water approximately 55 ft west of the existing wharf deck. It would consist of 12 steel piles (included in the 271 piles above) with cast-in-place concrete pile caps. The mooring/breasting dolphin would be an approximately 30 ft by 45 ft rectangle. It would match the reconstructed wharf deck elevation and would be connected to the wharf deck by a four ft wide catwalk. |
| New Bollard and Fender System | The existing fenders and bollards will be removed and replaced. |
| Fencing and Security | The security gate and booth south of the abandoned tuna warehouse will be relocated and replaced 30 ft northward to provide room for a paved entrance road that connects to the main Airport-to-Seaport connector road. A new gate will be constructed at the east end of the wharf extension. Additional fencing would be installed adjacent to the east gate to assist with controlling access to the site. |
| Temporary Construction Worker Camp | Temporary construction worker camp for up to 75 workers near the Yap Sports Complex (approximately 2 acres) during construction. |
| Electrical Service | All electrical feeders, power/control panels, exposed conduits, wires, lighting fixtures, lighting devices, power equipment/devices, and service feeders, generators, and associated equipment in and around the tuna warehouse would be removed and disposed of. Electrical improvements would include a new transformer, meter, main breaker, distribution panel board, lighting control panel, and new service connections to the security booth panel. Eight new high mast light emitting diode (LED) lights, poles, and pole bases would be installed. Each high mast feature would include a 50 ft pole with six LED fixtures on a retractable fixture system. |

| *Improvement* | *Description* |
|---|---|
| Site Grading and Drainage | Four catch basins would be installed on low spots along the wharf to collect stormwater. Stormwater would be piped from the wharf extension, routed to the southern (landside) wharf edge, and discharged to a stormwater basin constructed for the Airport-to-Seaport connector road toward the southeast. The catch basins contain a catch basin filter with total suspended solids (TSS) and hydrocarbon removal capabilities that would act as a pretreatment before being discharged into the stormwater basin. A flow splitter box would be placed before the stormwater basin to control flows greater than the water quality design flow.<br><br>Slotted drains would be installed to mitigate existing ponding issues. The slotted drains would capture the stormwater and direct it through a new pipe to a new water quality treatment system, with an oil-water separator, in compliance with local and Navy requirements. After treatment, the stormwater would be discharged to a rock revetment adjacent to the wharf. A duck bill check valve would be placed at the exit of the pipe to prevent tidal backflow. A U-shaped headwall would be constructed at the outfall within the rock revetment to protect the check valve. Stormwater on the ramp between the existing wharf and the wharf extension would sheet flow down to the existing wharf and into the drainage system.<br><br>Stormwater within the storage area will drain into a catch basin at the center of the open paved area. Stormwater within the drive-through rinse down area will flow into a trench drain, aided by 2.0% slopes along the adjacent pavement. Pipes from both inlets would direct water westward from the area and ultimately through the new oil-water separator to be installed during the existing wharf rehabilitation. |
| New Harbor Access Road | The existing asphalt access road would be replaced with a concrete road between the proposed new RO/RO ramp and the existing Seaport access road intersection. A new bioswale would be constructed paralleling the new access road segment in accordance with the substantive standards of the U.S. Clean Water Act. |
| Water, Electrical, Sanitary Sewer, and Fuel | At the Seaport and vicinity, the construction contractor would use up to approximately 15,600 GPD of potable water for the concrete and asphalt batch plants, 19,000 GPD of non-potable water for dust control, and generate approximately 3,000 GPD of wastewater. At the worker camp and vicinity near the Yap Sports Complex, the construction contractor would use approximately 5,400 GPD of potable water, 8,000 GPD of non-potable water, and generate approximately 4,500 GPD of wastewater (to be treated via an on-site septic system/leach field). These volumes have been discussed with YSPSC and are within its capacity to accommodate. Non-potable water will be required for fire suppression (also provided by YSPSC if available). The peak electrical load, assuming all sites were connected at the same time, would approach approx. 1.0 MvA which YSPSC has indicated it can accommodate.<br><br>There are no permanent potable water, sanitary sewer, or fuel utility improvements proposed for the Seaport. |

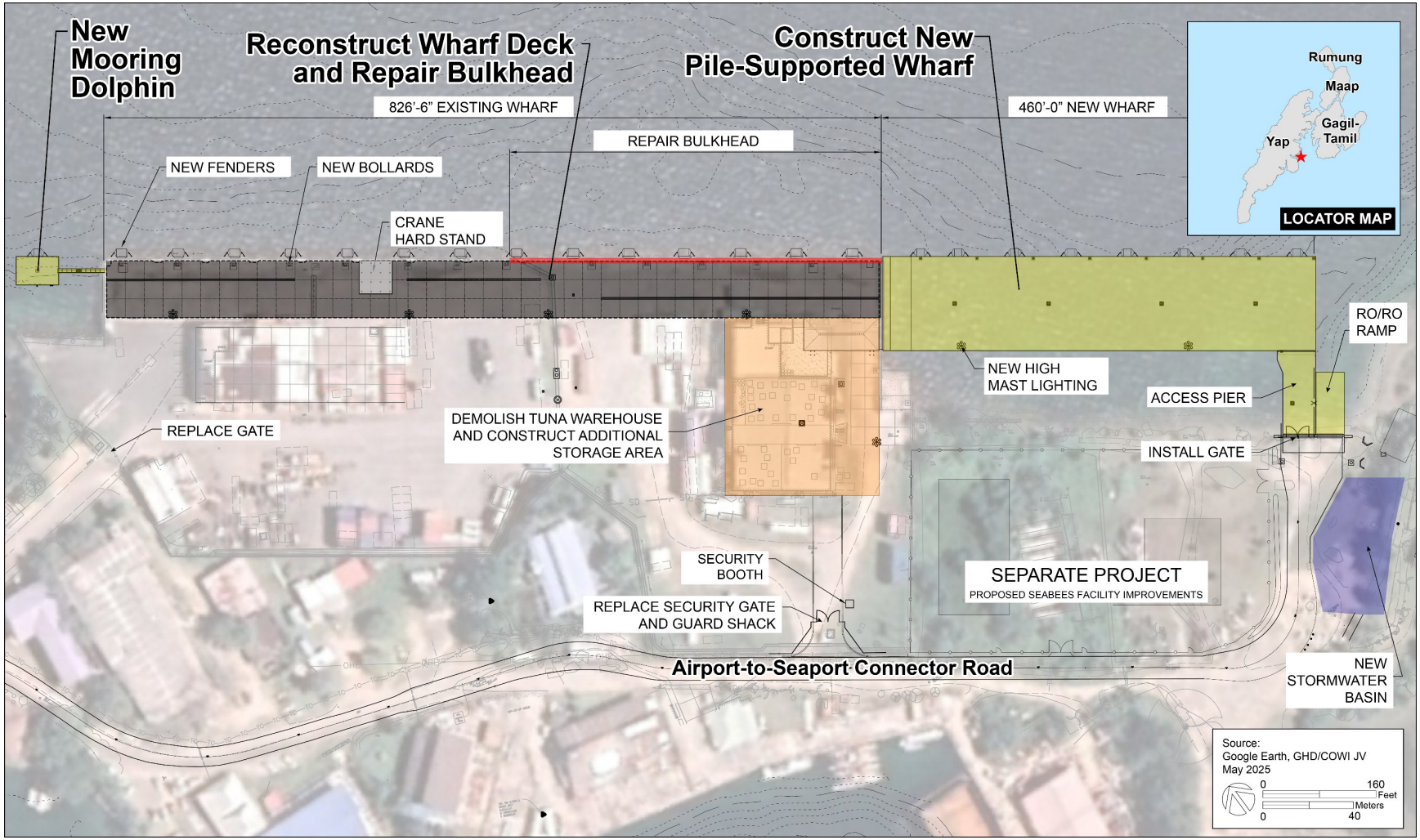



**Figure 2-8 Yap Seaport Wharf Improvements**

#### 2.5.3.1.1 Construction Logistics

Construction for the seaport improvements is expected to take approximately three years to complete, with construction estimated to start in mid-2027. Aggregate for the proposed improvements would come from regional locations like Guam or the Philippines. Other construction material and equipment for the new wharf (e.g., fill, aggregates, concrete, steel, etc.) will likely be acquired from regional sources. Materials and equipment would likely be shipped to, and offloaded at, the Seaport and then transferred via trucks and trailers to nearby staging areas, batch plants and construction yards. It is estimated that Seaport-related construction aggregates and equipment would be shipped to Yap in approximately 30 barge loads over the course of the three-year construction period. Additional equipment and supplies may arrive through scheduled commercial service. Barges would also be needed to move construction equipment back to Guam at project completion. These shipments would be closely coordinated with DPW&T's Division of Sea Transportation, and the wharf construction manager to minimize disruptions to port operations and new wharf construction activities.

#### 2.5.3.1.2 Proposed Demolition

The Proposed Action includes the following demolition activities:

- Removal of debris, signs, and bollards
- Removal of asphalt and concrete pavements
- Excavation of fills and backfill
- Cutting and/or drilling reinforced concrete
- Demolition of the abandoned tuna warehouse (approximately 21,400 SF)
- Removal of existing fenders, bollards and existing damaged wharf concrete slab

Work plans would be developed to establish procedures for careful removal and disposition of any salvageable materials. Applicable U.S., FSM, and Yap State regulatory and safety requirements would be followed, including local hauling and disposal regulations and safety requirements. The demolition process may encounter hazardous materials including asbestos containing materials (e.g., fuel pipe gaskets, and vinyl tile mastic); lead (e.g., paint and utility poles); material potentially presenting an explosive hazard (MPPEH), and soil containing total petroleum hydrocarbons. Hazardous material abatement would occur prior to demolition activities. Abatement activities would be performed by a qualified subcontractor that is licensed to perform hazardous material abatement. Abatement efforts would comply with applicable requirements. All hazardous waste would be placed in temporary storage/containment and shipped off island for disposal at an acceptable facility.

Demolition materials would be reused or recycled where practicable to reduce the volume of debris being disposed of at the Yap Main Public Landfill. Metal waste would be offered to Yap based recyclers or shipped off island for recycling. Inert materials including concrete rubble and clean soils would be utilized as fill at the Nungoch land reclamation site.

Demolition debris that cannot conveniently be reused or recycled would be disposed of at an approved construction and demolition waste disposal site, in accordance with applicable laws and standards. Controls will ensure the construction waste haulers observe best management

practices to avoid and/or minimize disruption to vehicle traffic patterns (e.g., traffic controls, time-of-day restrictions, employment of best management practices to ensure debris and associated dust is controlled, etc.).

#### 2.5.3.2 Construction Period Wharf Operations

To maintain uninterrupted commercial operations at the Seaport, utilization of the existing wharf would be necessary during construction. Phasing and sequencing of the proposed wharf would provide for continuous Seaport operations, with limited disruption, throughout project construction. The general construction sequence with respect to wharf availability follows:

1. The pile-supported wharf and mooring dolphin would be constructed first. During this time the full length of the existing wharf berth would be available for Seaport operations.
2. Next, the eastern half of the existing wharf would be improved. During this time the newly constructed pile-supported wharf and the western half of the existing Seaport wharf would be available for Seaport operations.
3. Lastly, the western half of the existing wharf would be improved. During this time the improved eastern half of the existing wharf and the new pile-supported wharf would be available for Seaport operations.

Throughout construction, the construction contractor would work closely with the Seaport Manager to coordinate construction activities with Seaport operations.

The Seaport Manager would be responsible for preparing, funding, and executing a comprehensive maintenance program to ensure the new wharf and navigational improvements reach their estimated design life (50 years). The maintenance program would include short, mid-, and long-term efforts to avoid or minimize deferred maintenance backlogs exacerbated by harsh tropical conditions. As a Defense Site, DoW would be able to seek sustainment funds to assist with Seaport improvements maintenance. Maintenance activities, which are not anticipated to be extensive, would not require specialized equipment or expertise. The construction contractor would be required to create a maintenance plan (e.g., training and manuals).

#### 2.5.3.3 Harbor Dredging and Channel Widening

The Preferred Alternative includes dredging at the Waneday Channel Entrance, in the turning basin, and adjacent to Seaport wharf to increase the acceptable draft depth for naval ships docking at the wharf (Figure 2-9). Dredge locations were determined based on navigational modeling of the Navy design vessels and consultations with commercial ship captains and the Seaport pilot. The areas directly adjacent to the wharf would be dredged to a depth of -36 ft MLLW, the area within the turning basin would be dredged to a depth of -38 ft MLLW, and the entrance channel dredging areas would be dredged to a depth of -41 ft MLLW. Because the dredging depths are considered minimums, a one ft over dredge is factored into the dredge volume calculations. Proposed dredging depths were calculated following DoW UFC and U.S. Army Corps of Engineers Hydrographic Surveying Manual standards as applied to the Navy design vessels. The proposed dredge depths account for a range of variables including the vessel's static draft, wave motion, vessel speed and under keel clearance allowance.

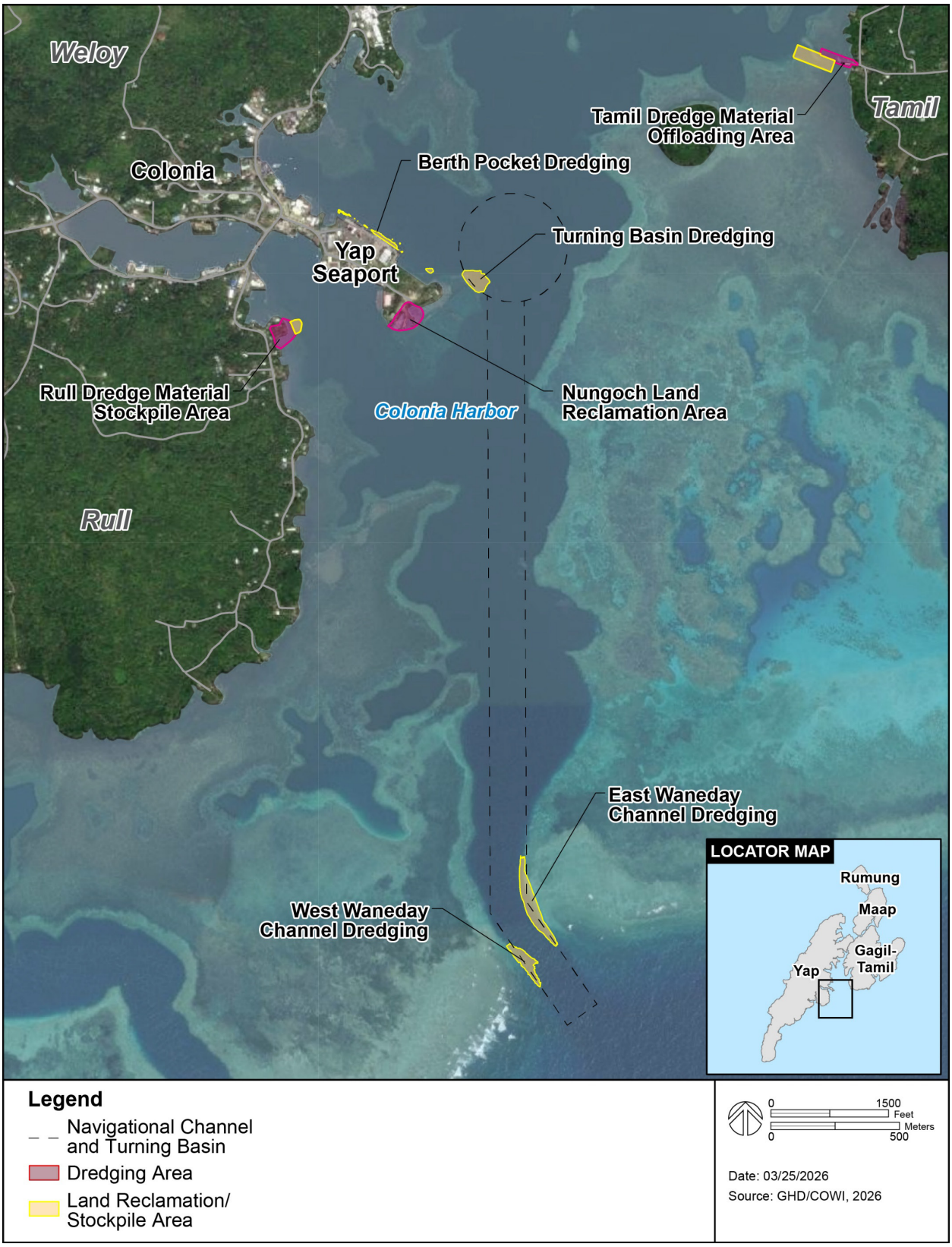



**Figure 2-9 Colonia Harbor and Waneday Channel Dredging**

A portion of the proposed dredging area along the east (Tamil) side of the entrance channel were dredged in 1991 during a previous Seaport improvement project. Harbor navigational dredging is estimated to generate approximately 106,000 cubic yards (CY) of dredged material (encompassing 6.8 acres of reef). Table 2-6 summarizes the dredging areas and dredge material volumes

**Table 2-6 Harbor Navigational Dredging Areas and Volumes**

| *Dredge Area* | *Area (acres)* | *Volume (CY)* |
|---|---|---|
| Berth | 0.5 | 2,500 |
| Turning Basin | 1.5 | 26,000 |
| Channel East | 3.5 | 54,000 |
| Channel West | 1.7 | 24,000 |
| **Total** | **6.8** | **105,645** |

Source: NAVFAC Southwest, 100% Yap Dredging Strategy Report, Nov. 8, 2024
Notes: Volumes are in situ and exclude allowances for bulking and losses.
Channel dredge acreages adjusted for steeply sloped channel walls

#### 2.5.3.3.1 Dredging Process

Dredging would be conducted utilizing a mechanical dredge (either clamshell dredge or backhoe dredge) and barge. An example of a backhoe dredge and barge is provided in Figure 2-10. Containment controls would be implemented to minimize potential impacts to the marine environment, including:

- Preferential use of a mechanical dredge to remove material
- Floating silt curtains surrounding the dredger
- Water quality monitoring and management plan
- Cessation of dredging works during specified coral and giant clam spawning periods

Navigational dredging at the berth, turning basin, and Waneday Channel entrance is anticipated to require 65 days of active dredging (downtime, disposal site transit time, weather conditions and other logistics could double or triple this estimate). After hours, the backhoe dredge and barge would be moored near the dredging area in Colonia Harbor, outside of active shipping lanes. During severe weather events, the two dredging vessels would either temporarily berth at the Seaport wharf or seek refuge offshore.




**Figure 2-10 Typical Example of Backhoe Dredge and Barge**

#### 2.5.3.3.2 Dredging Material Storage and Placement

Dredge material generated from the proposed channel, turning basin, and wharf dredging would be disposed of at three sites, described below. These sites were identified through coordination with local officials and stakeholders.

**Tamil Dredge Material Stockpile.** Approximately 54,000 CY of dredge material would be generated from dredging the east (Tamil) side of the channel entrance over a period of approximately 28 working days. This material would be barged to an offloading site in Tamil (see Figure 2-11) where it would be removed from the barge or scow onto land. Due to the existing water depth at the offloading site, the approach would require approximately 1.1 acres of dredging to create adequate depth to berth the dredge barge, resulting in an additional estimated 12,000 CY of dredge material. An existing causeway that extends into the water would be expanded and stabilized to create an unloading platform, approximately 65 ft wide, encompassing approximately 0.9 acres of land reclamation. The dredge material would be offloaded and hauled by truck to a stockpile area approximately one mile to the northeast (Figure 2-12). Transport of the dredge material would require about 250 truck trips per day for approximately 30 workdays. The stockpile site would cover about 2.6 acres and, when filled, reach a height of about 20 ft (Figure 2-13). The material would be available for beneficial reuse.

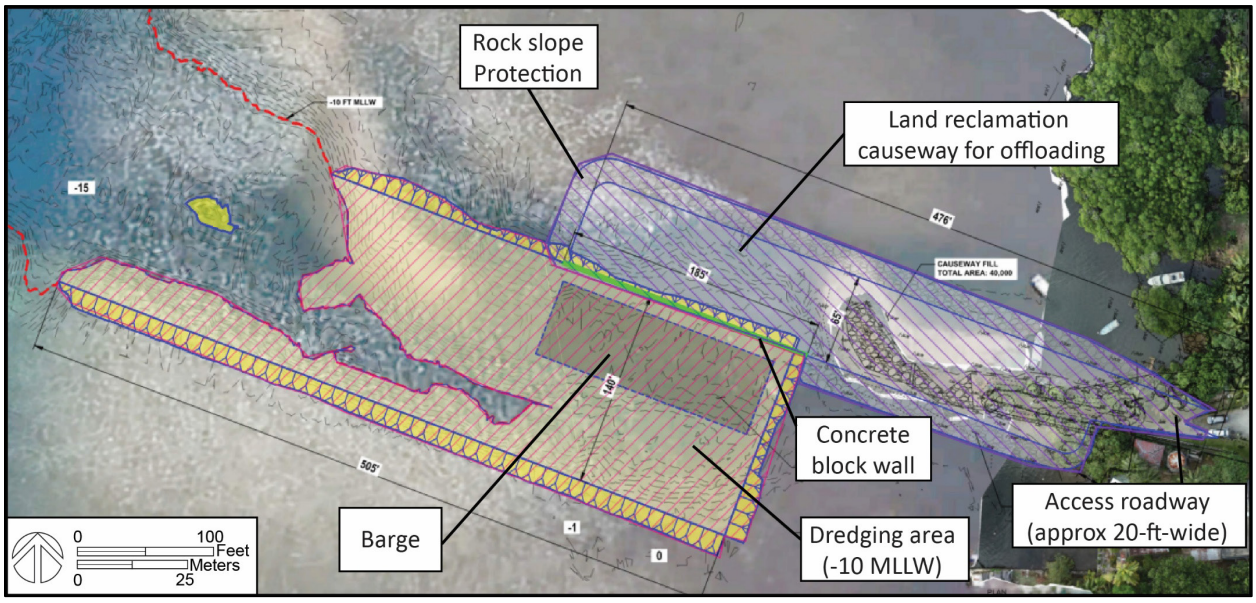



**Figure 2-11 Tamil Dredge Material Offload Site**

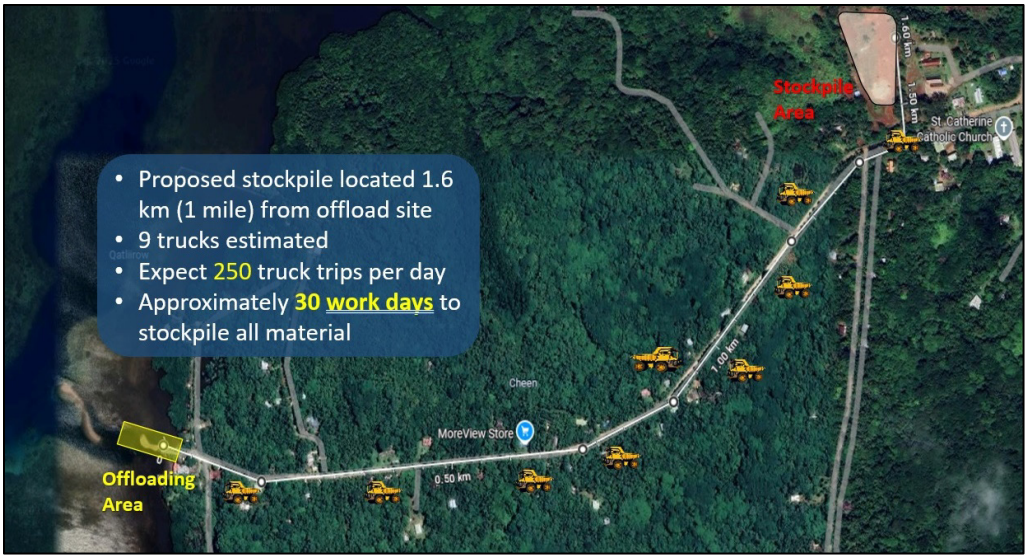



**Figure 2-12 Tamil Dredge Material Offloading Site, Haul Route, and Stockpiling Site**

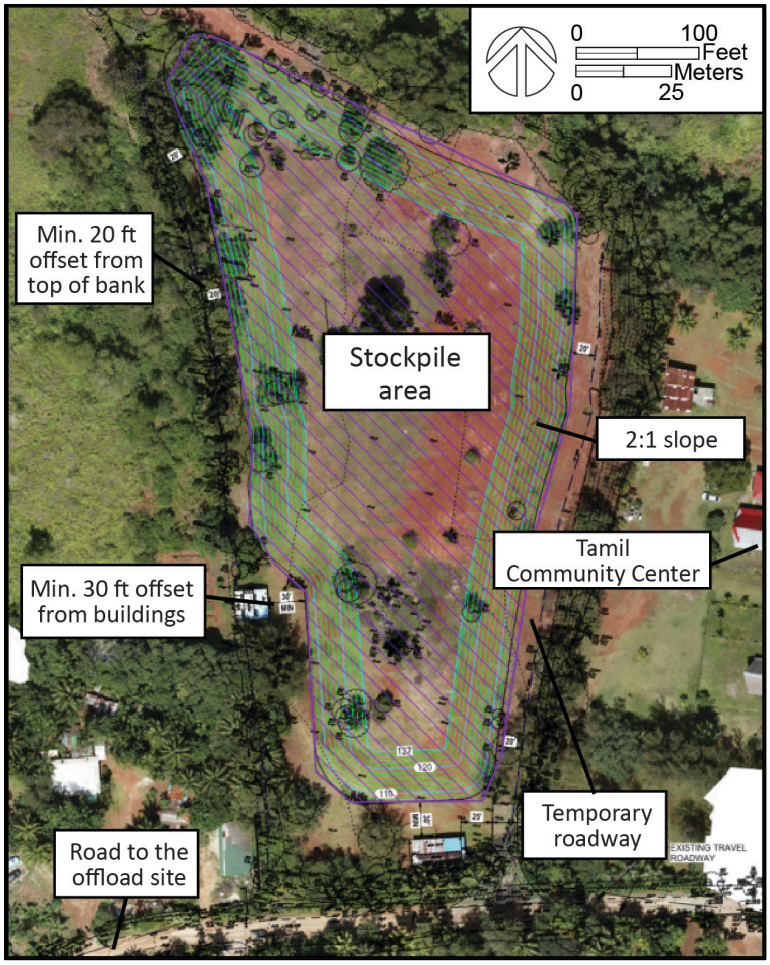



**Figure 2-13 Tamil Dredge Material Stockpiling Site**

**Rull Dredge Material Stockpile.** Dredging on the west side of the entrance channel would generate about 24,000 CY of material, which would be offloaded at a shoreline site in Rull (Figure 2-14). The proposed dredge material offloading and would require an estimated 0.4 acres of additional dredging to provide access for the barge to offload the dredge material resulting in an additional estimated 5,600 CY of dredge material. Stockpiling would include approximately 0.8 acres of upland stockpile area and approximately one acre of land reclamation in the adjacent nearshore area to the south and east. A permanent rock revetment would be placed along the seaward edge of the stockpile area and a concrete block wall would be constructed at the offloading platform. The total stockpile, including dredge material from the entrance channel and dredge material from the offloading barge access would reach a height of 16 ft and would be available for beneficial reuse. This offloading and stockpiling would require about 60 working days to complete.

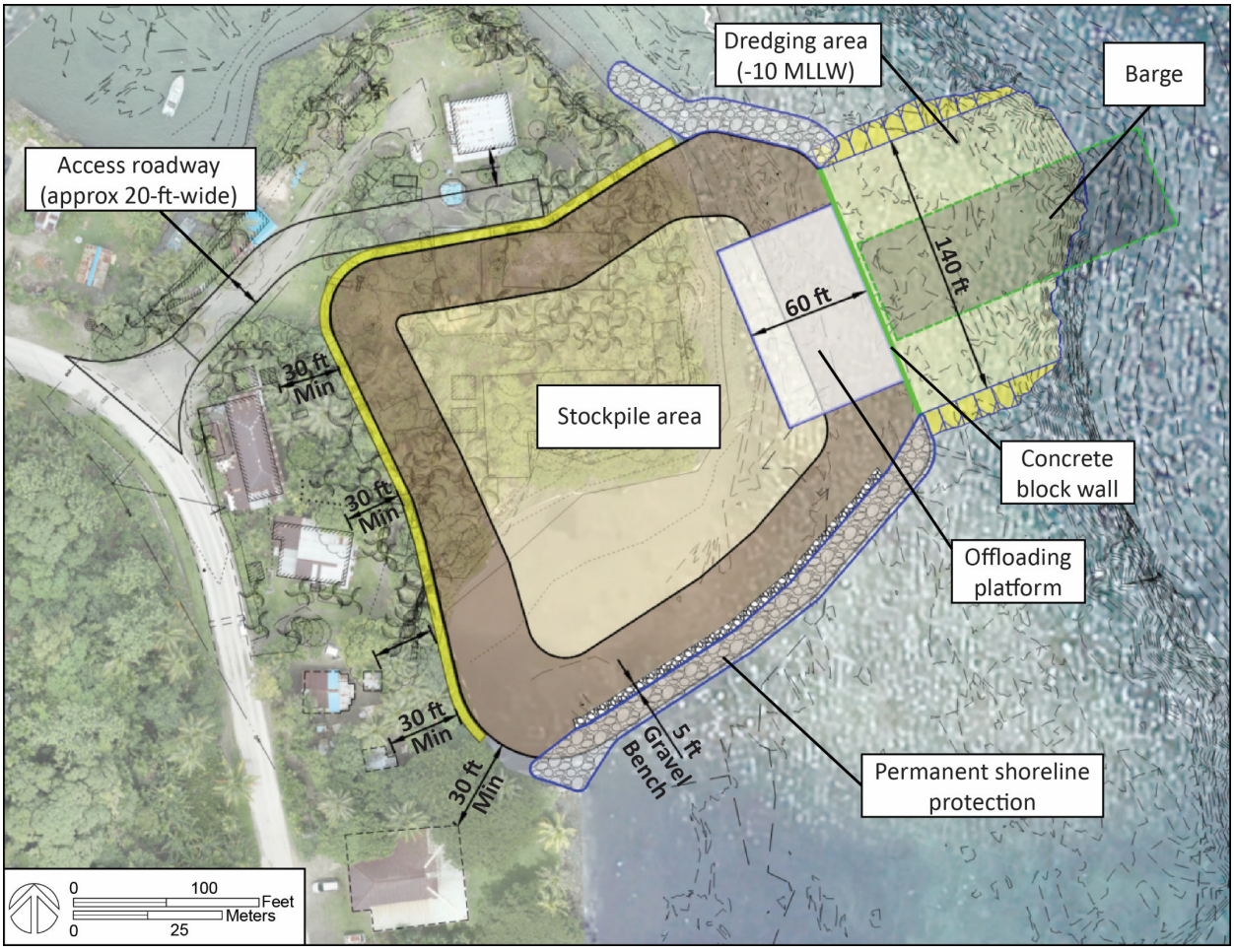



**Figure** 2-14 **Rull Dredge Material Offload Site**

**Nungoch Dredge Material Stockpile/Land Reclamation.** Approximately 26,000 CY of material dredged from the turning basin would be offloaded and stockpiled at the southwestern tip of the Nungoch peninsula, creating a land reclamation area with a total footprint of 2.2 acres including a permanent rock revetment along the seaward edge. The final finished surface of the land reclamation area represents approximately 1.7 of the total 2.2 acres, and would be seeded or stabilized and graded for surface water runoff (Figure 2-15). There was a previous land reclamation/stockpile effort in this location and the site currently includes some enclosed or partially enclosed pits that were subsequently excavated. These pits would be backfilled. Only approximately 0.7 acres of the proposed land reclamation area is outside of the footprint of the previous land reclamation area. The final elevation of the land reclamation area would be the same as the existing adjacent land. No dredging would be needed to offload the dredge material because the barge would be able to berth at an existing unloading platform at the southwest tip of the peninsula. The offloading and land reclamation process is anticipated to be completed over a period of approximately 55 working days.

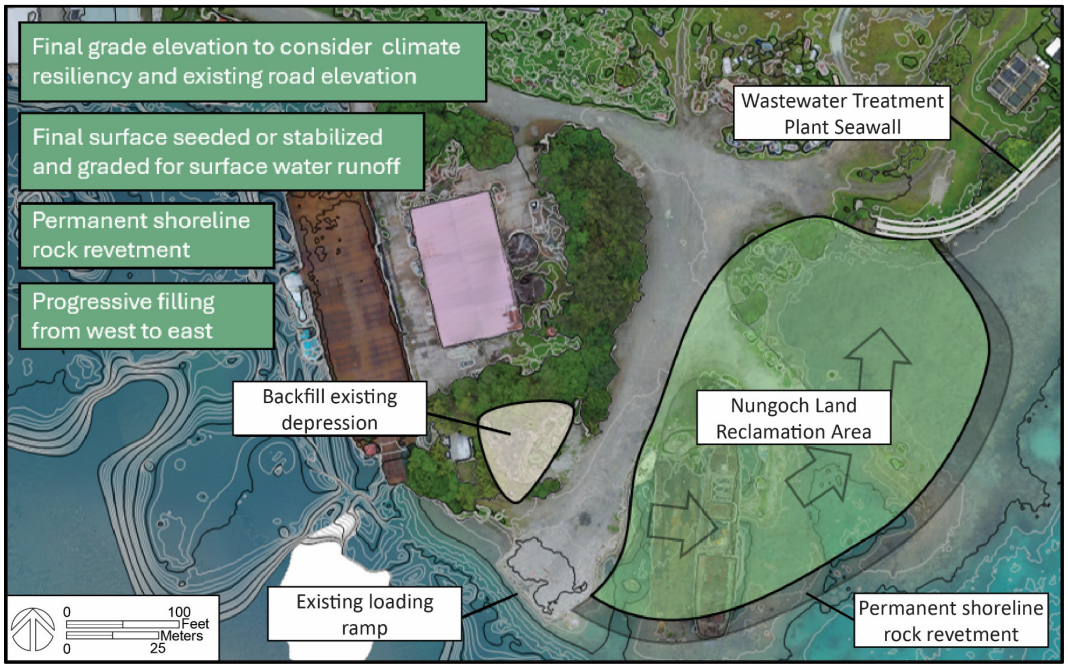



**Figure 2-15 Nungoch Land Reclamation Area**

**Berth Pocket Dredge Material Disposal at the Yap Public Transportation Site.** Approximately 2,500 CY of dredge material will be taken from the berth pockets adjacent to the existing wharf. Due to its proximity to industrial uses at the existing wharf, this material is considered restricted to industrial reuse. The material will be offloaded at the southwestern tip of the Nungoch peninsula and trucked (approximately 300 trucks) 1.8 miles west to a site behind the Yap Public Transportation Site and deposited (Figure 2-16). This dredging, offloading, and disposal process is expected to occur over an approximately five day period and would generate an average of 60 hauling trips per day.




**Figure 2-16 Yap Public Transportation Site Dredge Material Disposal**

#### 2.5.3.4 Aids to Navigation Improvements

ATONs are devices or markers that help ships navigate safely and accurately in channels and in congested port areas. The Proposed Action would replace and/or improve ATONs to meet Navy requirements, U.S. Coast Guard Design Standards, and International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Region A conventions (a standardized system using green markers on the right of the channel as the mariner heads inland and red on the left). All improvements would be in consultation with and subject to Yap State approval.

The Seaport entrance channel and harbor are currently marked with eighteen fixed ATONs, including 16 single-pile channel markers and 2 three-pile channel markers (at the ocean entrance to the channel). Figure 2-17 identifies ATON improvements within the Waneday channel and Colonia Harbor. All of the existing fixed ATONs would be replaced with larger fixed ATONs with lights and centered day-boards. The new ATONs would be mounted on submerged concrete foundations, following the current convention in Yap.

There are currently no range markers for the Yap entrance channel. Range markers are installed in pairs (front and rear) to assist ship captains in lining up with the center of the navigational channel. The Proposed Action would install a new front and rear range marker along the west side of the Waneday Channel. The proposed range markers would consist of a metal-framed tower mounted on a four-pile platform.

##### 2.5.3.4.1 Channel Marker Replacement and Installation

The Navy has conducted surveys of all ATONs that are proposed to be replaced (see Appendix E). The typical method for removing the fixed channel markers would be to lift the entire channel marker and foundation off the reef. In several locations, there are remnants of abandoned channel markers. Where these abandoned remnants present navigational hazards, they would be removed.

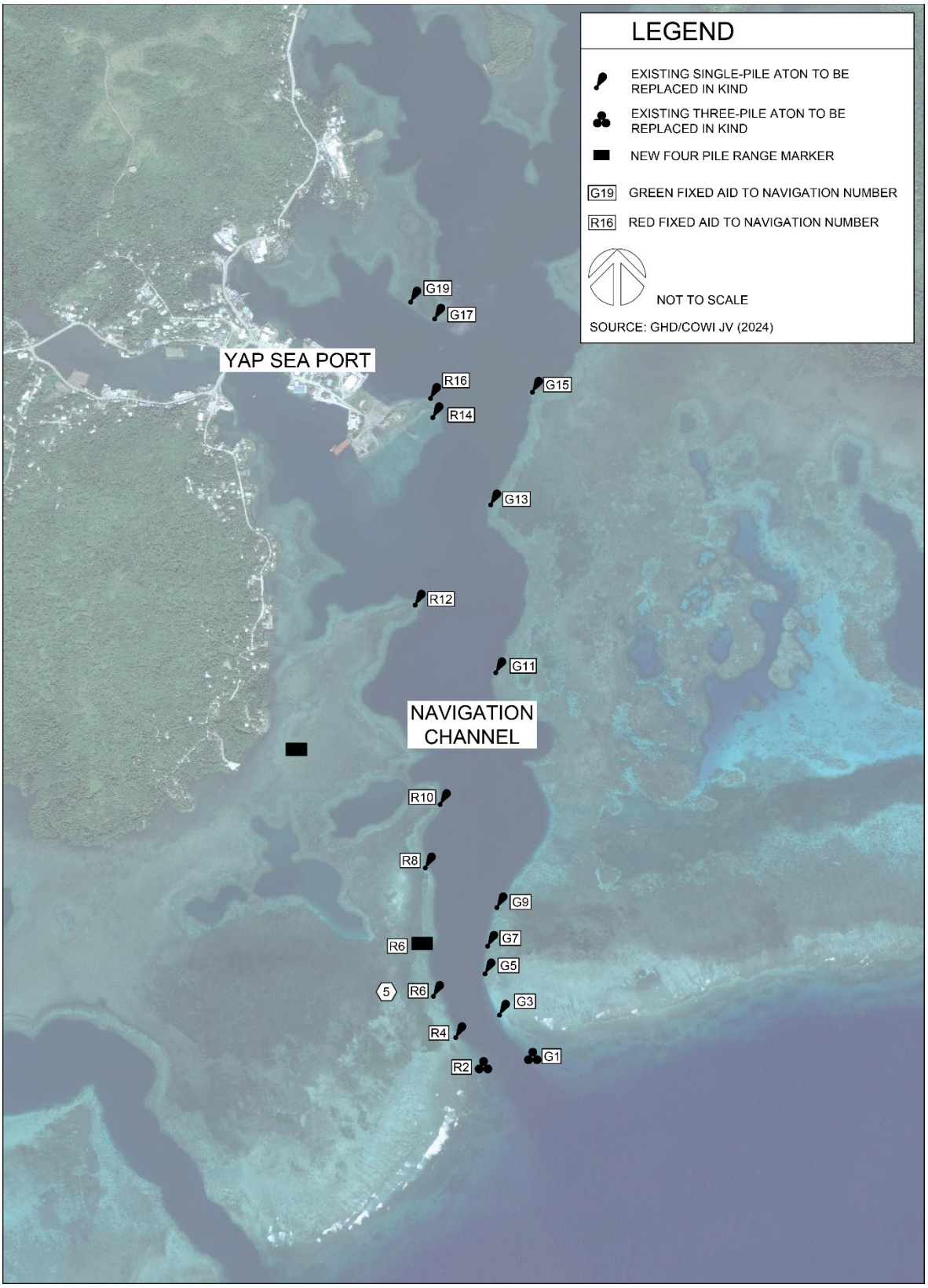



**Figure 2-17 Yap Seaport ATON Improvements**

Once the existing channel markers and abandoned remnants are removed, the new, improved channel markers would be installed. To minimize potential impacts to corals, the new channel markers would be placed within the same footprint as the previous channel marker that was removed. The replacement channel markers consist of an 18 inch diameter pipe stanchion bolted to a 6 ft by 6 ft square concrete base and topped by a 5 ft by 5 ft maintenance platform with dayboards and a solar powered lantern. The channel markers would reach a height of +15 ft above mean higher high water (MHHW). ATON removal and installation activities would likely be performed by a powered barge with a long hydraulic crane. The barge would moor in the adjacent channel, away from the reef edge. Support personnel would be on the reef flat to guide the removal of the old ATON/foundation/debris and placement of the new ATON. Sea conditions would be monitored to avoid periods of heavy swells and winds. Range Marker Replacement

The Proposed Action would install two new, four-pile range markers along the west side of the entrance channel. Each new range marker would consist of four 5 ft x 5 ft square concrete gravity blocks placed on the shallow benthic substrate supporting a 10 ft x 10 ft square metal platform holding the new 7 ft x 7 ft range marker tower and solar powered beacon. The front range marker replacements would reach a height of approximately +20 ft MHHW, and the rear range marker would reach a height of approximately +30 ft MHHW.

The front range markers would be located along the edge of the channel, and they would be replaced following the same procedures as the channel markers (see Section 2.5.3.4.1). The rear range marker would be situated in the intertidal area, some distance from the channel, with constrained access. Typical construction in these conditions requires a shallow barge accessing the site at high tide. The barge would be anchored in place with spuds and elevated above mean high water for the duration of the demolition and construction process. This area is shallow with a mostly sandy bottom and seagrass habitat. Personnel would access the barge platform via work boats during high tide. A barge mounted crane would replace the existing platform with components of the new platform that would be assembled by the construction crew. At the conclusion of construction, the barge would be refloated at high tide and removed from the area.

#### 2.5.3.5 Airport-to-Seaport Connector Road Improvements

The Seaport construction contractor would be responsible for improving the Airport-to-Seaport connector road between the Seaport and the west end of Chamorro Bay (near Aces Mart 2). Improvements along this stretch of the Airport-to-Seaport connector road are split into three segments (Figure 2-18). Segment A includes the reconstruction of approximately 4,200 ft of existing asphalt paved road. The reconstructed road would include asphalt pavement from Aces Mart 2 to the existing main port entrance. The existing paved roadway varies in width from 17 ft to 24 ft. The proposed improvements would provide a 20 to 24-ft-wide two-way asphalt paved roadway with drainage improvements and a continuous sidewalk around Chamorro Bay for pedestrians (Figure 2-19). Additional improvements would include soil stabilization efforts, replacement guardrails, as well as new striping and signage. Soil erosion areas would be stabilized by installing rip rap rock and approximately 3,200 ft of existing concrete swales are to be repaired and/or newly constructed. The causeway portion of Segment A (along the western edge of Chamorro Bay) would be elevated up to four feet to reduce the risk of flooding.

Segment B, approximately 1,700 ft, is an existing asphalt and gravel road from the main port entrance to the proposed pile-supported wharf and access pier/ramp (Figure 2-18) which would be replaced by a new two-lane, two-way concrete paved road. Each lane would be a minimum of 11 ft wide with a minimum total paved road width of 24 ft (Figure 2-19). Along horizontal curves, the roadway widens to 40 feet. Near the wharf extension, the roadway further widens to approximately 65 feet to match the wharf access road and boat ramp widths. The roadway would tie-in to the finished grade of the new wharf deck at an approximate elevation of +9.33 MLLW. A new roadside grass swale would be provided to meet Low Impact Development (LID) and stormwater treatment requirements, draining into a shallow depression and ultimately to the existing discharge location at the northeast end of the project site. A short segment of the roadside swale would drain westward towards an existing grass swale and outlet. No new water lines, sewer lines, or gas lines would be installed under this project. Construction contractors would also install conduit under the road from the Airport to the Seaport for potential future use for fiber-optic cable.

Segment C is a 2,800 ft existing asphalt paved road along the south side of Chamorro Bay between Aces Mart 2 and Ganir Bridge. This segment of roadway would provide an alternate route around Chamorro Bay during the construction process. The roadway would be repaved and a sidewalk would be installed along the full length to provide a full pedestrian loop around Chamorro Bay.

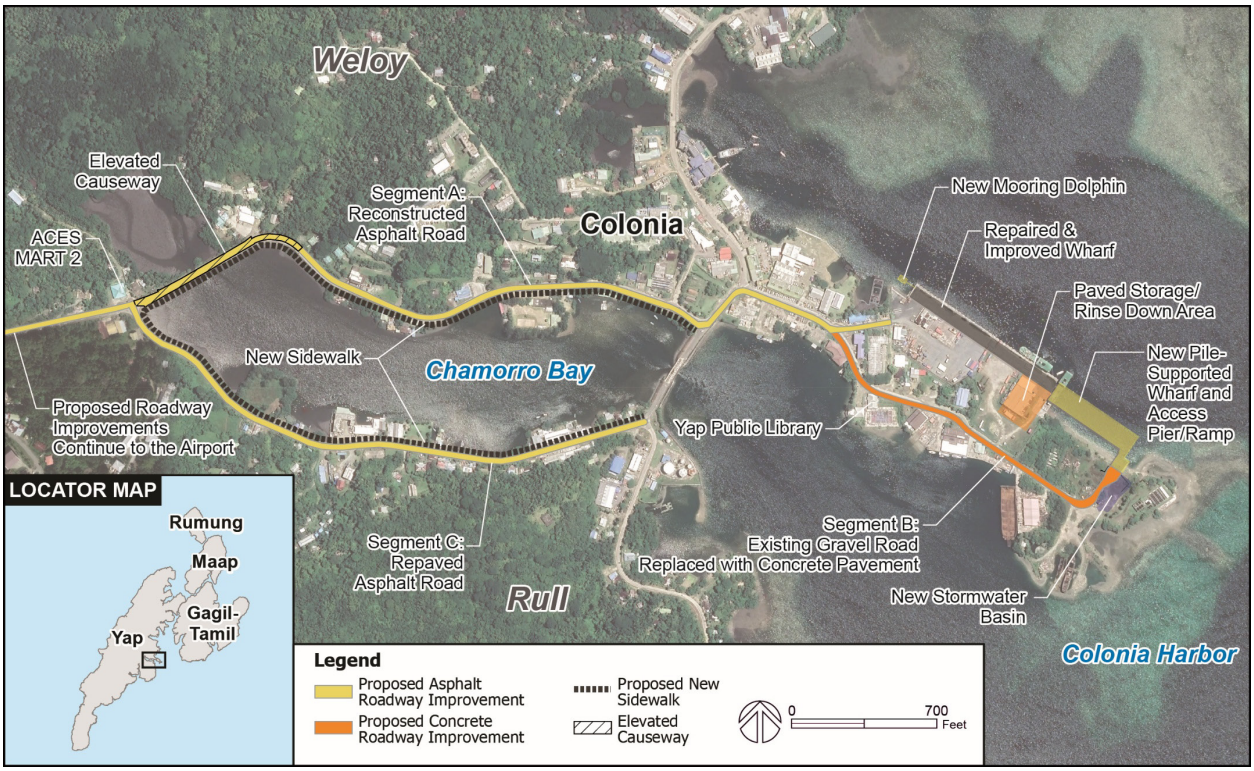



**Figure 2-18 Proposed Road Improvements near the Seaport**

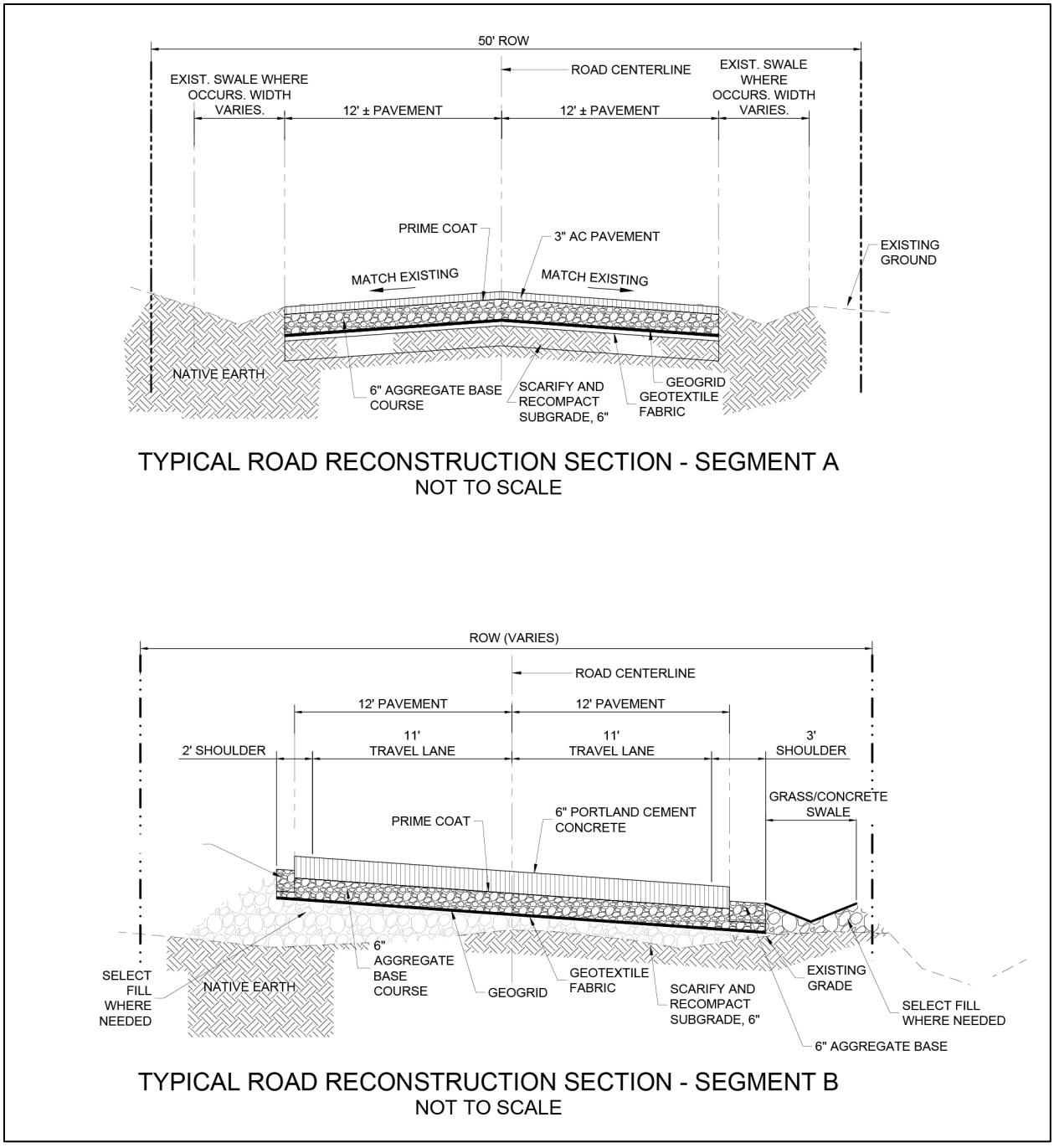



**Figure 2-19 Typical Roadway Improvement Sections**

Both road segments were analyzed for turning movements for a WB-50 design vehicle. In Segment A, there are two curves where overlaps occur if WB-50 vehicles were travelling in each direction side-by-side. Operational practices may need to be implemented, or continued, when WB-50 trucks, or other large vehicles, travel on this road. Such practices include having a lead vehicle to alert of the incoming truck's wide turns or practicing yielding until the lanes are clear prior to large trucks executing the turns. The latter is the current practice on the island of Yap.

#### 2.5.3.6 Construction Support Areas

The Proposed Action includes the establishment of additional construction support areas outside of the Seaport boundary to provide space for staging areas, a concrete batch plant, an asphalt batch plant, and a worker camp. In coordination with the Yap State Government, several potential locations have been identified for these construction support uses. Table 2-7 identifies each of these sites and the proposed construction support activities that could take place there. Additional locations for construction support may be secured by the construction contractor in accordance with FSM and Yap State requirements.

The Seaport contractor would construct a temporary, 75-person worker camp near the Yap Sports Complex (approximately 20 minutes from the Seaport).

**Table 2-7 Additional Contractor Construction Support Areas**

| *Site* | *Size* | *Construction Support Activity* |
|---|---|---|
| Seaport Area Site 1 (iBoom) | 0.5 acres | Staging area |
| Seaport Area Site 2 (Basketball Court) | 0.4 acres | Staging area |
| South Chamorro Bay Site 1 | 1.1 acres | Staging area |
| South Chamorro Bay Site 2 | 2.9 acres | Staging area |
| Tamil Construction Support Area | 4.3 acres | Staging area |
| Yap Sports Complex Site 1 | 6.6 acres | Worker camp and/or staging area |
| Yap Sports Complex Site 2 | 7.8 acres | Worker camp and/or staging area |

### 2.5.4 Seaport Post-Construction Activities

The Seaport would continue to be controlled by Yap State with continued primary use by local users (e.g., private, commercial, and government entities). The U.S. DoW anticipates conducting one to two military training events per year, which may involve either or both the Airport and Seaport. Each training event could last up to 14 days (inclusive of set-up and tear-down), or a total of up to 28 training days per year involving up to approximately 200 military service members. Proposed training at the Seaport would consist of approximately one vessel visiting the port. Port improvements would enable dual-use operations (i.e., military and commercial) and mooring of U.S. and allied vessels without interfering with normal commercial Seaport operations. During non-contingency times, the Navy anticipates mooring only one ship at a time. The largest vessels that might visit are approximately 700 ft in length. However, visiting vessels could be one of dozens of other smaller Navy vessels depending on the mission.

## 2.6 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements

In Alternative 2, most components would be the same as in the Preferred Alternative with the exceptions described in Sections 2.6.1 and 2.6.2. Alternative 2 is carried through the environmental analysis because it meets the screening factors described in Section 2.2. Alternative 2 project area footprints are shown in Figure 2-20.

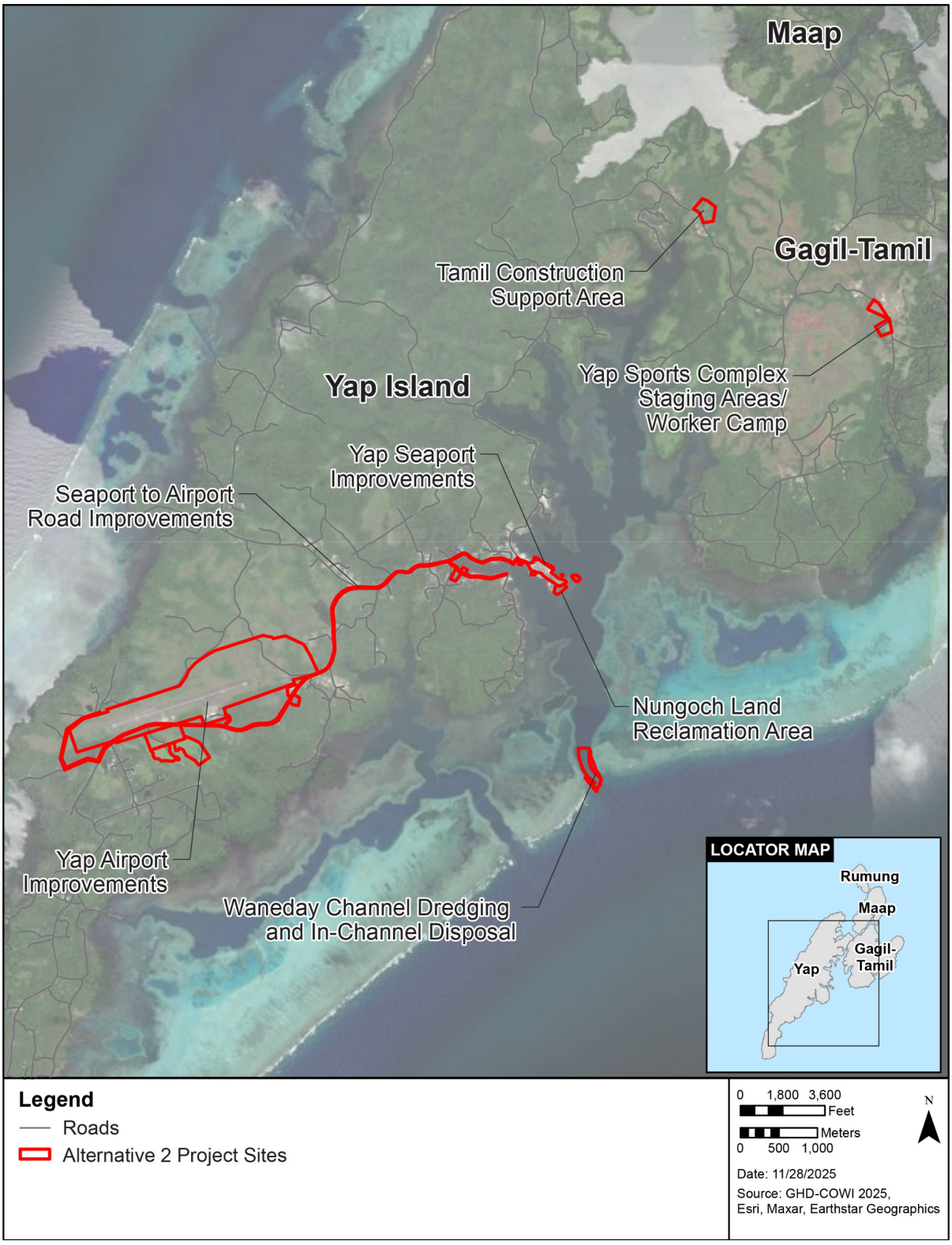



**Figure 2-20 Alternative 2 Project Area Footprints**

### 2.6.1 Airport Improvements

Under Alternative 2, improvements to the Airport would be largely the same as the Preferred Alternative with the exception of the location of the proposed aircraft parking apron. In this alternative, the apron would be located approximately 1,000 ft to the west of the Preferred Alternative location, as shown in Figure 2-21. This alternative would require more excavation north of the runway compared to the Preferred Alternative and scored lower than the Preferred Alternative in the alternatives analysis due to the greater earthwork and cost and longer construction period.

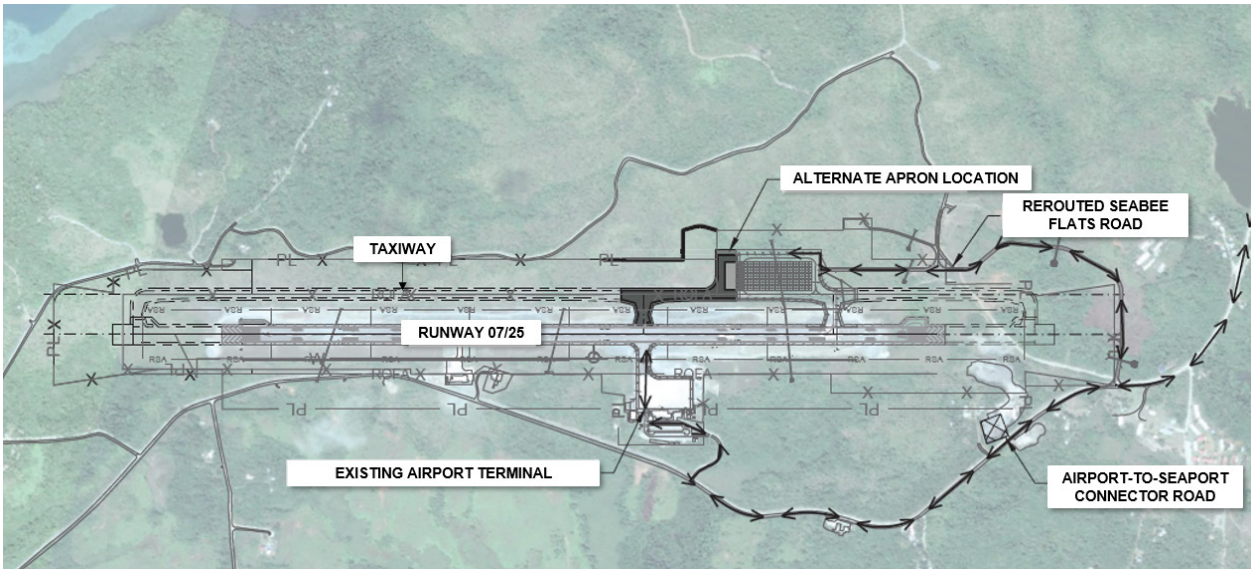



**Figure 2-21 Alternative 2 Airport Improvements**

### 2.6.2 Seaport Improvements

Under this alternative, the Seaport improvements would be the same as the Preferred Alternative except for dredge material disposal. As seen in Figure 2-22, dredge material from within Colonia Harbor would be used for the Nungoch land reclamation area at the west end of the Nungoch peninsula in the alternative. However, dredge material from the Waneday Channel dredging operations would be disposed of directly in the deeper sections of the channel rather than being transported to sites in Tamil and Rull for beneficial reuse. Figure 2-22 illustrates potential locations for in-channel placement of dredge material.

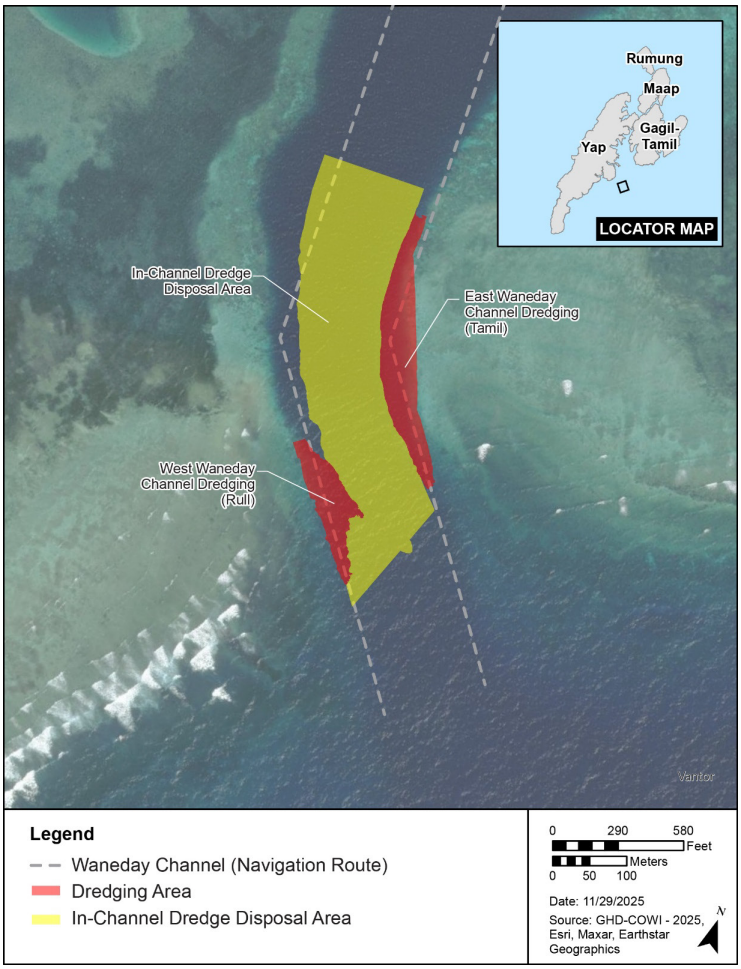



**Figure 2-22 In-Channel Dredge Disposal**

## 2.7 Alternatives Considered but not Carried Forward for Detailed Analysis

The following alternatives were considered but not carried forward for detailed analysis in this EIS as they did not meet the purpose and need for the project and satisfy the reasonable alternative screening factors presented in Section 2.2.

### 2.7.1 Airport Alternatives

#### 2.7.1.1 Reversed Runway Extension (2,000' West and 1,100' East)

Under this alternative, the Airport runway extension lengths would be reversed from the Preferred Alternative. It would be extended 2,000 ft to the west and 1,100 ft to the east to accomplish the required 9,100 ft long runway. Expansion by 2,000 ft to the west would require major acquisition of private land to expand the Airport boundary and facilitate construction (fails to meet Airport Screening Factor C). Additionally, it would require major earthwork to create a flat area for the runway extension and associated side slopes and safety zones (fails to meet Airport Screening Factor D). It would also cut off the existing community roadway to the west of the Airport and expand into areas with significant density of graves and cultural resources. It may also require removal of private residences (fails to meet Airport Screening Factor E).

#### 2.7.1.2 West Runway Extension (3,100')

Under this alternative, the Airport runway would be extended 3,100 ft to the west to provide the required 9,100 ft long runway. Expansion by 3,100 ft to the west would require major acquisition of private land to expand the Airport boundary and facilitate construction (fails to meet Airport Screening Factor C). Additionally, it would require major earthwork to create a flat area for the runway extension and associated side slopes and safety zones (fails to meet Airport Screening Factor D). It would also cut off the existing community roadway to the west of the Airport, expand into areas with significant density of graves and cultural resources, and may require removal of private residences (fails to meet Airport Screening Factor E).

#### 2.7.1.3 East Runway Extension (3,100 ft)

Under this alternative, the Airport runway would be extended 3,100 ft to the east to provide the required 9,100 ft long runway. Expansion by 3,100 ft to the east would require major acquisition of private land to expand the Airport boundary and facilitate construction (fails to meet Airport Screening Factor C). Additionally, it would require major earthwork to create a flat area for the runway extension (fails to meet Airport Screening Factor D), and it would encroach upon critical community facilities in the vicinity of the Early Childhood Education Center (fails to meet Airport Screening Factor E).

#### 2.7.1.4 Taxiway and Runway Reversal

Under this alternative, a new 9,100 ft runway would be constructed to the north of the existing runway, and the existing runway would be repurposed as a taxiway. This alternative would meet the requirement of establishing a 9,100 ft runway on Yap, but it would involve substantially more earthwork along the northern edge of the Airport boundary to provide the side slopes and safety zones for the new runway. This additional earthwork would involve greater impacts to potential natural and cultural resources in this area and pose a greater impact to the community along the northwest boundary of the Airport (fails to meet Airport Screening Factor E), and would likely require acquisition of private lands to the north of the Airport to further expand the Airport boundary (fails to meet Airport Screening Factor C). This alternative would also require a longer construction schedule and incur major additional costs (fails to meet Airport Screening Factor D).

#### 2.7.1.5 Reduced Length Parallel Taxiway

Under this alternative, a reduced length parallel taxiway would be constructed to connect the Airport parking apron to the extended runway. While this alternative would meet the requirement of establishing a 9,100 ft runway on Yap, it would create operational challenges during training events and in the case of an emergent situation. Therefore, it does not meet the DoW requirements for the proposed improvements to the Airport (fails to meet Airport Screening Factor A).

#### 2.7.1.6 Alternate Improved Airport Location in FSM

Under this alternative, Airport improvements would be constructed at an alternate location within FSM. This alternative was considered but is not being carried forward for detailed analysis in the EIS because the proposed project location was identified and agreed upon in concept as the appropriate site by the U.S. and FSM (including Yap State). Yap State is strategically located within the Second Island Chain between Guam and Palau. No other

location in the region can provide this strategic location with suitable collocated Airport and Seaport facilities (fails to meet Airport Screening Factors A and B).

### 2.7.2 Seaport Alternatives

#### 2.7.2.1 Partial Wharf Improvements

This alternative would provide the same improvements to the existing wharf as in the Preferred Alternative (e.g., demolition of existing warehouse, replacement of security fence and gate, wharf deck replacement, rinse down area, bollard and fender system replacement, new reinforced concrete crane pad, new breasting and mooring dolphin, removal of abandoned barge, harbor and channel dredging, ATON replacement), except with no wharf expansion to the east. This alternative was considered but is not being carried forward for detailed analysis in the EIS because it would not meet the U.S. Navy's requirements, which include the ability to simultaneously berth two large vessels at the wharf (fails to meet Seaport Screening Factor A). Additionally, by forgoing the eastern expansion of the wharf, it would be difficult to ensure uninterrupted operations of the port during the construction process because the construction of the wharf improvements would occur simultaneously in close proximity to ongoing wharf operations (fails to meet Seaport Screening Factor F).

#### 2.7.2.2 Alternate Eastern Wharf Expansion Structural Support

Under this alternative, the new wharf expansion along the east side of the existing wharf would be constructed as a bulkhead wharf instead of on piles. Constructing a bulkhead wharf in this location would be complex due to the increased water depth required at the wharf face. A rock berm would need to be installed in front of the bulkhead wall to provide structural support. Because of the potential for soil instability underlying the berm, an extensive volume of dredging would be required below the berm to eliminate the possibility of settling during a seismic event. This alternative would also significantly increase cost and construction duration when compared with the pile-supported wharf addition (fails to meet Seaport Screening Factor D). Additionally, because pile-supported wharves are more common in marine construction than bulkhead wharves, this alternative may limit the contractor pool available to construct the project. Therefore, this alternative was considered but is not being carried forward for detailed analysis in the EIS.

#### 2.7.2.3 Deeper Draft at the Berth

Under this alternative, the seafloor at the existing wharf would be dredged to a deeper approximate water depth of -38 ft MLLW compared to the proposed -36 ft MLLW in the Preferred Alternative. Dredging to -38 ft MLLW would require the installation of a buttress at the base of the existing wharf bulkhead wall to adequately support the wharf structure. The potential construction technologies involved with this alternative (building a secant wall or cement deep soil mixing) require extensive in-water work that would likely result in greater discharges and turbidity in the water column (fails to meet Seaport Screening Factors D & E). The Navy determined that it could achieve its operational goals with the water depths included in the Proposed Action (-36 ft MLLW). Therefore, this alternative is not being carried forward for detailed analysis in the EIS.

#### 2.7.2.4 Maximize Land Reclamation at Nungoch Peninsula

Under this alternative all of the dredge material at the berth, turning basin, and Waneday Channel would be placed at the Nungoch peninsula to maximize the size of the land reclamation area. This alternative would implement beneficial reuse of the dredged material, but it does not recognize the ownership of the Waneday Channel dredge material by the respective private owners and their right to maintain ownership of that material. Therefore, it does not meet requirements of Yap State (fails to meet Seaport Screening Factor A).

#### 2.7.2.5 Offshore Mooring

This alternative would provide offshore mooring locations for U.S. Navy ships but would not include harbor dredging or wharf improvements. This alternative was dismissed from further analysis because it would not meet the U.S. Navy and Yap State requirement for improvements to the port facility (fails to meet Seaport Screening Factor A), and it would not provide a strategic location with suitable collocated Airport and Seaport facilities to support the U.S. defense responsibilities established under Title Three of the CoFA between U.S. and FSM (fails to meet Seaport Screening Factor B).

#### 2.7.2.6 Alternate Improved Seaport Location in FSM

See discussion under Section 2.7.1.6. No other location in the region can provide this strategic location with suitable collocated Airport and Seaport facilities (fails to meet Seaport Screening Factors A and B).

### 2.8 Best Management Practices Included in Proposed Action

This section presents an overview of the best management practices (BMPs) that are incorporated into the Proposed Action in this document. BMPs are existing policies, practices, and measures that DoW would adopt to reduce the environmental impacts of designated activities, functions, or processes. Although BMPs mitigate potential impacts by avoiding, minimizing or reducing/eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are (1) existing requirements for the Proposed Action, (2) ongoing, regularly occurring practices, or (3) not unique to this Proposed Action. In other words, the BMPs identified in this document are inherently part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action.

Table 2-8 includes a list of BMPs. Mitigation measures are under discussion and will be presented in a later iteration of this EIS. The table below complements BMPs provided in the Division 01 – General Requirements specifications of the Airport and Seaport design contracts covering environmental protection measures during construction.

BMPs include actions required by applicable federal or state law or regulation. The recognition of the general management measures prevents unnecessarily evaluating impacts that are unlikely to occur.

## Table 2-8 Best Management Practices

| *EIS Sec. #* | *Resource* | *Avoidance/Minimization Measure* | *Description* |
|---|---|---|---|
| 3.1 | Topography, Geology, Soils | ECP pursuant to Environmental SOP that includes BMPs. Construction of drainage improvements. | • Limit area of ground disturbance; balance cut and fill volumes; appropriate design and soil stabilization techniques; erosion control (detention ponds, perimeter controls, silt fences, vegetation, etc.); avoid high rainfall periods where possible. Inclusion of Airport and Seaport drainage improvements. |
| 3.1 | Topography, Geology, Soils | Operational procedures and contingency plans for dredge material stockpiles | • Appropriate stockpile site selection; stockpile design (slope) and stabilization methods; silt fencing and barriers; site access controls; ongoing stockpile inspection and monitoring. |
| 3.2 | Water | Avoid potential pollution of groundwater | • All potential sources of pollution must be installed on the property as far away as is reasonably possible from any groundwater access point. |
| 3.2 | Water | Avoid potential pollution of potable water supplies | • Toxic chemicals and hazardous materials must be stored away from potable water supplies. |
| 3.2 | Water | Spill Prevention, Control, and Countermeasure (SPCC) Plan | • An SPCC Plan is required for activities involving storage, possession, or generation of hazardous substances. |
| 3.2 | Water | Spill monitoring | • Spill monitoring is required during operation. |
| 3.2 | Water | Risk minimization and accident preparedness | • Risk minimization and accident preparedness, including spill response equipment and supplies, and training. |
| 3.2 | Water | Secondary containment | • Secondary containment of petroleum product storage. |
| 3.2 | Water | Hazardous materials and toxic chemicals inventory | • Inventory control and record keeping of toxic chemicals and hazardous materials. |
| 3.2 | Water | Minimize potential water pollution | • Stormwater management of water pollution caused by toxic chemicals and hazardous materials. |
| 3.2 | Water | Erosion and Sediment Control Plan (ESCP) | • Require compliance with erosion and sediment control measures in accordance with an ECP. Measures may include mulching, compost blankets, geotextiles, slope stabilization, seeding, silt fences, sedimentation filter socks, sediment control practices, and work area limits/marking. |
| 3.2 | Water | Stormwater pollution prevention plan (SWPPP) | • Prepare and implement a SWPPP to prevent stormwater contamination, control sedimentation and erosion, and document compliance with applicable laws and regulations. |
| 3.3 | Air Quality and Greenhouse Gases | Dust suppression during construction | • Treat active construction areas with water to suppress fugitive dust, cover or wet down truckloads of soil and aggregate to prevent wind-blown dust during transport, sweep adjacent roads whenever soil deposits from excavation and grading are visible, and lower speed limit on access driveways to reduce fugitive dust generation. |

| *EIS Sec. #* | *Resource* | *Avoidance/Minimization Measure* | *Description* |
|---|---|---|---|
| 3.3 | Air Quality and Greenhouse Gases | Maintain construction machinery | • Maintain all construction machinery engines in good mechanical condition and observe regular maintenance procedures to minimize exhaust emissions. |
| 3.3 | Air Quality and Greenhouse Gases | Minimize idling | • Minimize the idling of diesel-powered machinery and vehicles, especially during staging or inactive periods. |
| 3.4 | Marine Biological Resources (General) | Special status species observers, shutdown zones | • Use of special status species observers and shutdown zones during proposed construction, dredging, and other activities to avoid adverse impacts on marine mammals and other special status species. |
| 3.4 | Marine Biological Resources (General) | Water quality protection | • Use of effective silt containment devices (such as silt or turbidity curtains) during in-water construction activities that may result in increased turbidity or sedimentation, to be used where and to the maximum extent practicable.<br>• Implementation of erosion control measures along roadway construction, such as vegetated swales.<br>• Adherence to stormwater and wastewater treatment requirements.<br>• Assurance of all material and equipment placed in the water are cleaned of pollutants before use.<br>• Storage of fueling project-related equipment away from the water.<br>• Proper disposal of all debris generated from the project.<br>• Assurance that sediments are free of toxicants before considering beneficial reuse of dredged sediments. |
| 3.4 | Marine Biological Resources (General) | Avoidance of spawning periods | • Avoidance of in-water construction activities if there is potential to impact Yap coral during major spawning events to the maximum extent practicable**.**<br>• Avoidance of giant clam spawning periods to the maximum extent practicable**.** |
| 3.4 | Marine Biological Resources (General) | Biosecurity protocols | • Development and implementation of biosecurity protocols for incoming construction equipment and materials and vessel ballast to avoid the introduction of invasive species. |
| 3.4 | Marine Biological Resources (General) | Biological monitoring | • Biological monitoring of corals and seagrasses before, during, and immediately after construction. |
| 3.4 | Marine Biological Resources (ESA-listed Sea Turtles and Fish/Rays) | Biological monitoring and in-water construction activity protocols | As applicable to mobile ESA-listed marine species (including non-listed marine mammals, although they are not expected to occur in the ROI), the following BMPs will be employed to avoid and minimize adverse effects:<br>• During in-water activities, such as pile-driving and dredging, a dedicated and competent observer who is familiar with local marine species will use binoculars to detect the presence of |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | | | ESA-listed marine species and notify construction crews to cease work if the ESA-listed species approaches the shutdown zone, as described below.<br>o The Contractor will comply with the following monitoring requirements:<br>➢ A competent observer will use binoculars to monitor the ROI for ESA-listed sea turtles and fish/rays during all in-water activities, if deemed necessary. If all work associated with a particular activity takes place above the High Tide Line (HTL), an observer will not be required for that element of the Preferred Alternative.<br>➢ Observations will begin each day 30 minutes prior to the start of in-water activities:<br>▪ If no ESA-listed sea turtles or fish/rays are seen during the 30-minute pre-clearance survey period, activities may commence.<br>▪ If an ESA-listed sea turtle or fish/ray is seen during the 30-minute pre-clearance survey period, the observer will notify the Project Manager immediately and monitor the animal. If the animal is within 50 yards of the in-water activity, animal behavior observations will be recorded. Work will not begin until the animal departs the area voluntarily or after 30 minutes have passed since the last animal sighting.<br>▪ During in-water activities, the observer will record environmental and action-related information, including but not limited to date, time, weather, action undertaken, status and effectiveness of BMPs, and ESA-listed marine species observed.<br>▪ During in-water activities, all in-water work shall stop when an ESA-listed sea turtle or fish/ray approaches or is sighted within 50 yards of the in-water work. Work shall begin/resume after the animal has departed the area voluntarily or after 30 minutes have passed since the last animal sighting.<br>▪ When pile driving occurs, shut-down zone(s) will be implemented. All in-water work shall stop when an ESA-listed species approaches or is sighted within the shut-down zone.<br>▪ All sightings of ESA-listed marine species shall be recorded.<br>o The Navy will also document any incidents where anchoring, dredging, or other project activities have a direct impact to the benthic community, as reported by the contractors.<br>• During in-water activities, the following measures will be implemented to reduce the potential for collisions with mobile ESA-listed species:<br>o Vessel operators will halt or alter course to remain at least 50 yards away from ESA-listed marine animals. Whenever possible, assign a designated individual to observe for protected species and limit vessel operation to only daylight hours.<br>o Vessel operators will reduce vessel speed to 10 knots or less when piloting vessels in the proximity of marine mammals and to 5 knots or less when piloting vessels in areas of |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | | | known or suspected sea turtle activity. Operators will be particularly vigilant to watch for sea turtles at or near the surface in areas of known or suspected sea turtle activity.<br>o If approached by an ESA-listed marine animal, the vessel operator will put the engine in neutral until the animal is at least 50 ft away and then slowly move to 50 yards away from the animal.<br>o Vessel operators will not encircle or trap ESA-listed marine animals between multiple vessels or between vessels and the shore or other structures.<br>o Barges and vessels will utilize existing deep water transportation corridors as possible, and while transiting in shallower water, there will be observers on the boats for navigating around corals or sensitive benthic habitat.<br>o During in-water activities, the following measures will be employed to reduce potential direct physical impacts on ESA-listed species:<br>o No personnel will attempt to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species except as provided in a Biological Assessment/Opinion. Entangled animals will be freed and photographed if possible, and each incident will be reported to TBD. Entanglement is not expected because the work area will be monitored and BMPs will be implemented to avoid entanglement from materials in the water, and therefore, no take for entanglements is requested.<br>o All personnel will stay more than 50 yards away from sea turtles, in the unlikely event they haul out on land in proximity to construction activities.<br>o Before any equipment or material enters the water, the Contractor will verify that no ESA-listed species are in the area where equipment (e.g., silt curtains [to be used only where practicable], anchor(s), or materials) are expected to contact the seabed.<br>o All objects lowered to the bottom will be lowered or installed in a controlled manner. This will be achieved by the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that affect positive control over the rate of descent.<br>o In-water tethers and mooring lines for vessels, marker buoys, and silt curtains (to be used only where practicable) will be kept to the minimum lengths necessary and will remain deployed only as long as needed to accomplish the task.<br>o Anchor lines from construction vessels will be deployed with appropriate tension to avoid entanglement with ESA-listed species. Construction-related equipment that may pose an entanglement hazard will be removed from the Action Area if not actively being used.<br>• During in-water pile driving, the following measures will be applied to protect ESA-listed species:<br>o A soft start procedure would be considered and used, as practicable, for pile driving at the beginning of each day's in-water pile driving or anytime that pile driving has ceased for more than 30 minutes. The soft start is an approach used to provide a warning pulse from |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | | | the pile driver so that animals in proximity have a chance to leave the area prior to the pile driver operating at full capacity, thereby exposing fewer animals to loud underwater sounds. The contractor shall provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, followed by two subsequent sets of strikes.<br>o If practicable, vibratory hammering and/or the use of a pile cap shall be used to minimize the impact of noise on marine species. When feasible, measures shall be implemented that attenuate the sound or minimize impacts to aquatic resources during pile installation.<br>o A soft start procedure would be considered and used, as practicable, for dredging at the beginning of each day's dredging or anytime that dredging has ceased for more than 30 minutes. |
| 3.4 | Marine Biological Resources (ESA-listed Corals) | Avoidance of spawning periods and storm conditions | • In-water construction activities will cease if there is potential to impact Yap coral during major spawning events. A specific coral spawning period may be attuned with Yap natural resource partner input but is estimated to be approximately 22 days total each year, including 8 days prior to the full moon and 14 days after (Richmond and Hunter, 1990).<br>• The development and adherence to an Inclement Weather and Typhoon Contingency Plan must include a large swell plan whereby in-water activities will be conducted during safe weather conditions (i.e., calm seas) and will cease during high surf, winds, or currents. As practicable, work will be conducted during calm sea states with work stoppages during high surf, winds, and currents. In the event of approaching foul weather (i.e., tropical storms and typhoons), equipment will be either removed from the Project site or adequately secured. Yap utilizes the severe weather alert system primarily through the National Weather Service (NWS) office in Guam. A Condition Level IV is the lowest alert level and indicates a possible threat of destructive winds within 72 hours and a Condition Level I is the highest alert that indicates destructive winds are expected within 12 hours. In order to provide 48-hour leeway preparation, work activities will immediately begin with the appropriate removal and/or securement of all in water equipment, vessels and barges once a Condition Level III is triggered. Once post storm activities permit a safe assessment of equipment and conditions of the project sites, as feasible, that will be evaluated for a safe return to work providing reports of any additional adverse storm impacts.<br>o Yap Typhoon Conditions of Readiness:<br>a) Condition Level I: A typhoon is expected to hit the island within 12 hours.<br>b) Condition Level II: A typhoon is expected to hit the island within 24 hours.<br>c) Condition Level III: A typhoon may possibly hit the island within 48 hours.<br>d) Condition Level IV: A typhoon may develop and hit the island within 72 hours. |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | | | ○ Work barges and vessels will be either relocated to more sheltered interior areas or would transit offshore in the event of inclement weather.<br>• Equipment (e.g., moorings, anchors, chains) will be placed in soft sediment only, and selection of anchor locations will take into consideration damage that could occur from the anchor chain if the vessel swings due to currents or tides. If practicable, all intertidal work will be conducted at low and/or slack tides.<br>• Where applicable, divers will check anchor deployment and shift anchors to another location, if needed, to ensure that they are not a threat to corals or seagrass.<br>• During the ATON replacement, a biologist will evaluate coral growth on and around the structure. If leaving the concrete base in place will not create a navigational hazard, the biologist will determine if doing so minimizes the overall impact on the coral.<br>• All construction-related equipment must be operated and anchored to avoid impacting sensitive marine habitat or contacting coral reef resources during in-water activities or extreme weather conditions:<br>○ Anchors, anchor chains, wire ropes, and associated anchor rigging from construction-related vessels must be restricted to designated anchoring areas within the construction footprint (i.e., soft bottom) or within the area that will be permanently impacted.<br>○ While in water depths where the draft of the vessel provides less than a 6 ft clearance, all vessels would operate at "no wake/idle" speeds at all times and would preferentially follow deep-water routes (e.g., marked channels) whenever possible. If operating in shallow water, all vessels would have a crewmember serve as a dedicated lookout to assist the pilot with avoiding large coral colonies and other benthic organisms that might extend up from the bottom.<br>• Contractors would be required to operate in accordance with International Maritime Organization (IMO) International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention). |
| 3.4 | Marine Biological Resources | Water pollution prevention | A Storm Water Pollution Prevention Plan (SWPPP) will be followed by the construction contractor to reduce on-site erosion and sedimentation. The SWPPP will include, at a minimum, the following BMPs:<br>• Silt socks, filter fabric, or an approved equivalent would be used around out-of-water repair sites along the shorelines.<br>• An Oil Spill Contingency Plan to control and clean spilled petroleum products and other toxic materials will be included in the SWPPP and implemented throughout the construction of the Project: |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | | | ○ Oil or other hazardous substances will be prevented from seeping into the ground or entering any drainage inlet or local bodies of water.<br>○ When applicable, all temporary fuel oil or petroleum storage tanks will be surrounded with a temporary berm of sufficient size and strength to contain the contents of the tanks (plus 10 percent freeboard for precipitation) in the event of an accidental release.<br>○ Fueling of Project-related vehicles and equipment will take place at least 150 ft away from the water and within a containment area, preferably over an impervious surface. With respect to equipment that cannot be fueled on land, spill prevention booms will be employed in the water to contain potential spills. All fuel spilled will be cleaned up immediately.<br>○ Lubricants and excess oil will be disposed of in accordance with applicable federal, territorial, and local regulations, laws, ordinances, and permits.<br>○ Appropriate materials to contain and clean potential spills will be stored at the work site and be readily available.<br>○ All Project-related materials and equipment placed in the water will be free of pollutants and visually inspected for aquatic invasive species.<br>○ All equipment would be maintained in accordance with the manufacturer's specifications and daily pre-work inspections of heavy equipment for cleanliness and leaks would be conducted. All heavy equipment operations will be postponed or halted until leaks are repaired and equipment is cleaned.<br>○ All Project-related debris and other waste will be contained and will not enter or remain in the marine environment.<br>• For all in-water activities that require staging materials in the marine environment and/or be supported by divers (e.g. coral translocation), the Navy will ensure that these activities avoid any unnecessary contact with marine organisms, and avoid exposing corals directly or indirectly to taxicopathological agents (which includes sunscreens with harmful chemicals like oxybenzone, avobenzone, and oxycrylene).<br>• The proposed fuel storage system would be designed and constructed in accordance with appropriate federal and U.S. DoD regulations for petroleum fuel facilities, including UFC 3-460-01, and tropical requirements, including those outlined in UFC 3-301-01 and UFC 3-440-05N, which would minimize concerns related to spills and chemical runoff or infiltration into nearby marine environments.<br>• Stormwater control would be based on FAA Advisory Circular 150-5320-5D, UFC 3-201-01, and UFC 3-210-10, Low Impact Development, which would help minimize impacts on the marine environment from stormwater management. |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | | | • All vessels using the Seaport or waters surrounding Yap would adhere to stringent policy requirements that limit or preclude discharges of hazardous materials within 12 NM of land, where ballast water can be exchanged, and require in-port collection of sewage, graywater and oily waste when available in accordance with OPNAV M-5090.1 and the Military Sealift Command Civil Service Handbook, as applicable.<br>• During training activities, Navy ships would operate in accordance with OPNAV M-5090.1, Environmental Readiness Program Manual, which requires that ships have shipboard spill contingency plans for responding to onboard and overboard spills. Any spill as minimal as a sheen would be immediately acted upon to mitigate effects and reported in accordance with OPNAV M-5090.1 Chapter 5-3.15. |
| 3.4 | Marine Biological Resources | Sedimentation prevention | Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices (to be used only where practicable), and curtailment of work during adverse weather and tidal/flow conditions:<br>• Full-length or partial silt curtains could be installed immediately adjacent to and around the area of active work, to isolate and contain the in-water work area and prevent turbid water from flowing outside the project area. Silt curtains would partially or completely enclose the area of active construction activity to the maximum extent practicable to reduce effects on water quality. Silt curtains may not be practical in some areas due to rough environmental conditions that do not allow for their safe and effective deployment.<br>• Silt curtains would be deployed in a manner to avoid contact with corals.<br>• The Construction Contractor must continuously monitor to ensure that control measures are in place and functioning properly.<br>• If a visible plume is observed outside the silt curtains, construction activity will be suspended and evaluated, and corrective measures will be taken.<br>• Activity may resume after a problem is corrected.<br>• As practicable, work will be conducted during calm seas with work stoppages during high surf, winds, and currents.<br>• Any changes made to these silt curtain plans and/or BMPs by the contractor will be relayed through the Navy to Yap State. |
| 3.4 | Marine Biological Resources | Vessel transit protocols | In addition to the avoidance, minimization measures, BMPs, and potential mitigations for construction vehicles operating within the harbor, there would be additional requirements for vessels transiting from abroad to Yap carrying construction materials, fuels, or equipment:<br>• Vessel operations will only occur during ocean conditions that do not compromise safe operation, with contingency plans to cancel or delay the action for favorable weather conditions. |

| *EIS Sec. #* | *Resource* | *Avoidance/Minimization Measure* | *Description* |
|---|---|---|---|
| | | | • Operators will be particularly vigilant to watch for marine mammals, pinnipeds, and sea turtles, and remain at least 50 yards from ESA-listed marine species (XX yards when impact pile driving).<br>• Vessels will follow established transportation channels whenever practicable.<br>• Contracted vessels must meet the requirements of the International Maritime Organization (IMO) International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention). U.S. DoW vessels will follow DoW/Navy ballast water and hull fouling requirements.<br>• All vessels would adhere to biosecurity protocols/SOPs agreed upon by DoW and FSM. |
| 3.4 | Marine Biological Resources | Construction noise controls | • Other than dredging, nearly all construction noise would be limited to normal working hours and would return to ambient levels at the conclusion of the construction, and no pile driving would occur outside of daytime work hours or within 50 ft of any occupied vessels.<br>• The Project would use low-noise emission products, as certified by the USEPA, to the maximum extent practicable.<br>• For impact hammers used during pile driving, the power of the hammer would be reduced to minimum energy levels necessary, reducing the amount of noise produced in the marine environment.<br>• All construction-related boats would follow the International Regulations for Preventing Collisions at Sea (COLREGs). |
| 3.5 | Terrestrial Biological Resources (General) | Special status species observers and biosecurity protocols | • Use of qualified biological monitors to avoid adverse impacts on special status species.<br>• Implementation of biosecurity protocols agreed upon by DoW and FSM for incoming material and equipment and operations activities to avoid the introduction or spread of current invasive species. |
| 3.5 | Terrestrial Biological Resources (General) | Silt containment, erosion control, and water quality protection | • Effective silt containment techniques (e.g., silt fences, wattles) during construction activities, will be used where practicable.<br>• Implementation of erosion control measures along roadway construction, such as vegetated swales.<br>• Adherence to stormwater and wastewater treatment requirements.<br>• Assurance that all material and equipment are cleaned of pollutants before use.<br>• Proper disposal of all debris generated during construction or operations.<br>• Adherence to SWPPP by the construction contractor to reduce on-site erosion and sedimentation. The SWPPP would include BMPs similar to those described in under Marine Biological Resources – Water Pollution Prevention BMPs described earlier in this table. |
| 3.5 | Terrestrial Biological Resources | Avoidance of nesting seasons, pre-construction surveys, minimum | • To protect special status birds, to the degree practicable, tree-clearing activities would not occur during known nesting seasons (e.g., May through November during Yap monarch nesting). |

| EIS Sec. # | Resource | Avoidance/Minimization Measure | Description |
|---|---|---|---|
| | (Special Status Species) | distances, contractor training, transplantation | ○ If tree clearing activities cannot avoid nesting season, pre-construction surveys could be conducted to identify and avoid any active nests.<br>○ If an active nest is detected, a 25 ft buffer around the nest would be put in place until chicks/juveniles have fledged.<br>• Construction personnel would be trained to identify, avoid, and report active nests.<br>• Pre-construction Yap flying fox surveys in accordance with Joint Region Mariana Fruit Bat Monitoring Protocol (JRM, 2010) would be conducted no earlier than one week prior to construction activities commencing.<br>• If construction night work is required, a biological monitor would be required to observe for Yap flying fox activities during nighttime construction activities.<br>• All construction activities and construction or operations personnel would maintain a 492-ft distance from known Yap flying fox colonies.<br>• When construction activities would occur within 164 ft of a water source, or where standing water persists, a qualified biologist would conduct surveys for special status migratory birds<br>• Perimeter fencing would maintain a vegetation free area on either side of the fence to minimize entanglement with birds or bats.<br>• If special status plants are documented during pre-construction surveys, the U.S. Government would work in conjunction with the Department of Forestry and Agriculture to identify desirable locations to transplant the individuals and train local staff to monitor.<br>• To the degree practicable, culturally valuable plants identified by local experts would be made available for harvest by Yap practitioners prior to construction disturbance. |
| 3.5 | Terrestrial Biological Resources | Post-construction period protocols | • Remove, minimize, or reduce food sources or habitat on or near the airfield.<br>• All herbicides would be used according to label instructions.<br>• Prohibit planting or re-seeding with plants that are attractive to birds and bats.<br>• Conduct DNA analysis of snarge (animal remains that have collided with an aircraft) and annually analyze bird/wildlife aircraft strike hazard data to determine potential trends that could be associated with wildlife conflicts.<br>• Set up and operate a temporary biosecurity area at the Airport and Seaport during training activities, as needed. |
| 3.5 | Terrestrial Biological Resources | Invasive species prevention | • All cargo, equipment, containers, and vehicles associated with the military readiness activities would be required to meet the Armed Forces Pest Management Board Technical Guide No. 31 (AFPMB TG-31) cleanliness standards prior to arrival, prior to interisland movement, and prior to departing the FSM. |

| *EIS Sec. #* | *Resource* | *Avoidance/Minimization Measure* | *Description* |
|---|---|---|---|
| | | | • Construction equipment and materials would be biosecurity inspected (i.e., invasive species control) and treated (if needed) in accordance with biosecurity protocols agreed upon by DoW and FSM. |
| 3.5 | Terrestrial Biological Resources | Construction noise controls | • The construction contractors would use low-noise emission products, as certified by the USEPA. |
| 3.6 | Cultural Resources | Archaeological monitoring | • Use of qualified archaeological monitors to avoid adverse impacts on cultural resources during construction. |
| 3.6 | Cultural Resources | Cultural resources training | • Cultural resources training for all personnel who will have access to the project area. |
| 3.6 | Cultural Resources | Cultural resources avoidance | • Avoid cultural resources if possible and install physical barriers to prevent impacts. |
| 3.6 | Cultural Resources | Cultural resources documentation | • If impacts cannot be avoided, sites would be fully documented before they are impacted or removed. |
| 3.6 | Cultural Resources | Development of further BMPs | • Development and implementation of BMPs through consultation with historic partners and local community members. |
| 3.8 | Land Use | Maintain public access during construction | • Provide continued public/community access to important resources during the construction period to the extent practicable. |
| 3.8 | Land Use | Pre-construction notice | • Provide notice to adjacent landowners prior to initiating construction. |
| 3.8 | Land Use | Visual screening | • Erect construction fencing for dust suppression and visual screening. |
| 3.9 | Airspace | Coordination with Airport Manager | • Contractor to work closely with the Airport Manager to coordinate and plan construction period runway closures to minimize adverse impacts to commercial passenger and cargo flights. |
| 3.10 | Infrastructure and Utilities | Construction backup utilities | • Construction contractor provide own onsite backup utility systems (Power generation, water, wastewater) to support construction and workforce needs. |
| 3.10 | Infrastructure and Utilities | Low Impact Development (LID) | • Incorporate LID concepts in design to avoid offsite drainage impacts during construction and operation. |
| 3.10 | Infrastructure and Utilities | Contemporary construction standards and stormwater pollution prevention | • Follow construction standards per SOP and best management practices. |
| 3.11 | Transportation | Minimize impacts to airport operations | • Comply with the Construction Safety Phasing Plan (CSPP) to avoid and/or minimize impacts to existing passenger and cargo flights to the extent practicable during the construction period. |
| 3.11 | Transportation | In-water construction safety perimeter | • During dredging and other in-water construction, establish a safety perimeter with warning buoys and coordinate notices to mariners through the Yap State Department of Public Works and Transportation. |

| *EIS Sec. #* | *Resource* | *Avoidance/Minimization Measure* | *Description* |
|---|---|---|---|
| 3.11 | Transportation | Exclusion zone design | • During Seaport training exercises/port visits, design all exclusion zones to allow commercial and recreational boat traffic sufficient space for safe navigation within the port and harbor. |
| 3.11 | Transportation | Repair and maintenance of haul routes | • Conduct ongoing repair and maintenance of roadways used for hauling during the construction process. |
| 3.11 | Transportation | Avoid peak traffic hours | • Avoid construction related hauling trips during peak traffic hours (7:45-8:45 AM and 4:45-5:45 PM). |
| 3.11 | Transportation | Coordinate traffic lane closures | • Coordinate all lane closures well in advance with the Yap State Department of Public Works and Transportation, and provide advance notice to drivers through signage. |
| 3.12 | Public Health & Safety | Construction safety protocols | • Clear and visible barriers and signage during construction; maintain stringent vehicle, harbor vessel and personnel controls during construction; require use of PPE; maintain clear communication with Airport and Seaport operators; timely notifications to Airport and Seaport users. |
| 3.12 | Public Health & Safety | Medical screening and service | • Contractor required to provide own medical personnel to service employees. Pre-employment medical screening. |
| 3.12 | Public Health & Safety | Crime prevention | • Vet potential construction employees through criminal background checks. Contractor provided security personnel for Airport and Seaport work areas and construction camps. |
| 3.13 | Hazardous Materials and Wastes | Hazardous material abatement | • Hazardous material abatement would occur prior to demolition activities. Abatement activities would be performed by a qualified subcontractor that is licensed to perform hazardous material abatement. Abatement efforts would comply with applicable requirements. |
| 3.13 | Hazardous Materials and Wastes | Hazardous waste disposal | • Because there are no hazardous waste disposal facilities in Yap, all hazardous waste will be appropriately containerized and managed for off-island disposal at a certified facility. |
| 3.14 | Socioeconomics | Avoid impacts from training on the local economy | • U.S. DoW will coordinate with FSM and Yap State Authorities well in advance of training exercises to ensure that the training avoids or minimizes potential adverse impacts on the local economy and community. |
| 3.14 | Socioeconomics | Avoid impact to local housing market during construction period | • Contractor-provided worker camps to provide housing for construction employees. Camps would provide food, water and medical services to employees, including Yap residents. |
| 3.14 | Socioeconomics | Avoid impact to local housing market during operational period | • Training commands to provide temporary expeditionary camps to accommodate up to 200 training personnel while on-island. |
| 3.14 | Socioeconomics | Construction period | • Establish hiring preferences for FSM residents. |

# 3 Affected Environment and Environmental Consequences

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing any of the alternatives and an analysis of the reasonably foreseeable effects of each alternative.

All potentially relevant environmental resource areas were initially considered for analysis in this EIS. In compliance with NEPA and U.S. Department of Defense NEPA Implementing Procedures, the environmental analysis focuses only on those resource areas potentially subject to reasonably foreseeable effects. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

U.S. Department of Defense NEPA Implementing Procedures define reasonably foreseeable as "sufficiently likely to occur such that a person of ordinary prudence would take it into account in reaching a decision." If an effect is determined to be reasonably foreseeable, the Action Proponent considers the potentially affected environment and degree of the effect. In determining if the degree of effect, the Action Proponent may consider the following, as appropriate to the specific action:

- short-term and long-term effects
- beneficial and adverse effects
- effects on public health and safety
- economic effects
- effects on the quality of life

The environmental resource areas analyzed in detail in this EIS include: topography, geology, and soils; water resources; air quality and greenhouse gases; marine biological resources; terrestrial biological resources; cultural resources; noise; land use; airspace; infrastructure and utilities; transportation; public health and safety; hazardous materials and wastes; and socioeconomics.

The potential impacts to the following resource areas are considered to be negligible or non-existent so they were not analyzed in detail in this EIS:

**Visual Resources:** Impacts would not be reasonably foreseeable because (1), changes would not visually alter the character of the landscapes at Airport or Seaport (2), the projects are horizontal elements to an already altered landscape and (3) there are no existing public view plane studies suggesting viewing either area is of cultural or public importance.

**Public Access:** Impacts would not be reasonably foreseeable because access to the Airport and Seaport is regulated by Yap State and it will continue oversight through the construction and post-construction period. Some restrictions will be imposed for safety reasons during construction but again, coordinated through Yap State.

Environmental Standard Operating Procedures

Under section 161(a)(3) of the CoFA, the U.S. is required to comply with standards substantively similar to those required by the Endangered Species Act of 1973, as amended; the Clean Air Act, as amended; the Clean Water Act, as amended (Federal Water Pollution Control Act); Title I

of the Marine Protection, Research and Sanctuaries Act of 1972 (Ocean Dumping Act); the Toxic Substances Control Act, as amended; and the Solid Waste Disposal Act, as amended.

Section 161(a)(4) of Article VI of the COFA requires the U.S. to develop written standards and procedures, as agreed with the Government of the FSM, to implement the substantive provisions of the statutes made applicable to U.S. Government activities under Section 161(a)(3) of the CoFA prior to conducting any activity requiring the preparation of an EIS (such as the proposed Airport and Seaport improvements). The following Draft SOPs, provided in Appendix A, are being prepared in coordination with FSM National and Yap State Officials under Section 161(a)(4) of the COFA:

1. Environmental Compliance SOP
2. Endangered Species Act SOP

In addition, the following Draft SOPs, also provided in Appendix A, are being developed in coordination with FSM National and Yap State Officials:

1. National Environmental Policy Act SOP
2. Cultural Resources Consultation SOP
3. Biosecurity SOP

**Impact Determination Definitions and Assumptions**

A standard set of five potential impact determinations were assigned to each of the two action alternatives: Alternative 1 (Preferred Alternative), Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal); and the No Action Alternative based on a detailed analysis of reasonably foreseeable effects. For the action alternatives, impact determinations were assigned to both the construction and post-construction periods.

A key assumption underlying the impact determinations is that all BMPs and avoidance and minimization measures (Table 2-8) would be implemented and the Proposed Action would comply with the SOPs. The impact determination hierarchy is summarized in Table 3-1 below.

**Table 3-1 Environmental Impact Determination Hierarchy**

| Scale | Determination |
|---|---|
| Adverse Impact to Beneficial Impact | Significant adverse impact |
| | Less than significant adverse impact |
| | No impact |
| | Less than significant beneficial impact |
| | Significant beneficial impact |

## 3.1 Topography, Geology, and Soils

Topography, geology, and soils describe surface and subsurface features of land. Topography is typically described with respect to the elevation, slope, and surface features found within a given area. Geology is characterized by the physical features of the earth and includes rock type, geologic structure and mineral deposits. Soil refers to unconsolidated earthen materials overlying bedrock or other parent material. This section of the EIS discusses the impact of Airport and Seaport improvements on topography, geology, and soils.

The Proposed Action also includes placement and temporary storage of dredged material at several stockpile sites which were selected in consultation with local government entities. Upon placement of the dredged material, the sediments would become part of the surface soils at those sites and are addressed in this section as such. Other dredging-related issues, including bathymetry, water quality, and marine biology are discussed in other sections of this EIS (Section 3.2, Water Resources, Section 3.4, Marine Biological Resources).

Following placement of the dredged material, the stockpile sites would be turned over to the local governments which would assume responsibility for their long-term management and use. Long-term management of the stockpiles is outside the scope of the Proposed Action.

## 3.1.1 Affected Environment

### 3.1.1.1 Topography

Yap Proper is made up of four main islands: Yap Island, Gagil-Tamil, Maap, and Rumung. The four islands are separated by relatively narrow water features, and the islands are surrounded by a common coral reef. The islands of Yap are characterized by rolling hills, valleys, and a surrounding fringing reef, with coastal areas featuring beaches, mangrove swamps, and cliffs.

Yap was formed from an uplift of the Philippine Sea Plate and is referred to as a “high” island as opposed to an atoll. The topography of Yap consists of a central, high-elevation island with rolling hills and a highest point of 568 ft at Mount Taabiywol. The main island is thickly wooded with some areas of natural savanna and mangrove swamps along the coast, and beaches on its northwestern side. Yap's outer islands, in contrast, are mostly low-lying coral atolls.

#### 3.1.1.1.1 Airport

The Airport is located on a relatively broad upland area with gently rolling terrain that slopes generally toward the coast to the south and southeast. The existing runway is at an elevation of about 90 ft. Land to the east and west of the runway in the areas of the proposed runway extensions are open fields since they are located close to both runway end approaches. The areas north of the runway are at higher elevation with rolling topography and the areas to the south are generally at a lower elevation with the exception of one hill to the southeast of the existing runway.

A topographic survey conducted using LiDAR was conducted by AECOM in support of the Airport Layout Plan. Topographic data notes the range in elevation around the Airport is from 16 ft above mean sea level on the south up to 276 ft on the north. Grades on both north and south sides of the runway were noted as challenging for development, requiring significant amounts of cut (on the north) and fill (on the south). The analysis indicates that except for the runway, civilian terminal apron, and other smaller areas on the Airport property, slopes for the majority of the land surrounding the runway will present a challenge to development and increase development costs (USINDOPACOM, 2024).

#### 3.1.1.1.2 Seaport

The Seaport is located along the shoreline of Colonia Harbor and consists largely of reclaimed and developed land with relatively flat topography. The Yap Seaport area and the connector road around Chamorro Bay are at sea level with flat topography. The Seaport project area, most

of which is fenced, is paved and relatively flat. The remaining area of the port is unpaved and slopes toward the ocean. Based on the available topographic survey data, the ground surface at the existing port generally slopes down from the north to the south, with ground surface elevations ranging from +4.5 to +9.9 ft MLLW.

#### 3.1.1.1.2.1 Airport-to-Seaport Connector Road

The topography along the Airport-to-Seaport connector road corridor varies from near sea level around Chamorro Bay, and gradually rises as the road heads west, topping out at just over 100 ft elevation near the GPPC baseyard, southeast of the Airport.

#### 3.1.1.1.2.2 Stockpiling Sites

As described in Chapter 2, dredged material from the Seaport wharf area, Colonia Harbor channel entrance, and harbor turning basin would total approximately 106,500 CY and would be placed at three sites: a) Tamil Dredge Material Stockpile; b) Rull Dredge Material Stockpile; and c) Nungoch Dredge Material Stockpile/Land Reclamation.

The proposed Tamil stockpile site is located approximately one mile from the shoreline groin where the dredged material will be offloaded. Material would be trucked uphill to the northeast to the stockpile site, which has fairly level topography.

At the Rull site, material offloading and stockpiling would occur adjacent to the shoreline, in an area with level terrain. Stockpiling at Rull would include less than one acre of upland area and approximately one half-acre of submerged land in the adjacent nearshore area to the south. In the submerged area, the benthic composition is characterized as sand and rubble (67.8 percent), live coral (22.0 percent), dead coral (9.4 percent), and other, with small patches of seagrass. The marine environment at the Rull offload area is discussed in more detail in Section 3.2, Water Resources.

The Nungoch stockpile and land reclamation area is located at the southwestern tip of the Nungoch peninsula, which has flat topography. Approximately 2.2 acres of new land would be created at the tip of the peninsula. The composition of the benthic area where sediment would be placed is composed of sand and rubble (61.6 percent), live coral (12.7 percent), dead coral (7.4 percent), algae (7.1 percent, with the remainder as seagrass and other (NAVFAC Pacific, 2023).

### 3.1.1.2 Geology

The geology of Yap is distinctive among high islands. Rather than forming from volcanic activity, Yap originated from metamorphic and volcanic rocks that uplifted from the Philippine Sea Plate. As a result, the island is geologically different from most Pacific islands, which are typically composed of basaltic volcanic rocks or uplifted coral limestone.

Yap lies within a tectonically active region associated with the Yap Trench and the nearby Palau and Mariana trenches. These submarine ridges and trenches form the boundary between the Philippine Sea and the Pacific Ocean. Oceanic trenches are long, narrow depressions on the ocean floor created when tectonic plates collide and one plate is forced beneath another, a process known as subduction. The Yap Trench marks a particularly complex area where the Philippine, Pacific, and Caroline plates converge (Geolabs, Inc., 2024).

Where other islands in the region have raised coral reefs that over time became coralline limestone or basalt, the islands of Yap are composed mainly of accretionary metamorphic rock. From the western coast of Yap Island to the eastern coast of Tamil Island, the metamorphic grade increases from greenschist facies to amphibolite facies in the eastward direction. Metamorphic grade of rocks refers to the level of pressure and temperature that rocks experience during their formation, and affects the rock's density, strength, stability, and permeability.

The dominant bedrock on Yap, known as the Yap Formation, consists largely of greenschist—a gray-brown to dark colored metamorphic rock formed under relatively low temperatures and pressures. Greenschist is composed of platy minerals; in geology, "platy" describes rocks with thin, sheet-like layers, which causes greenschist to split easily along those planes. Because of this structure, weathered greenschist can degrade when exposed to moisture and mechanical disturbance, affecting its suitability for use as construction material. Without proper stabilization, drainage, and maintenance, greenschist used as fill or pavement subbase can degrade significantly as moisture increases.

Overlying the bedrock schist is a layer of silty sandy clay with varying amounts of gravel. Across Yap, alluvial deposits of clay, silt, sand, and gravel occupy valley bottoms, beaches, and mangrove swamps. Black muck—a fine organic sediment—occurs within mangrove areas that line much of the shoreline. This muck is thinner and more compacted near the shore. Surrounding the island group is a fringing coral reef composed of limestone derived from the calcium-carbonate skeletons of marine organisms (Jacobs/Burns McDonnell, 2025).

#### 3.1.1.3 Soils

Soils refer to the unconsolidated earthen materials overlying bedrock or other parent material. In the case of Yap, it is the material overlying the metamorphic Yap Formation described above. Soil structure, elasticity, strength, shrink-swell potential, and erodibility determine the ability for the ground to support structures and facilities, which have implications for design and construction. This section discusses soils in the Airport and Seaport project areas, as described in geotechnical studies (Jacobs/Burns McDonnell, 2025; Geolabs, Inc., 2024) conducted as part of the design process. There is also a discussion of the marine sediments that will be dredged and placed at stockpile sites, as well as used for land reclamation. Upon placement, they will become part of the area soils.

##### 3.1.1.3.1 Airport

Improvements at the Airport include lengthening the existing runway both to the east and west of the existing runway footprint. These areas are currently open fields with grasses and brush. The new parking apron and taxiway is proposed adjacent to the northside of the runway. This area has a higher, rolling elevation, with vegetation becoming denser north beyond the airfield fence line.

The environmental baseline survey for the Airport identified four geological formations within the Airport project area: 1) The Yap Formation; 2) Tamil volcanics, described as being composed of "andesitic and basaltic volcanic breccias, conglomerates, lava flows, and tuffs" (NAVFAC Pacific 2024b); 3) Alluvium, found in marshy environments in the southern part of the project

area; and 4) Mangrove swamp deposits are found in the southern project area, which contains organic-rich soils composed of muck, sand, silt, and clay.

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) described seven different soil series in the Airport area (Element Environmental, 2025). The soil types are shown in Figure 3-1. The following are the NRCS descriptions (USDA NRCS, 2024):

- Gitam very gravelly silty clay loam, 0 to 12% slopes, comprises the most prevalent soil series in the survey area. This moderately deep and somewhat poorly drained soil is formed on plains in materials derived from schist. Depth to solid bedrock is typically 90 centimeters.
- The Rumung-Weloy complex, 12% to 50% slopes, is present on low-lying foothills within the northern portion of the survey area and within small pockets in the central portion (USDA NRCS 2024). It is composed of approximately 45% Rumung gravelly silt loam and 35% Weloy gravelly silty clay loam. Rumung and Weloy soils formed in residuum derived from schist and are well drained. Rumung soil is typically shallow (25 to 30 centimeters to bedrock), while Weloy soil is moderately deep (50 to 62 centimeters to bedrock).
- Gagil silty clay loam, from 2% to 30% slopes, is mapped along the southern boundary of the survey area (USDA NRCS 2024). The Gagil series formed in highly weathered volcanic breccia and tuff on central uplands and is very deep and well-drained.
- Dechel mucky silt loam, 0% to 2% slopes, is found in the southcentral and eastern portions of the survey area. This soil series formed in alluvium from volcanic rock and schist and is found on valley floors (USDA NRCS 2024). It is very deep (80 centimeters to bedrock) and poorly drained.
- Mesei mucky peat, 0% to 1% slopes, is found in a small pocket along the southern boundary of the survey area. It is formed in organic deposits overlying alluvium on bottom lands, is very deep (80 cm to bedrock), and is very poorly drained.
- Ilachetomel peat, 0% to 1% slopes, is present in a small pocket in the southern portion of the survey area (USDA NRCS 2024). This soil is formed by decomposing mangrove roots and litter in intertidal zones; it is very deep and very poorly drained.
- Yap silty clay loam, 2% to 6% slopes, is present in the northwest corner of the survey area. The soil series formed in material derived from volcanic breccia and tuff, is very deep and well-drained and found on ridges.

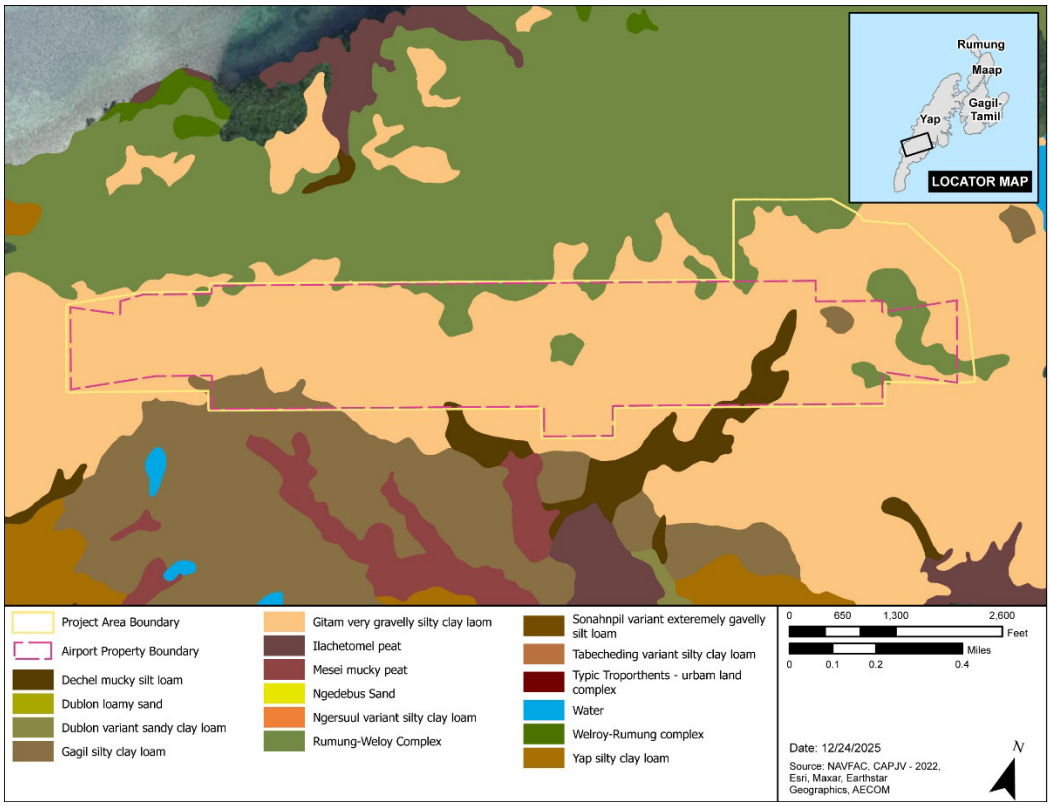



**Figure 3-1 Airport Area Soils**

A Geotechnical Report for the Airport (Jacobs/Burns McDonnell, 2025) indicates that within the area of the existing airfield and the proposed parking apron and taxiway extensions to the north, the overlying soils, referred to in the report as "overburden," generally range from less than ten feet to five feet or less in thickness before weathered schist bedrock is encountered. These soils vary considerably in composition, including both cohesive and non-cohesive materials with grain sizes ranging from silt to gravel. Perched ground water is expected in isolated locations, but the long-term ground water at this site is anticipated to be located near sea level. Geotechnical analysis has noted that prior runway pavement failure at the Airport was mostly attributed to the use of local schist aggregates for the base course and/or drainage layer material. This aggregate broke down over time, weakening the base course and drainage layer.

The geotechnical report (Jacobs/Burns & McDonnell, 2025) identified several conditions relevant to construction at the Airport:

1. Shear strength and compressibility of the upper soils will control the behavior of the proposed structures, slopes, and pavements;
2. Variable weathering of schist leading to difficult excavation conditions;
3. Dissimilar bearing materials at foundation and subgrade elevations that could result in differential movement/settlement;
4. Addition of up to 60 ft of fill requiring settlement monitoring prior to paving operations or structural fill placement beneath structures;

5. Plastic clays in cut areas possibly requiring remediation;
6. Localized wet areas and schist affecting compaction; requiring drying of some on-site soils or pulverizing to achieve proper compaction during grading; and
7. Sensitive near-surface soils that may present mobility challenges for conventional equipment.

#### 3.1.1.3.2 Seaport

A significant portion of the Seaport project area is reclaimed land. Along the shoreline and at the port facility, land development and reclamation have added man-made fills that shaped the present wharf configuration and shoreline profile.

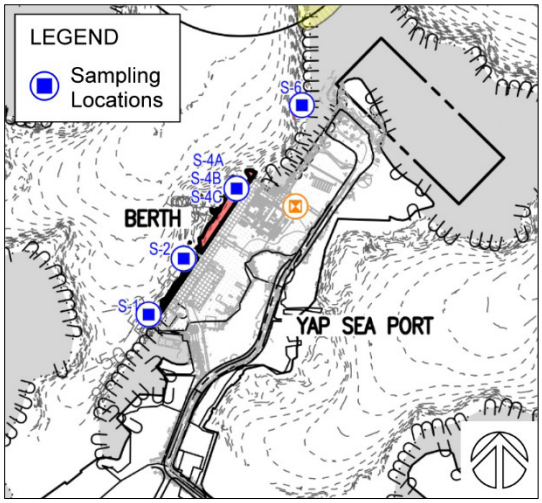
The geotechnical report for the Seaport area (Geolabs, Inc., 2024) generally encountered 2 to 8 inches of concrete pavement underlain by surface fill materials extending to depths from about 2 to 41 ft. The surface fill materials generally consist of loose to very dense silty and gravelly sand, silty and sandy gravel, and stiff to hard sandy silt and clayey silt. These surface fills were underlain by coralline deposits at depths from about 16 to 72 ft. The coralline deposits were underlain by interbedded layers of weathered schist and schist formation. The geotechnical study described the general characteristics of each of the stratigraphic units, from newest (closest to surface) to oldest:

- Made Land (ml). This stratigraphic unit represents lands that were reclaimed from the adjacent shallow waters from Colonia Harbor. Most of the fill materials placed on these shallow waters were either dredged from the bottom of the harbor or acquired from the reefs located in areas east of Colonia. The materials used for the man-made land were predominantly lime sand, gravel, coral, and minimal amounts of clay.
- Coralline Limestone (Qls). This unit consists of fossil remnants of coral-algal reefs and their detrital debris deposits. The detrital deposits are weakly to strongly cemented coralline debris consisting of gravel, sand and silt-sized clastic fragments. Some of the coralline fragments were dissolved, and the solution cavities were filled with cemented and/or uncemented fine sands and silts.
- Yap Formation (pTy). Yap formation represents the oldest and lowest exposed basement rock on the island. It consists primarily of a complex assemblage of metamorphic rocks. Near Colonia, highly weathered greenschist is encountered beneath the reef. Structurally, the schist formation is among the strongest materials identified within the project area. Although it provides excellent load-bearing capacity in its undisturbed state, in portions of the project site, the depth to the top of the schist limits its practical use for foundation support.

##### 3.1.1.3.2.1 Dredged Material

The physical, chemical and biological characteristics of dredged material determine its potential reuse and can affect the environment during dredging, transport, and stockpiling. Geotechnical investigation was conducted for proposed dredge areas. Boring logs from the main wharf extension area characterize the physical characteristics of the sediment as silty sand with coral block and fragment overlaying bedrock (schist). Sediment samples were collected for chemical analysis and bioassay to evaluate potential dredged material management options. Sediment

boring locations at the wharf area are shown in Figure 3-2 below. Bioassay samples were also taken in the berth, turning basin, and Waneday Channel dredging areas.




Source: NAVFAC Southwest, November 2024

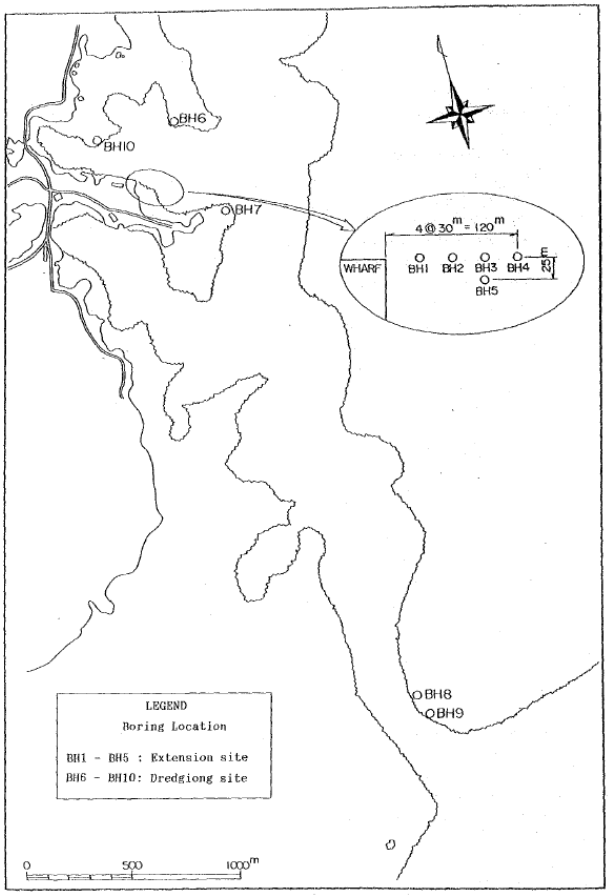
**Figure 3-2 Marine Sediment Sampling Locations**

Chemical analysis of the proposed dredge sediments indicates there may be sediments exceeding Tropical Pacific Environmental Screening Levels (TPESLs) present at the berth (NAVFAC Southwest, November 2024). Therefore, sediment from the berth area is not suitable for unconditional reuse and is proposed to be used as fill at an industrial use site. Sediment from the turning basin and channel dredging areas is suitable for unrestricted reuse, as analytical results from bioassay and chemical analysis did not indicate TPESL exceedances for unrestricted land use. Additionally, bioassay results indicate the material from all proposed dredge areas was compliant with the limiting permissible concentration for bioaccumulation, which indicates there is no potential for adverse toxicity effects to sensitive marine organisms from dredge area sediment (NAVFAC Southwest, November 2024).

Historic information is also available from prior studies. In 1990, a geotechnical investigation was performed by the Japan International Cooperation Agency (JICA) in conjunction with a project for a wharf extension and channel dredging. The purpose of that dredging effort was to address maritime safety conditions associated with the channel configuration and protruding shallows in the approach channel and turning basin. Soil borings were conducted at the channel dredging area, the turning basin dredging area, and the wharf extension area, with boring log data obtained at ten points. Five of ten borings from the 1990 project, shown as B6 to B10 in Figure 3-3 below, are expected to reflect conditions in the current dredging areas. The nature of the ground soil was described as follows (JICA, 1990):

- Port mouth channel dredging area. Sea bottom layer at the port mouth entrance dredging area (BH9) consists of a hard layer of coral reef with dense silty sand mixture, and underneath layer is silty sand of dense consistency.
- Dredging area off Donich Island. Soil layer in area off the sewage disposal plant at Donich Island (BH7) consists of three ft thick coral layer at top with underneath silty layer of medium consistency containing coral fragments.

- Turning basin dredging area. Soil layer in the turning basin expansion dredging area (BH6) in front of the existing wharf are similar to that of BH7. Top of sea bottom is covered by one ft thick coral reef buried in silty sand, and underneath is silty sand containing coral fragments.




Source: JICA, 1990

**Figure 3-3 1990 Channel Boring Locations**

In 2024, channel areas to be dredged were investigated through a debris survey using a remotely operated vehicle (ROV) (Sea Engineering, 2024) and using information from the prior 1990 core borings (JICA, 1990). For the 2024 debris survey, eight perpendicular transects were conducted across the channel width. The survey revealed that the substrate in the center of the channel was sand and silt, transitioning in one transect to low relief rubble, and becoming progressively more rocky and rubbly moving offshore. Abundant live coral was present along the transect furthest from the port.

#### 3.1.1.3.3 Erosion

Soil erosion in Yap is a significant issue driven by its tropical climate, high rainfall, and human activities like deforestation and agriculture, which have replaced traditional land management systems. Yap receives a significant amount of annual rainfall, including intense downpours during the monsoon season, which extends from May through November. Human activities such as clearing forests for agriculture or other land uses remove the natural protective canopy and soil-binding roots. Agricultural practices like clear-cutting for new fields can expose or

disturb the soil. Wildfires, which can be a problem in the dry season, make the soil susceptible to erosion. Coastal erosion is also driven by significant rainfall and coastal exposure to waves and rising sea levels. A 2017 assessment of coastal degradation in Yap found that coastal erosion is particularly severe on northern and western parts of the islands exposed to the reef, which lacks natural protection like mangroves (Pacific R2R, 2017).

Mangroves found along the shoreline continue to play a crucial role in preventing coastal erosion on Yap by acting as a natural buffer, dissipating wave energy and stabilizing the shoreline. Their dense, intricate root systems are specifically adapted to anchor sediment and protect the coast from the destructive forces of waves, tides, and storm surges. They also protect water quality by filtering pollutants and trapping sediments.

Traditional Yapese land management practices such as tree gardens (which mimic natural forests), taro patches (which act as silt traps), and stone-lined ditches (to manage water runoff) were effective at mitigating erosion (U.S. Forest Service, 1990). However, modern challenges, including increasing sea level rise, have made erosion control a more urgent concern. The impacts of coastal erosion and the role of mangroves are discussed further in Section 3.2, Water Resources.

There are existing erosion problems at both the Airport and Seaport areas due to inadequate stormwater drainage systems. These stormwater systems are described in Section 3.10.1.3. At the airfield, the existing stormwater system was designed to collect, convey, and discharge stormwater but did not include measures to detain or treat the runoff, resulting in erosion and sedimentation to downstream areas. At the Seaport, stormwater drains via sheet flow to catchment basins and drains throughout the paved deck and then directly into the ocean without treatment. Stormwater drainage at both the Airport and Seaport results in sedimentation and erosion into receiving waters.

### 3.1.2 Environmental Consequences

The analysis of geological resources (including topography and soils) evaluates how the proposed project would alter existing surface and subsurface physical conditions and whether those changes would result in adverse environmental effects. The analysis addresses the construction phase and post-construction phase separately, and focuses on changes to landform, geologic stability, soil characteristics, and sediment runoff.

#### 3.1.2.1 Analysis Method

At the Airport, existing geological conditions (topography, geology and soils) influence the project design and construction methods including the configuration of the runway, utilities, drainage systems, and other structures. These conditions affect foundation design, excavation requirements, cut and fill balances, slope stability, and erosion control needs. In addition, geologic conditions and soil properties also influence the availability and suitability of local construction materials (e.g., aggregate, base course, and fill) and the selection of appropriate construction techniques.

At the Seaport, the environmental analysis also considers the physical and chemical characteristics of the marine sediments proposed for placement at three stockpile sites. Sediment characteristics influence dredging methods, handling and placement of dredged material, suitability for reuse, and the design and stability of dredged material stockpiles.

Project effects on topography, geology, and soils are evaluated qualitatively based on the following criteria:

- Extent of land disturbance, including the amount of grading, excavation, fill placement and alteration of existing landforms;
- Changes to drainage patterns, surface runoff characteristics, and infiltration capacity;
- Potential for soil erosion or sedimentation, including off-site transport to downstream or marine environments;
- Effects on soil stability, including slope failure, settlement, or subsidence;
- Geologic hazards, including exposure to seismic hazards; and
- Compatibility of site conditions with proposed structures and uses, including post-construction and training activity.

Construction phase impacts to geological conditions are associated with ground disturbance, including the placement of fill and/or dredged material. Although the project construction phase will extend up to 7.25 years including mobilization/demobilization, most of the ground disturbing activity at the Airport and Seaport will occur during the first two years. Grading and earthwork would be conducted in accordance with engineered design plans to ensure slope stability, drainage control, and long-term structural integrity.

Post-construction impacts consider long-term changes to surface conditions, including stormwater runoff, erosion potential, and sediment transport resulting from training activities at the Airport and Seaport.

The significance of impacts is based on their magnitude, duration, geographic extent, and reversibility. BMPs and design features, e.g., erosion and sediment control measures, slope stabilization, drainage improvements and detention systems, are incorporated to avoid or minimize adverse effects.

Impacts are considered:

- Less than significant if project activities would not substantially alter existing topography, soil stability, drainage conditions, or erosion patterns, and if erosion can be effectively controlled with BMP measures
- Significant if the project would cause substantial or widespread alteration of the landform, create soil instability, substantially increase erosion or sedimentation, or increase geologic hazards
- Beneficial if the project improves existing conditions, including reducing erosion, stabilizing soils, or improving stormwater management compared to existing baseline conditions

#### 3.1.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no drainage improvements at the Airport, Seaport and along the Airport-to-Seaport connector road. There would be no change to baseline geology, topography, or soils.

Although there would be no land disturbance and no increase in impermeable surfaces, the many beneficial aspects of the project would be lost, specifically stormwater system improvements that would prevent future erosion and sedimentation problems. Negative

impacts to soils, land stability, erosion, and water quality would continue, and over time, are likely to become more pronounced.

The poorly functioning drainage system at the Airport would remain, resulting in continued uncontrolled sedimentation, erosion, adverse water quality impacts downstream, and potentially negative impacts on coastal biota. Airport facility managers would continue to employ stop gap measures such as planting trees to control erosion, requiring ongoing maintenance that takes time away from other tasks.

At the Seaport, there would be no drainage improvements at the existing wharf. Current ponding issues would continue. The deposition of sediment around the end of Nungoch peninsula and sediment build-up along the face of the existing Yap wharf has been documented (NAVFAC Southwest, October 2024a). Under No Action, untreated stormwater runoff would continue to sheet flow into the harbor and the depth at the wharf face will continue to decrease due to sediment accumulation.

The proposed Tamil, Rull and Nungoch stockpiling sites would remain unchanged, and there would be no land reclamation at Rull or Nungoch. With No Action, dredged sediment would not be available to the local governments to be used for fill, construction material, beach nourishment, wetland restoration, and other beneficial uses.

No Action would be a less than significant adverse impact, which over time, could become a significant adverse impact.

#### 3.1.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

The study area for this resource encompasses the Airport, Seaport, and roadway areas where construction and ground disturbing activities are proposed. It also includes the dredged material stockpile areas at Tamil, Rull, and Nungoch. Potential offsite effects are also considered, including downstream areas or marine environments.

##### 3.1.2.3.1 Avoidance, Minimization Measures and Best Management Practices

###### 3.1.2.3.1.1 Construction Activity

The construction contractor would develop and implement an environmental compliance plan (ECP) pursuant to the Environmental SOP. The compliance plan will include BMPs and construction-specific management practices such as detention ponds, swales, sediment control logs, rock check dams, inlet protection, rock berms, , mulch, and erosion control blankets to provide erosion and sediment control during construction. These on-site measures would reduce the flow and velocity of stormwater and minimize the transport of soils and sediment off site. The plan would include an inspection and monitoring protocol through the construction phase.

###### 3.1.2.3.1.2 Stockpiling and Reuse of Marine Sediments

The *100% Dredging Strategy Report* (NAVFAC Southwest, November 2024) identifies the following avoidance and minimization measures for reducing impacts associated with the stockpiling and use of dredged material (marine sediments).

- Area Selection: Limit the footprint of stockpiles to areas of historical disturbance, low ecological value or areas designated for future development where possible.

- Beneficial Reuse: Use cemented dredged materials as reclamation bunding (i.e., earthen barriers to manage water and soil for land restoration) where suitable and supplemented with locally available rock (if needed). Dredged sediments can also be used to create bunds if used to fill geotubes/geotextile containers. Remaining dredged material can be stockpiled behind bunds for beneficial reuse as construction material or reclamation fill.
- Adhere to regional appropriate regional and local guidelines and environmental practices which describe appropriate techniques to prevent erosion and control sediment for activities involving clearing, grading, stockpiling and earthmoving at construction sites. Typical controls include implementing operational procedures and contingency plans, regulating traffic frequency and speed, and establishing management and monitoring protocols [such as] the use of silt fencing [as illustrated]. Turbidity curtains, flexible floating barriers can also be employed to contain suspended sediment within intertidal stockpile sites until shoreline stabilization works are completed.
- Site Access Considerations: Construct stabilized construction entrances to minimize sediment and mud tracking. These entrances consist of temporary crushed rock or coral pads located at all points where vehicles enter or exit a construction site. Wash stations would be available for all vehicles entering and exiting the site.

#### 3.1.2.3.2 Construction Impacts

The analysis below has determined that during the construction period, the Proposed Action would result in less than significant adverse impacts to topography, geology and soils, including soils associated with dredged material placement. Work at the Airport would involve substantial earthwork, including excavation, grading, and placement of fill. However, these activities would occur within the defined project footprint. Potential effects such as erosion, sediment transport, and soil instability would be minimized through project design measures and implementation of BMPs, including erosion and sediment control measures, slope stabilization, and stormwater management. The analysis of individual resource areas is provided below.

##### 3.1.2.3.2.1 Topography

**Airport**

The existing topography in the areas planned for the aircraft parking apron and taxiway are at higher elevations than the existing runway and would require extensive cutting to reach required runway grades and slopes. Approximately three million cubic yards (CY) of excavation and fill would be required. Most excavation would occur along the northwest length of the airfield, while fill would be primarily along the east and southwest ends. Cut depths would generally range from 15 to 35 ft, with a maximum up to 85-90 ft, while fills would generally range from 10 to 25 ft with a maximum up to 60 ft.

Modification of the topography around the airfield is needed to meet current runway safety and design standards and provide a long-term operational benefit. The magnitude of grading, the large volume of cut and fill, and the spatial extent and duration of earthmoving activities represent a substantial but planned alteration of the existing land surface. Grading and earthwork would be conducted in accordance with grading and drainage plans prepared by

qualified geotechnical and civil engineers to ensure slope stability, appropriate drainage, and long-term structural integrity of the airfield facilities. Because the changes are confined to the project footprint and are part of a planned project to enhance the physical environment, the overall construction-period impact to topography is considered a less than significant adverse impact.

**Seaport/Dredged Material Stockpile Sites**

During the construction period, there would be no discernible impact to topography at the Seaport and along the Airport-to-Seaport connector road. Minor grading would be required for road rehabilitation and repaving.

The placement of dredged material at the Rull, Tamil, and Nungoch would temporarily modify the topography of the three stockpile sites, and at Rull and Nungoch, create new reclaimed land in the nearshore areas. As described in Chapter 2, topographic changes at the stockpile sites would occur as follows:

- **Tamil Stockpile Site:** Approximately 2.6 acres would be used to stockpile about 54,000 CY of dredge material generated from the east (Tamil) side of the channel entrance. Stockpiled material would reach a height of about 20 ft.
- **Rull Stockpile Site:** Approximately 24,000 CY of dredged material from the west side of the entrance channel would be placed at this site. The proposed offloading and stockpiling would include approximately 0.8 acres of total stockpiling and including approximately 1.0 acres of stockpiling in the adjacent nearshore area. Offloading the dredge material would require additional dredging to provide barge access. The stockpile would reach a height of approximately 16 ft.
- **Nungoch Stockpile/Land Reclamation Site:** This currently submerged area at the southwestern tip of the Nungoch peninsula would receive approximately 26,000 CY of dredged material from the wharf face and turning basin, creating an approximately 2.2-acre land reclamation area to be used as a park. The final elevation would match the existing adjacent fastland. The reclaimed area would be stabilized and integrated with the existing shoreline resulting in a permanent but localized modification of the nearshore topography.

At the Tamil and Rull sites, the existing topography would be substantially altered as the dredged material is stockpiled, reaching heights up to 20 ft. Although these stockpiles are not intended to be permanent and are expected to be reused for local construction or infrastructure projects, they may remain in place for several years following completion of dredging until beneficial reuse occurs. Once the dredging phase is completed, the stockpiles will be turned over to the local government, which will be responsible for long-term management, stabilization, and erosion control.

At Nungoch, the placement of dredged material would permanently modify the nearshore surface by converting submerged benthic habitat to fastland.

Due to the localized extent, engineered design, and planned beneficial reuse of the dredged material, these construction-period impacts to topography at Tamil, Rull and Nungoch would be a less than significant adverse impact.

#### 3.1.2.3.2.2 Geology

**Airport**

Airport design and construction methods take into consideration Yap's geology, which is dominated by accretional metamorphic greenschist (Yap Formation). This bedrock has low permeability and limited infiltration capacity, which has informed the design of the Airport drainage and stormwater management system, specifically its focus on surface water management and storage.

The Airport geotechnical study noted that the underlying schist tends to split into layers and can degrade with increased moisture content. On site materials will not be used as structural fill or pavement subbase, as this material will be imported. As recommended by the geotechnical study, the addition of up to 60 ft of fill at the Airport site would require a settlement monitoring plan and evaluation of data prior to paving operations or structural fill placement beneath structures (Jacobs/Burns McDonnell, 2025). A settlement monitoring plan is a program designed to measure and analyze the vertical movement (sinking or subsidence) of soil, foundations, and surrounding structures during and after construction.

With incorporation of these design measures and construction controls, there would be no alteration of underlying geologic formations or resulting geologic instability. Construction activities would involve excavation and placement of fill within the project footprint but these activities would not modify geologic conditions. Therefore, construction of Airport improvements would have a less than significant adverse impact to geologic resources.

**Seaport**

Construction activities would occur within previously disturbed or reclaimed areas and would not alter underlying geologic formations. Improvements at the Seaport and along the Airport-to-Seaport connector road corridor would not involve major alterations to the landform, would include erosion control measures, and would follow engineered plans to ensure stability and drainage control. The stockpile sites would be a temporary modification to the landform, include drainage and stability measures, and would not affect geologic conditions. For these reasons, construction period activities at the Seaport, Airport-to Seaport connector road corridor, and stockpile sites would have a less than significant adverse impact to geology.

#### 3.1.2.3.2.3 Soils

**Airport**

The composition of soils influence site preparation, soil compaction, grading, fill placement, and the design of foundations, pavements, retaining walls, and drainage features. The geotechnical report for the Airport identified several project components (e.g., fire protection water pump house, fire protection water tank, fuels structures) that would be affected by existing soil conditions; however, all identified issues could be mitigated through appropriate design and construction. The geotechnical study found that materials on site are not suitable as a base rock beneath structures and pavements. Aggregate would be purchased from commercial sources (likely in Guam or the Philippines). The design of drainage structures and detention pond outlets take into consideration the low infiltration rates of surface soils and underlying bedrock (Jacobs/Burns & McDonnell, 2025).

The extensive cut and fill at the Airport area would result in temporary ground disturbance and increased potential for erosion and sediment loads in stormwater runoff. These effects would be minimized by limiting the area of disturbance and balancing cut and fill volumes to the extent possible. They are further minimized by the detention ponds and water quality ponds that will be constructed before major earthwork begins elsewhere on site. Extensive soil testing has provided designers with an understanding of the soil composition and its load-bearing capacity, and appropriate soil stabilization techniques would be employed. This includes proper slope angles and design features such as retaining walls and geotextiles to minimize the risk of slope failure. For example, all slopes 3:1 (horizontal: vertical) and steeper would be protected with erosion control blankets and seeded for vegetation, and all other disturbed areas would be seeded, vegetated and mulched.

Construction period erosion and sediment control BMPs would be implemented through the contractor's environmental compliance plan, and would include three detention ponds, two water quality ponds (which also act as detention), swales, perimeter controls, erosion control blankets, dust suppression, and regular inspections. The 24/7 construction schedule would allow the contractor to work around intermittent individual storm events.

With implementation of standard erosion and sediment control BMPs and project design measures, construction-related soil disturbance would be temporary and controlled. Therefore, there would be less than significant adverse impacts to soils during the construction period.

**Seaport**

Most Seaport construction would occur in previously developed areas of the wharf, which is underlain by fill material. As a result, construction activities would have limited impact on underlying soil.

**Airport-to-Seaport Road Corridor**

If road corridor improvements involve vegetation clearance, it could temporarily create bare areas that are susceptible to erosion. These effects would be minimized by limiting ground disturbance and vegetation clearance during the rainy season to the extent possible. Existing erosion areas near the Seaport would be stabilized by installing riprap rock and repairing existing concrete swales and a new grass swale designed to meet Low Impact Development (LID) requirements.

**Dredged Material Stockpile Sites**

Chemical analysis of the proposed dredge sediments indicate there may be sediments exceeding TPESLs present at the berth (NAVFAC Southwest, November 2024). These restricted dredge materials would be transported to a designated industrial site adjacent to the Yap Public Transportation yard approximately 1.8 miles away and used for fill at that location. The dredge material from the turning basin and Waneday Channel is suitable for unrestricted reuse.

The establishment of the stockpiles would temporarily alter site topography, drainage patterns and infiltration characteristics. They could increase the potential for slope instability, erosion and sedimentation if not managed properly. To minimize these effects, the construction contractor would prepare a Dredged Material Management Plan (DMMP) to guide the testing, transport, and placement of the dredged material. Stockpile management measures would include engineered placement, perimeter erosion and sediment controls physical covers (e.g.,

plastic or geotextile covers, erosion-control blankets), vegetation, and dust suppression as appropriate. With these measures in place, there would be a less than significant adverse impact to soils during construction.

#### 3.1.2.3.3 Post-Construction Impacts

The analysis below has determined that during the post-construction period, the Preferred Alternative would have less than significant beneficial effects on topography, geology and soils. The project improvements, including upgraded drainage systems, detention and water quality ponds, and erosion control features, would improve stormwater management and erosion compared to existing conditions. Following placement, dredged material stockpiles will be turned over to the local governments and there would be no long-term adverse effects on topography, soils, or geologic conditions. Analyses of individual resource areas are provided below.

##### 3.1.2.3.3.1 Topography

**Airport**

Increased airfield training activities would occur primarily at the airfield and would not include ground maneuver training, off-road vehicle use, jungle training, or use of explosives. Training activities would not alter landforms or require grading or excavation.

Training activities could involve erection of simple temporary structures such as tents, but these would be placed in developed areas and would not modify the existing topography. As a result, training during the post-construction period would have no impact on Airport topography.

**Seaport**

Training activity and visiting ship traffic would not impact topography in the Seaport area or along the Airport-to-Seaport connector road. Personnel and vehicle movements would be limited to developed areas and existing roads.

Following completion of construction and dredging, ownership and management of the dredge material stockpile sites would be transferred to the appropriate Yap municipalities for beneficial reuse. Proposed training activities would have no impact on the stockpile sites. Therefore, during the post-construction period, there would be no impact to topography at the Seaport.

##### 3.1.2.3.3.2 Geology and Soils

**Airport**

**Training Activity**. There will be no post construction impacts to geology from proposed training activities. Minor soil disturbance could occur from personnel and vehicle movements; however, movements would be confined to existing runways, roads, and developed areas and would not cause erosion or alter surface runoff. No excavation, movement of rocks, use of explosives or live fire is proposed during training. Temporary structures and housing camps would be within designated, previously disturbed areas.

**Proposed Facilities**. As described in Chapter 2, future construction of a new fuel storage complex may occur separately from the main airport improvements. Proposed facilities include two permanent, double walled, cut and cover storage tanks with maximum 840,000-gallon

capacity. In the interim, an expeditionary fuel system is proposed to support training exercises. The expeditionary system, located north of the runway near the apron and fuel storage complex, includes fuel storage with no single container being larger than 50,000 gallons, with a maximum of six containers. The current design does not require any grading to support the fuel storage containers.

Fuel storage and fire protection systems could pose a risk of soil or groundwater contamination through preferential pathways (i.e., "fast lanes" or routes for contaminants to reach soil and groundwater such as natural cracks and fractures, or man-made routes such as utility lines or sewers). However, all fuel storage facilities would be designed, constructed, and operated in compliance with applicable federal and U.S. DoW regulations. Features would include secondary containment, leak detection systems, spill prevention plans, and emergency response procedures. Airport fire protection systems would utilize fluorine-free foam, and there would be no use of per- and polyfluoroalkyl substances (PFAS). No hazardous materials would be stored at the Airport.

**Impervious Surfaces and Stormwater Runoff**. The proposed runway extensions, taxiway, and apron would increase impervious surfaces by approximately 75 acres, resulting in increased stormwater runoff. The new drainage and detention system is designed to capture, slow, and treat runoff, resulting in improved stormwater management compared to existing conditions.

The drainage plan includes five new ponds designed to manage both new and existing runoff: three ponds are for detention only and two are detention and water quality ponds. Their design responds to the existing soil conditions of low permeability and limited infiltration capacity. The detention ponds are designed to temporarily impound incoming runoff, allowing solids and attached pollutants to settle out before being discharged in a slower, controlled manner. The water quality ponds will provide same benefit as the detention basins with the addition of the reduction of the total suspended solids discharged from those areas.

Site drainage, generally to the south and southeast, flows to several watercourses, leading ultimately to the Pacific Ocean approximately one-quarter mile from the southern perimeter of the Airport. Other areas flow to the south, feeding the southern water aquifer.

The new drainage system would discharge gradually into surrounding taro patches and mangroves. Routine maintenance would be required to keep the stormwater treatment system functioning as designed. In the event of an event exceeding the 100-year storm, the system will direct overflows into the taro patches to prevent flooding of the immediate area. By reducing sediment loads and improving stormwater management, the Airport improvements would provide beneficial effects to soils, downstream water quality, and coastal resources, including nearshore and marine biota. Post-construction stormwater flows from the detention ponds will be equal to or less than current flows from these areas.

**Seaport**

After construction is completed, the project drainage improvements along the wharf, including installation of catch basins along the wharf, would have a significant beneficial impact by reducing ponding, capturing sediments and hydrocarbons, and directing runoff to a water quality treatment system with an oil-water separator. Proposed land-based training at the Seaport would occur in developed areas and have no effect on geology or soils. Overall, during

the post-construction period, there would be a significant beneficial impact on geology and soils, including on sedimentation and erosion rates.

**Airport-to-Seaport Connector Road Corridor**

Roadway improvements between the between the west end of Chamorro Bay (i.e., near Aces Mart 2) to the Airport would include primarily repaving the existing road and would not include drainage improvements. Roadway corridor improvements near the Seaport would include measures that would stabilize soils and reduce existing erosion. At present, drainage along the paved portions of the road is mostly addressed through grass or concrete swales that drain into Chamorro Bay. Along the gravel portion of the road, runoff sheet flows to shoulder areas or ponds in ruts and depressions.

Road improvements including pavement rehabilitation, soil stabilization, installation of riprap rock to remediate eroded areas, and drainage swale repair would reduce erosion along the road. A section of causeway along the western edge of Chamorro Bay would be elevated to reduce the risk of flooding. Installation of a new grass swale near the Seaport would meet LID and stormwater treatment requirements. These improvements would have a significant beneficial impact to soil erosion along the length of the connector road corridor.

### 3.1.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

#### 3.1.2.4.1 Construction Impacts

Overall, during the construction period, Alternative 2 would have less than significant adverse impacts on geological resources including topography, geology and soils, at both the Airport and Seaport.

**Airport**

In this alternative, the airfield apron would be located approximately 1,000 ft west of the apron in the Preferred Alternative. This location requires greater quantities of cut and fill because of the steeper topography in this area. Construction for the apron in this more western location would take longer than the Preferred Alternative due to substantially more earthwork required. Like the Preferred Alternative, the degree of change to the Airport topography, large volume of earthwork, and years-long construction period can be perceived as a less than significant adverse impact.

As with the Preferred Alternative, the risk of erosion, stormwater pollutants, and landslides associated with earthmoving activities would be mitigated to a less than significant adverse impact through sound engineering design and construction methods, and implementation of construction BMPs such as detention ponds, sediment control logs, rock check dams, inlet protection, berms, and other measures.

**Seaport**

In the Seaport area, dredged material from within Colonia Harbor turning basin would be used for land reclamation at the west end of the Nungoch peninsula. Dredge material from the entrance channel would be disposed of in the deeper sections of the channel. No material would be transported to Rull and Tamil for upland beneficial reuse. This alternative's dredge

disposal option would not affect the topography, geology, or soils at Rull and Tamil. It would change the physical conditions at the end of the peninsula where new fast land is created.

#### 3.1.2.4.2 Post-Construction Impacts

Similar to the Preferred Alternative, once construction is complete, there would be a less than significant beneficial impact on topography, geology, and soils.

**Airport**

At the Airport, the post-construction impacts would be similar to the Preferred Alternative. Drainage improvements at Airport would result in significant beneficial impacts due to controlled stormwater runoff and lower sedimentation. The drainage improvements will accommodate both existing stormwater runoff and increased runoff due to new impervious surfaces at the Airport.

**Seaport**

At the Seaport, the in-channel disposal of some dredge material into the channel would reduce the quantity of material available for beneficial reuse. While in-channel disposal eliminates the local municipalities' maintenance responsibility for stockpiled material, it is also a lost opportunity for beneficial reuse. The new land reclamation area at the west end of the Nungoch peninsula would still be part of the project and represent a positive community benefit.

Similar to the Preferred Alternative, once the construction period is over, the long-term benefits to geological resources, particularly the stormwater improvements, would improve current drainage conditions and associated erosion.

## 3.2 Water Resources

This discussion of water resources includes groundwater, surface water, wetlands, floodplains, marine waters, and physical oceanography. As described in the Environmental Compliance SOP (Appendix A), an ECP would be developed and implemented for the Proposed Action to comply with the substantive standards of the U.S. Clean Water Act (CWA).

### 3.2.1 Affected Environment

The following discussions provide a description of the existing conditions for water resources within and around the project areas on Yap.

Yap is located approximately 9.5 degrees north of the equator and has a tropical climate. Annual rainfall averages approximately 122 inches with almost twice as much rain falling each month during the wet season (July – October) than during the dry season (December – April) (USGS, 1983; Australian Government BOM, 2025). Typhoons tend to pass north of the islands, although typhoons in 2002, 2004, and 2009 caused flooding and widespread destruction across Yap (USGS, 1983; FSM, 2016). Droughts occur periodically during El Niño periods and typically last 8-15 months. The most recent droughts occurred in 2015-2016 and 2019-2020 (Loco et al., 2020).

Intermittent meteorological datasets are available at various locations on Yap, and USGS stream gages were established at various stream sites and collected data for a period during

the early 1980s. A few surface and groundwater quality and quantity studies have been conducted over the past 50 years due to the increasing population in the latter half of the 20th century and the limitations of existing water supplies, particularly during droughts (USGS, 1983, FSM 2025).

On Yap Island, approximately 82% of the households are connected to a piped water supply, which is provided by public utilities and community water supplies (Loco et al., 2020). The two water suppliers on Yap Island are YSPSC (also referred to as the Colonia Water System) and SYWA. The YSPSC system is fed by surface water stored at Gitam Reservoir, located 0.3 miles northeast of the Airport and 1.5 miles southwest of Colonia. The system serves about 914 households including government and commercial buildings. Raw surface water is treated to remove turbidity, filtered, and disinfected with chlorine (WERI, 2006). The SYWA is supplied by two groundwater wells located near the old airport (former Japanese airfield), approximately 0.7 miles south of the project area. It serves approximately 400 households and is not treated (WERI, 2006). Neither Yap nor the FSM have official water quality standards.

#### 3.2.1.1 Groundwater

##### 3.2.1.1.1 Airport

Most of Yap Island consists of the Yap Formation, which consists of dense metamorphic rocks that typically weather to clay, which limits groundwater storage and hydraulic conductivity (See Section 3.1 for more details). Groundwater discharge typically occurs along the contact between the weathered rock and the underlying less permeable unweathered rock in the form of seeps or springs. Shallow wells can produce a moderate amount of water. In low lying areas and drainages where the overlying weathered soil is thicker, marshes can form along with mangrove swamps nearer coastal areas. A lens of freshwater typically overlies saline groundwater along the coast.

The Airport project area is located on the southern edge of the Yap Formation near the boundary with the more porous Tamil Volcanics. The Tamil Volcanics underlie the southern tip of Yap Island and provides a source of groundwater for the SYWA. Due to the limited permeability of the Yap formation, rates of groundwater recharge are estimated at one to seven percent of rainfall resulting in most of the water running off instead of infiltrating and recharging the limited groundwater aquifer (Shade et al., 1992). The nearest groundwater well used for domestic supply is located near the old airport approximately 0.7 miles south of the project area drawing from the Tamil Volcanic formation (USGS, 1983).

Historic measurements of water quality in groundwater samples collected from the wells near the old airport were generally good except for high iron and manganese concentrations (Shade et al., 1992). More recent measurements indicated that water from the SYWA system meets USEPA National Primary Drinking Water Regulations with the exception of fecal coliform, which were positive in 11 of 48 samples collected (WERI, 2006).

##### 3.2.1.1.2 Seaport

The Nungoch peninsula where the seaport is located consists mostly of fill material along the shoreline and port facility. The fill generally consists of calcareous sands, gravel, and small amounts of clay dredged from the nearby harbor (Geolabs Inc., 2024). Based on recent

geotechnical investigations, groundwater was encountered 1.5 to 9.6 ft below the existing ground surface, which are about -1.7 to +6.1 ft relative to the MLLW level. The report noted that groundwater levels are affected by tidal fluctuations, storm surge conditions, rainfall, time of year, seasonal precipitation, surface water runoff, and other factors due to the location adjacent to the water (Geolabs Inc., 2024). With limited recharge due to impervious surfaces and proximity to the marine environment, groundwater under the Port project area is likely to be saline and could have some contamination from spills or leaks from facilities located on the peninsula including the fuel farm, former tuna processing facility, maintenance shops, abandoned vehicles and scrap, and the recycling center. A Phase I Environmental Site Assessment noted several potential locations where petroleum products or other contaminants spilled on the ground and could have infiltrated into the ground (NAVFAC PAC, 2024a).

#### 3.2.1.2 Surface Water

##### 3.2.1.2.1 Airport

Due to the small drainage basins and impermeable geologic substrate, streams on Yap Island flow intermittently and are dry from a few days to several months during the dry season (USGS, 1983).

Most of the Proposed Action area drains south through several channels to Tamaney Stream, which has a 0.17 square mile drainage area that extends to the low divide on the north side of the Airport. The western edge of the project area drains to the southwest and the eastern edge drains east to the named Ripu Stream (USGS, 1983). There are currently three culverts under the existing Airport runway that drain the north side of the Airport and discharge into the jungle and Mangrove habitat south of the Airport. No existing stormwater treatment or detention basins were observed during site investigations for the current project.

The Airport-to-Seaport connector road and community road on the west side of the Airport pass through 15 watersheds and five USGS named streams between the Seaport and the northwest side of the airport (Digital Atlas of Micronesia, 2025; USGS, 1983). The Airport-to-Seaport connector road passes to the south of Gitam Reservoir and north of the YSPSC water treatment plant, which are located approximately 0.3 miles northeast of the edge of the current Airport boundary.

Recent water quality sampling has focused on public water supplies. The water supply for the YSPSC water supply is runoff and rainfall collected at the Gitam Reservoir, which is supplied by open grassland in the lower part and forest in the upper part of the watershed (WERI, 2006). Water quality tests for standard parameters, metals, and volatile organics (based on one sample collected from treated water) met USEPA National Primary Drinking Water standards. However, of 41 samples collected from the distribution system tested for bacteria, 11 were positive for total coliform as well as one raw water sample collected from the system upstream from the treatment plant (WERI, 2006). Rural shallow wells and dip wells in other parts of Yap showed relatively heavy coliform contamination, indicating a general need for improved sanitation, water storage, and distribution (WERI, 2006). Older water quality sampling results from streams in the vicinity of the Airport indicated that parameters generally met World Health Organization standards for domestic use with slightly elevated iron levels (USGS, 1983). Overall, water quality was consistent with tropical streams flowing over the types of rocks

present, with expected increases in turbidity during higher flow events. Turbidity generally returns to clear conditions soon after the storm event had ended (USGS, 1983).

Other than the one sample analyzed for volatile organics collected from the YSPSC water system in 2006, no other data was available regarding potential water quality contamination in the vicinity of the Airport. As part of this project, a Phase I Environmental Baseline Survey investigation was conducted to identify potentially hazardous materials and sources within the Proposed Action footprint (Department of the Air Force [DAF], 2025a). The study identified numerous locations with petroleum spills and potential contamination sources. It has not been determined whether these spills have impacted nearby streams or water bodies.

#### 3.2.1.2.2 Seaport

The Nungoch peninsula where the seaport project area is located consists of fill where there are no natural surface drainage features. Water runs off impervious surfaces, roads, and undeveloped areas through swales, ditches, and drains into the surrounding marine waters. A Phase I Environmental Site Assessment investigation was also conducted at the Seaport site and noted several locations with potential contamination spills (NAVFAC PAC, 2024a). The study did not determine the extent that the potential contamination had entered the groundwater or surface water systems.

The three potential dredge disposal locations under consideration include the Nungoch site located at the southwestern tip of the Nungoch peninsula, where up to 2.2 acres of land would be created from the dredge material, the Rull stockpile location, which is on Yap Island southwest of the Seaport, and the Tamil site, which is approximately 1 mile inland on Gagil-Tamil Island. The Nungoch site is part of the peninsula where the wharf is located and is described above. Most of the peninsula consists of fill and the dredge material would expand the land available by filling in shallow nearshore areas at the end of the peninsula. The Rull site, on the east edge of Yap Island, is located on the southern tip of a small peninsula between two small watersheds. The offloading dock for the Tamil site is located on the west coast of Gagil-Tamil island where there are no significant streams. The one-mile haul road would cross three watersheds and be located at a high point where multiple watersheds converge (Digital Atlas of Micronesia, 2025).

### 3.2.1.3 Wetlands

The U.S. Clean Water Act and its implementing regulations define wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands generally include swamps, marshes, bogs and similar areas in freshwater and estuarine/marine areas. In the tropical coastal estuarine areas, wetlands are often dominated by mangrove trees, a species found in tropical and sub-tropical regions throughout the world. Mangrove wetlands are described in detail in Section 3.2.1.4. The preliminary wetland survey report with detailed descriptions of the methods, findings, and results is located in Appendix O.

#### 3.2.1.3.1 Airport

Various wetland classification schemes have been developed to communicate similarities and differences across wetland types, assess wetland functions and conditions, and support a variety of management activities such as restoration, conservation planning, and land-use. The following wetland types that occur on or adjacent to the Airport are based on a combination of the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979) and the Hydrogeomorphic (HGM) Approach to Assessing Wetland Functions: Guidelines for Developing Guidebooks (Version 2) (Smith et al., 2013).

Riverine: The observed riverine wetlands in the project area were found in floodplains adjacent to small rivers and streams. The river channels and adjacent floodplains are inundated following large rain events when water overflows the banks, or when downstream discharge capacity is exceeded inducing backwater flooding. These wetlands may become dry during low rainfall and runoff periods, especially during drought.

Depressional and fringe wetland: These wetlands occur in low lying depressions and fringes along the border of pools and ponds. These habitats are saturated or inundated by water that accumulates in areas of lower topographic relief than the surrounding landscape. Some depressional and fringe wetlands remain saturated most of the year, but these ecosystems may also become dry during droughts or during seasonal drawdown caused by evapotranspiration.

Forested wetland: Forested wetlands are abundant across a variety of landforms in the project area. The observed forested wetlands in the project area were found on floodplains, slopes, and depressional areas both inland and along the coastline.

Approximately 33 acres of wetlands were identified in seven wetland survey areas within the 60-acre survey area in and around the Airport (Figure 3-4). Approximately 29 acres were wetlands that are connected to waterways and an additional 4 acres were isolated wetlands that are not hydrologically connected to waterways (U.S. Army Engineer Research and Development Center [ERDC], 2026).

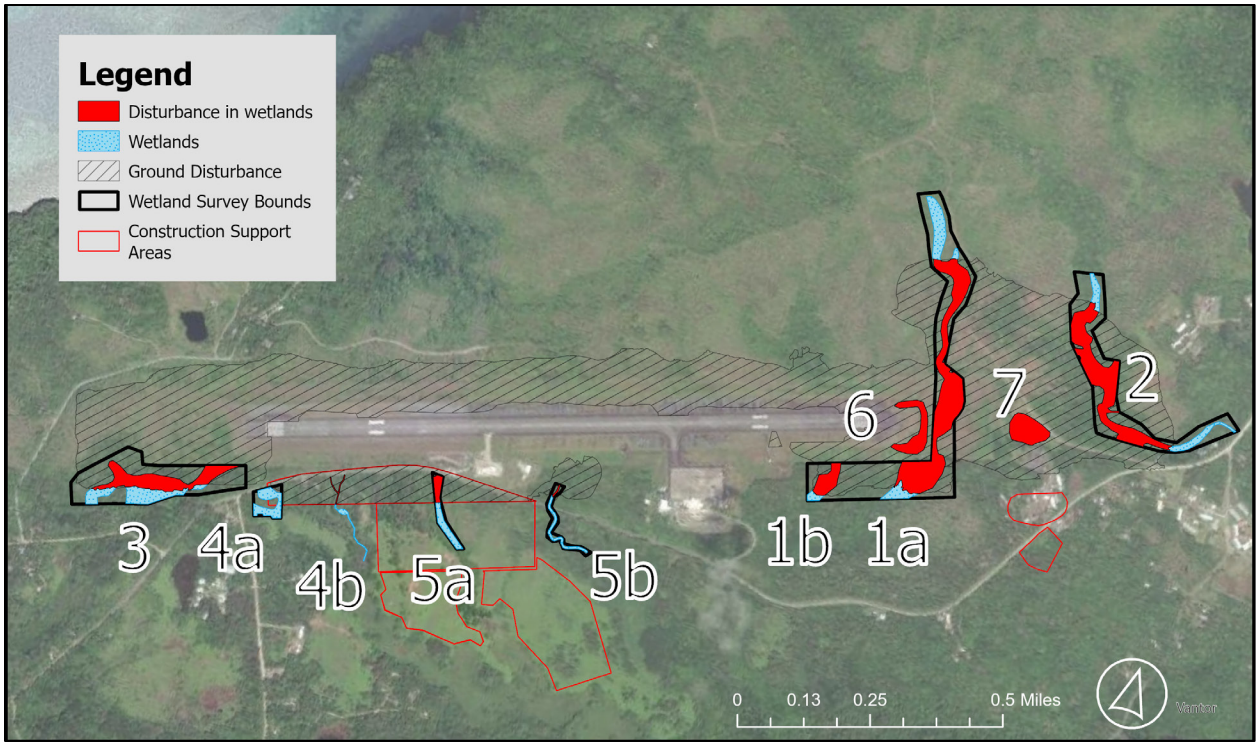



**Figure 3-4 Wetland Disturbance at the Airport**

#### 3.2.1.3.2 Seaport

The Nungoch peninsula, where the proposed Seaport project area is located (Figure 2-8), consists of fill where there are no natural surface drainage features or wetlands. Water runs off impervious surfaces, roads, and undeveloped areas through swales, ditches, and drains into the surrounding marine waters.

The three dredge disposal locations including the southwestern tip of the Nungoch peninsula, the Rull site on the east edge of Yap Island, and the Tamil site on the west coast of Gagil-Tamil island do not have wetlands associated with them other than the mangrove wetlands, which are described in detail in Section 3.2.1.4.

### 3.2.1.4 Mangroves

Mangroves are a crucial ecosystem that provides habitat for marine life and builds resilience by stabilizing coastlines, reducing erosion, sequestering carbon, and protecting water/ocean quality (Florida Department of Environmental Protection, 2016). In Yap, mangroves function as a natural filtering and nutrient-buffering system between the island and the lagoon, serve as fish nurseries, provide habitat for birds and fruit bats, provide building material, and provide recreational areas for community members (Falanruw et al., 1987).

The mangrove areas in Yap can be further categorized by forest structure: fringe, riverine, and basin mangroves. Fringe mangroves are relatively narrow, occur along the coastline, and are influenced by tidal movements. They occur along protected shorelines at elevations above mean high tide, trap organic debris with extensive root systems, and are occasionally affected by strong winds (Lugo and Snedaker, 1974). Riverine mangroves are associated with river and creek deltas and are influenced by river discharge and tidal activity. Basin mangroves commonly

occur in inlets, coves, and low-lying inland areas with tidal influence that decreases inland (Lugo and Snedaker, 1974).

#### 3.2.1.4.1 Airport

Airport Mangrove Area 1 is a basin mangrove community located in Rull, southeast of the airport parking and south of the Airport-to-Seaport connector road (Figure 3-5). This area is located 275 feet from the airport boundary and extends downstream to the coast. Qualitative field observations noted the presence of four species of mangroves: *Rhizophora mucronata, Bruguiera gymnorrhiza, Sonneratia alba,* and *Lumnitzera littorea* (ERDC, 2026). This area consists of a lush, mature stand of mangrove species that hosts a large Yap flying fox roost. The data from the 2026 Wetland and Mangrove Study (Appendix O) confirm a mature mangrove stand across this area with heights ranging from 5 to 50 feet. The dominant species, *R. mucronata*, in particular ranged in height from 7 to 50 feet. Regeneration is evident with one sample plot having a density of 0.07 stems per square foot. During data collection, flowering and propagule production were observed in Rhizophora species, and several other mangrove species were noted to be fruiting. Incidental to the data collected during the quantitative survey were observations of numerous mangroves in excess of 100 years old, numerous seedlings from this year, 4-6 year old trees, 10-15 year old trees, and hundreds of trees beyond a 20-year size class. Based on these observations, the elevations within the forest are within the typical range for the species that dominate each zone (ERDC, 2026). Mangroves with varying levels of maturity indicate a healthy stand with evident regeneration.

Airport Mangrove Area 2 is a basin mangrove community located in Rull within the Fatamaday Estuary east of the airport and adjacent to the Yap High School Campus (Figure 3-5). It is located 580 feet outside the project boundary. Based on qualitative field observations, this area is comprised of *Rhizophora apiculata, R. mucronata, B. gymnorrhiza, Xylocarpus granatum,* and *Excoecaria agallocha.* Visual assessments suggest this area may experience more extreme environmental conditions than Airport Mangrove Area 1. Environmental conditions were indicated by wind-damaged mature *B. gymnorrhiza,* with broken upper trunks and the development of prop roots in addition to knee roots, which may provide greater structural support during strong tidal conditions. In this area, *X. granatum* exhibited signs of fruit feeding damage, possibly associated with opportunistic bat foraging. Among the 7 plots surveyed in this area, 29 individuals were under 1.6 feet and 36 were over 3.4 feet in height. This spread of size classes across Airport Mangrove Area 2 may indicate that seed dispersal and germination is prevalent and that regeneration is evident following extreme weather conditions (ERDC, 2026).

Airport Mangrove Area 3 is a fringe mangrove community located in Rull, within Qeeluul', south of Fatamaday (Figure 3-5). It is located 2150 feet southwest of the project boundary along the coast. Qualitative field observations indicate the presence of *S. alba* and *B. gymnorrhiza* by the entrance of the fringing coast, with *R. mucronata* and *R. apiculata* present further into the stand. Juveniles of varying heights and seed production, dispersal and germination were evident in this area; however, due to weather and time constraints, limited data were collected (ERDC, 2026).

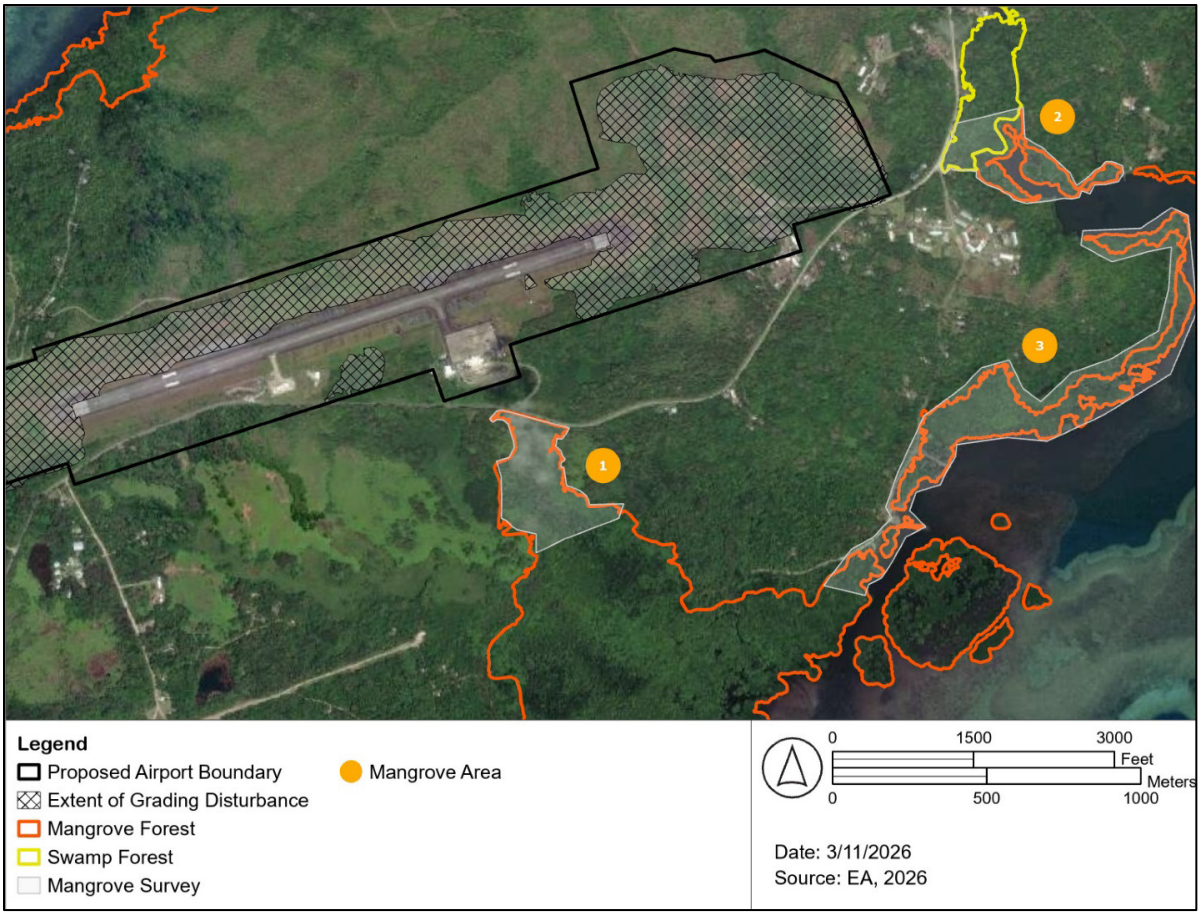



**Figure 3-5 Mangrove Areas Near the Airport**

#### 3.2.1.4.2 Seaport

Seaport Mangrove Area 1 is located at the proposed Rull Dredge Material Stockpile area along the coast (Figure 3-6). The Rull area is a mix of vegetation, rocky substrates, and accumulated natural and manmade debris along the interior coastline.

Seaport Mangrove Area 2 is located southwest of Seaport Mangrove Area 1 adjacent to the road and consists mainly of *Rhizophora* species (Figure 3-6).

Seaport Mangrove Areas 1 and 2 are both fringe mangrove communities. Three mangrove species were found across the two areas: *R. gymnorrhiza*, *R. mucronata*, and *X. granatum* – the most abundant of the three being *R. mucronata*. The mangrove stands were sparse among the two areas and trash was observed in substantial amounts within these mangrove communities. Based on surveys conducted in these areas, average heights were documented ranging from 6-11 feet with average diameter at breast height ranging from 1-6 inches. The data confirm a mature mangrove community in this area with a spread of juveniles and mature individuals (ERDC, 2026).

Seaport Mangrove Area 3 is located just northeast of the Tamil Dredge Material Offloading Area across the channel from the Seaport within the Tamil community. It is a fringing mangrove community on the seaward side of the village road, while the landward side of the village road was a basin mangrove community. Based on qualitative visual surveys, mangrove species in this

area are comprised of *R. apiculata, R. mucronata, B. gymnorrhiza, S. alba,* and *X. granatum*. Aside from trash along the road edge, the mangroves in this area generally appear healthy. Based on visual surveys of the landward basin mangrove community, the species present include *B*. *gymnorrhiza*, *R*. *apiculata*, *R*. *mucronata*, *X*. *granatum*, and, most abundantly, *Nypa fruticans*. The survey in this area reported average heights ranging from 14.7-30 feet with average diameter at breast height ranging from 0.8-19.7 inches (ERDC, 2026). Mangroves with varying levels of maturity indicate a healthy stand with evident regeneration.

Seaport Mangrove Area 4 begins at the north side of Seaport Mangrove Area 3 and continues for approximately 850 feet north along the coast. This fringing mangrove community consists of *R. mucronata, B. gymnorrhiza, S. alba, X. granatum*, and *Ceriops tagal*. The 2026 Wetland and Mangrove Study indicates that this is a mature mangrove community with heights recorded from 17-49.9 feet. The dominant species, *S. alba*, ranged in height from 6.99-51.8 feet. Regeneration in this area had a density of 0.53 stems per square foot (ERDC, 2026).

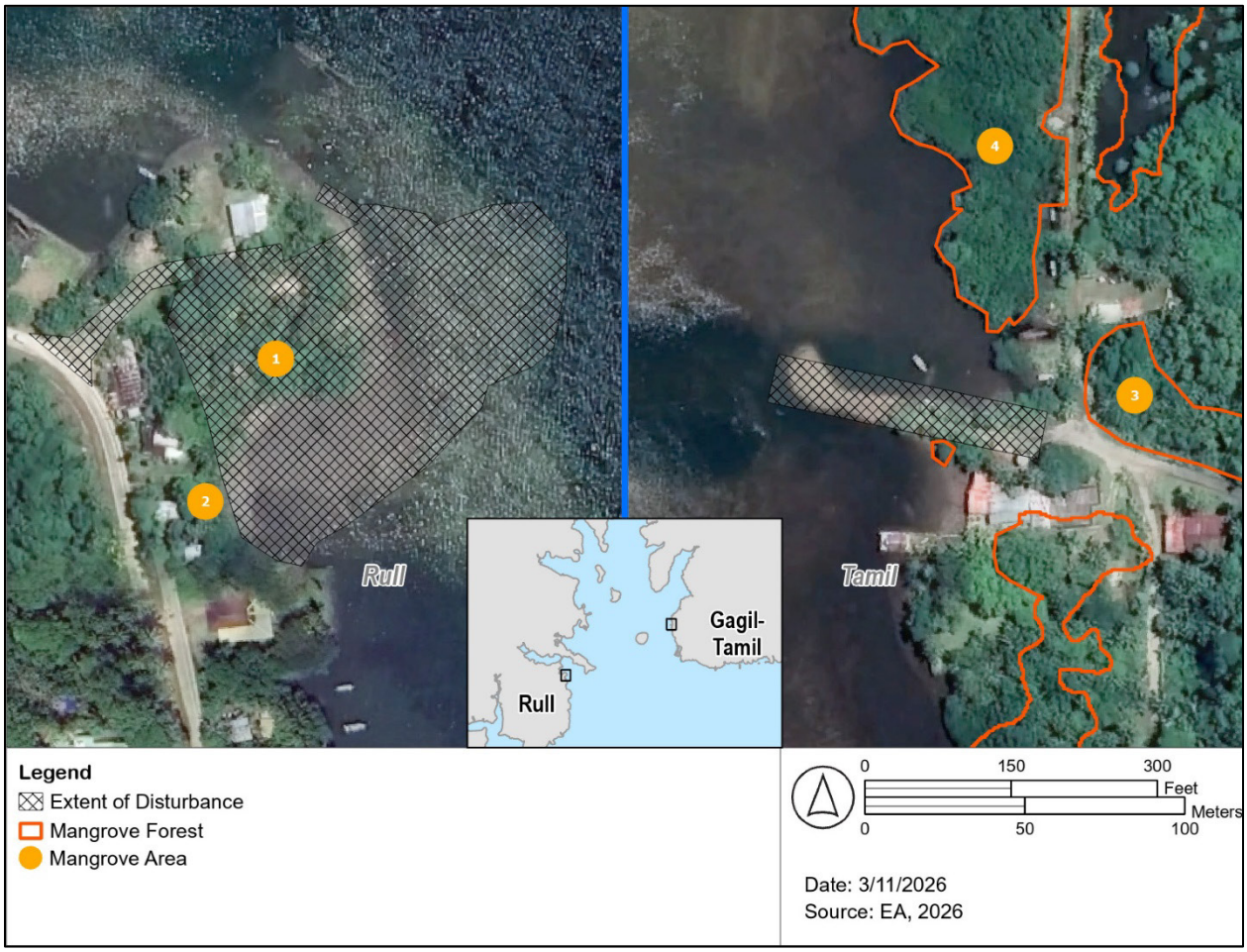



**Figure 3-6 Mangrove Areas Near the Rull and Tamil Dredge Disposal Sites**

### 3.2.1.5 Marine Waters

Marine water quality data for Yap is limited. Baseline studies were conducted in the 1980s with a few subsequent studies and reports published since (University of Guam, 1980; Nishihara et

al., 2001). Currently, no active water quality monitoring is occurring on Yap (Cardno GS – AECOM, 2022).

#### 3.2.1.5.1 Airport

As described in Section 3.2.1.2.1, most of the Airport drains south through a large mangrove stand to the sea. Other than the Airport located across a substantial part of the upper watershed, there is comparatively little development in the watershed south of the Airport-to Seaport connector road. Although recent data is unavailable, one historic sample collected in 1979 from the coast south of the Airport indicated no water quality deficiencies for the physical, chemical and bacteriological data collected (University of Guam, 1980).

#### 3.2.1.5.2 Seaport

The Seaport is located in an area with comparatively high population density and industrial and commercial activity. The existing wharf lacks stormwater controls. Rainfall falling on the wharf and potential pollutants that may be picked up from the wharf drain directly to adjacent marine waters without treatment. Historic water quality observations and data reported oil discharges from the old power plant and storage tanks, sewage treatment plant discharges, runoff from animal lots, discharge from commercial ships, and sewage overflows (USACE, 1983). Non-point sources of pollution included road repair and runoff, oil from filling stations and boats, and runoff and sediment from cleared land or construction (USACE, 1983). High levels of coliform bacteria were noted in several samples in Chamorro Bay near Colonia. Areas outside the port area had better water quality with only low dissolved oxygen being reported in one sample (USACE, 1983). A more recent study in 2015 of waste management on Yap stated that testing by Yap State EPA had documented bacterial counts that were below the level that would be considered a danger to the public (Rouse, 2015). Indirect evidence of water quality conditions around the port include a recent biological survey that did not find a type of algae associated with nutrient loading typically associated with agricultural runoff and sewage discharge. The report concluded that the survey results suggest that the Yap Port “exhibits minimal signs of nutrient enrichment, despite its proximity to a populated shoreline and a sewage treatment outfall” (Cardno GS-AECOM, 2023).

### 3.2.1.6 Physical Oceanography

This section provides a summary of the physical oceanography conditions within the project area including bathymetry, water temperature and salinity, wind speed and direction, water levels, currents, waves, and storms. Additional detail is provided in the MetOcean Study (Appendix F; NAVFAC SW, 2024b).

#### 3.2.1.6.1 Bathymetry

Bathymetry refers to the ocean's depth relative to sea level or the depths and shapes of underwater terrain. Colonia Harbor and the surrounding waters of Yap Port have been hydrographically surveyed a number of times. Available bathymetry includes a survey conducted for a 1991 Colonia Harbor Extension Project and a hydrographic survey performed in 2018. The most recent multibeam survey was conducted from May 5, 2023 to May 15, 2023 by Sea Engineering, Inc.

Bathymetric elevation values are referenced to MLLW. Within the entrance channel, the deepest elevation depths are approximately -180 ft MLLW, with a gradual decrease in depth through the channel to approximately -120 ft MLLW. Around the existing wharf area, the depth decreases from -110 ft MLLW to -50 ft MLLW, with a rapid loss of depth towards the shoreline. Although the channel has been modified in places for shipping, it is a naturally occurring deep water inlet; therefore, outside of previously dredged areas, the channel sides are naturally steep, ending in very shallow reef flats.

All three bathymetric sources are consistent, indicting little change to the alignment or depth of the channel, outside of man-made actions. The outermost end of the Nungoch peninsula, in the vicinity of the wastewater treatment plant, appears to have been utilized as a dredge disposal/material reclaim source over the years. Historical aerial imaging shows the change in the peninsula.

Additional bathymetric surveys were conducted in the vicinity of the Rull and Tamil dredge disposal locations once these had been identified by the community as preferred dredge material offloading locations. Sea Engineering, Inc. conducted single-beam bathymetric surveys in August 2025 to inform the conceptual design of the dredge material offloading improvements. The Rull site is primarily defined by a shallow reef flat with a sharp drop off approximately 150 ft off shore. The Tamil site contains an existing deeper water channel (approximately -15 to -8 ft MLLW) bordered to the north and south by shallow reef flats and seagrass beds.

#### 3.2.1.6.2 Water Temperature and Salinity

Water temperature and salinity data was extracted from the Multi Observation Global Ocean (ARMOR3D L4) platform maintained by the Copernicus Marine Service for a point offshore of Yap. Monthly averages for the 4.5-year period between January 2019 to June 2023 indicate the ocean surface temperature varied from 27.6°C to 30.5°C, with an average value of 29.3°C. The surface temperature is seasonal in nature with minimums occurring around February and maximums occurring in the summer months. Ocean surface salinity varied from 33.9 practical salinity units (PSU) to 34.3 PSU, with an average value of 34.1 PSU (Copernicus Marine Service Information, 2023).

#### 3.2.1.6.3 Wind Speed and Direction

Typical wind speeds in Yap are often low, but squalls can cause navigation hazards, and extreme storm events (such as tropical storms to typhoons) cause dangerous navigation conditions. Wind data was extracted from the Yap International Airport (Sta. FMW00040308), covering a 71-year timespan of 1952 to 2023. This station is located approximately 4 miles southwest of the port at an elevation of approximately 44 ft. The predominant wind direction is from the east and north-east, with the most frequent wind speeds ranging between 10 to 15 knots. The summer months experience the highest wind speeds, primarily out of the west and west-northwest, which is consistent with typhoon season (June to November). The winter and spring months bring more easterly and north-easterly winds. Extreme wind events associated with typhoons are discussed in Section 3.2.1.6.7.

#### 3.2.1.6.4 Water Levels

Water levels include normally occurring tides, seasonal and long-term water elevation change, and extreme extent fluctuations such as storm surge and tsunami.

**Tides**

The University of Hawaii Sea Level Center (UHSLC) operates and maintains a network of tide stations throughout the Pacific Ocean. The representative tide gauge for the site is located near the wharf (UHSLC ID 008) and contains a data record as far back as 1969 (Caldwell et al., 2015). The water levels for the project site are mixed semi-diurnal, meaning that there are two high tides and two low tides of differing values per lunar day. The tidal range, or the difference between the typical high tide (mean higher high water, MHHW) and typical low tide (MLLW) is approximately 4.6 ft.

**Climate Oscillation**

El Niño Southern Oscillation (ENSO) is a periodic fluctuation in sea surface temperature and the air pressure of the overlying atmosphere across the equatorial Pacific Ocean that occurs about every 2 to 7 years (NOAA NCEI 2023). These fluctuations have been recognized as El Niño for warm events and La Niña for cool events that occur in the eastern tropical Pacific Ocean. These occurrences can have a substantial global effect on rainfall distribution, sea surface temperatures, and weather patterns.

The El Niño and La Niña climatic oscillations can impact water levels in the Colonia Harbor. In the FSM, El Niño periods are typically characterized by cooler water temperatures and lower-than-usual sea levels (Grecni et al. 2023), whereas La Niña periods are typically characterized by heightened sea levels. Of the 51-year data record, 12 years were considered to be La Niña and 10 years were considered to be El Niño. Seasonally, months considered to be in an El Niño cycle can deviate about 6 inches below the mean sea level (MSL), with the lowest water levels occurring in January and February. Whereas the La Niña cycle can lead to increased water levels around 7 inches higher than the MSL, peaking in the June to August months.

**Extreme Water Levels**

Ocean water levels typically vary within predictable astronomical tide ranges. However, sea level anomalies may occur that increase water levels above the predicted tides. These anomalies may occur with ENSO (as discussed in the previous section) or large storm events and can result in elevated water levels.

An EVA of the water level record from 1969 to 2023 was undertaken to estimate extreme water levels at various return intervals. The extreme water levels estimated include storm surge associated with typhoon activity and may not accurately represent storm surge associated with individual storms. The 100-year extreme water level estimate (i.e., 1% annual exceedance probability) is 8.0 ft above MLLW.

**Sea Level Rise**

Sea level rise (SLR) projections for Yap are not available; therefore, the representative station for which SLR projections are provided is Palau (Malakal). By the year 2100, the SLR projection for Malakal ranges between 1.26 ft to 2.51 ft (IPCC, 2021).

#### 3.2.1.6.5 Currents

Currents within Colonia Harbor are largely driven by tides; however, wind can also drive surface currents. A coupled hydrodynamic and wave transformation model was used to define the currents through the Yap entrance channel to the Port (GHD-COWI, 2024). A field investigation measuring the magnitude and direction of currents, using a combination of vessel mounted ADCP (acoustic doppler current profiler) in the channel and a seabed-mounted ADCP in the harbor, was used to verify the model.

Peak flood currents in the vicinity of the port occur two hours before the modeled spring high tide, generally flowing northward towards the port from the south access channel. Very weak depth averaged currents (<0.1 knots) are predicted near the port area. Slightly stronger currents (still less than 0.15 knots) are observed in the turning basin. Currents capping at 0.6 knots are observed along the access channel, especially near the entrance and close to the bend.

Peak ebb currents in the vicinity of Yap Port occurred 4 hours after the spring high tide. Currents flow southwards, out of the harbor and channel area. Weak currents (<0.1 knot) are observed near the port area while currents capping at 0.2 knot can be expected at the turning basin. Strongest currents reaching up to 0.8 knot was modeled along the access channel, near the entrance at the vicinity of the channel bend. Ebb currents are expected to be stronger relative to flood currents.

Currents in the areas near the port are generally weak and not more than 0.1 knots in magnitude. Stronger currents can be observed along the Yap channel reaching as high as 0.8 knots, but around 0.4 knots on average. Field data collection over a 3-month period from January 2024 to April 2024 verified modeled current velocities. Two instruments observed maximum velocities of 0.1 knots and 0.3 knots at the Port and turning basin, respectively.

#### 3.2.1.6.6 Waves

A hindcast station located offshore of the southeast Yap coastline provides a 30-year wave hindcast for Yap by Waves and Coasts of the Pacific. Based on this swell wave hindcast, the predominant offshore wave direction is from the east with wave heights ranging from calm to approximately 10 ft.

Colonia Harbor is not exposed to swell waves (originating many hundreds of miles away in the Pacific Ocean) due to its protected location inside the fringing reef. Therefore, the only waves predicted to impact the navigation approach and at the berth are short period wind waves. This assumption has been qualified using field data and a numerical model to simulate the wave climate inside the reef, noting that elevated water levels (as may occur during tropical storms) would allow more wave energy to penetrate the harbor (GHD-COWI, 2024).

Wave data (significant wave height, peak period, and mean wave direction) were extracted from the numerical model to inform project design and environmental analysis. Relatively calm waves are expected across the harbor area near the Seaport and the turning basin for the entire year where wave heights of less than 0.8 ft are modeled. Along the channel, waves are observed to be higher . The channel feeds from the offshore waves which can reach more than 9 ft in height. The waves dissipate as these penetrate towards the harbor due to the presence of reef on both sides of the channel.

#### 3.2.1.6.7 Storms

The location of Yap in the north Pacific Ocean exposes the project site to frequent extreme typhoon events. Historical records of extreme storm events were queried through the Historical Hurricane Track database maintained by the NOAA (NOAA OCM, n.d.). All storms passing within a 150-mile radius of the project site were filtered for further examination. Since 1947, there have been a total of 127 named tropical storms and typhoons that have passed within a 150-mile radius of the project site.

The majority of passing storms are within the "tropical storm" wind speed intensity limits while passing within 150 miles of Yap. Major typhoons (classified as Category 3 or higher) compose just over 15% of the total passing typhoon events since 1947. The most severe storms in terms of sustained winds were Typhoons Haiyan and Maysak occurring in 2013 and 2015, respectively. Both storms recorded 150-knot sustained wind speeds while passing Yap.

Tropical storms result in high winds, and can result in elevated water levels, increased currents and aggravated wave conditions. However, since the port is inside Colonia Harbor, which itself is inside of the protective fringing reef, it is expected that the most impactful metocean parameter on the port is wind. Typhoon Sudal in 2004 caused the highest water level captured in the approximately 53-year record at the UHSLC Yap station (Caldwell et al., 2015). Many reports consider this storm to be one of the most severe to ever impact Yap. Typhoon trajectory, path, and linger duration in relation to land and hemisphere of occurrence can significantly influence the resulting storm surge that is observed. This is evident in the case of Typhoon Maysak, which occurred in 2015 and passed Yap as a Category 5 storm but did not produce a recorded significant surge. Typhoon Maysak passed to the north of Yap causing widespread wind damage and surge on the north and western shorelines of the island but did not produce a significant surge effect near the project area. The most dramatic water surface elevations at the project site generally occur alongside storms that pass to the south of Yap.

### 3.2.2 Environmental Consequences

In this EIS the analysis of water resources looks at the potential impacts on groundwater, surface water, marine waters, wetlands, mangroves, and physical oceanography. Groundwater analysis focuses on the potential for impacts to the quality, quantity, and accessibility of the water. The analysis of surface water quality considers the potential for impacts that may change the water quality, including both improvements and degradation of current water quality. Marine waters analysis includes potential changes to physical and chemical characteristics. The impact assessment of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland.

#### 3.2.2.1 Analysis Method

The analysis for water resources was based on reviewing existing studies and information in the affected environment and qualitatively estimating how the Proposed Action would impact water resources. Construction and post construction activities were evaluated for the potential to impact groundwater and surface water quality and quantity. Water quantity is affected by changes to surface water area, or other physical changes from excavation, adding fill, or expanding impervious surfaces. These changes may result in different drainage patterns or effects to hydrology, soils, or vegetation that can alter surface water flows or infiltration. As

part of the engineering design at the Airport and Seaport, quantitative modeling was conducted to estimate discharge rates based on watershed characteristics and precipitation events estimated from historic precipitation records. Regional standards were followed to design stormwater management systems that mimic existing natural flow patterns. BMPs and erosion control measures also follow design standards and are assumed to be effective while operating within design specifications.

#### 3.2.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and existing water quality issues would continue at the Seaport and Airport. The lack of stormwater management and treatment at the Seaport and Airport would continue to allow untreated stormwater flow into Chamorro Bay and areas downstream from the airport.

The current baseline conditions at the Airport include a lack of stormwater treatment and management for runoff from the site. Stormwater flows will continue unattenuated, which may continue to cause higher peak flows downstream than would otherwise occur. In addition, the Phase I Environmental Baseline Survey indicated several locations with spills of hydrocarbons and other chemicals (DAF, 2025a; Section 3.13). Although it has not been determined whether these locations are impacting surface or groundwater quality, leaking contamination sources could continue to contaminate local water bodies and groundwater under the No Action Alternative.

The Seaport currently has no stormwater and water quality treatment BMPs in place. Stormwater flows would continue untreated, contributing sediment, pollutants, and runoff into Chamorro Bay. The Phase I Environmental Site Assessment identified several sources of contamination that could be leaking and transported into the nearby marine environment (NAVFAC PAC, 2024a; Section 3.13). Under the No Action alternative, the potential contamination sources within the construction footprint would not be addressed as part of the Proposed Action and would continue to leak contaminants into nearby water bodies and groundwater if not remediated.

Under the No Action Alternative, no wetlands or mangroves would be impacted from construction activities at the Airport and Seaport sites, and they would remain in their current condition.

Therefore, the No Action Alternative would result in a less than significant adverse impact to water resources.

#### 3.2.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

The study area for the analysis of effects on water resources associated with the Preferred Alternative includes the Airport Proposed Action footprint and downstream from the Airport along drainage pathways to the ocean. For the Seaport, the study area includes the Proposed Action footprint at the site and the marine environment immediately adjacent to the site, the channel where dredging will occur, and the area immediately around the land disposal transfer sites. The area around and immediately downslope from the Airport-to-Seaport connector road is included in the study area.

#### 3.2.2.3.1 Avoidance, Minimization Measures and Best Management Practices

The following documents include BMPs for stormwater and wastewater management to prevent runoff of hazardous materials and sediment. Prior to construction, a plan to address stormwater discharges and erosion would be prepared. Preparation of an Erosion and Sedimentation Control Plan would be required. Documents guiding the design and construction of the project include the Guam Department of Public Works Transportation Stormwater Drainage Manual (TSDM) and the Palau Stormwater Management Manual, May 2010.

Yap State regulation 2014-07 Drinking Water Regulations and 2015-02 Hazardous Substance Regulations require the following BMPs:

- All potential sources of pollution must be installed on the property as far away as is reasonably possible from any groundwater access point
- Toxic chemicals and hazardous materials must be stored away from potable water supplies
- An SPCC Plan is required for activities involving storage, possession, or generation of hazardous substances
- Spill monitoring is required during operation
- Risk minimization and accident preparedness, including spill response equipment and supplies, and training
- Secondary containment of petroleum products
- Inventory control and record keeping of toxic chemicals and hazardous materials
- Stormwater management of water pollution caused by toxic chemicals and hazardous materials

#### 3.2.2.3.2 Construction Impacts

Construction would require preparation of an Erosion and Sediment Control Plan (ESCP) that would include equivalent BMPs and a storm water pollution prevention plan (SWPPP) that meets regional requirements and would be stricter and more protective than existing conditions.

As described in Section 2.5, extensive earthwork would be required to expand the current runway and taxiway and to level areas for the parking apron, fuel, storage, buildings, batch plants, temporary housing, staging areas, and other improvements. The Airport construction process is expected to include approximately 326 acres of ground disturbance with construction lasting up to eight years. Approximately 8,800 ft of roads would be rebuilt, and 3,500 ft of new road would be constructed.

The proposed stormwater management infrastructure includes the addition of inlets with grates, pipes, culverts, ditches, swales, inlet and outlet headwall structures, and stormwater ponds to the existing drainage system. The 100-year storm event was used for the design of all stormwater collection, conveyance, and detention facilities. The ditches and swales would be lined with grass, turf reinforcement mats, or concrete to prevent erosion. Stormwater control would be based on FAA Advisory Circular 150-5320-5D, UFC 3-201-01, and UFC 3-210-10, Low Impact Development.

The Preferred Alternative would require the demolition of an existing unpaved road on the east side of the Airport that would be replaced with a paved two-lane road outside the proposed Airport boundary. The new road would be 3,500 ft long and cross the Ripu Stream with culverts. The Airport-to-Seaport connector road would be repaved, but would not involve widening, bridge work, or drainage improvements.

Construction at the Seaport will occur in phases to avoid interference with abandoned port operations. The project would require removal of debris, existing concrete and asphalt, the existing tuna warehouse, and wharf components. Construction is expected to last three years.

#### 3.2.2.3.2.1 Groundwater

**Airport**

The Preferred Alternative would involve cutting and filling extensive areas around the existing runway. Cutting into the slope on the north side of the runway could intercept shallow groundwater flow that would be expressed at the surface as seeps or springs during the rainy season. Due to the lower permeability of the underlying bedrock, this is unlikely to result in significant changes to groundwater or surface water flows. There is no proposed groundwater use under this alternative, and the nearest potable water well is approximately 0.7 miles to the south near the old airport, which draws from a different geologic formation and is unlikely to be affected by construction activities (Shade et al., 1992). Earthmoving activities and subsequent paving may reduce groundwater infiltration, which is already low. Therefore, the Preferred Alternative would have short term, less than significant adverse impacts on groundwater at the site.

Potential sources of contamination encountered in the construction footprint would be addressed during construction, reducing the potential that contamination from those sites would enter the groundwater. Therefore, the Preferred Alternative would have less than significant beneficial impacts on groundwater quality. Road construction and paving of the Airport-to-Seaport connector road is expected to have no effect on groundwater recharge, discharge, and quality.

**Seaport**

There is no proposed groundwater use by the Preferred Alternative and groundwater beneath the Seaport is likely to be saline and fluctuate with tidal influences. Potential sources of contamination encountered in the construction footprint would be addressed during construction, reducing the potential that contamination from those sites would enter the groundwater. Therefore, the Preferred Alternative would have less than significant beneficial impacts on groundwater quality.

Dredge disposal along the shoreline or inland at the Tamil site is not expected to affect groundwater recharge, discharge, or quality when compared to the baseline condition since the disposal materials would be placed on the surface and there would be no interaction with groundwater at the disposal sites.

#### 3.2.2.3.2.2 Surface Water

**Airport**

The Airport construction would include approximately 265 acres of ground disturbance within the proposed Airport boundary and additional 61 acres of ground disturbance for temporary construction support areas (e.g., vegetation and topsoil storage, staging yard, earthwork storage, and workforce camp). The total estimated 326 acres of ground disturbance would be included in the ESCP that includes industry-standard best practices to control erosion including erosion control blankets on steep slopes, inlet protection to reduce sediment delivery to drainages, and reinforcement mats to protect ditches and soil from erosion. At the beginning of construction, permanent detention basins and water quality basins would be constructed before work begins in upland areas of the airport to minimize potential sediment and stormwater impacts to downstream areas.

Heavy metals and chromium, in particular, have been identified as naturally occurring in bedrock and soils at the project site. Earthmoving activities could mobilize naturally occurring chromium, which could be a hazard to human health and the environment (Jacobs/B&M JV, 2025). BMPs include enhanced engineering controls during earthwork to control dust and runoff and include decontamination at the site (Jacobs/B&M JV, 2025). In addition to naturally occurring materials, several locations with potential petroleum or other contamination were identified during the Phase I investigation (DAF, 2025a). Contamination encountered in the construction footprint would be addressed during construction.

Construction equipment would need fueling, maintenance, and petroleum-based lubricants during the construction phase. BMPs would be implemented for hazardous materials storage including placement away from groundwater recharge and potable water supplies, secondary containment, spill prevention practices and training, tracking, clean up kits, and spill response plans (See Section 3.2.2.3.1 for BMPs).

Temporary short-term disruptions to natural flow patterns would be expected on-site during construction, particularly during the rainy season. Stormwater management designs would reduce disruptions to surface water flows but would result in a short-term less than significant adverse impact to receiving waters.

There is the possibility of a significant storm event occurring during the projected 7.25-year construction period (the percent chance of a 100-year storm event occurring in the 7.25-year period is approximately 7.7% [National Weather Service, 2025]). A storm larger than the design event could result in flows bypassing stormwater management controls and carrying sediment and contaminants downstream from the project site. Storm-related BMPs such as a severe weather monitoring and action plan would reduce the risk of contaminant spills by moving materials and equipment away from waterways and storing hazardous materials in flood-proof locations. Storm events on Yap typically result in erosion and increased turbidity during and immediately after high flows, which transports pollution from existing contaminant sources in the watershed downstream (USGS, 1983). Compared to the baseline condition, where stormwater and pollutant controls are minimal, the Preferred Alternative would have the potential for short term, less than significant adverse impacts to downstream water quality in the event of a large storm event.

With BMPs in place, repaving of the Airport-to-Seaport connector road is expected to have no effect on surface water quantities and quality in the watersheds the roads pass through compared to the baseline condition.

Overall, construction at the Airport site would be expected to have a less than significant adverse impact to surface water quantity and quality.

**Seaport**

Construction at the Seaport would occur in phases to not interfere with ongoing operations. Clean up of contaminated areas would involve additional testing and either paving over or removing contamination sources for disposal off Yap (GHD COWI, 2025). Areas around the dock would be graded and are expected to need 1 to 1.5 ft of fill to match the proposed wharf elevation. Erosion control measures would be installed prior to construction and would consist of compost socks barriers, silt fences, a segregated stockpile for contaminated material, and a stabilized construction entrance (GHD COWI, 2025). Stormwater systems would be upgraded prior to earthwork to collect and treat site stormwater (GHD COWI, 2024). A significant improvement in water quality would result once contamination sources are removed and stormwater treatment facilities are operational. Compared to the baseline condition, which has minimal stormwater treatment or controls and several local identified sources of pollutants, the Preferred Alternative would have a less than significant adverse impact on water quality at the Seaport site.

Dredge disposal along the shoreline or inland at the Tamil site is not expected to affect surface water quantity or quality when compared to the baseline condition since there are no surface water sources at those sites other than surface runoff. Erosion control BMPs would limit erosion and sediment transport from the site.

#### 3.2.2.3.2.3 Marine Waters

**Airport**

As described in Section 3.2.2.3.2.2, stormwater detention basins and water quality basins would be installed to control stormwater during construction and sources of contamination within the construction footprint would be addressed in the surrounding watersheds as part of the Preferred Alternative. Compared to the baseline condition, which has minimal effective stormwater controls and several local identified sources of pollutants, the Preferred Alternative would implement construction and storm-related BMPs resulting in a less than significant adverse impact on downstream marine water quality.

**Seaport**

As described in Section 3.2.2.3.2.2, a stormwater treatment system would be installed to control stormwater during construction and in the post-construction period, and sources of contamination within the construction footprint would be addressed.

A large storm event (with a greater than 25-year recurrence interval, which has an 11 percent chance of occurring in three years [National Weather Service, 2025]) during construction could exceed the stormwater treatment limits and discharge sediment or contaminants into adjacent marine water bodies. The probability of a large storm event (greater than a 100-year event) occurring during the three-year construction period of the Seaport is lower than for airport construction with a 3% chance due to the shorter construction schedule (National Weather

Service, 2025). Storm-related BMPs such as a severe weather monitoring and action plan would reduce the risk of contaminant spills by moving materials and equipment away from waterways and storing hazardous materials in flood-proof locations. Compared to the baseline condition, which has minimal stormwater treatment or controls and several local identified sources of pollutants, the Preferred Alternative would have a less than significant adverse impact on marine water quality.

Sediment sampling was conducted for the proposed dredging areas at the berth, turning basin, and both sides of the Waneday Channel and both chemical and bioassay analyses were conducted (NAVFAC, 2025). Sediment at the berth exceeded thresholds for unrestricted reuse but was suitable for industrial use. Therefore, it will be used for fill at an industrial area, shown in Figure 2-16, adjacent to the Yap Public Transportation yard. Sediment from the turning basin and Waneday Channel dredging areas is suitable for both in-water and upland placement, as analytical results from bioassay whole-sediment or chemical analysis did not indicate TPESL exceedances for unrestricted reuse (NAVFAC, 2025).

A sediment plume dispersion model was developed using the baseline data collected for Colonia Harbor (summarized in Section 3.2.1.6) (NAVFAC, 2026). The sediment plume dispersion modeling results are provided in Appendix P. The model predicts that changes in suspended sediment concentrations resulting from unmitigated dredging and stockpiling activities are restricted to areas close to the operations and return to baseline conditions shortly after activities cease (NAVFAC, 2026). Similarly, the impact on sediment deposition would be localized, with significant deposition confined to the immediate vicinity of the stockpile sites. The model assumed an unmitigated scenario without the use of silt curtains. The extent of turbidity plumes associated with dredging and stockpiling activities would be reduced below model levels through the use of silt curtains where practicable and through use of turbidity monitors to require pauses in dredging if turbidity limits are exceeded. With the implementation of these BMPs, the Preferred Alternative is anticipated to result in less than significant impacts to marine water quality (NAVFAC, 2026).

#### 3.2.2.3.2.4 Wetlands

**Airport**

Construction at the airport would require clearing, grading, and placing streams flowing through the east side of the Airport into culverts in areas 1a, 1b, and 2 (Figure 3-4). Additional clearing for facilities and construction support areas would impact additional streams in wetland areas 4b and 5a. Wetland area 4a would be protected from impacts and may be targeted for enhancement activities. Approximately 3.7 acres of area 3 would be filled within the project footprint. Table 3-2 lists the acres of the wetlands in each area and the estimated amount of disturbance under the Preferred Alternative. Wetland functions associated with sediment storage, nutrient cycling, and habitat would be permanently lost for areas with wetland disturbance. Potential changes in flows associated with loss of wetlands would be addressed through the stormwater management system, which is designed to reduce disruptions to downstream surface flows.

**Table 3-2 Area, Estimated Disturbance, and Connection Status for Wetland Survey Areas**

| *Wetland Survey Area* | *Wetland Area (acres)* | *Estimated Disturbance (acres)* | *Hydrologic Connection to Coastal Waters* |
|---|---|---|---|
| Area 1a | 11.47 | 9.20 | Yes |
| Area 1b | 1.37 | 1.14 | Yes |
| Area 2 | 7.54 | 6.27 | Yes |
| Area 3 | 5.88 | 3.66 | Yes |
| Area 4a | 1.06 | No disturbance | Yes |
| Area 4b | 0.35 | 0.11 | Yes |
| Area 5a | 1.05 | 0.41 | Yes |
| Area 5b | 0.46 | 0.05 | Yes |
| Area 6 | 1.80 | 1.80 | No |
| Area 7 | 2.04 | 2.04 | No |
| **Total** | **33.02** | **24.68** | |

Note: Wetland survey areas, wetland areas, and estimated disturbance are illustrated in Figure 3-4.
Source: ERDC, 2026

Sediment control logs, rock check dams, inlet protection, rock berms, and other erosion control devices would be installed at the downgradient perimeter of the construction site in areas determined to be of potentially high erosion. Site restoration would include restoring all temporary construction features such as temporary access roads and staging areas to existing conditions. Disturbed areas would be graded smoothly into the surrounding terrain and seeded with non-invasive grasses.

Approximately 3.8 acres of isolated wetlands identified at areas 6 and 7 would be removed for the Airport improvements. These wetland areas are not hydrologically connected to traditional navigable waters (coastal waters) and mitigation is not required. Disturbance of approximately 20.8 acres of wetlands that are hydrologically connected to navigable waters (Areas 1 through 5) would be subject to compensatory mitigation for loss of wetland functions and services under the substantive provisions of the U.S. Clean Water Act. Potential mitigation options to offset the impacts to the 20.8 acres of wetlands connected to navigable waters include:

1. reduce stream incision and improve floodplain connectivity and water quality,
2. address invasive species and enhance wetland hydrology and/or support taro farming,
3. evaluate water control structures and conveyances to advance water quality objectives while ensuring wetland hydrology remains intact, and
4. incorporate constructed wetland features into the proposed airport expansion.

Mitigation options are described in more detail in the Wetland and Mangrove Study (Appendix O). Detailed wetland mitigation plans will be developed as part of the EIS and ECP process. Mitigation would occur during the construction phase to ensure no net loss of wetland functions and values.

Due to the extent of wetland disturbance, the Preferred Alternative would have a significant adverse impact on wetlands, however, in accordance with the substantive standards of the Clean Water Act, mitigation would be required to offset those impacts to less than significant.

#### 3.2.2.3.2.5 Mangroves

Lewis et al. (2016) described acute and chronic stressors that, depending on magnitude, can individually result in mortality, or incrementally working in combination with one or more factors, can also lead to mangrove mortality. Examples of stressors that commonly affect mangroves are channelization/damming, partial changes in hydroperiods, herbivore outbreaks, harvesting, fire, toxic substances, and temperature extremes (Lewis et al., 2016).

The description of the environmental consequences of the Preferred Alternative focuses on both direct and indirect effects on the existing mangrove communities near the proposed project. The direct effects considered are physical removal by mechanical equipment and placement of fill material in the mangrove community. The indirect effects considered are changes to hydrology causing hypersalinity, hydrogen sulfide accumulation, chronic flooding, change in drainage, filling or siltation resulting from excessive flows transporting sediments into the receiving mangrove community, no water flow, and low oxygen and water quality—routes for the potential influx of contaminants such as oil coating, heavy metal runoff, and drainage or blocking of nutrient inputs.

**Airport**

The Preferred Alternative is not anticipated to significantly adversely affect the timing, volume, or water quality of the water reaching Mangrove Areas 1 and 2 as described in Section 3.2.2.3.2.2. Mangrove Area 3 is not directly downstream from the project area. Stormwater and water quality detention basins would be constructed initially during the construction phase and may result in short-term insignificant adverse changes to flows downstream from the site. However, the presence and zonation of mangrove species is a function of sea level and not salinity (Lugo and Snedaker, 1974). While stormwater improvements could lead to slight changes in the timing of freshwater inflows, mangroves located in these areas are subject to daily tidal influences, which have a much more significant effect on the mangroves than freshwater discharges from the Airport.

**Seaport**

Approximately 0.3 acres of mangrove fringe would be removed during construction at Seaport Mangrove Areas 1 and 2 at the Rull dredge material area.

Alternative 1 may directly impact Seaport Mangrove Area 3 by widening the roads and reclaiming approximately 0.9 acres around the proposed Tamil offloading site. There are two small *R*. *apiculata* on the south side of the existing jetty (approximately 0.004 acres), and depending upon the project design, these mangroves might be directly affected. Direct impacts of this action will include the removal of vegetation, potential permanent loss of two small mangrove trees, and reduced use of nursery and foraging habitat by local fauna. In-water construction activities may have indirect effects, including altering tidal activity and sedimentation patterns, and temporarily degrading water quality, which may adversely affect neighboring mangroves. As design of the proposed action advances and the expected impacts to mangroves is better known, compensatory mitigation to offset the unavoidable impacts to mangroves will be determined, including the location, size, and type of mitigation to offset the unavoidable impacts to mangrove wetlands.

#### 3.2.2.3.2.6 Physical Oceanography

Most of the components of physical oceanography are controlled by forces much broader than the project area, and therefore the Preferred Alternative is not expected to impact water temperature and salinity, wind, water levels, or waves. The Preferred Alternative would involve dredging that would impact bathymetry within the Colonia Harbor and therefore could potentially also affect currents and potentially storm surge events associated with large storms within the harbor. The analysis of construction related impacts to physical oceanography focuses on these two components.

**Bathymetry**

The Preferred Alternative would involve dredging at the entrance channel, turning basin, and berth, which would alter existing bathymetry. The design of the Preferred Alternative is based on data collection, hydrodynamic modeling, and a detailed navigation assessment to determine the areas of dredging and ATON placement that are necessary for safe navigation of the design vessels. Therefore, the proposed dredging has been specifically designed to minimize the extent of dredging within the entrance channel, turning basin, and berth.

Dredging would also take place at the Tamil and Rull dredge material offloading sites (Figure 2-11 and Figure **2**-**14** respectively). These locations and the required dredging were coordinated closely with the respective communities and the Yap Task Force. In addition, bathymetric surveys were conducted (Sea Engineering, Inc., 2025) and conceptual designs were developed to minimize dredging to only what was required to safely operate a barge for dredge material offloading.

Therefore, the Proposed Action is expected to result a in less than significant adverse impact to bathymetry.

**Currents**

Bathymetry effects currents by steering the movement of water by wind, waves, tides, and other forces. In general, currents are weak within the inner Colonia Harbor, including the turning basin, berth, Rull and Tamil dredge offloading locations, and Nungoch land reclamation site. Additionally, the proposed navigational dredging within the harbor is limited to isolated locations at the berth (0.5 acres) and turning basins (1.5 acres). Due to the relatively weak baseline current conditions in the harbor and the limited area of impact, dredging is not anticipated to have an effect on overall currents within the harbor.

Currents are much stronger at the entrance channel and are mainly driven by the tides because the waters in the harbor primarily ebb and flood through the entrance channel. The MetOcean Study for the Proposed Action (Appendix F) indicates currents up to approximately 0.4 knots at the bend in the channel near the channel entrance (NAVFAC SW, 2024b). In the vicinity of the entrance channel, the tidal profile (Figure 3-7) is defined by the southeast facing reef flats and the nearby Gabach Channel (approximately 4,000 ft to the southwest of the entrance channel). The proposed dredging at the entrance channel would alter the cross section of the channel, however, it represents much less than a 0.01% change in the overall tidal profile. Therefore, dredging at the Waneday Channel entrance is not expected to impact currents in the channel or within Colonia Harbor.

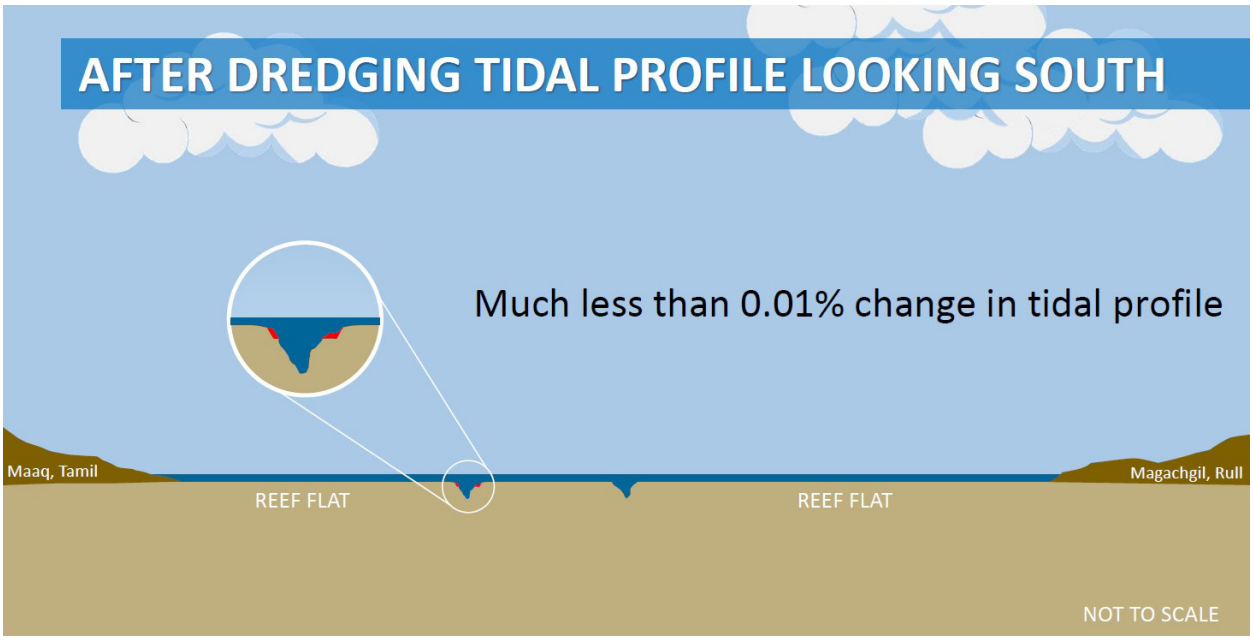



**Figure 3-7 Entrance Channel Dredging Impacts on the Tidal Profile**

**Storm Surge**

Yap's location of North Pacific Ocean exposes the island to frequent extreme typhoon events and historically the most dramatic water surface elevations at the Seaport generally occur alongside storms that pass to the south of Yap. The fringing reef provides protection from high wave energy associated with large storm events. While the dredging at the channel entrance would slightly widen the channel and allow some additional wave energy to pass through the channel, as discussed previously, the overall scale of dredging at the Waneday channel is minimal compared with the overall tidal profile.

The nearest coastline to the Waneday Channel entrance is in Baleabaat, approximately one mile northwest. However, the fringing reef encompasses most of that distance (approximately 0.7 miles) providing a shallow reef flat to dissipate the wave energy through friction and bottom drag. Some additional wave energy would make its way through the widened channel entrance to the deep water channel of Colonia Harbor, but the side friction and wave diffraction from the channel edges would reduce and disperse wave energy over the approximately 1.5 miles to the southwest end of the Nungoch peninsula. While storm surge would remain a threat on Yap during extreme storm events, the proposed dredging is not anticipated to make storm surge worse or more frequent. Therefore, the Preferred Alternative is expected to have no impact on storm surge or vulnerability to extreme storm events.

#### 3.2.2.3.3 Post-Construction Impacts

Operation of the Airport under the Preferred Alternative would not differ much from existing airport operations with regard to water resources. DoW exercises at the Airport would occur for up to four weeks a year, and any additional water requirements would be fulfilled by the local water utility supplying potable water (YSPSC). Non-potable water for fire suppression and non-potable uses would be from the YSPSC utility. Fire protection water storage tanks would be filled slowly to capacity to not overburden the supply. No additional groundwater or surface

water demand is anticipated during post-construction activities under the Preferred Alternative. Stormwater would be managed and slowly released from detention ponds to mitigate runoff from additional impervious surfaces. The three detention basins would have low-flow channels to allow for regular stream flows to mangroves to maintain existing conditions. The two water quality basins would have settling basins to collect excess sediment. Routine maintenance would be required to keep the stormwater treatment system functioning as designed.

Operation of the Seaport would be similar to current operations with some additional impervious surfaces and buildings that would drain to a water treatment system before discharging to the sea. Military exercises at the Seaport would occur for 1-2 weeks per exercise per year. Routine maintenance would be required to keep the stormwater treatment system functioning as designed.

#### 3.2.2.3.3.1 Groundwater

**Airport**

The Airport improvements would increase the amount of impervious surface by 75 acres, which would reduce the area available for precipitation to infiltrate into the groundwater. The expanded north side of the runway would also cut into the hillside farther than the current Airport configuration, which could result in intercepting some groundwater flow and discharging it to the surface. As described in Section 3.2.1.1.1, groundwater infiltration rates are low in the vicinity of the Airport due to the underlying geology. The change in groundwater due to additional pavement, detention ponds, and potential interception of groundwater is not likely to be significant. Fuel and chemical storage would use secondary containment and spill response plans and equipment would be kept ready to mitigate potential spills. The nearest groundwater well used for domestic supply is located approximately 0.7 miles south near the old airport and draws from a more permeable geologic formation.

There are no expected significant changes to groundwater quality or quantity associated with this alternative, resulting in less than significant adverse impacts to groundwater quality and quantity.

**Seaport**

Groundwater below the Seaport is saline and likely fluctuates with the tides and other factors described in Section 3.2.2.1. There are no known groundwater uses in the vicinity of the Seaport. The Preferred Alternative does not propose any use of or discharge to groundwater. The area of impervious surface would increase by approximately 1.7 acres, which would increase the area where stormwater would be treated before discharge to the bay.

As part of this alternative, potential sources of contamination encountered in the construction footprint would be addressed during construction, reducing the potential that contamination from those sites would enter the groundwater.

Post construction activities would result in no anticipated impacts on groundwater quantities in the vicinity of the Seaport and a less than significant beneficial impact to groundwater quality.

#### 3.2.2.3.3.2 Surface Water

**Airport**

The Preferred Alternative would result in an increase of 75 acres of impervious surface relative to the existing condition. The increase in impervious surface would reduce infiltration but would be limited since the amount of water infiltration under undeveloped conditions is estimated to be 1 to 7 percent due to the low permeability of the underlying bedrock. The primary objectives of the stormwater design were to maintain or reduce peak discharge rates and to drain stormwater detention and water quality ponds quickly to avoid standing water that could create habitat for wildlife that could be hazardous to airport operations (Jacobs/B&M JV, 2025). Stormwater management infrastructure would meet FAA guidelines for LID. Three stormwater detention ponds and two stormwater quality ponds covering 8.5 acres would be built to detain peak discharges based on a 100-year storm event. Of the six designated outfalls from the project site, three would have stormwater detention ponds that provide storage to attenuate peak stormwater flows, and a fourth would have two stormwater quality ponds with stilling basins to allow for sediment settling while not retaining standing water long enough to attract wildlife or breed mosquitoes. The proposed stormwater infrastructure would reduce offsite sediment transport and were designed for easy access to facilitate long-term maintenance.

Changes in surface water runoff and quality associated with the road improvements would be minimal since there would be negligible increases in surface area, runoff, and traffic (See Section 2 for details on road improvements and Section 3.11 for details on changes in traffic).

Overall, the Preferred Alternative would result in a less than significant beneficial impact for water quantity and quality due to the improved stormwater management relative to the baseline condition.

**Seaport**

Stormwater management design standards have not been developed for Yap. The Palau Stormwater Management Manual was used for guidance in preparing the stormwater design and is similar to the requirements for Guam (GHD-COWI, 2024). A 25-year storm was used for base treatment design, and a 10-year storm was used for conveyance and piping. The piping will also meet Navy requirements (UFC 3-301-01, Chapter 3).

The preferred alternative would install four catch basins along the wharf extension to collect stormwater. Catch basin inserts would pretreat runoff for total suspended solids and hydrocarbons and pipe the water to the roadside stormwater basin to the south. For the existing wharf, slotted drains would collect stormwater and pipe it to an oil-water separator. Treated stormwater would be discharged through a check valve at the outfall on a rock revetment adjacent to the wharf. Stormwater in the storage area would drain to a catch basin at the center of the open area and then to the oil water separator described above. No changes to potable water usage are proposed.

The current Seaport has no stormwater treatment or LID features. The Preferred Alternative would result in a reduction in sediment and contaminants in stormwater discharges. Therefore, the Preferred Alternative would result in a significant beneficial impact.

#### 3.2.2.3.3.3 Marine Waters

**Airport**

As described in Section 3.2.2.3.3.2, a stormwater detention basins and water quality basins would be installed to control stormwater at the improved airfield and sources of contamination encountered in the construction footprint would be addressed as part of the Preferred Alternative. Secondary containment and spill cleanup plans would be implemented to prevent fuel and contaminants used at the Airport site from impacting downstream waterbodies. Changes in surface water runoff and quality associated with the road improvements would be minimal since there would be negligible increases in surface area, runoff, and traffic. Compared to the baseline condition, which has minimal stormwater treatment or controls and several local identified sources of pollutants, the Preferred Alternative would result in a less than significant beneficial impact on downstream marine water quality.

**Seaport**

The proposed training exercises would involve up to two port visits per year by a Navy vessel. Turbidity can occur by bringing in large ships, but potential impacts would be very temporary. As currently occurs in the port of Yap all ships would be required to follow BMPs for bow thrusters.

As described in Section 3.2.2.3.3.2, a stormwater treatment system (including an oil-water separator) would be installed to control stormwater post construction and sources of contamination within the construction footprint would be addressed. Proposed DoW training at the Yap Seaport would consist of approximately one vessel visiting the port per training event and up to two training events per year. Each training event could last up to 14 days (inclusive of set-up and tear-down), or a total of up to 28 training days per year. The visit would not interfere with normal commercial operations. Secondary containment, spill response materials, and spill cleanup plans would be available to prevent fuel and contaminants used at the site from entering marine waters. The current Seaport has no stormwater treatment or LID features. The Preferred Alternative would result in a reduction in sediment and contaminants from reaching marine waters adjacent to the Seaport. Therefore, the Preferred Alternative would result in a significant beneficial impact.

Road improvements include widening and repaving the road from the port to the upper end of Chamorro Bay. Additional improvements include soil stabilization, rip rap, and repair of existing concrete swales. The road segment at the port would be widened and a grass swale that meets LID guidelines would be installed next to the road that will tie into existing drainage or discharge locations. By using the LID guidelines for water drainage, water quality parameters such as turbidity would be expected to improve slightly when the runoff discharges to the marine environment.

#### 3.2.2.3.3.4 Wetlands

**Airport**

Operation of the Airport under the Preferred Alternative would not differ much from existing airport operations with regard to wetlands. Once construction is complete, stormwater systems would be in place and there would be a beneficial impact on water quantity and quality due to improvements relative to the baseline condition (See Section 3.2.2.3.3.2 for details). Mitigation

projects would be complete by the time construction is complete, offsetting loss of wetland function around the Airport.

Overall, post-construction impacts at the Airport site are expected to have a less than significant adverse impact to wetlands once mitigation has been completed.

#### 3.2.2.3.3.5 Mangroves

**Airport**

There will likely be no effect on the Airport Mangrove Areas 1-3 after construction is complete, and they will continue to function as they do now. Alternative 1 would result in a small improvement to the timing, volume, or water quality of the water reaching the mangroves downstream from the airport due to improvements in stormwater management relative to the baseline condition (See Section 3.2.2.3.3.2 for details). While stormwater improvements might lead to minor changes to freshwater and sediment inflows, mangroves found in these areas would be unaffected as their proximity to the coast currently subject them to daily tides, which have a much stronger influence on mangrove health than minor changes in freshwater inputs.

**Seaport**

Once construction of dredge material landing sites and stockpile sites are completed, no additional impacts to mangroves would occur from proposed DOW training activities. Therefore, there would be no impacts to mangroves from proposed post-construction activities under the Preferred Alternative.

#### 3.2.2.3.3.6 Physical Oceanography

Operations of the improved Seaport and U.S. DoW training exercises are not anticipated to impact physical oceanographic conditions. However, the proposed improvements would improve the resilience of the Yap Seaport in the face of existing and potential future oceanographic conditions including sea level rise and extreme storm events.

### 3.2.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

For Alternative 2, most components would be the same as for the Preferred Alternative with the following changes that affect the water resources analysis. At the airport, the location of the parking apron would be approximately 1,000 ft west of the location proposed for Preferred Alternative, requiring additional excavation and longer construction times. At the Seaport, improvements would be the same as the Preferred Alternative except for dredge material disposal. Dredge material at the channel entrance would be disposed of directly in deeper areas of the channel rather than at the Tamil and Rull sites.

#### 3.2.2.4.1 Avoidance, Minimization Measures and Best Management Practices

The same avoidance, minimization measures and BMPs proposed for the Preferred Alternative would be used for Alternative 2.

#### 3.2.2.4.2 Construction Impacts

**Airport**

The same stormwater management facilities and BMPs would be used during construction as with the Preferred Alternative. There would be an increase in the amount of cut and fill required due to the location of the parking apron, which would result in an increase in construction time. The total area of impervious surface is not expected to change. There would be negligible differences in impacts to groundwater and surface water quantity and quality between the two alternatives. Therefore, construction of Alternative 2 would have short term, less than significant adverse impacts on groundwater and surface water quantity and quality.

Alternative 2 would shift the location of the parking apron approximately 1,000 feet west of the location of the Preferred Alternative, however, impacts to wetlands would be the same as the Preferred Alternative. Even though the apron would be relocated, grading in the vicinity of wetland areas 6 and 2 would remain the same because of the required access road improvements and the necessary disposal of fill from the excess excavation required for the relocated apron. As with the Preferred Alternative, mitigation would be required to offset unavoidable impacts to wetlands. Due to the extent of wetland disturbance, Alternative 2 would have a significant adverse effect on wetlands, however, in accordance with the Environmental Compliance SOP and ECP, mitigation would be required to offset those impacts.

**Seaport**

Construction impacts to groundwater and surface water quantity and quality would be the same at the Seaport between the Preferred Alternative and Alternative 2. Alternative 2 would have less than significant beneficial impacts on groundwater quality and less than significant adverse impacts on surface water quality.

Sediment dredged from the Waneday Channel would be deposited in the center of the channel and would therefore have a greater impact on marine water quality and sediment dispersion in the channel during dredging. Alternative 2 would not include dredge disposal in Rull or Tamil, so there would be no marine water quality impacts at either of those sites. Therefore, Alternative 2 would have less than significant impacts on water quality.

#### 3.2.2.4.3 Post-Construction Impacts

During the post-construction period, activities would be the same for the Preferred Alternative and Alternative 2. Therefore, there would be no difference in impacts between the two alternatives for post-construction impacts.

## 3.3 Air Quality and Greenhouse Gases

This discussion of air quality and greenhouse gases (GHGs) includes regulated air pollutants, sources, and substantive standards. Air quality in each location is characterized by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and quantity of pollutants emitted into the atmosphere, the size and topography of the air basin, and the meteorological conditions.

Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, non-road engines) and stationary sources (e.g., batch plants, refineries, power plants),

as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires. In accordance with the Environmental Compliance SOP (Appendix A) the Proposed Action would comply with the substantive standards established by the U.S. Clean Air Act (CAA) and the Yap State Air Quality Regulations.

### 3.3.1 Regulated Air Pollutants and Ambient Air Quality Standards

Under the CoFA between the United States and the FSM, NEPA applies to U.S federal actions undertaken within FSM territory, including Yap Island. Pursuant to Sections 161(a)(3) and 161(a)(4) of the CoFA, U.S. federal actions must comply with standards substantively similar to the provisions of the CAA (42 U.S.C 7401-7671q), as well as any more stringent environmental standards adopted by the FSM or Yap State (Table 3-3). Although the U.S. Environmental Protection Agency (EPA) does not administer CAA regulatory programs in FSM, the substantive requirements of the CAA apply to the Proposed Action.

Air quality management on Yap Island is overseen by the Yap State EPA, which has adopted ambient air quality standards for six pollutants of concern, herein referred to as regulated ambient air pollutants. These pollutants are carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), ozone ($O_3$), particulate matter less than or equal to 10 micrometers ($PM_{10}$), particulate matter less than or equal to 2.5 micrometers ($PM_{2.5}$), and lead (Pb). CO, $SO_2$, $NO_2$, Pb, and some particulates are emitted directly into the atmosphere from both stationary and mobile emission sources. Ozone, much of the fine particulate in the atmosphere, and some of the $NO_2$ are formed through atmospheric transformations of other pollutant emissions (called precursors) that are influenced by weather, ultraviolet light, and other atmospheric processes. The Yap State Ambient Air Quality Standards (AAQS) are intended to protect public health and welfare on and around Yap Island and are generally more stringent than the U.S. National Ambient Air Quality Standards (NAAQS) (Table 3-3).

Compliance with applicable U.S. CAA requirements and Yap State air quality standards will be implemented through the ECP developed in coordination with Yap State and FSM regulatory authorities. The ECP will identify applicable air quality requirements, establish BMPs and emission control measures, and ensure that construction and post-construction activities associated with the Proposed Action are conducted in a manner protective of public health and welfare.

**Table 3-3 Yap State and U.S. National Ambient Air Quality Standards**

| *Pollutant* | *Averaging Time* | *Yap AAQS* | *Form (Yap)* | *NAAQS[1]* | *Form (NAAQS)* |
|---|---|---|---|---|---|
| CO | 8 hour | 9 ppm | Not to be exceeded more than once per year | 9 ppm | Not to be exceeded more than once per year |
| CO | 1 hour | 35 ppm | Not to be exceeded more than once per year | 35 ppm | Not to be exceeded more than once per year |
| Pb | Rolling 3-month average | 0.15 µg/$m^3$ | Not to be exceeded | 0.15 µg/$m^3$ | Maximum arithmetic mean of 3 consecutive monthly means in a 3-year period |

| *Pollutant* | *Averaging Time* | *Yap AAQS* | *Form (Yap)* | *NAAQS[1]* | *Form (NAAQS)* |
|---|---|---|---|---|---|
| $NO_2$ | 1 hour | 200 µg/m$^3$ | 1-hour mean | 188 µg/m$^3$ | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| $NO_2$ | Annual | 40 µg/m$^3$ | Annual mean | 100 µg/m$^3$ | Annual Mean |
| $O_3$ | 8 hour | 100 µg/m$^3$ | 8-hour mean | 137 µg/m$^3$ | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| $PM_{2.5}$ | Annual | 10 µg/m$^3$ | Annual mean | 9.0 µg/m$^3$ | Annual mean, averaged over 3 years |
| $PM_{2.5}$ | 24 hour | 25 µg/m$^3$ | 24-hour mean | 35 µg/m$^3$ | 98$^{th}$ percentile, averaged over 3 years |
| $PM_{10}$ | Annual | 20 µg/m$^3$ | Annual mean | N/A | N/A |
| $PM_{10}$ | 24-hour | 50 µg/m$^3$ | 24-hour mean | 150 µg/m$^3$ | Not to be exceeded more than once per year on average over 3 years |
| $SO_2$ | 24-hour | 20 µg/m$^3$ | 24-hour mean | N/A | N/A |
| $SO_2$ | 1-hour/ short-term | 500 µg/m$^3$ | 10-minute mean | 196 µg/m$^3$ (1-hr) | Annual 99$^{th}$ percentile of 1-hour daily maximums, averaged over 3 years |
| $SO_2$ | Annual | N/A | N/A | 26 µg/m$^3$ | Annual mean, averaged over 3 years |

Notes:

ug/m$^3$ = Microgram(s) per cubic meter l ppb = part(s) per billion; ppm = part(s) per million.

[1] Table includes only primary NAAQS with the exception of annual SO2 secondary NAAQS. Note: Exception is because there is no more stringent primary NAAQS for annual SO2 as there are for secondary NAAQS of other pollutants. Concentration units for gaseous pollutants under NAAQS expressed in parts per million or parts per billion were converted to micrograms per cubic meter to allow direct comparison with Yap State Air Quality Standards. Conversions were performed, assuming standard conditions of atmosphere.

Source: USEPA 2025a; Yap State EPA, 2015

### 3.3.1.1 Air Toxics

Air toxics, including hazardous air pollutants (HAPs) are emitted from both stationary and mobile sources and may cause adverse health or environmental effects depending on exposure levels and duration. AAQS have not been established for HAPs because USEPA's strategy is to use reductions of HAP emissions from stationary, industrial, mobile, and indoor sources to provide nationwide health protections. Accordingly, air toxics are regulated through technology-based standards, fuel requirements, and emission controls rather than ambient concentration limits. Yap State does not currently establish source-specific regulatory programs for HAPs; therefore, this analysis evaluates air toxics impacts qualitatively and in coordination with the broader discussion of regulated ambient air pollutants addressed under the Yap State AAQS. Potential air toxics emissions associated with the Proposed Action would originate primarily from combustion sources, including diesel-powered construction equipment, emergency generators, aircraft ground support equipment, vehicles, and marine vessels. Diesel fuel sulfur content influences sulfur dioxide and particulate emissions, fuel supplied to Yap

Island may vary depending on regional availability. Where practicable, the Proposed Action would rely on modern equipment, assuming USEPA Tier 2 compliant engines at a minimum, and the utilization of lower-sulfur fuels to minimize air toxics emissions where feasible. To assess risk from exposure to toxics, the USEPA has tabulated long-term (chronic non-cancer and cancer) and short-term (acute non-cancer) dose-response assessments that could be used for risk assessments of HAPs (IRIS 2003, 1991; FERA, 2023).

#### 3.3.1.2 Greenhouse Gases

GHGs are gaseous pollutants that trap heat in the atmosphere, contributing to the greenhouse effect. The primary GHGs associated with human activities include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), and fluorinated gases; among these, $CO_2$ is the dominant GHG emitted from fuel combustion. GHG emissions result from both natural processes and anthropogenic sources, including stationary sources such as generators and mobile sources such as aircraft, marine vessels, vehicles, and construction equipment. Scientific evidence indicates a trend of increasing global temperature during the past century due to an increase in GHG emissions from human activities. FSM has established long-term greenhouse gas mitigation commitments through the Nationally Determined Contribution (NDC 3.0, 2025) under the Paris Agreement. This commitment outlines sector-specific mitigation pathways, with the objective of achieving net-zero emissions by 2050. According to FSM's NDC, emissions are targeted to be approximately 153,000 tons of carbon dioxide equivalent ($CO_2e$) under its mitigation measures by 2030. At the State level, the Yap State Environmental Quality Protection Act (Title 18, Yap State Code) provides the policy framework for maintaining environmental quality and guiding development in a manner that supports ecological integrity and community well-being. This analysis evaluates the potential greenhouse gas emissions associated with the Proposed Action.

### 3.3.2 Affected Environment

Air quality impacts are evaluated in the context of Yap Proper as a remote island environment with limited industrial development, relatively low population density, and an absence of large stationary emission sources. Ambient air quality on Yap Proper is primarily influenced by natural sources, small-scale combustion activities, and regional background conditions, including long-range transport of pollutants typical of the Western Pacific region (World Bank, 2021). Localized emissions are associated with marine activities, air and ground transportation, and other small-scale combustion sources. Prevailing trade winds are from the northeast and during other times, winds are from all other directions. Pollutants are dispersed downwind from the emission releases such as from active construction sites, areas of biomass (agricultural waste) burning, and unpaved or poorly maintained paved roads. Background air quality is expected to be good in the Western Pacific region where there is distance from pollutant emitting activities.

There are currently no permanent ambient air quality monitoring stations in Yap State, therefore, assessments of existing conditions rely on regional background information and datasets that represent pollutant emitting activities. The World Health Organization's (WHO 2025) global-modeled datasets for FSM reports an annual mean for $PM_{2.5}$ at a value of 8 $\mu g/m^3$. Elevated $PM_{2.5}$ exposure in remote and low-income settings has been attributed in part to

household combustion sources, including limited access to clean fuels and cooking technologies. These findings suggest that baseline $PM_{2.5}$ concentrations in remote island settings such as Yap may be higher in or near areas where combustion activities occur, relative to areas not downwind of activities that generate air pollutants.

### 3.3.3 Environmental Consequences

The effects of the Proposed Action on local air quality are based on an anticipated emissions generated during construction and post-construction activities. The region of influence (ROI) for this air quality assessment encompasses Yap Proper and its immediate coastal and marine surroundings, representing the primary area where project-related pollutant emissions, dispersion, and deposition would occur. To contextualize existing conditions, available reference data, such as WHO-reported regional fine particulate matter values and representative data, i.e., data collected at locations with similar pollutant emitting activities, are used to characterize baseline air quality in lieu of state or local monitoring networks. The air quality analysis incorporates locally applicable emission factors, available meteorological datasets, and dispersion modeling outputs to estimate pollutant concentrations and evaluate the potential for project-related impacts. Modeled pollutant concentrations will be compared to available thresholds to assess the relative magnitude of predicted impacts.

#### 3.3.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and no new construction or post-construction emission sources would be introduced. Air quality conditions would reflect the existing baseline conditions; however, current infrastructure deficiencies would influence local air quality over time. Deteriorating paved and unpaved roadways at and near the Airport and Seaport would continue to generate fugitive dust emissions, including particulate matter, from ongoing vehicle traffic and lack of roadway improvements.

Without implementing the Proposed Action, the conditions at Yap would persist or gradually worsen as infrastructure continues to age, resulting in localized, short-term increases in air pollutant concentrations. The No Action Alternative would not provide opportunities to reduce fugitive dust, improve infrastructure conditions, or otherwise mitigate existing air quality stressors. The No Action Alternative would maintain or potentially exacerbate existing localized air quality conditions and GHG emissions. Therefore, the No Action Alternative would result in a less than significant adverse impact on air quality.

#### 3.3.3.2 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

The analysis of the Preferred Alternative includes direct emissions from construction and post-construction activities, including aircraft and vessel operations, fuel handling, and support systems.

##### 3.3.3.2.1 Avoidance, Minimization Measures and Best Management Practices

The implementation of best air pollution control practices is recommended to reduce localized air quality impacts from construction activities and to support responsible environmental stewardship. These voluntary practices, while not regulatory requirements, facilitate minimizing environmental consequences to the greatest extent feasible. Some examples of best air pollution control practices to reduce the effects on air quality include the following:

- Treat active construction areas with water to suppress fugitive dust
- Cover or wet down truckloads of soil and aggregate to prevent wind-blown dust during transport
- Sweep adjacent roads whenever soil deposits from excavation and grading are visible
- Lower speed limit on access driveways to reduce fugitive dust generation
- Use of ultra-low sulfur diesel (ULSD) fuel
- Maintain all construction machinery engines in good mechanical condition and observe regular maintenance procedures to minimize exhaust emissions
- Minimize the idling of diesel-powered machinery and vehicles, especially during staging or inactive periods

#### 3.3.3.2.2 Construction Impacts

Construction-related air pollution sources include fugitive dust from land clearing, grading, excavation, material handling, and vehicle travel; exhaust emissions from construction equipment and generators; on-road vehicle emissions from worker commutes and material transport; operations of the asphalt and concrete batch plants; and volatile organic compound (VOC) emissions associated with asphalt curing. An air quality impact study is underway to estimate emissions and pollutant concentrations during the construction period. The detailed results of the air quality impact study will be provided in an appendix to the Final version of this EIS and a summary of the results will be included in this section of the Final EIS. The impact analysis process will ensure that appropriate BMPs are identified for inclusion in the ECP that is required to be developed in coordination with the FSM and Yap State before construction can commence.

Under section 161(a)(3) of the CoFA, the U.S. DoW's proposed construction of the Preferred Alternative is required to comply with the more stringent standards of the U.S. CAA and the Yap ambient air quality standards. Additionally, the ECP will identify specific BMPs to ensure compliance with these standards and such BMPS are likely to have a moderating effect on the impacts to human health risks from HAP exposure in areas where public presence is expected. Therefore, the Preferred Alternative would result in less than significant impacts to air quality.

#### 3.3.3.2.3 Post-Construction Impacts

Post-construction air emissions are associated with long-term, recurring activities that would occur following completion of the Proposed Action at the Airport and Seaport. These emissions result from intermittent military training activities, airport flight activity, vessel calls at the Seaport, fuel handling and storage, ground support equipment, emergency and standby generators, and on-road vehicle traffic.

Post-construction emission sources at the Airport include aircraft engine emissions during landing and takeoff cycles (LTO) and climb-out activities up to 3,000 ft above ground level, as well as ground-based mobile and stationary combustion sources. Contributors to air emissions include periodic military training exercises involving fighter and cargo/tanker aircraft. At Yap Seaport, post-construction emissions include vessel emissions associated with port calls, pier-side equipment operation, on-site vehicle traffic, and small stationary combustion sources.

An air quality impact study is underway to estimate emissions and pollutant concentrations generated from the proposed post-construction activities, and BMPs will be identified to ensure the activities will comply with applicable ambient air quality standards. The detailed results of the air quality impact study will be provided in the appendices to the Final EIS, and a summary of the results will be provided in this section of the Final EIS. The impact analysis will ensure that appropriate BMPs are identified for inclusion in the ECP that is required to be developed in coordination with the FSM and Yap State before post-construction activities can commence.

Under section 161(a)(3) of the CoFA, the U.S. DoW's proposed post-construction activities included in the Preferred Alternative are required to comply with the more stringent standards of the U.S. CAA and the Yap ambient air quality standards. Additionally, the ECP will identify specific BMPs to ensure compliance with these standards and such BMPS are likely to have a moderating effect on the impacts to human health risks from HAP exposure in areas where public presence is expected. Therefore, the Preferred Alternative would result in less than significant impacts to air quality and GHGs.

#### 3.3.3.3 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Alternative 2 would have a similar impact on air quality as the Preferred Alternative. The primary difference is the land clearing associated with the Airport improvements would be shifted west to account for the alternative apron locations. The relocation of construction activities is not expected to result in significant changes to the air emissions estimates.

The other primary difference of Alternative 2 would be changes to the dredging operations in Waneday Channel and the elimination of transport dredge materials for beneficial use. Although this would eliminate some transportation related emissions associated with the short duration dredge operation, it would not be expected to result in significant changes to air emissions compared to the Preferred Alternative.

Overall, Alternative 2 would result in similar impacts during the construction period as the Preferred Alternative associated with heavy-duty construction equipment and would not significantly change with respect to other project elements that contribute to air quality. During the post-construction period, Alternative 2 would result in the same impacts as the Preferred Alternative associated with Airport and Seaport post-construction use.

## 3.4 Marine Biological Resources

Marine resources include marine flora and fauna, marine habitats, and marine resources as they relate to traditional cultural practices. This section details the sensitive and valuable ecosystems, including the extensive coral reef system and seagrass beds. It also discusses the rich marine biodiversity, including fish, invertebrates, and protected or threatened species in the ROI. Mangroves and estuarine zone vegetation are discussed in Section 3.2, Water Resources.

### 3.4.1 Affected Environment

The following discussions provide a description of the existing conditions for marine biological resources in the ROI. The ROI for marine resources includes the coastal environment, nearby waters, and submerged habitats within and adjacent to the Proposed Action where marine

resources may be impacted by presence of humans, vessels, and construction equipment, lighting, and noise. Additionally, it includes areas where overflights would occur at altitudes low enough to potentially disturb marine biota by their presence and/or noise could potentially affect marine resources. It also includes coastal waters downgradient from proposed Airport improvements where stormwater runoff and sedimentation could reach the marine environment. For the proposed Seaport improvements, the ROI includes in-water areas where the improvements would occur at the Seaport, as well as nearby areas where noise or turbidity could affect marine resources in Chamorro Bay or Colonia Harbor. The ROI also includes proposed dredging areas in Colonia Harbor and the Waneday Channel as well as dredge offload sites/disposal areas at Tamil, Rull, and Nungoch. Areas along the Waneday Channel where ATONs would be placed, and shipping lanes for construction materials out to 12 nm are also part of the ROI.

Throughout this section, the first introduction of a plant or wildlife species includes the scientific name, followed by the common and local names, if applicable. Subsequent references use the common name; however, if there is no common name, the shortened scientific name is used.

#### 3.4.1.1 Marine Protected Areas

Yap's marine resources are also managed by a traditional political structure, anchored by the Council of Pilung, that has been partially integrated into the modern representative government (Tafileichig and Inoue, 2001; Smith, 1991). The Yap Constitution recognizes traditional rights and ownership of natural resources and areas within the marine space of the State, within and beyond 12 miles from the island baselines (Tafileichig and Inoue, 2001; Article XIII, Section 5, Yap Constitution). Any resource management involving the utilization of inshore marine resources has to be accepted and approved by the Council of Pilung, which consists of chiefs from Yap main islands and neighboring islands (Tafileichig and Inoue, 2001). The Council of Pilung heads the customary branch of the Yap Government and has a strong say over custom, behavior and development (Tafileichig and Inoue, 2001).

In Yap, the Protected Area Network (PAN) serves as a formal framework that bridges modern conservation science with the island’s deeply rooted traditional management systems. Marine Protected Areas (MPAs) are established to safeguard biodiversity and food security, and they rely on the constitutional recognition of village-level authority and customary reef ownership.

There are no PAN MPAs located in the vicinity of the Airport. Channel dredging at the Waneday Channel would occur immediately adjacent to and partially within the PAN Tamil MPA to the east of the proposed dredging area. The Tamil MPA consists of three zones: 1.) Tamil traditional management zone, 2.) warning zone, and 3.) no take, no entry zone (Figure 3-8).

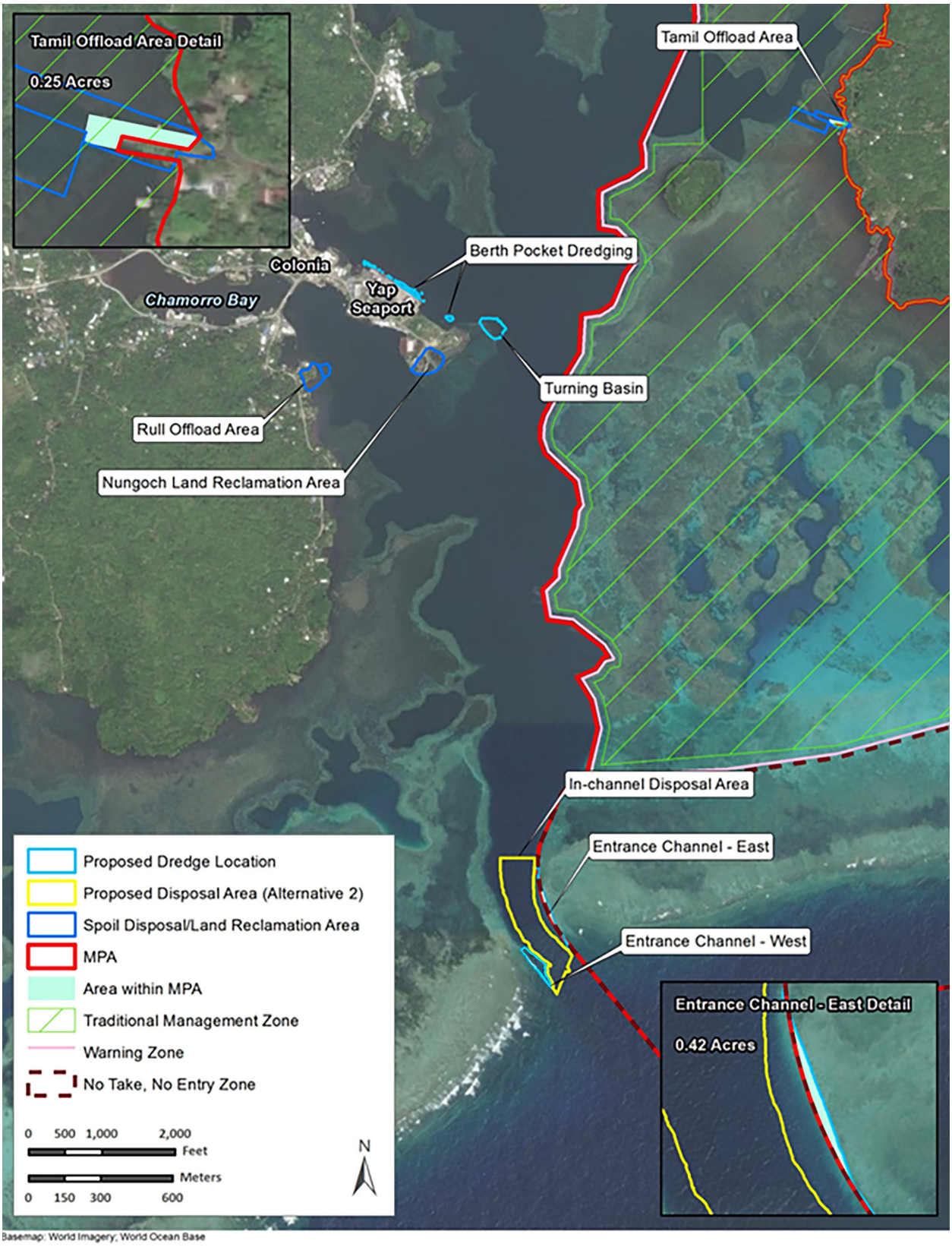



**Figure 3-8 Marine Protected Area (MPA) Map, Proposed Dredging Areas (Both Alternatives), and Proposed In-Channel Dredge Disposal Area (Alternative 2)**

### 3.4.1.2 Benthic Environment

The Seaport is in Colonia Harbor on the north side of the Nungoch peninsula, which is largely developed and provides services for international and domestic cargo, fuel tankers, inter-island passenger ships, and occasional longline-fishing vessels. Ships travel through a 1.5-mile-long reef passageway, referred to as the Waneday Channel, to the existing 825-foot-long wharf at the Seaport.

In 2023, a marine resources survey was conducted around the Seaport and along the Waneday Channel Entrance to document the presence of marine resources. The marine surveys included four components: 1) marine habitat mapping, 2) benthic/biotic surveys, 3) ecotourism investigation, and 4) remote sensing. The survey team conducted the marine habitat mapping using the manta tow methodology, the benthic/biotic surveys using the line-intercept and belt transect methodologies and performed the ecotourism investigation using a desktop analysis and on-island verification. Benthic/biotic composition surveys were conducted in a subset of the overall surveyed locations, including the Waneday Channel Entrance, the Seaport, and the proposed Rull Offload Site (NAVFAC Pacific, 2023). Of the surveyed areas, the Waneday Channel Entrance had the highest biotic and abiotic benthic coverage, followed by the proposed Rull Offload Site, and then the Seaport (Table 3-4) (NAVFAC Pacific, 2023).

**Table 3-4 Mean Benthic Type Cover by Survey Area**

| *Benthic Cover Type* | *Waneday Channel Entrance Percent* | *Seaport Percent* | *Proposed Rull Offload Site Percent* |
|---|---|---|---|
| Live Coral | 28.6 | 12.7 | 22.0 |
| Dead Coral | 36.3 | 7.4 | 9.4 |
| Crustose coralline algae | 4.2 | <0.1 | 0.0 |
| Algae* | 11.2 | 7.1 | 0.0 |
| Seagrass | 1.0 | 3.6 | 0.1 |
| Sand/Rubble | 14.9 | 61.6 | 67.8 |
| Other | 3.7 | 7.6 | 0.9 |

**Source:** NAVFAC Pacific, 2023

*All algae other than crustose coralline algae.

Soft bottom habitats (characterized as sand/rubble in Table 3-4), consisting of carbonate sands, silt, and coral rubble, are the most ubiquitous benthic features in Colonia Harbor. While often perceived as less productive than reefs, these areas are vital for nutrient cycling and provide habitat for specialized infauna. These communities are dominated by burrowing invertebrates such as polychaete worms, mollusks, and crustaceans. Rubble fields, often created by storm events or the natural degradation of reef structures, provide a transition zone that offers structural complexity for small cryptic fish. In Yap, soft bottoms serve as foraging grounds for various species of rays and fish which sift through the upper layers of sediment for prey (George, et al., 2008). These areas also support various invertebrates, such as sea cucumbers, which play a vital role in sediment oxygenation and the overall health of the benthic environment (Munger et al., 2023).

Algal flats typically occur on the shallow reef flats and back-reef slopes where sunlight is abundant and water circulation is consistent. Beyond their role as primary producers, algal flats are significant contributors to the island's sand production through the breakdown of calcified algal tissues over time (Bellwood et al., 2017). These flats are essential grazing grounds for a

variety of herbivorous fish, most notably *Acanthuridae* (surgeonfish) and *Scaridae* (parrotfish). Furthermore, algal flats provide a stable substrate for the *Tridacna* spp. (giant clam), a culturally significant and ecologically sensitive species in FSM that relies on these shallow, sunlit areas for growth (George et al, 2008).

Seagrass beds in Yap are primarily found in the sheltered, shallow waters and near mangrove fringes. Seagrasses help to stabilize seafloor sediments, filter terrestrial pollutants from the water column, and sequester significant amounts of carbon. Seagrass beds are among the most productive habitats in the Pacific and serve as foraging grounds for the *Chelonia mydas* (green turtle) (Smithsonian, 2026). Additionally, these beds function as critical nurseries for commercially and ecologically important species, including snappers, groupers, and the *Bolbometopon muricatum* (green humphead parrotfish), which is considered a species of special concern due to its cultural importance and vulnerability to overfishing (Orcutt et al., 1989).

Yap is characterized by its well-developed fringing and barrier reef systems, which are characterized by high coral cover dominated by *Acropora*, *Porites*, and *Montipora* species. These reefs provide the essential structural framework that protects the coastline from wave energy and storm surges while representing the highest level of biological complexity in the region. The reefs of Yap support the resident population of the *Mobula alfredi* (reef manta ray), which utilizes specific reef cleaning stations where smaller fish remove parasites from their bodies. These reefs also support several sensitive species, including the *Cheilinus undulatus* (Napoleon wrasse) and a vast array of hard corals. As a critical component of the local marine ecosystem, the reefs also serve as essential habitat for various shark species (Houk et al., 2012).

#### 3.4.1.3 Marine Vegetation

Marine vegetation (i.e., plants occurring in marine waters) includes seagrass and algae (including macroalgae or seaweed). Mangroves are discussed in Section 3.2, Water Resources.

##### 3.4.1.3.1 Seagrass

In Yap, there are seven reported species of seagrasses (Tsuda et al., 1977). These species consist of *Cymodocea serrulata*, *C. rotundata*, *Enhalus acoroides*, *Thallasia emprichii*, *Halophila minor*, *H. ovalis* and *Syringodium isoetifolium* (Edward, 2002). The 2023 marine resources survey (Appendix H) noted healthy and established mixed seagrass patches near the west side of Waneday Channel and to the north and southeast of the Seaport (Figure 3-9) (NAVFAC Pacific, 2023). Only small patches of seagrass were observed around the Seaport, the east side of Waneday Channel, the Waneday Channel Entrance, and the proposed Rull Offload Site (Figure 3-9) (NAVFAC Pacific, 2023). In general, the seagrass beds occupied shallow sandy areas with low coral cover and were located away from high wave action areas.

Seagrass beds or meadows are highly productive ecosystems that can sustain a variety of fisheries, contribute to fish density and diversity on adjacent coral reefs, and facilitate the transfer of energy through the marine and terrestrial food webs (Dorenbosch et al., 2005; Heck et al., 2008; Houk et al., 2013). Seagrass roots help to stabilize sediment, and their leaves provide shelter and food to many organisms. Green turtles commonly feed on seagrasses in the genera of *Thalassia*, *Cymodocea*, and *Halophila*, all of which are found in the lagoon surrounding Yap (Merlin et al., 1996). Seagrass beds also act as a nursey ground for some invertebrates and fishes, function as a hunting ground for large carnivorous fish during high

tide, lessen the effects of currents, and can trap silt and sediments washed into the sea from land areas (Merlin et al., 1996; Edward, 2002). Seagrass, specifically *Enhalus acoroides*, has also been traditionally used by the people of Yap to make fine mesh nets due to its persistent and strong fibers, although the use of these nets has declined since World War II (Falanruw, 1992). Seagrasses in Micronesia are generally found in shallow water, less than 3 meters deep (Seagrass Watch, 2025).

Seagrass beds and algae can be disturbed and damaged by natural or human causes. Excessive soil run-off due to increased erosion on land may increase turbidity and limit the amount of sunlight available to seagrasses and algae, which can stunt the growth of plants or even kill them (Merlin et al., 1996). Reduced seagrass and algae growth may limit the growth and development of marine animals that rely on marine vegetation (Merlin et al., 1996). During the 2023 surveys (found in Appendix H), approximately 4.6 acres of seagrass were documented within the project area, and of that, only 0.33 acres of seagrass is located within the proposed dredge area (Figure 3-9). A small portion of the project area was not surveyed in 2023, the seagrass composition of approximately 0.8-acre of the Rull side of the entrance channel dredging area and 14.1-acres of the 15.5-acre proposed in-channel dredge disposal area are unknown. Areas that were surveyed on either side of the 0.8-acre and 14.1-acres areas did not contain seagrass. It is reasonable to assume that these unsurveyed areas (primarily deep water) do not contain seagrass, supported by the lack of seagrass in the adjacent areas and decreased sunlight at depths that range between 120 and 160 ft (NAVFAC SW, 2024).

#### 3.4.1.3.2 Algae

There are 161 reported species of algae in Yap, not including algae from the outer atolls within Yap State. They consist of 11 *Cyanophyta*, 61 *Chlorophyta*, 18 *Phaeophyta*, and 71 *Rhodaphyta* species (Tsuda, 2002).

The 2023 marine survey report noted an absence of *Padina* algae in all survey transects and low densities observed throughout the surveyed areas (NAVFAC Pacific, 2023). *Padina*, specifically *P. pavonica*, is considered an indicator species for eutrophication (excessive nutrients) when found in high densities, which can stem from anthropogenic activities like agricultural runoff and sewage discharge (Geeraert et al., 2020; NAVFAC Pacific, 2023). The lack of presence of *Padina* in the surveyed areas suggests there are minimal signs of nutrient enrichment around the Seaport, despite its proximity to a populated shoreline and sewage treatment outfall (NAVFAC Pacific, 2023). In addition, crustose coralline algae were observed as benthic cover in the surveyed areas (NAVFAC Pacific, 2023). Crustose coralline algae can influence and encourage coral larval settlement and can contribute to reef building through carbonate production (Tebben et al., 2015; Cornwall et al., 2023).

### 3.4.1.4 Marine Wildlife

#### 3.4.1.4.1 Marine Mammals

Marine mammals are considered special status species and are discussed in **Section 3.4.1.5**.

#### 3.4.1.4.2 Sea Turtles

Sea turtles are protected under the ESA and discussed in **Section 3.4.1.5**.

#### 3.4.1.4.3 Fish

Yap hosts a diverse population of fish species. The total known fish fauna of Yap State is 787 species in 275 genera and 76 families (Allen, 2007). Reef fish, such as corallivorous butterflyfish, serve as indicator species for the assessment of ecological conditions on Pacific coral reefs (Crosby and Reese, 1996), while sharks perform important ecological roles in their marine environments (Roff et al., 2016). Yap is renowned for its reef channels, including Mi'l and Goofnuw, which are famous for consistent manta ray sightings and dynamic diving experiences shaped by tidal currents. Culturally valued marine fish species are discussed in Section 3.4.1.5.

The benthic/biotic surveys recorded the presence and abundance of coral, fish, and invertebrate species that occurred in the Waneday Channel Entrance, Seaport, and the northern half of Seaport–Southwest (Appendix H). The survey team strategically placed transects to ensure a representative sample of the primary zones within a coral reef ecosystem. Reef fish assessments from the 2023 marine survey recorded 121 species and 28 families of reef fish, including two reef shark species, across all surveyed areas. Wrasse (*Labridae*; 20 species), butterflyfish (*Chaetodontidae*; 13 species), damselfish/clownfish (*Pomacentridae*; 13 species) and goby (*Gobiidae*; 12 species) had the highest number of individual species present. The striped bristletooth (*Ctenochaetus striatus*) was the most abundant species throughout the surveyed areas. Other species of surgeonfish (e.g., *Acanthurus blochii*, *Acanthurus lineatus*) and a triggerfish (*Rhinecanthus rectangulus*) were also regularly observed, but not in the abundances of the striped bristletooth. Small and gregarious species like *Chromis* spp., *Apogon* spp., *Thalassoma* spp., and several goby species were abundant but showed a marked affinity for particular reef zones and even particular coral types (e.g., *Chromis viridis* and several species of *Apogon* inhabiting *Acropora* corals within the inner reefs) (NAVFAC Pacific, 2023). See Table 3-5 for a list of all fish species documented during 2023 Seaport surveys.

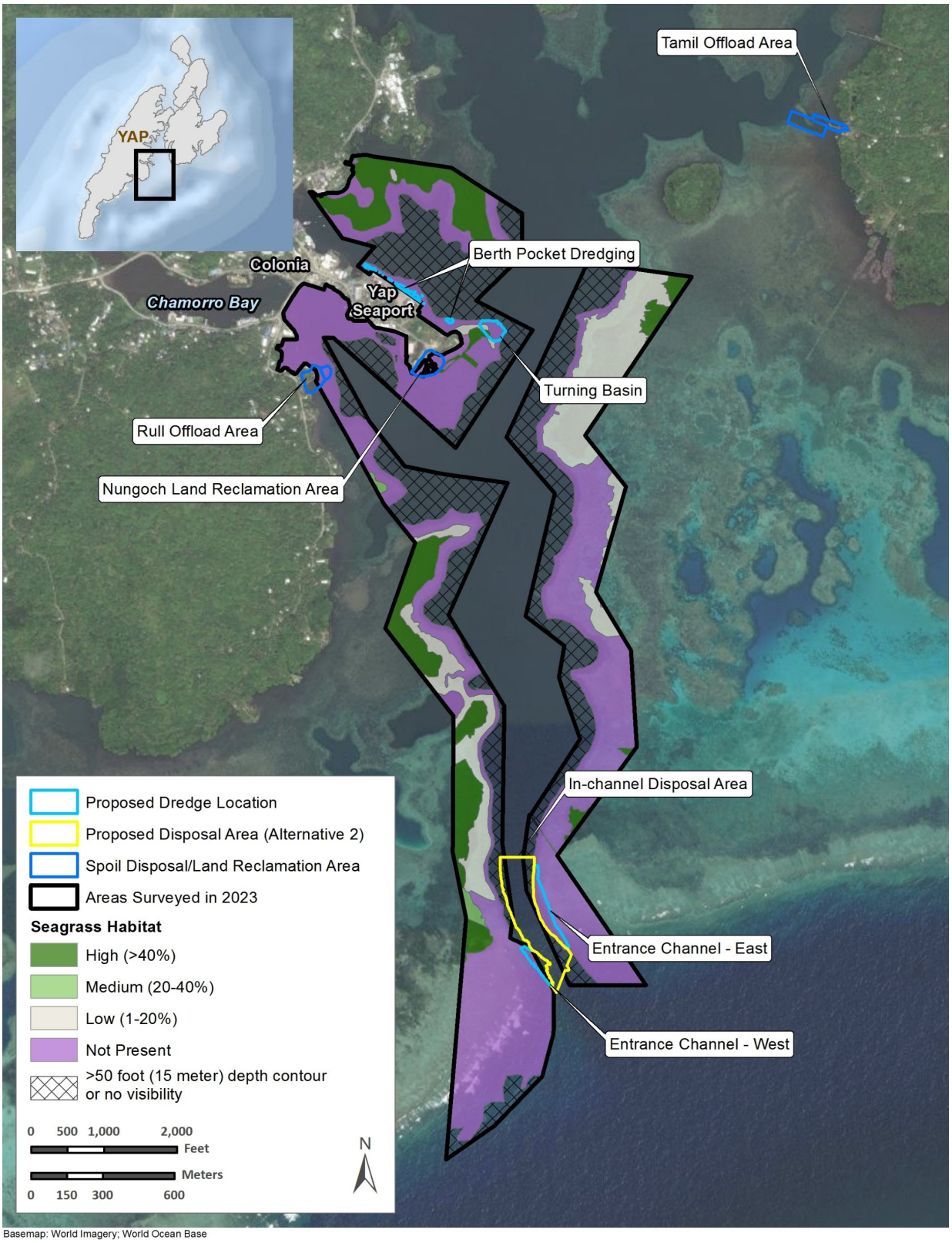



**Figure 3-9 Seagrass Habitat Map, Proposed Dredging Areas (Both Alternatives), and Proposed In-Channel Dredge Disposal Area (Alternative 2)**

## Table 3-5 Fish Species Recorded During Reef Fish Assessments

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| ***Elasmobranchii* (Cartilaginous Fish)** | | | | | | |
| *Carcharhinidae* | *Carcharhinus melanopterus* | Blacktip reef shark | Primarily associated with coral reefs and soft bottom sand flats in shallow inshore waters and lagoons. | X | | |
| | *Triaenodon obesus* | Whitetip reef shark | Resides in coral reef caves and ledges in coastal waters and lagoons, extending from shallow depths to deep waters up to 330m. | X | | |
| ***Teleostei* (Bony Fish)** | | | | | | |
| *Acanthuridae* | *Acanthurus blochii* | Ringtail surgeonfish | Primarily associated with soft bottom (compacted sand) and coral reefs in shallow inshore lagoons and coastal seaward reef slopes. | X | X | |
| | *Acanthurus lineatus* | Lined surgeonfish | Associated with coral reefs (primarily reef flats and crests) and algal mats in shallow inshore and coastal surge zones. | X | | |
| | *Acanthurus nigricans* | Whitecheek surgeonfish | Coral Reefs; specifically shallow, high-energy reef flats and surge zones. | X | | |
| | *Acanthurus olivaceus* | Orange-spot surgeonfish | Adults inhabit coral reefs (seaward slopes) and soft bottom areas of mixed rubble and sand in deep coastal waters; juveniles utilize shallow inshore lagoons and protected bays. | X | | |
| | *Acanthurus* sp. | Surgeonfish | Shallow coral reef systems, rocky outcrops, and limestone. | X | | |
| | *Acanthurus triostegus* | Convict surgeonfish | Abundant on algal flats and coral reefs (hard substrates) in shallow inshore lagoons, coastal reef flats, and intertidal tide pools. | X | | |
| | *Ctenochaetus striatus* | Striped bristletooth | Coral Reefs and Algal Flats; extremely common on reef flats and slopes. | X | X | X |
| | *Naso lituratus* | Orange-spine unicornfish | Coral Reefs and Algal Flats; preference for reef areas with heavy macroalgae growth. | X | | |
| | *Naso unicornis* | Bluespine unicornfish | Coral Reefs (slopes) and Algal Flats; juveniles often stay in shallower, algae-rich areas. | X | | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Zebrasoma flavescens* | Yellow tang | Primarily inhabits coral reefs (coral-rich areas) and soft bottom (rock/rubble) substrates in shallow inshore lagoons and coastal seaward reefs, typically below the surge zone to depths of 46 m. | X | X | |
| *Apogonidae* | *Apogon* sp. | Cardinalfish | Coral reefs, rocky shorelines, and seaward reef slopes; typically found in shallow, high-energy waters where sunlight promotes heavy algal growth. | X | X | |
| | *Cheilodipterus quinquelineatus* | Five-lined cardinalfish | Primarily associated with coral reefs (specifically branched corals like Acropora) and hard bottom rocky outcrops in shallow inshore lagoons, reef flats, and sheltered coastal seaward reefs. | | X | |
| | *Sphaeramia* sp. | Cardinalfish | Primarily associated with coral reefs (branching corals) and mangrove roots in shallow inshore lagoons, sheltered bays, and harbors. | | X | |
| *Balistidae* | *Balistapus undulatus* | Orange-lined triggerfish | Coral-rich areas of deep lagoon and seaward reefs. | X | | |
| | *Balistoides viridescens* | Titan triggerfish | Coral Reefs and Soft Bottom (rubble) areas where it searches for benthic invertebrates. | X | | |
| | *Rhinecanthus aculeatus* | White-banded triggerfish | Subtidal reef flats and shallow protected lagoons. | | X | |
| | *Rhinecanthus rectangulus* | Wedge-tail triggerfish | Shallow outer reefs subject to surge. Commonly found over barren rock or the spur-and-groove zone where there is a mixture of bare rock, rubble, and coral. | X | | |
| | *Sufflamen chrysopterum* | Halfmoon triggerfish | Coastal to outer reefs. Habitats from silty lagoons to pristine outer reef walls in shallow lagoon and seaward reefs. | X | X | X |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| *Blenniidae* | *Cirripectes* sp. | Blenny | Wave-swept algal ridge of outer reef flats. Usually found on rocky and coralline substrates. | X | | |
| | *Ecsenius* sp. | Blenny | Common species on coastal and inner reef crests with rich coral growth. | X | X | |
| | *Plagiotremus laudandus* | Bicolor fangblenny | Coastal lagoons and seaward reefs | X | X | |
| | *Plagiotremus rhinorhynchos* | Bluestriped fangblenny | Coral-rich areas of lagoon and seaward reefs | X | | |
| | *Salarias* sp. | Blenny | Shallow, coastal waters, seagrasses, and seaweeds | X | X | |
| *Carangidae* | *Caranx melampygus* | Bluefin trevally | Adults are pelagic in coastal and oceanic waters, associated with reefs. Juveniles occur seasonally in shallow sandy inshore waters. | X | X | |
| | *Caranx* sp. | Jack | Adults are pelagic in coastal and oceanic waters, associated with coral and rocky reefs. Juveniles occur in shallow sandy inshore waters including beaches, lagoons, mangroves, and tidal flats. | X | | |
| *Chaetodontidae* | *Chaetodon Auriga* | Threadfin butterflyfish | Variety of habitats ranging from rich coral reefs to weedy and rubble covered areas | X | X | X |
| | *Chaetodon ephippium* | Saddle butterflyfish | Lagoons and seaward reefs, prefer coral-rich and clear water areas | X | X | X |
| | *Chaetodon kleinii* | Sunburst butterflyfish | Occur in deeper lagoons and channels, and seaward reefs | | X | |
| | *Chaetodon lunulatus* | Oval butterflyfish | Coastal coral-rich areas. Juveniles hide among branches of small corals, often in lagoons | X | X | X |
| | *Chaetodon mertensii* | Atoll butterflyfish | Deep lagoons and seaward reefs | | X | |
| | *Chaetodon rafflesia* | Latticed butterflyfish | Areas of rich coral growth of lagoon and protected reef flats and seaward reefs | X | | |
| | *Chaetodon* sp. 1 | Butterfly fish | Coral reefs, lagoons, and protected bays; highly abundant in shallow, coral-rich areas and seaward slopes. | X | | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Chaetodon* sp. 2 | Butterfly fish | Coral reefs, lagoons, and protected bays; highly abundant in shallow, coral-rich areas and seaward slopes. | X | | |
| | *Chaetodon speculum* | Mirror butterflyfish | Coastal reef slopes rich with hydroids and anemones. Small juveniles secretive in coral thickets | X | | |
| | *Chaetodon vagabundus* | Vagabond butterflyfish | Reef flats, lagoon and seaward reefs and sometimes in turbid waters subject to freshwater runoff | X | | |
| | *Forcipiger flavissimus* | Longnose butterflyfish | Common in exposed seaward reefs but also found in lagoon reefs | X | X | |
| | *Heniochus monoceros* | Masked bannerfish | Lagoon and seaward reefs with rich coral growth | X | | |
| | *Heniochus* sp. | Bannerfish | Adults primarily inhabit outer reef slopes, deep protected lagoons, and current channels. Juveniles are often found in shallow inshore waters, including sheltered lagoons, estuaries, and harbors. | X | X | |
| *Cirrhitidae* | *Cirrhitichthys oxycephalus* | Coral hawkfish | Areas of rich coral growth and clear water of lagoon, channel, or seaward reefs | X | | |
| | *Paracirrhites arcatus* | Arc-eye hawkfish | Lagoon and seaward reefs, on heads of small branching corals | X | | |
| *Ephippidae* | *Platax teira* | Longfin batfish | Adults live in sheltered bays as well as deep offshore. Juveniles inhabit shallow protected inner reefs while adults occur in lagoon and seaward reefs. | X | | |
| *Gobiidae* | *Amblygobius* sp. | Goby | Primarily inhabit protected coastal reefs, lagoons, and estuaries, specifically occurring over sand and rubble flats or near seagrass beds. | X | X | |
| | *Asterropteryx semipunctata* | Starry goby | Found on algal-coated reef rock and rubble of inner flats and turbid lagoons. | X | X | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Coryphopterus* sp. | Sailfin goby | Primarily inhabit sand patches around the bases of coral and rocky reefs, often occurring in areas of white sand, rubble, or seagrass beds. | X | | |
| | *Ctenogobius* sp. | Sandgoby | Demersal in shallow inshore waters, inhabiting bays, estuaries, and river mouths. They are frequently associated with soft bottom substrates like sand and mud, often found near submerged vegetation, mangroves, or seagrass beds. | X | X | |
| | *Eviota bifasciata* | Twostripe dwarfgoby | Clear coastal reefs and protected outer reef coral habitats. | X | X | |
| | *Eviota pellucida* | Transparent dwarfgoby | Inshore coral reefs, reported to be associated with *Heliofungia actiniformis*. | X | X | |
| | *Eviota sigillata* | Adorned dwarfgoby | Larvae spend three weeks in the open ocean and mature within two weeks of settling on a reef. | X | X | |
| | *Eviota sp.* | Dwarfgoby | Adults are primarily benthic inhabitants of coral and rocky reefs. Juveniles: Following a very short pelagic larval stage, juveniles settle onto shallow patch reefs or sheltered inshore waters. | X | | X |
| | *Fusigobius signipinnis* | Sailfin goby | Lives on patches of fine sand near coral rock or rubble of lagoon reefs. | X | X | |
| | *Istigobius* sp. | Sandgoby | Adults are primarily benthic on sand and rubble bottoms associated with coral and rocky reefs. They inhabit sheltered lagoons, reef flats, and seaward slopes. Juveniles occur seasonally in shallow, sandy inshore waters, including protected bays and estuaries. Before settling into these habitats, they undergo a pelagic larval stage in the open water. | | X | |
| | *Koumansetta rainfordi* | Old glory | Sandy and muddy bottoms of turbid coastal reefs. | | X | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Valenciennea strigata* | Blueband goby | Clear outer lagoon and seaward reefs, over hard bottoms as well as over sand and rubble. | X | | |
| *Haemulidae* | *Plectorhinchus lineatus* | Yellowbanded sweetlips | Deep inner to outer reef habitats. | X | | |
| *Holocentridae* | *Myripristis kuntee* | Shoulderbar soldierfish | Subtidal reef flats, also in lagoon and seaward reefs below the surge zone. | X | X | |
| | *Neoniphon argenteus* | Clearfin squirrelfish | Found mainly around oceanic islands. It is an uncommon inhabitant of reef flats, lagoon and semi-sheltered seaward reefs. | X | X | X |
| *Kiphosidae* | *Kiphosus* sp. | Chub | Adults are primarily benthopelagic in shallow coastal waters, typically associated with coral reefs, rocky substrates, and reef flats. Juveniles occur primarily as surface-dwellers associated with flotsam (floating debris) in the open ocean. | X | | |
| *Labridae* | *Bolbometopon muricatum* | Green humphead parrotfish | Juveniles are found in lagoons while adults inhabit clear outer lagoon and seaward reefs. | X | | |
| | *Cheilinus undulatus* [a] | Napoleon wrasse | Adults are benthopelagic, inhabiting steep outer reef slopes, channel slopes, and lagoon reefs. Juveniles are encountered in coral-rich areas of lagoon reefs, where staghorn *Acropora* corals abound and also in algae reefs or seagrasses. | X | | |
| | *Chlorurus microrhinos* | Steephead parrotfish | Occurs in lagoon and seaward reefs. | X | X | |
| | *Chlorurus sordidus* | Daisy parrotfish | Highly variable and inhabit both coral rich (Ref. 58652) and open pavement areas of shallow reef flats and lagoon and seaward reefs, as well as drop-offs. Juveniles are found in coral rubble areas of reef flats and lagoons. | X | X | X |
| | *Coris batuensis* | Batu coris | Inhabit clear lagoon and seaward reefs and nearby sand-rubble bottoms. | X | | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Coris gaimard* | African coris | Areas of mixed coral, sand and rubble of exposed outer reef flats, lagoon and seaward reefs. | X | | |
| | *Coris* sp. | Coris | Adults primarily inhabit coastal and offshore reefs, rocky areas, and weed beds, often associated with sand and rubble patches near the reef. Juveniles occur seasonally in shallow, sheltered inshore waters, including tide pools, seagrass beds, and lagoons. | X | X | X |
| | *Gomphosus varius* | Bird wrasse | Coral-rich areas of lagoon and seaward reefs. | X | | |
| | *Halichoeres hortulanus* | Checkerboard wrasse | Inhabits sand patches of lagoon and seaward reefs; also on slopes to moderate depths along drop-offs. | X | X | X |
| | *Halichoeres melanurus* | Tail-spot wrasse | Found mostly on shallow coral reefs and rocky shores. | X | X | |
| | *Hipposcarus* sp. | Parrotfish | Adults are primarily reef-associated in coastal and oceanic waters, typically inhabiting turbid lagoons, reef flats, and seaward reef slopes. Juveniles occur primarily in sheltered, shallow inshore habitats, particularly in algae-rich reef areas or among dense coral cover. | X | X | |
| | *Labrichthys unilineatus* | Tubelip wrasse | Inhabits shallow lagoon and semi-protected seaward reefs with high coral cover often near branching corals, particularly staghorn *Acropora.* | X | | |
| | *Labroides dimidiatus* | Bluestreak cleaner wrasse | Inhabits coral rich areas of inner lagoons and subtidal reef flats to seaward reefs. | X | X | |
| | *Novaculichthys taeniourus* | Rockmover wrasse | Inhabit semi-exposed reef flats and lagoon and seaward reefs. Common in areas of mixed sand and rubble that are subject to mild surge. | X | | |
| | *Scarus frenatus* | Bridled parrotfish | Exposed outer reefs, sometimes in very shallow water. Juveniles occur among coral and rubble of lagoon reefs. | X | | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Scarus ghobban* | Blue-barred parrotfish | Adults inhabit lagoon and seaward reefs on slopes and drop-offs; common in atolls where they live around the inner and outer edges of barrier reefs. Small juveniles are found in groups inshore on algae reef habitat. | X | | |
| | *Scarus oviceps* | Dark capped parrotfish | Inhabits lagoon and seaward reefs, coastal, and outer reefs. | X | | |
| | *Thalassoma lunare* | Moon wrasse | Upper portions of lagoon and coastal reefs, and in protected seaward reefs. | X | X | X |
| | *Thalassoma lutescens* | Yellow-brown wrasse | Clear outer lagoon and seaward reefs, over open sand and rubble as well as dense coral growth. Common is shallow exposed areas. | X | | |
| | *Thalassoma* sp. | Wrasse | Adults are primarily reef-associated in coastal and oceanic waters, occurring over coral reefs, rocky flats, and seagrass beds. Juvenile occur primarily in sheltered, shallow, inshore environments, such as lagoons and protected reef flats. | X | X | |
| *Lethrinidae* | *Gnathodentex aureolineatus* | Striped large-eye bream | Subtidal reef flats, lagoons, and seaward reefs. | X | | |
| | *Lethrinus harak* | Thumbprint emperor | Shallow sandy, coral rubble, mangroves, lagoons, channel, and seagrass areas inshore and adjacent to coral reefs. | X | X | |
| | *Monotaxis heterodon* | Redfin emperor | Shallow, protected coral reefs, particularly in sand and rubble areas on the periphery of reef complexes. | | X | |
| | *Scolopsis* sp. | Bream | Primarily benthic on sand or mud bottoms close to reefs, occurring in sheltered lagoons, reef flats, and seaward slopes. | | | X |
| *Lutjanidae* | *Lutjanus bohar* | Two-spot red snapper | Coral reefs, including sheltered lagoons and outer reefs. | X | | |
| | *Lutjanus gibbus* | Humpback snapper | Adults mainly inhabit coral reefs. Juveniles occur in seagrass beds, also in mixed sand and coral habitats of shallow sheltered reefs | X | X | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Lutjanus viridis* | Blue and gold snapper | Coastal waters, frequently around rocky and coral reefs. | X | X | |
| *Mullidae* | *Parupeneus barberinus* | Dash-and-dot goatfish | Adults inhabit large sand patches as well as sand and rubble areas of reef flats, and lagoon and seaward reefs. Juveniles usually in small groups, are often mixed with other species in sparse seagrass habitats | X | X | |
| | *Parupeneus multifasciatus* | Manybar goatfish | Benthopelagic, occurring over sand patches as well as rubble, consolidated limestone, or coral bottoms from reef flats and shallow lagoons. | X | X | |
| *Muraenidae* | *Echidna nebulosa* | Starry moray | Found between rocks and corals of intertidal reef flats, also in shallow lagoon and seaward reefs. | X | | |
| | *Gymnothorax flavimarginatus* | Yellow-edged moray | Occurs in coral or rocky areas of reef flats and protected shorelines to seaward reefs. | X | | X |
| *Nemipteridae* | *Scolopsis lineata* | Striped monocle bream | Common on coral reefs usually associated with sandy areas. | | X | |
| *Pomacanthidae* | *Centropyge bicolor* | Bicolor angelfish | Inhabits lagoon, channel, or protected seaward reef slopes, drop offs, coral, and rubble areas. | X | X | X |
| | *Pomacanthus imperator* | Emperor angelfish | Juveniles are encountered under ledges, or in holes of outer lagoon patch reefs or semi-protected areas of exposed channels and outer reef flats. Subadults move to reef front holes and surge channels. Large adults inhabit ledges and caves in areas of rich coral growth on clear lagoon, channel, or seaward reefs | | X | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Pomacanthus* sp. | Angelfish | Adults are primarily reef-associated in coastal and oceanic waters, typically inhabiting coral reefs, rocky areas, and ledges. Juveniles occur primarily in shallow, sheltered inshore habitats, including patch reefs, seagrass beds, and reef flats. | X | X | X |
| | *Pygoplites diacanthus* | Regal angelfish | Occurs in coral rich areas of lagoon and seaward reefs, often found in the vicinity of caves. | X | | |
| *Pomacentridae* | *Abudefduf* spp. | Sergeant-major | Adults inhabit upper edge of outer reef slopes and inshore rocky reefs. Juveniles associated with drifting seaweed. | X | X | |
| | *Chromis* spp. | Chromis | Adults are primarily reef-associated in coastal and oceanic waters, typically inhabiting outer reef slopes, protected lagoons, and reef flats. Juveniles occur primarily in sheltered, shallow inshore environments, staying closely tied to individual coral heads or rubble for protection. | X | | |
| | *Chromis viridis* | Blue-green chromis | Adults are often found above thickets of branching *Acropora* corals in sheltered areas such as subtidal reef flats and lagoons. Juveniles are closely tied to individual coral heads. | X | X | X |
| | *Chrysiptera brownriggii* | Surge damselfish | Occur in rubble-strewn surge channels, the outermost reaches of exposed reef flats, and the upper submarine terrace. | X | X | |
| | *Dascyllus aruanus* | Whitetail dascyllus | Shallow lagoon and subtidal reef flats. | | X | |
| | *Dascyllus reticulatus* | Reticulate dascyllus | Outer lagoon and seaward reefs, typically inhabiting branching coral heads. | X | X | |
| | *Dischistodus chrysopoecilus* | White-spot damsel | Coral outcrops and seagrass beds of silty areas of lagoon and coastal reefs. | | X | |
| | *Dischistodus perspicillatus* | White damsel | Small patch reefs of shallow lagoons, with algae or seagrass habitats. | | X | X |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Plectroglyphidodon leucozonus* | Singlebar damsel | Adults inhabit surge-swept shorelines and seaward reef margins. Juveniles often occur in pockets of the intertidal reef crest, while adults are found in ridges between surge channels. | | X | X |
| | *Pomacentrus coelestis* | Neon damselfish | Adults inhabit lagoon and seaward reefs, close to the bottom among rubble beds. Juveniles often school among soft corals. | X | X | |
| | *Pomacentrus* sp. | Damselfish | Adults primarily inhabit sandy areas of lagoons and seaward reefs, often found around isolated rocky outcrops, coral heads, or rubble patches. Juveniles occur primarily in sheltered, shallow inshore waters, including tide pools and reef flats. | X | X | |
| | *Pycnochromis margaritifer* | Bicolor chromis | Coastal reefs, amongst mixed algae-coral reef or rocky reefs and exposed seaward reefs; less abundant in lagoons and channels. | X | | |
| | *Segastes* spp. | Farmerfish | Adults are primarily benthic on shallow coral reefs and reef flats, typically occurring in areas with high algal growth and branching corals like *Acropora*. Juveniles occur primarily in extremely shallow inshore waters, including tide pools and the very top of reef flats. | X | X | |
| *Pseudochromidae* | *Pseudochromis* sp. | Dottyback | Found among corals of subtidal lagoon and seaward reefs, crevices, and ledges. Usually found in association with branching corals like *Acropora.* | | X | |
| *Ptereolotridae* | *Ptereleotris monoptera* | Lyre-tail dart-goby | Lives in reef habitats from shallow coastal slopes to outer reef lagoons and slopes below drop-offs, among rubble | X | | |
| *Scorpaenidae* | *Pterois antennata* | Broadbarred firefish | Occurs in lagoon and seaward reefs. | X | | |
| | *Pterois volitans* | Red lionfish | Inhabit lagoon and seaward reefs from turbid inshore areas to depths of 50 m. | X | | |

| *Family* | *Species Name* | *Common Name* | *Habitat* | *Waneday Channel Entrance* | *Seaport* | *Proposed Rull Offload Site* |
|---|---|---|---|---|---|---|
| | *Sebastapistes cyanostigma* | Yellowspotted scorpionfish | Found in reef crests with rich coral growth. Typically found among the branches of *Pocillopora* corals in surge areas of seaward reefs. | X | | |
| *Serranidae* | *Cephalopholis argus* | Peacock hind | Benthic and benthopelagic in a variety of coral habitats. | X | | X |
| | *Cephalopholis miniata* | Coral hind | Coral reefs; more often found in exposed rather than protected reef areas. | X | X | X |
| | *Epinephelus hexagonatus* | Starspotted grouper | Common in exposed outer-reef areas in relatively shallow water. | X | | |
| *Siganidae* | *Siganus doliatus* | Barred spinefoot | Inhabits coral-rich areas of lagoons and seaward reefs. | X | | |
| | *Siganus lineatus* | Golden-lined spinefoot | Adults inhabit shallow areas, typically protected waters such as lagoons and bays in the vicinity of rocky substrata or reefs (resting on rubble or sandy bottoms); juveniles common around estuarine areas including mangrove areas and seagrass flats. | X | | |
| | *Siganus* sp. | Spinefoot | Adults primarily inhabit coral and rocky reefs, sheltered lagoons, and seagrass beds. Juveniles occur primarily in shallow, sheltered inshore environments, including mangrove swamps, estuaries, and seagrass flats. | X | X | |
| *Syngnathidae* | *Corythoichthys* sp. | Pipe fish | Found among algal-matted rock and living corals of lagoon and seaward reefs from the low tide line to a depth of 25 m or more. | X | X | |
| *Zanclidae* | *Zanclus cornutus* | Moorish idol | Adults inhabit turbid inner lagoons, reef flats, and clear seaward rocky and coral reefs. Long pelagic larval stage is the reason for the wide distribution. | X | X | |

**Source**: NAVFAC Pacific, 2023; Fishbase, 2026 **Key**: m = meters; sp. = species

#### 3.4.1.4.4 Coral

Coral reef ecosystems are one of Earth's critically important life support systems. Approximately 25 percent of all marine species, including over 4,000 fish species, are reliant on coral reefs at some point in their life cycle (EPA, 2025). Coral reefs provide habitat, feeding, spawning and nursery grounds for marine organisms, including commercially harvested fish species. Coral reefs also provide food and shoreline protection for people living near reefs, particularly on small islands like Yap Island. Healthy reef systems can also attract recreation and tourism opportunities, which can provide economic benefits to nearby communities (Cesar, 2000).

Coral reef ecosystems are being degraded worldwide through direct and indirect anthropogenic impacts (Cesar, 2000). The leading causes of environmental impacts on coral reefs in the FSM include sewage and runoff, forest cutting (particularly mangrove deforestation), sand mining and dredging, growing fisheries exploitation, and increasing heat-stress events (Edward, 2002; Houk et al., 2024). Other lesser causes that also contribute to reef degradation include destructive fishing practices such as dynamite fishing, ship groundings, and marine construction activities (Edward, 2002).

Houk et al. (2012) conducted marine surveys to characterize and evaluate coral reefs around Yap. Surveys indicated that corals from the inner and channel reefs were twice as large compared with the outer reefs, although the assemblages of the inner and channel reefs were half as diverse (Houk et al., 2012). Several fish species were larger and more diverse on the outer and channel reefs compared with the inner reef (Houk et al. 2012). Surveys conducted in the vicinity of the Yap Seaport ranked lowest for fish biomass and overall reef condition compared to the rest of the island (Houk et al. 2012).

The 2023 marine resources survey (explained in Appendix H) conducted in Colonia Harbor identified medium to high coral cover areas along the east and west side of Waneday Channel, particularly towards the channel entrance. Low to trace coral habitat was identified around the Seaport, and low to medium to coral habitat was identified near the proposed Rull Offload Site. A total of 30 coral genera were recorded during the 2023 marine resources survey (Table 3-6) (NAVFAC Pacific, 2023). Three species of Porites (*P. cylindrica, P. lobata,* and *P. rus*) had the highest abundance and overall percentage of live coral on the reef, across all survey areas (NAVFAC Pacific, 2023). See Table 3-6 for coral cover and Figure 3-10 for locations.

The Waneday Channel Entrance is where the reef meets the Pacific Ocean and the deeper channel basin. As the forereef wraps into Waneday Channel, the substrate transitions from solid, rocky substrate composed of coral skeletons, boulders, and reef framework to a mixture of rocky surfaces, live coral formations, sandy patches, and dead boulder coral structures. These substrate types provide attachment surfaces for various marine organisms and support different ecological communities. Surveys near the Waneday Channel Entrance recorded coral reef with high coral cover (mainly encrusting or massive growth forms), moderate levels of crustose coralline algae, low algal cover, and a high presence of dead coral and bare substrate (NAVFAC Pacific, 2023). The eastern portion of the entrance channel was dredged in the past, and much of the proposed dredging would overlap that previously disturbed area (JICA, 1990).

The Seaport and port-adjacent areas had low coral coverage; high sand, rubble, and macroalgae coverage; and low visibility compared to the Waneday Channel and channel entrance.

However, the port exhibited high live coral cover in a small reef area on the south side of the Nungoch peninsula, with delicate branching *Acropora sp.* and sturdy branching *P. cylindrica* in abundance (Figure 3-10) (NAVFAC Pacific, 2023).

Only about 0.5 acres of the Alternative 2 proposed in-channel dredge disposal area was surveyed in 2023, leaving approximately 15 acres not surveyed. The areas surveyed along Entrance Channel-East and Entrance Channel-West that are adjacent to or overlay the proposed Alternative 2 in-channel dredge disposal area have predominantly medium to low coral coverage, with one small area on the southwest portion of the in-channel dredge disposal area that may have some high coral cover (Figure 3-10).

**Table 3-6 Mean Live Coral Cover by Genus/Species by Survey Area**

| *Coral Genus/Species* | *Waneday Channel Entrance Percent* | *Seaport Percent* | *Proposed Rull Offload Site Percent* |
|---|---|---|---|
| *Acropora spp.* | 2.1 | 22.2 | — |
| *Alveopora spp.* | 1.1 | — | — |
| *Astreopora spp.* | — | 0.5 | — |
| *Coscinaraea spp.* | 0.2 | — | — |
| *Cyphastrea spp.* | 0.2 | — | — |
| *Diploastrea spp.* | 2.1 | — | — |
| *Echinophyllia spp.* | — | 16.2 | — |
| *Favia spp.* | 2.4 | 3 | — |
| *Favites spp.* | 2.8 | 1.2 | — |
| *Fungia spp.* | 0.1 | 0.6 | — |
| *Galaxea spp.* | 1.2 | — | — |
| *Goniastrea spp.* | 1.3 | 0.6 | — |
| *Hydnophora spp.* | 3 | — | — |
| *Isopora spp.* | 0.2 | — | — |
| *Leptastrea spp.* | 0.7 | 0.3 | — |
| *Leptoria spp.* | 3.4 | — | — |
| *Leptoseris spp.* | — | — | — |
| *Millepora spp.* | 4.6 | — | — |
| *Montastraea spp.* | 2.1 | 1.4 | — |
| *Montipora spp.* | 9.7 | 3.1 | 0.5 |
| *Pachyseris spp.* | 0.2 | 6.4 | — |
| *Pavona spp.* | 1.6 | — | — |
| *Pectinia spp.* | — | — | — |
| *Platygyra spp.* | 2.3 | — | — |
| *Pocillopora spp.* | 3.5 | — | — |
| *Porites spp.* | 1.1 | — | — |
| *Porites cylindrica* | 8.2 | 37.3 | 70.7 |
| *Porites lobata* | 15.7 | 3 | 28.8 |
| *Porites rus* | 28.5 | 3 | — |
| *Psammocora spp.* | 0.3 | — | — |
| *Stylophora spp.* | 1.2 | — | — |
| *Symphyllia spp.* | — | 0.8 | — |
| *Turbinaria spp.* | 0.1 | 0.6 | — |
| **Total Genera Recorded** | **28** | **16** | **3** |

**Source**: NAVFAC Pacific, 2023 **Key**: spp. = species

#### 3.4.1.4.5 Benthic Invertebrates

Typical non-coral marine benthic invertebrates found in Yap include polychaete annelids (marine worms), mollusks (gastropods, bivalves, and cephalopods), crustaceans, and echinoderms (sea stars, sea urchins, and sea cucumbers). There are 37 holothuroid (sea cucumber) species, 14 echinoid (sea urchin) species, 14 asteroid (sea star) species, and five crinoid (feather star or sea lily) species that have been identified in Yap waters (Kerr et al. 2007; Kim et al. 2014). Sea cucumbers are an international trade commodity and managed natural resource in Yap's marine ecosystem, despite not being traditionally used as a protein source by Yap communities (Ropeti et al., 2010). Sea anemones and sponges are also part of the marine benthic community. These marine invertebrates play key roles in the nutrition and food chains of any reef ecosystem (Sheppard et al., 2009).

Clams are discussed in Section 3.4.1.5.

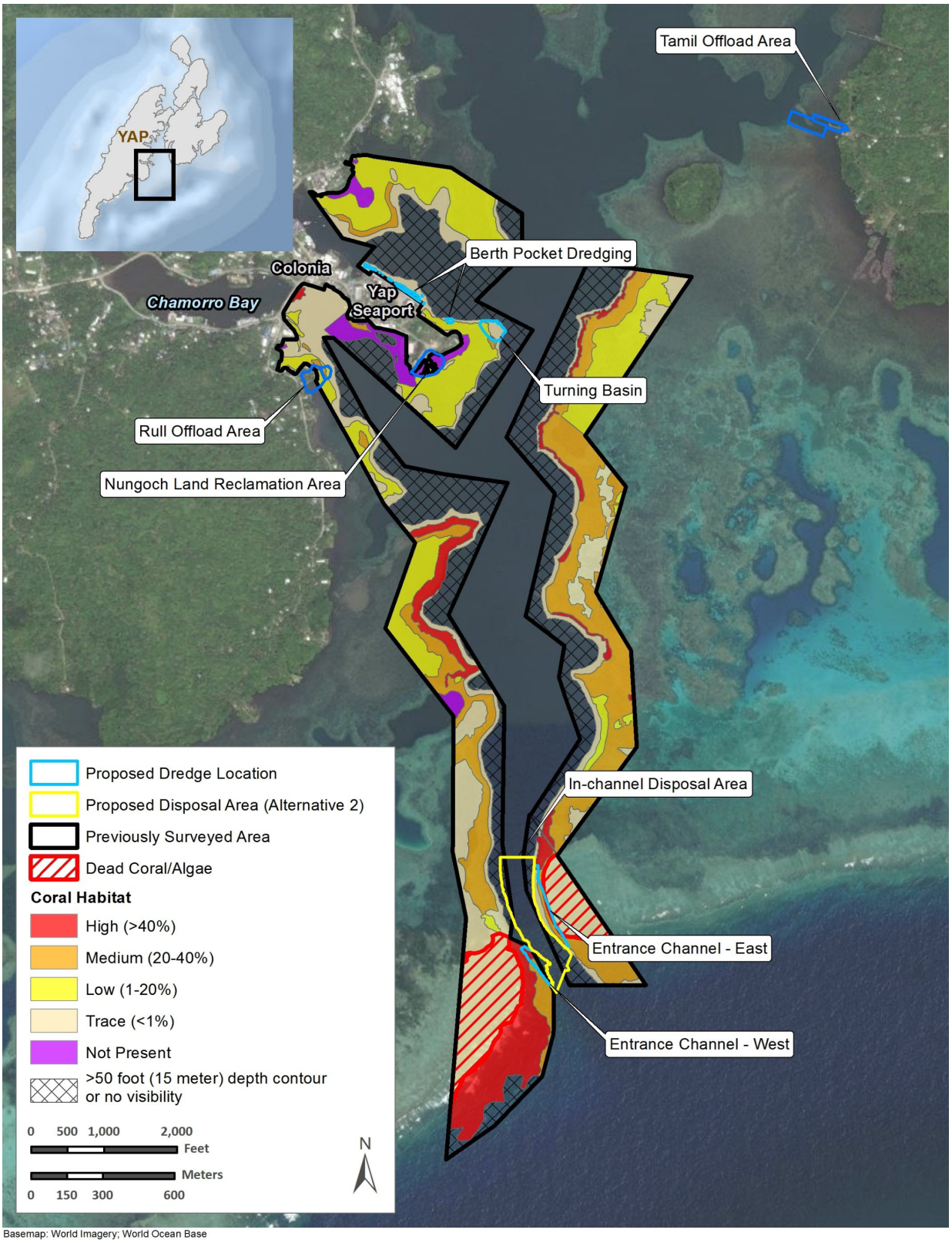



**Figure 3-10 Coral Habitat Map, Proposed Dredging Areas (Both Alternatives), and Proposed In-Channel Dredge Disposal Area (Alternative 2)**

### 3.4.1.5 Marine Special Status Species

Through dialogue between DoW and Yap/FSM officials, special status marine species were identified for purposes of this NEPA analysis. These species may occur in the ROI and include species that are listed under the FSM ESA of 1975 (FSM Code, Title 23, Chapters 1 and 3), the U.S. ESA of 1973 (16 U.S. Code 1531-1544), Yap Species of Concern (SOC), Yap culturally valued species, species listed on the IUCN red list, and threatened and endangered CITES species. It is recognized that certain species are of high value to the people of FSM and Yap from a protective natural or cultural resources view even though they have not been given legal protective status by any governmental authority. Altogether, these species have been considered in the analysis in this document.

Based on previous surveys, review of historical surveys, and a desktop search, 79 special status marine species or genera have the potential to occur in the Seaport project area. They consist of 21 mammal species, 6 reptile species, 22 fish species, 30 invertebrate species (Table 3-7). The marine special status species include charismatic megafauna (e.g., rays, reef sharks, sea turtles) and species of fish suspected to be of importance to the Yap State Government based on the Yap State prohibition against harvesting (Yap State Law 9-2) (e.g., green humphead parrotfish and Napoleon wrasse) (NAVFAC Pacific, 2023). The FSM ESA Title 23 § 115 prohibits the take of all marine mammals for commercial purposes, including but not limited to porpoises, whales, seals, and dugongs, and the Endangered Species Act of the Trust Territory of the Pacific Islands that has been carried over to the FSM lists: *Balaenoptera musculus* (blue whale), *Dugong dugon* (dugong), and *Physeter macrocephalus* (sperm whale) (Bailey et al., 2022).

During the *Marine Biological Survey of the Proposed Dock Site at Colonia, Yap* conducted in 1977, two fish genera, *Naso* spp. and *Cheilinus* spp., were observed throughout the entire dock project area (Amesbury et al., 1977). Special status corals were also encountered, such as *Acropora* spp., *Alveopora* spp*., Montipora* spp*., and Porites* spp*.* The *Marine Biological Survey of Yap Lagoon*, which was completed between 1977 and 1978 identified special status species within the study area, including many endangered coral, sea snail, clam, ray, and fish species (Tsuda et al., 1978).

A desktop analysis, *Terrestrial, Cultural, and Marine Resources Desktop Analysis Report for Yap Pacific Deterrence Initiative Baseline Surveys at Various Port Locations in the Pacific Area of Responsibility*, was conducted in 2022 to identify the cultural and marine resources that exist or have the potential to exist within the Seaport project areas. This analysis revealed that the three species listed in the FSM ESA (dugong, blue whale, and sperm whale) are not likely to occur in the Seaport or deep lagoon areas (Bailey et al., 2022).

Surveys conducted in 2023 and explained in Appendix H confirmed the presence of seven special status species, including *Aetobatus narinari* (spotted eagle ray), *Carcharhinus melanopterus* (blacktip reef shark), *Chelonia mydas* (green turtle), *Eretmochelys imbricata* (hawksbill turtle), green humphead parrotfish, Napoleon wrasse, and *Triaenodon obesus* (whitetip reef shark). Additionally, the destructive crown-of-thorns starfish was documented in 2023. *Tridacna gigas* (giant clam) was once considered extirpated in the FSM; however, it has been reintroduced and a privately owned giant clam farm was observed within the Seaport

area during the 2023 surveys (NAVFAC Pacific, 2023). The special status marine species with the potential to occur in the ROI are listed in Table 3-7.

#### 3.4.1.5.1 Special Status Mammal Species

Twenty-one special status marine mammals could potentially occur in the waters around FSM due to their established range or documented sightings (Table 3-7). Of these, six marine mammal species are protected by the FSM ESA, the U.S. ESA, or listed as endangered, near threatened, or vulnerable on the IUCN Red List, or listed as species threatened with extinction in CITES Appendix I.

The six marine mammal species listed as threatened or endangered under the FSM ESA, the U.S. ESA, IUCN, or CITES that are known to occur or potentially occur around Yap are: *Balaenoptera borealis* (Sei whale), *Balaenoptera musculus* (blue whale), *Balaenoptera physalus* (fin whale), *Dugong dugon* (dugong), *Megaptera novaeangliae* (humpback whale [Western North Pacific DPS]), and *Physeter macrocephalus* (sperm whale). Other marine mammal species that have been reported in FSM and may occur in Yap waters include *Globicephala macrorhynchus* (short-finned pilot whale), *Orcinus orca* (killer whale), *Stenella longirostris* (spinner dolphin), and *Tursiops spp.* (bottlenose dolphin). Killer whales and short-finned pilot whales may enter more coastal waters but typically prefer deeper and/or colder offshore waters, and are not likely to occur in the project areas. Spinner dolphins and bottlenose dolphins may be possible in Colonia Harbor within or near project areas (Miller, 2007; Marsh et al., 2002; Buden and Haglelgam, 2010; Bailey et al., 2022; Eldredge, 1991; Hoyt, 2001; Buden and Bourgoin, 2018; Takeda, 2001; Miyazaki and Wada, 1978; O'Connor et al., 2009).

In the Caroline Islands, dugongs primarily occur in Palau, though Buden and Haglelgam, noted in their *Review of Crocodile (Reptilia: Crocodilia) and Dugong (Mammalia: Sirenia) Sightings in the Federated States of Micronesia* that dugongs have only been recorded twice in Yap, one caught and sold at market in 1963, and another seen by a turtle hunter in 1977 (Buden and Haglelgam, 2010). A 2022 desktop analysis noted that the records of dugong sightings are outdated (Bailey et al., 2022). Multiple studies have asserted that dugongs sighted in Yap are likely vagrants from a small breeding population in Palau (Marsh et al., 2002; Buden and Haglelgam, 2010; Bailey et al., 2022). For these reasons, the presence of dugongs in the ROI is not expected.

Several other marine mammal species have been documented in FSM and may potentially occur in the waters around Yap. The sperm whale is thought to be common in FSM and has been documented in two other FSM states (Eldredge, 1991). However, the presence of sperm whales in the ROI is unknown and not likely to occur because they typically inhabit deeper, more offshore waters (Bailey et al., 2022). Similarly, species such as *Balaenoptera edeni* (Bryde's whales), blue whales, dwarf sperm whales, Fraser's dolphins, ginkgo-toothed beaked whales, *Peponocephala electra* (melon-headed whale), *Pseudorca crassidens* (false killer whale), pygmy sperm whales, *Steno bredanensis* (rough-toothed dolphin), *Stenella attenuata* (pantropical spotted dolphins), *Stenella coeruleoalba* (striped dolphin), and *Ziphius cavirostris* (goose-beaked whales) which have been documented in Yap are typically deep, offshore species and are unlikely to be found within the Proposed Action area (Miller, 2007; Miyazaki and Wada, 1978).

## Table 3-7 Marine Special Status and Culturally Valued Species Known to Occur or Potentially Occur in the ROI

| *Scientific (common, local)/DPS* | *Status*[1] | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| **Mammals** | | | |
| *Balaenoptera borealis* (Sei Whale) | E; ESA E; I | Deep offshore waters and continental shelf edges | Not likely |
| *Balaenoptera edeni* (Bryde's whale) | LC; I | Offshore and coastal waters. | Not likely |
| *Balaenoptera musculus* (Blue whale) | E, ESA E; FSM ESA; I | Occurs in both nearshore and deep oceanic waters. | Not likely |
| *Balaenoptera physalus* (Fin whale) | V; ESA E; I | Primarily deep, offshore waters and coastal and continental shelves | Not likely |
| *Dugong dugon* (Dugong) | V; ESA E; FSM ESA; I | Shallow coastal waters, inhabiting seagrass meadows, coral reefs, and estuaries. | Not likely |
| *Globicephala marcorhynchus* (Short-finned pilot whale) | LC; YAP CV; II | Deep, open ocean and coastal areas near continental shelves. | Not likely |
| *Kogia breviceps* (Pygmy sperm whale) | LC; YAP CV; II | Deep, offshore areas near continental shelves. | Not likely |
| *Kogia sima* (Dwarf sperm whale) | LC; YAPCV; II | Deep, offshore areas near continental shelves. | Not likely |
| *Lagenodelphis hosei* (Fraser's dolphin) | LC; YAP CV; II | Open ocean areas away from the coast. | Not likely |
| *Megaptera novaeangliae* (Humpback whale)/Western North Pacific | LC; ESA E; I | Shallow coastline waters and open ocean. | Not likely |
| *Mesoplodon ginkgodens* (Ginkgo-toothed beaked whale) | DD; YAP CV; II | Deep, offshore waters. | Not likely |
| *Orcinus orca* (Killer whale) | DD; II | Open ocean, coastal and offshore seas. | Not likely |
| *Peponocephala electra* (Melon-headed whale) | LC; II | Deep waters, prefer areas with scattered islands and steep underwater slopes. | Not likely |
| *Physeter macrocephalus* (Sperm whale) | V; ESA E; FSM ESA; I | Deep open ocean, often found where the continental shelf drops. | Not likely |
| *Pseudorca crassidens* (False killer whale) | NT; II | Deep offshore waters. | Not likely |
| *Stenella attenuata* (Pantropical spotted dolphin) | LC; II | Most often found in deeper offshore waters. | Not likely |
| *Stenella coeruleoalba* (Striped dolphin) | LC; II | Offshore and inshore waters. | Not likely |
| *Stenella longirostris* (Spinner dolphin) | LC; II | Offshore waters, prefer coastal zones and seamounts, particularly around islands. At night, they tend to move offshore to deeper waters to hunt, and then return to shallow, sheltered coastal bays during the day to rest. | Possible |
| *Steno bredanensis* (Rough-toothed dolphin) | LC; II | Deep oceanic waters. | Not likely |

| *Scientific (common, local)/DPS* | *Status*[1] | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| *Tursiops* spp. (Bottlenose dolphin) | LC; II | Offshore and coastal waters, including bays, tidal creeks, inlets, marshes, estuaries, along open ocean beaches. | Possible |
| *Ziphius cavirostris* (Goose-beaked whale) | V; II | Deep, offshore waters. | Not likely |
| **Reptiles** | | | |
| *Caretta caretta* (Loggerhead turtle, Weel) | V; ESA E; Yap Regulated/CV; I | Open ocean, and shallow coastal waters, bays, lagoons, salt marshes, creeks, coral reefs, and rocky areas. As hatchlings, they are found in the open ocean environment, often seeking refuge in floating mats of Sargassum seaweed. | Not likely |
| *Chelonia mydas* (Green turtle, Weel)/Central South Pacific, Central West Pacific | E; ESA E; Yap Regulated/CV; I | Coastal waters, coral reefs, seagrass beds, and coastal lagoons. As hatchlings, they are found in the open ocean environment, where they live among floating seaweed for several years before moving to coastal feeding grounds. | Likely |
| *Chelonia mydas* (Green turtle, Weel)/Central North Pacific | E; ESA T; Yap Regulated/CV; I | Coastal waters, coral reefs, seagrass beds, and coastal lagoons. As hatchlings, they are found in the open ocean environment, where they live among floating seaweed for several years before moving to coastal feeding grounds. | Likely |
| *Crocodylus porosus* (Saltwater crocodile) | LC; I/II | Saltwater and brackish wetlands, beaches and estuaries, open ocean, mangrove swamps, and deltas. | Not likely |
| *Dermochelys coriacea* (Leatherback turtle, Weel) | V; ESA E; Yap Regulated/CV; I | High seas to coastal areas, including shallow intertidal zones. As hatchlings, they are found in the open ocean environment. | Not likely |
| *Eretmochelys imbricata* (Hawksbill turtle, Weel) | CR; ESA E; Yap Regulated/CV; I | Found in shallow waters near coral reefs, coastal areas, rocky regions, and lagoons. As hatchlings, they are found in the open ocean environment, where they drift in pelagic currents until they are large enough to return to coastal reefs. | Likely |
| *Lepidochelys olivacea* (Olive ridley turtle, Weel) | V; ESA T; Yap Regulated/CV; I | Open ocean and coastal areas. As hatchlings, they are found in the open ocean environment, typically drifting with surface currents for several years before returning to coastal areas. | Not likely |
| **Fish** | | | |
| *Aetobatus narinari* (Spotted eagle ray) | E; Yap CV; II | Shallow coastal waters, coral reefs, and bays. | Likely |
| *Alopias pelagicus* (Pelagic thresher) | E; II | Deep, offshore waters, enter coastal habitats and coral reef drop-offs or seamounts. | Possible |

| *Scientific (common, local)/DPS* | *Status*[1] | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| *Alopias superciliosus* (Bigeye thresher) | V; II | Deep, offshore, occasionally entering shallow coastal waters. | Possible |
| *Bolbometopon muricatum* (Green humphead parrotfish, Gamiygul) | V; Yap Regulated/CV | Reef slopes, lagoons, and outer reef areas. | Likely |
| *Carcharhinus amblyrhynchos* (Grey reef shark) | E; Yap CV; II | Coral reefs, shallow waters near coral atolls and lagoons, coral reef drop-offs, and edges. | Possible |
| *Carcharhinus longimanus* (Oceanic whitetip shark) | CR; ESA T; II | Found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water areas. | Not likely |
| *Carcharhinus melanopterus* (Blacktip reef shark) | V; Yap CV; II | Shallow, inshore waters, coral reefs, reef ledges, and sandy flats, though it has also been known to enter brackish and freshwater environments. | Likely |
| *Cheilinus undulatus* (Napolean wrasse, Marib/Numam) | E; Yap Regulated/CV; II | Coral reefs, areas with steep drop-offs and outer slopes, juveniles near staghorn coral groves. | Likely |
| *Hippocampus bargibant* (Bargibant's seahorse) | DD; II | Lives exclusively on gorgonian coral sea-fans. | Possible |
| *Hippocampus denise* (Denise's pygmy seahorse) | DD; II | Coral reefs, often hiding in fields of gorgonian corals. | Possible |
| *Hippocampus kuda* (Common seahorse) | V; II | Coastal environments, including coral reefs, seagrass beds, mangroves, and estuaries. | Possible |
| *Hipposcarus longiceps* (Pacific long-nose parrotfish (Nguywee) | LC; | Turbid lagoons and outer reef areas. | Possible |
| *Isurus oxyrinchus* (Shortfin mako) | E; II | Deep offshore, occasionally closer to shore, around islands or inlets. | Not likely |
| *Lutjanus gibbus* (Humpback red snapper, Gadaw) | LC; | Found on corals reefs. Juveniles shelter in beds of sea grass in protected areas of sandy and muddy substrates. | Possible |
| *Mobula alfredi* (Reef manta ray) | V; Yap CV; II | Shallow, coastal areas, near coral reefs, and atolls. | Possible |
| *Mobula birostris* (Giant manta ray) | E; ESA T; Yap CV; II | Offshore waters, coastal regions, estuaries, and bays. | Not likely |
| *Naso lituratus* (Orangespine unicornfish, Erngal) | LC, Yap CV | Coral-rich areas, lagoons, coastal reefs. | Likely |
| *Naso unicornis* (Bluespine unicornfish, Um) | LC, Yap CV | Shallow coastal reefs. | Likely |
| *Rhincodon typus* (Whale shark) | E; II | Coastal areas, continental shelves, and offshore waters. | Not likely |
| *Siganus fuscescens* (Dusky rabbitfish, Daruy) | Yap CV | Lagoons, coastal reefs, shallow seagrass beds, and mangroves. | Possible |

| *Scientific (common, local)/DPS* | *Status*[1] | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| *Sphyrna lewini* (Scalloped hammerhead shark)/Indo-West Pacific DPS | CR; ESA T; Yap CV; II | Coastal areas, continental shelves, and deeper waters, juveniles stay in shallow coastal waters, including bays and mangroves. | Not likely |
| *Triaenodon obesus* (Whitetip reef shark) | V; Yap CV; II | Shallow waters, near coral heads, ledges, sandy flats, and lagoons, finding shelter in caves and crevices. | Likely |
| **Invertebrates** | | | |
| *Acanthaster planci* (Crown-of-thorns starfish) | Yap Invasive SOC[2] | Undisturbed waters, such as lagoons, deep seawater, and protected, shallow parts of the backreef. | Likely |
| *Acropora globiceps* (Hard coral) | E; ESA T;II | Found on shallow forereefs, but may also occur in backreef areas, pools, and lagoons where wave energy is high. Depth distribution of 0–20 m, although it is typically more abundant at <8 m depth. Requires exposed, natural, consolidated hard substrate. | Likely |
| *Acropora lokani* (Hard coral) | V; ESA T; II | Occurs in sheltered lagoonal patch reefs and a range of other reef habitats, from depths of approximately 8-50 m. | Possible |
| *Acropora retusa* (Hard coral) | V; ESA T; II | Occurs primarily on shallow forereefs and other shallow, high-energy environments, from depths of approximately 0-29 m. Requires exposed, natural, consolidated hard substrate. | Possible |
| *Acropora speciosa* (Hard coral) | V; ESA T; II | Occurs on walls and steep slopes, found from 12-65 m, but rarely at less than 30 m. Requires exposed, natural, consolidated hard substrate. | Possible |
| *Acropora tenella* (Hard coral) | V; ESA T; II | Mesophotic species, most common at >40 m and reported from 6-110 m, deeper than any other *Acropora* species. Requires exposed, natural, consolidated hard substrate. | Possible |
| *Anacropora spinosa* | E; ESA T; II | Preference for clear water, but also occurs in turbid water on sand and mud as well as hard substrates, from 5-15 m. Requires exposed, natural, consolidated hard substrate. | Possible |
| *Alveopora* spp. (Hard coral) | E/V; II | Shallow, partly wave-washed rocky foreshores nested among algae and soft corals. | Likely |
| *Astreopora* spp. (Hard coral) | E/V; II | Shallow reef areas, in clear, nutrient poor waters. | Likely |
| *Birgus latro* (Coconut crab, ayuy) | V; Yap Regulated/CV | Inhabits marine tidal areas. | Likely |
| *Fimbriaphyllia paradivisa* (Soft coral) | LC; T; II | Shallow reefs. | Not likely |

| *Scientific (common, local)/DPS* | *Status*[1] | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| *Hippopus hippopus* (Horse's hoof clam, Faasuw/Tow) | PT; Yap Regulated/CV; II | Shallow, nearshore patches of reef (up to 10 m), may prefer siltier sediments and more turbid waters of lagoon reef flats, sandy areas, and seagrass beds. | Possible |
| *Holothuroidea* (Sea cucumbers) | V/E; Yap CV; II | Shallow water to deep-sea ecosystems, often burrowing in sediments or moving along the seabed. | Possible |
| *Millepora* spp. (Fire coral) | E; II | Shallow reefs, in upper reef slopes and lagoons. | Likely |
| *Nautilus pompilius* (Chambered nautilus) | ESA T; II | Coral reefs and on sharp slopes. Deep waters of the open ocean. | Not likely |
| *Pavona duerdeni* (Porkchop coral) | E; II | Shallow reef environments, forming large colonies on horizontal shallow substrates. | Possible |
| *Pectinia alcicornis* (Hard coral) | E; II | Turbid water, especially on horizontal substrates. | Possible |
| *Pectinia lactuca* (Lettuce coral) | E; II | Reef slopes and lagoons. | Possible |
| *Pinctada margaritifera* (Black-lip mother-of-pearl oyster) | Yap CV | Coral reefs with low turbidity, attaching themselves to barnacles and other hard substrates. | Possible |
| *Pleuractis paumotensis* (Elongate mushroom coral) | E; II | Upper reef slopes, usually found on sand or beds of coral fragments. | Possible |
| *Pocillopora* spp. (Cauliflower and brush corals) | E; II | Shallow, fringing reefs to lagoons. | Likely |
| *Porites* spp. (Finger and hump corals) | LC/V; ESA T; II | Shallow reefs, forereefs and backreefs, among mangroves and seagrasses. | Likely |
| *Seriatopora* aculeata (Needle coral) | E/V; ESA T; II | Shallow reef slopes and upper reef crests, in intertidal reef flats. Requires exposed, natural, consolidated hard substrate. | Possible |
| *Stylophora subseriata* (Club finger coral) | E; II | Shallow slow-slopped reefs and forereefs. | Possible |
| *Tridacna crocea* (Boring giant clam, Faasuw/Tow)[3] | LC; PT; Yap Regulated/CV; II | Shallow waters of coral reefs and atoll lagoons. | Possible |
| *Tridacna derasa* (Smooth giant clam, Faasuw/Tow) | E; PE; Yap Regulated/CV; II | Found on the outer edges of reefs, clear offshore waters distant from areas of significant freshwater run-off and seem to favor oceanic small islands and atolls more than fringing reefs adjacent to large island masses. Considered to be an "introduced," non-natives species to FSM. | Possible |
| *Tridacna gigas* (True giant clam, Faasuw/Tow)[4] | CR; PE; Yap Regulated/CV; II | Coral reefs, found in habitats including high- and low-islands, atoll lagoons, and fringing reefs. | Possible |

| *Scientific (common, local)/DPS* | *Status*[1] | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| *Tridacna maxima* (Small giant clam, Faasuw/Tow)[3] | LC; PT; Yap Regulated/SOC; II | Coral reefs and atoll lagoons. Often found partially embedded in coral heads, limestone rock, or reef flats in high-current, well-lit areas. | Possible |
| *Tridacna noae* (Noah's giant Clam, Faasuw/Tow)[3] | LC; PT; Yap Regulated/SOC; II | Outer coral reef flats and fore-reef slopes. Often found fully embedded or recessed into coral heads or limestone substrate in clear, shallow, high-energy waters with intense light. | Possible |
| *Tridacna squamosa* (Fluted giant clam; Faasuw/Tow)[3] | LC; PT; Yap Regulated/SOC; II | Coral reefs, reef flats, and lagoons. Found in gullies behind reef crests, outer reef slopes, reef pockets and on sandy or rubble substrates. | Possible |

**Source**: Bailey et al., 2022; NAVFAC Pacific, 2023; NMFS, 2023; NMFS, 2024; CITES 2025; Diving in Yap, 2025; Eldridge, 1991; Hoyt, 2001; Island of Yap, 2025.; IUCN, 2025; Manoa Mapworks, 1988; Marsh et al., 2002; Takeda, 2001; Tsuda et al., 1978; Weeks et al., 2016; Yap Nature's Way - Diving, Snorkeling & Eco Tours, Micronesia, 2019.

**Key**: CR = Critically Endangered; CV = Culturally Valued; DD = Data Deficient; DPS = Distinct Population Segment; E = Endangered; ESA = Endangered Species Act; FSM = Federated States of Micronesia; IUCN = International Union for Conservation of Nature; LC = Least Concern; NT = Near Threatened; P = Proposed; SOC = Species of Concern; T = Threatened; V = Vulnerable

1. Status in order of IUCN assessment; United States Federal laws, ESA; FSM ESA; Yap Regulated; Yap SOC; and CITES Appendix number, if pertain.
2. Crown-of-thorns starfish (*Acanthaster planci*) is considered a Yap SOC because it is a priority potential native organism with pest tendencies that requires population suppression through long-term management control efforts, not because it warrants protection.
3. Proposed to be listed due to similarity of appearance to species proposed to be listed as threatened/endangered, and it should be noted that NMFS take statements have not included take for these similarity of appearance species.
4. The giant clam (*Tridacna gigas*) was once considered extirpated in the FSM; however, it has been reintroduced and a privately owned giant clam farm was observed within Yap Seaport–Southeast (east of the proposed Rull Offload Site across Waneday Channel) during surveys in 2023 (NAVFAC Pacific 2023).

Outside the Proposed Action area, marine mammals that have been encountered at dive sites located around Yap include killer whales, short-finned pilot whales, spinner dolphins, and bottlenose dolphins. The first photographically confirmed records of killer whale in the FSM occurred in 2013 in Pohnpei and were reported in 2018 by Buden and Bourgoin in *Pacific Science*, and they noted that several other sightings reported over the years were considered to be unconfirmed. Killer whales are distributed worldwide but are more numerous in colder waters at higher latitudes than in the tropics (Buden and Bourgoin 2018). Therefore, while killer whales could be possible in the ROI, they are not likely to occur.

No marine mammal species were encountered during the 2023 surveys (NAVFAC Pacific, 2023). While several marine mammal species have been reported in FSM and in Yap waters, their occurrence relative to the ROI is unknown. However, based on the literature, documented sightings, and species general behavioral tendencies (e.g., tend to inhabit and feed in deep, offshore waters) these species have been characterized as being either "not likely" or "possible" in the ROI (Table 3-7). Due to the coastal and inshore nature of the project areas, and based on documented sightings in the literature, the only marine mammal species with the potential to occur in the ROI are bottlenose dolphins and spinner dolphins.

#### 3.4.1.5.2 Special Status Reptiles

Six species of marine reptiles listed as threatened or endangered are known to occur in Yap waters (Table 3-7). These include *Caretta caretta* (loggerhead turtle), *Crocodylus porosus* (saltwater crocodile), *Dermochelys coriacea* (leatherback turtle), green turtle, hawksbill turtle, and *Lepidochelys olivacea* (olive ridley turtle). The IUCN endangered and U.S. ESA endangered Central South Pacific and Central West Pacific DPSs, and the threatened Central North Pacific DPS, of green turtle is the most abundant turtle species. While adult green turtles are not known to feed in great numbers anywhere in Yap, they are known to commonly breed/nest at a number of locations in the State. Research suggests that most green turtles migrate to and from feeding grounds located outside of Yap State (Kolinski 1995). The second most common turtle species is the IUCN and U.S. ESA endangered hawksbill turtle. Hawksbill turtles are known to occasionally nest on the outer islands of Yap (Cruce, 2009). Two less common species are the olive ridley turtle and the leatherback turtle (Orcutt et al., 1989; Edward, 2002). Leatherback and olive ridley turtles have been reported in pelagic waters and therefore are not expected in the ROI.

Resident sea turtles occur in Yap State waters (Kolinski et al., 2014) and are known to feed continuously along Yap's nearshore seagrass beds (Edward, 2002). The neighboring islands of Yap State have been identified as important nesting and foraging areas for the green turtle and hawksbill turtle (Kostka and Gavitt, 2006). Juvenile hawksbill turtles are frequently seen at dive sites around Yap (Manta Ray Bay Report, 2013). During the 2023 marine resources survey, 28 sea turtles were observed (Figure 3-11) (NAVFAC Pacific, 2023). Green and hawksbill turtles are likely to be encountered in the ROI, whereas loggerhead and olive ridley turtles are not likely due to their preference for deep, offshore waters.

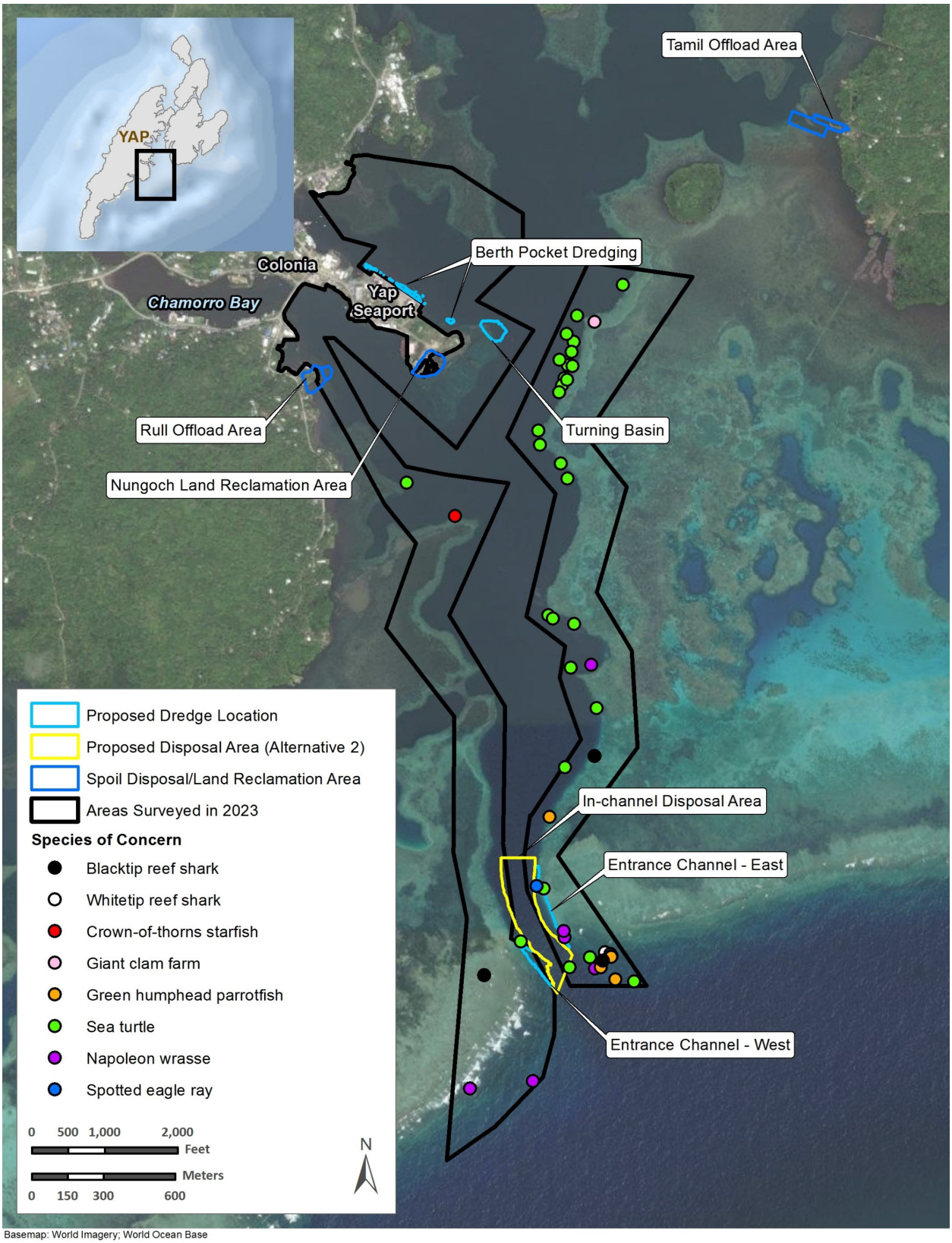



**Figure 3-11 Special Status Species Documented during 2023 Surveys**

Saltwater crocodile sightings around Yap are considered vagrants from Palau and there are no known breeding populations in FSM. Only three confirmed occurrences of crocodiles have been recorded for FSM, and only two occurred in Yap. One was as observed by a young boy on Eauripik Atoll in 1959 and the other by a Yap Marine Resources worker on Woleai Atoll in 1986 (Buden and Haglelgam, 2010). While not impossible, it is highly unlikely that saltwater crocodiles are present in the project area; therefore, this species is not discussed further.

#### 3.4.1.5.3 Special Status Fish

Twenty-two species of fish listed as threatened, endangered or vulnerable, and Yap SOC are known to occur in Yap waters (Table 3-7). Threatened or endangered shark and ray species that are known to occur in Yap waters include *Alopias pelagicus* (pelagic thresher), *A. superciliosus* (bigeye thresher), blacktip reef shark, *C. amblyrhynchos* (grey reef shark), *C. longimanus* (oceanic whitetip shark), *Isurus oxyrinchus* (shortfin mako), *Mobula alfredi* (reef manta ray), *M. birostris* (giant manta ray), *Rhincodon typus* (whale shark), *Sphyrna lewini* (scalloped hammerhead shark), spotted eagle ray, and whitetip reef shark (Bailey et al., 2022; NAVFAC Pacific, 2023; IUCN, 2025).

In addition to the sharks and ray species listed above, 10 species of bony fish are listed by CITES and the IUCN Red List, or are a Yap SOC and are known to occur in Yap waters. These include green humphead parrotfish, *Hippocampus bargibanti* (Bargibant's seahorse), *H. denise* (Denise's pygmy seahorse), *H. kuda* (common seahorse), *Hipposcarus longiceps* (Pacific long-nose parrotfish), *Lutjanus gibbus* (humpback red snapper), Napolean wrasse, *Naso lituratus* (orangespine unicornfish), *N. unicornis* (bluespine unicornfish), and *Siganus fuscescens* (dusky rabbitfish) (Weeks et al., 2016; Bailey et al., 2022; Allen, 2007; NAVFAC Pacific, 2023; Kronen et al., 2006).

During the *Marine Biological Survey of the Proposed Dock Site at Colonia, Yap* in 1977, two special status fish genera, *Naso* sp. and *Cheilinus* sp. were observed in the Seaport area (Amesbury et al., 1977). The *Marine Biological Survey of Yap Lagoon* completed in 1978, identified special status species such as the green humphead parrotfish, Napoleon wrasse, and orangespine and bluespine unicornfish (Tsuda, 1978). The 2023 surveys (Appendix H) documented four special status reef fish including blacktip and whitetip reef sharks, green humphead parrotfish, and Napoleon wrasse (NAVFAC Pacific, 2023) (Figure 3-11). Based on these sightings, all of these previously observed special status fish species are likely to occur in the ROI.

#### 3.4.1.5.4 Special Status Corals

The existing conditions for corals are discussed in Section 3.4.1.4.4. While the surveys described in Appendix H did not identify corals to species level, in order to provide a conservative analysis, identified coral genera that include one or more protected species that have potential to occur in Yap waters were considered to have the potential to be those protected species. The only identified coral genera with protected species potentially occurring in Yap waters was *Acropora* spp. Five *Acropora* species currently listed under the ESA have the potential to occur in Yap (*Acropora globiceps*, *A. lokani*, *A. retusa*, *A. speciosa*, and *A. tenella*). Although surveys (Appendix H) identified *Isopora*, *Montipora*, *Pavona*, and *Porites* species, none of the ESA-listed

species in these genera have been documented to occur in Yap. Additionally, ESA-listed *Anacropora spinosa* and *Seriatopora aculeata* potentially occur in Yap, but *A. spinosa* is considered uncommon and these genera were not documented in the 2023 surveys (Appendix H) of the Proposed Action area (NMFS, 2023; NAVFAC, 2023).

Of the special status coral genera with the potential for ESA-listed species to occur in Yap waters (*Acropora* spp., *Anacropora* spp., and *Seriatopora* spp.), only *Acropora* spp. were encountered in the Seaport area during the *Marine Biological Survey of the Proposed Dock Site at Colonia, Yap* conducted in 1977 (Amesbury et al., 1977). The *Marine Biological Survey of Yap Lagoon*, completed in 1977 and 1978, identified special status species within the project area, including endangered coral species.

Approximately 300 species of coral occur in the FSM, of which 155 species of coral are listed under the U.S. ESA or on the IUCN Red List. Only one genus of endangered or threatened corals was encountered in the ROI during the 2023 surveys (Table 3-8). Coral reef habitat extended to the boundary of the Waneday Channel Entrance (NAVFAC Pacific, 2023).

**Table 3-8 Threatened and Endangered Coral Genera in the Project Area**

| *Coral Genus/Species* | *Waneday Channel* | *Seaport*[1] | *Proposed Rull Offload Site* |
|---|---|---|---|
| *Acropora* sp. | X | X | — |
| *Anacropora* sp. | — | — | — |
| *Seriatopora* sp. | — | — | — |
| **Total Genera Recorded** | **1** | **1** | **0** |

Source: NAVFAC Pacific, 2023

[1]Includes the sites of the wharf improvements, proposed wharf extension, turning basin, and land reclamation/Nungoch stockpile site.

#### 3.4.1.5.5 Special Status Invertebrates

Special status invertebrates, other than corals discussed in Section 3.4.1.5.4, include species such as clams, sea snails, sea cucumbers, the coconut crab *Birgus latre*), and *Pinctada margaritifera* (black-lip mother-of-pearl oyster) (Table 3-7). Sessile and mobile invertebrates were encountered during the 2023 surveys described in Appendix H; however, they were not identified to species level. No coconut crab, sea snails, sea cucumbers, or black-lip mother-of-pearl oyster were documented during the 2023 surveys. Proposed threatened or endangered marine clams on Yap include the *Hippopus hippopus* (horse hoof clam), *Tridacna crocea* (boring giant clam), *T. derasa* (smooth giant clam), *T. gigas* (true giant clam), *T. maxima* (small giant clam), and *T. squamosa* (fluted giant clam) (Kronen et al., 2006; Bailey et al., 2022). *T. gigas* was once considered extirpated in the FSM; however, it has been reintroduced and a privately owned giant clam farm was observed within the Seaport–Southeast survey area (located east of the proposed Rull Offload Site, across Waneday Channel) during the 2023 surveys (NAVFAC Pacific, 2023). Other clams, not identified to species, occurred on the reef crests, reef flats, inner reef, and forereef during the 2023 surveys.

#### 3.4.1.5.6 Culturally Valued Marine Species

In Yap, several marine species that are not currently categorized as vulnerable, threatened, or endangered under the IUCN, ESA, or CITES are considered culturally valued marine species by

the local people. This valuation stems from their critical roles as primary food sources, their presence in religious and spiritual practices, and their integration into the island's unique culture, heritage, and tradition. Species that are not listed in Table 3-7 as special status species, but that are considered to be culturally valued marine species known to occur or potentially occur in the ROI are listed in Table 3-9.

In Yap State, some culturally valued marine species such as sea turtles, coconut crabs, clams, and *Trochus* spp. are also subject to local regulations, as listed in the Yap State Code Title 18, *Conservation and Resources*. Title 18, §1005, *Protection of Turtles* states that turtle meat and turtle eggs shall not be sold commercially by any wholesale or retail store licensed to do business in the State. Title 18, §1004, *Protection of Coconut Crab* states no coconut crab, whose shell is less than three inches in diameter measured at the base, shall be taken or killed within the State nor shall any such crabs be taken or killed during their breeding season each year and from June 1st to September 30th nor shall any such crabs be sold commercially in any wholesale or retail store licensed to do business in the State. Title 18, §1006, *Protection of Clams* states the Governor is authorized to declare a harvesting season and to set a size limit for the taking or harvesting of clams. Clam meat shall not be sold commercially by any wholesale or retail store licensed to do business in the State. Title 18, §1009, *Protection of Trochus* states the harvesting of or in any way intentionally interfering with the growth of *Trochus* in the waters of the State of Yap is prohibited.

**Table 3-9 Culturally Valued Marine Species Known to Occur or Potentially Occur in the ROI**

| ***Scientific (common, local)/DPS*** | ***Status**** | ***Habitat*** | ***Potential to Occur within ROI*** |
|---|---|---|---|
| **Invertebrates** | | | |
| *Octopus cyanea* (Reef octopus) | Yap Regulated/CV; CBFM Listing | Coral reefs, reef flats, and seagrass beds. Diurnally active, frequently foraging across sandy, muddy, or rocky substrates during the day and sheltering in lairs or dens excavated in coral bedrock, rubble, or under coral heads. | Likely |
| *Panulirus penicillatus* (Pronghorn spiny lobster) | Yap Regulated/CV; CBFM Listing | Rocky and coral reefs in areas with strong water circulation. Frequently on outer reef slopes, surge channels, and reef flats that are exposed to heavy surf in deep crevices, caves, and lava tunnels. | Possible |
| *Panulirus versicolor* (Painted spiny lobster) | Yap Regulated/CV; CBFM Listing | Rocky regions and coral reefs, often on the seaward edges of coral plateaus, and other structures, from the low-tide mark to 15 m depth. | Possible |
| *Tripneustes gratilla* (Collector urchin) | CBFM Listing | Shallow waters, seagrass beds, macroalgae flats, and coral reef flats. Often found in lagoons and protected bays with moderate water movement, where it resides on sandy, rocky, or rubble-strewn substrates. | Likely |
| *Trochus niloticus* (Topshell, Yogyog) | Yap Regulated/CV | Coral rubble covered areas of the reef flat to large rocks around the deeper reef edge. | Possible |
| *Trochus maximus* (Sea snail, Yogyog) | Yap Regulated/CV | Shallow waters, near coral reefs, on rocky shores. | Possible |
| *Tectus maximus* (Sea snail, Yogyog) | Yap Regulated/CV | Shallow waters, near coral reefs, on rocky shores. | Possible |

| *Scientific (common, local)/DPS* | *Status** | *Habitat* | *Potential to Occur within ROI* |
|---|---|---|---|
| **Fish** | | | |
| *Acanthurus nigricauda* (Epaulette surgeonfish) | CBFM Listing | Clear lagoons and seaward reefs, occurring over sandy or rocky bottoms and reef slopes. Unlike many other surgeonfish, it prefers sandy areas near coral heads or rocks. | Likely |
| *Acanthurus lineatus* (Lined surgeonfish) | CBFM Listing | Shallow, high-energy surge zones on the outer edges of exposed seaward reefs. | Likely |
| *Acanthurus xanthopterus* (Yellowfin surgeonfish) | CBFM Listing | Protected lagoons and bays with large sandy or silty expanses, frequently forming large schools over open, deep sandy areas near the base of reef slopes. | Likely |
| *Ctenochaetus striatus* (Striated surgeonfish) | CBFM Listing | Found in all reef zones, from shallow inner lagoons to deep seaward reef slopes, where it prefers coral-rich substrates and areas with high-relief limestone. | Likely |
| *Naso literatus* (Pacific orange-spine unicornfish) | CBFM Listing | Coral-rich areas of lagoons and seaward reefs, typically found in clear, open water or along the edges of drop-offs | Likely |
| *Naso unicornis* (Bluespine unicornfish) | CBFM Listing | Shallow, high-energy surge zones and inner reef flats, often found near channels and reef drop-offs. | Likely |
| *Naso Tonganus* (Bulbnose unicornfish) | CBFM Listing | Clear lagoons and seaward reefs with high coral cover, frequently occurring along steep outer reef slopes and drop-offs. | Likely |
| *Siganus canaliculatus* (White-spotted spinefoot) | CBFM Listing | Shallow coastal waters, particularly seagrass beds, algae-rich limestone flats, and mangrove-lined lagoons. | Likely |
| *Siganus lineatus* (Golden-lined spinefoot) | CBFM Listing | Shallow mangrove-lined lagoons, estuaries, and inner reef flats with heavy algae or seagrass cover. | Likely |
| *Siganus doliatus* (Barred spinefoot) | CBFM Listing | High-relief coral-rich areas of clear lagoons and seaward reefs. | Likely |
| *Siganus argenteus* (Streamlined spinefoot) | CBFM Listing | High-energy seaward reefs and clear lagoon channels. | Likely |
| *Siganus punctatus* (Gold-spotted spinefoot) | CBFM Listing | Clear lagoon and seaward reefs with high coral cover, frequently found near steep drop-offs and reef walls. | Likely |
| *Hipposcarus longiceps* (Pacific longnose parrotfish) | CBFM Listing | Clear lagoons and seaward reefs, particularly over sandy areas and reef flats near coral patches. | Likely |
| *Chlorurus microrhinus* (Steephead parrotfish) | CBFM Listing | Clear lagoons and seaward reefs, typically preferring lagoonal patch reefs and ocean-facing reef fronts. | Likely |

Source: FishBase, 2026; Yap Division of Marine Resources and Management, 2026.
Key: CBFM = Community-based fisheries management; CV = Culturally Valued

#### 3.4.1.5.7 Invasive Species

There have been two species considered to be or managed as invasive species documented or suspected within the Yap marine waters: *Acanthaster planci* (crown of thorns starfish) which is a native species but is often managed as an invasive pest due to its destructive behavior during population outbreaks, and *Acanthophora spicifera* (prickly seaweed) (GISD, 2025; YIST, 2018; YIST, 2025). Additionally, the Yap Invasive Species Taskforce (YIST) Adaptive Strategic Management Plan identified sea snakes, barnacles, and other biofouling organisms as invasive species of concern (YIST, 2025). Only the crown of thorns was documented during the 2023 marine surveys (Figure 3-11).

### 3.4.2 Environmental Consequences

#### 3.4.2.1 Analysis Method

The marine biological resources analysis discusses impacts on vegetation, wildlife, and special status species from construction, as well as aircraft and ship activities associated with the projects at the Airport and Seaport. The analysis considers the type, location, duration, timing, and magnitude of activities that could affect marine habitats, assemblages, and special-status species. Potential impact intensity and significance are evaluated based on the degree or extent to which an alternative would result in any of the following:

- adverse effects that measurably reduce population abundance or distribution of special-status species;
- long-term loss or degradation of habitat necessary for special-status species survival and recovery;
- fragmentation that disrupts habitat connectivity or movement;
- increased occurrence, establishment, or spread of existing or introduced invasive species;
- exceedance of relevant species tolerance thresholds (e.g., sound, turbidity, water quality); or
- inconsistency with applicable FSM, Yap State, or U.S. federal biological resource standards or authorizations (e.g., ESA).

Using these criteria, each alternative is evaluated to determine whether potential effects would be considered short- or long-term, adverse or beneficial, and less-than-significant or significant.

As discussed in Section 3.4.1, the ROI for marine resources includes the coastal environment, adjacent waters, and submerged habitats potentially impacted by the Proposed Action's Airport and Seaport improvements. This encompasses areas affected by stormwater runoff, sedimentation, lighting, overflights, in-water construction (noise/turbidity), dredging and disposal sites, navigation channels, and shipping lanes within 12 nautical miles (nm) of shore.

#### 3.4.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to marine biological resources. Therefore, no impacts on marine biological resources would occur with implementation of the No Action Alternative.

### 3.4.2.3 Alternative 1 (Preferred Alternative) Potential Impacts

#### 3.4.2.3.1 Avoidance, Minimization Measures and Best Management Practices

Adverse impacts would be reduced or avoided by implementation of the avoidance, minimization measures, and BMPs listed in **Section 2.8**.

#### 3.4.2.3.2 Construction Impacts

The analysis below has determined that during the construction period, Alternative 1 would have a significant adverse impact on marine biological resources. Mitigation measures would be implemented to offset adverse impacts, as appropriate.

Airport and roadway construction would include ground disturbance, which could potentially contribute to sedimentation or pollutants in stormwater runoff that would ultimately reach the marine environment. However, with the implementation of standard construction BMPs, such as erosion control practices, effective silt containment devices, and strict protocols for pollutant and spill prevention outlined in the SWPPP, impacts on the marine environment from airport and roadway construction would be negligible and are not analyzed further with respect to impacts on marine resources.

During construction of the Seaport portion of the Preferred Alternative, activities that may impact marine resources in the ROI include reconstructing the wharf and bulkhead, constructing a new pile-supported wharf, installation a new mooring dolphin, dredging the harbor and channel entrance, dredging and fill at the Tamil and Rull Offload Sites, land reclamation at the Nungoch Dredge Material Stockpile/Land Reclamation Site, replacing and repairing ATON channel markers and installing new range markers, and improving the roadway along segments that are adjacent to the coastline. Construction would take approximately three years to complete.

Reconstructing the wharf and bulkhead and constructing a new wharf would involve pile driving, which could impact marine resources through elevated underwater noise, increased turbidity and sedimentation, and physical disturbance.

The wharf improvements would also include a new paved area and vehicle wash area, which could impact marine resources through increased surface water runoff into the marine environment. Increased surface water runoff may contribute to sediment runoff, increased turbidity, and introduction of pollutants. Lighting upgrades associated with wharf improvements may also increase marine artificial light pollution. Demolition of existing infrastructure may impact marine resources through harmful direct contact with marine organisms and introduction of pollutants.

Dredging activities may impact marine resources through elevated underwater noise, increased turbidity, harmful direct contact with marine organisms, introduction of pollutants, and removal and loss of benthic habitat or species within the dredge footprint. Dredged materials would be primarily stockpiled on land. However, some in-water disposal of dredge spoils would occur at the Rull stockpiling site, Tamil offloading site, and Nungoch stockpile/land reclamation site. At the Rull stockpile site, approximately 0.4 acres of dredging would be required to provide access for the barge to offload the dredge material. Stockpiling of dredge material in Rull would include approximately 0.8 acres of upland stockpile area and approximately one acre below the

high tide line where marine habitat would be covered with dredge spoil for land reclamation/stockpiling. The stockpile area would also be fortified with a rock revetment along the seaward edge and a concrete block wall at the offloading platform. At the Tamil offload site, approximately 1.1 acres of seabed would be dredged for barge access and additional approximately 0.9 acres would be filled to expand the causeway and support offloading. At the Nungoch stockpile/land reclamation site, dredged material from the turning basin would be offloaded and stockpiled at the southwestern tip of the Nungoch peninsula. The land reclamation area would impact approximately 2.2 acres of benthic habitat and would be stabilized by a permanent rock revetment. It is notable that only 0.7 acres would be outside the footprint of a previously disturbed land reclamation project. Dredging and dredged material placement and land reclamation may impact marine resources through habitat loss, increased turbidity and sedimentation, harmful direct contact with marine organisms, and introduction of pollutants.

Analysis was conducted using GIS data to look at the overlap of the proposed dredging areas with survey data and MPA boundaries. Up to 0.42 acres of dredging may overlap with the MPA at the east channel dredging site, and approximately 0.25 acres would overlap the traditional use zone at the Tamil offload site (Figure 3-8) (TNC, 2016). However, that represents approximately 0.01 percent of the total MPA area. Only 0.31 acres of medium coverage coral habitat and 0.11 acres of trace coral habitat would be impacted, and no seagrass would be impacted within the MPA from east channel dredging. At the Tamil offload site, the entire 0.25-acre impacted area within the MPA would be primarily seagrass habitat. The dredged areas within the MPA represent only 0.06 percent and 0.01 percent of the total seagrass and coral habitat, respectively in the MPA. It is important to note that much of this area was dredged previously approximately 20 to 25 years ago and is previously disturbed habitat. Any dredging or fill operations occurring in these zones would be coordinated closely with the Tamil Chief, Council of Tamil, Tamil Resources Conservation Trust, and other applicable stakeholders.

Replacing and repairing channel markers would involve either cutting the existing marker off at its foundation block, or removing the entire marker and its foundation, and replacing it with a new marker in the same footprint. A barge-mounted crane or excavator would be used to remove the old channel markers and install the new markers.

Installing the two new range markers would involve the use of a shallow barge that would be anchored in place with spuds and then placing four-pile range markers on concrete blocks on the benthic substrate with a barge-mounted crane or excavator. The front range marker would be located along the edge of the channel, and the rear range marker would be situated in the intertidal area, some distance from the channel.

Roadway improvement activities include repaving and widening sections of the roadway, drainage improvements, and soil stabilization efforts. Impacts from these activities on marine resources may include the introduction of pollutants through surface and stormwater runoff, and increased turbidity and sedimentation. However, inland construction activities would have no appreciable effect on the downgradient marine environment due to the rigorous implementation of a SWPPP and industry-standard BMPs, such as silt fencing, secondary containment for pollutants, and site stabilization. These measures would effectively capture

sediment and prevent pollutant discharge at the source, ensuring that downstream water quality and coastal marine resources remain protected from project-related runoff.

Construction equipment and materials that are brought to Yap have the potential to inadvertently introduce invasive species to the marine environment. Invasive species impacts would be minimized by implementation of the avoidance, minimization measures, and BMPs listed in Section 2.8, including adherence to the *DoW Biosecurity Standard Operating Procedures for Airport and Seaport Improvements At Yap, Federated States of Micronesia* currently being developed in consultation with FSM Quarantine and Yap State, which will include inspection, cleaning, testing and treatment, and documentation requirements for vessels and cargo (Appendix A, Draft Biosecurity Plan/SOP).

In addition to in-water noise, construction activities may utilize equipment in which marine species could get entangled (e.g., turbidity curtains) or increase direct strike potential to mobile marine species because of increased vessel traffic anticipated during construction activities at the Airport and Seaport. Standard DoD, Navy, and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) vessel strike avoidance procedures (i.e., lookouts, speed conditioning near surfacing animals, and reporting) would be implemented to minimize risk (NOAA Fisheries, 2021a) and all contractors would be required to comply with the BMPs in Section 2.8.

#### 3.4.2.3.2.1 Marine Vegetation

There would be short-term, less than significant, adverse impacts on marine vegetation from increased sedimentation and turbidity and long-term, less than significant, adverse impacts on marine vegetation from in-water construction, dredging, and land reclamation activities. Marine vegetation, such as seagrass and algae, may be impacted by increased turbidity and sedimentation from various construction and dredging activities, which may limit the amount of available sunlight required for them to survive (Merlin et al., 1996). Turbidity plumes and increased suspended sediments could reduce light penetration in the immediate construction zone and temporarily affect submerged aquatic vegetation (if present). Mechanical disturbance could result in direct removal or breakage of seagrass or macroalgae within the physical footprint of dredging or excavation. It may take seagrass anywhere from 2-4 years to over 5 years to recover from disturbance, depending on the species and other environmental conditions such as water quality (Erftemeijer and Lewis, 2006). There is no seagrass located in the dredging locations for the two berths, Rull Offload Site, or Waneday Channel Entrance (Figure 3-9). However, proposed dredging in the Turning Basin would potentially remove approximately 0.13 acres of high seagrass cover habitat and 0.20 acres of low seagrass cover. This represents 0.20 and 0.27 percent of the high and low seagrass cover in the survey area, respectively. The Tamil dredge material offload site was not surveyed. However, using a conservative approach based on data available on the Allen Coral Atlas (Allen Coral Atlas, 2025) dredging and filling would remove up to approximately 2 acres of seagrass habitat. It should be noted that the data in the Allen Coral Atlas is not to the scale of surveyed data used for other analyses and appears to be outdated when compared to more recent satellite imagery. The Rull Dredge Material Offload Site dredging would impact approximately 1.3 acres of benthic habitat. There is no documented seagrass habitat in that footprint, however 0.3 acres was not surveyed, and data was not available in the Allen Coral Atlas. The Nungoch Dredge Material

Stockpile/Land Reclamation Site would impact approximately 1.4 acres of benthic habitat. Only approximately 0.7 acres of the proposed land reclamation area represents potentially undisturbed area outside of the footprint of the previous land reclamation area and seagrass was not present in this area. Additionally, satellite imagery for the site shows evidence of previous dredging/scraping of the seabed at the Nungoch site related to previous land reclamation projects. Furthermore, over time the nearby remaining seagrasses would be expected to continue to grow, potentially expanding back into areas impacted by dredging.

Plume modeling simulations selected a representative year from 30 years of global wave historical data. Within this year, two scenarios were modeled: windy conditions from January 1 to March 1, 2020, and calm conditions from July 1 to August 30, 2020. Sediment source parameters were updated using the project dredging quantities and operational assumptions. Dredging was assumed to occur at a production rate of 200 $m^3$/hr under a 24-hour operational schedule, 6.5 days/week, with 70% operational availability (allowing for weather and mechanical delays). All modeling was considered to be conservative due to the 24-hr operational schedule and because modeling did not consider the use of silt/turbidity curtains (i.e., all modeling was of an unmitigated scenario). The plume dispersion modelling for Yap Seaport predicted that changes in suspended sediment concentrations resulting from unmitigated dredging and stockpiling activities are restricted to areas close to the operations and return to baseline conditions shortly after activities cease. Similarly, the impact on sediment deposition would be localized, with significant deposition confined to the immediate vicinity of the stockpile sites. The extent of turbid plumes associated with dredging and stockpiling activities would be greatly reduced through the use of turbidity barriers/silt curtains (NAVFAC, 2026).

Adverse impacts would be minimized by implementation of avoidance, minimization measures, and BMPs listed in Section 2.8. Dredging operations would employ the use of silt curtains to the maximum extent practicable which would confine suspended sediment to the immediate location of the dredging/disposal (NAVFAC, 2026) and would also implement additional minimization measures including electronic turbidity monitors to be placed outside of the silt curtains to ensure that sediment is being contained within the silt curtains. Silt curtains may not be feasible at the channel entrance due to high wave/current action, but modeling suggests that the change in suspended sediment concentration and sediment deposition impacts would be limited even without use of silt curtains (NAVFAC, 2026). Considering the large quantity of available seagrass habitat in the project area, the relatively small area that would potentially be removed, and the implementation of appropriate BMPs, impacts on marine vegetation are expected to be both short- and long-term, adverse, and less than significant.

#### 3.4.2.3.2.2 Marine Wildlife

##### 3.4.2.3.2.2.1 Marine Mammals

A number of marine mammals are protected under ESA and others are covered under IUCN, Yap regulated or species of concern, and/or CITES and are discussed in Section 3.4.2.3.2.3.

##### 3.4.2.3.2.2.2 Sea Turtles

Sea turtles are protected under the ESA and discussed in Section 3.4.2.3.2.3.

#### 3.4.2.3.2.2.3 Fish

There would be short-term, less than significant, adverse impacts on fish species from construction, dredging, and land reclamation activities and long-term, less than significant, adverse impacts due to loss and/or alteration of habitat. Fish species, including sharks and manta rays, may be impacted by construction and dredging activities through elevated noise levels, increased turbidity and sedimentation, introduction of pollutants, and marine artificial light pollution. Elevated noise levels can have a variety of effects on fish ranging from no effect to brief acoustic annoyance, behavioral changes and stress, temporary or permanent loss of hearing, or tissue injuries and barotraumas (Hastings and Popper, 2005; Ruggerone et al., 2008; Hedges, 2011; WSDOT, 2020).

Exposure to either intense or low levels of long-term underwater sound pressure from impact pile driving may result in auditory tissue damage or temporary hearing loss in many fish species (Caltrans, 2020). Factors such as the frequency, duration, and repetition rate of the underwater sound pressure level, along with the size and life history stage of the organism influences the extent of potential auditory tissue damage or temporary hearing loss an organism may experience (Caltrans, 2020). Impact pile installation of 36-inch steel pipe piles would have the largest elevated noise level impact on fish, with the potential of causing onset of physical injury to small fish (<2 grams) located up to 370 ft away and behavioral response may occur out to 5,200 ft (Accomando et al., 2025). Table 3-10 provides the thresholds for onset of physical injury and behavioral response, and calculated distances to those thresholds from pile driving of 36-inch piles associated with the wharf expansion and breasting dolphin construction. (Note: Table 3-10 values may be revised with updated pile driving data.) During dredging operations, the greatest potential impact from underwater noise is typically temporary behavioral changes that include startling and avoidance behaviors in fish (Reyff and Ambaskar, 2024). Although there are no known studies on the auditory sensitivity of manta rays, their hearing sensitivity is likely to be similar to that of other sharks and elasmobranchs, which have poor hearing sensitivities and cannot detect sound pressures (Neider et al., 2023). Unlike many bony fishes, sharks and rays do not possess swim bladders or other structures that can convert acoustic pressure into a displacement stimulus and, therefore, respond only to the particle motion component of sound (e.g., acceleration, velocity, displacement) and not the pressure component, although this remains to be demonstrated conclusively (Neider et al., 2023). Sharks and rays are able to sense sounds up to approximately 1000 Hz and are most sensitive to frequencies below approximately 150 Hz (Neider et al., 2023). As a group, elasmobranchs appear to be less sensitive to sound at all frequencies compared to teleost fishes. This is either due to the lack of any pressure-to-displacement transduction mechanism (e.g., swim bladder, Weberian ossicles) or because their gelatinous otoconial masses are less dense than the solid otoliths of bony fishes and, therefore, less sensitive to linear motion and acceleration. Thus, acoustic impacts to manta rays are discountable.

Increased turbidity and sedimentation have the potential to interfere with fish respiration and affect fish ability to search for food (Berry et al., 2003; Wengner et al., 2012; Hess et al., 2017). Fish in the immediate construction area could experience temporary loss of foraging habitat due to turbidity or direct habitat removal at pile, dredge, and land reclamation footprints. Some

mortality of eggs/larvae or sessile juvenile life stages could occur in the direct footprint. Adult and juvenile fish are expected to avoid the most intense noise and turbidity.

It is likely that fish species would avoid the Preferred Alternative area during active in-water construction activities, thereby avoiding some of the associated impacts. Adverse impacts would be further minimized by implementation of avoidance, minimization measures, and BMPs listed in Section 2.8, including qualified biological species monitors prior to and during in-water work, implementing shutdown zones, and use of silt curtains while dredging which would contain turbidity and also prevent mobile species from entering the area.

**Table 3-10 Calculated Distances to Sound Exposure Criteria for Onset of Physical Injury and Behavioral Disturbance for Fish from Pile Driving**

| | | | ***Impact Pile Driving*** | ***Impact Pile Driving*** | ***Impact Pile Driving*** | ***Impact Pile Driving*** | ***Vibratory Pile Driving*** |
|---|---|---|---|---|---|---|---|
| | | | ***Onset of Physical Injury*** | ***Onset of Physical Injury*** | ***Onset of Physical Injury*** | ***Behavior*** | ***Behavior*** |
| | | | ***Peak (PK)*** | ***SELcum (Fish ≥ 2 g)*** | ***SELcum (Fish < 2 g)*** | ***RMS*** | ***RMS*** |
| ***Structure*** | ***Pile Size and Type*** | ***Metric*** | ***Threshold: 206 dB*** | ***Threshold: 187 dB*** | ***Threshold: 183 dB*** | ***Threshold: 150 dB*** | ***Threshold: 150 dB*** |
| Wharf Expansion and Breasting Dolphin | 36-inch diameter Steel Pipe | Distance (ft) | 24 | 200 | 370 | 5,200 | 607 |

Legend: dB = decibel; ft = feet; $SEL_{cum}$ = cumulative sound exposure level (decibel referenced to 1 microPascal squared seconds [dB re 1 $\mu Pa^2$-s]), PK = peak sound pressure level (decibel referenced to 1 microPascal [dB re 1 µPa]); RMS = root mean square

Sources: Accomando et al., 2025, NMFS, 2025. Note: Values may be revised with updated pile driving data.

#### 3.4.2.3.2.2.4 Coral

It is expected that short- and long-term, significant, adverse impacts on coral would occur from implementation of the Preferred Alternative. During construction, corals in the project vicinity may be impacted by direct harmful contact, increased turbidity and sedimentation, introduction of pollutants, elevated noise levels, and marine artificial light pollution. Permanent physical damage or mortality may occur from direct contact between corals and construction and dredging equipment and through removal of existing ATON structures. Increased turbidity and sedimentation may adversely affect corals due to light attenuation, as corals are phototrophic epibenthic organisms (Bessell-Browne et al., 2017; Jones et al., 2020). Sedimentation may also smother or bury certain types of corals, disrupt polyp gas exchange, inhibit nutrient acquisition, and increase metabolic rates (Rogers, 1990; Richmond, 1993; Telesnicki and Goldberg, 1995; Jones et al., 2019). Elevated noise levels may disrupt coral larval settlement (Lecchini et al., 2018), and marine artificial light pollution may disrupt reproduction, settlement, and recruitment cues that are tied to the lunar cycle (Fobert et al., 2023).

Corals present within the project footprint would experience direct removal or shading effects. This risk would be avoided to the extent practicable through pre-construction surveys and siting

to avoid colonies. Where avoidance is infeasible, relocation/transplantation of some ESA-listed species would be considered and potentially implemented, consistent with marine species consultation results and by approved coral relocation protocols. Proposed dredging and land reclamation operations under the Preferred Alternative would potentially impact up to 12.5 acres of benthic habitat; however, using a conservative weighted calculation that applied the approximate highest coverage for each characterized area (trace, low, medium, and high), the approximately 12.5 acres of coral habitat would be reduced to 1.9 acres of live coral (Table 3-11). With implementation of avoidance, minimization, BMPs, and mitigation measures to be coordinated through the consultation process, adverse impacts could be reduced to less than significant.

**Table 3-11 Coral Cover Impacts in the Project Area**

| *Survey Area* | *Coral Cover Classification* | *Acres Impacted* | *Weighted Acres Impacted** |
|---|---|---|---|
| Berth 1 | Trace | 0.41 | 0.04 |
| Berth 2 | Low | 0.02 | 0.00 |
| Berth 2 | Trace | 0.08 | 0.01 |
| Entrance Channel – West | Not Mapped (in channel) | 0.77 | -- |
| Entrance Channel – West | High | 0.39 | 0.39 |
| Entrance Channel – West | Medium | 0.48 | 0.19 |
| Entrance Channel – East | High | 0.06 | 0.06 |
| Entrance Channel – East | Medium | 1.43 | 0.57 |
| Entrance Channel – East | Trace | 1.71 | 0.17 |
| Turning Basin | Low | 0.42 | 0.08 |
| Turning Basin | Medium | 0.03 | 0.01 |
| Turning Basin | Trace | 1.04 | 0.10 |
| Nungoch Land Reclamation** | Low | 0.23 | 0.05 |
| Nungoch Land Reclamation** | Not Present | 1.18 | 0.00 |
| Rull Stockpile Site** | Medium | 0.18 | 0.07 |
| Rull Stockpile Site** | Low | 0.70 | 0.14 |
| Rull Stockpile Site** | Trace | 0.09 | 0.01 |
| Rull Stockpile Site ** | Unmapped | 0.48 | - |
| Tamil Offload Site** | Unmapped | 2.00 | - |
| **Dredge TOTAL** | | **12.48**** | **1.89**** |

Source: NAVFAC Pacific, 2023

* Weighted acres assumed highest percentage for each category (i.e., trace = 1%; low = 20%; medium = 40%; and high = 100%). For example, 0.48 acres of medium coral coverage impacted in Entrance Channel – West would be considered to be effectively 0.48 acres X 0.4 = 0.19 weighted acres of live coral impacted.

** Acreages impacted subject to confirmation/change

#### 3.4.2.3.2.2.5 Benthic Invertebrates

Construction of the Preferred Alternative is expected to result in short-term, less than significant, adverse impacts to non-coral benthic invertebrates through increased turbidity and sedimentation, introduction of pollutants, and potential for direct contact to sessile invertebrates. Invertebrate species that are limited in movement may experience disruption in feeding, increased abrasion, decreased respiration rates, or changes in their behavior (Todd et al., 2015). The Proposed Action would also result in long-term, less than significant, adverse impacts from the permanent removal and/or alteration of benthic habitat. As previously discussed, the proposed Turning Basin dredge area and the Rull, Tamil, and Nungoch dredge

material stockpiling/offloading sites would impact seagrass habitat in the project area. Algal flats, unconsolidated soft bottom including sand and rubble would also be disturbed and permanently altered, however the proposed dredging and reclamation areas represent a small portion of the available habitat in Colonia Harbor, and would not be expected to significantly impact the available habitat for benthic invertebrates. While some invertebrates, particularly sessile species, would be impacted directly, it would not represent a significant impact at the species level. With the implementation of proposed BMPs, impacts on non-coral benthic invertebrates from construction and dredging activities are expected to be short-term, less than significant, and adverse.

Colonization of new hard substrate provided by the new piles would constitute a long-term small-scale conversion to hardbottom assemblages. Given the small project footprint relative to available habitat, the effect would not be significant. Short-term, less than significant, adverse impacts on benthic invertebrates would occur, but over time benthic invertebrates are expected to rehabituate to the area.

#### 3.4.2.3.2.3 Marine Special Status Species

Special status marine species include marine mammals, sea turtles, fishes, corals, and invertebrates (Table 3-7) that may be present in the ROI. This section also incorporates discussion and analysis of Yap culturally valued and invasive species (Table 3-9).

Potential impacts from Seaport and wharf improvements on special status marine species that primarily remain below the surface of the water, such as corals, invertebrates and fishes, including sharks and rays, would be similar as described above under the non-benthic invertebrates and marine wildlife sections. There would be short-term, less than significant, adverse impacts on mobile special status marine species from dredging activities that would remove approximately 106,000 CY of dredge material. Impacts on corals from dredging are expected to be long-term, significant, and adverse. Adherence to avoidance, minimization measures and BMPs outlined in Section 2.8, along with implementation of mitigation measures that will be included in a mitigation plan developed through marine species consultation, would help to reduce the severity of adverse impacts.

Marine species present in the project areas are expected to be habituated to noise disturbances because of the urbanized environment and vessel traffic; however, there could be short-term, less than significant, adverse impacts to all marine species from visible human presence, construction-associated noises, suspended sediments in the water, turbidity, decreased visibility, pile driving, and vessel use associated with construction materials deliveries and construction activities.

Short-term, less than significant, adverse impacts on special status species are anticipated from in-water construction noise. The highest levels of construction-related noise would be generated from 36-inch steel pile installation and removal. Elevated construction noise levels in water may solicit minor behavioral responses in special status species. Driving of steel piles can generate underwater noise levels high enough to cause onset of auditory injury in special status marine mammals, sea turtles, and fish (NMFS, 2025). Pile driving under the Preferred Alternative may have the potential to generate sound levels intense enough to cause injury or harm to special status marine species likely to occur at the port, but only at close proximity to

the pile driving. It is expected that most motile species would avoid construction areas due to the general presence of humans and noise from construction, vessel movements, and other activity. Species specific impacts are discussed in the species subsections below.

#### 3.4.2.3.2.3.1 Special Status Marine Mammals

There would be short-term, less than significant, adverse impacts to marine mammals. Marine mammals are not considered present within the Colonia Harbor or Waneday channel, however, they could be temporarily displaced from nearby affected areas during in-water construction, pile driving, or dredging due to visible human presence, noise, and turbidity, which may extend outside of the harbor and channel.

Impact pile driving creates high-intensity impulsive underwater sound that can cause auditory injury in marine mammals that enter the zone of influence, while non-impulsive sound from vibratory pile driving or rotary drilling can cause temporary behavioral disturbance over a larger distance. Table 3-12 provides the maximum distances to onset of auditory injury, which is considered Level A harassment and varies by marine mammal species (i.e., cetaceans hear at low/high/very high frequencies), as well as the maximum distance to which a behavioral response may be elicited, considered Level B harassment. (Note: Table 3-12 values may be revised with updated pile driving data.) Table 3-12 also shows the total estimated area in acres that would potentially be exposed to these levels of pile driving noise. Impacts are provided for the loudest or most impactful activity, which is impact pile driving of 36-inch steel pipe piles for Level A harassment and vibratory pile driving of 36-inch steel pipe piles for Level B harassment. It is not likely that marine mammals would be in this vicinity of impact pile driving activities, as their occurrence within Colonia Harbor is rare and most marine mammals would be expected to avoid areas of heightened human activity, movement, and general construction noise. However, as the area of behavioral harassment extends into the Philippine Sea, there is potential for marine mammals to be impacted by noise from vibratory pile driving. Exposure to noise varies for each marine mammal population present in the Level B harassment zone, and exposures to noise from pile driving may cause auditory masking, physiological stress, or minor behavioral responses. Due to the low number of days (approximately 111 days total) that pile driving would occur and the intermittent use of pile driving (average of 2.4 piles per day at 15 minutes vibratory/drilling and approximately 20 minutes impact driving per pile is estimated, for a total of less than 1.5 hours per pile driving day), effects are expected to be minor and temporary (lasting minutes to hours). Quantitative data regarding specific marine mammal densities within the nearshore waters of Yap remain limited; however, local anecdotal reports and historical sighting records suggest that most species are relatively rare or transient within the immediate project vicinity. While the surrounding deep-ocean environment supports a diverse range of cetaceans, their presence in the shallow, reef-proximal zones typically used for pile driving is infrequent.

Given this low likelihood of occurrence, combined with the short duration of the proposed vibratory activities—which are expected to occur only intermittently over a period of approximately 111 days, the probability of an individual animal being present within the Level B harassment zone during active pile driving is low. Consequently, any potential for Level B harassment of marine mammals would be short-term, adverse, and less than significant. The transient nature of the noise, paired with the ability of mobile species to avoid the area,

supports the determination that no significant or long-term impacts on local populations would occur.

Adverse impacts would be minimized by the implementation of BMPs in Section 2.8 such as shutdown zones, soft starts, and noise attenuation devices to avoid injury. To further minimize potential effects, the project will implement "soft-start" procedures for pile driving activities. This involves initiating the pile driving hammer at a reduced power level for a short duration, followed by several rest periods, before reaching full operational energy. This technique serves as a warning mechanism, allowing any marine mammals that may be in the vicinity to voluntarily vacate the area and move toward a safer distance before the onset of full-intensity noise. Temporary displacement or avoidance of the immediate work area may occur during active impact and vibratory pile driving, but adverse effects are anticipated to be short-term, localized, and less that significant based on the rarity or lack of marine mammal sightings within Colonia Harbor, the entrance channel, and along the outer reefs, as well as the limited project area size.

**Table 3-12 Calculated Maximum Distances Corresponding to MMPA Thresholds for Underwater Sound from Pile Driving at Yap Project Area**

| *Facility* | *Pile Size and Type* | *Metric* | *Impact Pile Driving* | *Impact Pile Driving* | *Impact Pile Driving* | *Impact Pile Driving* | *Vibratory Pile Driving* |
|---|---|---|---|---|---|---|---|
| | | | *Level A (Auditory Injury onset) Harassment* | *Level A (Auditory Injury onset) Harassment* | *Level A (Auditory Injury onset) Harassment* | *Level B (Behavioral) Harassment* | *Level B (Behavioral) Harassment* |
| | | | *LF Cetacean* | *HF Cetacean* | *VHF Cetacean* | *All Marine Mammals* | *All Marine Mammals* |
| | | | *Maximum Distance to 183 dB SELcum Threshold/ Area of Harassment Zone* | *Maximum Distance to 193 dB SELcum Threshold/ Area of Harassment Zone* | *Maximum Distance to 159 dB SELcum Threshold/ Area of Harassment Zone* | *Maximum Distance 160 dB RMS SPL Threshold/ Area of Harassment Zone* | *Maximum Distance 120 dB RMS SPL Threshold/ Area of Harassment Zone* |
| Wharf Expansion and Breasting Dolphin | 36-inch diameter Steel Pipe | Distance (ft) | 368 | 47 | 570 | 1,119 | 60,625 |

Source: Accomando et al., 2025; NMFS, 2025; NAVFAC Pacific, 2026. Note: Values may be revised per updated pile driving data.

Legend: dB $SEL_{cum}$ = cumulative sound exposure level; ft = feet; HF = High Frequency; LF = Low Frequency; VHF = Very High Frequency

#### 3.4.2.3.2.3.2 Special Status Sea Turtles

Turtles would experience short-term, less than significant, adverse impacts from in-water noise, as well as lighting, which would occur during construction activities. None of the activities associated with the Preferred Alternative are likely to generate in-air noise levels that extend to areas used by nesting sea turtles. Nesting beaches do not occur in the project footprint, and nesting is not known to occur along the areas planned for repair or construction. Green turtles most commonly nest on neighboring islands of Yap state (Dutton, et al. 2016).

If a sea turtle is in the project area during construction activities, individuals could experience impacts similar to those described for marine mammals. Table 3-13 provides the maximum distances to onset of auditory injury and behavioral response that may be elicited in sea turtles. (Note: Table 3-13 values may be revised with updated pile driving data.) Impacts are provided for the loudest or most impactful activity, which is impact pile driving of 36-inch steel pipe piles. The maximum distance at which sea turtles would potentially experience auditory injury, and behavioral harassment would be 316 ft and 112 ft, respectively. Like marine mammals, it is not likely that sea turtles would be this close to pile driving activities; while their occurrence within Colonia Harbor is common, sea turtles tend to be human averse and would be expected to avoid areas of heightened human activity, movement, and general construction noise.

Section 2.8 includes avoidance, minimization measures, and BMPs such as presence of a biological observer to survey prior to and during construction efforts for special status species, which would be implemented to minimize impacts.

**Table 3-13 Calculated Maximum Range to Sea Turtle Sound Thresholds from Impulsive Noise (Impact Pile Driving)**

| *Facility* | *Pile Size and Type* | *Metric* | *Level A (Auditory Injury onset) Harassment* | *Level B (Behavioral) Harassment* |
|---|---|---|---|---|
| | | | *Maximum Distance to 184 dB SELcum Threshold/Area of Harassment Zone* | *Maximum Distance to 175 dB RMS Threshold/Area of Harassment Zone* |
| Wharf Expansion and Breasting Dolphin | 36-inch diameter Steel Pipe | Distance (ft) | 316 | 112 |

Sources: NAVFAC Pacific, 2026, NMFS, 2025; Accomando et al., 2025. Note: Values may be revised per updated pile driving data.
Legend: ft = feet; RMS = root mean square; $SEL_{cum}$ = cumulative sound exposure level

#### 3.4.2.3.2.3.3 Special Status Fish

Special status fish (blacktip and whitetip reef sharks, green humphead parrotfish, and Napoleon wrasse) are expected to experience the same impacts as those described in Section 3.4.2.3.2.2.3.

#### 3.4.2.3.2.3.4 Special Status Corals

Special status corals are expected to experience the same impacts as those described in Section 3.4.2.3.2.2.4. Additional analysis was performed to determine special status coral species that may be likely to be directly impacted by in-water work. Table 3-14 denotes the ESA-listed corals that were observed on transects overlapping or near-overlapping the proposed in-water project sites. Only *Acropora spp.* (located near the turning basin dredge area, Nungoch land reclamation/stockpile site, and east and west Entrance Channel), *Anacropora* spp., and *Seriatopora* spp. have the potential to be ESA-listed species. No *Anacropora* or *Seriatopora* corals were identified during the 2023 surveys. While other coral genera that have one or more species listed under the ESA were observed, none of the ESA-listed species have been documented and are unlikely to occur in Yap or within the project areas (NMFS, 2023). Corals were only identified to genus-level, and it has not been confirmed if any ESA-listed species within those genera are within the proposed project areas. Other coral species are listed in

CITES Appendix II and/or IUCN Red List. However, conservatively assuming that identified *Acropora* spp. within the project sites are ESA-listed species (*A. globiceps, A. lokani, A. retusa, A. speciosa, or A. tenella*), impacts from dredging, dredge disposal, land reclamation/stockpiling, pile driving and pile removal, and wharf expansion would be expected to be long-term, adverse, and significant. However, with implementation of avoidance, minimization, and BMPs, and implementation of mitigation measures to be developed through the marine species consultation process, adverse impacts could be reduced.

**Table 3-14 ESA-Listed Coral Species Potentially Occurring Within or Very Near Proposed Project Sites**

| *Coral Genus/ Species* | *Existing Wharf Improvement Site* | *Proposed Wharf Extension Site* | *Turning Basin* | *Proposed Rull Offload Site* | *Land Reclamation/ Nungoch Stockpile Site* | *Waneday Channel Entrance - East Dredge Site* | *Waneday Channel Entrance - West Dredge Site* |
|---|---|---|---|---|---|---|---|
| *Acropora* sp. | — | — | X | — | X | X | X |
| *Alveopora* sp. | — | — | — | — | — | X | — |
| *Anacropora* sp. | — | — | — | — | — | — | — |
| *Astreopora* sp. | — | — | — | — | — | — | — |
| *Favites* sp. | — | — | — | — | — | X | — |
| *Isopora* sp. | — | — | — | — | — | — | — |
| *Millepora* sp. | — | — | — | — | — | — | — |
| *Montipora* sp. | — | — | X | X | X | — | X |
| *Pavona* sp. | — | — | — | — | — | X | X |
| *Pectinia* sp. | — | — | — | — | — | — | — |
| *Pocillopora* sp. | — | — | — | — | — | — | X |
| *Porites* sp. | — | X | — | — | — | X | X |
| *Seriatopora* sp. | — | — | — | — | — | — | — |
| *Stylophora* sp. | — | — | — | — | — | X | — |
| **Total Special Status Genera Recorded** | **0** | **1** | **2** | **1** | **2** | **6** | **5** |

Source: NAVFAC Pacific, 2023; NMFS, 2023.

#### 3.4.2.3.2.3.5 Special Status Benthic Invertebrates

Short-term, less than significant, adverse impacts on invertebrate species would be expected during Seaport and wharf construction activities, dredging/stockpiling, and ATON replacement associated within the project footprint and habitat loss and/or alteration and turbidity and sediment deposition. Impacts are expected to be the same as those described in Section 3.4.2.3.2.2.5.

#### 3.4.2.3.3 Post-Construction Impacts

The analysis below has determined that during the post-construction period, the project would have a less than significant adverse impact on marine biological resources. Mitigation measures would be implemented to offset adverse impacts, as appropriate.

Operations at the airport would continue as they are currently ongoing, but with an approximate increase of 2.71 average annual day flight operations (takeoffs and landings) due to the increased aircraft activity during training exercises. Existing policies, procedures, and protocols would ensure that impacts to the marine environment from refueling or other post-construction activities would remain negligible.

The Preferred Alternative would result in Seaport improvements that would enable dual-use operations (i.e., military and commercial) without interfering with normal commercial Seaport operations. As a result, there would be a minor increase in vessel traffic from the Preferred Alternative. It is anticipated that the Navy would move only one ship at a time, and that proposed training exercises would consist of approximately one vessel visiting the Seaport per year for HADR or logistics training, with visits lasting one to two weeks.

##### 3.4.2.3.3.1 Marine Vegetation

Long-term, less than significant, adverse impacts on marine vegetation would be anticipated during the post-construction period. After construction, no permanent change in shading or water quality is expected beyond the immediate footprint of installed structures at the Seaport. While the wharf extension and access pier potentially overlap an area where trace seagrass was identified in the 2023 survey, there are numerous areas of high (greater than 40 percent coverage) seagrass presence located to the east and south of the Seaport (Table 3-4 and Figure 3-9). The relatively small structure footprint would not appreciably diminish the overall quantity of seagrass habitat in the area. Routine vessel traffic may cause minor episodic turbidity during maneuvering in shallow areas but would not measurably affect growth or distribution of marine vegetation.

##### 3.4.2.3.3.2 Marine Wildlife

###### 3.4.2.3.3.2.1 Marine Mammals

Marine mammals are considered special status species and are discussed in Section 3.4.2.3.3.1.

###### 3.4.2.3.3.2.2 Sea Turtles

Sea turtles are protected under the ESA and discussed in Section 3.4.2.3.3.2.

###### 3.4.2.3.3.2.3 Fish

There would be long-term, less than significant, adverse impacts from routine vessel operations and increased Seaport activity may incrementally increase turbidity from propeller wash and wake. Such effects are within the range already experienced in the ROI. As with other mobile species, fish would be expected to avoid vessels and may exhibit temporary behavioral response. Given the abundance of habitat in the area, important behaviors such as fish spawning are not likely to differ meaningfully. Long-term, adverse impacts on fish would be less than significant overall.

#### 3.4.2.3.3.2.4 Coral

There would be long-term, less than significant, adverse impacts from the mooring dolphin and 460 ft wharf extension. These additions would not measurably alter sediment regimes at coral locations. While the wharf extension and mooring dolphin would introduce long-term shading structures, the footprint would be small in relation to the available habitat, and nearby habitat consists of only low or trace coral coverage, so long-term adverse impacts would be expected to be less than significant.

#### 3.4.2.3.3.2.5 Benthic Invertebrates

There would be long-term, less than significant, adverse impacts following the construction period and dredging operations. It is anticipated that existing communities would habituate to new structures and ongoing vessel activity similar to ambient conditions, while some would colonize the new pile surfaces and or make use of the ample adjacent benthic habitats.

### 3.4.2.3.3.3 Special Status Species

Impacts on special status species from project post-construction activities (including maintenance) would be similar to the marine wildlife impacts. Special status invertebrates, particularly benthic invertebrates, are not likely to be adversely affected by vessel or aircraft activities. With implementation of agency-standard operational procedures and BMPs discussed in Section 2.8, including biosecurity protocols, pollution prevention and spill response procedures, and vessel operation requirements, post-construction activities under the Preferred Alternative are expected to result in long-term, less than significant, adverse effects to marine special status species.

#### 3.4.2.3.3.3.1 Special Status Marine Mammals

Long-term, less than significant, adverse impacts from occasional training vessel presence and noise and episodic aircraft overflight noise are anticipated. Post-construction activities could cause brief behavioral responses (startle, minor course alteration) in marine mammals. No injury or long-term displacement is expected. It has been documented that aircraft sounds have more energy at lower frequencies, with differing noise levels based on engine types, flight height, speeds, and angles (Erbe et al., 2018). Military post-construction activities would remain within existing operating areas where marine mammals are already habituated to intermittent aircraft and vessel presence and noise. Aircraft post-construction activities under the Preferred Alternative would increase episodically with up to two training events per year, which may involve either or both the Airport and Seaport. Each training event could last 14 days, or a total of up to 28 training days per year, and would typically involve only one vessel of up to 700 ft in length, though any of several other smaller Navy vessels could be involved in training events, depending on the mission Marine mammals in the vicinity of the Airport are already exposed to ongoing aircraft post-construction activities and are expected to be habituated to intermittent aircraft noise; however, the frequency and intensity of aircraft activities may cause short-term, less than significant, adverse, impacts on marine mammal behavior.

Urick (1983, in DoN, 2015) noted that water acts as a sound reflector if the angle of the sound is greater than 13 degrees from the vertical angle of incidence when it hits the surface of the water and that aircraft sound transmitted to water occurs directly below the aircraft. Underwater sound from aircraft overflights has been modeled for some airframes. At 164 ft

above the water, F/A-18 Hornet aircraft overflights produce sound levels that peak at 148 dB re 1 µPa 6 ft below the surface of the water (DoN, 2015). Long-term, less than significant, adverse impacts would occur from increased aircraft and vessel presence and noise, particularly for animals at or near the surface as aircraft are taking off or landing at the Airport. Standard DoW and Navy vessel strike avoidance procedures would be implemented to minimize risk (see Section 2.8). Underwater noise impacts associated with post-construction aircraft training are expected to be short-term and less than significant. Marine mammals have not been documented within the Colonia Harbor and would not be expected to be impacted by potential noise emanating from the east of the Airport across the harbor. While there may be marine mammals transiting along the western coast of the island, the noise levels are not expected to reach harassment levels. Additionally, the angle of the sound waves would likely be much greater than 13 degrees. Operational seaport noise impacts from exercises are expected to be negligible, and additional BMPs or mitigation are not anticipated (ANL, 2026).

#### 3.4.2.3.3.3.2 Special Status Sea Turtles

There would be long-term, less than significant, adverse impacts from lighting and additional Seaport usage. All lighting installed would comply with Unified Facilities Criteria 3-530-01 *Interior and Exterior Lighting Systems* (DOD, 2023a), which requires wildlife-friendly lighting that is fully shielded to direct light downward, uses long wavelength amber or red light sources, and is minimal in intensity using controls like motion sensors and dimmers. Airport lighting would also comply with UFC 3-535-01 *Visual Air Navigation Facilities* (DoD, 2023b), which provides additional standards specific to airfield lighting. By implementing wildlife-friendly standards, complying with Dark Skies guidelines to the extent practicable, and applying BMPs, impacts on sea turtles would be minimized.

Post-construction aircraft overflights and vessel traffic could create an ongoing risk of behavioral disturbance and low probability of vessel strike. Standard DoD, Navy, and NOAA NMFS vessel strike avoidance procedures would be implemented to minimize risk (NOAA Fisheries, 2021a). Effects on sea turtles would be similar to those described for marine mammals. Sea turtles are not expected to experience any adverse effects from in-air aircraft noise. In-water noise would be expected to be intermittent and localized; and adverse impacts would be less than significant with the implementation of standard avoidance procedures and BMPs including vessel operator education and species avoidance measures.

#### 3.4.2.3.3.3.3 Special Status Fish

Impacts to special status species fish are expected to be the same as those described in Section 3.4.2.3.3.2.3.

#### 3.4.2.3.3.3.4 Special Status Coral

Impacts to special status coral are expected to be the same as those described in Section 3.4.2.3.3.2.4.

#### 3.4.2.3.3.3.5 Special Status Benthic Invertebrates

Impacts to special status benthic invertebrates are expected to be the same as those described in Section 3.4.2.3.3.2.5.

#### 3.4.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

##### 3.4.2.4.1 Avoidance, Minimization Measures and Best Management Practices

Avoidance, minimization measures, and BMPs under Alternative 2, are expected to be the same as the Preferred Alternative in Section 2.8.

##### 3.4.2.4.2 Construction Impacts

The analysis below has determined that during the construction period, Alternative 2 would have a significant adverse impact on marine biological resources. Mitigation measures would be implemented to offset adverse impacts, as appropriate.

###### 3.4.2.4.2.1 Marine Vegetation

Construction impacts on marine vegetation under Alternative 2 would be similar to those described for the Preferred Alternative in Section 3.4.2.3.2.1.

The following describes the differences from implementation of Alternative 2 to marine vegetation. There would be no impacts associated with the dredge material offload sites because Alternative 2 does not require dredge material offload site usage. It also does not include offload site dredging and/or land reclamation activities that would occur at Tamil and Rull. Additionally, there would be short- and long-term, less than significant, adverse impacts from placing dredge disposal material on approximately 15.5 acres of sea-floor in the Waneday Channel, which could permanently alter the habitat by placing sediment over any marine vegetation located in the disposal area and temporary increase in turbidity and sediment plume dispersal on surrounding marine vegetation during dredging and disposal activities. While dredge disposal under Alternative 2 was not modeled, plume modeling results of unmitigated dredge disposal (without use of silt curtains) at Rull, Tamil, and Nungoch indicated that the majority of material settles close to the disposal site under both calm and windy conditions and that sediment deposition did not exceed 5 mm beyond approximately 100 m from dredge/disposal areas. It is not expected that there would be substantial sediment deposition that could impact seagrasses in areas outside of those within or immediately adjacent to the in-channel dredge disposal site (NAVFAC, 2026). Further, due to the depth of the channel, it is not likely that much, if any, marine vegetation is supported in the disposal area. Seagrasses are photosynthetic and are typically found in depths of 3 to 9 ft (Smithsonian Institute, 2025) and are typically found in Yap at depths less than 10 ft (McKinzie, et al., 2021). Depths in the center of the channel are typically greater than 100 ft, so it is not likely that substantial marine vegetation would be impacted. Disposal of the dredge material in the deep channel could introduce additional sediment plumes in the Waneday Channel because the material would be reentering the water column for disposal at this location. However, it is expected that the additional sediment plume associated with in-channel disposal would disperse rapidly, as the area is highly energetic and tides and currents would quickly dilute and disperse the sediment plume. Only a small percentage of suspended sediment is likely to settle on the seafloor in the disposal area and adjacent areas as it would be dispersed across a larger area and would eventually settle in much lower concentrations.

Conversely, implementation of Alternative 2 would preclude the need for dredging and in-water dredge disposal and/or land reclamation at the Tamil and Rull offload sites, where the much shallower environments have been documented to support some seagrasses. Accordingly, it would be expected that adverse impacts to marine vegetation would be reduced from the Preferred Alternative levels by implementing Alternative 2.

#### 3.4.2.4.2.2 Marine Wildlife

Construction impacts on marine wildlife under Alternative 2 would be similar to those described for the Preferred Alternative in Section 3.4.2.3.2.2.

The different impacts on marine wildlife from implementation of Alternative 2 would be primarily attributable to the depth of the in-channel disposal site versus that of the Rull and Tamil dredge material offloading/stockpiling sites. The much deeper channel is likely to support less biodiversity than the shallower sites that would be impacted under the Preferred Alternative. The richer, more productive habitats in the shallower areas, where most seagrass and corals tend to thrive would likely support more overall species, including small prey species, which in turn attract the larger species. Therefore, impacts on marine wildlife resulting from Alternative 2 would likely be less relative to the Preferred Alternative.

#### 3.4.2.4.2.3 Marine Special Status Species

Construction impacts on marine special status species under Alternative 2 would be similar to those described for the Preferred Alternative in Section 3.4.2.3.2.3.

Similar to seagrasses, corals in Yap tend to thrive at depths less than 10 ft but reach depths of 30 ft in some places (George, et al., 2008). More recent reports suggest ESA-listed Indo-Pacific corals can reach depths of up to 110 m (NMFS, 2023). Still, it is expected that dredge disposal in the channel would not be likely to directly cover or impact a substantial amount of coral directly. Under Alternative 2 dredging to provide access to unloading/stockpiling at Rull and Tamil would not be necessary, and there would be no effect on corals at those sites. While it is not expected that dredging of coral would be extensive at the Rull and Tamil Stockpile/Offload sites under Alternative 1, incidental or unanticipated take of coral would be less likely in the channel than at those sites, so Alternative 2 would likely have less of an impact on corals in comparison to Alternative 1.

Likewise, marine protected species would generally exhibit the same behavioral and habitat preferences as marine species overall, so it would be less likely to have an adverse effect on marine special status species from in-channel dredge disposal than from disposal near and on shore. Therefore, impacts to marine special status species would be expected to be reduced relative to impacts under the Preferred Alternative. While surveys have not been conducted to identify potential ESA-listed coral species in the channel, it can be reasonably assumed that the likelihood of ESA-listed corals in the channel, which was dredged previously, would be less than the shallow areas for dredge material stockpiling and/or offloading. While *A. globiceps* can occur to 20m depths, it is most common at depths less than 8 meters. *Anacropora spinosa* is not documented nor likely to occur at depths greater than 15 m, so *A. spinosa* would not be likely to inhabit unsurveyed areas (>15 m) in the channel. *A. lokani* and *A. retusa* commonly occur at greater depths (up to 50 m) and *Seriatopora aculeata* has a wide range (3-40 m), but because of the lack of exposed natural consolidated hard substrate due to history of substrate

removal (dredging) and light limitations due to depth and/or turbidity, the area provides low-quality, marginal habitat that is unlikely to support long-term colony maturation. Also, as discussed previously, the majority of the suspended dredge material is expected to disperse quickly and sediment deposition beyond the proposed disposal site and immediately adjacent areas (NAVFAC, 2026), so any protected corals that are located within the channel may be less likely to become buried than in the shallow Rull and Nungoch land reclamation areas, where any corals present would almost certainly become smothered and destroyed if not relocated prior to dredge disposal dumping.

#### 3.4.2.4.3 Post-Construction Impacts

The analysis above has determined that during the post-construction period, the project would have the same less than significant adverse impact on marine biological resources. Post-construction impacts on marine vegetation, wildlife, and special status species are expected to be the same as those described in Sections 3.4.2.3.3.1, 3.4.2.3.3.2, and 3.4.2.3.3.3 because post-construction activities would be the same under both alternatives. Mitigation measures would be implemented to offset adverse impacts, as appropriate.

## 3.5 Terrestrial Biological Resources

Terrestrial resources include vegetation and wildlife, both native and non-native, and the habitats in which they occur. For this analysis, terrestrial resources are evaluated in three major categories: vegetation, wildlife, and special status species and areas, which include culturally valued species.

Wetlands, including mangroves and estuarine zone vegetation and wildlife species, are discussed in Section 3.2, Water Resources.

### 3.5.1 Affected Environment

The following discussions provide a description of the existing conditions for the Airport and Seaport terrestrial resources in the ROI. The ROI for terrestrial resources includes the project footprints at both the Airport and Seaport, the Airport-to-Seaport and community roads, and inland dredge disposal and laydown areas, as well as areas that encompass habitats that potentially support wildlife and special status species populations that are not immediately within the project areas but could be impacted by Proposed Action noise from either construction or post-construction activities.

Throughout this section, the first introduction of a plant or wildlife species includes the scientific name, followed by the common and local names, if applicable. Subsequent references use the common name; however, if there is no common name, the shortened scientific name is used.

#### 3.5.1.1 Terrestrial Vegetation

There are 10 vegetation communities present on Yap based on the 2019 U.S. Department of Agriculture vegetation surveys and the 2005 Digital Atlas of Micronesia (USDA, 2019). Vegetation community descriptions were derived from the U.S. Department of Agriculture 1987 mapping and the *Trees of Yap: A Field Guide*, which are included in the 2023 Navy and 2024 DAF survey reports (Appendix I) (USDA, 1987; USDA, 2015).

#### 3.5.1.1.1 Yap International Airport

In 2024, the DAF conducted generalized vegetation surveys based on 2019 Yap vegetation surveys conducted by the U.S. Department of Agriculture and the 2005 Digital Atlas of Micronesia that mapped Yap Island from satellite imagery, computer modeling, and visual interpretation (USDA, 2019; DAoM, 2005). A total environmental survey area of 919 acres was surveyed, which included 406.4 acres of the Airport main project area and 93 acres, including 15.1 acres of potential disturbance area, of road connecting the Airport main project area to the Seaport. Nine vegetation communities were present within the 2024 environmental survey area, eight were mapped within the project area (i.e., Airport main project area and the Airport-to-Seaport road), and six were mapped with the Airport area of disturbance. See Table 3-15 and Figure 3-12.

A mixture of native and non-native vegetation was documented within the Airport environmental survey area. The most common plant species observed included: *Alysicarpus vaginalis* (white moneywort), *Chromolaena odorata* (Jack in the bush; invasive), *Cocos nucifera* (coconut palm/niew), *Desmodium triflorum* (threeflower ticktrefoil), *Euphorbia hypericifolia* (graceful sandmat), *Leucaena leucocephala* (tangantangan/ganinityuwan), *Microsorum scolopendria* (monarch fern), *Mikania scandens* (climbing hempvine), *Morinda citrifolia* (Indian mulberry/ magarwek), *Pandanus tectorius* (thatch screwpine/choi), *Passiflora suberosa* (corkystem passionflower), *Phyla nodiflora* (turkey tangle fogfruit), *Pilea microphylla* (rockweed), *Portulaca oleracea* (common purslane), *Premna serratifolia* (malbau), *Pyrrosia lanceolata* (lanceleaf tongue fern), and *Tridax procumbens* (coat buttons) (PACAF, 2024).

A summary of all plants documented within the 2024 environmental survey area and 2023 Seaport surveys are included in the 2023 Navy and 2024 DAF survey reports (Appendix I).

Within the Airport project area, up to 265.3 acres would be disturbed, which includes the Material Equipment Staging Area (Table 3-16 and Figure 3-14). Vegetation communities that would be impacted include Agroforest, Savanna, Secondary Vegetation, and Upland forest, as well as Barren and Urban Builtup/Cultivated. In addition to construction activities that would occur within the Airport project footprint, there are four project components south of the project footprint (Table 3-15 and Figure 3-12):Earthwork Handling Staging (23.8 acres): 80 percent Savanna vegetation community, with the remainder Agroforest, Secondary Vegetation, and Urban Builtup/Cultivated vegetation communities.

- Office Staging Area (3.6 acres): approximately 67 percent Savanna and 33 percent Agroforest.
- Potential Vegetation Management Area (31.1 acres): approximately 83 percent Savanna, and the remainder Marsh and Barren vegetation communities.
- Worker Camp Offices (2.4 acres): Approximately 50 percent agroforest and 50 percent savanna vegetation communities.

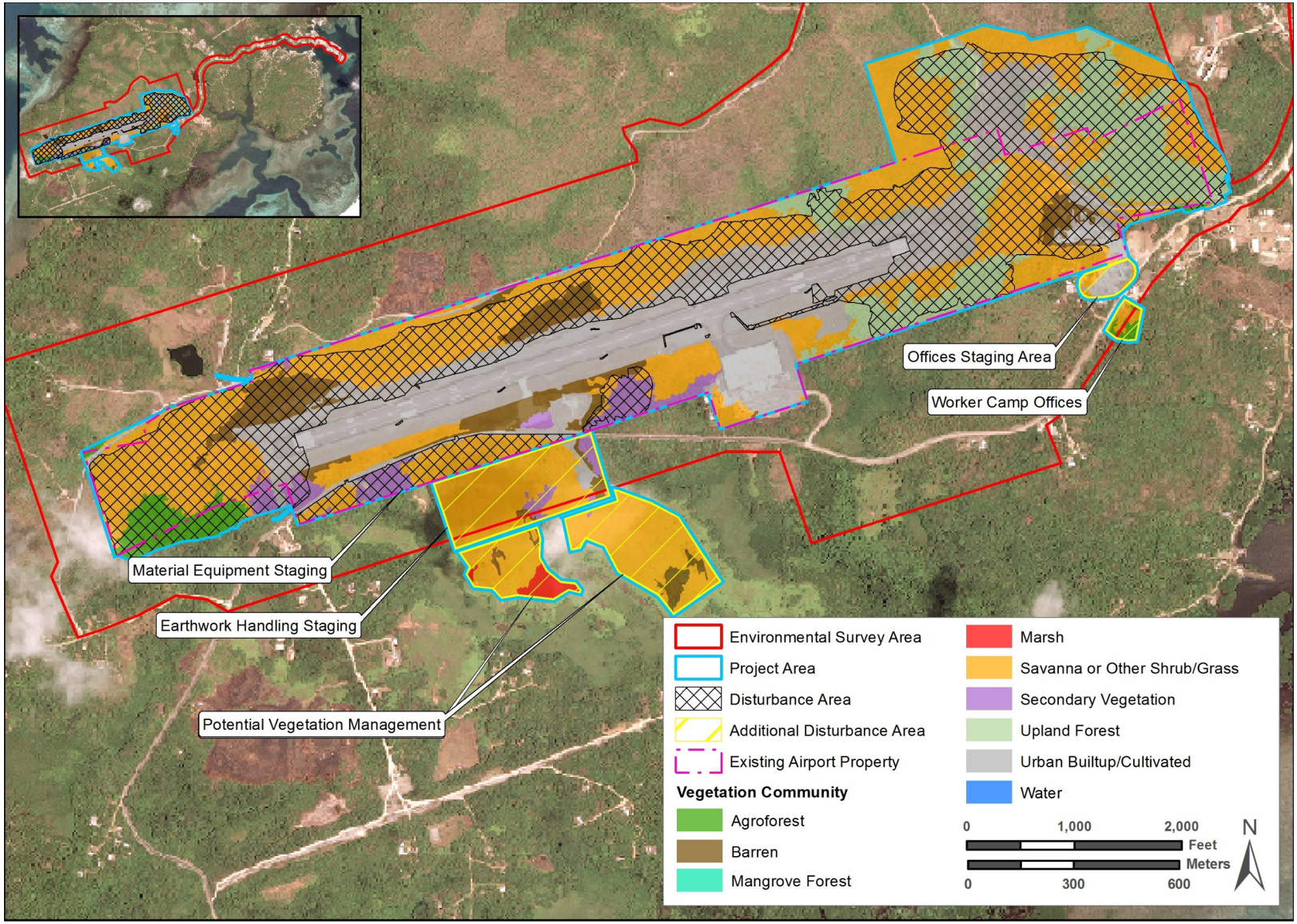
See Section 2.5.1.6 for descriptions and map of these project components.

## Table 3-15 Vegetation Communities within the Airport Environmental Survey and Component Areas (Acres)

| *Vegetation Community* | *Airport Project Area* | *Airport Disturbance Area* | *Earthwork Handling Area* | *Office Staging Area* | *Potential Vegetation Management Area* | *Worker Camp Offices Area* | *Airport-to-Seaport Road* | *Percent of Yap Island Area* |
|---|---|---|---|---|---|---|---|---|
| Agroforest | 8.1 | 9.9 | 0.0 | 0.0 | 0.0 | 1.1 | 1.0 | 0.05 |
| Barren | 24.9 | 17.2 | 1.2 | 0.0 | 2.5 | 0.0 | 0.0 | 0.09 |
| Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | < 0.1 | 0.00 |
| Marsh | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 0.0 | 0.0 | 0.01 |
| Savanna | 171.3 | 122.4 | 19.00 | 1.2 | 25.7 | 1.2 | 0.8 | 0.71 |
| Secondary Vegetation | 12.5 | 9.5 | 2.3 | 0.0 | 0.1 | 0.0 | 1.4 | 0.05 |
| Swamp Forest | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | < 0.1 | 0.00 |
| Upland Forest | 53.4 | 46.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 0.19 |
| Urban Builtup/Cultivated | 136.3 | 60.2 | 1.3 | 2.4 | 0.0 | 0.2 | 11.0 | 0.27 |
| Water | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.00 |
| Total | 406.4 | 265.3 | 23.8 | 3.6 | 31.1 | 2.4 | 15.1 | 1.37 |

**Source**: USDA, 2019; DAoM, 2005; PACAF, 2024

**Key:** < = less than




Basemap: Digital Atlas of Micronesia 2018 Imagery

**Figure 3-12 Vegetation Communities in the Airport Environmental Survey Area and Airport Project Area**

#### 3.5.1.1.2 Yap Seaport

In 2023, the Navy conducted generalized vegetation surveys of approximately 22.9 acres around the Seaport and 13,759 LF along either side of the existing road along Chamorro Bay (NAVFAC Pacific, 2023). The 22.9-acre Seaport consists of seven vegetation communities. The Seaport area was predominantly mapped as Urban Builtup, with Secondary Vegetation and Coastal Vegetation the next biggest classes, accounting for approximately 87 percent of the project area. Vegetation community descriptors are based on the classifications described in the *Trees of Yap: A Field Guide* (USDA, 2015). The 13,759 LF surveyed of Chamorro Bay consisted of the six vegetation communities with the predominant community being Urban Builtup. See Table 3-16 and 3-17 and Figure 3-13 and 3-16.

**Table 3-16 Vegetation Communities within the Seaport Survey Area**

| *Vegetation Community* | *Acres of Seaport Survey Area* | *Percent of Seaport Seaport Area* |
|---|---|---|
| Coastal Mixed | 2.31 | 10.1 |
| Mangrove Forest | 0.00 | 0.0 |
| Potential Coastal Wetland | 0.07 | 0.3 |
| Secondary Vegetation | 2.32 | 10.1 |
| Urban Builtup | 15.20 | 66.4 |
| Urban Cultivated –Food | 0.35 | 1.5 |
| Urban Cultivated–Ornamental | 1.56 | 6.8 |
| Water | 1.08 | 4.7 |
| **Totals** | **22.89** | **100.0** |

Source: NAVFAC Pacific, 2023

**Table 3-17 Vegetation Communities within the Chamorro Bay Survey Area**

| *Vegetation Community* | *Linear Feet* |
|---|---|
| Urban Builtup | 5,943.2 |
| Agroforest | 1,137.4 |
| Coastal Mixed | 2,127.1 |
| Urban Cultivated–Ornamental | 2,642.3 |
| Urban Cultivated –Food | 985.1 |
| Mangrove Forest | 923.8 |
| **Totals** | **13,758.9** |

**Source**: NAVFAC Pacific, 2023

Urban areas that are built-up within the Seaport consist of mostly impervious surfaces with no vegetation such as buildings and roads. When there is vegetation present, it is composed of maintained grass, herbaceous weeds, and other grasses growing within cracks in the concrete or gravel. Within the Secondary Vegetation community, common species typically included *Ipomoea pes-caprae* (morning glory vine), *Mimosa invisa* (giant sleeping grass), and *Sphagneticola trilobata* (wedelia). Other herbaceous forbs and grasses may also be present. The Urban Cultivated–Ornamental Vegetation community was mapped around several Yap Government buildings in the Seaport. This vegetation community was planted as landscape and is actively cultivated with ornamental species such as *Alpinia purpurata* (red ginger), *Bambusa* sp. (bamboo), *Bougainvillea* sp. (bougainvillea), *Cordyline* sp. (ornamental red ti), and *Plumeria* sp. (plumeria). The Urban Cultivated–Food vegetation community was also mapped around Yap

Government buildings in the Seaport. Species in this vegetation community include *Areca catechu* (betel nut), *Artocarpus altilis* (breadfruit/thow), *Citrus* sp. (citrus), coconut palm, *Mangifera indica* (mango), and *Musa* sp. (banana). Coastal mixed occurs throughout the Seaport, with most of the acreage occurring along Colonia Harbor. This vegetation community includes native and non-native coastal species including *Barringtonia asiatica* (mango pine), *Casuarina equisetifolia* (ironwood), *Hibiscus tiliaceus* (sea hibiscus), morning glory vine, and thatch screwpine (NAVFAC Pacific, 2023).

#### 3.5.1.1.2.1 Dredge Disposal and Laydown Area

There are three proposed dredge disposal areas; one each at Tamil, Rull, and Nungoch described below. Additionally, Nungoch has a land reclamation component that would use some dredge disposal materials. There are also multiple laydown areas: four at Chamorro Bay and three at the Yap Sports Complex. See Figure 3-15 for locations.

**Tamil Dredge Material Stockpile Area.** The Tamil dredge disposal area is a 2.6-acre stockpile site located approximately one mile northeast and upland of the Tamil offloading area. This site is designated to receive and store up to 74,000 CY of dredged material from seaport dredging activities from the east side of the channel entrance and dredging activities that would be necessary to create adequate depth to berth the dredge barge at the Tamil offloading site. A survey of the wharf and Tamil dredge stockpile area, as well as the road connection the two areas, was conducted in September 2025.

Wharf vegetation consisted of a few small mangroves, *Scaevola taccada* (half-flower/thoth), and a few unidentified shrubs. Indian mulberry, citrus trees, *Codiaeum variegatum* (croton), coconut, *Cordyline fruticose* (Hawaii ti), and a *Spondias mombin* (hogplum) were documented at the entrance to the material stockpile site; however, the stockpile site itself is predominantly disturbed with a few ironwood and *A. auriculiformis* (earleaf acacia) trees. Several common species, including crotons, betel nut, *Swietenia mahagoni* (big leaf mahogany), mango, breadfruit, and coconut trees, were documented along the road between the wharf and Tamil stockpile area (DAF, 2025b).

There were 101 birds from 7 species, as well as 11 *Pteropus pelewensis yapensis* (Yap flying fox/maagul'aew), documented during the September surveys. Species documented included *Aplonis opaca* (Micronesian starling), *Gygis alba* (white tern), *Myzomela rubratra* (Micronesian myzomela), *Pampusana xanthonura* (white-throated ground dove), *Rhipidura versicolor* (Micronesian rufous fantail), *Zosterops hypolais* (plain white-eye), and *Zosterops oleagineus* (Yap greater white-eye) (DAF, 2025b).

**Rull Dredge Material Stockpile Area.** The Rull dredge disposal area is a 1.5-acre stockpile site in Rull along the Seaport project shoreline that is designated to receive and store up to 29,100 CY of dredged material from seaport dredging activities from the west side of the channel entrance.

**Nungoch Dredge Material Land Reclamation Area.** The Nungoch land reclamation area is a 2.2-acre site at the southwestern tip of the Nungoch peninsula that is designated to receive up to 26,000 CY of dredged material from seaport dredging activities occurring in the turning basin. The upland areas are largely disturbed or considered Urban Builtup with the Urban Cultivated–Ornamental Vegetation Type growing around the urbanized areas. Species present are similar to those described for the Seaport project area (Figure 3-12).




**Figure 3-13 Vegetation Communities, Wildlife, and Special Status Species in the Yap Seaport Project Area**

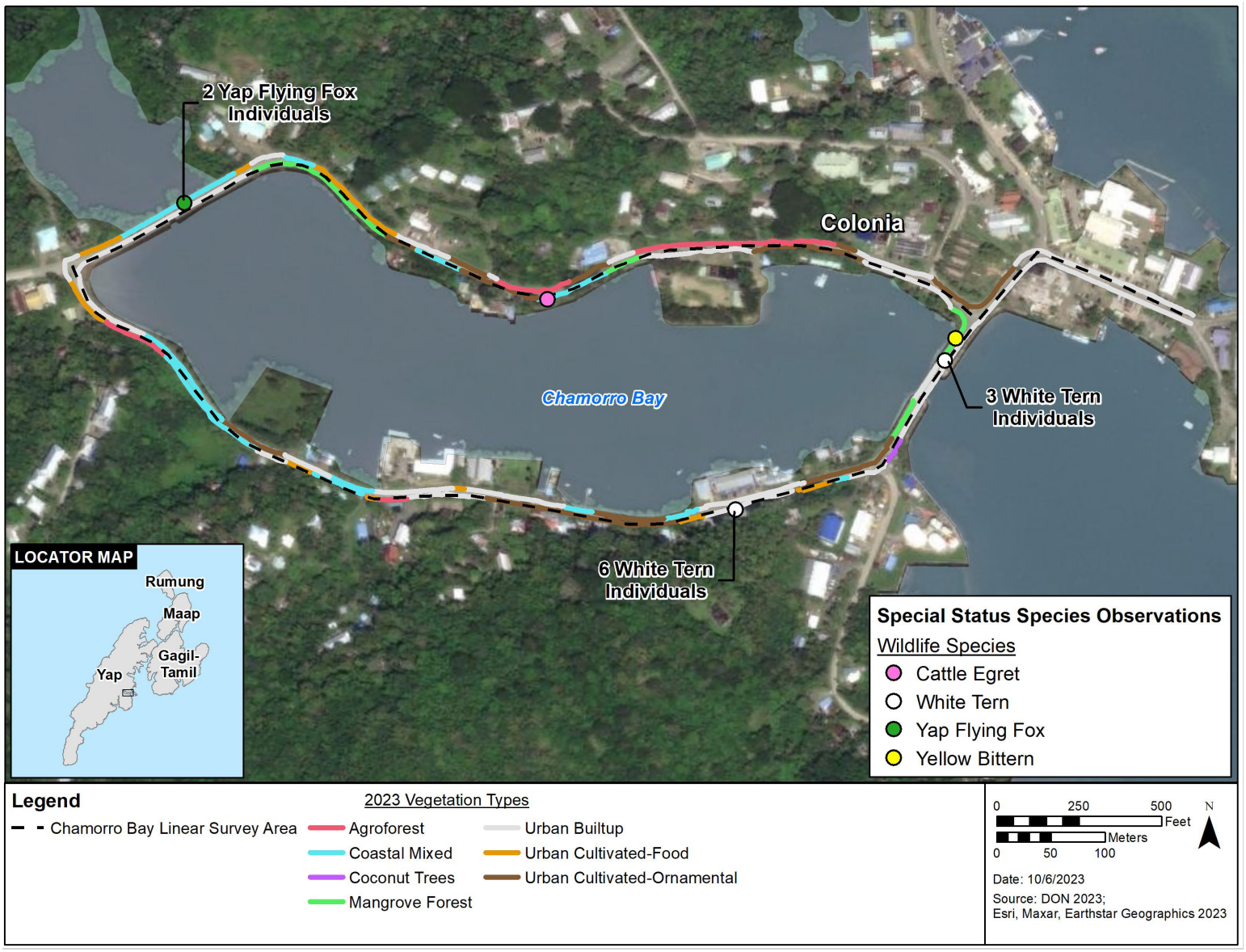



**Figure 3-14 Vegetation Communities, Wildlife, and Special Status Species documented in the Chamorro Bay Survey Area**

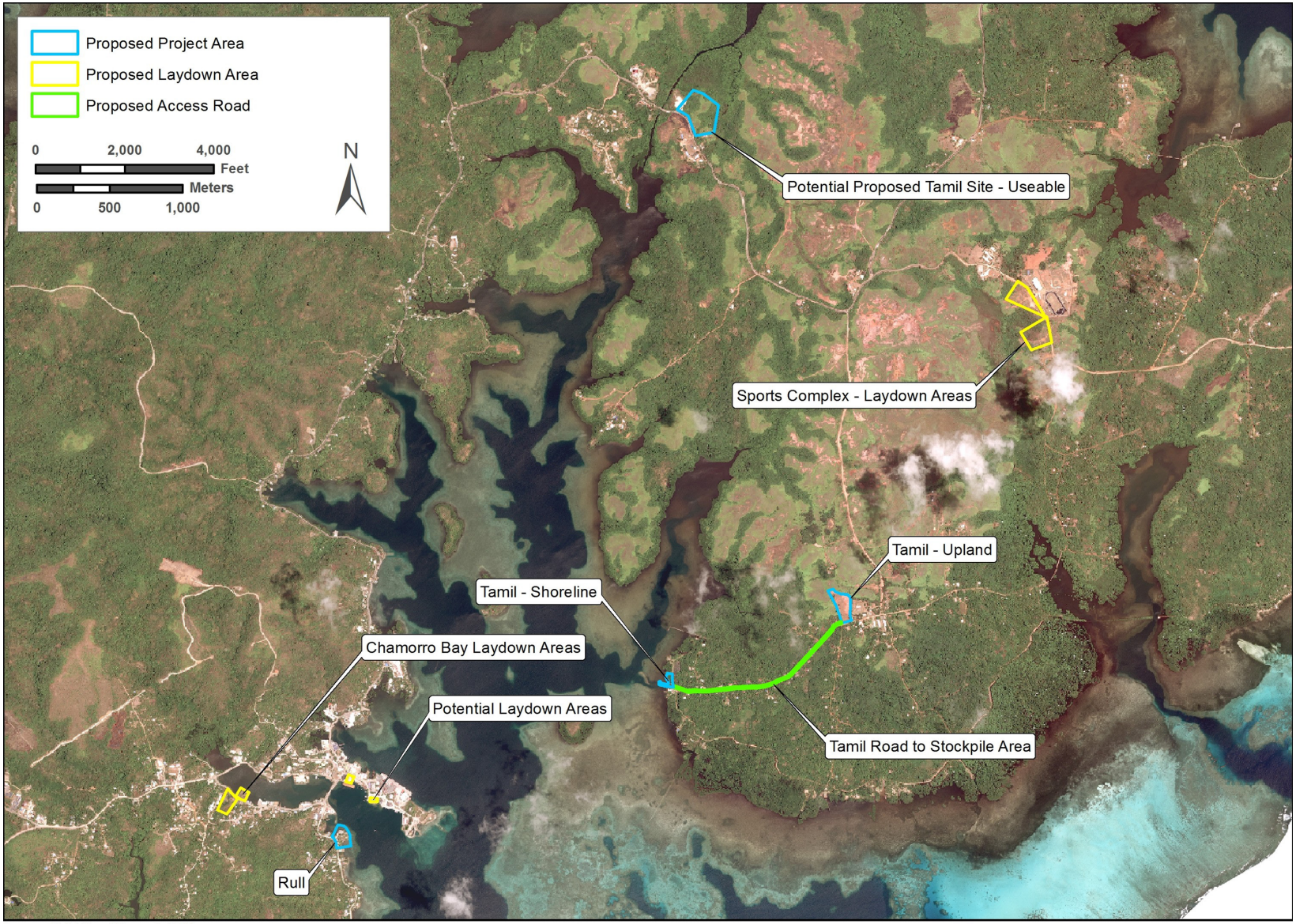



**Figure 3-15 Dredge Disposal and Laydown Areas**

### 3.5.1.2 Terrestrial Wildlife

There have been 127 non-special status wildlife species either documented on or with the potential to occur on Yap. Species include 7 mammals; 89 migratory, endemic, or introduced birds; 18 reptiles and amphibians; and 13 invertebrates. Of the 127 known or suspected non-special status species, 11 are known to be invasive. See Table 3-18 for a complete list of non-special status wildlife species known to have been documented on Yap (Avibase, 2025; Buden, 2009; Buden, 2010; Buden, 2011; Buden, 2013; iNaturalist, 2025a; iNaturalist, 2025b; iNaturalist, 2025c; iNaturalist, 2025d).

A total of 21 non-special status wildlife species were documented during the 2024 Airport surveys. Wildlife species documented included: two mammals *Canis familiaris* (domestic dog, feral), *Felis catus* (domestic cat, feral); six migratory birds, *Anous stolidus* (brown noddy), Micronesian starling, *Egretta garzetta* (little egret), white tern, *Botaurus sinensis* (yellow bittern), and the *Pluvialis fulva* (Pacific golden plover); one native bird Micronesian myzomela; two introduced birds *Gallus gallus* (red junglefowl) and *Passer montanus* (Eurasian tree sparrow); four reptiles and amphibians *Carlia ailanpalai* (curious skink), *Lamprolepis smaragdina* (emerald tree skink), *Rhinella marina* (cane toad), and *Varanus indicus* (monitor lizard); and six invertebrates *Agrionoptera insignis* (grenadier), *Hypolimnas bolina* (great eggfly), *Neurothemis terminata* (straight-edge red parasol), *Orthetrum serapia* (green skimmer), *Papilio polytes* (common Mormon swallowtail), and the *Tuerkayana hirtipes* (Pacific land crab) (PACAF, 2024).

An additional six non-special status wildlife species were documented during the 2023 Seaport project area and Chamorro Bay surveys. These species documented at the Seaport included: *Ardea intermedia* (intermediate egret), *Bubulcus ibis* (cattle egret), *Charadrius leschenaultii* (greater sand-plover), white tern, yellow bittern, and the Pacific golden plover (NAVFAC Pacific, 2023). Additionally, the Pacific reef heron (*Egretta sacra*) was observed outside the survey area along the Colonia roadways and migratory species, such as *Tringa nebularia* (common greenshank) and *Pluvialis* sp., were observed within the survey area after the 2023 Seaport survey. This suggests that more bird species than were documented during the 2023 Seaport surveys may frequent the Yap Port and Tamil Harbor areas (NAVFAC Pacific, 2023).

### 3.5.1.3 Special Status Species

Through dialogue between DoW and Yap/FSM officials, special status terrestrial species were identified for purposes of this NEPA analysis. These species may occur in the ROI and include species that are listed under the FSM ESA of 1975 (FSM Code, Title 23, Chapter 3), the ESA of 1973 (16 U.S. Code 1531-1544), Yap Species of Concern (SOC), Yap culturally valued species, species listed on the IUCN red list, and threatened and endangered CITES species. It is recognized that certain species are of high value to the people of FSM and Yap from a protective natural or cultural resources view even though they have not been given legal protective status by any governmental authority. Altogether, these species have been considered in the analysis in this document. There is the potential for 32 special status species to be in or around the Airport and Seaport project areas which includes road improvement projects, dredge disposal areas, and laydown areas based on either habitat preferences described in Table 3-19 or suspected occurrence within the FSM. There were 11 special status species documented on or near the Airport and Seaport project areas during the 2023 and 2024 environmental surveys, or during surveys conducted of the wharf, Tamil dredge disposal

stockpile area, and the road connecting the two areas. Species documented included 3 plants, 1 mammal, 6 birds, and 1 invertebrate (Table 3-19, Figure 3-13, Figure 3-14 and Figure 3-16). During Seaport surveys, there were incidental observations of the white-throated ground dove and Yap monarch (*Monarcha godeffroyi*) outside the survey area along the Colonia roadways, which suggests that more bird species than were documented during the Seaport surveys may frequent the Yap Port and Tamil Harbor areas (NAVFAC Pacific, 2023). Additionally, there are two special plant species discussed in Section 3.5.1.3.1 and three special status bird species discussed in Section 3.5.1.3.3, which were not documented during surveys conducted in support of the Proposed Action. These species are included in ongoing consultation between the DoW and Yap State.

#### 3.5.1.3.1 Special Status Species Plants

***Cycas micronesica* (cycad/faltir)**: Cycads are a federally threatened endemic species to Yap. Cycads are typically unbranched trees with a thick trunk that can grow 26 to 39 ft tall. This species does not flower but produces male and female cones on separate trees. On Guam, Rota, and Palau, cycads are threatened by the invasive *Aulacaspis yasumatsui* (aulacaspis scale) (Bösenberg, 2022). In 2015, the USFWS estimated Yap had an estimated total of approximately 288,450 cycads across three populations (DOI, 2015). While the aulacaspis scale has not been documented on Yap, a 2023 USFWS cycad species assessment applied the known Guam and Rota 8.1 percent rate of decline to the 2015 total, resulting in an estimated approximately 136,000 cycad individuals between Yap and Palau (USFWS, 2023). In 2016, a forest inventory conducted by the U.S. Forest Service estimated there were approximately 1,236 individuals across FSM (USDA, 2025). The USFWS lists the cycad as threatened and there is no associated critical habitat (DOI, 2015) and IUCN lists this species as endangered with a decreasing population trend (Bösenberg, 2022). Cycads are considered culturally valued because historically this species was used as a food source, a marker, and for medicine (DAF, 2026). Two cycads were documented during the 2024 Airport surveys; one cycad was documented within the Airport project footprint disturbance area and one in Rull (Figure 3-16) (PACAF, 2024).

***Dioscorea nummularia* (Pacific yam/thap)**: The introduced Pacific yam is a climbing perennial vine that produces twining stems annually from a tuberous rootstock. The species is cultivated throughout Micronesia as a food source and grows best in well-draining, sandy loam soil (UTPD, 2014). The IUCN considers the Pacific yam to be near threatened with a decreasing population due to deforestation, expanding human settlements, and associated agriculture (Omosowon and Kell, 2019). Eight Pacific yams were documented during the 2024 Airport surveys; three Pacific yams were documented within the Airport project footprint disturbance area and one within the Worker Camp Offices Area (Figure 3-16) (PACAF, 2024).

***Drypetes yapensis* (tuyama)**: The Yap endemic *D. yapensis* is a shrub to medium-sized tree with simple and shallowly serrated leaves that taper at the tip (USDA, 2015). There are no population estimates available for this species and little known about its distribution, other than it is found in native vegetation (Oldfield, 2024); however, in 2016, 142,308 individuals were estimated to be present in lowland rainforests across FSM (USDA, 2025). The IUCN considers *D. yapensis* to be critically endangered with a decreasing population due to its limited range (less than 100 square kilometers), agriculture, deforestation, expanding human

settlements, typhoons, and wildfires (Oldfield, 2024). No D. yapensis individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas.

***Pterocarpus indicus* (rosewood/lach)**: The Yap rosewood native to the Caroline islands (USDA, 2015), is a tall tree that can grow up to 120 ft tall with a stout, buttressed trunk and is most commonly found along coasts, rocky shores, and tidal creeks, but can also be found in uplands and savannas (USDA, 2015). Yap population estimates for rosewood are not available; however, in 2016, rosewood trees were estimated to make up approximately 6.9 percent off the Yap forest canopy and there were estimated to be 95,939 rosewoods across FSM (USDA, 2025). The IUCN considers the rosewood to be endangered due to deforestation, expanding human settlements, and associated agriculture with a decreasing population due to logging and wood harvesting (Barstow, 2018). Rosewood trees are considered culturally valued because these trees are important in canoe and building material, and medicine; additionally, this species is considered "premium" furniture material in other areas where it is found (DAF, 2026). Two rosewood trees were documented during the 2024 Airport surveys, and three rosewood trees were documented during 2023 Seaport surveys (Figure 3-13 and Figure 3-16) (PACAF, 2024; NAVFAC Pacific, 2023).

***Swetinia machrophylla* (big leaf mahogany)**: The introduced big leaf mahogany is a large, straight tree that can grow up to 120 feet tall with a 6-foot trunk and pinnate compound leaves. This species is considered naturalized to Yap (USDA, 2015). There are no population estimates available for Yap. The IUCN considers the big leaf mahogany to be endangered with a decreasing population due to habitat loss, logging, and forest conversion (Barstow and Negrão, 2023). Big leaf mahogany trees are considered culturally valued because these trees are a good wood source (DAF, 2026). No individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas.

## Table 3-18 Wildlife Species with the Potential to Occur on or Near the Project Areas

| *Scientific (common, local)* | *Origin** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| **Mammals** | | | |
| *Canis familiaris* (domestic dog, feral) | INV | Forests, grasslands, wetlands, urban areas | Yes[1]/Likely |
| *Felis catus* (domestic cat, feral) | INV | Forests, grasslands, wetlands, urban areas | Yes[1]/Likely |
| *Mus musculus* (house mouse) | INV | Forests, grasslands, wetlands, urban areas | No/Likely |
| *Rattus exulans* (Polynesian rat) | INV | Forests, grasslands, wetlands, urban areas | No/Likely |
| *Rattus norvegicus* (brown rat) | INV | Forests, grasslands, wetlands, urban areas | No/Likely |
| *Rattus rattus* (black rat) | INV | Forests, grasslands, wetlands, urban areas | No/Likely |
| *Sus scrofa* (wild boar) | INV | Forests, grasslands, wetlands, agricultural land | No/Likely |
| **Birds** | | | |
| *Actitis hypoleucos* (common sandpiper) | END | Fresh and saltwater wetlands, coastlines, estuaries | No/Likely |
| *Acrocephalus syrinx* (Caroline reed warbler) | END | Forests, marshes, dense wetlands, mangroves, and grasses | No/Possible |
| *Aerodramus inquietus* (Caroline Islands swiftlet) | M | Caves, cliffs, lowland sub-tropical and tropical forests, man-made structures | No/Possible |
| *Amaurornis phoenicurus* (white-breasted waterhen) | M | Fresh water bodies, mangroves, grasslands, marshes, swamps, farmlands | No/Possible |
| *Anas acuta* (northern pintail) | M | Wetlands, grasslands, coastal marshes, lakes, flooded agricultural fields | No/Possible |
| *Anas crecca* (green-winged teal) | M | Mudflats, marshes, ponds, pools, shallow streams and lakes | No/Possible |
| *Anous minutus* (black noddy) | M | Atolls, coastal areas, rocky islands, cliffs | No/Likely |
| *Anous stolidus* (brown noddy) | M | Rocky cliffs, tropical and subtropical islands, coral reef areas | Yes[1]/Likely |
| *Anthus cervinus* (red-throated pipit) | M | Marshlands, mountains, grassy areas, wetlands, agricultural fields | No/Unlikely |
| *Aplonis opaca* (Micronesian starling) | END | Subtropical and tropical lowland and dry forest, coastal areas | Yes[1,3]/Likely |
| *Apus pacificus* (Pacific swift) | M | Cliffs, caves, natural rock crevices, coastal areas, vertical man-made structures | No/Unlikely |
| *Ardea alba* (great egret) | M | Lakes, ponds, streams, fresh and saltwater marches, mud flats, wetlands | No/Possible |
| *Ardea cinerea* (gray heron) | M | Wetlands, estuaries, rivers, lakes, coastal areas, marshes | No/Possible |
| *Ardea intermedia* (intermediate egret) | M | Wetlands, riverbanks, marshes, swamps, flooded fields | Yes[2]/Likely |
| *Ardenna pacifica* (wedge-tailed shearwater) | M | Pelagic waters, offshore islands, atolls | No/Possible |
| *Ardenna tenuirostris* (short-tailed shearwater) | M | Coastal waters, coastal vegetation, grasslands | No/Possible |
| *Aythya fuligula* (tufted duck) | M | Slow rivers, ponds, lakes, thick vegetation, coastal areas | No/Possible |
| *Aythya marila* (greater scaup) | M | Coastal bays, lakes, estuaries | No/Possible |
| *Botaurus cinnamomeus* (cinnamon bittern) | M | Wetlands, marshes, flooded fields and meadows | No/Unlikely |
| *Botaurus sinensis* (yellow bittern) | M | Swamps, marshes, wetlands, dense vegetation, reed beds | Yes[1,2]/Likely |

| *Scientific (common, local)* | *Origin*[*] | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| *Bubulcus ibis* (cattle egret) | M | Livestock-grazing areas, grasslands, meadows, shallow marshes | Yes[2]/Likely |
| *Butastur indicus* (gray-faced buzzard) | M | Paddy fields, woodlands, grasslands, streams, marshes | No/Unlikely |
| *Butorides striata* (striated heron) | M | Mangroves, coastal wetlands, riverbanks, estuaries | No/Possible |
| *Calidris alba* (sanderling) | M | Mudflats, beaches, lagoons, rocky intertidal areas, coastal areas | No/Possible |
| *Calidris pugnax* (ruff) | M | Wet meadows, marshes, grasslands, mudflats | No/Possible |
| *Calidris subminuta* (long-toed stint) | M | Freshwater wetlands, swamps, grassy bogs | No/Possible |
| *Charadrius alexandrinus* (Kentish plover) | M | Coastal areas, saline lakes, lagoons, marshes, dunes | No/Unlikely |
| *Charadrius dubius* (little ringed plover) | M | Shores, lakes, ponds, gravel areas near freshwater, coastal lagoons, salt flats | No/Possible |
| *Charadrius leschenaultii* (greater sand-plover) | M | Mud and clay flats, rocky plains, cultivated areas | Yes[2]/Likely |
| *Chlidonias hybrida* (whiskered tern) | M | Freshwater wetlands, rivers, lakes, marshes, flooded salt marshes, swamps | No/Likely |
| *Chlidonias leucopterus* (white-winged tern) | M | Lakes, freshwater marshes, freshwater swamps, rivers, lagoons, coastal waters | No/Possible |
| *Chroicocephalus ridibundus* (black-headed gull) | M | Marshes, reed beds, coastal areas, agricultural fields, wetlands, urban areas | No/Possible |
| *Columba livia* (rock pigeon) | INT | Urban areas, rocky cliffs and ledges | No/Possible |
| *Cuculus optatus* (Oriental cuckoo) | M | Coniferous and deciduous forests, open woodlands | No/Possible |
| *Edolisoma monacha* (Palau cicadabird) | M | Tropical and subtropical lowland forests, shrubland, savannah | No/Possible |
| *Egretta garzetta* (little egret) | M | Coastal areas, lagoons, wetlands, inland freshwater bodies | Yes[1]/Likely |
| *Egretta sacra* (Pacific reef-heron) | M | Lagoons, sand beaches, coral reef areas, mangroves | No/Likely |
| *Eurystomus orientalis* (dollarbird) | M | Rivers, streams, wetlands, open wooded areas, savannahs | No/Possible |
| *Falco peregrinus* (Peregrine falcon) | M | Coastal areas, grasslands, meadows, shrublands | No/Possible |
| *Fregata ariel* (lesser frigatebird) | M | Tropical and subtropical waters, coastal areas, mangroves | No/Possible |
| *Fregata minor* (great frigatebird) | M | Mangroves, Tropical and subtropical islands, open waters | No/Likely |
| *Gallinula chloropus* (Eurasian moorhen) | M | Ponds, lakes, marshes, canals, urban areas | No/Unlikely |
| *Gallinago megala* (Swinhoe's snipe) | M | Freshwater wetlands, forest glades, meadows, paddy fields | No/Possible |
| *Gallus gallus* (red junglefowl) | INT | Tropical and subtropical forests, forests, mangroves, agricultural fields | Yes[1]/Likely |
| *Glareola maldivarum* (Oriental pratincole) | M | Grasslands, agricultural fields, marshes | No/Possible |
| *Gygis alba* (white tern) | M | Coastal area, open waters, woodlands | Yes[1,2,3]/Likely |
| *Himantopus himantopus* (black-winged stilt) | M | Ponds, lakes, fresh and saltwater wetlands, coastal lagoons, flooded fields | No/Possible |
| *Himantopus leucocephalus* (pied stilt) | M | Wetlands, marshes, mudflats, coastal lagoons, flooded fields | No/Possible |
| *Himantopus mexicanus* (black-necked stilt) | M | Marshes, ponds, mudflats, flooded fields, man-made wetlands | No/Possible |

| *Scientific (common, local)* | *Origin** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| *Hirundo rustica* (barn swallow) | M | Open spaces, farmlands, urban areas | No/Likely |
| *Lonchura punctulata* (scaly-breasted munia) | INT | Grasslands, tropical plains, paddy fields, scrublands, agricultural fields | No/Likely |
| *Mareca penelope* (Eurasian wigeon) | M | Flooded fields, swamps, lakes, estuaries, bays, lagoons | No/Possible |
| *Microcarbo melanoleucos* (little pied cormorant) | M | Coastal areas, estuaries, freshwater lakes, rivers, inland waters | No/Unlikely |
| *Motacilla cinerea* (gray wagtail) | M | Rivers, streams, canals, mad-made moving watercourses, urban areas | No/Possible |
| *Motacilla tschutschensis* (Eastern yellow wagtail) | M | Wet meadows, open areas near water | No/Possible |
| *Muscicapa griseisticta* (gray-streaked flycatcher) | M | Forests, urban areas, grasslands, shrublands | No/Unlikely |
| *Myzomela rubratra* (Micronesian myzomela) | END | Mangroves, forests, urban areas, scrublands | Yes[1,3]/Likely |
| *Numenius phaeopus* (whimbrel) | M | Coastal areas, saltmarshes, beaches, moors | No/Likely |
| *Nycticorax nycticorax* (black-crowned night heron) | M | Fresh and saltwater wetlands, lakes, marshes, swamps, rivers | No/Possible |
| *Onychoprion fuscatus* (sooty tern) | M | Coastal areas, open waters, rocky offshore islands, coral areas | No/Likely |
| *Onychoprion lunatus* (gray-backed tern) | M | Coastal areas, rocky offshore islands, shorelines, tidepools | No/Possible |
| *Pandion haliaetus* (osprey) | M | Coastal areas, lakes, rivers, salt marshes, mangroves, swamps | No/Possible |
| *Passer montanus* (Eurasian tree sparrow) | INT | Farmlands, gardens, orchards, urban areas | Yes[1]/Likely |
| *Phaethon lepturus* (white-tailed tropicbird) | M | Sea cliffs, offshore rocky islands, subtidal reefs, subtidal rocky areas | No/Likely |
| *Phalacrocorax carbo* (great cormorant) | M | Large rivers, coastal areas, estuaries, wetlands, inshore waters | No/Unlikely |
| *Pluvialis fulva* (Pacific golden plover) | M | Mudflats, coastal areas, beaches, agricultural fields | Yes[1,2]/Likely |
| *Poliolimnas cinereus* (white-browed crake) | M | Mangroves, grasslands, marshes, reed beds | No/Likely |
| *Pseudobulweria rostrata* (Tahiti petrel) | M | Forest, tropical and subtropical lowlands, sandy shores | No/Unlikely |
| *Puffinus bailloni* (tropical shearwater) | M | Coastal areas, rock cliffs, offshore islands, open waters | No/Possible |
| *Rhipidura versicolor* (Micronesian rufous fantail) | M | Forests, urban areas | Yes[3]/Likely |
| *Spatula clypeata* (northern shoveler) | M | Ponds, lakes, marshes, wetlands, flooded fields | No/Possible |
| *Spatula querquedula* (garganey) | M | Marshes, ponds, lakes, grasslands | No/Unlikely |
| *Sternula albifrons* (little tern) | M | Marshes, ponds, grasslands, salt marshes, lagoons, flooded fields | No/Possible |
| *Sterna hirundo* (common tern) | M | Lakes, coastal areas, beaches, open waters | No/Possible |
| *Sterna sumatrana* (black-naped tern) | M | Beaches, rocky shorelines, rocky offshore islands | No/Likely |
| *Sula brewsteri* (Cocos booby) | M | Coastal areas, coral atolls, volcanic islands | No/Unlikely |
| *Sula dactylatra* (masked booby) | M | Coastal areas, cliff sides, flat islands | No/Likely |
| *Sula leucogaster* (brown booby) | M | Coastal areas, open and inshore waters, cliff sides | No/Likely |

| *Scientific (common, local)* | *Origin** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| *Sula sula* (red-footed booby) | M | Coastal areas, cliff sides, forests, scrublands | No/Likely |
| *Tachyspiza soloensis* (Chinese sparrowhawk) | M | Wetlands, forests, wooded areas | No/Possible |
| *Thalasseus bergii* (great crested tern) | M | Coastlines, offshore islands, coral reef areas, lagoons, estuaries | No/Likely |
| *Tringa brevipes* (gray-tailed tattler) | M | Stony riverbeds, sandy and muddy coastlines | No/Likely |
| *Tringa glareola* (wood sandpiper) | M | Freshwater wetlands, marshes, ponds | No/Possible |
| *Tringa incana* (wandering tattler) | M | Lakes, rocky coastal areas, coral reel areas, man-made structures | No/Likely |
| *Tringa nebularia* (common greenshank) | M | Wooded areas, mudflats, estuaries, lagoons, coastal areas | No/Possible |
| *Tringa stagnatilis* (march sandpiper) | M | Marshes, inland freshwater and brackish wetlands, wet grasslands | No/Possible |
| *Tringa totanus* (common redshank) | M | Saltmarshes, wetlands, swamps, reservoirs, coastal areas | No/Possible |
| *Urodynamis taitensis* (long-tailed koel) | M | Forests, shrublands, parks and residential areas, plantations | No/Unlikely |
| *Xenus cinereus* (Terek sandpiper) | M | Sandy beaches, estuaries, mudflats, | No/Likely |
| **Reptiles and Amphibians** | | | |
| *Anolis carolinensis* (green anole) | U | Forests, gardens, shrubland | No/Possible |
| *Carlia ailanpalai* (curious skink) | INV | Forests, grasslands, man-made habitat | Yes[1]/Likely |
| *Emoia atrocostata* (littoral whiptail skink) | U | Mangroves, tidal pools, inter-tidal zones, rocky shorelines | No/Possible |
| *Emoia boettgeri* (Boettger's emo skink) [a] | U | Forests, coastal areas, grasslands | No/Unlikely |
| *Emoia caeruleocauda* (Marianas blue-tailed skink) [a] | U | Forests, rocky islands, rural gardens | No/Unlikely |
| *Emoia impa* (azure-tailed skink) | U | Forests edges, rural gardens | No/Possible |
| *Emoia jakati* (Kopstein's emo skink) | U | Tropical rainforests | No/Possible |
| *Gehyra mutilata* (stump-toed gecko) [a] | U | Vegetated areas, plantations, urban areas | No/Unlikely |
| *Gehyra oceanica* (Oceana gecko) [a] | U | Forests, gardens, plantations | No/Unlikely |
| *Lamprolepis smaragdina* (emerald tree skink) | U | Tropical forests, plantations, disturbed coastal areas | Yes[1]/Likely |
| *Lepidodactylus lugubris* (mourning gecko) [a] | U | Coastal areas, man-made habitat | No/Unlikely |
| *Lepidodactylus moestus* (Micronesian scaly-toed gecko) [a] | U | Forests, plantations, man-made habitat | No/Unlikely |
| *Nactus pelagicus* (Pacific slender-toed gecko) [a] | U | Coastal areas, rainforests, plantations, urban areas | No/Unlikely |
| *Perochirus ateles* (Micronesia saw-tailed gecko/ qadburruq) | END | Coastal areas, rainforests | No/Possible |
| *Ramphotyphlops hatmaliyeb* (blind snake/hatmaliyeb) | U | Under rock and debris, forests | No/Possible |
| *Rhinella marina* (cane toad) | INV | Forests, urban area, nearby to water sources | Yes[1]/Likely |
| *Varanus bennetti* (Benett's long-tailed monitor) | INT | Coastal areas, rainforests, wetlands | No/Possible |

| *Scientific (common, local)* | *Origin** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| *Varanus indicus* (monitor lizard) | INV | Coastal areas, mangroves, forests, lakes | Yes[1]/Likely |
| **Invertebrates** | | | |
| *Agrionoptera insignis* (grenadier) | U | Rivers, ponds, lakes, swamps | Yes[1]/Likely |
| *Argiope appensa* (Hawaiian garden spider) | INT | Forests, vegetated areas, urban areas | No/Likely |
| *Coenobita rugosus* (tawney hermit crab) | U | Mangrove forests, sandy beaches, coastlines, beach forests | No/Unlikely |
| *Cryptophyllium yapicum* (hidden leaf insect) | U | Tropical forests, vegetated areas | No/Unlikely |
| *Dysdercus decussatus* (fork-banded cotton bug) | INT | Agricultural areas, coastal areas | No/Likely |
| *Hierodula patellifera* (giant Asian mantis) | U | Plantations, riverbanks, gardens | No/Likely |
| *Hypolimnas bolina* (great eggfly) | U | Rainforests, woodlands, disturbed man-made areas | Yes[1]/Likely |
| *Neurothemis terminata* (straight-edge red parasol) | U | Wetlands, marshes, ponds, flooded fields | Yes[1]/Likely |
| *Olethrius carolinensis* (no common name) | U | Open woodlands, swamps, urban areas | No/Unlikely |
| *Orthetrum serapia* (green skimmer) | U | Rivers, lakes, ponds, marshes | Yes[1]/Likely |
| *Papilio polytes* (common Mormon swallowtail) | U | Tropical forests, gardens | Yes[1]/Likely |
| *Tuerkayana hirtipes* (Pacific land crab) | U | Open waters, coastlines | Yes[1]/Likely |
| *Wasmannia auropunctata* (little fire ant) | INV | Riparian areas, forests, agricultural fields | No/Likely |

* Status in order of Origin; International Union for Conservation of Nature assessment; Yap Species of Concern

a = Recorded only on Fais Island, Ngulu Atoll, or Sorol Atoll.

1 = Documented during 2024 Airport Surveys

2 = Documented during 2023 Seaport Surveys

3 = Documented during 2025 Tamil Surveys

Notes: END = Endemic; INT = Introduced; INV = Invasive; M = Migratory; U = Unknown

Source: Avibase, 2025; Buden, 2009; Buden, 2010; Buden, 2011; Buden, 2013; DAF, 2025b; GISD, 2025; iNaturalist, 2025a; iNaturalist, 2025b; iNaturalist , 2025c; iNaturalist, 2025d, NAVFAC Pacific, 2023; PACAF 2024; Yap State, 2024.

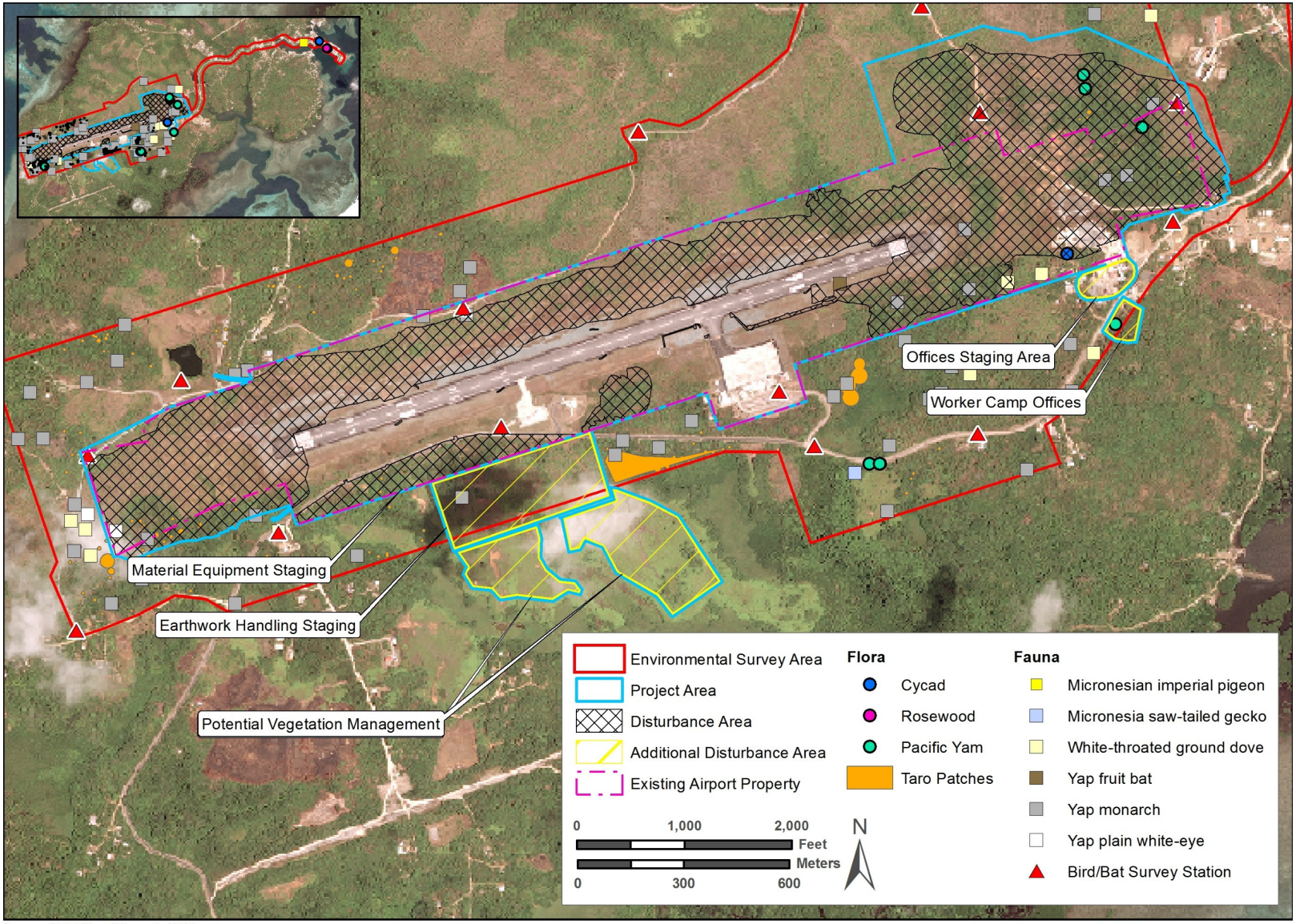



**Figure 3-16 Special Status Species Documented during 2024 Airport Surveys**

## Table 3-19 Special Status Species with the Potential to Occur Near or Within the Seaport or Airport Project Areas

| *Scientific (common, local)* | *Status** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| **Plants** | | | |
| *Areca cathechu* (betelnut/buw) | CV | Occurs mostly in humid tropical lowland areas and wet forests with clay loam soil | Yes[1,2,3]/Likely |
| *Artocarpus altilis* (breadfruit/thow) | CV | Occurs mostly in tropical lowland areas with well-draining soil | Yes[1,2,3]/Likely |
| *Artocarpus mariannensis* (seeded breadfruit) | CV | Adapted to limestone ridges and outcrops and shallow calcareous soil with good drainage | Yes[1,3]/Likely |
| *Calophyllum inophyllum* (beach mahogany/biyuuch) | CV | Found mostly in coastal areas and adjacent lowland forest; occasionally occurs inland at higher elevations | Yes[1,2,3]/Likely |
| *Cocos nucifera* (coconut palm/niew) | CV | Occurs mostly in humid, frost-free coastal lowlands and seashores | Yes[1,3]/Likely |
| *Cordia subcordata* (beach cordia/gonow) | CV | Found in coastal areas, on beach strands and in limestone soils | No/Unlikely |
| *Cycas micronesica* (cycad/faltir) | END/FE/T/ CV | Occurs most often on coastal limestone and cliffsides, and occasionally on back strands | Yes[1]/Likely |
| *Dioscorea nummularia* (Pacific yam/thap) | INT/NT | Occurs mostly in lowland areas with well-draining sandy loam soil | Yes[1]/Likely |
| *Drypetes yapensis* (tuyama) | CR | Found in remnant native forest | No/Unlikely |
| *Ficus elastica* (rubber tree/gakiy ni goma) | CV | Found often on cliffs and limestone hills | No/Possible |
| *Ficus microcarpa* (Chinese banyan) | CV | Occurs mainly at low elevations, including within tropical rainforests, river edges, coasts, swamps, and mangroves | No/Possible |
| *Ficus prolixa* (banyan tree/aw) | CV | Occurs in fertile and well-draining soils | Yes[1]/Likely |
| *Ficus senfftiana* (weche) | CV | Prefers full sun, consistent moisture, and well-draining soil | No/Possible |
| *Ficus tinctoria* (Dyer's fig/waseguy) | CV | Found in rocky areas and moist valleys | Yes[1]/Likely |
| *Intsia bijuga* (Borneo teak/throrrot) | INT/NT/CV | Found along forest edges, grows best within lowland areas with well-drained soils and full sun | No/Possible |
| *Leucaena leucocephala* (white leadtree/ganinityuwan) | CV | Found in disturbed areas, especially in limestone soils | Yes[1,2]/Likely |
| *Metroxylon amicarum* (Caroline ivory nut palm) | INT/NT | Prefers moist forest edges above 1,500 ft, wetlands, and coastal rainforests | No/Possible |
| *Pandanus tectorius* (thatch screwpine/choi) | CV | Occurs in moist coastal locations and valley slopes to an elevation of 2,000 feet | Yes[1,2]/Likely |
| *Pandanus yapensis* (tha) | CV | Found in swampy areas of Yap, primarily forest understory | Yes[1]/Likely |
| *Pericopsis mooniana* (nedun tree) | INT/V/II | Occurs along rivers and coasts | No/Possible |
| *Pterocarpus indicus* (rosewood/lach) | END/E/CV | Occurs along rocky shores, tidal creeks, and coasts; occasionally in savannas and uplands | Yes[1]/Likely |

| *Scientific (common, local)* | *Status** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| *Samanea saman* (monkeypod) | CV | Occurs in lowland areas with freely draining soils, near mangroves and riparian corridors in tropical and subtropical climates | No/Possible |
| *Serianthes kanehirae var yapensis* (gumor) | CV | Endemic to Yap, found in lowland forests and along roads | Yes[1]/Likely |
| *Swietenia macrophylla* (big leaf mahogany) | E/CV | Found within wet and dry tropical forests | No/Possible |
| *Terminalia catappa* (country almond/kel) | CV | Prefers sandy and rocky coastal areas | Yes[1,2]/Likely |
| **Mammals** | | | |
| *Pteropus pelewensis yapensis* (Yap flying fox/maagul'aew) | END/E/Yap SOC/CV | Roosts and forages mainly in mangroves and secondary forests | Yes[1,2,3]/Likely |
| **Birds** | | | |
| *Ardenna carneipes* (flesh-footed shearwater) | M/NT | Continental slopes and coastal areas | No/Unlikely |
| *Arenaria interpres* (ruddy turnstone) | M/NT | Rocky coastal areas, mudflats, intertidal areas | Yes[2]/Likely |
| *Bulweria bulwerii* (Bulwer's petrel) | M/LC | Open seas, offshore islands, rocky crevices | No/Possible |
| *Calidris acuminata* (sharp-tailed sandpiper) | M/V | Shallow freshwater wetlands, rocky shores, flooded fields, mangroves, mudflats | No/Possible |
| *Calidris ferruginea* (curlew sandpiper) | M/V | Pools, marshes, coastal areas, estuaries | No/Possible |
| *Calidris ruficollis* (red-necked stint) | M/NT | Intertidal mudflats, coastal areas, sheltered inlets, lagoons, fresh and saltwater wetlands | No/Possible |
| *Calidris tenuirostris* (great knot) | M/E | Prefers mudflats, coastal marine, wetlands, and intertidal habitats | No/Unlikely |
| *Calonectris leucomelas* (streaked shearwater) | M/NT | Forested hills, offshore islands, pelagic waters | No/Unlikely |
| *Charadrius mongolus* (Siberian sand plover) | M/E | Sand dunes, coastal mountains, beaches, mudflats, estuaries | No/Possible |
| *Ducula oceanica* (Micronesian imperial-pigeon/buleogol) | INT/V | Found across most habitats, but prefers undisturbed forest | Yes/Possible |
| *Edolisoma nesiotis* (Yap cicadabird) | END/E | Found across most habitats, but prefers undisturbed forest | No/Likely |
| *Hydrobates matsudaira* (Matsudaira's storm-petrel) | M/V | Coastal areas, sea cliffs, rocky offshore islands | No/Possible |
| *Limosa lapponica* (bar-tailed godwit) | M/NT | Occurs on sandy beaches and intertidal habitats | No/Possible |
| *Limosa limosa* (black-tailed godwit) | M/NT | Occurs on grasslands, wetlands, and intertidal habitats | No/Possible |
| *Monarcha godeffroyi* (Yap monarch) | END/NT | Occurs across most habitats including mangroves and savannahs | Yes[1]/Likely |
| *Numenius madagascariensis* (Far Eastern curlew) | M/E | Found along coastal marine areas, estuaries, intertidal flats and mangrove swamps | No/Likely |
| *Numenius madagascariensis* (Far East curlew) | M/E | Prefers open mossy or transitional bogs, wet meadows, and swampy shores of small lakes | No/Possible |
| *Numenius tahitiensis* (bristle-thighed curlew) | M/NT | Found along coral reefs, intertidal flats, palm forests, rocky shores, and beaches | No/Possible |

| *Scientific (common, local)* | *Status** | *Habitat* | *Documented/ Potential to Occur within Project Areas* |
|---|---|---|---|
| *Pampusana xanthonura* (white-throated ground dove) | END/NT | Found in native and secondary forest, fields, and developed areas | Yes[1,3]/Likely |
| *Pluvialis squatarola* (black-bellied plover) | M/V | Coastal areas | No/Likely |
| *Pseudobulweria becki* (Beck's petrel) | M/CR | Nests in burrows of high mountains but may breed on small islets | No/Unlikely |
| *Streptopelia dusumieri* (Philippine collared dove) | INT/V | Forests, gardens, urban areas, grasslands, agricultural fields | No/Possible |
| *Zosterops hypolais* (Yap plain white-eye) | END/NT | Found in shrublands, grasslands, forests, and savannahs | Yes[1,3]/Likely |
| *Zosterops oleagineus* (Yap olive white-eye) | END/NT | Found in forest habitats, including forest edges and mangroves | Yes[3]/Likely |
| **Reptiles and Amphibians** | | | |
| *Perochirus ateles* (Micronesia saw-tailed gecko/qadburruq) | END/V | Inhabits forests and introduced vegetation | Yes[1]/Likely |
| **Invertebrates** | | | |
| *Birgus latro* (Coconut crab) | END/V/Yap SOC | Inhabits forests and marine tidal areas | No/Likely |

* Status in order of Origin; International Union for Conservation of Nature assessment; Yap Species of Concern; Culturally Valued, and CITES Appendix number

1 = Documented during 2024 Airport Surveys

2 = Documented during 2023 Seaport Surveys

3 = Documented during 2025 DAF Surveys

Notes: CR = Critically Endangered; CV = Culturally Valued; E = Endangered; END = Endemic; INT = Introduced; LC = Least Concern; M = Migratory; NT = Near Threatened; SOC = Species of Concern; T = Threatened; V = Vulnerable

Source: Avibase, 2025; CITES, 2025a; DAF, 2025b; DAF, 2026; iNaturalist, 2025a; iNaturalist, 2025b; iNaturalist, 2025c; iNaturalist, 2025d; NAVFAC Pacific, 2023; PACAF, 2024; USDA, 2015.

#### 3.5.1.3.2 Special Status Species Mammal

***Pteropus pelewensis yapensis* (Yap flying fox/maagul'aew)**: The Yap flying fox is endemic to Yap and is a subspecies of the Pelew flying fox (*Pteropus pelewensis*). This small to medium-sized frugivorous bat weighs under a pound and produces pups throughout the year forming roosts and colonies, primarily in mangrove swamps. (Falanruw and Manmaw, 1992; Wiles et al., 2008). Mangrove forests on Yap are considered the most diverse within the FSM and important habitat for the Yap flying fox (Falanruw, 1988a; Falanruw, 2002). Yap population estimates for the Yap flying fox are not available. Although the Pelew flying fox is listed by CITES, the Yap flying fox is not listed by CITES (CITES, 2025b). The IUCN considers the Yap flying fox to be an endangered subspecies due to its extremely small area of occurrence and habitat changes, hunting, and agricultural impacts (Waldien et al., 2025). The Yap flying fox is culturally valued based on Yapese legends and customs that believe the species to be a symbol of good luck and prosperity and because the species is also a limited traditional food source (Falanruw, 1988b).

Historically, the Yap flying fox has been observed throughout the Yap forests. An island-wide survey conducted by USFWS in 1984 recorded 2,363 bats across 26 colonies. Six colonies were noted as having greater than 100 bats, and many colonies were comprised of sub-colonies that favored larger trees like *Calophyllum* sp., *Ficus* sp., *Sonneratia* sp., and *Rhizophora* sp. for roosting (USFWS, 1984). No Yap flying fox roosts or colonies were documented in the savanna habitat during surveys; however, savanna habitat was noted as being used frequently for foraging where flying foxes fed, predominantly on *Pandanus* sp. Mangrove forests were the Yap flying fox's preferred roosting location. In 1984, mangrove habitat comprised 15 percent of the overall Yap habitat, and 33 percent of bat colonies were documented within mangroves (USFWS, 1984). Successful management of this mangrove needs to include protection of roosting areas (Falanruw, 1988a). Mangroves and impacts from implementation of the Proposed Action are discussed and analyzed in Section 3.2.

The 2024 Airport transect surveys documented six tree species that the Yap flying fox is known to use for roosting or foraging within the environmental survey area: breadfruit, coconut palm, *Glochidion ramiflorum,* West Indian mahogany*, Campnosperma brevipetiolata*, and Tahitian screwpine (Wiles and Fujita, 1992, in Appendix I). During 2024 Airport transect surveys, no Yap flying fox colonies or roosts were documented within the 919-acre survey area. In addition to transect surveys, 14 bird/bat observation stations were identified and situated based on the most optimal vantage points to view the 919-acre Airport survey area for birds and Yap flying fox (Figure 3-16). Eight monitoring events were conducted using protocols outlined in the "Landscape counts for solitary bats" in the *Joint Region Marianas Mariana Fruit Bat Monitoring Protocol*, dated September 2010 (JRM, 2010). A total of 18 Yap flying foxes were observed in-flight during bird/bat survey events. Additionally, three Yap flying foxes were observed in-flight during transect surveys (PACAF, 2024). Two Yap flying foxes were documented in flight during the Chamorro Bay portion of the 2023 Seaport surveys (Appendix I); no roosts or colonies were documented during those surveys (NAVFAC Pacific, 2023). There were 11 Yap flying foxes detected during surveys of the Tamil dredge material stockpile area; 1 was observed in a breadfruit tree and 10 were observed flying overhead (DAF, 2025b).

Additionally, four direct count surveys (one morning and three evening) were conducted between two vantage points strategically located west and north of the Yanif/Galil mangrove

forest in November 2025. The northern vantage point was located at the airport looking south over the mangrove canopy. This was the same vantage point used during past Forestry Department monitoring of the flying fox and by the island-wide flying fox survey by USFWS (1984). The second vantage point was along the Ngoof peninsula looking east northeast. Because of their separation from each other, there is unlikely to be double counting of bats from these two vantage points. A single evening survey yielded a combined count of 670 flying foxes exiting from the central part of the Yanif/Galil mangrove south of the Airport (NAVFAC Marianas, 2025). The exact location of the colony cannot be known from the informal November 2025 surveys; therefore, a potential "roosting zone" area has been interpolated from the two vantage points to represent the area within the Yanif/Galil mangrove forest where the colony could be located (Figure 3-17).

#### *3.5.1.3.3* Special Status Species Birds

***Arenaria interpres* (ruddy turnstone)**: The ruddy turnstone is a migratory bird that prefers rocky coastal areas, mudflats, and intertidal areas. The IUCN estimates there are between 750,000 and 1,750,000 mature individuals across the species range and identified the ruddy turnstone to be a near threatened species with a decreasing population due to development, agriculture, invasive species, and human disturbance (BLI, 2024a). During the 2023 surveys (Appendix I), eight ruddy turnstones were documented foraging in the grass around the Seaport (Figure 3-13) (NAVFAC Pacific, 2023). The ruddy turnstone uses Yap as a wintering ground or stopover, generally between August through May, breeding in the Arctic tundra and wintering as far south as Argentina (BC, 2015).

***Calidris tenuirostris* (great knot)**: The great knot is a medium-sized, migratory shorebird that uses the Asian-Australasian Flyway. This species breeds in the subarctic region of Siberia on the slopes or plateaus with gravelly areas covered with lichen, herbs, stunted larch, and dwarf pine (BLI, 2019). The great knot overwinters (mainly in Australia) in inlets, sandy beaches, bays, harbors, estuaries, and coastal brackish lagoons with large intertidal and mud and sand flats (BLI, 2019). Yap population estimates for the species are not available. The IUCN considers the great knot to be endangered because global population estimates (between 255,000 and 340,000) for the species reflect a population reduction by nearly 80 percent over the last 22 years. Numbers that are steadily declining as a result of ongoing reclamation and development of wetlands and intertidal habitat across the species range, which had been used for nonbreeding stopover grounds. No individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas

***Charadrius mongolus* (Siberian sand plover)**: The Siberian sand plover is a small wading bird in the east Asian-Australasian Flyway that is in steep decline. It breeds only in Far Eastern Russia before migrating south through east Asia to winter (mostly) in Australia (BLI, 2023a). This species can occur in forest, grassland, wetlands (inland) marine intertidal, coastal, and terrestrial areas. In Siberia, the species breeds on mountains but also at sea level, inhabiting sand dunes along the coast. The species is predominantly coastal during the non-breeding season, preferring sandy beaches, mudflats of coastal bays and estuaries, sand flats and dunes near the coast, and occasionally frequenting mangrove mudflats and feeding on exposed coral reefs along its migratory routes. Yap population estimates for the species are not available. The

IUCN considers the Siberian sand plover to be endangered because the global population estimate is between 18,000 and 50,000 mature individuals, reflecting a reduction by approximately 60 percent over the last three generations (13 to 15 years) (BLI, 2023a). Threats to the species include habitat reclamation from changing sea levels changing accessibility of intertidal mudflats, coastal development, rapid increase in human populations along coastlines, and loss of coastal vegetation. No individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas.

***Ducula oceanica*** **(Micronesian imperial-pigeon/buleogol)**: The introduced Micronesian imperial-pigeon is a large forest pigeon found across most habitats that is believed to breed year-round. Yap population estimates for this species are not available. The IUCN estimates 2,500 to 12,200 mature individuals across the pigeon's habitat range. The IUCN considers the Micronesian imperial-pigeon a vulnerable species due to deforestation, expanding human settlements, and associated agriculture with a decreasing population due to habitat impacts, hunting, logging and wood harvesting, and agriculture (BLI, 2020). During the 2024 surveys, one Micronesian imperial-pigeon was documented at the Pine Club Bar and Grill located along the Airport-to-Seaport connector road (Figure 3-16) (PACAF, 2024).

***Edolisoma nesiotis*** **(Yap cicadabird**): The endemic Yap cicadabird is a small non-migratory cuckooshrike that is found only on Yap in forested and savannah habitats (BLI, 2022). The IUCN estimates the population to be stable at 180 individuals and considers the species to be endangered due to accidental fires during the dry season, and large seasonal storms such as typhoons (BLI, 2022). No individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas.

***Monarcha godeffroyi*** **(Yap monarch)**: The endemic Yap monarch is a black and white bird and found across most habitats on Yap with a nesting season that coincides with the rainy season (BB, 2025a). The 2022 IUCN assessment for the Yap monarch population estimates a trending stable population with 10,000 to 30,000 mature individuals occurs across the species' range. The IUCN considers the Yap monarch to be a near threatened species due to habitat impacts, fire concerns, and invasive species (BLI, 2022a). During 2024 Airport surveys, 58 Yap monarchs were documented in the larger environmental survey area; 7 individuals were documented within the Airport project footprint disturbance area and 1 within the Earthwork Handling Area (Figure 3-16) (PACAF, 2024).

***Numenius madagascariensis*** **(Far Eastern curlew)**: The Far Eastern curlew is a large, mostly brown, wading bird with a long curved bill. When breeding, the species prefers habitat in open mossy or transitional bogs, wet meadows, and swampy shores of small lakes. During the non-breeding season, this curlew species prefers coastal estuaries, mangrove swamps, saltmarshes, and intertidal flats with extensive seagrasses and sandy beaches. Yap population estimates for the species are not available. The global population for this species is estimated at between 20,000 and 35,000 (BLI, 2024b). IUCN considers the Far Eastern curlew to be endangered due to rapid population decline (between 50 and 80 percent) over the last 25 years as a result of reclaimed land along the coastline reducing access to intertidal mudflats, degraded mudflat habitat due to invasive vegetation (cordgrass) that continues to spread, coastal erosion due to storms and subsidence, and hunting and fishing along mudflats and intertidal areas. No

individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas.

***Pampusana xanthonura* (white-throated ground dove)**: The endemic white-throated ground dove is a medium-sized bird that inhabits a variety of areas, including native and secondary forest, fields, and developed areas such as plantations; this species is suspected of nesting year-round (Animalia, 2025). The 2023 IUCN assessment for the white-throated ground dove population estimates a population between 10,000 to 19,999 mature individuals occurs across the species' range. The IUCN considers the white-throated ground dove to be a near threatened species due to hunting and invasive species impacts (BLI, 2023b). During the 2024 Airport surveys, 14 white-throated ground doves were documented, 1 within the Airport project footprint disturbance area (Figure 3-16); and 4 white-throated ground doves were documented during surveys of the Tamil dredge disposal area, wharf, and the road connecting the two areas (PACAF, 2024; DAF, 2025b).

***Pseudobulweria becki* (Beck's petrel)**: Beck's petrel is a small, migratory gadfly petrel that nests in burrows on the slopes of high mountains on larger islands, as well as small islets. The species is known to breed in Papua New Guinea and the Solomon Islands and has a migratory range that could include American Samoa, Australia, Fiji, FSM, Nauru, New Caledonia, and other Pacific islands in the region. Yap population estimates for Beck's petrel are not available. With a global population estimated between 50 and 249 individuals, and decreasing, the IUCN considers Beck's petrel to be critically endangered (BLI, 2018a). Threats to the species include agricultural development and farming activities, aquaculture practices, mining and quarrying, and predation by feral cats, house rats, and feral pigs that prey on eggs and chicks. No individuals were observed within or around the Airport or Seaport project footprints, the Tamil dredge disposal area, or along road improvement areas.

***Zosterops hypolais* (Yap plain white-eye)**: The endemic Yap plain white-eye is a small warbler that prefers grasslands, shrublands, savannahs, grasslands, and forests (eBird, 2025). This species' nesting season tends to coincide with the rainy season (BB, 2025b). The IUCN estimates a stable trending population of 40,000 to 80,000 mature individuals occur across the species' range. The IUCN assessment identified the Yap plain white-eye as a near threatened species due to habitat changes and invasive species impacts (BLI, 2018b). During 2024 Airport surveys, 2 Yap plain white-eyes were documented, 1 within the Airport project footprint disturbance area (Figure 3-16); and 23 Yap plain white-eyes (as well as 6 white-eyes that could not be identified to species) were documented during surveys of the Tamil dredge disposal area, wharf, and road connecting the two areas (PACAF 2024; DAF, 2025b).

***Zosterops oleagineus* (Yap olive white-eye)**: The endemic Yap olive white-eye is a small warbler that prefers lowland forest, forest edges, and mangroves (BLI, 2018). This species' nesting season tends to coincide with the rainy season (BB, 2025b). The IUCN estimates a decreasing population of approximately 13,000 mature individuals occur across the species' range. The 2022 IUCN assessment identified the Yap greater white-eye as a near threatened species due to climate and habitat changes, as well as invasive species impacts (BLI, 2018). During surveys of the Tamil dredge disposal area, wharf, and road connecting the two areas, nine Yap greater white-eyes (as well as 6 white-eyes that could not be identified to species) were documented (DAF, 2025b).

#### 3.5.1.3.4 Special Status Species Reptile

***Perochirus ateles*** **(Micronesia saw-tailed gecko/qadburruq)**: The endemic Micronesia saw-tailed gecko is a relatively large gecko weighing 4 to 5 grams and is considered widespread and common on Yap (Buden, 2011). This species inhabits forests and introduced vegetation. Yap population estimates for the Micronesia saw-tailed gecko are not available. The IUCN considers the Micronesia saw-tailed gecko to be a vulnerable species with a decreasing trend due to habitat changes and invasive species impacts (Allison et al., 2017). One Micronesia saw-tailed gecko was documented during the 2024 Airport surveys (Figure 3-16) (PACAF, 2024).

#### 3.5.1.3.5 Yap Culturally Valued Species

*Araceae* (aroid family), commonly called taro, is a plant in the Araceae family that includes over 2,500 species. There are three common species cultivated on Yap for food: *Cyrtosperma merkusii* (swamp taro/lak) is the most common, the second is *Colocasia esculenta* (wild taro/mal), and the least common is *Xanthosoma sagittifolium* (arrowleaf elephant's ear/ Honolulu) (Falanruw, 1990). *Alocasia macrorrhiza* (giant taro) is also present on the main island; however, it is more common in the outer islands (Ruegorong et al., 2016).

The taro root is an important traditional Yapese food staple (Krishnapillai et al., 2018). Taro patches are frequently cultivated in ditches between garden beds near water sources (Ruegorong et al., 2016). There were 195 taro patches (covering approximately 7.4 acres) observed across 919 acres during the Airport surveys in 2024. Of the 7.4 acres, approximately 0.7 acres (9.3 percent) were documented within the area of disturbance, and an additional 0.1 acre (1.1 percent) was documented within the project footprint (Figure 3-16).

In addition to taro, the following 19 plant species (not discussed in previous sections) are culturally valued:

- *Areca cathechu* (betelnut/buw): This species is the largest Yap export and culturally important for building material, firewood, and spades to dig taro patches (DAF, 2026). Betel nut chewing is a cultural tradition dating back thousands of years in Micronesia (Fitzpatrick et al., 2003).
- Breadfruit and *A. mariannensis* (seeded breadfruit): All parts of the breadfruit trees, including the sap, have traditional Yapese use and provide medicinal value. The fruit is a food source for both island inhabitants and the Yap flying fox, and the wood is valued as timber (e.g., canoe outriggers, building materials) (DAF, 2026).
- *Calophyllum inophyllum* (beach mahogany/biyuuch): Beach mahogany has been used as markers for historical sites; the wood can be used for canoes and building materials; larger trunks are highly sought for milling; it is used as firewood and has medicinal value. Beach mahogany fruit is used to produce tamanu oil and flowers are used to make lace or as a traditional perfume for women (DAF, 2026).
- Coconut palm: All parts of the coconut palm have traditional uses, such as building material, timber, thatch roof materials, fish trap material, broom, basket, hat, handicraft, food, drinking water, livestock feed, oil, firewood, charcoal, medicine, ropes, wine, candy, and fishing lures (DAF, 2026).

- *Cordia subcordata* (beach cordia/gonow): Beach cordia wood is used for carving, and the tree has medicinal value (DAF, 2026).
- *Ficus elastica* (rubber tree/gakiy ni goma), *F. microcarpa* (Chinese banyan), *F. prolixa* (banyan tree/aw), *F. senfftiana* (weche), *F. tinctoria* (Dyer's fig/waseguy): All *Ficus* spp. are ornamental, and some have edible fruits that forest birds and Yap flying fox eat. These species are culturally associated with spirits and have medicinal value. The roots are used to form small bridges or hanging chairs (DAF, 2026)
- *Intsia bijuga* (Borneo teak/throrrot): Borneo teak wood is used for carving, is good for milling and building (e.g., canoe, house), and has medicinal value (DAF, 2026).
- White leadtree: This species is used as firewood, charcoal, and improves farm soil (DAF, 2026).
- Thatch screwpine: It is used for weaving and thatch material. The fruits are edible, and the wood is good for building posts, which are particularly resilient in coastal areas (DAF, 2026).
- *P. yapensis* (tha): This species provides long fibers used for a variety of projects (DAF, 2026).
- *Samanea saman* (monkeypod): Monkeypod wood is used for carving and milling (DAF, 2026).
- *Serianthes kanehirae* var. *yapensis* (gumor): The trunks of this species are good canoe, timber, milling, and building materials; it can also be used to improve soil (DAF, 2026).
- Big leaf mahogony: This species is a good wood source (DAF, 2026).
- *Terminalia catappa* (country almond/kel): Country almond wood can be used in canoe building and timber milling, and is the main post of the "man's house" and community meeting houses. The fruits are edible, and it has medicinal value (DAF, 2026).

#### 3.5.1.4 Invasive Species

The Global Invasive Species Database notes 43 invasive species have been documented on Yap (GISD, 2025). Additionally, the little fire ant (LFA) and curious skink are not listed on the Global Invasive Species Data website for Yap but are considered an invasive species. In late 2017, the Agriculture Division at the Yap Department of Resources & Development detected LFA in Waanyan, Gagil. To date, there have been 28 confirmed LFA-infested areas recorded in Yap, spanning approximately 128 acres across Gagil, Tamil, Rull, Dalipebinaw, and Fanif (Yap State, 2024). Additionally, Buden (2009), discussed the curious skink is an introduced invasive species that outcompetes native skinks. Twenty-two invasive species listed below were documented within the project areas during DoW surveys in support of the Proposed Action.

During the 2023 Seaport surveys, four invasive plant species and three suspected invasive plants (not identified to species) were documented: *Bambusa* sp., *Bidens pilosa* (hairy beggerticks), *Cyperus* sp., *Merremia* sp., *Mimosa pudica* (shameplant), *Passiflora foetida* (stinking passionflower), and wedelia (GISD, 2025; NAVFAC Pacific, 2023). During 2024 Airport surveys, 15 invasive plant species and 5 invasive wildlife species were documented: *Acacia confusa* (Ayangile), *Bambusa vulgaris* (common bamboo), cane toad, *Cenchrus polystachios*, curious skink, *Cyperus rotundus* (nutgrass), *Dioscorea bulbifera*, domestic dog, domestic cat,

hairy beggerticks, Jack in the bush, *Lantana camara* (West Indian lantana), *Melaleuca quinquenervia* (paperbark tree), *Mikania micrantha*, *Mimosa diplotricha*, monitor lizard, shameplant, *Paspalum scrobiculatum* (Kodo millet), *Psidium guajava* (common guava), and stinking passionflower (GISD, 2025; PACAF, 2024). The 2023 Navy and 2024 DAF survey reports (Appendix I) list all invasive species documented on Yap.

YIST identifies and manages invasive species through the YIST Adaptive Strategic Management Plan. Invasive species documented on Yap that are of particular concern for spread to other parts of the island include *Bactrocera frauenfeldi* (mango fruit fly), LFA, *Pyrrhoderma noxium,* formerly known as *Phellinus noxius* (black sock/tree killer fungus), and weeds such as *Clerodendrum quadriloculare* (bronze-leafed clerodendrum), *Operculina turpethum* var. *ventricosa* (paper rose), *Pennisetum polystachion* (cat's tail), *Spathodea campanulata* (African tulip), wedelia, and West Indian lantana. Additional terrestrial priority species of invasive concern for introduction to Yap include: *Boiga irregularis* (brown tree snake) and other snakes, fruit flies not yet established, *Neotermes rainbow* (coconut rainbow termite), *Oryctes rhinoceros* (coconut rhinoceros beetle), *Solenopsis invicta* (red imported fire ant), and other "high alert" agriculture pests (YIST, 2025).

## 3.5.2 Environmental Consequences

### 3.5.2.1 Analysis Method

The terrestrial resources analysis discusses impacts on vegetation, wildlife, and special status species from construction, as well as aircraft and ship activities associated with the Airport and Seaport, the Airport-to-Seaport and community roads, as well as in-land dredge disposal and laydown areas. This section outlines the methods and criteria used to assess potential significant impacts on terrestrial resources and includes the degree or extent to which an alternative would result in:

- Notable adverse effects leading to populations or distribution reduction of special status species or habitat.
- Long-term loss or degradation of habitat necessary for special status species survival and recovery.
- Habitat fragmentation adversely affecting the habitat connectivity for special status species.
- Increase in occurrence of existing, or introduced, invasive species.

As discussed in Section 3.5.1, the ROI for terrestrial resources includes the project footprints at both the Airport and Seaport, the Airport-to-Seaport and community roads, as well as in-land dredge disposal and laydown areas. This ROI also includes areas encompassing habitats that potentially support wildlife and special status species populations, that are not immediately within the project areas but could be impacted by Proposed Action noise from either construction or post-construction activities.

Using these criteria, each alternative is evaluated to determine whether potential effects would be considered short- or long-term, adverse or beneficial, and less-than-significant or significant.

Wetlands (including mangrove and estuarine zone vegetation and wildlife species) are discussed and analyzed in Section 3.2.

#### 3.5.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no changes to terrestrial resources. Therefore, no adverse or beneficial impacts on terrestrial resources would occur with implementation of the No Action Alternative.

#### 3.5.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

##### 3.5.2.3.1 Avoidance, Minimization Measures and Best Management Practices

Avoidance, minimization measures, and BMPs that would be implemented to reduce or avoid adverse impacts on terrestrial resources are provided in Section 2.8.

##### 3.5.2.3.2 Construction Impacts

The analysis below has determined that during the construction period, Alternative 1 would have a less than significant adverse impact on terrestrial biological resources.

###### 3.5.2.3.2.1 Terrestrial Vegetation

**Airport**: Short- and long-term, less than significant, adverse impacts on vegetation would occur from temporary disturbance of vegetation and soil compaction during construction and from permanent vegetation removal for new facilities and infrastructure. Short-term impacts would occur from temporary disturbance of vegetation from the use of heavy equipment and may include trampling and soil compaction of up to approximately 265 acres within the Airport project footprint, 61 acres immediately south of the Airport project footprint, and excavation of up to 3 million CY within the Airport project footprint. Excavated soils would be placed and compacted as required for structural fill in low areas of the project area, assisting with erosion control.

Vegetation removal would consist of a loss of approximately 11.0 acres of Agroforest, which represent a loss of 0.05 percent of the Agroforest vegetation community islandwide; 20.9 acres of Barren, which represent a loss of 0.09 percent of the Barren vegetation community islandwide; 2.8 acres of Marsh, which represents a loss of 0.01 percent of the Marsh vegetation community islandwide; 169.4 acres of Savanna, which represents a loss of 0.71 percent of the Savanna vegetation community islandwide; 11.8 acres of Secondary Vegetation, which represents a loss of 0.05 percent of the Secondary Vegetation community islandwide; 46.1 acres of Upland Forest, which represents a loss of 0.19 percent of the Upland Forest vegetation community islandwide; and 64.1 acres of Urban Builtup/Cultivated, which represents a loss of 0.27 percent of the Urban Builtup/Cultivated community islandwide.

There would be long-term, less than significant, adverse impacts from the disturbance of approximately 326 acres between the areas of disturbance within the Airport project footprint and the component areas south of the project footprint. Airport acreage disturbed during construction would either be developed (e.g., warehouse), resurfaced with cover material (e.g., pavement, gravel), or revegetated after construction is completed. Construction of the Airport portion of the Proposed Action would create a total of 75 acres of new impervious surface. Disturbed areas that are not developed or resurfaced with cover material would be revegetated in accordance with the *Pacific Islands Area Vegetative Guide* (NRCS, 2012), as well as FSM and Yap State regulations and recommendations.

There would be long-term, less than significant, adverse impacts on terrestrial vegetation from increased stormwater runoff and erosion, if rain events exceed proposed stormwater management infrastructure. Proposed stormwater management infrastructure is described in Section 2.5 and includes the addition of inlets with grates, pipes, culverts, ditches, swales, inlet and outlet headwall structures, and stormwater ponds to the existing drainage system. The system would include the addition of five stormwater ponds, approximately 8.5 acres, three of which would include Type VI stilling basins to address potential 100-year inflow. The stormwater would be detained for up to 40 hours. The stormwater system would include intermediary berms and bio-infiltration media for stormwater runoff control.

There would be short- and long-term, less than significant, adverse impacts on vegetation on either side of Airport-related road improvement areas as described in Section 2.5.1.7 and shown in Figure 2-6. Impacts would include removing a portion of the existing unpaved Seabee Flats Road (approximately 3,500 ft of roadway). Proposed construction includes grading and preparation of the roadbed and laying asphalt pavement for the proposed new two-lane Seabee Flats Road (approximately 3,500 ft long and 28 ft wide [24 ft two-lane road and 2 ft shoulders]), new 28-ft-wide access roads connecting Seabee Flats Road with the aircraft parking apron and fuel storage complex, and three 15-ft-wide maintenance roads with turnarounds to stormwater drainage structures. Approximately 3.8 miles of improvements to the Airport-to-Seaport road from the community road to the west of the airport to the western edge of Chamorro Bay would occur. The majority would be repaved (i.e., overlayed with asphalt pavement); however, the approximately 1,000 feet nearest to Chamorro Bay would be improved via a full depth reconstruction. Road improvements would include marginal expansion of impervious surfaces. To the degree practicable, revegetation of disturbed areas along either side of the road would be accomplished as described above.

There could be long-term, less than significant, adverse impacts from the potential for increased invasive invertebrates, seeds, or spores from imported construction materials or transfer from one part of the island to another. The Armed Forces Pest Management Board Technical Guide 31 (AFPMB-TG31): *Operational Washdown and Agricultural Inspection Preparation for Military Conveyances and Equipment*, is the primary driver for U.S. DoW cleanliness standards and protocols. The AFPMB-TG31 requires that all construction equipment and materials, heavy equipment, and personal gear are free of soil, foreign debris, plant pests, animal pests, and prohibited agricultural items. In accordance with the biosecurity protocols currently being developed in consultation with FSM Quarantine Services and Yap State (see Appendix A), all imported construction equipment and materials must be certified clean of soil, foreign debris, plant pests, animal pests, and prohibited agricultural items prior to loading and transportation. Prior to offloading, equipment and materials must be visually inspected by FSM Quarantine Services and declared free of pests. Personnel are required to report cargo contaminated with dirt/soil or biological material detected at any time during onload, transportation, offload, or during unpacking. If hitchhiking pests are detected on U.S. DoW cargo within FSM, eradication efforts begin immediately. Avoidance, minimization measures, and BMPs outlined in Section 2.8 would minimize and mitigate the potential introduction or spread of invasive species to adjacent vegetation from construction.

There could be short-term, less than significant, adverse impacts on vegetation from potential fuel/contaminant spills from motorized and mechanical equipment used during construction that could impact vegetative habitat. Any potential fuel or contaminant spills would be reported and cleaned up immediately in accordance with the ECP.

**Seaport**: Short- and long-term, less than significant, adverse impacts on vegetation would occur from temporary and permanent disturbance associated with Seaport construction from trampling and soil compaction during heavy equipment usage and increased construction personnel. Short-term vegetation impacts would be considered less than significant because most of the Seaport is classified as Urban Builtup (as described in the *Trees of Yap: A Field Guide*) and encompasses predominantly impervious surfaces. The creation of less than an acre of additional impervious surface represents a less than significant long-term impact. Once the proposed construction has completed, and to the degree practicable, areas where cultivated ornamentals and food species were documented would be revegetated with similar species.

There would be long-term, less than significant, adverse impacts on vegetation from the permanent loss of approximately 2.7 acres for the Tamil dredge material stockpile area, 0.8 acres for the Rull dredge material stockpile area, approximately 0.7 acres of land reclamation in the adjacent nearshore area, and 2.2 acres for the Nungoch dredge material stockpile area. The Tamil dredge material stockpile area was predominantly disturbed; therefore, vegetation impacts would be considered less than significant. There would be short-term, less than significant, adverse impacts on vegetation from the temporary loss of approximately 14 acres associated with currently vegetated laydown areas.

There would be short-term, less than significant, adverse impacts on vegetation during Airport-to-Seaport connector road improvements, which would widen approximately 5,590 ft of roadway to a width of 24 ft and repave and provide a sidewalk for 2,800 ft of road along the south side of Chamorro Bay between Aces Mart 2 and Ganir Bridge (Figure 2-18) as described in Section 2.5. These impacts are anticipated to be less than significant because the area is predominantly Urban Builtup, with some Urban Cultivated-Ornamental and Coastal Mixed (as described in the *Trees of Yap: A Field Guide*) land covers. To the degree practicable, revegetation would occur as described above and invasive seed or spore introduction would be minimized by compliance with avoidance, minimization measures, and BMPs outlined in Section 2.8.

There could be short-term, less than significant, impacts on vegetation from potential fuel/contaminant spills from motorized and mechanical equipment used during construction that could impact vegetative habitat. Any potential fuel or contaminant spills would be reported and cleaned up immediately in accordance with the ECP.

#### 3.5.2.3.2.2 Terrestrial Wildlife

**Airport**: Short- and long-term, less than significant, adverse impacts on wildlife may occur from increased noise, habitat removal, and potential displacement associated with construction of the Airport-to-Seaport and Seabee Flats Road improvement activities, development of maintenance roads, and added lighting. Short-term, less than significant, adverse impacts on wildlife would occur from noise generated during operation of heavy equipment use and increased human presence during Airport project construction. The increase in the frequency of occurrence and/or intensity of noise from construction could temporarily displace wildlife.

Individual pieces of heavy equipment generate noise levels ranging from 80 to 90 A-weighted decibels (dBA) at a distance of 50 feet from the source (see Noise Section 3.7). With multiple items of equipment operating concurrently, noise levels can be high within several hundred feet of active construction sites. Noise beyond comfort levels can affect wildlife to varying degrees of response and could cause unhabituated wildlife alert, startle, or alarm, which could increase the potential for wildlife to receive auditory damage, abandon nests or young, or increase energy expenditure (NPS, N.D). Wildlife species would be expected to use adjacent suitable habitat during construction and could return to the area once the noise from heavy equipment use has ceased. Furthermore, wildlife currently inhabiting the Airport project area are expected to be habituated to noise disturbances because of the existing highly urbanized environment and flight operations at an active airport; however, an increase in the frequency of startle responses or other behavioral modifications caused by the proposed construction could occur. Studies have documented habituation to aircraft overflights and other noises by birds and other wildlife after continuous or frequent exposure (e.g., Knight and Gutzwiller, 1995; Shannon et al., 2016); therefore, it is expected that long-term construction noise impacts on wildlife would be less than significant.

In addition to the potential impacts associated with increased noise, there may be short-term, less than significant, adverse impacts from other construction activities including lighting and dust created during excavation and grading activities, as well as demolition of existing structures (e.g., fencing and buildings) that may temporarily impact wildlife individuals and their habitat. Dust and light may cause habitat degradation and alter wildlife behavior. Demolition, site excavation, and grading activities would adhere to BMPs and SOPs outlined in the dust control plan to minimize or prevent dust from expanding beyond the project footprint and adversely impacting wildlife. Exterior lighting would be wildlife safe (i.e., amber color, shielded, and pointed downward) and turned off when not needed to avoid seabird fallout and other wildlife impacts.

There would be short-term, less than significant, adverse impacts from potential fuel/ contaminant spills from motorized and mechanical equipment used during construction that could adversely impact water quality and habitat on which wildlife rely. Any potential fuel or contaminant spills would be reported and cleaned up immediately in accordance with the ECP.

There would be short-term, less than significant, adverse impacts from an increase of up to 200 off-island construction workers living on the construction site over an approximately 8-year construction period due to increased potential human and wildlife interactions during non-working hour activities. The increase in personnel would be minimal, less than 2 percent, in comparison to Yap's population; therefore, this impact would be considered less than significant.

Long-term, less than significant, adverse impacts on wildlife would occur from the permanent loss of up to 326 acres of potential wildlife habitat, which provides habitat for birds, mammals, and herpetofauna, would be permanently lost. Approximately 241 acres is considered quality habitat and the loss of that habitat acreage represents approximately 1.0 percent of the overall available habitat of the Agroforest, Marsh, Savanna, Secondary Vegetation, and Upland Forest vegetation communities. Habitat fragmentation is not a concern because the majority of the special status species observed are capable of flight, and there is no designated critical habitat.

The loss of habitat would be a less than significant impact because there is sufficient adjacent habitat for wildlife species to utilize.

Short-term, less than significant, adverse impacts on wildlife would occur from Airport-to-Seaport and community road improvements. These areas are already used by resident traffic or are developed and would be expected to be habituated to noise. It is assumed that any species that may be present and bothered by construction associated with road improvements would voluntarily move to suitable adjacent habitat.

**Seaport**: Short- and long-term, less than significant, adverse impacts on wildlife may occur from activities associated with Seaport construction activities (i.e., pile driving at 100+ dBA) for similar reasons as described above for Airport construction activities (ANL, 2026). These impacts would be less impactful than Airport construction activities because the Seaport project area is highly urbanized and any wildlife present would be expected to be habituated to noise and human disturbances.

There would be long-term, less than significant, adverse impacts on wildlife from the loss of approximately 2.7 acres for the Tamil dredge material stockpile area and 0.8 acres for the Rull dredge material stockpile area. The Tamil dredge material stockpile area was predominantly disturbed and does not support high quality wildlife habitat; therefore, wildlife impacts would be less than significant. There would be short-term, less than significant, adverse impacts on wildlife from the temporary loss of vegetation at the proposed laydown and worker camp areas.

There could be short-term, less than significant, adverse impacts from potential fuel/ contaminant spills from motorized and mechanical equipment used during construction that could adversely impact water quality and habitat on which wildlife rely. Any potential fuel or contaminant spills would be reported and cleaned up immediately in accordance with the ECP.

#### 3.5.2.3.2.3 Special Status Species

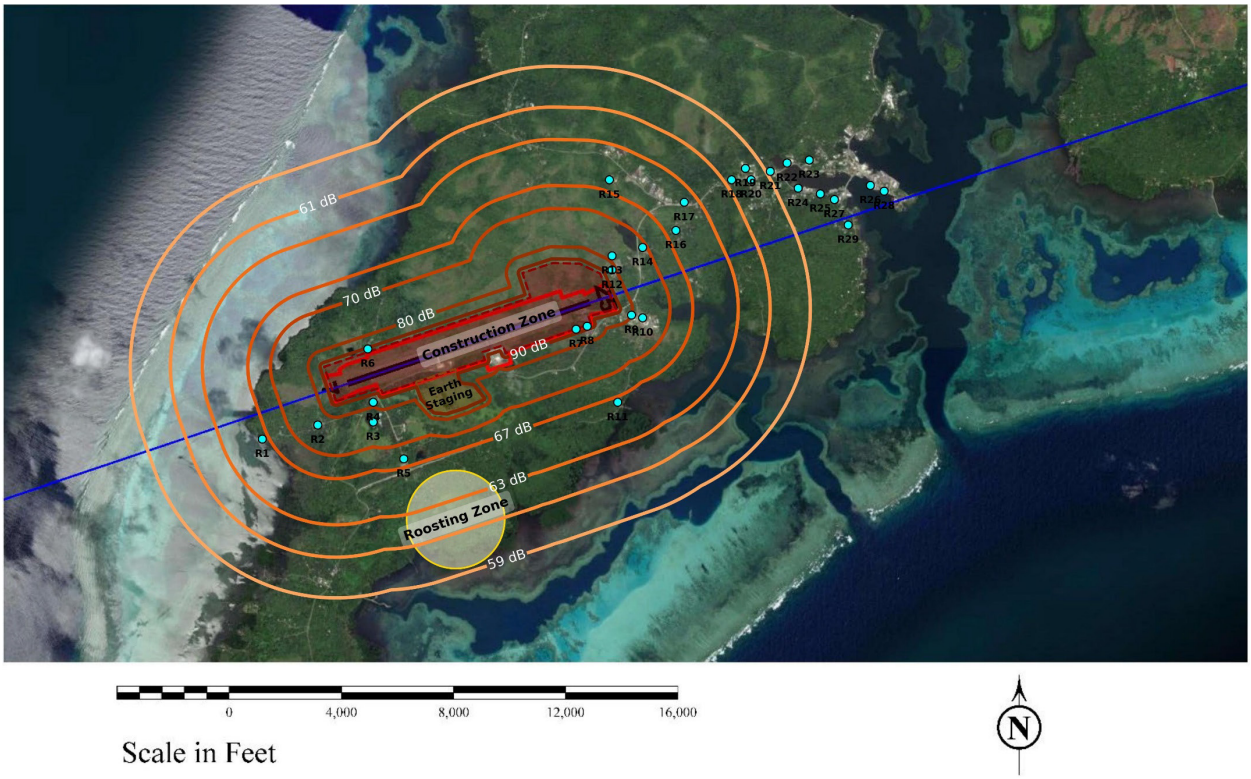
**Airport:** With the exception of the Yap flying fox, the Pacific yam, and one cycad documented in the southeastern corner edge of the disturbance area (shown in Figure 3-16), impacts on special status species within the Airport project area would be the same as impacts described for wildlife in Section 3.5.2.3.2.2.

Based on informal November 2025 flying fox surveys, the northernmost edge of the potential roosting zone is estimated to be approximately 2,000 feet from the southernmost edge of the Earthwork Staging Area (Figure 3-17), indicating that construction noise levels could range between 59 and 66 decibels (dB). A noise level of 60 dB or greater could elicit short-term behavioral responses (e.g., alerting, breeding, communication) (USFWS, 2010); Yap flying foxes within the roosting zone could be adversely affected by construction noise (Figure 3-17). It is not anticipated that individuals would be impacted to the degree they would relocate; therefore, potential construction noise impacts to Yap flying foxes is considered less than significant.

Pre-construction surveys would confirm whether the cycad is still at the documented location within the Airport project footprint, and whether the Pacific yams are still within the Airport project footprint and the Worker Camp Offices Area. If present, and in cooperation with the Department of Agriculture and Forestry, the cycad and/or the Pacific yams could be

translocated and monitored. Avoidance, minimization measures and BMPs outlined in Section 2.8 would be implemented to minimize impacts on the individual.

**Seaport**: Impacts on special status species within the Seaport project, Airport-to-Seaport road, dredge disposal areas, and laydown areas would be the same as described for wildlife in Section 3.5.2.3.2.2.




Source: ANL, 2026

**Figure 3-17 Construction Noise Contours in Relation to the Yap Flying Fox Roosting Zone**

#### 3.5.2.3.2.4 Invasive Species

There would be long-term, less than significant, adverse impacts from the potential for increased invasive species from imported construction materials or transfer from one part of the island to another. Avoidance, minimization measures, and BMPs outlined in Section 2.8 (which include biosecurity protocols agreed to by DoW and FSM) would avoid or minimize the potential introduction or spread of invasive species from construction.

### 3.5.2.3.3 Post-Construction Impacts

The analysis below has determined that during the post-construction period, Alternative 1 would have less than significant adverse impacts on terrestrial vegetation and wildlife, and significant adverse impacts on special status species.

#### 3.5.2.3.3.1 Terrestrial Vegetation

**Airport**: There could be short-term, less than significant, adverse impacts on vegetation from potential environmental contaminants or the introduction of invasive species during the up to 28 days of aircraft training that would occur each year at the Airport (up to two 14-day training

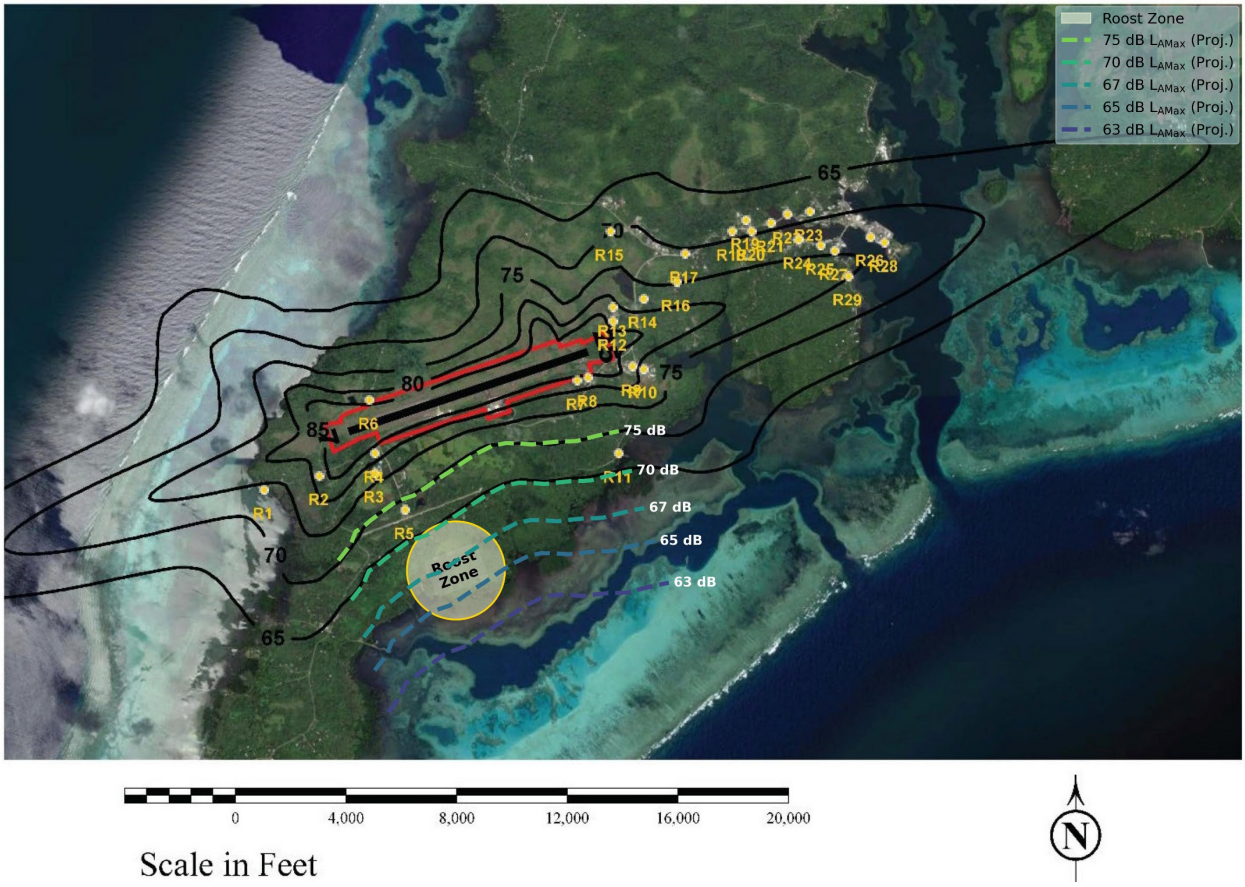
events), as well as associated building and area maintenance. Increased stormwater runoff combined with trace amounts of herbicide or fuel/contaminant spills from motorized and mechanical equipment could impact vegetative habitat. All herbicides would be used according to label instructions, and most herbicides are designed for low toxicity when diluted properly. Any potential fuel or contaminant spills would be reported and cleaned up immediately in accordance with the DAF compliant SPCC Plan. Additionally, introduction of invasive species would be minimized by compliance with biosecurity protocols agreed to by DoW and FSM and the avoidance, minimization measures, and BMPs outlined in Section 2.8.

**Seaport**: There could be short-term, less than significant, adverse impacts on vegetation from potential environmental contaminants or the introduction of invasive species during marine activities, as well as associated building and area maintenance. Increased stormwater runoff combined with trace amounts of herbicide or fuel/contaminant spills from motorized and mechanical equipment could impact the marine vegetative habitat. Adherence to the same protocols and avoidance, minimization measures, and BMPs as discussed for the Airport would also ensure potential adverse impacts at the Seaport would be less than significant.

#### 3.5.2.3.3.2 Terrestrial Wildlife

**Airport**: Long-term, less than significant, adverse impacts on wildlife would occur from an increase in aircraft activities over normal Airport activities during military training events that are anticipated to occur up to 28 days per year. Some aircraft ground activities (e.g., taxiing, idling, maintenance) and associated personnel noise could be amplified at the Airport. Aircraft noise levels would increase in intensity and frequency, and there would be low levels of noise from maintenance activities and project-related traffic from increased Airport-to-Seaport, community, and maintenance road usage.

Current Airport activities include aircraft arrivals and departures from United Airlines, Pacific Mission Aviation, and cargo flight services via Asia Pacific Airlines that, when combined, include up to 936 flights annually, which includes 468 takeoffs and 468 landings (ANL, 2026). The existing maximum noise levels ($L_{max}$) from these activities range between 64 and 70 dB approximately 2,000 - 4,000 feet north and south of the Airport runway (Figure 3-20) (ANL, 2026).




Source: ANL, 2026

**Figure 3-18 Existing Aircraft Maximum Sound Level Contours in Relation to the Yap Flying Fox Roosting Zone**

DoW training activities at the Airport are expected to take place for up to 28 days annually and are projected to include up to 962 flights, including 494 takeoff and 494 landings (ANL, 2026). While the proposed activity level represents an approximately 103 percent increase over normal Airport operations, the increase would be limited to approximately two weeks twice a year, with up to 15 DoW flights per day. Noise modeling conducted in support of the Airport project determined that aircraft noise generated during activities could be in excess of 100 dB in the vicinity of the Airport during flight takeoffs/landings. The noise contours could extend up to 5 miles east of the Airport across the Colonia Harbor, and 5 miles west of the airport into the Pacific Ocean, and approximately 1 mile to the north and south (Figure 3-19) (USDOT, 2025; ANL, 2026).

Although some birds, small mammals, invertebrates, and other common small wildlife species may use adjacent habitat for shelter and feeding, birds and other animals living below the flight paths at the Airport are exposed to up to 85 dB noise from current Airport operations year-round. These individuals would be expected to be habituated to intermittent aircraft noise; however, the frequency of occurrence and intensity of aircraft operations may cause short-term behavioral changes.

Despite the anticipated 103 percent increase in aircraft operations during military exercises, with up to 10 percent of the activities occurring during nighttime hours (between 10:00 PM and 7:00 AM), noise exposure and related impacts (such as startle responses) on wildlife would not be expected to change under the increased Airport activities because these species are expected to be habituated to noise levels associated with current Airport activities; therefore, impacts to wildlife are expected to be less than significant. There could be short-term, less than significant, adverse impacts from generator noise, lighting associated with the expeditionary camp, potential fuel/contaminant spills from aircraft during training events, or motorized and mechanical equipment used during post-construction activities (including routine maintenance) that could adversely impact water quality and habitat on which wildlife rely. Any potential fuel or contaminant spills would be reported and cleaned up immediately in accordance with the DAF compliant SPCC Plan. Exterior lighting would be wildlife safe (i.e., amber color, shielded, and pointed downward) and turned off when not needed to avoid and minimize wildlife impacts.

**Seaport**: No associated terrestrial wildlife impacts are anticipated with Seaport post-construction activities because all project-related activities would occur on paved or previously disturbed surfaces within the Seaport or are confined to the marine environment. New Seaport lighting would be installed and used so that they are wildlife safe (i.e., amber color, shielded, and pointed downward) and turned off when not needed to avoid seabird fallout and other wildlife impacts.

Post-construction Airport activities noise would be consistent with the existing Airport aircraft noise at the Seaport area which ranges between 70 and 75 dB (Figures 3-20 and 3-21). Therefore, there would be no additional impacts on wildlife that may be present at the Seaport from Airport post-construction activities.

#### 3.5.2.3.3.3 Special Status Species

**Airport**: With the exception of the Yap flying fox discussed below, impacts on special status species within the Airport project area would be the same as impacts described for wildlife in Section 3.5.2.3.3.2.

There could be short- and long-term, significant, adverse impacts to the Yap flying fox from post-construction activities. Noise modeling indicates that noise ranging between 86 and 92 dB $L_{Amax}$ (Figure 3-19) could extend into the Yap flying fox roosting zone within the Yinuf/Galil mangrove forest south of the Airport. $L_{Amax}$ indicates the maximum dBA that occurs during a specific time period. See Section 3.7 for a complete list of noise descriptors and definitions.

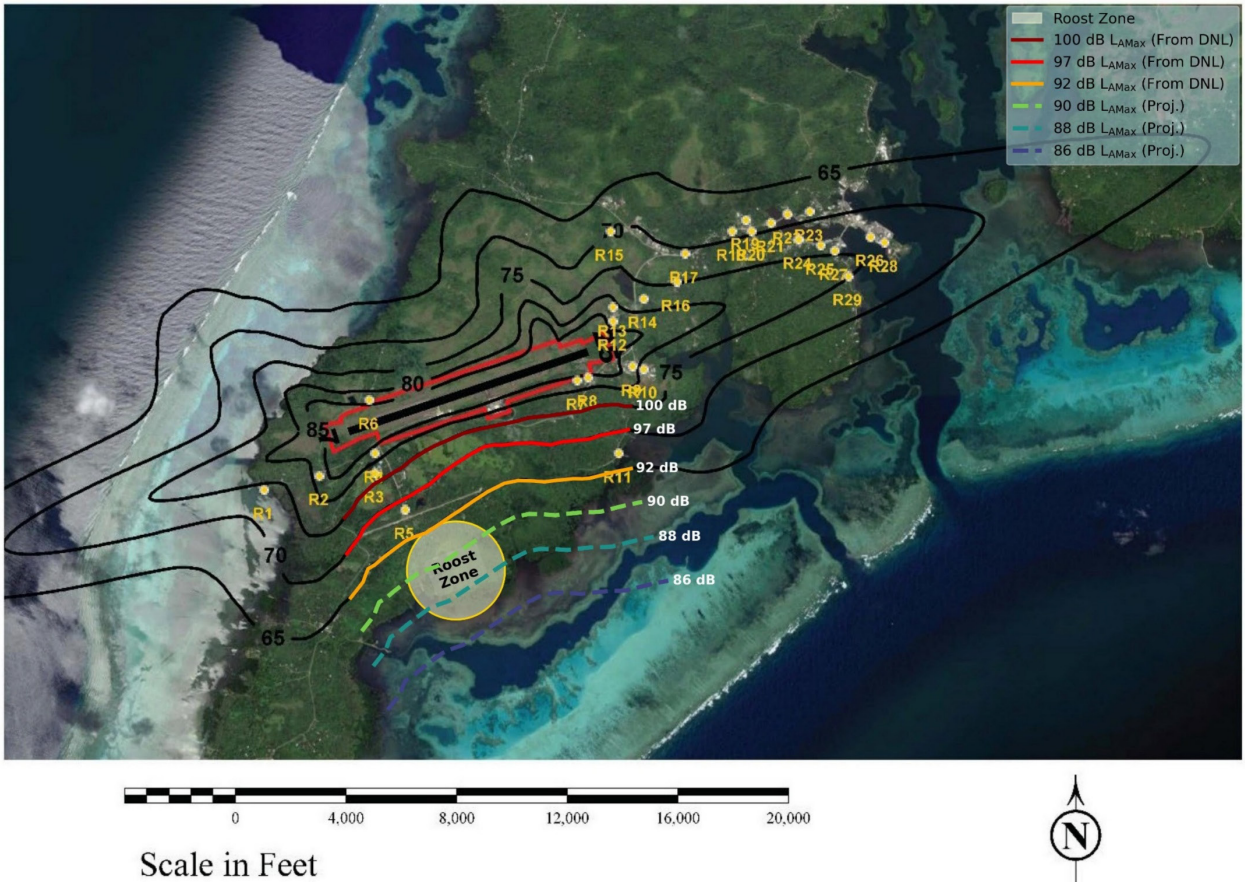
Increased noise levels can result in unnecessary expenditure of energy as well as stress-related behaviors or flushing from the roosting area (SWCA, 2012). Similar flying fox species have been documented flushing from roost locations when exposed to noise levels above 90 dBA during intermittent aircraft overflights. Documented flushing occurrences were infrequent and involved singular flying foxes, most individuals resumed roosting activities after the incident. It is suspected that certain levels of noise may be tolerated in exchange for high-quality roosting areas that are close to food and provide hunting and weather protection (SWCA, 2012). Between January and March 2008, weekly counts of the roosting colony at Andersen Air Force Base (AAFB) detected a decrease of approximately 35 percent of bat individuals (44 to 32

individuals) during exercises that included frequent F-18 flyovers (SWCA, 2008). The decrease in population size measured by SWCA during the January to March exercise contrasts with the results of the University of Guam-DoN long-term fruit bat monitoring surveys on AAFB that demonstrate seasonal increases of the Mariana fruit bat population at the roosting colony during a similar timeframe (Mildenstein, 2024). Mariana fruit bats start adding to the colony as early as the end of December, and the number increases steadily through the end of February, peaking in early March; often increasing the roosting population by as much as 10 times (Mildenstein, 2024). Disturbance at the roost site may negatively affect fruit bats in a variety of ways, including energetic and hormonal imbalance, disruptions to social structure or breeding, relocation to lower quality habitat, and abandonment of their young (Heideman, 2000; Klose et al., 2006; USFWS, 2016). While fruit bats generally demonstrate a high level of fidelity to a roosting location unless disturbance is substantial (USFWS, 2016). Exposure to high levels of noise may result in roost area abandonment if noise increases stress to a level that cannot be tolerated.

Yap flying foxes would likely respond differently to different levels of noise. For sound levels less than 60 dBA, there may not be any visible response (SWCA, 2008). For sound levels greater than 60 dBA but less than 90 dBA, there is likely to be changes in regular communications at the roost site. In a study in Australia on more distantly related Pteropids, researchers found when aircraft noise levels exceeded the background noise level at the colony, the bats ceased to vocalize until the aircraft sound had dissipated (Pearson and Clarke, 2018). The colonies studied were roosting in urban landscapes, the background measured sound level of 55 dBA is likely greater than the background soundscape level at the mangrove colony on Yap. Hence, it may take less aircraft noise to cause the Yap flying fox mangrove colony to stop normal vocalizations.

If a Yap flying fox individual, or a colony, is present within the section of the roosting zone that experiences 90 dB $L_{Amax}$ or greater, individuals may experience impacts that could include individual or roost disruption, including flushing (SWCA, 2008; SWCA, 2012). Flushing occurrences could be temporary or permanent for individuals, or the entire colony, depending on the individual and/or colony habituation capacity and tolerance to episodic or intermittent loud noises. While Yap flying foxes within the roosting zone are currently exposed to between 64 and 70 dB year-round from existing Airport flight activities, the episodic increase up to 92 dB $L_{Amax}$ could cause individuals or the colony to flush. It should be noted that flushing events that affect just a few individuals may still have significant adverse effects on the colony. If there are non-volant pups present within the colony, it is possible the pup could lose grip and fall to the forest floor when the female flushes.

Conservation measures to mitigate significant adverse impacts on the Yap flying fox are identified in the Biological Assessment/Biological Opinion that is currently under consultation between the DoW and Yap Government and is estimated to be completed in June 2026. A summary of the consultation actions, conservation measures, and the Biological Opinion in support of this EIS will be provided in Appendix H of the final EIS.




Source: ANL, 2026

**Figure 3-19 Proposed Action Aircraft Maximum Sound Level Contours in Relation to the Yap Flying Fox Roosting Zone**

Long-term, less than significant, adverse impacts on the Yap flying fox would occur from the permanent loss of up to 241 acres (Agroforest, Marsh, Savanna, Secondary Vegetation, and Upland Forest vegetation communities) of potential foraging habitat. The loss of this foraging habitat would be a less than significant impact because there is sufficient adjacent foraging habitat for the Yap flying fox to utilize and flying foxes have been known to regularly travel up to 30 nightly per night in search of food (Australian Museum, 2025).

The Proposed Action at the Airport includes demolition of portions of the existing airfield perimeter fence and installation of 26,100 LF of new fencing to surround the airfield perimeter. The fencing would be chain link, a minimum of 8 ft tall, and include barbed wire outriggers. Barbed wire poses a potential entanglement risk to birds and bats (Maclean, 1999; Queensland Conservation, 2006). Avoidance, minimization measures, and BMPs outlined in Section 2.8 would minimize the potential impacts on birds or the Yap flying fox.

**Seaport**: Impacts on special status species within the Seaport project, Airport-to-Seaport connector road, and dredge disposal and laydown areas would be the same as described for wildlife in Section 3.5.2.3.3.2.

#### 3.5.2.3.3.4 Invasive Species

Additionally, there could be long-term, less than significant, adverse impacts from the potential for increased invasive species from post-construction activities and aircraft or ships coming in from outside Yap or FSM. Avoidance, minimization measures, and BMPs outlined in Section 2.8 would avoid or reduce the potential introduction or spread of invasive species during post-construction activities.

### 3.5.2.4 Alternative 2 - Airport (Relocated Apron) and Seaport (In-Channel Dredge Disposal) Improvements Potential Impacts

#### 3.5.2.4.1 Avoidance, Minimization Measures and Best Management Practices

Avoidance, minimization measures, and BMPs implemented for Alternative 2 would be the same as described for the Preferred Alternative (see Section 2.8).

#### 3.5.2.4.2 Construction Impacts

The analysis below has determined that during the construction period, Alternative 2 would have a less than significant adverse impact on terrestrial biological resources.

##### 3.5.2.4.2.1 Terrestrial Vegetation

**Airport**: Construction impacts on terrestrial vegetation would be similar to those described for the Preferred Alternative described in Section 3.5.2.3.2.1 because the only change in this alternative would be the relocation of the aircraft parking apron from the eastern aspect north of the runway to the western aspect north of the runway.

**Seaport**: Construction impacts on terrestrial vegetation would be similar to but less than those described for the Preferred Alternative described in Section 3.5.2.3.2.1 because the channel dredge material would be disposed of within the channel and would not affect the land area in Tamil, Rull, or Nungoch.

##### 3.5.2.4.2.2 Terrestrial Wildlife

**Airport**: Construction impacts on terrestrial wildlife would be similar to those described for the Preferred Alternative described in Section 3.5.2.3.2.2 because the only change in this alternative would be the relocation of the aircraft parking apron from the eastern aspect north of the runway to the western aspect north of the runway.

**Seaport**: Construction impacts on terrestrial wildlife would be similar to but less than those described for the Preferred Alternative described in Section 3.5.2.3.2.2 because the channel dredge material would be disposed of within the channel and would not affect the land area in Tamil, Rull, or Nungoch.

##### 3.5.2.4.2.3 Special Status Species

**Airport**: Construction impacts on terrestrial special status species would be similar to those described for the Preferred Alternative described in Section 3.5.2.3.2.3 because the only change in this alternative would be the relocation of the aircraft parking apron from the eastern aspect north of the runway to the western aspect north of the runway.

**Seaport**: Construction impacts on terrestrial special status species would be similar to but less than those described for the Preferred Alternative described in Section 3.5.2.3.2.3 because the

channel dredge material would be disposed of within the channel and would not affect the land area in Tamil, Rull, or Nungoch.

#### 3.5.2.4.2.4 Invasive Species

**Airport**: Construction impacts on invasive species would be similar to those described for the Preferred Alternative in Section 3.5.2.3.2.4 because the only change in this alternative would be the relocation of the aircraft parking apron from the eastern aspect north of the runway to the western aspect north of the runway.

**Seaport**: Construction impacts on invasive species would be similar to but less than those described for the Preferred Alternative in Section 3.5.2.3.2.4 because the channel dredge material would be disposed of within the channel and would not affect the land area in Tamil or Rull.

### 3.5.2.4.3 Post-Construction Impacts

The analysis below has determined that during the post-construction period, Alternative 2 would have a less than significant adverse impact on terrestrial vegetation and wildlife, and significant adverse impacts on special status species.

Post-construction impacts of Alternative 2 on terrestrial vegetation, terrestrial wildlife, special status species, and invasive species would be the same as those described for the Preferred Alternative described in Section 3.5.2.3.3 because Airport and Seaport post-construction activities would be the same in both alternatives.

## 3.6 Cultural Resources

In coordination with the FSM and Yap State, the U.S. DoW has developed a Cultural Resources SOP (Appendix A) to provide uniform guidelines for cultural resource consultation during the course of U.S. activities requiring an EIS on Yap, such as the Proposed Action. The SOP also covers cultural resources identification and survey activities. This SOP incorporates existing laws and regulations that apply to U.S. federal actions and undertakings that occur abroad at overseas locations and commits compliance with the applicable portions of the National Historic Preservation Act (NHPA), Title 54 USC § 307101(e) [Formerly known as Section 402]; as well as incorporating substantive portions of FSM and Yap specific cultural resource laws including Yap State Title 5 Chapter 4 and FSM Title 26 relating to concepts of culture.

This discussion of cultural resources includes historic properties, other historical architectural resources, archaeological resources, and cultural items and traditions. The term cultural resource categories/types are defined based on laws and regulations, including the National Historic Preservation Act (NHPA) Title 54 USC § 307101 (e) (formerly known as NHPA Section 402, the World Heritage List, and local FSM and Yap State definitions. Cultural resources include archaeological and historic sites and artifacts; traditional religious, ceremonial, and social sites, funerary and other sacred objects; and buildings, structures, or material remains results from or associated with, human cultural activity. Cultural resources can be divided into four major categories:

1. Historic property is defined by FSM Title 26 § 102 and Yap State Code (YSC) Title 5 §404 as “any site, structure, building, object or area of significance in the history, archaeology

or culture of the people of the State of Yap." Historic properties that are included, or eligible for inclusion, on the National Register of Historic Places (NRHP) meet one or more of the four National Register criteria, pursuant to 36 CFR Sec. 60.4 and possess integrity to convey that significance. Yapese cultural resources may not meet NRHP eligibility criteria but may still be culturally significant. YSC Title 5 § 404 defined traditional culture is defined as "any tradition, art, craft, song, story or technology indigenous to the people of the State of Yap." FSM Title 26 §102 defines "cultural attribute" as "all aspects of local culture, tradition, arts, crafts, all social institutions, forms of expression, and modes of social interaction." "Historical artifact" is defined as "an object produced by human beings 30 or more years ago."

2. Architectural resources include buildings and structures, and other built-environment resources of historic or aesthetic significance, but not including roads, railroads, and landscapes.
3. Archaeological resources are any material remains of past human life or activities which are at least 30 years of age and of interest to archaeological study. These resources are significant from both a historical and cultural perspective and provide insight into past human activities on Yap.
4. A Traditional Cultural Places (TCP) is a building, structure, object, site, or district that may be listed (or determined eligible for listing) the NRHP for its significance to a living community because of its association with cultural beliefs, customs, or practices that are rooted in the community's history and that are important in maintaining the community's cultural identity (National Park Service, 2024). Historic properties that are included, or eligible for inclusion in the NRHP, possess integrity and meet one or more of the four NRHP criteria, pursuant to 36 CFR Sec 60.4. A historic property is considered a TCP when it is a place that a living community regards as important for its association with cultural practices, beliefs, traditions, lifeways, arts, crafts, or social institutions. TCPs are rooted in a community's history and are important in maintaining the continuing cultural identity of the community.

The Cultural Resources SOP defines three categories of cultural resources, which were created with respect to FSM and Yap State definitions: 1) tangible resources, 2) intangible resources, and 3) burials/graves/cemeteries. Tangible resources include sites, structures, buildings, objects, and areas of historic and cultural significance, for example, stone money. Intangible resources include traditions; arts and crafts; myths, stories, and legends; chants and songs; and indigenous technology. Burials/graves/cemeteries are defined as ancient (unknown connection to living population), historic with family connections, modern with family connections, and historic/modern (unknown connection to living population).

### 3.6.1 Affected Environment

In compliance with the NHPA, the DoW, in consultation with regulators and other consulting parties, identifies historic properties and other cultural resources that may be impacted by the Proposed Action and assess the effects on those resources. The ROI for cultural resources includes project footprints at both Yap State Seaport (Seaport), Yap State International Airport

(Airport) proposed roadway improvements, dredge disposal locations, and construction support areas and is referred to as an area of potential effects (APE) under NHPA.

In support of the Proposed Action, the DoW conducted inventories of cultural resources within the project footprint to identify historical properties that are listed or eligible for listing in the NRHP (Title 54 USC § 307101 [e] [formerly known as Section 402]) (Bailey et al., 2022; CAP JV, 2023; Craft et al., 2025; Napolitano et al., 2024; Navy, 2025, 2026; Stolfer and Bierly, 2025) (Table 3-20; Figure 3-20). The Cultural Resources Survey Reports for the Airport and Seaport are provided in Appendices J-1 and J-2 respectively.

**Table 3-20 Previous investigations that overlap or are adjacent to the APE**

| *Reference* | *Relationship to Project Area* | *Type of Investigation* | *Summary of Findings* |
|---|---|---|---|
| ***Airport*** | | | |
| Bailey et al. (2022) | Overlaps | Desktop analysis | Analysis of terrestrial and marine natural resources and cultural resources in support of the Proposed Action |
| Beardsley (2004) | Adjacent | NRHP nomination | NRHP nomination for Dinay Village |
| Craft et al. (2025) | Overlaps | Archaeological inventory survey | Delineated and recorded representative features within the Yabach Traditional Cultural Area and four cemeteries; documented 16 historical sites, and 38 "isolated occurrences" |
| Dodson and Intoh (1999) | Adjacent | Paleoenvironmental survey | Sediment cores containing charcoal radiocarbon dated to approximately 3,300 years ago |
| Gordon (1980) | Overlaps | Survey and data recovery | Recorded 1,157 graves, some of which were excavated |
| Intoh and Leach (1985) | Adjacent | Archaeological survey and excavation | Recorded traditional and contemporary village features and excavated house platforms in Gitam village |
| King (2006) | Overlaps | Archaeological survey | Recorded aircraft wrecks and revetments with aircraft debris |
| Kirch (1978) | Overlaps | Archaeological survey | Recorded general locations of Yapese graves, the 19th century tombs of Chief Orothin and Chief Yaloth, and Japanese WWII features |
| Napolitano et al. (2024) | Overlaps | Archaeological monitoring | Recorded a Japanese cave and tunnel and a traditional multi-tiered grave; also report locations of nine sites/features and 348 graves recorded by biologists from Duenas, Camacho, and Associates |
| Napolitano (2021) | Adjacent | Paleoenvironmental survey | Collected sediment cores in Foqol Swamp |
| Stolfer and Bierly (2025) | Overlaps | Archaeological inventory survey | Recorded 167 Yapese graves, nine traditional structures, and 57 WWII features. Graves, structures, and WWII features were recorded using the same terminology as Gordon (1980); dimensions, full descriptions, and photographs of graves and structures were not provided. |
| Thompson (2012) | Adjacent | Archaeological inventory survey | Inventory of stone money banks (*malal*) |

| *Reference* | *Relationship to Project Area* | *Type of Investigation* | *Summary of Findings* |
|---|---|---|---|
| ***Seaport*** | | | |
| Bailey et al. (2022) | Overlaps | Desktop analysis | Analysis of terrestrial and marine natural resources and cultural resources in support of the Proposed Action |
| CAP JV (2025) | Overlaps | Archaeological survey | Recorded Spanish Fort, two traditional retaining walls (*tanayboch*), one anthropogenic mound, and 11 shipwrecks |
| Ford (2023) | Overlaps | Evaluation of geotechnical boring locations | Conducted on-site evaluation of geotechnical boring locations prior to ground disturbance; no findings |
| Moon (1976) | Overlaps | NRHP nomination | NRHP nomination for Spanish Fort |
| ***Tamil Dredge Material Storage/ Placement Area*** | | | |
| Gifford and Gifford (1959) | Overlaps | Archaeological survey and excavation | Recorded the site of Walgom, the location an earthen mound with a three-tier house platform for the priest of Magrogoy, the iguana god. The site plots inside the APE based on the 1959 map, but the site location is not confirmed |
| Department of the Navy (2025) | | Archaeological survey | Pedestrian survey identified six cultural resources that abut the APE |
| ***Rull Dredge Material Storace/ Placement Area*** | | | |
| Bailey et al. (2022) | Overlaps | Desktop analysis | Analysis of terrestrial and marine natural resources and cultural resources in support of the Proposed Action |
| CAP JV (2025) | Overlaps | Archaeological survey | Recorded Spanish Fort, two traditional retaining walls (*tanayboch*), one anthropogenic mound, and 11 shipwrecks, one of which partially overlaps with the dredge footprint |
| ***Waneday Channel Dredge Location*** | | | |
| Bailey et al. (2022) | Overlaps | Desktop analysis | Analysis of terrestrial and marine natural resources and cultural resources in support of the Proposed Action |
| CAP JV (2025) | Overlaps | Archaeological survey | Recorded Spanish Fort, two traditional retaining walls (*tanayboch*), one anthropogenic mound, and 11 shipwrecks, one of which overlaps with the dredge location |

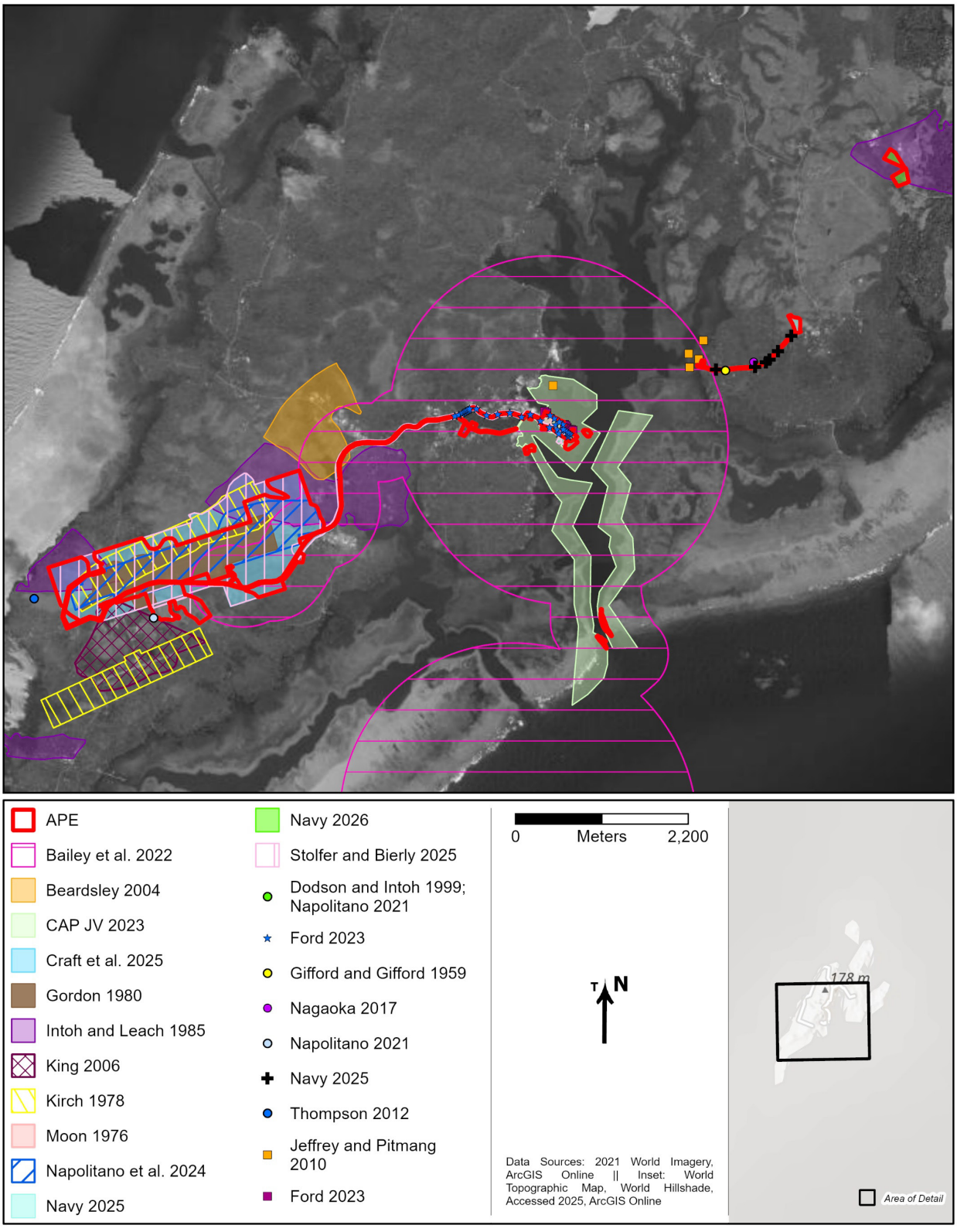



**Figure 3-20 Cultural resources studies overlapping with and within 400 m of the Preferred Alternative APE at the Airport and Airport-to-Seaport Road**

### 3.6.1.1 Archaeological Resources

This section is organized by APE sections. At least 69 archaeological sites are located within the APE (Table 3-21). Traditional Yapese features that were not evaluated for NRHP eligibility in the source report are recommended as eligible for listing in the NRHP under Criterion D and may retain integrity of location, materials, feeling, design, setting, workmanship, and association.

#### 3.6.1.1.1 Airport

At least 64 archaeological sites have been identified within the APEs for Preferred Alternative and Alternative 2 at the Airport (Table 3-21 and Figure 3-21). Craft et al. (2025) identified the Yabach Traditional Cultural Area (KLF-TSN-17), four Yapese cemeteries (Taliw u Fedoor [KLF-TSN-18], Taliw u Lamer [KLF-TSN-19], Taliw u Dakiy [KLF-TSN-20], and Taliw u Fanqalily [KLF-TSN-21]), and 16 historical sites (KLF-TSN-01 to KLF-TSM0-16). Thirty-eight "isolated occurrences" were documented (Craft et al., 2025: Table 10). The Air Force (Stolfer and Bierly, 2025) documented 167 Yapese graves, nine traditional Yapese structures, and 57 WWII features. Kirch (1978) recorded a defensive position with a "Japanese cannon," a gun emplacement, the general location of Yapese graves, the Tomb of Orothin and two pyramidal graves, one of which is the grave of Chief Yaloth. Orothin and Yaloth were 19th century chiefs from Dalipebinaw and Lamer, Rull and died approximately within three years of each other (Kirch, 1978:5). Gordon (1980) recorded 1,157 graves in the APE prior to construction of the Airport. Spatial data for all graves has not been published, and it is unknown which graves documented by Gordon (1980) were destroyed or relocated. Napolitano et al. (2024) recorded a Japanese cave and tunnel (designated Temporary Site 01) and a traditional Yapese multi-tiered grave (designated Temporary Site 02). Napolitano et al. (2024) also presented the locations of Temporary Site 03 to Temporary Site 12 and 348 graves that were recorded by Duenas Camacho and Associates (DCA) during its natural resources survey of the Preferred Alternative. Several sites have been recorded multiple times and the cultural areas delineated by Craft et al. (2025) overlap with several previous documented sites and graves (see Table 3-21).

#### 3.6.1.1.2 Seaport

Three archaeological sites are within the Seaport portion of the APE for the Preferred Alternative and Alternative 2 (see Table 3-21 and Figure 3-22). CAP JV (2023) recorded three sites. Moon (1976) completed an NRHP nomination for the Spanish fort (Reference no. 76002215) (Moon, 1976). CAP JV (2023) documented Temporary Site 02, a retaining wall built for erosion control (*tanayboch*) that abuts the Preferred Alternative APE. The site is recommended eligible for listing in the NRHP under Criterion D (CAP JV, 2023). Temporary Site 03 is a mid-20th century anthropogenic mound on the edge of what was Tablaaw Island. Tablaaw was incorporated into a peninsula through land reclamation and currently supports the Yap State Legislature building. It is eligible under Criterion D, but it lacks integrity of location, setting, design, materials, workmanship, feeling, and association and is therefore not eligible for listing in the NRHP (CAP JV, 2023).

#### 3.6.1.1.3 Airport-to-Seaport Road

A desktop study was completed using the best available information (Bailey et al., 2022). There are no known archaeological sites in the Airport-to-Seaport road APE.

#### 3.6.1.1.4 Tamil Dredge Material Offloading and Stockpile Areas

One archaeological site is known within the Tamil Dredge Material Storage/Placement area in the Preferred Alternative (see Table 3-21; Figure 3-23). The APE includes the Tamil Community Wharf Access Road. This area is not a component of Alternative 2. Gifford and Gifford (1959) excavated the site of Walgom in Teb Village, which may overlap with the road segment of the Tamil Dredge Material Storage/Placement Area (Gifford and Gifford's site map was georeferenced for this analysis but the site was not re-located). The site is an earthen mound approximately with a three-tier terraced house platform on it. The house was no longer present when the site was recorded but the location was a retreat for the priest of Magrogoy, the iguana god. A shrine for Magrogoy was 15.2 m east of the house platform. The site plots inside the APE but it was georeferenced from the map in the original publication (Gifford and Gifford, 1959) and the site location is not confirmed. It was not observed during the Navy's (2025) survey.

#### 3.6.1.1.5 Rull Dredge Material Stockpile Area

A desktop study was completed using the best available information (Bailey et al., 2022). There are no known archaeological sites in the Rull Dredge Material Stockpile Area.

#### 3.6.1.1.6 Tamil Dredge Material Storage/Placement Area

The Navy (2025) completed a pedestrian survey of the Tamil Dredge Material Storage/Placement Area and did not identify archaeological sites in the APE. Using the best available information, there are no known archaeological sites in the Tamil Dredge Material Storage/Placement Area APE.

#### 3.6.1.1.7 Gagil Construction Support Area

The Navy (2026) completed a pedestrian survey in the Gagil Construction Support Area and did not identify any archaeological sites in the APE. Using the best available information, there are no archaeological sites known with the Yap Sports Complex worker camp site.

#### 3.6.1.1.8 Waneday Channel Dredge Location

One archaeological site is known within the Waneday Channel Dredge Location of the Preferred Alternative and Alternative 2 (see Table 3-21 and Figure 3-22). CAP JV (2023) recorded a 19th or 20th century shipwreck identified as either the SMS *Planet* or the *Kokura Maru* (Target 24). It is eligible for listing in the NRHP under Criterion D (CAP JV, 2023).

**Table 3-21 Previously Recorded Archaeological Sites Within the Preferred Alternative and Action Alternative 2**

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| ***Airport*** | | | | | |
| 48NE:1 | Grave | Burial/Traditional Yapese | 62 low rubble graves, one piled stone grave, 18 one-tiered graves, 21 two-tiered graves, five two-tiered tombs, and three three-tiered tombs on an agricultural terrace | Eligible (D) | Gordon (1980) |
| 49NW:2 | Grave | Burial/Traditional Yapese | 29 graves on a finger of land surrounded by ravines | Eligible (D) | Gordon (1980) |
| 46SW:3 | Grave | Burial/Traditional Yapese | One low rubble grave; overlaps with Taliw u Fedoor (Craft et al., 2025) | Eligible (D) | Gordon (1980) |
| 46SW:4 | Grave | Burial/Traditional Yapese | Forty-four graves on a hilltop | Eligible (D) | Gordon (1980) |
| 46SW:5 | Grave | Burial/Traditional Yapese | Four piled stone graves in flat savanna | Eligible (D) | Gordon (1980) |
| 46SW:15 | Grave | Burial/Traditional Yapese | Five low rubble graves and one piled stone grave in flat savanna | Eligible (D) | Gordon (1980) |
| 46SW:16 | Grave | Burial/Traditional Yapese | Three low rubble graves, one piled grave, and one one-tiered grave | Eligible (D) | Gordon (1980) |
| 46SW:17 | Grave | Burial/Traditional Yapese | One low rubble grave in flat savanna | Eligible (D) | Gordon (1980) |
| 46SW:18 | Grave | Burial/Traditional Yapese | One low rubble grave in flat savanna; overlaps with Taliw u Fedoor (Craft et al., 2025) | Eligible (D) | Gordon (1980) |
| 46SW:21 | Grave | Burial/Traditional Yapese | Six low rubble graves in flat savanna | Eligible (D) | Gordon (1980) |
| 46SW:22 | Grave | Burial/Traditional Yapese | Two low rubble graves in flat savannah; overlaps with Taliw u Fedoor (Craft et al., 2025) | Eligible (D) | Gordon (1980) |
| 46SW:29 | Grave | Burial/Traditional Yapese | One low rubble grave on a finger of land bounded by ravines; overlaps with Taliw u Fedoor (Craft et al., 2025) | Eligible (D) | Gordon (1980) |
| 46SW:30 | Grave | Burial/Traditional Yapese | Five low rubble graves on a finger of land bounded by ravines | Eligible (D) | Gordon (1980) |
| 46SW:32 | Grave | Burial/Traditional Yapese | One low rubble grave on a finger of land bounded by ravines | Eligible (D) | Gordon (1980) |
| 46SW:35 | Grave | Burial/Traditional Yapese | 28 low rubble graves, 12 piled graves, two one-tiered grave, and 2 piled stone tombs on a ridgetop | Eligible (D) | Gordon (1980) |
| 46SW:36 | Grave | Burial/Traditional Yapese | 59 low rubble graves, one piled stone grave, 13 one-tiered graves, two two-tiered graves, and one rubble tomb on a ridgetop | Eligible (D) | Gordon (1980) |

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| 46SE:1 | Grave | Burial/Traditional Yapese | 108 low rubble graves, four piled stone graves, 17 one-tiered graves, two two-tiered graves, one one-tiered tomb, and two three-tiered tombs on a hilltop | Eligible (D) | Gordon (1980) |
| 46SE:2 | Grave | Burial/Traditional Yapese | 67 low rubble graves, two piled stone graves, four one-tiered graves, 12 two tiered graves, one three-tiered grave, four rubble tombs, one one-tiered tomb, and three two-tiered tombs in flat savanna | Eligible (D) | Gordon (1980) |
| 46SE:15 | Grave | Burial/Traditional Yapese | Five low rubble graves and one piled stone grave in flat savanna | Eligible (D) | Gordon (1980) |
| 46SE:27 | Grave | Burial/Traditional Yapese | Large area on a finger of land bounded by ravines; heavy vegetation prevented assessment | Eligible (D) | Gordon (1980) |
| 46SE:30 | Grave | Burial/Traditional Yapese | Five low rubble graves on a finger of land bounded by ravines | Eligible (D) | Gordon (1980) |
| 47SE:2-1 | Grave | Burial/Traditional Yapese | One low rubble tomb on an agricultural terrace; overlaps with Yabach Traditional Cultural Area (Craft et al., 2025) | Eligible (D) | Gordon (1980) |
| 48NE:1 | Grave | Burial/Traditional Yapese | Two low rubble graves and three one-tiered graves on an agricultural terrace | Eligible (D) | Gordon (1980) |
| 49NW:2 | Grave | Burial/Traditional Yapese | 29 low rubble graves on a finger of land bounded by ravines | Eligible (D) | Gordon (1980) |
| 49NW:3 | Grave | Burial/Traditional Yapese | 56 low rubble graves, 11 one-tiered graves, and two two-tiered graves on a finger of land bounded by ravines | Eligible (D) | Gordon (1980) |
| 49NW:4 | Grave | Burial/Traditional Yapese | 127 low rubble graves, four piled stone graves, 48 one-tiered graves, six two-tiered graves, seven rubble tombs, six one-tiered tombs, six one-tiered tombs, two three-tiered graves, one circular tomb on a finger of land bounded by ravines | Eligible (D) | Gordon (1980) |
| Japanese cannon | Defensive position | Military/Japanese | Re-recorded as Temporary Site 05 by Napolitano et al. (2024) and as KLF-TSN-01 by Craft et al. (2025) | Not evaluated | Kirch (1978) |
| KLF-TSN-01 | Defensive position | Military/Japanese | More than 100 partially buried metal barrels and debris, Japanese gravestone, glass fragments, two large artillery guns | Not evaluated | Craft et al. (2025); Kirch (1978) |

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| KLF-TSN-02 | Pit | Military or resource procurement/ Japanese | Possible Japanese prospect pit 49.2 ft (15.0 m) in diameter and 8.2 ft (2.5 m) deep with a trench extending from the west site of the pit that measures 16.4 (5.0 m) long by 6.5 ft (2.0 m) wide and 6.5 ft (2.0 m) deep | Not evaluated | Craft et al. (2025) |
| KLF-TSN-03 | Bottle dump | Military/Japanese | Scatter of more than 30 glass bottles, a glass beaker, and metal debris across 82 ft (25.0 m) by 147.6 ft (45.0 m) area | Not evaluated | Craft et al. (2025) |
| KLF-TSN-04 | Personal effects | Military/Japanese or American | Japanese glass bottles, glass jar, ceramics, and a canteen across 114.8 ft (35 m); recently exposed with a bulldozer cut | Not evaluated | Craft et al. (2025) |
| KLF-TSN-05 | Prospecting site | Military or resource procurement/ Japanese | Prospecting site straddling a small stream with glass bottles, metal barrels, and metal debris, tunnel extends 32.8 ft (10 m) into the hillside | Not evaluated | Craft et al. (2025) |
| KLF-TSN-06 | Glass bottles | Military/Japanese | Glass beverage bottles and marine shell across a 32.8 ft (10.0 m) by 32.8 ft (10.0 m) area | Not evaluated | Craft et al. (2025) |
| KLF-TSN-07 | Airplane debris | Military/Japanese | Debris scatter with Japanese military aircraft parts across a 108.2 ft (33.0 m) by 108.2 ft (33.0 m) area | Not evaluated | Craft et al. (2025) |
| KLF-TSN-08 | Concrete aqueduct | Unknown | Concrete aqueduct section that is 98.4 ft (30.0 m) long, 2.3 ft (0.7 cm) wide, and 3.0 ft (0.9 cm) high with an associated earthen mound that measures 49.2 ft (15 m) by 10.8 ft (3.3 m) wide by 2.6 ft (0.8 m) high | Not evaluated | Craft et al. (2025) |
| KLF-TSN-09 | Prospecting site | Military or resource procurement/ Japanese | Prospecting site spanning 85.3 ft (26.0 m) by 98.5 ft (30.0 m) area and a partially collapsed tunnel extending 11.5 ft (3.5 m) into the hillside; associated glass bottles, metal barrels | Not evaluated | Craft et al. (2025) |

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| KLF-TSN-10 | Prospecting site | Military or resource procurement/ Japanese | Prospecting site spanning a 246.1 ft (75.0 m) by 656.2 ft (200.0 m) area with a remnant aqueduct or channel, two excavated pits with tunnels, and other excavations and spoils mounds; two pits were recorded: Pit 1 is collapsed and has an opening of 5.6 ft (1.7 m) by 7.5 ft (2.3 m) and a deep trench approximately 131.2 ft (40.0 m) long extends from the pit, Pit 2 is at the end of an 26.2 ft (8.0 m) trench measuring 7 ft (2.3 m) wide and 4.9 ft (1.5 m) deep; associated glass bottles and metal debris | Not evaluated | Craft et al. (2025) |
| KLF-TSN-11 | Defensive position | Military/Japanese | Japanese gun mount, glass bottles, and metal debris across a 23.0 (7.0 m) by 55.8 ft (17.0 m) area; the gun mount is on top of 11 partially buried metal barrels | Not evaluated | Craft et al. (2025) |
| KLF-TSN-12 | Prospecting site | Military or resource procurement/ Japanese | Japanese prospecting site with metal rail and glass bottle | Not evaluated | Craft et al. (2025) |
| KLF-TSN-13 | Prospecting site | Military and resource procurement/ Japanese | Prospecting site including a collapsed tunnel that measures 13.1 ft (4.0 m) across and 7.2 ft (2.2 m) high, and 4.9 ft (1.5 m) cave depth; a trench that measures 20.7 ft (6.3 m) in length, 3.3 ft (1.0 m) wide, and 2.3 ft (0.7 m) deep; and an impact crater that measures 9.8 ft (3.0 m) by 9.8 ft (3.0 m) by 3.3 ft (1.0 m) deep; associated with antiaircraft gun parts, a mining cart with associated rails, and metal debris | Not evaluated | Craft et al. (2025) |
| KLF-TSN-14 | Pits | Unknown | Excavated pits spanning 19.7 ft (6.0 m) by 22.0 m; each depression measures 8.2 ft (2.5 m) across and 3.3 ft (1.0 m) to 6.6 ft (2.0 m) deep; possible Japanese foxholes | Not evaluated | Craft et al. (2025) |

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| KLF-TSN-15 | Defensive position | Military/Japanese | Japanese defensive position with small dry-stacked rock wall; a trench measuring 8.2 ft (2.5 m) across by 5.6 (1.7 m) deep and continues downslope for approximately 32.8 m (10.0 m); and an excavated depression measuring 9.8 ft (3.0 m) by 6.6 ft (2.0 m) deep; associated with an antiaircraft gun | Not evaluated | Craft et al. (2025) |
| KLF-TSN-16 | Prospecting site | Military or resource procurement/ Japanese | Collapsed Japanese tunnel with the entrance measuring 4.3 ft (1.3 m) across and 1.6 ft (0.5 m) high; a trench measuring 26.2 ft (8.0 m) long, 4.6 ft (1.4 m) wide, and 4.9 (1.5 m) deep extends from the tunnel entrance | Not evaluated | Craft et al. (2025) |
| KLF-TSN-17 | Yabach Traditional Cultural Area | Habitation/ Traditional Yapese | Village with traditional stone village components and a cemetery spanning 45.7 acres (18.5 hectares); 17 representative features recorded; overlaps with 47SE:2 (Gordon, 1980) | Eligible (D) | Craft et al. (2025) |
| KLF-TSN-18 | Taliw u Fedoor | Burial/Traditional Yapese | Cemetery with more than 200 burial features spanning 62.5 acres (25.3 hectare); 12 representative feature recorded; cluster of Yapese graves and the Tombs of Orothin and Chief Yaloth recorded by Kirch (1978), overlaps with 46SW:3, 46SW:18, 46SW:22, 46SW:29 (Gordon, 1980), Temporary Sites 08, 09, and 12 (Napolitano et al., 2024), KLF-TSN-02 (Craft et al., 2025) | Eligible (D) | Craft et al. (2025); Kirch (1978) |
| KLF-TSN-19 | Taliw u Lamer | Burial/Traditional Yapese | Cemetery spanning 45.2 acres (18.3 hectare); 10 representative features recorded | Eligible (D) | Craft et al. (2025) |
| KLF-TSN-20 | Taliw u Dakiy | Burial/Traditional Yapese | Cemetery with more than 100 graves across 78.1 acres (31.6 hectare); 12 representative feature recorded | Eligible (D) | Craft et al. (2025) |
| KLF-TSN-21 | Taliw u Fanqalily | Burial/Traditional Yapese | Cemetery with more than 50 graves spanning43.5 acres (17.6 hectare); five representative features recorded | Eligible (D) | Craft et al. (2025) |
| Revetment #1 | Aircraft debris | Military/Japanese or American | Aircraft debris; recorded as Temporary Site 07 by Napolitano et at. (2024) and KLF-TSN-07 by Craft et al. (2025) | Not evaluated | King 2006; Napolitano et al. (2024) |

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| Temporary Site 01 (Napolitano et al. 2024) | Cave | Military/Japanese | Japanese-built caves and tunnel | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 02 (Napolitano et al. 2024) | Grave | Burial/Traditional Yapese | Multi-tiered grave | Eligible (D) | Napolitano et al. (2024) |
| Temporary Site 03 (Napolitano et al. 2024) | Gun | Military/Japanese | Japanese antiaircraft gun | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 04 | Vehicle | Military or resource procurement/ Japanese | Possible Japanese vehicle | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 05 | Gun | Military/Japanese | Japanese Type 10, 120 mm antiaircraft guns | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 06 | Vehicle | Military or resource procurement/ Japanese | Possible Japanese vehicle | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 07 | Aircraft debris | Military/Japanese or American | Aircraft parts (King 2006 Revetment #1) | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 08 | Gun emplacement | Military/Japanese | Possible Type 93 machine gun emplacement; overlaps with Taliw u Fedoor (Craft et al., 2025) | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 09 | Aircraft debris | Military/Japanese | Aircraft wreckage; overlaps with Taliw u Fedoor (Craft et al., 2025) | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 10 | Cave | Military or resource procurement/ Japanese | Cave, possibly anthropogenically modified | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 11 | Gas cylinder and fuel tank | Military or resource procurement/ Japanese | Acetylene gas cylinders and fuel tank | Not evaluated | Napolitano et al. (2024) |
| Temporary Site 12 | Gun | Military/Japanese | Japanese Type 96 gun; overlaps with Taliw u Fedoor (Craft et al., 2025) | Not evaluated | Napolitano et al. (2024) |
| Tomb of Orothin | Grave | Burial/Traditional Yapese | Tomb associated with Chief Orothin; later incorporated into KLF-TSN-18 | Eligible (D) | Craft et al. (2025); Kirch (1978) |
| Yapese Grave Site | Grave | Mortuary/ Traditional Yapese | n/a | Eligible (D) | Kirch (1978) |

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| Yapese Grave Site | Grave | Mortuary/ Traditional Yapese | n/a | Eligible (D) | Kirch (1978) |
| ***Seaport*** | | | | | |
| Temporary Site 01 (CAP JV 2023) | Retaining wall | Traditional Yapese | Retaining wall built for erosion control (*tanayboch*) measuring approximately 68.9 ft (21.0 m) long by 5.9 ft (1.8 m) high with associated Japanese-administration concrete steps | Eligible (D) | CAP JV (2023) |
| Temporary Site 02 | Retaining wall | Erosion control/Tradition al Yapese | Retaining wall built for erosion control (*tanayboch*) measuring 85 ft (26 m) long by 3 ft (0.9 m) high; with a large vertically placed *Tridacna* s. shell at the southeast corner | Eligible (D) | CAP JV (2023) |
| Temporary Site 03 | Earthen mound | Traditional Yapese | Anthropogenic earthen mound constructed in the mid-20th century at the edge of what was Tablaaw Island, but was incorporated into the Nungoch peninsula through land reclamation and was built by Japanese residents who remained on Yap after WWII; the mound now supports the Yap State Legislature building | Not eligible | CAP JV (2023) |
| ***Tamil Seaport Dredge Material Storage/Placement*** | | | | | |
| Walgom | House platform and shrine | Traditional Yapese | Earthen mound approximately 14.8 ft (4.5 m) to 20.0 ft (6.1 m) high with a three-terrace house platform on it; the two lower terraces are rectangular, the top one is hexagonal; the house was no longer present, but the location served as a retreat for the priest of the iguana god, Magrogoy; a shrine is approximately 49.8 ft (15.2 m) east of the house platform | Eligible (D) | Gifford and Gifford (1959) |
| ***Waneday Channel*** | | | | | |
| Target 24 | Shipwreck | Historical European or Japanese | Debris field of late 19th/20th century wreck of either the SMS *Planet* or the *Kokura Maru* | Eligible (D) | CAP JV (2023) |

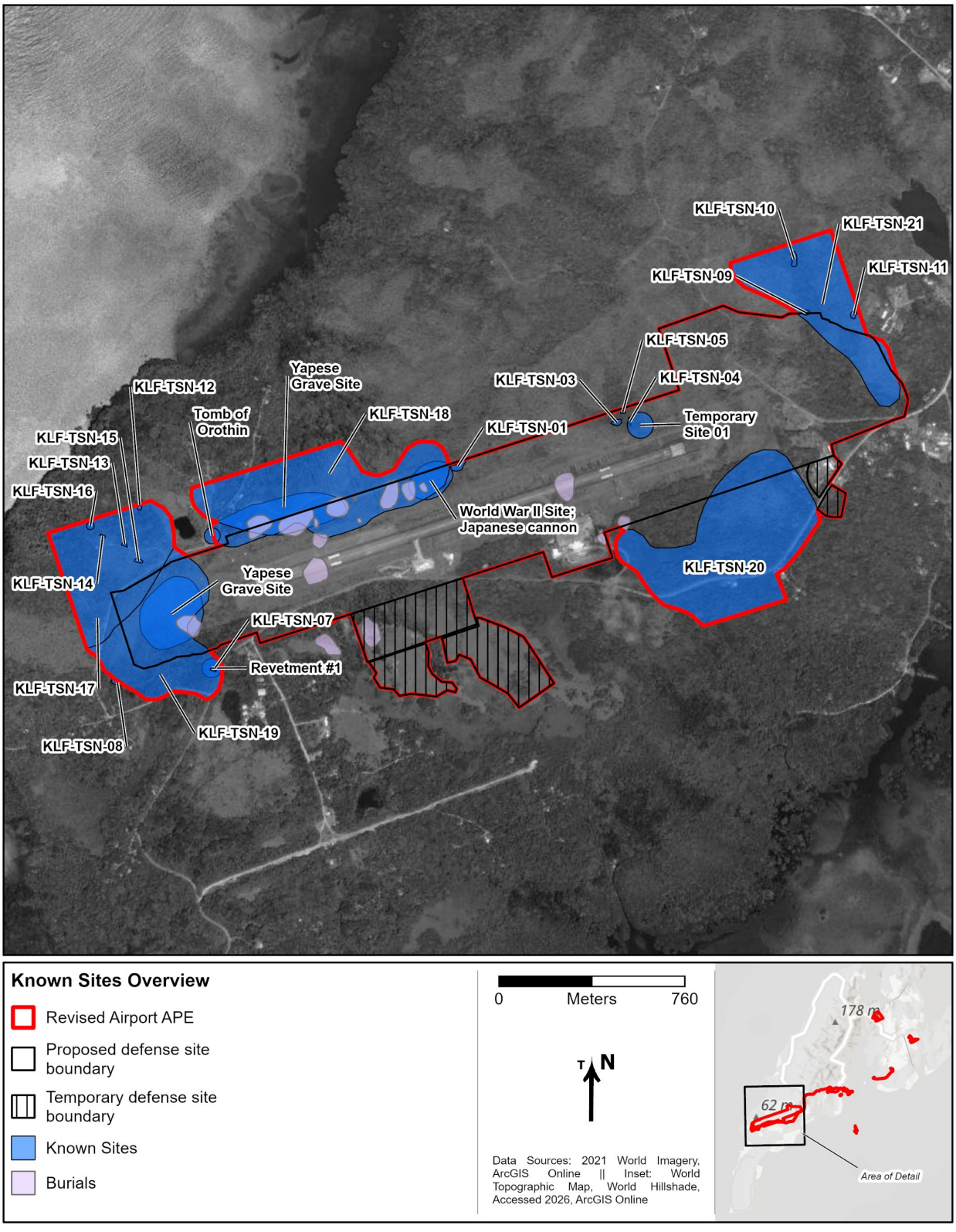



**Figure 3-21 Previously recorded archaeological sites at the Airport within the Preferred Alternative APE**

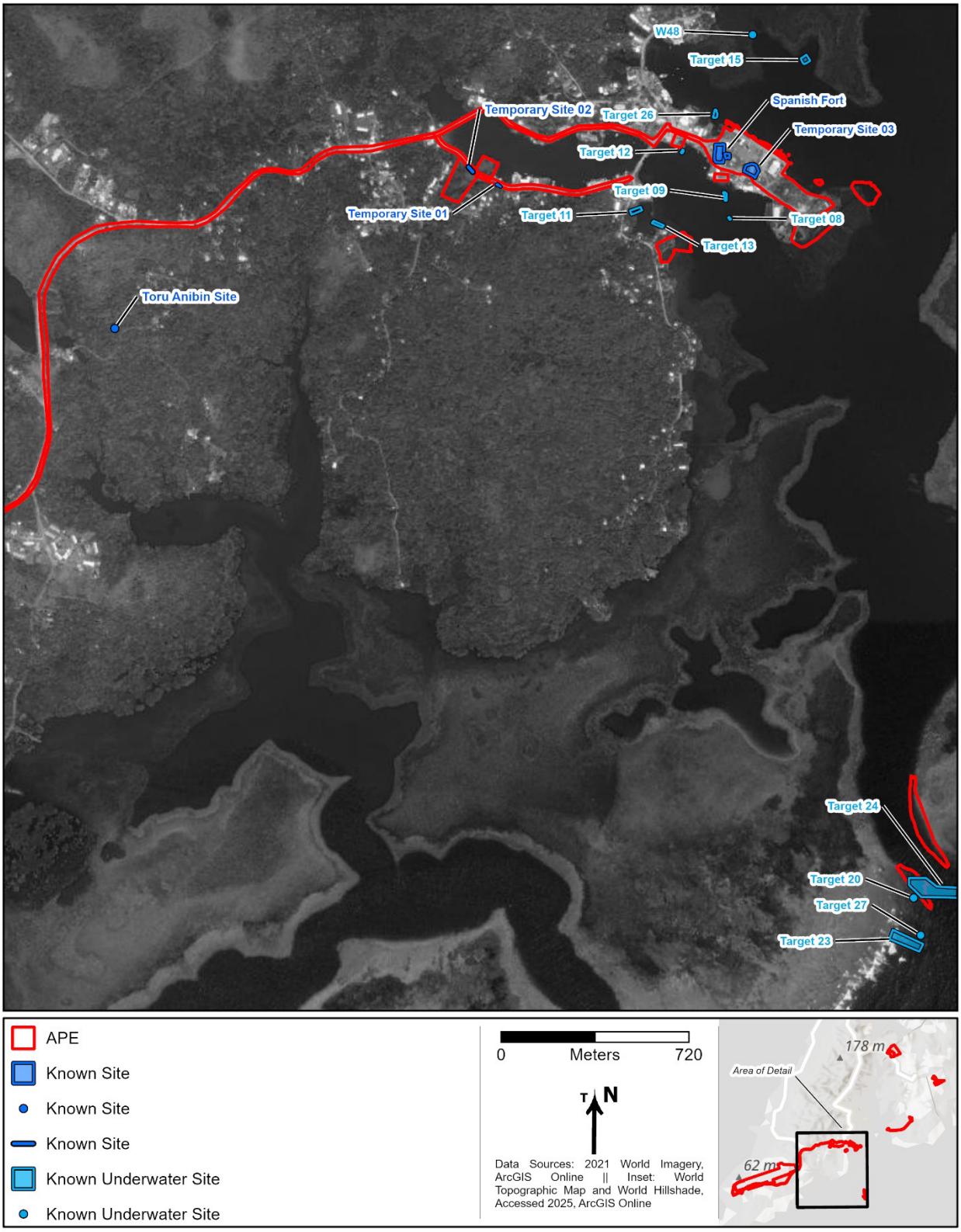



**Figure 3-22 Previously recorded archaeological sites at the Seaport within the Preferred Alternative APE**

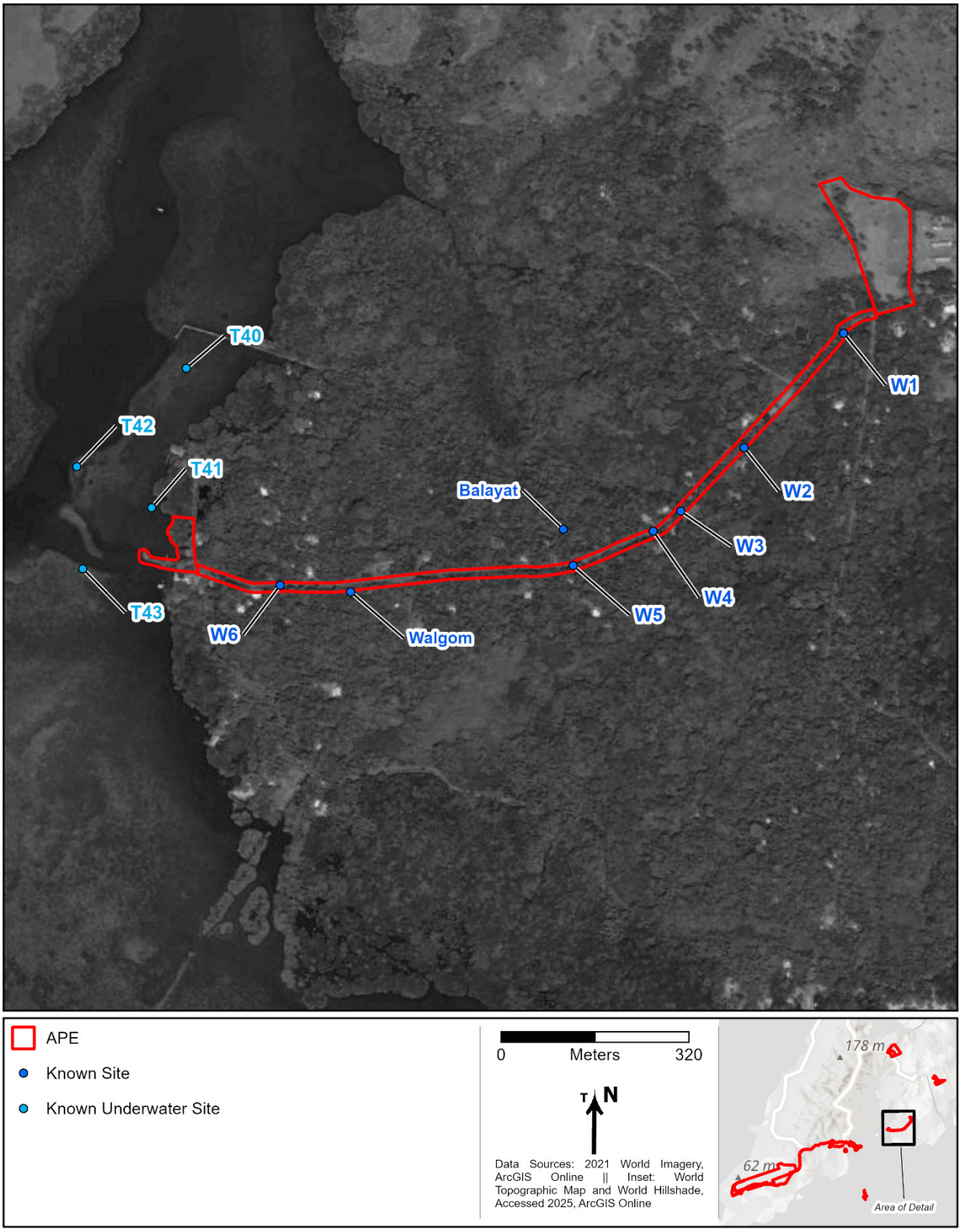



**Figure 3-23 Previously recorded archaeological sites within the Preferred Alternative APE at the Tamil Dredge Storage/Placement Area**

### 3.6.1.2 Architectural Resources

Three architectural resources are located within the Preferred Alternative at the Seaport (Table 3-22 and Figure 3-24). The first architectural resource is the Spanish fort, which is within the APE and is listed in the NRHP (Reference no. 76002215) (Moon, 1976). The second architectural resource is the former Japanese hospital that is now the Yap State Administration building, including the Yap Governor's office (CAP JV, 2023). The third architectural resource is the Yap State Historic Preservation Office building is currently in the former Japanese morgue building. The CAP JV (2023:4-11, 4-13) recommend that the three architectural resources be documented by architectural historians, including a Historic American Buildings Survey (HABS) for the Spanish fort. Using the best available data, no architectural resources studies (e.g., HABS) have been completed within the Seaport section of the Preferred Alternative.

**Table 3-22 Architectural Resources Within the Preferred Alternative APE**

| *Site* | *Type* | *Function & Affiliation* | *Description* | *NRHP Elig.* | *References* |
|---|---|---|---|---|---|
| Spanish fort | Earth and stone-faced embankment | Fortification/Spanish Administration, German Administration, Japanese Administration, traditional Yapese | Large, rectangular earthen mound and masonry embankment constructed in 1886 and/or 1887 with military quarters and a trading center built atop the structure; interior buildings no longer extant; later modified during the Japanese Administration | Listed | CAP JV (2023); Moon (1976) |
| Japanese hospital | Building | Building/Japanese Administration, traditional Yapese | Former Japanese hospital during the Japanese Administration; currently the site of the Yap State Administration building and governor's office | Not evaluated | CAP JV (2023) |
| Japanese morgue | Building | Building/Japanese Administration, traditional Yapese | Former Japanese hospital morgue; currently the site of the Yap State Historic Preservation Office | Not evaluated | CAP JV (2023) |

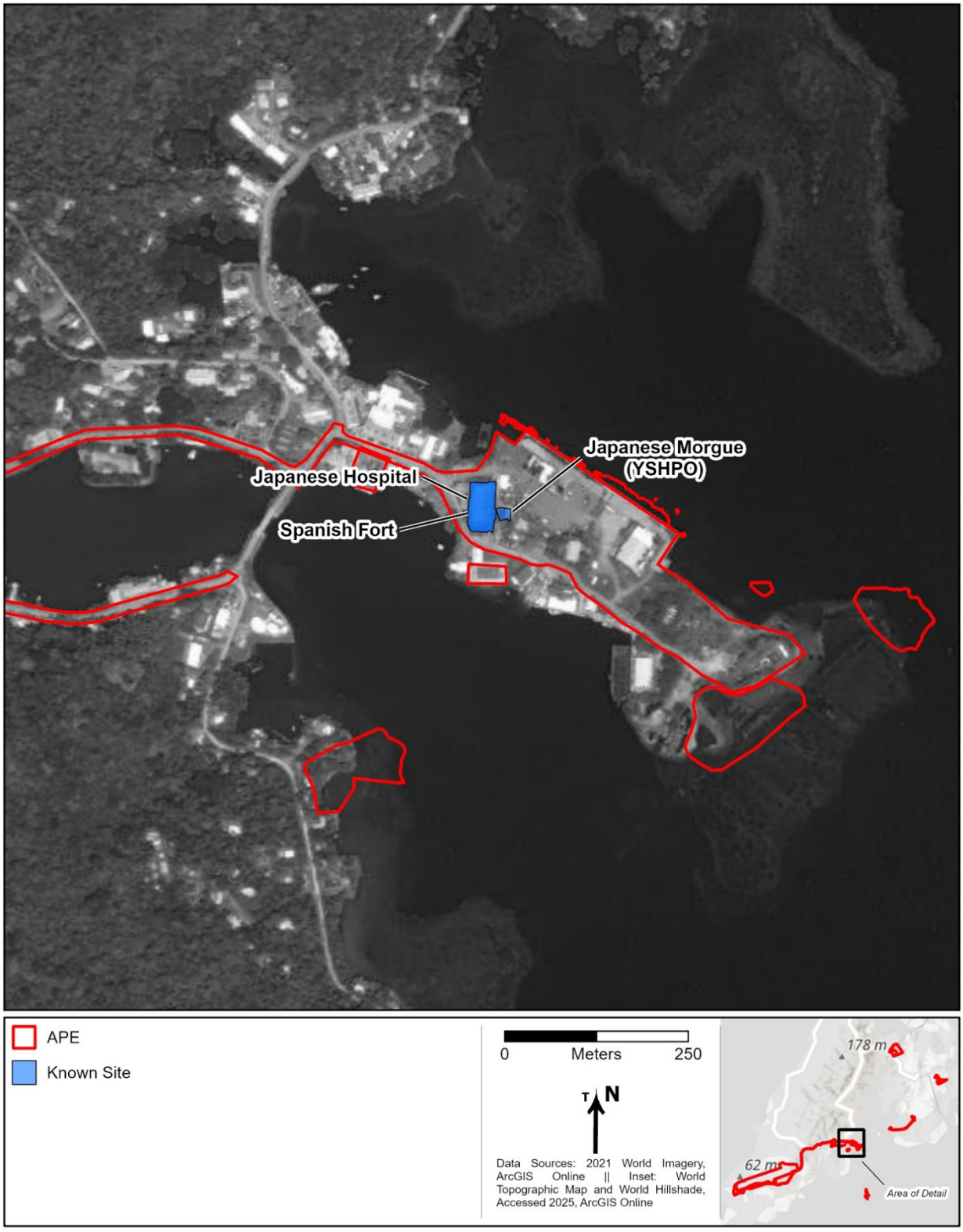



**Figure 3-24 Previously recorded architectural resources within the Seaport Preferred Alternative APE. Note the Japanese hospital is atop the Spanish fort embankment.**

#### 3.6.1.3 Historic Sites and Landmarks

There are no historic sites and landmarks within the APE for the Preferred Alternative and Alternative 2.

#### 3.6.1.4 Traditional Cultural Places

Using the best available information, there are no identified TCPs within the APE for the Preferred Alternative or Alternative 2 APE. No TCP studies have been undertaken.

#### 3.6.1.5 Sacred or Religious Sites and Uses

A site is designated sacred or of religious significance if it was published as having these qualities. No cultural resources documented by archaeologists have been reported as sacred or religious sites. Archaeological sites or areas may be identified as sacred or religious through community consultations.

#### 3.6.1.6 Traditional Uses or Customary Land Ownership Areas

All the land in the Preferred Alternative and Alternative 2 excluding the defense site and the current boundary of the Seaport and Airport are used for traditional purposes and are privately owned. Craft et al. (2025) documented the Yabach Traditional Cultural Area and five cemeteries that are still used or managed. Additional graves were identified in Gordon (1980), Kirch (1978), and Napolitano et al. (2024). Excluding the Seaport and the Airport, all the land for the Preferred Alternative and Alternative 2 is privately owned. The water around the Seaport is privately owned and is used for fishing.

Land ownership and inheritance is part of the *tabinaw* (land estates). *Tabinaw* refers to a collection of parcels of land associated with a *daf/dayif* and it is what determines a person or clan's rank, position, and authority (Krause, 2016:35–36; Marksbury, 1975:49). Rank, position, and authority belong to the land, not individuals. In addition, ancestral spirits live in the *daf/dayif* and people are often named after ancestral spirits (Lingenfelter, 1975; Krause, 2016).

### 3.6.2 Environmental Consequences

This section discusses methods for assessing effects and potential consequences on cultural resources from construction as well as post-construction activities at the Airport and Seaport. The analysis considers both direct and indirect impacts including the type, location, duration, timing, and magnitude of activities that could affect cultural resources. Potential impact intensity and significance are evaluated based on the degree or extent to which an alternative would result in any of the following that would result in changes to integrity of a cultural resource: physical destruction or damage, alteration, relocation, change in use/setting, incompatible elements (e.g., visual, audible, or atmospheric elements), neglect, or transfer/lease of land. Using these criteria, each alternative is evaluated to determine whether potential effects would be considered significant adverse impact; less than significant adverse impact; or no impact.

#### 3.6.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to cultural resources. Therefore, no significant impacts to cultural resources would occur with implementation of the No Action Alternative.

#### 3.6.2.2 Preferred Alternative - Airport (East and West Extensions) and Seaport (Upland Dredge Disposal/Land Reclamation) Improvements Potential Impacts

Construction of the Preferred Alternative will result in significant adverse impact at the Airport, Seaport, and in Waneday Channel. There will be no impact to cultural resources along the Seaport to Airport road, the Tamil Dredge Material Storage/Placement Area, the Rull Dredge Material Storage/Placement Area, or at the Gagil Laydown Areas. Construction has the potential to directly impact culturally important resources that are not historic properties but may be considered under NEPA. In general, all ground-disturbing activities, including dredging in the channel, around the Seaport, and in Tamil, has the potential to impact surface and subsurface deposits, including previously undocumented cultural resources. There are no anticipated impacts to cultural resources during post-construction operations or anticipated training exercises.

##### 3.6.2.2.1 Avoidance, Minimization Measures and Best Management Practices

At the Airport, all archaeological sites (the cemeteries, the isolated graves and grave clusters, the tombs of Orothin and Yaloth, Yabach Traditional Cultural Area, and 16 Japanese Administration/WWII sites) and architectural resources would be avoided, if possible. If impacts to these sites cannot be avoided, the sites would be fully documented before they are impacted or removed. For the mortuary sites and features, direction on BMPs will be developed through consultation with historic partners and local community members.

At the Seaport, Temporary Site 02, the retaining wall (*tanayboch*) (CAP JV, 2023), would be avoided, if possible. If impacts to this site cannot be avoided, the site and features would be fully documented with GPS coordinates collection on a professional-grade GPS, field notes, and digital records including a detailed description, scaled map and profile, photographs, and material suitable for radiocarbon dating. Based on those results, mitigation actions (e.g., data recovery or archaeological monitoring) may be warranted.

In Waneday Channel, the shipwreck would be fully documented and removal of the debris would be monitored by an archaeologist.

For all other areas of the Preferred Alternative, construction boundaries would be marked by high-visibility fencing or similar markers or barricades to ensure known and undocumented cultural resources abutting the APE are not inadvertently damaged or destroyed.

The following list provides general avoidance, minimization measures, and BMPs that would be implemented as part of the Proposed Action:

- Use of qualified archaeological monitors to avoid adverse impacts on cultural resources during construction
- Cultural resources training for all personnel who will have access to the project area
- Avoid cultural resources if possible and install physical barriers to prevent impacts
- If impacts cannot be avoided, sites would be fully documented before they are impacted or removed
- Development and implementation of BMPs through consultation with historic partners and local community members

#### 3.6.2.2.2 Construction Impacts

Construction of the Preferred Alternative would result in significant adverse impacts at the Airport, Seaport, and in Waneday Channel. There would be no impact to cultural resources along the Airport-to-Seaport road, the Tamil Dredge Material Storage/Placement Area, the Rull Dredge Storage/Placement Area, the Tamil construction support area, Gagil Laydown Areas. Construction has the potential to directly impact culturally important resources that are not historic properties but may be considered under NEPA. In general, all ground-disturbing activities, including dredging in the channel, around the Seaport, and in Tamil, has the potential to impact surface and subsurface deposits, including previously undocumented cultural resources.

##### 3.6.2.2.2.1 Archaeological Sites

Construction activities associated with the Preferred Alternative will adversely affect historic properties (see Table 3-21). Potential adverse effects from excavation and soil removal associated with grading and construction could occur at 34 historic properties eligible for the NRHP (see Table 3-21). If graves cannot be preserved in place, data recovery for historic properties that are archaeological in nature and relocation will be necessary following guidelines developed through consultation with historic partners. Sixteen Japanese Administration sites (Craft et al., 2025) will be removed or buried by construction activities. The determination of effect for archaeological sites at the Airport is significant adverse impact.

Construction and use of the proposed laydown facility south of Chamorro Bay has the potential to cause an impact to Temporary Site 02, the retaining wall (*tanayboch*) (CAP JV, 2023). The site would be avoided if possible. If impacts to this site cannot be avoided, the site and features would be fully documented with GPS coordinates collection on a professional-grade GPS, field notes, and digital records including a detailed description, scaled map and profile, photographs, and material suitable for radiocarbon dating which would be obtained through subsurface testing. Based on those results, mitigation actions (e.g., data recovery or archaeological monitoring) may be warranted.

Adjacent to the Seaport, there is potential for intact subsurface deposits on the three former islets that were subject to land reclamation in the 19th and 20th centuries (CAP JV, 2023:4-12–4-13). The determination of effect for archaeological sites at the Seaport is significant adverse impact.

In Waneday Channel, the shipwreck within the dredge footprint would be fully documented and removal of the debris would be monitored by an archaeologist. The determination of effect for archaeological sites in Waneday Channel is significant adverse impact.

For all other areas of the Preferred Alternative, no known archaeological sites will be affected. The determination of effect for all other areas of the Preferred Alternative is no effect.

##### 3.6.2.2.2.2 Architectural Resources

At the Seaport, the proposed construction at the wharf and the Airport-to-Seaport connector road would avoid architectural resources including the Spanish fort, the Yap Administration building (the former Japanese hospital), and the YSHPO (the former Japanese morgue). The determination of effect for architectural resources is no impact because these resources are outside of the construction footprint.

#### 3.6.2.2.2.3 Historic Sites and Landmarks

No historic sites and landmarks will be affected. The determination of effect for historic sites and landmarks is no impact because no historic sites and landmarks are within the APE.

#### 3.6.2.2.2.4 Traditional Cultural Places

No TCPs are known in the APE; therefore no TCPs will be affected. The determination of effect for TCPs is no impact.

#### 3.6.2.2.2.5 Sacred or Religious Sites and Uses

No sacred or religious sites are known in the APE, therefore no sacred or religious sites will be affected. The determination of effect for sacred or religious sites is no impact.

#### 3.6.2.2.2.6 Traditional Uses or Customary Land Ownership Areas

Any construction within the defense site and outside the current boundary of Airport property will disrupt the *tabinaw* system after the land is acquired by Yap State to support designation of the defense site. People who live in areas that will be impacted by construction will lose access to that land and some community members may be displaced. Dredge storage/placement in Rull and Tamil has the potential to temporarily disrupt access to those areas and may disrupt people's ability to fish or collect food. However, the temporary land use in Gagil and Tamil during construction would not disrupt the tabinaw system. The determination of effect for traditional uses or customary land ownership areas is significant adverse impact.

### 3.6.2.2.3 Post-Construction Impacts

#### 3.6.2.2.3.1 Archaeological Sites

Historic properties that would be impacted by construction could be removed/relocated, or preserved in place. Historic properties not removed during construction may be subject to post-construction impacts. If historic properties are removed during construction activities, then there will not be post-construction impacts because the historic property will not exist. The determination of effect for archaeological resources is pending forthcoming consultation under the Cultural Resources SOP.

#### 3.6.2.2.3.2 Architectural Resources

There will be no post-construction impacts to architectural resources because post construction activities will not be located near architectural resources. The determination of effect for architectural resources is no impact.

#### 3.6.2.2.3.3 Historic Sites and Landmarks

There will be no post-construction impacts to historic sites and landmarks because there are no historic sites and landmarks identified in the APE. The determination of effect for historic sites and landmarks is no impact.

#### 3.6.2.2.3.4 Traditional Cultural Places

There will be no post-construction impacts to TCPs. The determination of effect for TCPs is no impact because there are no known TCPs in the APE.

#### 3.6.2.2.3.5 Sacred or Religious Sites and Uses

There will be no post-construction impacts to sacred or religious sites and uses because no sites or uses have been identified in the APE. The determination of effect for sacred or religious sites and uses is no impact.

#### 3.6.2.2.3.6 Traditional Uses or Customary Land Ownership Areas

The proposed post-construction activities, including U.S. DoW training, would be conducted at the Seaport, Airport, and along the Airport-to-Seaport Road. No additional post-construction land acquisition is proposed to support training. The determination of effect traditional uses or customary land ownership areas is no impact.

### 3.6.2.3 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

#### 3.6.2.3.1 Construction Impacts

#### 3.6.2.3.1.1 Archaeological Resources

Construction activities associated with Alternative 2 will adversely effect the same historic properties effected by the Preferred Alternative (see Section 3.6.2.2.2.1) and one additional site. Kirch (1978) identified a WWII Japanese gun emplacement. It has not been evaluated for eligibility for listing in the NRHP.

#### 3.6.2.3.1.2 Architectural Resources

At the Seaport, the proposed construction at the wharf and the Airport-to-Seaport connector road would avoid architectural resources including the Spanish fort, the Yap Administration building (the former Japanese hospital), and the YSHPO (the former Japanese morgue). The determination of effect for architectural resources is no impact because these resources are outside of the construction footprint.

#### 3.6.2.3.1.3 Historic Sites and Landmarks

No historic sites and landmarks are within the APE for Alternative 2. The determination of effect for historic sites and landmarks is no impact.

#### 3.6.2.3.1.4 Traditional Cultural Places

No known TCPs are within the APE for Alternative 2. The determination of effect for TCPs is no impact.

#### 3.6.2.3.1.5 Sacred or Religious Sites and Uses

No sacred or religious sites and uses are located within the APE for Alternative 2. The determination of effect for sacred or religious sites and uses is no impact.

#### 3.6.2.3.1.6 Traditional Uses or Customary Land Ownership Areas

Any construction within the defense site and outside the current boundary of Airport property will disrupt the *tabinaw* system after the land is acquired by Yap State of support designation of the defense site. People who live in areas that will be impacted by construction will lose access to that land and some community members may be displaced. Temporary land use in Gagil, and Tamil would not disrupt the *tabinaw* system However, the temporary land use in Gagil and

Tamil during construction would not disrupt the tabinaw system. Dredge storage/placement in Rull and Tamil has the potential to disrupt access to those areas and may disrupt people's ability to fish or collect food. The determination of effect for traditional uses or customary land ownership areas is significant adverse impact.

#### 3.6.2.3.2 Post-Construction Impacts

Post-construction period impacts for Alternative 2 would be the same as for the Preferred Alternative.

## 3.7 Noise

This discussion of noise includes the types or sources of noise and the associated sensitive receptors in the human environment. Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Noise is subjectively defined as any sound that is undesirable because it interferes with normal activities, diminishes the quality of the environment, or is otherwise annoying. This section discusses the acoustic environment of the project area experienced by humans, while noise in relation to biological resources and wildlife species is discussed in the Biological Resources sections (Sections 3.4 and 3.5).

The standard for the loudness of sound or noise levels is a quantity known as the "decibel (dB)." The human ear is not uniformly sensitive to all frequencies of sound. Most common sound sources are measured using A-weighted decibels (dBA). The A-weighting corresponds to the ear's sensitivity and deemphasizes very high and low sound frequencies to only reflect the frequencies that people actually hear. The DoW typically uses A-weighting to describe sound from generators, aircraft, and general transportation. For reference, a normal voice has a sound level of approximately 60 dBA, and a busy highway can have a noise level of over 85 dBA (DENIX, 2025).

Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual.

Figure 3-25 provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., ambulance siren) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time.

| Noise Source (at a given distance) | Sound Level (dBA) | Typical Reaction |
|---|---|---|
| | 140 | Pain |
| Civil Defense Siren (100 ft) | 130 | |
| Jackhammer (50 ft) | 120 | Maximum Vocal Effort |
| Pile Driver (50 ft) | 110 | |
| Ambulance Siren (100 ft) | 100 | |
| Motorcycle, Power Lawnmower (25 ft) | 90 | Very Annoying/Discomfort |
| Garbage Disposal, Alarm Clock (3 ft) | 80 | |
| Vacuum Cleaner (3 ft) | 70 | Intrusive |
| Normal Conversation, Dishwasher (5 ft) | 60 | |
| Light Traffic (100 ft) | 50 | Normal Speech |
| Bird Calls (Distant), Quiet Urban Daytime | 40 | |
| Soft Whisper (5 ft), Quiet Urban Nighttime | 30 | Quiet |
| | 20 | |
| | 10 | Just Audible |
| Human Breathing | 0 | |

Source: DENIX, 2025

**Figure 3-25 Common Sounds and Noise Levels (A-weighted)**

## 3.7.1 Affected Environment

Many components may generate noise and warrant analysis as contributors to the total noise impact. Response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species.

### 3.7.1.1 Ambient Noise Conditions

Aircraft operations[1] represent the predominant noise source both at and around the airfield, as well as in the airspace. Other components such as construction, aircraft ground support equipment for maintenance purposes, and vehicle traffic produce noise, but such noise generally represents a transitory and negligible contribution to the average noise level environment. Aircraft noise varies with time. During an overflight, noise starts at the background level, rises to a maximum level as the aircraft flies above the receiver, then returns to the background level as the aircraft recedes into the distance. A number of metrics can be used to describe aircraft operations (i.e., takeoffs and landings)—from a particular individual

[1] In this EIS, an "aircraft operation" is defined as a takeoff or landing.

aircraft event to the cumulative noise effect of all aircraft events over time. “Day-night average sound level” (DNL) is the most widely used metric to describe, assess, and predict long-term noise exposure. It is a 24-hour average sound level that includes a 10-dB adjustment, or “penalty,” for activity occurring between 10 PM and 7 AM. The 10-dB penalty considers that people are more sensitive to noise during these hours, when sounds are more noticeable and may be considered more intrusive. The DoW uses DNL as the basis for determining land use compatibility for noise associated with aviation (DENIX, 2025).

Apart from aircraft noise, the current noise environment near the Airport includes natural sounds and sounds from residential, educational, commercial, light industrial, and public facility land uses in a largely rural to small-town setting. It also includes noise from a small number of air service and charter aircraft operations at the Airport averaging less than three combined arrivals and departures per day (USDOT, 2025). Average annual day noise levels for existing conditions near the Airport were modeled using version 7.370 of NOISEMAP (computer software used to predict noise exposure from aircraft flight, maintenance, and ground runup activities). The modeling inputs included airfield layout, flight paths, runway utilization, annual aircraft flight events (converted into average daily operations), and the locations of noise sensitive receptors.

The level of aircraft operations at the Airport is very low (1.28 landings+takeoffs per average day). Figure 3-26 shows that small areas outlined in red at each end of the runway (near the start of aircraft takeoff rolls) are exposed to average annual day aircraft noise levels of 65 dB DNL or higher. No areas off Airport property are exposed to aircraft noise in excess of 65 dB DNL. All land uses are considered “compatible” with aircraft noise when it is below 65 dB DNL.

The nearest sensitive receptors to the Airport are shown in Figure 3-26 and listed in Table 3-23 along with the existing computed average noise exposure levels at each sensitive receptor. Table 3-23 shows that computed aircraft DNL for noise sensitive receptors identified near the Airport range from 35 to 49 dB DNL (i.e., land uses compatible with the current aviation noise levels at the Airport). In addition to aircraft noise, other noise sources are present within the study area. Typical rural to small town noise levels from non-aircraft sources would be expected to result in DNLs ranging from the mid-40s to lower 50s (EPA, 1974). (Potentially noise-sensitive wildlife species are discussed in Sections 3.4 and 3.5.)

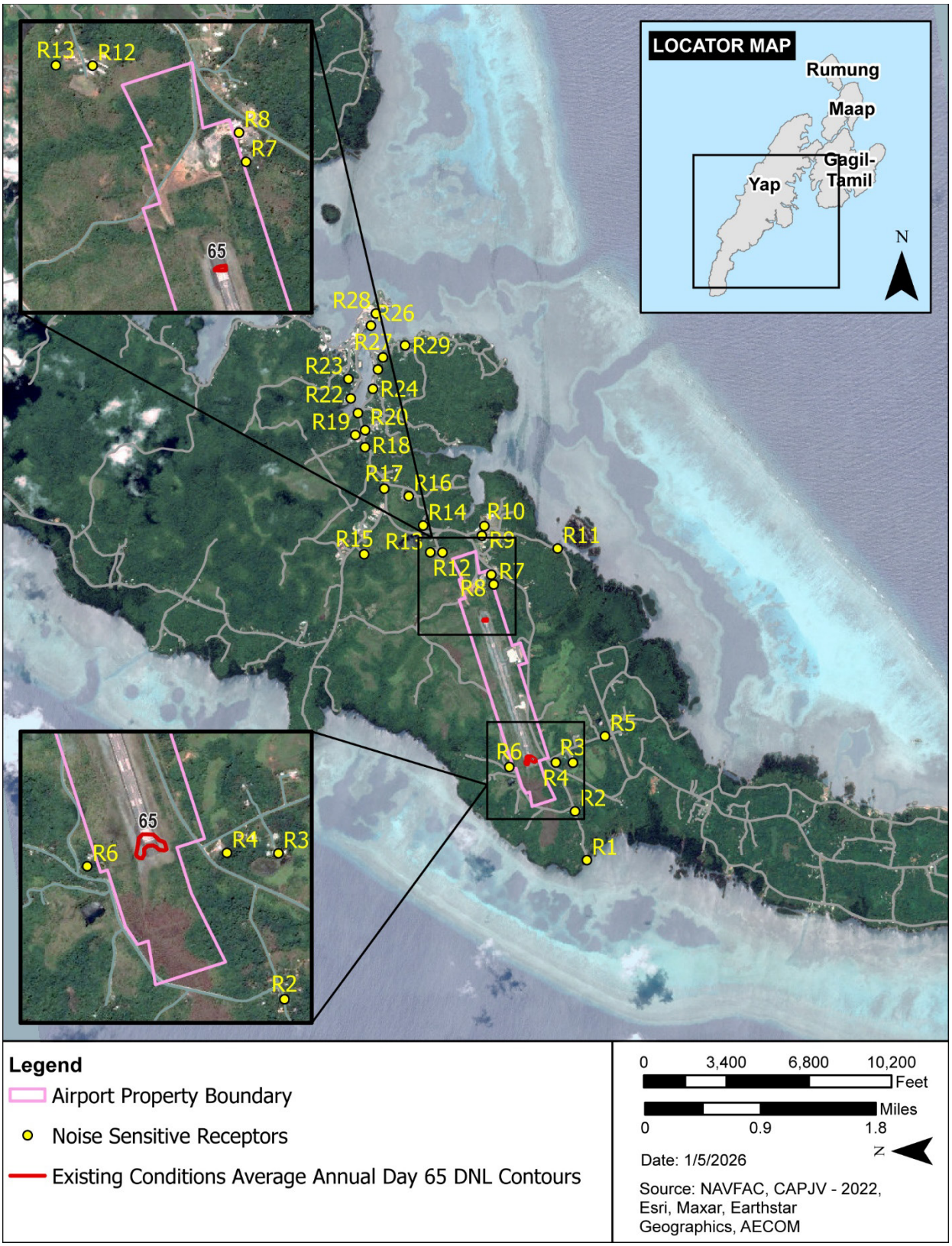



**Figure 3-26 Existing Conditions Aircraft Noise Exposure at Noise Sensitive Receptors**

**Table 3-23 Existing Conditions Aircraft Noise Exposure at Noise Sensitive Receptors**

| *ID* | *Name* | *Category* | *Day-Night Average Sound Level (dB)* |
|---|---|---|---|
| R1 | Daqabyuch Building | Private Residence | 44 |
| R2 | Residences Southwest of Airport | Private Residences | 44 |
| R3 | Yap Catholic High School | School | 43 |
| R4 | Avi's Laundromat | Business | 48 |
| R5 | Milew Community Center | Community Center | 35 |
| R6 | Residence North of Airport | Private Residence | 49 |
| R7 | Residences East of Airport | Private Residences | 49 |
| R8 | GPPC Batch Plant (Private Property) | Industrial Zone - Private Property | 48 |
| R9 | College of Micronesia (Yap Campus) | School and Nearby Private Residences | 47 |
| R10 | Yap High School | School | 46 |
| R11 | Ohnn | Church | 36 |
| R12 | Colonia Middle School | School | 48 |
| R13 | Yap Early Childhood Education Center | School and Nearby Private Residences | 45 |
| R14 | YSPSC Water Plant | Light Industrial Zone | 45 |
| R15 | Yap Seventh-day Adventist Church | Church | 35 |
| R16 | Jesylene Googur | Private Residences | 44 |
| R17 | Satawal Compound (housing complex) | Private Residences | 40 |
| R18 | Yap Department of Agriculture and Forestry Complex | Government Office | 39 |
| R19 | Gaanelay Elementary School | School | 38 |
| R20 | The Church of Jesus Christ of Latter-day Saints | Church | 39 |
| R21 | Aces Mart 2 | Business | 39 |
| R22 | Aces Mart 1 | Business | 38 |
| R23 | Yap State Department of Education | Government Office | 38 |
| R24 | ESA Bay View Hotel | Hotel | 41 |
| R25 | Oceania Hotel | Hotel (now restaurant) | 42 |
| R26 | Yap Public Library | Public Library | 42 |
| R27 | YCA Hardware | Business | 43 |
| R28 | FSM National Police Yap Field Office | Government Office | 43 |
| R29 | J&S Store | Business | 43 |

Source: Volpe, 2026

Atmospheric noise levels at the Seaport are typical of low volume industrial areas, with noise sources that include occasional ship visits by commercial vessels (e.g., 3 to 5 cargo vessels per month), and operation of vehicles and cargo handling equipment. Other project areas (roadways, construction support areas, dredge material disposal sites) are generally expected to have low ambient noise conditions typical of rural communities with vehicle traffic likely to be the primary noise sources.

## 3.7.2 Environmental Consequences

The analysis of potential noise impacts includes estimating likely airborne noise levels from the Proposed Action and determining potential effects to sensitive receptor sites. It assesses temporary construction noise and long-term post-construction noise at the Airport and Seaport on the general public and land use compatibility.

### 3.7.2.1 Analysis Method

The analysis of noise impacts involves comparing the modeling estimates of the noise metrics defined below that are generated by construction or post-construction activities. Noise impacts are evaluated using both primary and supplemental acoustic metrics because no single metric fully captures all relevant noise effects. For military aircraft operations, the primary analysis is the land use compatibility (LUC) assessment based on Annual Average Day-Night Sound Level (AADNL), consistent with current DoW compatibility guidance. AADNL is used to evaluate long-term average aircraft noise exposure and the general compatibility of recurring aircraft operations with surrounding land uses. Land use compatibility was used to determine the significance of post-construction impacts due to increased aircraft activity at the Airport.

Because annual-average metrics (e.g., AADNL and land use compatibility) do not fully capture the timing, loudness, and frequency of individual events, the analysis also used supplemental event-based metrics described below to evaluate sleep disturbance, speech interference, learning disruption, worship disruption, and hearing impairment and noise induced hearing loss. For project construction activities, AADNL and LUC are not the primary analytical tools because construction noise is temporary, location-specific, and variable by phase and equipment usage. It was therefore evaluated separately using receptor-based metrics that more directly characterize noise from specific construction activities. The significance of impacts was determined based on the degree to which resulting noise levels at sensitive receptors would affect these conditions and whether acceptable interior noise levels can be achieved via BMPs. (More detailed descriptions of these metrics are found in Appendix K-1, Yap Airport and Seaport Noise Impact Analysis.)

**Land Use Compatibility.** General land use compatibility for different land uses as a function of Annual Average DNL at the site is defined in DoD Instruction 4165.57 *Air Installations Compatible Use Zones* (DoD, June 30, 2025), which is based, in part, on FAA AC 150/5020-1 *Noise Control and Compatibility Planning for Airports* (FAA, 1983). In this framework, increasing AADNL corresponds to increasing potential for incompatibility between aircraft noise exposure and noise-sensitive land uses, particularly residential uses, schools, hospitals, and places of worship. Figure 3-27 presents the LUC categories used in this analysis for long-term aircraft noise exposure.

| *A-Weighted DNL Levels in dB* | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Land Use*** | ***A <55*** | ***B 55-65*** | ***C-1 65-70*** | ***C-2 70-75*** | ***D-1 75-80*** | ***D-2 80-85*** | ***D-3 >85*** |
| All Residential and Nursing Homes | | | (1) | (1) | | | |
| Transient Lodgings | | | (1) | (1) | (1) | | |
| Public Assembly and Nature Exhibits | | | | | | | |
| Schools and Hospitals | | | (2) | (3) | | | |
| Cultural Activities | | | (2) | (3) | | | |
| Entertainment and Recreational Activities | | | | (2) | | | |
| Livestock Farming and Animal Breeding | | | | | | | |
| Business Services, Stores, Restaurants | | | | (2) | (3) | | |
| Religious Activities and Governmental | | | | (2) | (3) | | |
| Outdoor Recreational Activity | | | | | | | |
| Manufacturing And Industry | | | | (2) | (3) | (4) | |
| Agriculture, Forestry, and Mining | | | (5) | (6) | (7) | | |
| | | | | | | | |

KEY: Compatible Incompatible

Notes:

(1) Residential use is discouraged in zone C-1 and strongly discouraged in C-2 and transient lodging use is discouraged in zones C-1, C-2, and C-3. Where the community determines that these uses must be allowed, follow note (2) for zone C-1, note (3) for zone C-2 and note (4) for Zone D-1.

(2) Incorporate measures to achieve an outdoor-to-indoor noise reduction level (OINRL) of at least 25 dB in noise sensitive areas.

(3) Incorporate measures to achieve an OINRL of at least 30 dB in noise sensitive areas.

(4) Incorporate measures to achieve an OINRL of at least 35 dB in noise sensitive areas.

(5) Where residences are permitted, follow (2) for residential designs.

(6) Where residences are permitted, follow (3) for residential designs.

(7) Where residences are permitted, follow (4) for residential designs.

Reference: (DoD, June 30, 2025)

**Figure 3-27 Land Use Compatibility in Aircraft Noise Zones**

While LUC can give guidance as to potential impacts of construction activities or changes in airport operation, other metrics such as $L_{eq}$, $L_{max}$, and SEL are typically used for development of BMPs or mitigations for minimizing impact because they are focused on sound from a particular event or piece of equipment rather than being long-term averages and BMPs and mitigations are focused on reducing the sound of a particular event or piece of equipment. The assessment of compatibility requires the assumption of an outdoor-to-indoor noise reduction level (OINRL) which is a measure of the sound level reduction provided by the building enclosure.

For typical construction of homes and small buildings in the United States with doors and windows closed, an OINRL of 20 to 25 dB is usually assumed in environmental impact analysis (FAA, 1983) (DoD, June 30, 2025). However, because general building construction on Yap is more lightweight (e.g., naturally ventilated with jalousie windows, with windows and doors less well sealed than in standard U.S. construction), 15 dB is a more appropriate OINRL value to be used in this impact assessment. This assumption is used in interpreting the extent to which outdoor aircraft noise exposure may affect indoor conditions relevant to certain land uses.

**Maximum Sound Level.** The maximum sound level, or $\mathbf{L_{max}}$ is the highest value of the sound level of an event in which sound level changes over time. For noise impact assessment, the A-weighted maximum sound level is used (FICUN, 1980) and throughout the remainder of this

analysis, the term $L_{max}$ can be assumed to refer to A-weighted maximum sound level. $L_{max}$ is a metric used in the analysis of speech interference and learning disruption impacts.

**Equivalent Continuous Sound Level.** The equivalent continuous sound level, or **$L_{eq}$**, is a measure of the average sound energy over a given time period expressed in decibels. The time period needs to be denoted, and this is often denoted in the subscript. For example, the $L_{eq}$ for a one day or 24-hour time period would typically be denoted as $L_{eq(24h)}$. When A-weighting is applied, an "A" is often added to the subscript (e.g., **$L_{Aeq}$**). All sound levels referred to in this analysis should be assumed to be A-weighted and the notation $L_{eq}$ assumes the equivalent sound level is A-weighted.

**Sound Exposure Level.** The sound exposure level, or **SEL**, is a cumulative measure of the total sound energy of a noise event (like an aircraft takeoff or overflight) with changing sound levels. SEL is formally defined as the equivalent sound level $L_{eq}$ that would need to occur for a period of one second to impart the same total sound energy as the event in question. Since overflight events typically last longer than one second, the SEL for an event is usually higher than the $L_{max}$. SEL is a primary metric used in the assessment of sleep disturbance.

**Number of Events Above a Threshold Level.** The Number of Events Above a Threshold (**NA**) is the total number of events that exceeded a specific sound level threshold during a given period. The threshold is typically either SEL or $L_{max}$. This metric is useful for looking at how often high noise level events occur. This metric is commonly denoted as NAXXYYY where XX is the threshold in dB and YYY is the selected metric (e.g., the number of events where the sound exposure level exceeds 90 dB would be denoted NA90SEL and the number of times the $L_{max}$ exceeds 65 dB would be NA65$L_{max}$). The counting period would also be included (e.g., number of events per hour, per night, per 24 hours, etc.). The NA metric is used in assessing sleep, learning, and worship disturbance.

#### 3.7.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to operations at the Airport (i.e., nine flights per week or 468 flights per year) or Seaport; associated baseline noise levels would remain the same. Therefore, no impacts to the noise environment at the Airport, Seaport, roadways, and dredge material disposal sites would occur with implementation of the No Action Alternative.

#### 3.7.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

The study area for the Preferred Alternative is the area potentially within AADNL contours greater or equal to 65 dB DNL or where sensitive noise receptors are exposed to noise levels that may impact sleep, learning, worship, general speech communication, or cause hearing impairment and noise induced hearing loss.

##### 3.7.2.3.1 Avoidance, Minimization Measures and Best Management Practices

Appropriate BMPs and/or mitigation measures are being assessed by DoW and could include the following where appropriate and practicable.

- Use modern mufflers and electric-powered equipment where feasible.
- Use vibratory pile drivers instead of impact drivers where practicable.

- Limit noisy activities during sensitive times (e.g., late nights/early mornings, holidays, cultural events).
- Keep the community informed about the timing of noisy activities.
- Designate a Community Noise Liaison to be the primary point of contact to support communication among the construction contractor, the military, local officials and the Yap community.

#### 3.7.2.3.2 Construction Impacts

Construction noise at the Airport, roadway expansion/repair, and at the Seaport were modeled using standard models for airport and seaport construction and roadway noise modeling (Traffic Noise Model 3.2, see Appendix K-1 for details of the noise model). Because a detailed construction plan with specific types and location of equipment and schedules of operations had not yet been developed, simplifying assumptions were made in the noise technical report analysis (see Appendix K-2), which was a conservative screening approach to estimate $L_{max}$. The analysis estimated $L_{max}$ based on the loudest likely piece of equipment located at the closest point on the construction-zone boundary to each receiver. For example, for the airport construction, the analysis assumed the loudest equipment (e.g., batch plant and rock crusher) would be located at the closest point on the construction zone boundary to each sensitive receptor (shown in Figure 3-28 as N1 – N4), although the equipment would actually be located well within the Airport footprint (farther from sensitive receptors). Therefore, the simplifying assumptions are expected to overpredict the construction noise levels and the results reported below can be considered a "worst case scenario" for airport, roadway, and seaport construction noise. (See Section 2.2 of Appendix K-1 for details of the simplifying assumptions.)

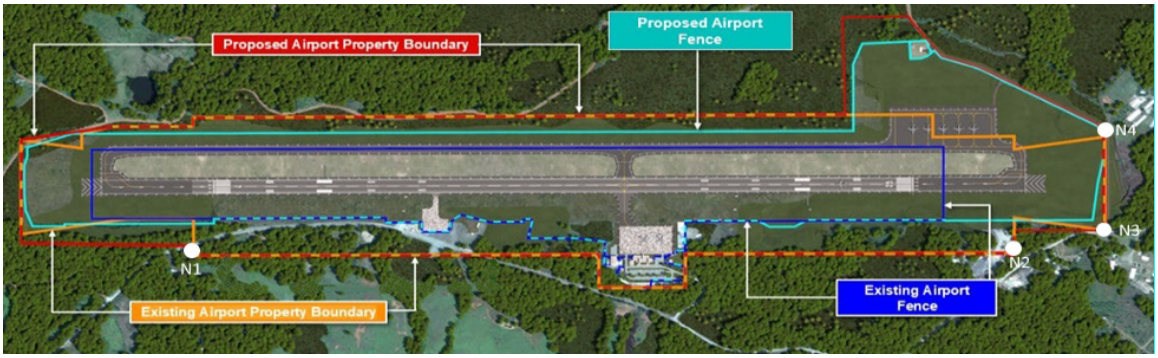



**Figure 3-28 Airport Construction Boundary Points Closest to Sensitive Receptors (N1–N4)**

The National Institute for Occupational Safety and Health (NIOSH) establishes a Recommended Exposure Limit of 85 dBA for an 8-hour time-weighted average (NIOSH, 1998). The Occupational Safety and Health Administration (OSHA) enforces a legal Permissible Exposure Limit of 90 dBA for an 8-hour shift (OSHA, 2004). For the Preferred Alternative, noise induced hearing loss of residents is not a potential impact as the analyses indicate that construction activities are not expected to generate noise exposures that exceed these thresholds for long enough time periods at any off-site community receivers. While construction equipment generates high noise levels at the source, sound attenuates with distance from the source. The continuous noise (Leq) reaching off-site receptors, even during the most intense phases of airport and

seaport construction, would generally remain well below the 85 dBA continuous threshold. For intermittent loud events, such as passing dump trucks or pile driving strikes (Seaport only), the cumulative exposure duration for community members is far too short to cause physiological hearing impairment. Therefore, the Preferred Alternative would not pose a risk of permanent hearing damage to the surrounding community but it may warrant BMPs and/or mitigation for annoyance, learning disruption, and sleep disturbance. (Note: Occupational noise exposure for on-site construction workers and military personnel is managed separately under applicable occupational health and safety programs.)

Under the conservative conditions assumed in the noise model for airport construction activities and based on anticipated levels of noise-related disturbance from those activities, the Preferred Alternative would result in less than significant adverse impacts to several sensitive receptors (e.g., schools, private residences, community center, worship spaces, government buildings) and the Preferred Alternative would not pose a risk to hearing. BMPs and maybe site-specific mitigation for a limited number of receptors would be needed to reduce noise levels to target interior noise levels.

#### 3.7.2.3.2.1 Airport

The proposed airport expansion involves a comprehensive, multi-year construction schedule projected to last 7.25 years. While construction would be permitted 24/7, the anticipated schedule would typically be up to 16 hours per day, 6 days per week.

**Classroom and Worship Space Impacts.** Learning and worship environments are highly sensitive receptors because they require low ambient background noise. Unlike aircraft flyover noise, which is transient, construction noise at this site would occur more continuously during daylight and early evening hours on most workdays throughout the construction period. As a result, construction activities cannot be scheduled to completely avoid school hours or weekday worship service hours.

To protect learning and worship environments, this analysis uses target interior noise equivalent noise levels ($L_{eq}$) of 35-45 dB, per ANSI/ASA S12.60 (ANSI/ASA, 2010), for classrooms and places of worship (35 dB) up to 45 dB for adult learners. See Appendix K-1 for additional details on standards. Using the construction-noise propagation analysis from the noise technical report (Appendix K-2), the analysis calculated the maximum allowable $L_{eq}$ at the construction sites closest to sensitive receptors (Locations N1–N4) needed to meet the interior thresholds of nearby land uses assuming an OINRL of 15 dB (i.e., noise reductions assumed to be provided by building construction in Yap).

As shown in Table 3-24, the required maximum 1-hr $L_{eq}$ at the applicable construction locations is 82 dB or higher for four of the six schools, a level that construction zone BMPs can likely achieve. The Yap Public Library (R26) is sufficiently far from the airport that construction noise is not expected to affect interior conditions. Two schools, R12, (Colonia Middle School) and R13 (Yap Early Childhood Education Center), are quite close to the east end of the airfield. These schools would require a maximum 1-hr $L_{eq}$ of approximately 74 -75 dB at the closest modeled construction location (N4). However, due to the conservative screening approach described earlier, noise levels are likely overestimated. Construction zone BMPs would meet these limits; however, additional mitigations might be needed to decrease the impact to learning. If

standard construction BMPs cannot consistently achieve the required boundary levels, additional accepted receiver site-specific mitigation may be needed to increase the OINRL to 20 or 25 dB.

**Table 3-24 Classrooms and Library Interior Target $L_{eq}$ and Maximum Construction Zone Border $L_{eq}$**

| *ID* | *Distance From Receiver to Border Location (ft)* | *Max Interior 1-hr Leq (dB)* | *Max 1-hr Leq at border (dB)[1]* | *Notes[2]* |
|---|---|---|---|---|
| **R3** | 1,005 | 45 | 86 | BMP Likely Enough |
| **R9** | 668 | 45 | 82 | BMP Likely Enough |
| **R10** | 1,079 | 45 | 86 | BMP Likely Enough |
| **R12** | 480 | 40 | 74 | BMP & Maybe Site Mitigation |
| **R13** | 906 | 35 | 75 | BMP & Maybe Site Mitigation |
| **R19** | 6,462 | 35 | 92 | BMP Likely Enough |
| **R26** | 10,134 | 45 | 106 | No BMP needed |

Source: Argonne National Laboratory, 2026.

[1] This is the required maximum $L_{eq}$ at the closest point of construction to meet the maximum target interior $L_{eq}$, assuming OINRL = 15 dB.

[2] **BMP Likely Enough** means that the border $L_{eq}$ requirement can likely be met with construction zone BMPs alone. **BMP & Maybe Site Mitigation** means that while construction zone BMPs alone might be enough, additional mitigation at the receptor site may be needed to increase the effective OINRL (e.g. to 25 dB) so that construction zone BMPs achieve the target interior $L_{eq}$.

As shown in Table 3-25, the maximum construction-zone boundary levels ($L_{eq}$) needed to achieve target interior sound levels is 90 dB or greater at noise receptor sites R5 (Milew Community Center) and worship spaces R11 (Ohnn Church), R15 (Yap Seventh-day Adventist Church), and R20 (The Church of Jesus Christ of Latter-day Saints). Standard construction site BMPs would reduce the Airport construction site noise levels to levels that avoid adverse impacts at these receptors.

**Table 3-25 Community Center and Worship Space Interior Target $L_{eq}$ and Maximum Construction Zone Border $L_{eq}$**

| ID | *Distance From Receiver to Border Location (ft)* | *Max Interior 1-hr $L_{eq}$ (dB)* | *Max 1-hr $L_{eq}$ at border (dB)[1]* | *Notes[2]* |
|---|---|---|---|---|
| **R5** | 2,139 | 45 | 92 | BMP Likely Enough |
| **R11** | 3,008 | 40 | 90 | BMP Likely Enough |
| **R15** | 3,540 | 40 | 90 | BMP Likely Enough |
| **R20** | 6,379 | 40 | 97 | BMP Likely Enough |

Source: Argonne National Laboratory, 2026.

[1] Maximum $L_{eq}$ at the closest point of construction that would meet the maximum target interior $L_{eq}$, assuming OINRL = 15 dB.

[2] **BMP Likely Enough** means that the border $L_{eq}$ requirement can likely be met with construction zone BMPs alone.

**Residential and Transient Lodging Space Impacts.** Residents are sensitive to construction noise; however, residential and transient lodging spaces generally have less stringent acoustic requirements than educational or worship spaces. For analysis of these spaces, the target interior 1-hr $L_{eq}$ is 60 dB which corresponds to a maximum exterior 1-hr $L_{eq}$ of 75 dB at the receiver location assuming an OINRL of 15 dB. Because the residential criterion is higher than

the classroom criterion, the allowable noise levels at the points of construction closest to the receptors are correspondingly higher.

As shown in Table 3-26, the required maximum 1-hr $L_{eq}$ levels can likely be met with little or no construction site BMP at most residential receptors except R7 (residences east of the airport), which is located directly adjacent to the construction zone border. At that receptor, construction zone BMPs with site-specific mitigation may be needed to minimize construction noise impacts.

**Table 3-26 Residential and Transient Lodging Interior Target $L_{eq}$ and Maximum Construction Zone Border $L_{eq}$**

| *ID* | *Distance From Receiver to Border Location (ft)* | *Max Interior 1-hr $L_{eq}$ (dB)* | *Max 1-hr $L_{eq}$ at border (dB)[1]* | *Notes[2]* |
|---|---|---|---|---|
| **R1** | 2,824 | 60 | 110 | No BMP needed |
| **R2** | 896 | 60 | 100 | BMP Likely Enough |
| **R6** | 180 | 60 | 86 | BMP Likely Enough |
| **R7** | 45 | 60 | 74 | BMP & Maybe Site Mitigation |
| **R9** | 668 | 60 | 97 | BMP Likely Enough |
| **R13** | 906 | 60 | 100 | BMP Likely Enough |
| **R16** | 3,125 | 60 | 111 | No BMP needed |
| **R17** | 4,014 | 60 | 113 | No BMP needed |

Source: Argonne National Laboratory, 2026.

[1] This is the required maximum $L_{eq}$ at the construction zone boundary to meet the maximum target interior $L_{eq}$, assuming OINRL = 15 dB.

[2] **BMP Likely Enough** means that the border $L_{eq}$ requirement can likely be met with construction zone BMPs alone. **BMP & Maybe Site Mitigation** means that construction zone BMPs may be enough, but additional mitigation at the receptor site may be needed to increase the OINRL so construction zone BMPs achieve the target interior $L_{eq}$.

#### 3.7.2.3.2.2 Road Construction

Road construction includes roadway improvements and realignments near the airport, improvements along Airport-to-Seaport connector road, and roadway improvements in the Seaport area. These activities typically move along the roadway and generate high noise levels only when crews and equipment are operating near a given location. As a result, roadway construction impacts at any individual receptor are expected to be short-lived (days to weeks) compared to the multi-year airport and Seaport construction programs, resulting in less than significant impacts.

**Residences and Transient Lodging.** Because roadway work would occur primarily during daytime hours, construction noise is not expected to affect nighttime sleep for most residences. However, it may disturb daytime rest at transient lodging facilities in Colonia. Table 3-27 summarizes the $L_{max}$ levels at residential and transient lodging locations. Three receptors, R17 (residential), R24 and R25 (hotels), are adjacent to the planned roadway work and could experience high daytime sound levels. When working near those locations, contractors would try to maintain a predictable daily schedule (e.g., avoid late work hours) and provide advance notice so occupants can plan around the loudest activities.

**Table 3-27 Roadway Construction Noise $L_{max}$ Levels at Residences and Transient Lodging**

| *ID* | *Name* | *Minimum Source Distance (ft)* | *$L_{max}$ (dB)* |
|---|---|---|---|
| **R1** | Daqabyuch Building | 2,212 | 61 |
| **R2** | Residences Southwest of Airport | 201 | 82 |
| **R6** | Residence North of Airport | 221 | 81 |
| **R7** | Residences East of Airport | 497 | 74 |
| **R9** | College of Micronesia and Nearby Residences | 455 | 75 |
| **R13** | Early Childhood Education and Nearby Residences | 763 | 71 |
| **R16** | Jesylene Googur | 930 | 69 |
| **R17** | Satawal Compound (housing complex) | 78 | 91 |
| **R24** | ESA Bay View Hotel | 49 | 95 |
| **R25** | Oceania Hotel | 70 | 91 |

Source: Argonne National Laboratory, 2026

**Schools, Library, Churches, and Community Center.** Table 3-28 and Table 3-29 summarize roadway construction $L_{max}$ levels at schools and library, and churches and community center, respectively.

At most schools, exterior $L_{max}$ is generally below 80 dB. Assuming an OINRL of 15 dB, the corresponding indoor $L_{max}$ would generally remain under 65 dB but above 50 dB. These levels suggest the potential for elevated but localized short-term disruption of learning when roadway construction occurs nearby. The Yap Public Library (R26) shows higher predicted levels and may experience more noticeable disruption. While the library is not a classroom, it functions as a quiet-use community learning space; therefore, contractors would use BMPs and provide clear public notice of days/times when noisy work will occur nearby.

**Table 3-28 Roadway Construction Noise $L_{max}$ Levels at Schools and Library**

| *ID* | *Name* | *Minimum Source Distance (ft)* | *$L_{max}$ (dB)* |
|---|---|---|---|
| **R3** | Yap Catholic High School | 534 | 74 |
| **R9** | College of Micronesia (Yap Campus) | 455 | 75 |
| **R10** | Yap High School | 771 | 71 |
| **R12** | Colonia Middle School | 377 | 77 |
| **R13** | Early Childhood Education | 763 | 71 |
| **R19** | Gaanelay Elementary School | 320 | 78 |
| **R26** | Yap Public Library | 113 | 87 |

Source: Argonne National Laboratory, 2026

Because roadway work is expected to occur primarily during the day, construction noise may disrupt worship activities. The results show that only one church, R20 (The Church of Jesus Christ of Latter-day Saints), is expected to experience notably elevated noise levels from roadway construction. When work occurs near R20, contractors would limit the duration of the daily work window and coordinate schedules to avoid conflicts within planned church activities where practicable.

**Table 3-29 Roadway Construction Noise $L_{max}$ at Churches and Community Center**

| *ID* | *Name* | *Minimum Source Distance (ft)* | *$L_{max}$ (dB)* |
|---|---|---|---|
| **R5** | Milew Community Center | 2,230 | 61 |
| **R11** | Ohnn | 2,203 | 62 |
| **R15** | Yap Seventh-day Adventist Church | 1,753 | 64 |
| **R20** | The Church of Jesus Christ of Latter-day Saints | 97 | 89 |

Source: Argonne National Laboratory, 2026

**Government Buildings and Businesses.** Table 3-30 and Table 3-31 summarize the roadway construction $L_{max}$ levels at government buildings and businesses, respectively. These uses are generally less noise-sensitive than residences, schools, and churches, but high sound levels may still cause annoyance and disrupt communication. Two government locations, R18, R28 and two businesses, R21 and R22, show predicted $L_{max}$ levels that may exceed 85 dB during nearby work. Because roadway activities near any one site are expected to be short in duration (typically several days), construction schedule changes are generally not necessary. However, contractors would still implement BMPs and coordinate with building owners/occupants so they can prepare for periods of elevated noise.

**Table 3-30 Roadway Construction Noise $L_{max}$ Levels at Government Buildings**

| *ID* | *Name* | *Minimum Source Distance (ft)* | *$L_{max}$ (dB)* |
|---|---|---|---|
| **R18** | Yap Department of Agriculture and Forestry Complex | 27 | 100 |
| **R23** | Yap State Department of Education | 419 | 76 |
| **R28** | FSM National Police Yap Field Office | 108 | 88 |

Source: Argonne National Laboratory, 2026

**Table 3-31 Roadway Construction Noise $L_{max}$ Levels at Businesses**

| *ID* | *Name* | *Minimum Source Distance (ft)* | *$L_{max}$ (dB)* |
|---|---|---|---|
| **R4** | Avi's Laundromat | 221 | 81 |
| **R21** | Aces Mart 2 | 47 | 95 |
| **R22** | Aces Mart 1 | 41 | 96 |
| **R27** | YCA Hardware | 364 | 77 |
| **R29** | J&S Store | 1,372 | 66 |

Source: Argonne National Laboratory, 2026

#### 3.7.2.3.2.3 Seaport

**Wharf Improvements.** The primary construction noise sources at the Seaport include installing steel piles for the mooring dolphin, wharf, and roll-on/roll-off ramp, as well as performing ground improvements using drilled shafts.

Because the Yap Seaport is an industrial environment, nearby receptors likely experience elevated ambient background levels (approximately 55–65 dB) compared to the other receptors on the island. However, pile driving produces impulsive, repetitive sound peaks that can be more annoying and more disruptive to concentration than continuous noise at the same average level.

The noise technical report (Appendix K-2) provides screening-level construction noise estimates for seaport activities that may occur concurrently with airport and roadway construction. The

same conservative approach used for the airport and roadway analyses (spherical spreading from the loudest equipment, with no BMPs assumed) was used in the Seaport noise impact analysis. Accordingly, the seaport results represent a worst-case scenario. (Note: This section only evaluates potential airborne noise impacts on nearby land-based receptors; underwater acoustic impacts on marine biota are described in Section 3.4.2.)

The noise technical study identified seaport construction as one of the loudest project elements, with maximum sound levels reaching approximately 108 dB $L_{max}$ at 50 ft for some equipment. Most receptors benefit from distance; however, two nearby receptors (R26, Yap Public Library and R28, FSM National Police Yap Field Office) may experience significant adverse impacts during pile driving without BMPs.

Table 3-32 summarizes the predicted $L_{max}$ levels at R26 and R28. These levels could cause substantial outdoor and indoor speech interference during active pile driving, and at R28 could disrupt radio dispatch, phone calls, and routine office communication. Additional receptors (Yap State Legislature and Yap State Government Administrative Building) are also located near the Seaport. Supplemental analysis (included in Appendix K-1) estimates exterior noise levels at these facilities of 90 dB and 93 dB, respectively (less than at the Police Field Office, R28). The higher noise level at the Administrative Building is due to its proximity to pile driving for the new mooring dolphin west of the wharf (see Figure 2-8), which would be of limited duration (approximately 6 days of pile driving).

Pile driving at the Seaport is projected to occur over approximately 111 days with an average of 2.4 piles driven per day, with a duration of about 35 minutes per pile (combination of vibratory and impact driving). Current construction BMPs include the use of soft starts (pile driver would gradually ramp up pile driving noise to minimize startling people and animals) and using cushioning material on the pile head to further attenuate impact noise. Consideration would be given to confining pile driving to civilian work hours when practicable, and coordinating timing with nearby library, police, and other government buildings. Implementation of BMPs would result in less than significant adverse noise impacts from construction at the wharf.

**Table 3-32 Predicted $L_{max}$ Levels during Seaport Construction**

| *ID* | *Name* | *Source Distance (ft)* | *$L_{max}$ (dB)* |
|---|---|---|---|
| **R26** | Yap Public Library | 734 | 86 |
| **R28** | FSM National Police Yap Field Office | 204 | 96 |

Source: Argonne National Laboratory, 2026

**Seaport Dredging.** The Proposed Action includes dredging the harbor channel entrance, turning basin, and wharf face to accommodate larger vessels. The dredging footprint includes the primary navigation channel and the turning basin adjacent to the seaport and dredging at the Rull dredge disposal site. Note that this section evaluates potential airborne noise impacts on nearby land-based receptors; underwater acoustic impacts on marine biota are described in Section 3.4.2.

Dredging activities can generate high maximum sound levels (e.g., $L_{max}$ > 90 dB 50 ft). However, at Yap, most dredging activity would occur at substantial distance from occupied structures. Only receptors near the proposed wharf toe dredging: R26 (Yap Public Library) and R28 (FSM National Police Yap Field Office) (and presumably the nearby Yap State Legislature and

Administrative Office buildings) were identified that predicted 15-minute equivalent levels exceeding 60 dB. In addition, dredging noise is typically dominated by continuous engine and excavator bucket noise, which is generally less disruptive than impulsive sources such as pile driving. Based on these screening-level results, dredging is expected to have minimal community noise impacts and is unlikely to require receptor-specific mitigation. BMPs would be implemented to keep noise levels as low as reasonably achievable and minimize disruptions at the most exposed facilities.

#### 3.7.2.3.3 Post-Construction Impacts

##### 3.7.2.3.3.1 Airport

After the proposed improvements are completed, DoW could hold up to two 14-day training events per year at either the Airport or Seaport (up to 28 days with up to 15 DoW flights per day), which would involve aircraft training activities at the Airport. An assessment of noise generated by aircraft and airport operations during the post-construction period was conducted for the Proposed Action, which includes continuation of normal (non-DoW) operations and increased activities during DoW training periods (Appendix K-1). The analysis assumes existing civilian aircraft and airport operations are the same as before construction (i.e., continue to with their current frequencies and schedules, including the two United Airlines night flights per week). The analysis indicates that the Preferred Alternative would result in significant adverse impacts to several sensitive receptors in the form of sleep, learning, and worship disturbances but would not pose a risk to hearing. BMPs and potentially mitigations would be needed to reduce disruptions due to the Preferred Alternative.

Model assumptions include the number of flight operations, takeoff, landing, flight paths, and times of day the flight operations would occur (daytime or nighttime) for two DAF cargo, two DAF tanker, four DAF fighter, and one DON cargo/passenger aircraft. For conservatism, the modeling analysis assumes that 10 percent of the DoW training flight activities would occur between 10:00 PM and 7:00 AM, which the noise impact modeling defines as “nighttime” events (for which a penalty applies resulting in a greater level of impact for nighttime activities). It is anticipated that the actual level of DoW flights and nighttime activities would likely be less than the modeled assumptions. The noise study modeled for the highest level of activity to provide a thorough, conservative analysis of potential impacts. (Note: All twice-yearly training events would be coordinated with Yap State and FSM well in advance of the activities.) The model resulted in predicted noise levels for aircraft operation noise at the 29 sensitive receptor locations listed in Table 3-23 and shown in Figure 3-26.

Analysis of the impacts of increased DoW activities is done in two ways: (1) Annual Average Day levels, which are computed by averaging noise from all aircraft activities throughout the year and (2) Average Exercise Day, which are computed using the average noise of aircraft activities just during the two-week exercises. Annual Average Day analysis is denoted as AAD (AADNL is the DNL for an Annual Average Day) or AED (AEDNL is the DNL for an Average Exercise Day). As mentioned earlier, the values that are obtained for an AED are more indicative of the impacts the community feels than AAD because of the high concentration of high noise activity during the estimated 28 exercise days per year.

**Land Use Compatibility Assessment from Aircraft Noise.** Land use compatibility (LUC) is a planning-based assessment used to evaluate the relationship between long-term aircraft noise exposure and surrounding land uses. For this project, LUC remains an important analytical tool because the Proposed Action would increase aircraft noise exposure relative to existing conditions. However, because the principal change in operations is associated with periodic, high-intensity exercise activity rather than a sustained year-round increase in routine daily operations, LUC is not the sole basis for impact assessment. Instead, it is used together with supplemental event-based metrics that better characterize short-term effects such as sleep disturbance, learning disruption, and worship disruption. Figure 3-29 shows the Annual Average DNL contours for the Preferred Alternative.

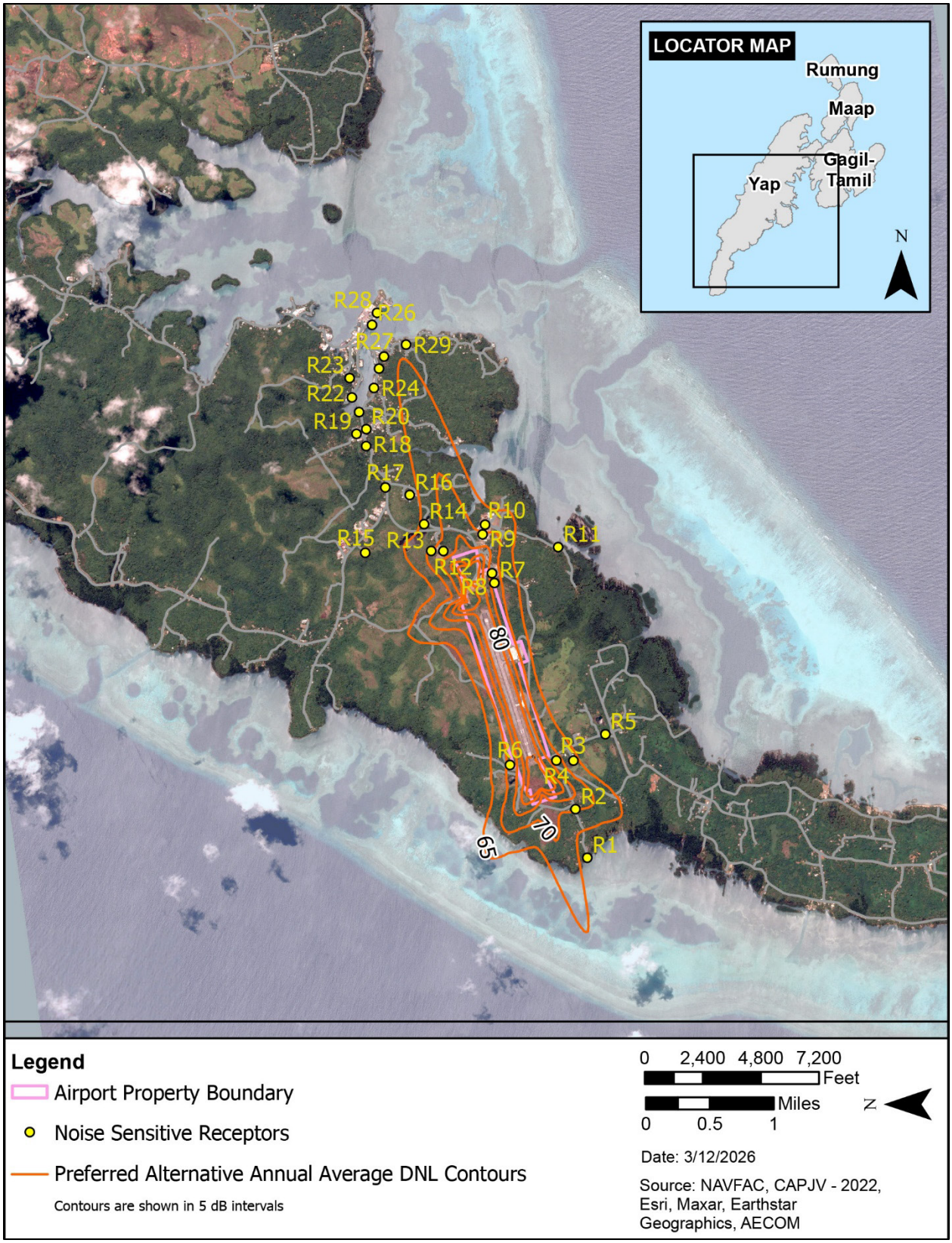



**Figure 3-29 Preferred Alternative Annual Average DNL Contours**

Residential uses, transient lodging, schools, and hospitals are among the land uses most commonly considered in LUC assessments because they include activities that are particularly sensitive to aircraft noise, including rest, sleep, learning, and other routine indoor uses. Table 3-33 summarizes the AADNL results and corresponding LUC determinations for residential and transient lodging receptors. Both transient lodging properties (R24 and R25) and Residences R1, R16, R17 and are considered LUC without restrictions. Residences at R2 , R6, R7, R9 and R13 fall within ranges where compatibility would require increased outdoor-to-indoor noise reduction and would require measures sufficient to achieve an effective OINRL of 30 dB.

**Table 3-33 DNL & Land Use Compatibility for Residential & Transient Lodging Properties**

| *ID* | *DNL (dB)* | *LUC* |
|---|---|---|
| **R1** | 63 | Y |
| **R2** | 70 | OINRL=30 |
| **R6** | 71 | OINRL=30 |
| **R7** | 73 | OINRL=30 |
| **R9** | 70 | OINRL=30 |
| **R13** | 70 | OINRL=30 |
| **R16** | 63 | Y |
| **R17** | 60 | Y |
| **R24** | 61 | Y |
| **R25** | 62 | Y |

Source: Argonne National Laboratory, 2026
Y (Yes)=Land use and related structures are compatible without restrictions.
N (No)=Land use and related structures are not compatible and should be prohibited.
"OINRL=30" denotes that receiver is compatible with the incorporation of measures to achieve an outdoor-to-indoor noise reduction level (OINRL) of at least 30 dB.

Table 3-34 summarizes the DNL and resulting LUC analysis for schools for the Preferred Alternative. Receptors R3 and R10 would require an OINRL of 25 dB, while receptors R9, R12, and R13 would require an OINRL of 30 dB.

**Table 3-34 DNL and Land Use Compatibility of Schools**

| *ID* | *Name* | *DNL (dB)* | *LUC* |
|---|---|---|---|
| **R3** | Yap Catholic High School | 66 | OINRL=25 |
| **R9** | College of Micronesia (Yap Campus) | 70 | OINRL=30 |
| **R10** | Yap High School | 68 | OINRL=25 |
| **R12** | Colonia Middle School | 72 | OINRL=30 |
| **R13** | Early Childhood Education | 70 | OINRL=30 |
| **R19** | Gaanelay Elementary School | 57 | Y |

Notes: See the notes for Table 3-33. Source: Argonne National Laboratory, 2026.

**Sleep Disturbance from Aircraft Noise.** To assess sleep disturbance, the analysis evaluated maximum nighttime sound exposure level (SEL), the number of events with an SEL > 90 dB (NA90SEL), and the probability of an awakening from the maximum SEL and assuming OINRL=15 dB (Table 3-35). The results show that the maximum SEL rises to 109-125 dB under the Preferred Alternative. The number of SEL over 90 dB, NA90SEL, rises from 0.0-0.2 for the No Action Alternative to 1.3-2.5 in the Preferred Alternative. The rise in both maximum nighttime SEL and NA90SEL for the Preferred Alternative is reflected in a doubling of the probability of

awakening; however, impacts would occur only during the intermittent training events (up to twice-yearly, for a maximum of 14 days each).

Even if BMPs were implemented to reduce the maximum nighttime SEL generated during the Preferred Alternative and mitigations were put in place at the receivers, nighttime exercises with loud aircraft would still be expected to create the potential for sleep disturbance.

**Table 3-35 Sleep Awakening Probability for Residential and Transient Lodging Locations for the Preferred Alternative**

| *ID* | *Max. Nighttime SEL (dB) - No Action Alternative* | *Max. Nighttime SEL (dB) – Preferred Alternative* | *Nighttime NA90SEL – No Action Alternative* | *Nighttime NA90SEL – Preferred Alternative* | *$P_{Awakening}$[1] – No Action Alternative* | *$P_{Awakening}$[1] – Preferred Alternative* |
|---|---|---|---|---|---|---|
| **R1** | 92 | 117 | 0.2 | 2.2 | 8% | 18% |
| **R2** | 92 | 122 | 0.2 | 2.4 | 9% | 21% |
| **R6** | 94 | 122 | 0.2 | 2.2 | 9% | 21% |
| **R7** | 94 | 125 | 0.2 | 2.2 | 9% | 22% |
| **R9** | 92 | 124 | 0.2 | 2.1 | 9% | 21% |
| **R13** | 91 | 124 | 0.2 | 2.0 | 8% | 22% |
| **R16** | 89 | 114 | 0.0 | 1.6 | 8% | 17% |
| **R17** | 86 | 109 | 0.0 | 1.3 | 7% | 15% |
| **R24** | 86 | 112 | 0.0 | 1.2 | 7% | 16% |
| **R25** | 87 | 114 | 0.0 | 1.2 | 7% | 17% |

[1]$P_{awakening}$ is computed using Eqn. 1 and the maximum nighttime SEL at the receiver location assuming an outdoor-to-indoor noise reduction level (OINRL) of 15 dB. Source: Argonne National Laboratory, 2026.

**Learning Disturbance from Aircraft Noise.** To assess potential impacts of aircraft noise on learning activities, the daytime $L_{eq}$, daytime $L_{max}$ and number of events $L_{max}$ > 65 dB during school hours ($NA65L_{amx}$), were computed for the No Action Alternative and Preferred Alternative at schools and the Yap Public Library (R26). An $NA65L_{max}$ outdoors corresponds approximately to an $NA50L_{max}$ indoors assuming an OINRL=15dB.

The analysis for schools and the Yap Public Library is presented in Table 3-36. The results show that in the No Action Alternative the $L_{eq}$ is under 40 dBA in nearly all locations. There are very occasional loud events as indicated by a maximum $L_{max}$ of 70-90 dB, but these are very infrequent as indicated by the $NA65L_{max}$ of 0-1 meaning, on average, fewer than one per day. This represents a minimal disruption from current airport activities.

Under the Preferred Alternative, the daytime outdoor $L_{eq}$ increases to approximately 67 to 83 dB. Assuming windows and doors are closed and an OINRL of 15 dB is achieved, estimated interior $L_{eq}$ values would still be above the 35 to 45 dB recommendations for learning space. Accordingly, exercise days would be expected to create the potential for learning disruption.

Looking at individual events metrics, the analysis shows that the proposed maximum $L_{max}$ rises from 75 to 88 dB in the No Action Alternative to approximately 99 to 114 dB under the Preferred Alternative. The number of school-hour events exceeding 65 dB outdoors, which corresponds approximately to indoor events exceeding 50 dB (assuming an OINRL of 15 dB), would increase from approximately 0.2 to 0.9 under the No Action Alternative to approximately 9.5 to 13.5 under the Preferred Alternative—suggesting roughly one or more potentially

disruptive events per hour during the school day. However, this would only occur during the twice-yearly training events, which would be spread out over up to 14 days in each event. BMPs such as coordination by DoW and local officials with the Yap community would reduce the chances of disruption on critical learning days such as exam days.

**Table 3-36 Daytime $L_{eq}$, $L_{max}$, and NA65$L_{max}$ for Schools and the Yap Library**

| *ID* | *Daytime Leq (dB) – No Action Alternative* | *Daytime Leq (dB) – Preferred Alternative* | *Max. Daytime $L_{max}$ (dB) – No Action Alternative* | *Max. Daytime $L_{max}$ (dB) – Preferred Alternative* | *NA65$L_{max}$ During School Hours – No Action Alternative* | *NA65$L_{max}$ During School Hours – Preferred Alternative* |
|---|---|---|---|---|---|---|
| **R3** | 40 | 76 | 83 | 106 | 0.7 | 13.5 |
| **R9** | 40 | 81 | 88 | 112 | 0.9 | 11.4 |
| **R10** | 39 | 78 | 86 | 110 | 0.9 | 10.9 |
| **R12** | 41 | 83 | 88 | 114 | 0.9 | 11.7 |
| **R13** | 39 | 81 | 85 | 109 | 0.7 | 11.5 |
| **R19** | 31 | 67 | 75 | 99 | 0.2 | 10.2 |
| **R26** | 36 | 72 | 78 | 108 | 0.7 | 9.5 |

**Worship Disturbance from Aircraft Noise.** To assess potential impacts of aircraft noise on worship and cultural activities, daytime $L_{eq}$, maximum daytime $L_{max}$ and NA65$L_{max}$ during a representative 1.5-hour long worship or cultural event during the day were computed and are shown in Table 3-37. During the No Action event, $L_{eq}$ is 30 to 32 dB, maximum daytime $L_{max}$ is 71 to 76 dB, and NA65 $L_{max}$ is 0.0 to 0.1 indicating that daytime aircraft activities under the No Action Alternative are not disruptive to worship or cultural activities. Under the Preferred Alternative, $L_{eq}$ rises to 67 to 69 dB, the maximum daytime $L_{max}$ range from 94 to 101 dB, and the NA65$L_{max}$ increases to approximately 1.7 to 2.2, indicating the potential for disruption of worship activities from the Preferred Alternative. Similar to schools, BMPs and mitigations that only reduce the noise level of individual events would not necessarily eliminate disruption. However, scheduling activities to reduce the number of loud events levels during primary worship service hours could substantially reduce the potential for disruption.

**Table 3-37 Daytime $L_{eq}$, $L_{max}$, and NA65$L_{max}$ for Worship Spaces**

| *ID* | *Daytime $L_{eq}$ (dB) – No Action Alternative* | *Daytime $L_{eq}$ (dB) – Preferred Alternative* | *Max. Daytime $L_{max}$ (dB) – No Action Alternative* | *Max. Daytime $L_{max}$ (dB) – Preferred Alternative* | *NA65$L_{max}$ During Worship Hours – No Action Alternative* | *NA65$L_{max}$ During Worship Hours – Preferred Alternative* |
|---|---|---|---|---|---|---|
| **R5** | 32 | 68 | 73 | 96 | 0.1 | 2.2 |
| **R11** | 31 | 67 | 73 | 94 | 0.0 | 1.7 |
| **R15** | 30 | 69 | 71 | 94 | 0.0 | 1.7 |
| **R20** | 32 | 68 | 76 | 101 | 0.0 | 1.9 |

Source: Argonne National Laboratory, 2026

Although military aircraft can generate maximum sound levels ($L_{max}$) exceeding 100 dB at nearby receptors, these are highly transient events lasting only seconds. The cumulative daily exposure falls well below the continuous 8-hour equivalents required to risk hearing damage. Furthermore, these high-noise exercise events are temporary, occurring only for a few weeks

per year, providing ample acoustic recovery time for the community. Therefore, while the Preferred Alternative may warrant BMPs and mitigation for annoyance, learning disruption, and sleep disturbance, it would not pose a risk of permanent hearing damage to the surrounding community.

Maximum anticipated exercise activity levels were included in the noise modeling results presented above; in typical exercise events, flight exercise levels and related noise impacts would likely be lower.

#### 3.7.2.3.3.2 Airport-to Seaport Connector Road

During the post-construction period, traffic along the Airport-to Seaport connector road may increase slightly during training events if DoW personnel are lodged in Colonia hotels. However, it is more likely that most personnel would stay in the expeditionary camp area within the Airport property and not contribute meaningfully to traffic-related noise on local roadways, resulting in less than significant impacts.

#### 3.7.2.3.3.3 Seaport

In addition to the impacts of long-term aircraft noise levels and short-term noise exposures due to construction activities, noise from future Navy ship activities at the seaport was evaluated for the Preferred Alternative. These activities include pulling in and out of port, berthing, and cargo activities. Unlike the aircraft noise or construction noise, there are no large datasets of reference noise levels or validated and approved noise models for these types of activities. Therefore, the noise analysis was qualitative in nature based on a comparison of the proposed activities to the existing activity in the vicinity of the Yap Seaport.

The Yap Seaport provides four berths servicing local and international cargo vessels, fuel tankers, an inter-island ferry, and longline fishing vessels. In addition to the Seaport, there are other industrial land uses on the peninsula. Although it is not possible to quantify all vessel traffic in the vicinity of the Seaport, schedules for the container ship service at the Seaport by Mariana Express Lines and Kyowa Shipping Co., Ltd. were obtained online. These carriers were found to average 27 and 13 operations at Yap Seaport annually.

Navy training activities at the Yap Seaport under the Proposed Action would consist of approximately one Navy vessel visiting the port per training event, with each event lasting one to two weeks (only one Navy ship mooring at a time). Port improvements would enable dual-use activities (i.e. military and commercial) and mooring of U.S. and allied vessels without interfering with normal commercial seaport operations. Airborne noise creating activities would include pulling in and out of port, berthing at the wharf, limited cargo loading, and the use of generators for power.

In the context of the much larger number of existing ocean vessel operations at the Seaport, including container-ship cargo operations and the existing industrial land uses on the peninsula, it is unlikely that the Navy activities at Yap Seaport would introduce new significant noise impacts.

#### 3.7.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Alternative 2 would have similar construction impacts as the Preferred Alternative, with the exception of some Airport construction noise sources being farther away from sensitive receptors northeast of the Airport. At the Seaport, Alternative 2 would have similar noise impacts because the same wharf improvements would be implemented, including pile driving. This alternative would not require as much dredge material transport or stockpiling, reducing some noise from vehicles and equipment.

During the post-construction period, Alternative 2 would have very similar impacts to noise sensitive uses from flight training operations because the same events would occur as in the Preferred Alternative. Naval vessel visits and operations at the Seaport would be the same under both action alternatives, with the same noise impacts.

## 3.8 Land Use

This discussion of land use includes current and planned uses and the regulations, policies, or zoning that may control the proposed land use. The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

### 3.8.1 Affected Environment

The following discussions provide a description of the existing conditions for land use resources in the vicinity of the Proposed Action project areas.

#### 3.8.1.1 Existing and Surrounding Land Uses

This section provides a description of existing land uses at the project sites and in the direct vicinity of those sites. A land use master plan or zoning ordinance has not been established for the Yap Proper Planning Area, so a review of existing land uses can provide context regarding potential land use compatibility of the Proposed Action.

##### 3.8.1.1.1 Airport

The Airport consists of a single runway: 07-25, which is 6,000 ft long by 150 ft wide. There is a single taxiway that connects the runway to the terminal apron along the south side of the runway. Most of the Airport development is focused in the vicinity of the terminal. There is a weather station in the vicinity of the Airport. Most of the northern boundary of the Airport land is currently vacant and is defined by thick vegetation. To the northwest, there is a residential community and Air Rescue and Fire Fighting (ARFF) Station located approximately 2,000 ft west of the terminal.

The Airport-to-Seaport connector road runs along the southern Airport boundary and passes within the boundary to the west of the terminal. To the southwest of the Airport there are several community uses including the Yap Catholic High School and the Milew Community Center. There are residential communities to the west and northwest. On the north side of the Airport, the topography steepens and the land is mostly vacant forested area. A GPPC asphalt batch plant and several residential structures are located east of the Airport.

#### 3.8.1.1.2 Airport-to-Seaport Connector Road

The Airport-to-Seaport connector road is a primary thoroughfare for the Yap community and there are a range of important land uses along the roadway including residential, commercial, industrial, and community uses. The following is a list of major existing land uses along or adjacent to the Airport-to- Seaport roadway:

- GPPC baseyard
- College of Micronesia
- Yap High School
- YSPSC Water Plant
- Yap Public Transportation System
- Yap Department of Forestry and Agriculture
- Yap International Christian School
- Bank of Guam
- Yap Post Office
- Yap Police Station
- Yap Living History Museum
- Yap Cooperative Association General Store

#### 3.8.1.1.3 Seaport

The Yap Seaport is managed by DPW&T, with Waab Transportation Company providing the stevedoring services. The Seaport is utilized by both international shipping and local boats typically transferring passengers and goods to and from the outer islands. The port includes a large open area utilized for container storage and handling, a warehouse for port operations, and the abandoned tuna warehouse. In the vicinity of the Seaport are a range of critical government and community uses including the Yap State Legislature, the FSM Social Security Administration, the Yap Public Library, the Yap Fishing Authority, and the FSM National Police Field Office.

#### 3.8.1.1.4 Harbor Dredging Areas

The proposed navigational improvements within Colonia Harbor (i.e., dredging and ATON improvements) would occur within the nearshore reefs at the berth, turning basin, and the east (Tamil) and west (Rull) side of the Waneday Channel. Under Article XIII, Section 5 of Yap's Constitution, "The State recognizes traditional rights and ownership of natural resources and areas within the marine space of the State from the high water mark up to [, within] and beyond 12 miles from island baselines." Traditional systems of marine resource ownership, regulation, tenure, and use rights are complex, but in general, the inshore waters, including the fringing reefs, of each village are within the jurisdiction of the village (Smith, 1991). The dredging location along the Tamil side of the Waneday Channel is located within the "no take, no entry zone" of the Tamil Marine Protected Area (TNC, 2016).

#### 3.8.1.1.5 Seaport Construction Support Areas

**Seaport Area**

The Seaport property itself would host some construction support areas including likely the concrete and asphalt batch plants and contractor laydown/staging areas. Additionally, one 0.5-acre parcel near the iBoom building and another 0.4-acre parcel on a former basketball court to the south of the Spanish Fort would be utilized as staging areas. These staging areas are currently vacant or used for vehicle parking. They are mostly paved with some intermittent grass and shrubs. The surrounding land uses for the iBoom site include the iBoom coffee shop and conference room, the YCA Business Center across the street to the north. The surrounding land uses for the basketball site include the adjacent Yap State Public Library, the Office of the Governor of Yap (Spanish Fort) to the north, and the Yap State Fishing Authority to the east.

**Chamorro Bay**

The two potential construction staging areas along the south side of Chamorro Bay are located approximately 0.7 miles east of the Seaport. The property along the north side of the road is a flat, 1.1-acre area of reclaimed land that extends into Chamorro Bay and is currently used as a staging area for the Ganir Bridge replacement project. The majority of the parcel has grass/shrub vegetation and the perimeter is ringed with trees. The property along the south side of the road is approximately 2.9 acres and includes some cleared areas and other areas with thick vegetation. The surrounding land uses include residential homes and commercial uses including the Organic Farm Market and ESA Bay View Hotel to the east of the proposed staging areas, and the Hilltop Motel to the west.

**Tamil Construction Support Site**

This potential staging area location encompasses approximately 4.3 acres and is a roughly five-mile drive north from the Seaport. It is located across German Channel from the Waab Construction Company baseyard, approximately 250 feet north of a single residential structure, and across the main road (approximately 200 feet northwest) of the Yap Seventh-Day Adventist School. The site is partially cleared with one existing structure and thick vegetation along the west boundary near German Channel.

**Yap Sports Complex**

There are two parcels in the vicinity of the Yap Sports Complex that could be utilized as a construction worker camp and additional staging areas. Both parcels encompass approximately 6.9 acres. One site is directly west of the Sports Complex, across the road from the track and sports arena. This site is mostly cleared with some trees and scrub vegetation.

The second site is located southwest of the Sports Complex along the west side of the main road. This site is partially cleared, with some areas of dense vegetation.

Other than the Sports Complex, the only other surrounding use in the vicinity is the College of Micronesia approximately 700 ft to the northwest along the main road.

#### 3.8.1.1.6 Dredge Material Offloading, Stockpiling, and Land Reclamation Areas

**Nungoch**

The Nungoch dredge material would be offloaded at an existing aggregate offloading site directly south of the Yap Recycling Center. The material would then be trucked to the adjacent

land reclamation area at the end of the Nungoch peninsula. The land reclamation area encompasses a portion of an abandoned vessel and the adjacent nearshore area. Land uses in the vicinity include the YSPSC Wastewater Treatment Plant and the proposed Seabee warehouses.

**Rull**

The Rull dredge offloading and stockpiling area is located approximately 1,500 ft southwest of the Seaport on the shoreline across from the Nungoch peninsula. The stockpiling area would encompass a vacant, vegetated upland area and the adjacent shallow nearshore area. There is one residential home directly north of the stockpiling site and several structures to the west of the stockpiling site along the road. There is also a community center building directly south of the stockpile area.

**Tamil**

The Tamil dredge material management locations include an offloading location approximately 1.2 miles northeast of the Seaport along the Tamil shoreline and within the Traditional Management Zone of the Tamil Marine Protected Area (TNC, 2016). The Tamil offloading location provides boat access directly to the harbor from the Tamil community. The haul route from the offloading site to the stockpile location is approximately 0.9 miles long and there are residential homes along the roadway for nearly the entire length. The Tamil stockpile site encompasses a flat area directly west of the Tamil Community Center. There is one structure and several garden beds along the eastern edge of the stockpile site. The remainder of the site is mostly clear of vegetation.

### 3.8.2 Environmental Consequences

The location and extent of a proposed action needs to be evaluated for its potential effects on a project site and adjacent land uses. Factors affecting a proposed action's impact on land use include its compatibility with on-site and adjacent land uses, restrictions on public access, or change in an existing land use that is valued by the community. Other considerations are given to proximity to a proposed action, the duration of a proposed activity, and its permanence.

#### 3.8.2.1 Analysis Method

The approach to the analysis of land use impacts considers existing or planned land uses that would be affected, limited, or precluded by the Proposed Action. The significance of impacts from the Proposed Action was determined based on the extent of deviation from and compatibility with existing and proposed land uses and community norms. Impacts may include the extended closure and loss of public access to public lands, permanent incompatible changes in land use, or a change in the nature of the existing land use.

#### 3.8.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to land use. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

#### 3.8.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

The project sites proposed for the Preferred Alternative and adjacent lands define the study area for land use analyses.

#### 3.8.2.3.1 Avoidance, Minimization Measures, and Best Management Practices

- Provide continued public/community access to important resources during the construction period to the extent practicable.
- Provide notice to adjacent landowners prior to initiating construction. The notice would indicate the construction start date, hours of operation, and provide a point of contact for questions, comments, and feedback.
- Erect construction fencing for dust suppression, visual screening, and/or safety as needed.

#### 3.8.2.3.2 Construction Impacts

Most lands to be utilized for the construction process are currently managed by Yap State for Airport, Seaport and roadway use and therefore, there would be no change in land use. Permission to use private lands for temporary use would be obtained by Yap State. Construction activities would have effects on adjacent land uses (e.g., noise, dust, traffic, etc.), but these effects would be minimized through the use of avoidance, minimization measures, and BMPs. Following the completion of construction, sites used for temporary support (i.e., staging, laydown areas, worker camps, etc.) would be returned to the respective landowners in accordance with the terms of the lease.

The permanent expansion of the Airport boundary would entail acquisition of approximately 63.6 acres of private land by the FSM/Yap State Government and funded by the U.S. DoW. Additionally, the harbor dredging would involve the removal of 6.8 acres of privately-owned reefs. Acquisition of the Airport expansion land and dredging of privately-owned reefs would be a significant adverse impact to land use during the construction period.

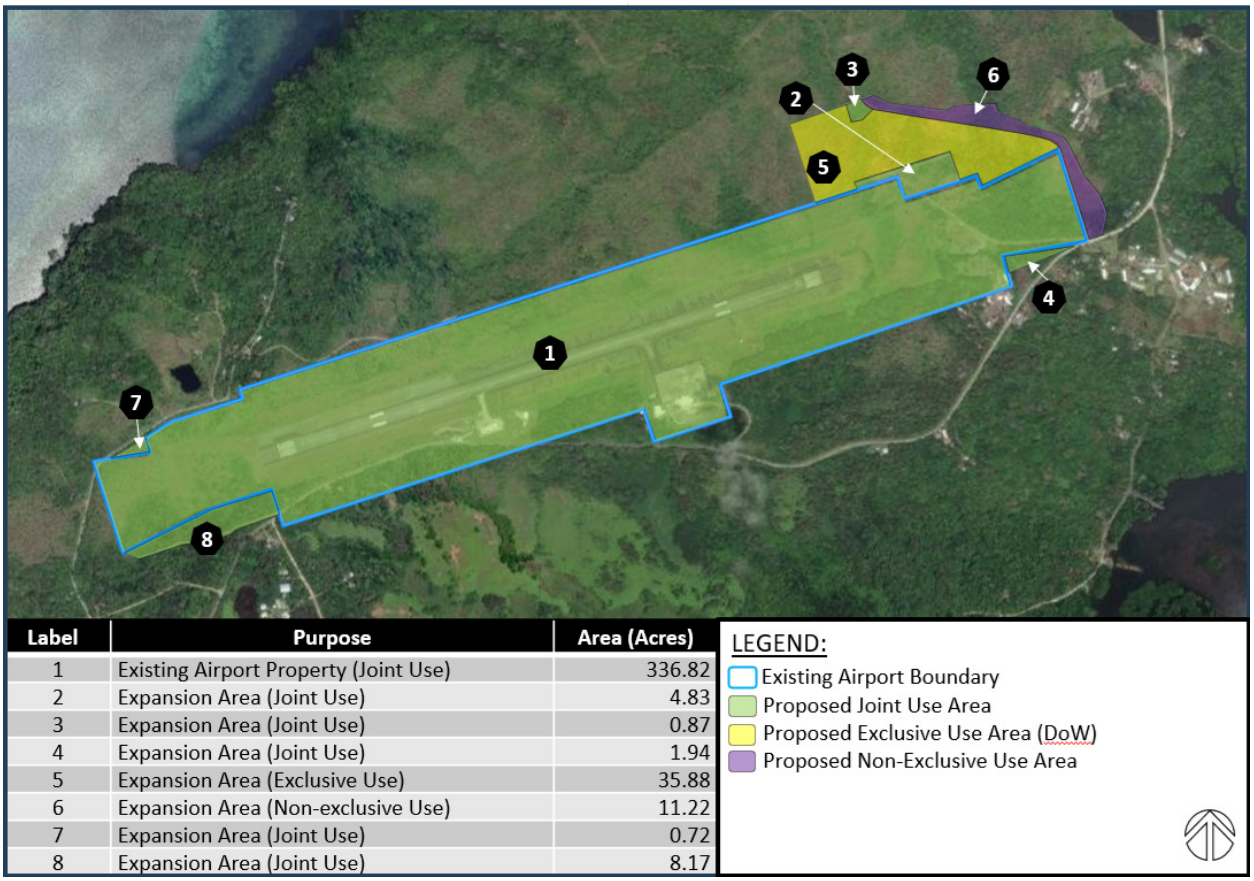
##### 3.8.2.3.2.1 Airport

Lands uses adjacent to and in the vicinity of the Airport would experience nuisances such as construction dust, noise, and traffic during the approximately eight-year Airport construction period. However, the construction contractor would be required to adhere to avoidance and minimization measures established in the relevant sections of this EIS (Sections 3.3 Air Quality and Greenhouse Gases, 3.7 Noise, and 3.12 Transportation).

Construction of the proposed improvements at the Airport will require approximately 63.6 acres of permanent land acquisition by FSM/Yap State Government and funded by the U.S. DoW for the Airport boundary expansion. Also, temporary land use agreements for the use of adjacent construction staging and laydown areas (approximately 60.9 acres) will be needed. Most of these lands are currently vacant, and all landowners would be justly compensated for the purchase or lease of their lands. Some of the areas required for the Airport boundary expansion include graves and/or other important community and cultural resources. Impacts associated with the removal of these resources are addressed in Section 3.6 Cultural Resources.

Figure 3-30 identifies the proposed Defense Site at the Airport (Appendix C). The existing Airport boundary is shown in blue outline (Area #1). Outside of the existing boundary are seven areas, totaling approximately 63.6 acres, proposed for acquisition and Airport expansion. These expansion areas include joint use areas (shown in green) which will be available for FSM/Yap State and U.S. DoW use, an area of exclusive use for the U.S. DoW (yellow, Area #5), and the area dedicated as a non-exclusive (i.e., public) use for the rerouted Seabee Flats Road (purple,

Area #6). The acquisition of private land for the Airport expansion represents a change in the nature of the existing land use at those properties and therefore the construction of the proposed improvements at the Airport would result in a significant adverse impact to land use.




| Label | Purpose | Area (Acres) |
|---|---|---|
| 1 | Existing Airport Property (Joint Use) | 336.82 |
| 2 | Expansion Area (Joint Use) | 4.83 |
| 3 | Expansion Area (Joint Use) | 0.87 |
| 4 | Expansion Area (Joint Use) | 1.94 |
| 5 | Expansion Area (Exclusive Use) | 35.88 |
| 6 | Expansion Area (Non-exclusive Use) | 11.22 |
| 7 | Expansion Area (Joint Use) | 0.72 |
| 8 | Expansion Area (Joint Use) | 8.17 |

LEGEND:
- Existing Airport Boundary
- Proposed Joint Use Area
- Proposed Exclusive Use Area (DoW)
- Proposed Non-Exclusive Use Area

**Figure 3-30 Proposed Airport Defense Site**

#### 3.8.2.3.2.2 Airport-to-Seaport Connector Road

Construction of the Airport-to-Seaport connector road improvements would affect land uses along the proposed corridors to be improved through increased noise, dust, and traffic. For most of the corridor, repairs and asphalt overlays are proposed and effects are a normal part of necessary roadway repair and maintenance. For the 1.3 miles of roadway nearest to the Seaport, full depth reconstruction is proposed. This would require a more intensive construction process and greater noise, dust, and traffic impacts to nearby land uses and for a longer duration. To address these potential impacts to nearby land uses, the construction contractor would be required to adhere to avoidance and minimization measures within this EIS and the forthcoming ECP such as establishing a traffic control plan, preconstruction notification to landowners, limiting construction use to normal working hours, and fugitive dust control measures. With the implementation of the avoidance and minimization measures and compliance with the ECP, less than significant adverse impacts to adjacent land uses associated with the Airport-to-Seaport connector road improvements are anticipated.

#### 3.8.2.3.2.3 Seaport

Construction at the Seaport would be limited to the existing Seaport property. No additional permanent land acquisition is required. The construction process would be coordinated closely with the Yap Seaport operators to avoid and/or minimize potential impacts to Seaport operations.

Nearby land uses are already accustomed to the noise, dust, and traffic related effects of typical Seaport operations and other nearby industrial uses (e.g., wastewater treatment plant, recycling center, etc.). While the construction of the Preferred Alternative would exacerbate these nuisances during the construction process, the contractor would be required to adhere to the avoidance and minimization measures identified in the relevant sections of this EIS (3.3 Air Quality and Greenhouse Gases, 3.7 Noise, and 3.11 Transportation). Therefore, the construction of the proposed improvements at the Seaport would result in less than significant adverse impacts to land use.

#### 3.8.2.3.2.4 Harbor Dredging

The proposed harbor dredging would impact approximately 6.8 acres of nearshore reef, including approximately 3.2 acres within the Tamil Marine Protected Area (TNC, 2016). During the dredging process, the U.S. DoW would obtain operational control for the impacted areas from the respective owners of the reefs which would require compensation to those owners. Following the completion of dredging, the control of those reef areas would be returned to the owners, but the long-term loss of these reefs and the associated resources they provide for the respective communities would result in a significant impact to existing use rights at those locations. In recognition of this impact, the U.S. DoW has coordinated the dredging process with the respective owners and the Proposed Action would include the beneficial reuse of the dredge material generated from each location to support the respective communities.

#### 3.8.2.3.2.5 Seaport Construction Support Areas

**Seaport Area**

The iBoom parcel is intermittently utilized for vehicle parking, and the basketball court parcel appears to be vacant and no longer used for basketball. Given the proximity of these sites to Colonia Town, YCA Business Center, and the Government uses on the peninsula, there is potential for disruption to adjacent land uses including from construction noise, dust, and traffic. The Yap State Public Library is directly adjacent to the basketball court site and is a particular concern. Close coordination with the library would be required to avoid potential significant impacts. Therefore, the use of these locations for staging areas would require avoidance and minimization measures like preconstruction notification to nearby businesses and landowners, limiting construction use to normal working hours, and erecting dust fencing to prevent dust and visually screen the site. With the implementation of these measures the use of the iBoom staging areas would have less than significant adverse impacts on surrounding land uses.

**Chamorro Bay**

Two potential staging areas have been identified along the south side of Chamorro Bay. The site on the south side of South Chamorro Bay Road is currently vacant so there would be no impact to the existing land use at the property. The site to the north of South Chamorro Bay Road is

currently in use as a staging area for the Ganir Bridge replacement project, so the proposed use as a staging area for the Seaport construction would be consistent with its existing use. There are a range of residential and commercial land uses adjacent to and in the vicinity of these potential staging areas. Therefore, the use of these locations for staging areas would require avoidance and minimization measures like preconstruction notification to landowners, limiting construction use to normal working hours, and erecting dust fencing to prevent dust and visually screen the site. With the implementation of these measures the use of the Chamorro Bay staging areas would have less than significant adverse impacts on surrounding land uses.

**Tamil Construction Support Site**

The Tamil Construction Support Site includes two separate portions of one property totaling approximately 4.3 acres. The site would potentially be used by the construction contractor as a staging/laydown area. The site is mostly vacant with one existing structure which would be left in place so there would be no impact to existing land use on the site. Low lying scrub vegetation (mostly ferns) would be removed to establish the staging areas and erosion and sediment control BMPs would be implemented to avoid potential impacts to the nearby German Channel. Sensitive nearby uses include a single residential structure approximately 250 feet to the south, and the Yap Seventh-Day Adventist School across the main road (approximately 200 feet to the southeast). The construction contractor would be required to comply with standard construction BMPs to minimize potential impacts on these uses including preconstruction notification to nearby businesses and landowners, limiting construction use to normal working hours, and erecting dust fencing to prevent dust and visually screen the site. With the implementation of these measures the use of the Tamil Construction Support Site staging areas would have less than significant adverse impacts on surrounding land uses.

**Yap Sports Complex**

Two potential parcels of land near the Yap Sports Complex have been identified for the location of a worker camp and potential staging areas for the Seaport construction contractor. Both parcels are located on the west side of the main road, across from the Yap Sports Complex and both sites are currently vacant so there would be no impact to existing land use at the properties. The Sports Complex is located across the roadway from the sites and it provides the primary sports facilities for Yap, including a track, football/soccer field, indoor arena, tennis courts, and baseball field. Other than the Sports Complex, the nearest community use is the FSM Maritime and Fisheries Institute campus approximately 700 feet northwest along the roadway. Direct impacts from the proposed worker camp and staging area are not anticipated, but they would result in some increased traffic on the roadway that serves the Sports Complex and bisects the campus (estimated at no more than 50 daily trips). The workers at the worker camp would be shuttled to/from the Seaport construction areas and hauling trips associated with the staging areas would avoid peak traffic hours to minimize potential impacts. With the implementation of these measures the use of the Yap Sports Complex worker camp and staging areas would have less than significant adverse impacts on surrounding land uses.

#### 3.8.2.3.2.6 Dredge Material Offloading, Stockpiling, and Land Reclamation Areas

**Nungoch**

Because the dredge material offloading will be at an existing aggregate offloading site, there would be no change to land use. The material would be trucked to a currently submerged, shallow reef flat at the end of the Nungoch peninsula. Land reclamation of this area represents a significant change in land use. However, this area was identified by the Yap State Government as its preferred location for land reclamation for a public park. The development of a public park would serve a critical need for the community and therefore represents a significant beneficial impact on land use.

**Rull**

The Rull dredge material offloading and stockpiling area would encompass a vacant, vegetated upland area and the adjacent shallow nearshore area. There is one residential home directly north of the stockpiling site and several structures to the west of the stockpiling site along the road. The proposed stockpile design includes a minimum 30 ft buffer to all existing structures as well as the implementation of standard erosion and sedimentation control features (e.g., silt fences, earthen swales, and berms). Even with the 30-foot buffer, the adjacent homes would likely be impacted by noise and dust from the stockpiling activities. However, these impacts would be relatively short-lived because the proposed stockpiling is only expected to take 10 working days to complete. Additionally, the construction contractor would be required implement standard BMPs including preconstruction notification to nearby residents and landowners, limiting construction use to normal working hours, and erecting dust fencing to prevent dust and visually screen the site. With the implementation of these measures the proposed Rull stockpiling site would have a less than significant adverse impact on surrounding land uses.

**Tamil**

The construction of the Tamil dredge material offloading location would impact an area within the Tamil Marine Protected Area; however, the proposed improvements have been carefully coordinated to minimize potential impacts and provide improvements for the benefit of the local community. The improvements would expand the existing finger of land extending into Colonia Harbor from the Tamil shoreline to support the dredge material offloading. Additionally, the proposed dredging would improve boat access to the Colonia Harbor for the Tamil community.

The hauling of dredge material up the 0.9 mile road to the stockpiling site would have temporary impacts on the adjacent residential land uses (i.e., dust, noise, traffic). However, the impacts would be limited to a relatively short period (approximately 30 work days), and adjacent landowners would be notified ahead of construction to minimize potential effects. The proposed stockpiling site is currently vacant except for a single structure and several garden beds along the eastern edge of the stockpile site. The proposed stockpile design would include a minimum buffer of 30 feet to the existing building and the garden beds would be even further away since they are on the other side of the building from the stockpile (Figure 2-13).

Additionally, the Tamil Community Center is located adjacent to the proposed stockpile site. The community center sits at a higher elevation than the stockpile site, so the visual impact

would be limited. The active stockpile site would create noise and dust impacts on the adjacent community center, but these impacts would be relatively short-lived during the estimated 30 work days it will take to stockpile the material. The Tamil traditional leaders have indicated their preference for this site to be used for stockpiling, and they would continue to be coordinated with during construction to minimize potential impacts to the community center. Therefore, potential adverse impacts to the community center or other nearby land uses are anticipated to be less than significant.

#### 3.8.2.3.3 Post-Construction Impacts

Following the completion of construction, the temporary construction-related sites (i.e., staging areas, batch plants, worker camps, and dredge material offloading/stockpiling sites) would be returned to their pre-construction land uses, unless otherwise dictated by the relevant landowner. Additionally, the improved Airport-to-Seaport connector road and Seaport would resume their pre-construction land uses.

At the Airport, the primary change in long-term land use would be the permanent expansion of the Airport boundary through the acquisition of approximately 63.6 acres of private land. Following construction, the construction support areas outside the proposed Airport boundary would be returned to the respective landowners in accordance with the terms of the lease. Additionally, the expansion of the Airport and its proposed use for U.S. DoW training purposes (up to twice a year for a period of up to 14 days each) would introduce additional aircraft noise exposure to nearby land uses (see Section 3.7 for a detailed description of noise impacts).

At the Seaport, the proposed U.S. DoW training would involve approximately one vessel visiting the port per training exercise. Port improvements would enable dual-use operations (i.e. military and commercial) and mooring of U.S. and allied vessels without interfering with normal commercial Seaport operations. The training exercises would be coordinated with the Seaport operators well in advance to further avoid or minimize potential impacts to Seaport operations and adjacent land uses.

In the post-construction period, the Airport and Seaport would continue to be controlled by Yap State with continued primary use by local users (e.g., private, commercial, and government entities). U.S. DoW training would be closely coordinated with Airport and Seaport operators and BMPs would be implemented to avoid and minimize potential noise disruptions for nearby land uses. Therefore, the Preferred Alternative would result in less than significant adverse impacts to land use in the post-construction period.

### 3.8.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Alternative 2 would have a similar impact on land use as the Preferred Alternative. The primary difference would be that the necessary land acquisition for the Airport improvements would be shifted to the west along the north side of the Airport to account for the alternate apron location. It is not anticipated that this shift would have a significant impact on surrounding land uses because that area is currently a vacant, forested hillside.

The difference at the Seaport is that Alternative 2 would dispose of dredged material from Waneday Channel within the deep channel and would not include stockpiling at Rull and Tamil

for the community's beneficial reuse. This would result in fewer temporary inconveniences associated with the temporary offloading and stockpiling of the dredge material. However, the elimination of beneficial reuse of the dredge material eliminates the primary benefit to these communities which would have offset potential negative effects.

Overall, during the construction period, Alternative 2 would result in a greater net adverse effect than the Preferred Alternative due to the lack of offsetting community benefits for Rull and Tamil. During the post-construction period, Alternative 2 would result in the same less than significant adverse impacts as the Preferred Alternative associated with noise exposure during training exercises on surrounding land uses at the Airport.

## 3.9 Airspace

Airspace management and its use considers how airspace is designated, used, and administered in a manner that best accommodates the individual and common needs of military, commercial, general aviation, and other users of airspace. This discussion of airspace includes current and proposed uses and controls of airspace. Because the proposed U.S. DoW training activities involve aircraft landings and takeoffs at the Airport, the study area for airspace includes the area managed by FSM/Yap State.

### 3.9.1 Affected Environment

#### 3.9.1.1 Airspace Classes

While the FAA manages all airspace within the United States and the U.S. territories (49 USC 40103[b]), the Division of Civil Aviation (a branch of FSM's Department of Transportation, Communication & Infrastructure) is responsible for the nation's airspace. Airspace classes (A, B, C, D, E, G in the U.S.) define zones with different rules, equipment, and Air Traffic Control (ATC) services, ranging from highly controlled (Class B, C, D) requiring clearances and communication, to uncontrolled (Class G) where pilots self-regulate, to specific zones (Class A for high-altitude IFR, Class E for general controlled airspace, and Special Use Airspaces like military operations areas). These classes manage aircraft density and safety, dictating pilot responsibilities, weather minimums, and communication requirements. Airspace is defined by both horizontal boundaries, like geographical shapes on a map, and vertical limits, specified in ft above ground level (AGL) or mean sea level (MSL), creating different classes (A, B, C, D, E, G) and Special Use Airspace (SUA).

The Yap International Airport follows both FAA and the International Civil Aviation Organization (ICAO) rules and is therefore identified in aeronautical publications as PTYA. The Airport operates in Class "G" uncontrolled airspace, this means there is no operational control tower whose role is to separate and sequence aircraft to the Airport. Instead, the Airport operates on a Common Traffic Advisory Frequency (CTAF) which is the standard for uncontrolled airports allowing pilots to announce their position in the traffic pattern in order to deconflict and safely sequence themselves for landing. At the Airport, Class A (controlled) airspace begins at 5,500 ft above MSL and Class E airspace starts at 60,000 ft above MSL.

#### 3.9.1.2 Airport Navigable Airspace and Obstructions

Code of Federal Regulations Title 14 Part 77 defines airport navigable airspace and obstructions to air navigation and navigational and communication facilities. This regulation details

standards and requirements when proposed construction notification to the FAA is required. Additionally, it provides a methodology and process for aeronautical studies of obstructions to air navigation or navigational facilities to determine the effect on the safe and efficient use of navigable airspace, air navigation facilities and/or equipment. Furthermore, it also establishes imaginary airspace surfaces in relation to the airport and to each runway based on the category of each runway and the type of approach available or planned for that runway. At an airport, an imaginary surface is a defined three-dimensional space above and around the airport. These surfaces are not physical structures, but rather conceptual areas used to determine permissible heights of objects (buildings, towers, trees, etc.) to ensure the safe operation of aircraft. They are important to ensuring obstacle clearance and preventing hazards to air navigation.

- a ***horizontal plane***: A horizontal plane 150 ft above the established airport elevation. Its shape is defined by connecting arcs drawn from the center of each end of the primary surface(s) of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs
- a ***conical surface***: Extends upward and outward from the edge of the horizontal surface. It is a cone-shaped surface that further expands the protected airspace
- a ***primary surface***: A surface longitudinally centered on the runway extending 200 ft beyond each end of the runway. Its width depends on the type of runway. It's at the same elevation as the nearest runway elevation
- an ***approach surface***: longitudinally centered on the runway centerline and extending outward and upward from each end of the primary surface (extends 10,000 ft at a slope of 50 to 1 and an additional 40,000 ft at a slope of 40 to 1 for all precision instrument runways). These surfaces slope upward from the ends of the runway. Their dimensions and slopes vary depending on the type of approach (e.g., precision instrument, non-precision instrument)
- a ***transitional surface***: These surfaces extend outward and upward from the sides of the primary surface, and the approach surfaces to join the horizontal surface. They are sloped surfaces (typically 7:1) that connect the lower surfaces to the higher, broader airspace

The current Airport does not meet current FAA runway safety area (RSA) requirements but is considered as being “grandfathered” due to its construction prior to current requirements. Potential public safety impacts related to the RSA are discussed in Section 3.12 Public Health and Safety.

### 3.9.2 Environmental Consequences

The analysis of airspace management and use involves consideration of many factors including the types, locations, and frequency of flight operations, the presence or absence of already designated (controlled) airspace, and the amount of air traffic using or transiting through a given area.

#### 3.9.2.1 Analysis Method

The analysis of potential consequences to Airport airspace considered whether activities or equipment associated with the construction or post-construction activities of the alternatives would impact navigable airspace.

#### 3.9.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to current Airport activities and thus no changes to Yap or FSM airspace. Therefore, the No Action Alternative would have no impact on existing airspace at the Airport. However, the pre-existing RSA nonconformities (i.e., gullies at both ends of the runway) would remain in place, and although considered grandfathered by FAA, the runway would continue to not meet contemporary FAA standards (i.e., forego the benefit of RSA improvements).

#### 3.9.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

As noted in the beginning of Section 3.9, readiness training activities such as annual multilateral exercises would occur outside FSM airspace; therefore, airspace impacts focus on the effect of the Preferred Alternative to arriving and departing aircraft at the Airport.

##### 3.9.2.3.1 Avoidance, Minimization Measures and Best Management Practices

The construction contractor would work closely with the Airport Manager to coordinate and plan runway closures and re-openings to minimize adverse impacts to commercial passenger and cargo flights during the construction period.

##### 3.9.2.3.2 Construction Impacts

During the over seven-year construction period, two full runway closures are currently anticipated during active construction work within the RSA (see Section 3.11 Transportation for detailed discussion). Other than the two full closures, the runway would remain operable to support existing United Airlines and Asia Pacific flight schedules. However, in between those flights, there would be a reduction in runway availability due to construction activity. These changes would not affect the Airport's navigable airspace. Therefore, the Preferred Alternative would have no impacts to airspace during construction.

##### 3.9.2.3.3 Post-Construction Impacts

During the post-construction period, the project would result in extending the Part 77 airspace surfaces 900 ft to the east due to the runway extension. U.S. DoW training activities would increase airspace usage during the up to 28 annual training days (maximum of two 14-day training events per year). Therefore, the Preferred Alternative would have a less than significant adverse impact on airspace during the post-construction period.

#### 3.9.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Because the same airfield is involved in both action alternatives, the affected airspace area and impacts for Alternative 2 are the same as the Preferred Alternative. This alternative would involve the same avoidance, minimization measures, and BMPs as the Preferred Alternative.

## 3.10 Infrastructure and Utilities

This section discusses infrastructure such as utilities (including potable water production, storage, and distribution; wastewater collection treatment and disposal; storm water management, solid waste management, energy production, transmission, and distribution; and communications), and facilities (including airfields, buildings, ranges, training and testing areas,

wharves, piers, housing, etc.). Transportation systems and traffic are addressed separately in Section 3.11.

## 3.10.1 Affected Environment

The following subsections provide descriptions of the existing conditions for each of the seven categories under infrastructure and utilities in Yap State. A general discussion of each system is provided first, followed by specifics related to the Airport and Seaport (in that order).

Yap's infrastructure and utility systems are extremely vulnerable to major weather events such as extended periods of drought during El Nino events (e.g., 2007, 2015-16 and 2023-24), major typhoons (e.g., Sudal 2024), and an exposed overhead electrical grid heavily reliant on fossil fuels shipped in from remote locations. This vulnerability results in frequent and sometimes extended utility system outages. Residents have learned to cope with vulnerability through off-grid practices such rainwater harvesting, renewable energy systems (wind and solar), communal structures that promote sharing and self-sufficiency and an agrarian, barter-based economy with a strong ethic of reducing, reusing and recycling resources. Accordingly, large multi-year construction projects such as the proposed action, need to ensure they can be self-reliant during expected periods of extended utility outages.

### 3.10.1.1 Potable/Non-Potable Water

There are three potable water management entities in Yap Proper: YSPSC manages the Central Water District (CWD) that provides municipal potable water service to Colonia and adjacent areas and also provides non-potable water service to the Airport. SYWA supplies potable water to the Airport and areas to the south, while the Gagil-Tomil Water Authority (GTWA) services the northern areas of the main Yap Islands (FSM, 2025).

#### Airport

The airfield is served by both YSPSC's CWD on the Colonia side of the Airport via a 6-8-inch high-density polyethylene (HDPE) non-potable transmission main under the highway and SYWA's potable service to the west side of the airport.

#### Seaport

The Seaport is located in the CWD serviced by a 45 MGD, well-fed Gitam Reservoir located between Colonia and the Airport that is treated (i.e., potable) and provided to residents in the greater Colonia area via an 6-8-inch HDPE transmission main running along the Airport-Colonia Road. The water main extends out the Nungoch peninsula, past the existing Seaport, to its terminus at YSPC's Wastewater Treatment Plant at the end of the peninsula. A lateral line serves the Seaport.

An existing 6-8-inch water main serves the community along the south side of Chamorro Bay.

### 3.10.1.2 Wastewater

The Colonia-Airport corridor is served by the YSPSC's Colonia wastewater system, which operates the only centralized wastewater treatment plant (WWTP) in the state. Outlying villages are served by septic systems. The WWTP provides primary treatment utilizing an Imhoff tank (two story wastewater treatment tank) providing settling (upper tank) and sludge digestion (lower tank) and drying beds, with a capacity of 340,000 GPD (output is only 170,000 GPD because only half of the capacity is being used to service about 300 homes) (NAVFACPAC,

May 2024). The treated effluent is discharged to a sewage outfall, which extends about 560 ft into the lagoon in a southeast direction.

**Airport**

Airport effluent is discharged to an 8-inch YSPSC conveyance line under the Airport-Colonia Road and ultimately treated at the Colonia WWTP.

**Seaport**

Seaport effluent is conveyed to the WWTP via a lateral connection to the main line.

### 3.10.1.3 Stormwater Drainage

**Airport**

The existing stormwater system was designed to collect, convey and discharge stormwater from the airfield. The system design did not include measures to treat and detain stormwater (which the Proposed Action would provide), resulting in increased erosion and sedimentation to downstream areas. Stormwater drainage at the airfield is by sheet flow, essentially perpendicular to the centerline of the runway. There are no paved or unpaved drainage ditches within the runway safety area (RSA). There are underground drainage systems within the limits of the RSA. On the north (upslope) side, runoff is collected through a series of ditches and channels parallel to the runway centerline. The ditches in turn carry the water to three main cross drainage structures passing under the RSA or past the ends of the RSA. The inlet/outlet for these main structures is outside the RSA. On the south side, the drainage is collected by a system of drainage channels parallel to the runway and surrounding the terminal area. These drainage channels are all outside the RSA. Subsurface drainage system elements run along both sides of runway with series of cleanouts and drains to subdrain manholes approximately three feet from the edge of the pavement and then connected to the existing open ditches draining to daylight and into existing water courses to the south (downslope) of the airfield. The existing storm water system is considered substandard measured against contemporary standards and is anecdotally assumed to adversely impact downslope ecological systems. Studies of downstream mangrove forest health provided in this EIS (e.g., Section 3.2) have determined the forest is healthy despite significant changes in the upland watershed (including airport and roadway construction).

**Seaport**

Storm water flows from the Seaport drains via sheet flow to numerous catchment basins, trench drains and floor drains located throughout the paved deck area and scuppers on the wharf face. All stormwater flows directly to the ocean without treatment. The existing storm water system is considered substandard measured against contemporary standards and imposes an adverse impact to nearshore ecosystems.

### 3.10.1.4 Solid Waste Management

Solid waste includes including municipal solid waste (e.g., everyday trash and garbage from households, businesses and institutions), construction and demolition waste (e.g., concrete rubble, metal and wood framing, roof material), and green waste (e.g., turf and tree waste). Solid waste management is the responsibility of Yap State Department of Public Works and Transportation (DPW&T) and Yap State Environmental Protection Agency (EPA) with private

sector support in the collection, transport, and disposal of solid waste (SPREP, 2021) (Note: Hazardous Material and Hazardous Waste are discussed in Section 3.13). Solid waste collection stations are located in 10 of 11 villages in Tamil. Solid waste from these villages is transported to the Yap State Landfill by private haulers as well as directly by households and businesses. The approximately two-acre landfill is located midway between the Airport and the Seaport and includes a closed landfill cell, two active landfill cells, a small leachate/oxidation pond and a small segregated green waste and scrap metal area. Total waste to the landfill is estimated at 2,000 tons per year (SPREP, 2021) or an average of approximately 5.6 tons per day. The landfill employs the Fukuoka Method common across the Pacific as an appropriate and cost-effective method for disposal and processing of solid waste (a semi-aerobic landfill treatment system that includes perforated drainpipes, leachate collection system, passive air inlets, and controlled layering and cover of waste). The landfill accepts general waste only. Separation of recyclables is undertaken at households and small amounts of recyclables are diverted at the landfill. Yap State has a Container Deposit Legislation (CDL) Recycling Program which helps to save space at the public landfill site. The landfill has recently been refurbished but has limited capacity and improvements to the separation and storage of recyclable wastes are still required (FSM, 2025). It has no capacity for large construction and demolition projects or projects that generate a significant amount of green waste.

Solid waste generated at the Airport and Seaport is conveyed to the Yap State Landfill via private haulers.

#### 3.10.1.5 Electrical/Energy

Yap's power system consists of an isolated diesel-based grid operated by YSPSC with approximately 8.3 MW of installed generation capacity serving a peak demand of about 2.4 MW; while this provides a nominal reserve margin exceeding 200%, system resilience is constrained by reliance on centralized diesel generation and storm-vulnerable overhead distribution infrastructure (NAVFAC SW, March 2026 – Appendix G). The system includes a centralized diesel power plant located off the Airport-to-Seaport connector road, midway between the two sites. The plant has a capacity of 7 MW with 1.9 MW at peak demand. A new, high-efficiency 830 kW diesel generator was commissioned in May 2024 to increase reliability. Other components include several industrial scale photovoltaic arrays, wind turbines and battery energy storage systems (BESS), connected by a series of overhead and underground transmission and distribution lines. The FSM has goals to reduce reliance on fossil fuels by 80% over the next two decades through growth in the renewable energy sector. In Yap Proper, the plan includes investment in new solar PV capacity to reduce the cost of electricity, as well as diesel to ensure security of supply (Yap State Department of Resources and Development, 2018). The YSPSC system serves both the Airport and the Seaport via its distribution system. It is important to note that water and wastewater utilities rely on electrical power to function, so electrical grid downtime also means downtime for water and wastewater utility systems.

**Airport**

The Airport receives electrical power from YSPSC's overhead lines along the Airport-Seaport connector road, which extend up the entrance road to the parking lot and then transition underground.

**Seaport**

Existing electrical power at the Seaport is from multiple YSPSC pole-mounted transformers located along the access road near the port entrance.

### 3.10.1.6 Communications

The FSM Telecommunications Corporation (FSMTC) is the sole provider of all telecommunications services within the FSM, except radio and television broadcasting (FSMC Title 21 §203). It provides phone, wireless, cable and internet services in each of the four FSM states, including Yap. FSMTC provides services to both the Airport and the Seaport.

### 3.10.1.7 Facilities

The Airport and the Seaport are the two major public transportation facilities that serve Yap Proper. Both facilities are owned and managed by Yap State.

**Airport**

The Airport is managed by Yap DPW&T with safety oversight provided by the FSM Division of Civil Aviation. The airfield occupies a 500-acre site in the Rull Municipality, approximately five miles west of Colonia, at an elevation of approximately 92 ft MSL. The Airport is operated in compliance with the International Civil Aviation Organization (ICAO) but follows the procedures in Federal Aviation Regulations (FAR) Part 139, Certification of Airports, to meet ICAO. The only runway (07-25) is 6,000 ft long, with 95% of the flights using runway 07 (i.e., approaching from the west and departing to the east). The runway's arrival threshold is displaced by 1,100 ft at each end. An aircraft rescue and firefighting (ARFF) facility was completed in March 2010. The terminal building is a one-story structure approximately 12,590 SF in size, constructed in the late 1980s (FSM DTC&I, 2012). The airport currently receives approximately nine flights per week (two United Airlines 737 flights, one Asia Air Cargo 757 flight and six PMA Beechcraft flights) (Volpe, January 2026).

An Airport Master Plan was prepared in 2012 (Leo A. Daly for DTC&I) to identify the Airport's potential and evaluate necessary improvements to the existing airfield and terminal facilities in response to the projected growth of tourism affecting Yap and future associated growth in aviation activities. The Master Plan identified $100 million in improvements over 20 years (2011-2031). Details on the 20-year plan are described in Tables 8-2 to 8.5 on pp 8-3 to 8-5 of the subject report. Phase 1 (2011-2016) included a remodeled and extended terminal building budgeted at $2.08 million. The largest budget item was $77 million for runway rehabilitation and 500 ft western extension in Phase 3 (2022-2031). Yap's FY2016-FY2025 Infrastructure Development Plan (IDP) included operational safety and security improvements to address passenger accommodation and handling issues including a new terminal building. The current (FY2025-2034) IDP includes a Yap Airport and Airfield Expansion Project ($400 million funded by U.S. DoW) and Yap Airport Runway Resurfacing and Terminal Improvements Project ($33 million funded by FAA) (completed in 2024).

**Seaport**

Yap's maritime transportation infrastructure is also managed by DPW&T. The State port in Colonia is utilized by both international shipping and local vessels typically transferring passengers and goods to and from the outer islands. The port facility is located on the Nungoch

peninsula facing north, approximately 1.8 miles north of the outer reef channel entrance. It occupies an approximately eight-acre site between the Yap State Legislature and Executive Offices and the WWTP. The existing wharf is an 825-ft long infill marginal wharf first constructed in 1982 with a 375-ft long eastern extension in 1991 (that included a 33-ft wide "roll on-roll off"[Ro/Ro] ramp for wheeled vehicles and equipment). The port handles approximately three to five cargo vessels per month (almost exclusively container freight) with Mariana Express Line Ltd and Kyowa Line providing scheduled services. The wharf can accommodate vessels up to 500 ft in length. Stevedoring services are provided by WAAB Transportation Company. (Logistics Cluster, 2022). Interisland ferry service is provided by the Hapilmohol 2 (also known as the H2), a passenger/Ro-Ro cargo ship built in 2022 carrying people and freight between Colonia and the Outer Islands. The Hapilmohol 1 is out of service and berthed at the Ro/Ro ramp which puts that facility out service until the H1 is either returned to service or hauled away.

Yap's FY2016-FY2025 IDP included $42M improvements to the Seaport, the wharf (2,500-foot extension), turning basin and entrance channel dredging, and a "Multi-Role Vessel" (to service interisland commerce and passengers). Yap's current IDP (FY2025-2034) includes the same general projects and funding but with a focus on purchasing a new "passenger and cargo ship" ($35M). Note: the Proposed Action addresses the wharf extension (850-foot extension), turning basin and entrance channel dredging, as well as ATON upgrades.

### 3.10.2 Environmental Consequences

This section analyzes the magnitude of anticipated increases or decreases in public works infrastructure and utility demands considering historic levels, existing management practices, system vulnerabilities, and storage capacity, and evaluates potential impacts to public works infrastructure and utilities associated with implementation of the alternatives. Impacts are evaluated by whether they would result in the use of a substantial proportion of the remaining system capacity, reach or exceed the current capacity of the system, ability to maintain operations independent of local utility support, or require development of facilities and sources beyond those existing or currently planned.

Given the isolated nature of Yap's utility systems and exposure to droughts and storm-related outages, the proposed action relies on standard construction-phase contingency measures, including contractor-provided power, water storage, hauling, and temporary systems. Potential use of reverse osmosis for freshwater generation and associated brine management is considered as a contingency only and would require separate regulatory coordination and approval. Overall, the evaluated utility demands are manageable within existing system capabilities using established construction-phase practices and do not present a constraint to project implementation (NAVFAC SW, March 2026 – Appendix G).

#### 3.10.2.1 Analysis Method

The analysis for infrastructure and utilities was based on reviewing existing studies and plans on the affected environment qualitatively and final NAVFAC design document information on projected demands and flows generated by the Proposed Actions (summarized in Chapter 2), and then estimating how the proposed actions would impact these systems. As noted in 3.10.2.3 below, the Preferred Alternative would not significantly increase direct or indirect

demands on public infrastructure and utility systems during or after construction because (1) the construction contractor(s) would be required to have backup systems in place (e.g., electrical generators, water treatment facilities, construction and demolition waste and green waste processing facilities) if local utility providers are unable to provide required services or capacities; and (2) it would not have post-construction impacts beyond improving safety and redundancy, and upgrading the Airport and Seaport facilities to current standards (i.e., no population-inducing effects).

### 3.10.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to the existing infrastructure of either the Airport or Seaport. The Airport, Seaport and the Airport-to-Seaport connector road are aging facilities, initially developed during the Trust Territory Administration in the 1980s, and need significant deferred maintenance investments to bring them up to contemporary standards. No Action would also hamper DoW's ability to defend and protect FSM under its CoFA obligations. For these reasons, the No Action Alternative would result in a less than significant impact to these facilities.

### 3.10.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

The study area for infrastructure for the Preferred Alternative includes the Airport, Seaport and the Airport-to-Seaport connector road.

#### 3.10.2.3.1 Avoidance, Minimization Measures and Best Management Practices

The Seaport and Airport improvements would increase demand on public infrastructure and utility systems during the construction period but would generally return to preconstruction levels of usage during the post-construction period (with the exception of periodic training events by DoW forces). The construction contractor would need to provide its own onsite backup systems (e.g., power generation and water/wastewater treatment systems) to support its construction and workforce needs, if adequate capacity from Yap State utility providers is not available (e.g., during drought periods, other natural disasters and occasional system outages). Low impact development (LID) principles incorporated into the overall design would avoid increased offsite drainage impacts during construction and in the post-construction period (e.g., through application of U.S. Clean Water Act BMPs, contemporary construction standards and associated stormwater pollution prevention measures—see Appendix A for standard operating procedures). The purpose of the project is to improve safety and flexibility of the Airport and Seaport without increasing permanent DoW personnel, which could increase demand on public facilities and services.

Another key BMP is for the construction contractor to have adequate utility backup systems in place in the likely event of local utility service interruptions. A summary of these systems for the Seaport is provided in "Yap Airport and Seaport Utilities Support Requirements" included as Appendix G (NAVFAC, March 2026).

#### 3.10.2.3.2 Construction Impacts

Construction impacts would occur during the construction of the Airport and Seaport projects. The Airport construction period is estimated at 7.25 years (2027 – 2035); including about nine months of mobilization and demobilization (actual construction estimate at 6.5 years). The

Seaport construction period is estimated at three years (2027 – 2030). Potential construction period impacts for each of the seven categories of infrastructure and utilities are discussed in the following sections.

#### 3.10.2.3.2.1 Potable/Non-Potable Water

**Airport**

The construction contractor would use potable water from SYWA from a connection point identified by SYWA and non-potable water from YSPCA's Gitam Resevoir approximately 1.4 miles east of the Airport entrance along the Airport-to Seaport Road for construction water (e.g., potable water for worker camp and concrete and asphalt batch plants, and non-potable water for dust control). There are two potential worker camp locations (one on the west side of the Airport in the SYWA service area and the other to the east near the GPCC site in the YSPSC service area). If SYWA is unable to provide potable water, the construction contractor could decide to only use the site on the east side in the YSPSC service area. The construction contractor would be responsible for utility metering and usage costs. Hook up charges and user fees would benefit the Yap utility providers.

The Airport construction contractor would require an average of up to 80,000 GPD of potable water and up to 60,000 GPD of non-potable water for construction. YSPCA and SYWA have indicated they have the capacity to support this level of water demand, and the design team continues to coordinate with both utilities about future estimated demands. The construction contractor would need to provide adequate backup systems in the event Yap utility providers are unable meet demands, including during periods of drought, other natural disasters and occasional system outages. Accordingly, there would be less than significant adverse impact to potable and non-potable water infrastructure during the construction period.

**Seaport**

At the Seaport and vicinity, the construction contractor would use up to approximately 15,600 GPD of potable water for the concrete and asphalt batch plants and 19,000 GPD of non-potable water for dust control. At the worker camp and vicinity near the Yap Sports Complex, the construction contractor would use approximately 5,400 GPD of potable water and 8,000 GPD of non-potable water. These volumes have been discussed with YSPSC and are within its capacity to accommodate. Non-potable water will be required for fire suppression (also provided by YSPSC if available). Hook up charges and user fees would benefit YSPSC. The construction contractor would need to provide adequate backup systems in the event Yap utility providers are unable meet demands, including during periods of drought, other natural disasters and occasional system outages. Accordingly, there would be less than significant adverse impact to potable and non-potable water infrastructure during the construction period.

#### 3.10.2.3.2.2 Wastewater

**Airport**

The construction contractor would obtain approval to use sanitary sewer services from YSPSC or rent portable toilets where waste would be trucked to the YSPSC WWTP by a Yap contractor if approval is not obtained to use the YSPSC sewer system. The proposed worker camp would generate an estimated 22,000 GPD. Revenue from hook up and disposal fees would benefit

YSPSC. There would be less than significant adverse impact to wastewater infrastructure during the construction period.

**Seaport**

At the Seaport and vicinity, the construction contractor would obtain approval to use sanitary sewer services from the YSPSC or rent portable toilets where waste (approximately 3,000 GPD) would be trucked to the YSPSC WWTP by a Yap contractor. At the worker camp and vicinity near the Yap Sports Complex where sewer service is not available, the construction contractor would generate approximately 4,500 GPD of wastewater that would be treated via an on-site septic system/leach field. The proposed leach field is more than 2,300 feet from the nearest groundwater production well. There would be less than significant adverse impact to wastewater infrastructure during the construction period.

#### 3.10.2.3.2.3 Stormwater Drainage

**Airport**

Construction period storm water management controls would comply with the substantive provisions of the U.S. Clean Water Act and Yap State Title X Earthmoving Regulations, which are reflected in the Yap Environmental Compliance SOP (Appendix A), including applicable conditions and the sediment and erosion control plan. The construction plan includes provisions to both treat and detain stormwater flows (including existing and extended airfield flows) in addition to continuing to collect, convey and discharge flows. This integrated system will control runoff levels entering downslope areas. Construction period erosion control BMPs include erosion control blankets, check dams, and slope surface roughening. Sediment controls include tire scrubbers at site intersections with roadways, sediment logs, inlet protection, and sediment basins (NAVFACPAC, November 2025). The construction period stormwater management controls would reduce the onsite grading and construction erosion impacts to offsite areas and downstream ecosystems. Therefore, there would be less than significant adverse impact during the construction period.

**Seaport**

The proposed design for the wharf includes catch basins installed on low spots along the new wharf and trench drains in the existing wharf to collect stormwater. Stormwater would be transferred through a trench drain and a new stormwater quality treatment unit before being discharged at the existing wharf face. For the extension, stormwater will be collected through depressed inlets on the wharf deck and piped through a stormwater quality treatment unit and then routed to the southern (landside) wharf edge and discharged to a stormwater basin constructed for the Airport-to-Seaport connector road toward the southeast. The catch basins contain a catch basin filter with total suspended solids and hydrocarbon removal capabilities that would act as a pretreatment before being discharged into the stormwater basin. Details on the proposed stormwater system are provided in Chapter 2. Construction period storm water management controls would comply with substantive provisions of the U.S. Clean Water Act and Yap State Title X Earthmoving Regulations, and applicable conditions and the sediment and erosion control plan. The construction plan includes BMPs for minimizing erosion and limiting sedimentation into receiving waters during the construction period. The stormwater management controls would ensure that onsite grading and construction erosion impacts are

contained with the construction area and would not impact receiving waters. Therefore, there would be less than significant adverse impact during the construction period.

#### 3.10.2.3.2.4 Solid Waste Management

Demolition materials would be reused or recycled where practicable to reduce the volume of debris being disposed of at the Yap Public Landfill. Metal waste would be offered to Yap-based recyclers or shipped off island for recycling. Inert materials including concrete rubble and clean soils will be utilized as fill at the airfield, fill at the Nungoch land reclamation/stockpiling site, or other sites recommended by Yap State. The construction contractor would be required to comply with substantive requirements of the Yap State CDL Recycling Program as reflected in the Environmental Compliance Plan (ECP). No hazardous material or waste is permitted to be disposed of in Yap State (see Section 3.13 for handling requirements). As noted, the landfill is small with a limited capacity. The construction contractor must have a backup plan for its solid waste if the landfill operator cannot receive it (to include source reduction, reuse, recycling/compositing and use of third-party vendors).

**Airport**

**Construction and Demolition Waste**: Approximately 3 acres of asphalt pavement (overruns, turnarounds, community road) and 0.01-acres of structures would be removed. The Preferred Alternative also includes demolition (and replacement) of portions of the existing airfield perimeter fence (15,900 linear feet). These materials would need to be reused, recycled or shipped off island due to limited landfill capacity. The Airport project includes a large area for collecting and composting green waste generated by construction activities that would subsequently be used as a soil additive to improve soil structure, fertility and water retention. Therefore, there would be less than significant adverse impact during the construction period.

**Municipal Solid Waste**. The planned 200-person worker camp would generate approximately 326 pounds of municipal solid waste per day using a World Bank/UNEP standard (Kaza et al., 2018) of 1.63 pounds per day per person (or approximately 60 tons/year – about 3 percent of the existing landfill throughput of 2,000 tons/year). This would be equivalent to 20 dumpster loads per year (at 3 tons per load). The construction contractor would be required to reuse/reduce/recycle as much of this waste stream as practical and would need to comply with substantive requirements of DPW&T (landfill operator) regulations and controls reflected in the ECP. Therefore, there would be less than significant adverse impact during the construction period.

**Seaport**

**Construction and Demolition Waste**: The existing tuna warehouse (approximately 21,400 SF) would be demolished and replaced with a new paved area to create a vehicle rinse area and additional storage area. The existing pavements as well as the damaged wharf concrete slab would also be removed. These materials would need to be reused, recycled or shipped off island due to limited landfill capacity.

**Municipal Solid Waste**: The planned 75-person worker camp would generate approximately 122 pounds of municipal solid waste per day using a World Bank/UNEP standard (Kaza et al., 2018) of 1.63 pounds per day per person (approximately 7.5 tons per year—about 0.3 percent of the existing landfill throughput of 2.000 tons/year). This would be the equivalent of 7.6

dumpster loads (at 3 tons per load) per year. The construction contractor would be required to reuse/reduce/recycle as much of this waste stream as practical and would need to comply with substantive requirements of DPW&T (landfill operator) regulations and controls as reflected in the ECP. Therefore, there would be less than significant adverse impact during the construction period.

#### 3.10.2.3.2.5 Electrical/Energy

**Airport**

To support construction and the worker camp, the construction contractor would use electricity from YSPSC's electrical grid. The largest power requirements would be the portable Asphalt Concrete and Concrete Batch Plants (both expected to produce approximately 100 Cubic Yards (CY) of material per hour). Estimated power demand if all sites were simultaneously operating at the conservatively high end of the estimated demand is 2.1 MvA. These plants and the worker camp would need backup power generators in the event the YSPSC power grid is incapacitated. Therefore, there would be less than significant adverse impact during the construction period.

**Seaport**

The construction contractor would use electricity from YSPSC's electrical grid. The total electrical demand across all sites combined could approach approximately 1.0 MvA if sites were simultaneously operating at the conservatively high end of the estimated demands. These loads are expected to be served by a combination of power provided by YSPSC when available, and portable or temporary (semi fixed) smaller generators provided, operated and maintained by the contractor. The largest power requirements would be the portable Asphalt Concrete and Concrete Batch Plants (both expected to produce approximately 100 Cubic Yards (CY) of material per hour). These plants and the worker camp would need backup power generators in the event the YSPSC power grid is incapacitated. Therefore, there would be less than significant adverse impact during the construction period.

#### 3.10.2.3.2.6 Communications

The respective construction contractors would obtain FSMTC approvals to provide communications services to both the Airport and the Seaport construction sites and be required to have backup communications systems in the event that Yap communications services are incapacitated. Therefore, there would be less than significant adverse impact during the construction period.

#### 3.10.2.3.2.7 Facilities

**Airport**

Airport construction is estimated to last for 7.25 years (6.5 years of actual construction and nine months of mobilization and demobilization). Yap State would retain management and control of the Airport during construction. Construction would be phased to avoid and minimize disruption to aviation services, in close coordination with FSM and Yap State. Some flight service disruptions and inconvenience to air travelers will occur in part due to stringent FAA safety requirements relating to work on active runways. FSM, Yap State and DoW have committed to schedule runway construction work to maintain current levels of commercial

service operations through the construction period, including two 737-800 commercial passenger flights per week and one 757 cargo flight per week (on one of the two days/week the commercial flights arrive/depart Yap), along with continued service from Pacific Mission Aviation's Beechcraft service (also used for medical evacuations). Given these protocols, there would be less than significant adverse impact during the construction period.

**Seaport**

Yap State would retain management and control of the Seaport during its expected three-year construction. The construction would be phased (i.e., new wharf extension constructed prior to rehabilitating the existing wharf) to avoid and minimize disruption to maritime services in close coordination with Yap State (e.g., cargo handling, fishing, ferry service, commercial diving and ocean recreation services and cultural practices will not be impacted). Therefore, there would be less than significant adverse impact during the construction period.

#### 3.10.2.3.3 Post-Construction Impacts

##### 3.10.2.3.3.1 Potable/Non-Potable Water

**Airport**

Potable and non-potable water service for civil operations at the Airport would return to preconstruction configurations and usage patterns (the worker camp would be removed at the end of the construction period). During DoW training exercises, potable water would be obtained from SYWA and/or YSPSC and stored in an appropriately sized AST, if necessary, for use at the temporary operations camp. Based on a potable water requirement (i.e., drinking, personal hygiene, and food preparation) of approximately 55 gallons per person per day (half of the total 110 gallons per person per day assumed for the construction contractor), and an onsite exercise party of 200 persons, a total of approximately 11,000 GPD of potable water would be needed for active training (up to 28 days per year). Non-potable water would be obtained from YSPSC and stored in an appropriately sized AST, if necessary, for use at the facility housing rapidly deployable base support materiel. Based on a non-potable water requirement (i.e., showers and latrines) of approximately 55 gallons per person per day, a total of approximately 11,000 GPD of non-potable water would be needed. DoW would be required to have backup systems in place in the event Yap utility services are temporarily incapacitated. There would be less than significant adverse impact during the post-construction period for potable and non-potable water.

**Seaport**

Potable and non-potable water service for civil operations at the Seaport would return to preconstruction configurations and usage patterns. The worker camp near the Sports Complex would be removed at the end of the construction period. During the biannual DoW exercises, Navy ships would provide their own onboard utility services.

##### 3.10.2.3.3.2 Wastewater

**Airport**

Wastewater service for civil operations at the airport would return to preconstruction configurations and usage patterns. During DoW exercises, approximately 16,400 GPD of sewage (e.g., shower, latrine, and kitchen water) per active training day (up to 28 days per year)

would be discharged to the YSPSC sanitary sewer pipe at the Airport or trucked to the Colonia WWTP by private vendor. DoW would be required to have backup systems in place in the event Yap utility services are temporarily incapacitated. There would be less than significant adverse impact during the post-construction period for wastewater.

**Seaport**

There would be no change to the preconstruction volume of wastewater discharged from the wharf area from existing commercial carriers and fishing vessels to the YSPSC sewer main.

While at sea, Navy ship liquid wastes such as blackwater, graywater, and bilgewater/oily wastewater would be managed in accordance with requirements defined by the Environmental Readiness Program Manual (OPNAV M-5090.1). Certain waste streams may be discharged at sea if the ships are underway, but there is limited holding capacity on Navy ships for extended periods in port. If necessary, shore support will be coordinated with husbanding agents. Under no circumstances will ship discharges create a sheen, and discharges will be minimized as much as practicable. For the aforementioned reasons, liquid waste management associated with Navy ship visits would cause less than significant adverse impacts.

#### 3.10.2.3.3.3 Stormwater Drainage

**Airport**

The proposed stormwater management infrastructure would remain under the control of FSM and Yap State. The infrastructure includes the addition of inlets with grates, pipes, culverts, ditches, swales, inlet and outlet headwall structures, and stormwater ponds to the existing drainage system designed for simple maintenance and to detain and treat stormwater and control runoff rates. The ditches and swales would be lined with grass, turf reinforced mats, or concrete to prevent erosion. See Chapter 2 for discussion of proposed storm water improvements, standards and controls. The planned airfield storm water infrastructure will reduce sedimentation and erosion caused by uncontrolled stormwater runoff. The proposed detention and treatment structures will significantly improve the quality of storm water flowing to downstream ecosystems, resulting in a significant beneficial impact during the post-construction period assuming stormwater systems are properly maintained.

**Seaport**

The proposed stormwater management infrastructure would remain under the control of Yap State. Four catch basins would be installed on low spots along the wharf to collect stormwater. Stormwater would be piped from the wharf extension, routed to the southern (landside) wharf edge, and discharged to a stormwater basin constructed for the Seaport-to-Airport connector road toward the southeast. The catch basins contain a catch basin filter with total suspended solids and hydrocarbon removal capabilities that would act as a pretreatment before being discharged into the stormwater basin. A bioswale would be constructed along the improved Seaport Access Road in accordance with Clean Water Act standards. The system would be designed for simple maintenance. Details on the proposed stormwater system are provided in Chapter 2. There would be a significant beneficial impact during the post-construction period for stormwater. Note: All stormwater systems need to be properly maintained or they will stop working.

#### 3.10.2.3.3.4 Solid Waste Management

**Airport**

Solid Waste management would return to preconstruction usage patterns (also assumes Yap State would continue to prohibit international aircraft wastes). Municipal solid waste (i.e., trash) generated during DoW exercises would be collected and removed from the island by DoW. There would be less than significant adverse impact during the post-construction period for solid waste management.

**Seaport**

Solid waste management at the Seaport associated with existing commercial carriers and fishing vessels would return to preconstruction usage patterns.

Navy ships segregate and manage solid wastes in accordance with requirements defined by the Environmental Readiness Program Manual (OPNAV M-5090.1). At sea, ships and submarines are self-sustaining and comply with U.S. and international law, where applicable, and generally more than three NM from shore, if not more. In port, the primary waste stream that may require offload would be general trash, comparable in composition to household garbage. If necessary and assuming appropriate shore support is available (i.e., dedicated dumpsters), the Navy can segregate and offload foreign food waste. Because FSM/Yap is not an authorized location for the offload of used/excess hazardous material, all Navy ships and submarines would retain such items for turn-in at an approved Navy port. Regulated medical waste will also not be offloaded in FSM/Yap. Navy ships will manage and maintain general trash shipboard to the maximum extent possible, but when necessary, will contract with local husbandry agents to offload and dispose of wastes appropriately. For the aforementioned reasons, solid waste management associated with periodic Navy ship visits would result in less than significant adverse impacts.

#### 3.10.2.3.3.5 Electrical/Energy

**Airport**

The primary source of power during training exercises and flight operations would be electrical lines installed by the construction contractor connected to the YSPSC electrical system. Backup generators would be available should YSPSC services be unavailable. There would be less than significant adverse impact during the post-construction period for electrical/energy systems.

**Seaport**

Electrical improvements would be focused on improving safety and reliability of the existing Seaport system. The post-construction berths would not provide hoteling services (e.g., sewer, water, power, steam). Visiting Navy ships would use their own generators and internal utility systems. There would be less than significant adverse impact during the post-construction period for electrical/energy systems

#### 3.10.2.3.3.6 Communications

**Airport**

DoW training exercises would rely on internal communication systems. There would be no impact on public communications systems.

**Seaport**

DoW training exercises would rely on internal communication systems. There would be no impact on public communications systems.

#### 3.10.2.3.3.7 Facilities

**Airport**

FSM and Yap State would retain management and control of the Airport post construction. DoW training events would be closely coordinated with FSM/Yap State airport managers well in advance to avoid and minimize impacts to the general public and commercials users. There would be less than significant adverse impact during the post-construction period.

**Seaport**

Yap State would retain management and control of the Seaport post construction. U.S. Navy ship visits would be closely coordinated with Yap State seaport managers well advance to avoid and minimize impacts to the general public and commercials users. There would be less than significant adverse impact during the post-construction period.

### 3.10.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Alternative 2 includes a western shift of the planned aircraft apron and an alternate approach to entrance channel dredge disposal.

**Airport**

The western shift of the planned aircraft apron would require additional excavation and grading but otherwise, would be identical to the Proposed Action alternative. Aside from longer runs of some utilities, the alternative would have no impact on public infrastructure or utilities.

**Seaport**

The alternate approach to entrance channel dredge disposal would include disposing of the Tamil and Rull-side channel entrance dredging material (78,000 cubic yards) into the deep channel bottom instead of barging the material to the Tamil and Rull landing sites for beneficial reuse.

Alternative 2 would have the same impacts on utilities and infrastructure as the Preferred Alternative. Therefore, Alternative 2 would result in less than significant adverse impacts on infrastructure and utilities.

## 3.11 Transportation

This discussion of transportation includes all of the air, land, and sea routes with the means of moving passengers and goods. A transportation system can consist of any or all of the following: roadways, bus routes, railways, subways, bikeways, trails, waterways, airports, and taxis, and can be looked at on a local or regional scale.

## 3.11.1 Affected Environment

### 3.11.1.1 Air Transportation

This section addresses air transportation services provided at the Yap Airport including commercial flights, commuter/charter flights, and cargo flights. Airspace is addressed in Section 3.9 Airspace.

United Airlines operates two flights a week between Yap and Guam (Antonio B. Won Pat International Airport). The flights typically arrive in Yap early Sunday and Wednesday morning (1:10 AM arrival) and depart back to Guam later that same morning (2:35 AM departure). United Airlines operates this route with a Boeing 737-800 aircraft. United Airlines also operates one cargo flight per week to Yap. United operates the cargo flight with a Boeing 757-200 aircraft.

In addition to the commercial air service, Pacific Mission Aviation (PMA) operates commuter inter-island flights with service to Yap. PMA flies to Falalop Island in the Ulithi Atoll, Fais Island, and Falalap Island in the Woleai Atoll. Flights to Ulithi Atoll tend to be driven by demand. PMA flies about once a month to Fais and only about a few times a year to Woleai Atoll (FSM Department of Transportation Communication and Infrastructure, 2012). PMA also provides service between Yap and Palau. Currently, they advertise a weekly flight that arrives in Yap at 3:00 PM on Tuesday and departs back to Palau at 10:00 AM on Wednesday (PMA, 2025). PMA's aircraft include a Beechcraft Queen Air (9 passengers with a 2,000-pound payload) and a Beechcraft Super King Air 200 (9 passengers with a 2,500-pound payload) (PMA, 2025).

### 3.11.1.2 Ocean Transportation

The Yap Seaport is managed by the Yap State DPW&T. The port includes an 825-foot contiguous wharf, two small barge slips located on the east (170 foot) and west (100 foot) ends or the primary wharf face, and a landing craft roll-on/roll-off (RO/RO) ramp south of the east barge slip. The port is accessed through a natural channel from the island's fringing outer reef (Waneday Channel).

The port typically handles three to five container ships per month with Mariana Express Line Ltd and Kyowa line providing scheduled services to Yap (Digital Logistics Capacity Assessments, 2025). The FSM Infrastructure Development Plan FY2016 – FY 2025 identifies an accessibility indicator of 48 cargo vessels per year (approximately 4 per month) and 714 containers imported and exported per year (approximately 60 per month) (FSM Department of Transportation, Communication & Infrastructure, 2015). The port also services the ferries that provide passenger and cargo service to the outer islands. Waab Transportation Company provides stevedoring services at the port.

In addition to cargo and passenger vessels, Colonia Harbor is a critical waterway for recreational and commercial fishing and diving vessels. Colonia Harbor provides direct access out of the fringing reef to the south via Waneday Channel and it also connects to the islands' Northern reefs via German Channel at its northern end.

### 3.11.1.3 Land Transportation

#### 3.11.1.3.1 Roadway Network

The road network in Yap Proper primarily consists of two-lane arterial roads (one lane in each direction) that are mostly paved and provide access between and within major population centers, and smaller single lane roads that are often dirt or gravel and provide regional access. Roads within the Proposed Action project area include the following routes:

**Airport-to-Seaport Connector Road**

- The Airport-to-Seaport connector road is an approximately 3.5-mile-long stretch of road from the Airport terminal to the Yap Seaport. The road is a paved, two-lane road and there are four primary intersections along this route including at the College of Micronesia, the Yap Public Transportation System, Aces Mart 2, and the Yap Cooperative Association.

**West Airport Community Road**

- The roadway serving the community to the west and northwest of the Airport is primarily a dirt and gravel road that extends from the main arterial paved road, around the west end of the Airport and eventually reconnects with Seabee Flats Road along the north boundary of the Airport.

**Seabee Flats Road**

- Seabee Flats Road is a single-lane gravel/dirt roadway that turns off from the Airport-to-Seaport connector road approximately 0.8 miles west of the Airport Entrance Road. The Road climbs a hillside to the west of the airport then proceeds eastward to the north of the Airport boundary where it meets up with the West Community Airport Road.

**South Chamorro Bay Road and Ganir Bridge**

- South Chamorro Bay Road is a two-lane paved road between the intersection with the Airport-to-Seaport connector road at Aces Mart 2 and Ganir Bridge. Ganir Bridge is currently under reconstruction and is unavailable for vehicle traffic. Once reconstruction is complete and reopened to vehicular traffic, it will provide a full loop around Chamorro Bay.

**Colonia to Yap Sports Complex**

- This route encompasses approximately 7 miles of paved two-lane roads between the YCA Intersection in Colonia and the Yap Sports Complex in Gagil-Tamil. This route serves a range of commercial, community, and residential uses and provides the main vehicular access route to Colonia from Gagil-Tamil and Maap.

**Tamil Dredge Material Offloading Route**

- This route includes the 0.9-mile-long paved roadway between the proposed Tamil dredge material offloading location and the stockpiling site near the Tamil Community Center. The road services primarily residential homes and serves as the primary access between the Tamil Community Center and the Colonia Harbor shoreline.

#### 3.11.1.3.2 Traffic

As of 2020, there were 2,153 registered vehicles in Yap State (Yap Department of Public Safety, 2023). Given the relatively small number of vehicles, traffic in Yap is generally free flowing, but

there are morning (AM) and evening (PM) peak hours with more vehicles using the roadways. Manual traffic count data were collected by an on-island contractor for the AM and PM peak traffic volumes at the following intersections:

1. Airport-to-Seaport Road/ Yap Cooperative Association General Store (YCA Intersection)
2. Airport-to-Seaport Road/ Yap Public Transportation System (PTS Intersection)
3. Airport-to-Seaport Road/College of Micronesia-Yap Campus (COM Intersection)
4. Airport-to-Seaport Road/Airport Access Road (Airport Intersection)

Traffic count data was collected between November 17-24, 2025. Based on the traffic count data, the weekday AM peak hour begins at 0745 and the PM peak hour begins at 1630 or 1645 depending on location. Table 3-38 shows the existing roadway volumes. The detailed traffic study and traffic count data are provided in Appendix L.

**Table 3-38 Existing Roadway Segment Volumes**

| *Roadway* | *Location* | *AM Peak Hour* | *PM Peak Hour* |
|---|---|---|---|
| Airport-to-Seaport | West of YCA Intersection | 558 | 570 |
| Airport-to-Seaport | West of PTS Intersection | 352 | 233 |
| Airport-to-Seaport | West of COM Intersection | 192 | 157 |
| Airport-to-Seaport | West of Airport Intersection | 148 | 105 |

Note: All traffic volumes include both directions of traffic

The highest traffic volumes were observed in the segment directly west of the YCA Intersection with more than 500 cars in the AM and PM peak hour. Peak traffic volumes gradually decrease moving west Colonia toward the Airport with AM and PM peak hour traffic at 148 and 105 vehicles respectively in the segment to the west of the Airport intersection. Background growth in vehicular traffic is expected to be minimal. Based on the Federated States of Micronesia Department of Resources and Development, the population has been relatively constant with roughly 11,241 people in year 2000 and roughly 11,577 people in year 2020 (FSM Department of Department of Resources & Development, Population Statistics, 2020).

Most roadways in Yap do not have sidewalks or pedestrian infrastructure. Paved and unpaved shoulders serve as pedestrian facilities on many roadways. Given the low volume and low speed of vehicular traffic on many roads, pedestrians can utilize the road itself. The Yap State Public Transportation System operates a limited bus service (mostly for students) connecting Colonia with other villages.

### 3.11.2 Environmental Consequences

Impacts to transportation are analyzed by considering the possible changes to air and ocean transportation service as well as changes to traffic conditions and the capacity of area roadways from proposed increases in commuter and construction traffic.

#### 3.11.2.1 Analysis Method

The approach to the analysis of transportation impacts depends upon the mode being assessed. For air and ocean transportation, impacts are assessed based on the extent to which existing or planned air and ocean transportation services could be disrupted or augmented by the Proposed Action. An impact could include full or partial shutdowns to Airport or Seaport operations, or reduced passenger and/or cargo services. For land transportation, impacts are

assessed based on the extent to which existing roadway traffic could be impacted by disruptions (e.g., road or lane closures) or increased traffic volumes associated with construction and post construction activities.

#### 3.11.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no U.S. DoW-funded improvements to existing transportation infrastructure. Existing roadways would not be repaired and/or upgraded by the U.S. DoW. Additionally, the major improvements for the Airport and Seaport that are identified in the FSM Infrastructure Development Plan FY 2016-FY 2025 would not be funded and constructed by the U.S. DoW. These significant transportation investments would require alternate funding sources which could result in significant or indefinite postponement of these important projects for Yap State. Therefore, the No Action Alternative would result in less than significant adverse impacts to transportation.

#### 3.11.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

##### 3.11.2.3.1 Avoidance, Minimization Measures and Best Management Practices

**Air Transportation**

- Avoid and/or minimize impacts to existing passenger and cargo flights to the extent practicable during the construction period by complying with the Construction Safety Phasing Plan (CSPP).

**Ocean Transportation**

- During dredging and other in-water construction, establish a safety perimeter with warning buoys and coordinate notices to mariners through the Yap State DPW&T.
- During Seaport training exercises/port visits, design all exclusion zones to allow commercial and recreational boat traffic sufficient space for safe navigation within the port and harbor.

**Land Transportation**

- Compliance with Yap State DPW&T hauling load restrictions for existing roadways.
- Conduct ongoing repair and maintenance of roadways used for hauling during the construction process.
- Develop and implement a Traffic Control Plan to manage construction-related traffic.
- Avoid construction related hauling trips during weekday peak traffic hours (7:45-8:45 AM and 4:45-5:45 PM).
- Notify community members of construction activities prior to the start of construction activities and provide regular updates through public meetings, news media, website, or place electronic message boards near the construction area.
- Coordinate all lane closures well in advance with the Yap State DPW&T, and provide advance notice to community members.

#### 3.11.2.3.2 Construction Impacts

During the construction period, improvements to the Airport and Seaport would be phased to avoid and minimize potential impacts to normal operations. The construction contractor would be required to implement a traffic control plan and construction-related hauling trips would avoid weekday peak traffic hours. Therefore, the Preferred Alternative is expected to result in less than significant adverse impacts to transportation. A detailed analysis of construction impacts on air, ocean, and land transportation is provided below.

**Air Transportation**

Construction of the runway extensions on both the east and west end of the runway will require active construction work within the RSAs. Therefore, under FAA regulations, the runway must be closed during construction activities within those areas. The U.S. DoW presented a range of potential construction phasing scenarios to the Yap State Task Force for their review and feedback. The scenarios looked at alternatives that could speed up construction of the airfield improvements but would result in longer closures and greater impacts to the commercial flight schedule (i.e., moving the biweekly flights closer together or moving down to one flight a week).

Ultimately, it was mutually agreed that the Airport construction improvements would be phased to avoid impacts to the biweekly commercial passenger flights operated by United Airlines. It was agreed that the cargo flight could be moved closer to one of the commercial flights to limit the required number of closures and re-openings each week. PMA operates smaller aircraft, and their landings may be accommodated through runway shortenings, rather than full runway closures in compliance with FAA regulations.

Over the approximately eight-year construction duration, the contractor will work closely with the Yap Airport Manager to close and reopen the runway prior to all scheduled commercial passenger and cargo flights. Below is a description of the runway closure and re-opening process:

- Prior to any approved runway closure, the Contractor would coordinate with the Yap Airport Manager to confirm approval for the construction work and that a Notice to Airmen (NOTAM) has been issued. The Airport Manager will coordinate the deactivation of the navigation aids (NAVAIDs), runway approach lights, and/or runway and taxiway edge lights. The Contractor shall place illuminated X's at both ends of each runway that is scheduled to be closed along with low-profile barricades at the locations designated on the approved barricade plan.
- Prior to re-opening of runways or taxiways, the Contractor shall contact the Yap Airport Manager at least 30 minutes prior to the scheduled re-opening to request a foreign object debris (FOD) inspection. To reopen a runway or taxiway/taxilane closed for construction for any period, all equipment and materials shall be moved outside of any active safety area. No stockpiles or parked equipment shall remain within the active safety area. Grading shall be completed or graded and covered in a manner to prevent dust and rock movement due to jet blast, or other objectionable movement of material onto the open runway or taxiway/taxilane, and the adjacent runway or taxiway pavement shall be swept and cleaned of all construction debris.

With the above runway closure and reopening procedures, and the agreed construction phasing approach, the Preferred Alternative would minimize potential impacts on air transportation by maintaining the existing commercial passenger flight schedule, shifting the cargo flight schedule, and accommodating continued PMA air service. Therefore, the construction of the Preferred Alternative would result in a less than significant adverse impact to air transportation.

**Ocean Transportation**

The three year-construction of the proposed improvements to the Yap Seaport have been designed and phased to avoid and minimize impacts to the continuous and safe operations of the Seaport to handle and transport goods for the community of Yap. The proposed wharf improvements would be constructed in three phases to ensure continued operations of the port:

1. The new pile supported wharf and the mooring dolphin would be constructed first, and the existing wharf would remain open for port operations (825-foot berth length).
2. Once the new pile supported wharf is completed, the eastern portion of the existing wharf would be closed for improvements, but the remainder of the existing wharf and the new mooring dolphin (approximately 500-foot berth length) would remain available for port operations.
3. Finally, the western portion of the existing wharf would be closed for repair. During this time, the newly improved eastern portion of the existing wharf and the new pile supported eastern wharf extension (approximately 860-foot berth length) would be opened for port operations.

In addition to the berthing plan, the contractor would be required to maintain their operations within a defined construction laydown area at the port (i.e., the demolished tuna warehouse) to avoid impacting container handling or other port operations.

For in-water construction work, including the new pile-supported wharf construction, dredging, and ATON replacements, the contractor would be required to adhere to all navigation rules and would establish clear safety perimeters around the work area. These perimeters would be marked with warning buoys to ensure that normal port vessel traffic (cargo, commercial, and recreational) is aware of the construction areas. Additionally, the contractor would be required to communicate directly with the port operator to provide adequate notice to mariners.

With the above construction safety and phasing protocols, the construction of the Preferred Alternative would avoid and/or minimize impacts to ocean transportation at the Yap Seaport and Harbor. Therefore, the Preferred Alternative is expected to have a less than significant adverse impact on ocean transportation during the three-year Seaport construction process.

**Land Transportation**

Construction associated with the Airport-to-Seaport connector road, Airport, and Seaport improvements would result in impacts to traffic. A detailed traffic assessment is provided in Appendix L and potential impacts to traffic are summarized below.

**Airport-to-Seaport Connector Road Improvements**

It is expected that lane closures would be required during some of the construction phases. During the expected lane closures, Airport-to-Seaport connector road would operate under two-way, one-lane conditions for the portion of roadway under construction. Figure 3-31 shows the Federal Highway Administration (FHWA) guidelines for the capacity thresholds for a two-way, one lane roadway section, which is based on the length of the restricted section. The lowest plotted capacity threshold is for a 1,600-foot two-way, one-lane section, which would be roughly 800 vehicles per hour.

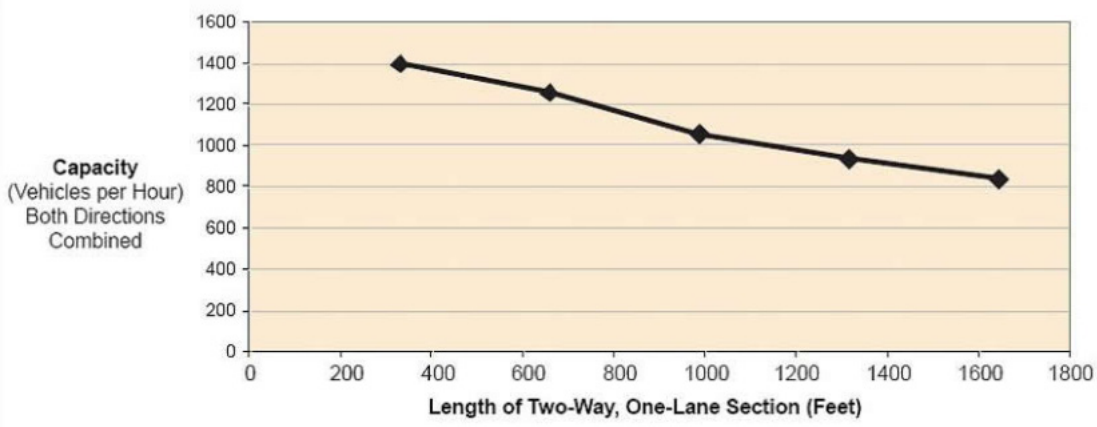



**Figure 3-31 FHWA Two-way, One-Lane Roadway Capacities**

Based on the traffic count data collected for this Project, the highest hourly volume on Airport-to-Seaport connector road was roughly 570 vehicles per hour west of the YCA intersection (Appendix L; Austin, Tsutsumi & Associates, Inc. [ATA] 2026). Thus, a 1,600-foot two-way, one-lane section can accommodate existing peak traffic plus 230 additional vehicles along Airport-to-Seaport connector road west of the YCA intersection. Seaport and Airport construction activity is expected to generate 80 worker trips during the peak hours, which is below the 230 additional vehicle capacity.

If full road closures are required near Chamorro Bay, traffic would be rerouted along South Chamorro Bay Road via Airport-to-Seaport connector road. According to the Highway Capacity Manual (HCM), 7th Edition, the capacity of a two-lane highway without a passing lane, under base conditions, is 1,700 vehicles per hour per lane. This base capacity may be lowered based on various factors including lane width, speed, grades, and number of access points. As a rule of thumb, a capacity of 1,000 vehicles per hour per lane is typically assumed.

Based on previously collected data (May 19, 2025), there are roughly 54 vehicles during the AM peak hour and 159 vehicles during the PM peak hour that travel southbound along the South Chamorro Bay Road. Assuming the northbound volumes would be roughly the opposite of the southbound volumes in the AM and PM at most there would be roughly 160 vehicles traveling in one direction along South Chamorro Bay Road.

Assuming a minimum threshold of 1,000 vehicles per hour per lane, South Chamorro Bay Road is expected to continue operating under capacity with up to 840 detoured vehicles. At the YCA intersection the highest hourly volume collected on Airport-to-Seaport connector road and Colonia Road was roughly 280 vehicles in one direction, which is below the additional 840 detoured vehicles the roadway is anticipated to be able to accommodate in one direction.

Other construction-related trips (e.g., hauling, etc.) would avoid the morning and evening peak hours and therefore would not impact peak hour traffic capacity.

Since the impacted roadways are expected to continue operating under capacity with one-lane closures or full roadway closures if needed near Chamorro Bay, the project-related closures are expected to have a less than significant adverse impact on existing traffic conditions along Airport-to-Seaport connector road.

**Airport**

Airport construction is estimated to require up to 200 workers with most living on site at one or two worker camps and roughly 40 local workers assumed to be living elsewhere in Yap. The workers living at the camps are not expected to generate a new vehicle trip and would walk or shuttle to the construction site. However, it was conservatively assumed that there may be up to 20 shuttle trips from the worker camp to the Airport work areas. It was also conservatively assumed that all local workers would arrive and depart separately within the same peak hour. Thus, there would be an additional 60 worker trips to/from the Airport during the AM and PM peak hours.

The highest hourly traffic volume collected on Airport-to-Seaport connector road was roughly 135 vehicles in one direction between the Airport and COM intersections. Based on the HCM 7th Edition capacity thresholds discussion above, assuming a minimum threshold of 1,000 vehicles per hour per lane, Airport-to-Seaport connector road is expected to continue operating under capacity with the addition of Airport worker trips during the AM and PM peak hours.

The estimated non-peak hour Airport construction trips are shown in Table 3-39. These trips would be spread throughout the day but would avoid the morning and evening peak hour traffic and therefore would not have a significant impact on vehicular traffic/roadway capacity.

Construction-related trips along the West Community Road would include up to 50 daily trips during portions of the Airport construction process. As part of the project Traffic Control Plan, these construction trips would be coordinated with the local community to provide advanced notice and avoid sensitive times for local roadway users (e.g., school commuting times, etc.). Additionally, the construction contractor would be required to maintain the roadway throughout the construction process.

**Table 3-39 Airport Construction Non-Peak Hour Trips**

| *Activity* | *Roadway* | *Number of Non-Peak Hour Trips* |
|---|---|---|
| Barge unloading | Airport-to-Seaport | 220 daily trips |
| Typical construction trips (not offloading a barge) | Airport-to-Seaport | 100 daily trips |
| Construction/hauling trips | West Community Road | 35 - 50 daily trips |
| Construction/hauling trips | Seabee Flats Road | 60 – 75 daily trips |

**Seaport**

Seaport construction requires up to 80 workers with most living at the worker camp near the Yap Sports Complex and some local workers. Workers living at the worker camp would be bused to the Seaport. Combined, worker camp shuttles and local worker trips are expected to add about 20 worker trips to/from the Seaport during the AM and PM peak hours. There are

many bridges and culverts between the Sports Complex/Tamil Construction Support Area and the Seaport. Some of these bridges and culverts may have structural limitations. The Seaport design team is coordinating with the Yap DPW&T to protect these facilities and the construction contractor would be required to comply with these load restrictions.

The highest hourly volume collected on Airport-to-Seaport connector road and Colonia Road was roughly 280 vehicles in one direction. Based on the HCM 7th Edition capacity thresholds discussion above, assuming a minimum threshold of 1,000 vehicles per hour per lane, Airport-to-Seaport connector road and Colonia Road are expected to continue operating under capacity with the addition of Seaport worker trips during the AM and PM peak hours.

Seaport improvements would also add non-peak hour construction trips (Table 3-40). At most, 80 daily Seaport construction trips (60 Berth Pocket Dredge Disposal trips plus 20 South Chamorro Bay staging area trips) are expected to be added to one route. As mentioned above, at the YCA intersection the highest hourly volume collected on Airport-to-Seaport connector road and Colonia Road was roughly 280 vehicles in one direction. Non-peak hour volumes are expected to be lower. Based on the HCM 7th Edition capacity thresholds discussion above, assuming a minimum threshold of 1,000 vehicles per hour per lane, Airport-to-Seaport connector road and Colonia Road are expected to continue operating under capacity with the addition of Seaport and maximum estimated construction trips during non-peak hours.

Hauling trips from the Tamil Dredge Disposal Offload site to the Tamil Stockpile site (approximately one mile) would include approximately 250 daily trips for approximately 30 work days. As part of the project Traffic Control Plan, these hauling trips would be coordinated with the local community to provide advanced notice and avoid sensitive times for local roadway users (e.g., school commuting times, etc.). Additionally, the construction contractor would be required to maintain the roadway throughout the construction process.

**Table 3-40 Seaport Construction Non-Peak Hour Trips**

| *Activity* | *Route To/From* | *Number of Non-Peak Hour Trips* |
|---|---|---|
| Construction Trips | Seaport towards the Sports Complex via Colonia Road | 50 daily trips |
| Construction Trips | South Chamorro Bay staging areas to Seaport | 20 daily trips |
| Berth Pocket Dredge Material Disposal | Seaport to Yap PTS | 60 daily trips<br>(for approximately 5 days) |
| Rull Dredge Material Disposal | Rull Stockpile Site to Balabat Men's House | 25 trips<br>(for approximately 1 days) |
| Tamil Dredge Material Disposal | Tamil Offload Site to Tamil Stockpile Site | 250 daily trips<br>(for approximately 30 days) |

#### 3.11.2.3.3 Post-Construction Impacts

The Preferred Alternative would include the implementation of major transportation infrastructure upgrades for air, ocean, and land transportation that are aligned with specific projects identified in the FSM Infrastructure Development Plan FY 2016-FY 2025. This significant investment would greatly improve transportation infrastructure, safety, and service in Yap State. Therefore, the Preferred Alternative is expected to result in significant beneficial impacts

to transportation. A detailed analysis of post-construction impacts on air, ocean, and land transportation is provided below.

**Air Transportation**

The proposed improvements would result in a substantially improved airport for joint use by the Yap community and U.S. DoW. The proposed improvements would address the following project identified in the FSM Infrastructure Development Plan FY 2016-FY 2025.

1. Project Y 32 – Yap International Airport Runway Extension (AT/1)

The runway would be extended to 9,100 ft which would provide more payload flexibility for visiting aircraft, and the proposed improvements would bring the Airport into compliance with FAA and ICAO RSA requirements.

The U.S. DoW would conduct training exercises at the Airport for up to two weeks at a time and up to twice a year (up to four weeks total per year). These training exercises would be coordinated well in advance with Yap airport operators to ensure they are aware of the upcoming training exercise and are able to provide input to avoid impacts to normal traffic operations. Additionally, the U.S. DoW exercise use of the Airport would be scheduled to avoid or minimize impacts to normal Airport operations.

Therefore, the Preferred Alternative would have a significant beneficial impact on air transportation in the long term.

**Ocean Transportation**

Following the construction process, the Seaport would be substantially improved for safe navigation and Seaport operations. The proposed improvements (wharf improvements, dredging, and ATON improvements) address project needs that were identified in the FSM Infrastructure Development Plan FY2016-FY 2025. The dredging and ATON improvements would help to ensure safe navigation within the harbor and could allow larger vessels to visit the improved Yap Port. Improvements at the port will separate the inter-island passenger ferry operation from the commercial port activity and create a safer environment for locals to access the ferry.

The proposed U.S. DoW training at the Seaport (up to two exercises per year for up to 14 days each) would involve approximately one vessel visiting the port per training exercise. Port improvements would enable dual-use operations (i.e. military and commercial) and mooring of U.S. and allied vessels without interfering with normal commercial Seaport operations. The training exercises would be coordinated with the Seaport operators well in advance to further avoid or minimize potential impacts to Seaport operations.

Due to the completion of safety improvements, and enhanced port capacity, the Preferred Alternative would have a significant beneficial impact to ocean transportation in the long-term.

**Land Transportation**

Following the construction of the proposed improvements to the Yap Airport and Seaport, all roadways utilized for the construction process would be repaired and or improved to at least their pre-construction condition. Additionally, the construction process would result in some major roadway improvements including:

1. Full reconstruction of the Airport-to-Seaport connector road between the Seaport and the western end of Chamorro Bay (i.e., at Aces Mart 2).
2. Replacement of Mulroo Bridge and elevation of the roadway (west end of Chamorro Bay) to reduce roadway flooding
3. Improvements to South Chamorro Bay Road
4. Installation of a sidewalk around the full length of Chamorro Bay

During the proposed U.S. DoW training exercises on Yap (up to four weeks per year), there may be some additional traffic associated with the additional on-island presence (up to 200 people). However, training would be coordinated well in advance with Yap State stakeholders and training related roadway trips, if needed, would avoid morning and evening peak hours. With the relatively low existing traffic volumes and minimal anticipated background traffic growth, additional training related vehicle trips would not result in a significant impact to traffic.

#### 3.11.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Alternative 2 would have similar impacts on transportation as the Preferred Alternative. The construction of Alternative 2 would require more earthwork than the Preferred Alternative at the Airport because of the alternate apron location. This would require more hauling trips associated with that earthwork, and a slightly longer construction period that would affect Airport operations. Overall, the increase in hauling and the construction timeline would still be a less than significant adverse impact.

The other difference is that Alternative 2 would not include the dredge material offloading and stockpiling areas in Rull and Tamil. Therefore, Alternative 2 would result in less barge traffic within Colonia Harbor, and it would not require hauling of dredge material from the offload site in Tamil to the stockpile site near the Tamil Community Center or from the Rull stockpile site to the Balabat Men's House.

Post-construction activities would be the same for Alternative 2 as the Preferred Alternative including significant improvements to air, ocean, and land transportation infrastructure. Therefore, Alternative 2 is anticipated to have significant beneficial impacts in the post-construction period.

## 3.12 Public Health and Safety

This section addresses public health and safety, which encompasses the sub areas of: 1) airfield safety; 2) ocean navigation safety; 3) emergency services (e.g., medical, police, fire protection); 4) health care services; and 5) environmental health/public health and safety. A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage.

The discussion considers activities that have the potential to affect the safety, well-being, or health of members of the public. The primary goal is to identify and prevent these public health risks to the public, and in particular, risks to children.

## 3.12.1 Affected Environment

### 3.12.1.1 Airfield Safety

Airfield safety is managed under the U.S. FAA Runway Safety Program (RSP), which provides standardized procedures, training and risk reduction measures to enhance runway and airfield safety at U.S. airports. As described in Section 3.11 (Transportation), current users include commercial and charter airlines, a missionary aviation service, cargo carriers, and the U.S. military.

FAA airfield safety standards establish critical zones which must be kept free from obstructions that could jeopardize the safe operation of aircraft. FAA standards include (but are not limited to) the items discussed below:

- Runway Safety Area (RSA) – FAA requires a minimum width of 500 feet centered along the length of the runway and extending a minimum of 1,000 feet beyond the departure ends of the runway for Aircraft Approach Category/Airplane Design Group IV (AAC/ADG IV)aircraft.
- Object Free Area (OFA) – FAA requires a minimum width of 800 feet centered along the length of the runway and extending a minimum of 1,000 feet beyond the ends of the runway for Aircraft Approach Category/Airplane Design Group IV (AAC/ADG IV) aircraft.
- Runway Protection Zone (RPZ) – The RPZ's function is to enhance the protection of people and property on the ground. This is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities.

The existing runway does not fully meet FAA safety standards for multi-user or larger military aircraft due to obstructions (topography, vegetation) on the north side. Runway extensions and other improvements are planned to address these deficiencies.

#### 3.12.1.1.1 Airfield Land Use Compatibility

Land use compatibility is addressed in Section 3.8, Land Use. Incompatible land use near an airfield can be a safety issue, posing physical hazards, obstructions, distractions, and other risks such as attracting wildlife or interference with navigation signals. The presence of high density or sensitive uses such as schools, churches, hospitals, and residences around an airfield increases the risk of harm to the public. Ensuring an obstruction-free runway and approach path is critical for safety.

Most areas around the runway are airport-controlled and low-density. Yap has developed a Wildlife Hazard Management Plan which includes a mitigation plan to minimize aircraft bird strikes.

### 3.12.1.2 Ocean Navigation Safety

The Seaport in Colonia is currently used by a variety of enterprises for commercial, governmental and private purposes. The harbor is used by commercial interests for the import of essential goods including food, fuel, construction materials and manufactured products. It also facilitates inter-island transport of supplies and people within Yap state. The FSM government utilizes the harbor for its patrol vessels related to maritime surveillance and law

enforcement. The harbor is also used by commercial and private fishing vessels of various sizes, and dive boats that cater to the local tourism industry.

Ocean safety is managed through standards adopted by the FSM national government and local Yap state government. The Yap Port Authority manages the main commercial harbor in Colonia and is responsible for Seaport operations and maintaining ATONs. Under the CoFA, the U.S. Coast Guard Forces Micronesia/Sector Guam assists with search and rescue in the FSM outside its territorial seas. There are currently no range markers for the Yap entrance channel (only channel edge markers). Additionally, the channel is narrow with a major bend near the entrance and protruding shallow areas, creating a safety challenge, especially for larger vessels (NAVFAC Southwest, 2024).

#### 3.12.1.3 Emergency Services

Emergency services include medical, police and fire protection. Yap is served by both national and Yap state police forces, including the FSM National Police which enforces national laws and fisheries regulations, and the Yap Division of Public Safety, with its police station in Colonia.

Fire protection is provided by the Yap Department of Public Safety Fire Division. Emergency medical service (EMS) is provided primarily by Yap State EMS, supported by partners like the U.S. Coast Guard. The U.S. military often assists with EMS, and air ambulance service may be coordinated through Pacific Mission Aviation, other commercial carriers and services like Global Air Rescue for transport to other off-island facilities.

#### 3.12.1.4 Health Care Services

The FSM Department of Health and Social Affairs is the national agency that oversees a range of health care services across FSM, including Yap. The Health Division, headquartered in Pohnpei, manages various aspects of health care including communicable diseases, chronic diseases, child and women's health, immunization, substance use prevention and treatment, psychological assessment and treatment, food safety and environmental health, hospital and public health.

Public medical facilities and public health programs, largely funded by the CoFA, experience challenges with funding, staffing, and facilities maintenance. On the island of Yap, medical services are provided by the public Yap State Hospital (YSH) in Colonia, operated by the State of Yap Department of Health Services (YDHS). The hospital was constructed in 1979 with 33 beds and has had minor renovations and additions in the years since. The hospital provides services for about 23,500 outpatient and 1,200 inpatient visits per year. YSH offers primary healthcare services, including emergency care, general surgery, and maternity services. However, the hospital is undersized and has been plagued by maintenance issues such as failing heating, ventilation and air conditioning (HVAC) system, mold and mildew, and lack of fire sprinklers. Facility maintenance has been hampered by limited funds, dependence on foreign grants, and chronic understaffing (USACE, 2023). Overall, health care on-island is limited and specialized care is not available. Patients requiring specialized care are often referred off island to Guam, the Philippines, or Hawaii.

#### 3.12.1.5 Environmental Health/Public Health and Safety

Environmental health examines the relationship between the environment and human health. This includes:

- Physical factors: air quality, noise, environmental changes
- Chemical factors: pollutants and toxins
- Biological factors: infectious agents and allergens
- Social factors: access to clean water, sanitation, housing, and food

Other encompassing environmental health issues for FSM include food security and public health. The FSM government has identified food security and public health as core economic and policy areas (Regional Pacific NDC Hub, 2025).

**Food Security**

Food security is generally defined as having physical and economic access to sufficient, safe, and nutritious foods that meet dietary needs and preferences.

Food security in the FSM has worsened significantly over the last few decades due to falling local production per capita, poor growth in the agricultural sector, and increased and costly dependence on food imports. Extreme weather patterns are projected to exacerbate this negative trend, as more frequent and intense rainfall, higher temperatures, drought, tropical cyclones, and ocean acidification affect the quality and yield of local crops and marine food resources (PASAP, n.d., Regional Pacific NDC Hub, 2025). Addressing food security is central to FSM public health goals, including reducing disease, improving nutrition, and supporting education. Strategies include incorporating resiliency practices such as restoring traditional agriculture, improving fisheries, aquaponics and hydroponics, integrated crop and livestock systems, efficient water use technologies, and ecosystem-based coastal and upland management.

**Public Health**

The FSM faces both communicable (vector-borne, waterborne, and foodborne) and non-communicable disease burdens. Vulnerabilities are exacerbated by limited access to clean water, reliance on imported processed foods, physical inactivity, and tobacco and local plant product use. Events such as extreme heat, drought, flooding, and storms create conditions that favor pathogens, increasing the risks of vector-borne disease (VBD), waterborne disease (WBD), and foodborne disease (FBD).

Key public health priorities include:

- Strengthening health policies, programs, and regulations
- Improving health data collection and analysis
- Increasing financial and human resources for public health
- Strengthening inter-agency coordination
- Maintaining resilient water supply systems
- Managing mosquito breeding zones
- Enhancing public education on VBD, WBD, and FBD

By 2030, FSM aims to implement a tropical disease surveillance system, increase training of medical personnel and public health officials, and improve medical facility capacity to respond to VBD, WBD, and FBD (Regional Pacific NDC Hub, 2025).

## 3.12.2 Environmental Consequences

The public health and safety analysis evaluates whether the Proposed Action could increase risk to the health, safety, or welfare of Yap's residents, workers, visitors, and sensitive populations. The analysis considers both construction and post-construction (training) period activities and examines whether the Proposed Action could introduce new hazards, exacerbate existing hazards, or interfere with the provision of emergency and health services.

### 3.12.2.1 Analysis Method

The analysis focuses on the Proposed Action's potential impacts to public health and safety in the resource areas:

1. Airfield Safety, including changes in aviation operations, aircraft movement patterns, and training activities
2. Ocean Navigation Safety, including changes in vessel traffic, dredging activity, improvements to ATONs, and new training activities
3. Emergency Services, including access to and capacity of police, fire protection, emergency medical services, and disaster response
4. Health Care Services, including the availability and capacity of medical facilities and personnel
5. Environmental Health/Public Health and Safety, including exposure to hazardous materials, fuels, emissions, noise and pathogens, food security and public health and safety

The analysis considers impacts separately for the construction and post-construction (training) phases, and for the Airport and Seaport project areas. Project effects are evaluated by comparing existing baseline conditions described above in Section 3.12.1 (Affected Environment) to conditions under the Proposed Action.

Determination of project impact on the resource areas is based on the folowing criteria:

- Introduction of new hazards or a substantial increase in safety risk
- Increase in incompatible land uses or activity close to sensitive areas such as housing, schools, and churches
- Interference with public emergency access or response times of police, fire, and medical services
- Violation of safety standards such as aviation, marine, occpational safety, or public health standards
- Public exposure to hazardous conditions, emissions, contaminants, or pathogens; or changes in conditions that increase vulnerability to these hazards
- The level of impact considers the type of hazard, its magnitude, frequency, duration, and geographic extent of the effect. It also considers operational safety measures and BMPs at the Airport and Seaport that are designed to avoid and minimize impacts. The impact determination reflects whether and to what extent the Proposed Action creates a risk to public health or safety, particularly for vulnerable populations.

### 3.12.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no improvements to Airport and Seaport infrastructure, nor any DoW training activity.

The Airport runway would continue to be adequate for current aircraft but remain in violation of RSA grading, Part 77 airspace obstructions, and other FAA safety standards, particularly for larger aircraft. Existing Airport operations would be maintained, but the ability to quickly bring in supplies or specialized personnel or to transport people off island in the event of HADR events would be limited. Yap State and FSM would continue to manage the airport and decide on changes (if any) to future flight operational tempo and Yap's role in the global air travel/air cargo marketplace.

At the Seaport there would be no change to existing operations nor modification to the frequency or type of ship traffic. However, there would be no improvements to navigational aids, and vessels would continue to operate without range markers in the entrance channel. The narrow channel conditions and shallow areas would still present a safety challenge for larger vessels.

There would be no change in availability of, or access to, health care facilities and emergency services on Yap. Under No Action, there would be no future DoW training activity or visiting personnel that could increase public exposure to noise, environmental pollutants or hazardous materials. Ongoing public health challenges in Yap and the greater FSM would continue, with many expected to become more critical as climate conditions evolve.

Given the major safety deficiencies at the Airport and the existing navigation deficiencies at the Seaport, No Action would represent a less than significant adverse impact on public health and safety.

### 3.12.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

#### 3.12.2.3.1 Avoidance, Minimization Measures and Best Management Practices

**Construction Phase**

Safety measures during construction at the Airport and Seaport to ensure continued safe airfield and harbor operations include:

- Compliance with the Construction Safety and Phasing Plan (CSPP)
- Airport construction contractor will ensure that all materials and equipment stored at or near the Airport (including on-site stockpiles) remain below the 14 CFR Part 77 elevation limits. A safety plan compliance document and FAA Form 7460-1 Notice of Proposed Construction or Alteration would be completed and submitted for FAA approval prior to commencing.
- Install clear and visible barriers and signage delineating construction and work areas and areas with obstructions and hazards
- Maintain stringent vehicle, harbor vessel, and personnel controls for employees and visitors in the vicinity of construction sites
- Clearly mark portions of runways and harbor when temporarily closed for construction activities

- Provide construction and dredging period safety briefings for Airport and Seaport operators, users, and contractors
- Require use of personnel protective equipment and high visibility vests by all construction personnel
- Maintain clear and ongoing communication with Airport Control and Seaport Operations throughout the construction period
- Maintain communication with both commercial and civilian Airport and Seaport users
- Provide timely notifications to mariners and aviators including information on areas with temporarily restricted or modified access

**Post-Construction**

- Port visits would be scheduled and coordinated through official channels, with appropriate Seaport authorities made aware of logistical support needs
- Set up secure perimeter around visiting Navy ship, clearly demarcated with navigation buoys
- Maintain coordination with Seaport operators to manage ship activity, scheduling, and berthing assignments and ensure continued access for other port users

**Public Health and Safety**

- Construction employees vetted with criminal background checks prior to arrival on Yap; those with felony convictions, sex offender status, or other violent or job-related criminal offenses will not be offered employment
- All employees will be required to adhere to all local law enforcement regulations, and the contractor will develop procedures for addressing complaints and dismissing non-compliant employees
- The construction contractor will provide its own security personnel for the Airport and Seaport work areas and employee camps, and these personnel will cooperate with local law enforcement personnel as appropriate
- All construction laborers who will be on island more than 45 days will require medical and dental clearance within three months of departure to Yap and before commencing work, including updated vaccinations (tetanus, MMR, influenza), chest x-ray and TB testing, syphilis, and HIV testing.
- Contractor is required to provide its own basic primary care personnel on island to service employees
- Contractor is required to have procedures in place for emergency medical evacuation

#### 3.12.2.3.2 Construction Impacts

The environmental analysis determined that the project's construction period impacts would result in a less than significant adverse impact on public health and safety. The analysis considered the individual resource areas of airfield safety, ocean navigation safety, emergency services, health care services, and environmental health/public health.

During construction, potential impacts include temporary increases in aviation and marine activity associated with construction logistics; dredging and vessel traffic affecting ocean navigation safety; increased demand on emergency services and health care facilities; and environmental health concerns related to noise, air quality, water quality, traffic safety, hazardous materials handling, and the temporary presence of up to 275 construction workers on Yap.

Construction activities will follow established aviation and marine safety procedures, navigation controls, and environmental BMPs to minimize risks to aircraft operations, vessel traffic, and public exposure to hazards. Worker health screening protocols, security procedures, and coordination with local emergency services will further reduce potential community health and safety concerns. The individual resource areas are addressed below.

#### 3.12.2.3.2.1 Airfield Safety

Construction at the Airport would include excavation along the northwest length of the airfield, fill mostly along the east and southwest ends, and construction of extended pavement on the east and west ends of the runway. During construction, there would be numerous construction vehicles, equipment and personnel in the airfield vicinity.

To ensure continued safe airfield operations and civilian safety during construction, clear and visible barriers and signage would be established to delineate areas under construction and other areas with obstructions and hazards. Stringent vehicle and personnel controls for employees and visitors would be maintained. When runways are closed, operators would use lighted “X’s” during day and night. All airport personnel would receive briefings and training on construction period safety. Clear communication with air traffic controllers and pilots would be maintained to avoid safety incidents. Construction equipment would remain below 14 CFR Part 77 elevation limits. With these measures, airfield safety concerns during construction would be minimized to a less than significant adverse impact.

#### 3.12.2.3.2.2 Ocean Navigation Safety

During dredging and harbor improvements, there will be a substantial increase in harbor vessels and movements that could disrupt current operations, inconvenience harbor users, and increase the potential for safety issues. Prior to and during construction, large quantities of equipment and materials would be transported to Yap via ship from outside of the FSM such as Guam and the Republic of the Philippines, resulting in more freight shipping traffic at the harbor. During dredging, the presence of the large backhoe dredge and barge near the pier and in the channel could disrupt normal ship traffic and operations. After hours, the backhoe dredge and barge would be moored near the dredging area in Colonia Harbor outside of active shipping lanes. During severe weather events, the two dredging vessels would either temporarily berth at the Yap Seaport wharf or seek refuge offshore.

During construction, movement and access of smaller vessels such as local maritime businesses, fishermen, recreational boaters, dive boats and marine tours, and other port users would be maintained. This will be coordinated by the dredging contractor.

To ensure safety throughout the dredging and construction period, work zones, both shoreside and in-water, would be clearly demarcated with signage, buoys, silt curtains and barriers, including lighted buoys visible at night. This ensures that smaller vessels do not inadvertently

enter the hazardous zone. Signage would provide guidance on entry and exit points, speed limits, restricted areas, and any temporary changes in navigation practice during construction. Harbor operators, users and contractors would undergo comprehensive training and be required to strictly adhere to safety protocols. Construction personnel would be required to use personal protective equipment (PPE) and high visibility vests.

Ocean navigation safety would also be maintained by phasing and sequencing of the proposed wharf construction to ensure continuous operations and limited disruption throughout project construction. The general construction sequence was described in Chapter 2.

Throughout the construction period, close coordination between harbor operators and the dredging/construction contractor would be ongoing, as well as communication to both commercial and civilian harbor users. Timely notifications to mariners would be provided, including information on areas with temporarily restricted or modified access. With these operational measures and construction BMPs, navigation safety during construction and dredging would be minimized to a less than significant adverse impact.

#### 3.12.2.3.2.3 Emergency Services

During the construction period, there would be up to 275 construction employees on island for the duration of the respective construction periods. This includes approximately 200 construction employees at the Airport during the 6.5 year construction period (plus up to 9 months of mobilization/demobilization); and 75 construction employees at the Seaport for approximately 3 years. Approximately 20 to 40 individuals are expected to be from Yap or other parts of the FSM and may already be on island. Construction employees will require routine health care and, on occasion, emergency medical services.

The construction work camps will be self-contained and include their own security personnel to manage resident safety and security. Demand for local police and fire protection is expected to be minimal.

Construction injuries are a potential source of demand on the local medical system. A safety program is required in the construction contract and successful implementation of this program would greatly reduce the risk of major injuries to all workers. Based on U.S. Centers for Disease Control (CDC) statistics for 2024, the expected construction injury rate (with OSHA safety programs required) is 2.5 per 100 full time workers (CDC 2024). For 275 Yap construction workers, this equates to approximately seven injuries per year, or less than one person per month that might need medical assistance.

In the case of a serious medical incident, medical evacuation procedures would be in place. Local emergency services may be called upon for temporary assistance in emergency situations until a patient is stabilized or transported elsewhere, but this would be a rare occurrence. Local Yapese workers would have the same access to these medical resources as workers from off island.

Other than a rare emergency where local responders may be called on, project-related demand on local police, fire, and emergency services is expected to be minimal. The project will not adversely affect the availability of health care services for the local Yapese population.

#### 3.12.2.3.2.4 Health Care Services

The construction contractor would be required to provide its own medical personnel on island to service employees. Services would be coordinated through the contractor's Medical Quality Control Manager. Telehealth services will also be provided for consultation with off-island professionals. If needed, employees will be referred to providers in Guam or the Philippines for procedures such as elective surgery or dental surgery and will not burden local health care providers.

With safety measures, contractor-provided medical support and evacuation procedures, construction would have a less than significant adverse impact on emergency services and health care availability for the local population.

#### 3.12.2.3.2.5 Environmental Health/Public Health and Safety

Dredging and construction activities have the potential to impact environmental health, specifically in the areas of noise, water quality, air quality, traffic safety, and exposure to hazardous substances. Construction period impacts to these resource areas are discussed in their respective sections of this EIS: air quality issues in Section 3.3; water quality in Section 3.2; noise impacts in Section 3.7; traffic safety in Section 3.11; and hazardous materials and waste in Section 3.13. Handling and disposal of hazardous waste and materials during construction will follow BMPs and ECP based on the Environmental SOP.

Overall, construction would have less than significant adverse effects on environmental health.

The arrival of up to 275 construction workers, mostly from outside of Yap, has raised concern among some Yap residents about communicable disease, crime, and social disruption. All construction laborers who will be on island more than 45 days will require medical and dental clearance within three months of departure to Yap and before commencing work, including updated vaccinations (tetanus, MMR, influenza), chest x-ray and TB testing, syphilis, and HIV testing.

Prior to arriving on Yap, construction laborers will be vetted with a criminal background check. Individuals with felony convictions, sex offender status, or other violent or job-related criminal offenses will not be considered for employment. All employees will be required to adhere to all local law enforcement regulations, and the contractor will develop procedures for addressing complaints and dismissing non-compliant employees. Cultural orientation will be provided, and a construction hotline will be available for community concerns.

The construction contractor's security personnel will be responsible for work areas and residential camps, and security officers will cooperate and work closely with local law enforcement as appropriate. With these screening protocols in place, there would be a less than significant adverse impact on public health and safety during the construction phase.

### 3.12.2.3.3 Post-Construction Impacts

The analysis of post-construction impacts has determined that the project will have a less than significant beneficial impact on public health and safety. The analysis considered the resource areas of airfield safety, ocean navigation safety, emergency and health care services, and environmental health/public health.

The Proposed Action would improve Airport and Seaport infrastructure and navigation aids, enhancing aviation and marine operational safety. Emergency services and health care facilities would not experience substantial increases in demand. Environmental health risks related to noise, hazardous materials, and air and water quality would be minimized through operational safety procedures, BMPs, and mitigation measures.

Overall, project improvements to transportation infrastructure and operational safety procedures would enhance HADR capabilities and community resilience, while avoiding substantial increases in public health risks. The analysis of the individual resource areas is below.

#### 3.12.2.3.3.1 Airfield Safety

The proposed improvements include a 3,100-foot runway extension, aircraft parking apron, taxiway, warehouses, and operations/command and control areas. New visual aids would be installed at both ends of the runway. The new facilities associated with the Preferred Alternative (both permanent structures and mobile equipment) would comply with 14 CFR Part 77 elevation limits. The Preferred Alternative Airport design would meet requirements of 14 CFR Part 77 airspace surfaces. In addition, the apparent physical obstructions (e.g., topography and vegetation) currently located within the primary and transitional surfaces of Runway 07-25 would be removed during project construction and the final elevations within those imaginary surfaces would be largely compliant with FAA standards. These improvements would have a significant beneficial impact on airfield safety. The improvements also increase the airfield capacity to accommodate larger aircraft, including aircraft providing Humanitarian Assistance and Disaster Recovery (HADR) assistance.

Proposed DoW training and exercises would increase operations at the airfield up to twice a year and involve up to 15 DoW flights per day for up to 28 days (i.e., up to 2 two-week periods per year). There may be periodic influxes of new aircraft types and changes in flight paths. Training flights would mostly take place outside the Yapese airspace, i.e. 12 nautical miles from shore. Additional HADR training and other contingency response training would include several monthly landings and takeoffs and could include joint exercises with Yap State and FSM government agency counterparts.

An increase in aircraft operations (takeoffs and landings) during proposed military training and exercises would incrementally increase exposure to aviation safety risk, as statistical risk generally rises with the number of operations. However, industry safety data indicate that the overall probability of an aviation accident remains extremely low. The correction of documented deficiencies relative to FAA safety standards is expected to improve baseline airfield safety conditions. Airfield safety would continue to be supported through compliance with applicable safety regulations and training requirements, adherence to established operational procedures, and ongoing risk management practices.

The improvements to the Airport enhance the general safety of Yap residents, workers, and visitors, by facilitating air transportation capabilities during HADR events.

Overall, while periodic training fights slightly increases risk exposure, the project corrects existing deficiencies, resulting in a net beneficial effect on operational airfield safety.

#### 3.12.2.3.3.2 Ocean Navigation Safety

Seaport improvements include the replacement of ATONs, installation of channel range markers, and harbor and channel dredging. The replacement of existing ATONs that do not meet current standards and provision of entrance channel range markers where none currently exist will improve ocean navigation safety. The proposed dredging of the harbor, turning basin and entrance channel would likewise have a positive effect on navigation safety.

There will be a slight increase in Seaport traffic because of the Proposed Action. There will be approximately one vessel visiting the port per training event for HADR or logistics training, with visits lasting one to two weeks. The proposed lengthening of the wharf would enable dual-use operations (i.e. military and commercial) and mooring of U.S. and allied vessels without interfering with normal commercial seaport operations. During its annual port calls, the Navy anticipates mooring only one ship at a time.

Approximately one week before a port call, the Navy would release detailed plans and conduct detailed coordination with Yap State and commercial operators including port operators, cargo ships, dive boats, fisherman, etc. A secure perimeter would be set up around the visiting Navy ship, clearly demarcated with navigation buoys.

Increased ship activity can be managed through scheduling of port calls and berthing assignments. In total, the dredging improvements, installation of navigation aids, and enhanced ability of the Seaport to accommodate a range of ships would be a less than significant beneficial impact to navigation safety.

#### 3.12.2.3.3.3 Emergency Services

After construction is complete, no additional full-time on-island project personnel are expected. Periodic military training exercises could slightly increase EMS demand, but exercises would have short duration. Local police, fire, and EMS services are expected to continue operations without disruption.

#### 3.12.2.3.3.4 Health Care Services

No permanent project-related increase in health care demand is anticipated. Routine care and emergencies for military exercises will be managed by DoW medical staff or temporary on-site arrangements. Off-island referrals will continue to be available as needed.

#### 3.12.2.3.3.5 Environmental Health/Public Health and Safety

The project would not have long-term, adverse impacts on environmental health, including environmental pollutants, noise, air quality, water quality, hazardous materials or other safety issues.

As discussed in other sections of this EIS, exposure to hazardous materials and increased airfield activity during training activities would be minimized by safety procedures and operational BMPs.

There will be an increase in aircraft operations and associated noise during bi-annual training which would involve various military aircraft. HADR training and other contingency response training will also add several additional monthly aircraft landings and takeoffs at the Airport, including by Boeing 737-800 and larger cargo aircraft. Although military training will occur only for a few weeks per year, military aircraft can generate high sound levels at nearby sensitive receptors. Noise impacts would not pose a risk to human hearing, although adverse effects may

include annoyance, learning disruption, and sleep disturbance. Mitigation measures and operational BMPs to minimize noise impacts during field training exercises include operational scheduling, flight planning, and community engagement (see Section 3.7, Noise).

The improved air and maritime transportation infrastructure supports future public health initiatives, including tropical disease monitoring, medical personnel training, and better equipped medical facilities.

Overall, post-construction, the project is expected to have a less than significant beneficial impact on environmental health and public health and safety.

#### 3.12.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

Overall impacts to public health and safety from Alternative 2 would be the same as the Proposed Action. During the construction period, impacts to Airfield Safety and Navigation Safety would be addressed by the recommended avoidance and minimization measures. Clear barriers and signage delineating construction areas, stringent vehicle and personnel control, safety training, and clear communication with airport and harbor operators would minimize safety hazards during construction. At the Airport, Alternative 2 would require more earthwork than the Preferred Alternative, which would involve a slightly longer site preparation period, but the nature and intensity of impacts, as well as avoidance and minimization measures would be similar to the Preferred Alternative.

At the Seaport, disposal of dredge material in the entrance channel rather than stockpiling involves a different work flow, barge routes, and types of equipment than the Preferred Alternative. A detailed means and methods plan with safety mitigation would be developed by the dredging contractor and operations will be managed in coordination with harbor operators.

The number of construction employees would be the same as with the Preferred Alternative: up to 200 at the Airport and 75 at the Seaport. During the construction period, there would be a less than significant adverse impact on emergency services, health care, and environmental health.

During the post-construction period, impacts at both the Airport and Seaport would be similar to the Preferred Alternative. The long-term result for both alternatives is a substantial improvement in airfield operation and safety, and construction contractors would be required to comply with all applicable safety guidelines. Seaport dredging and installation of ATONs will improve long-term navigation safety. The placement of some dredged material in the channel will alter the bathymetry of those areas but will have no effect on navigation safety. Similar to the Preferred Alternative, post-construction activities would have a less than significant adverse impact on emergency services, health care, and environmental health during the construction period, but a less than significant beneficial impact post-construction.

## 3.13 Hazardous Materials and Wastes

This section discusses hazardous materials, hazardous waste, toxic substances, and contaminated sites. The contractor will be expected to comply with an ECP to be developed in coordination with Yap State and FSM under the Environmental Compliance SOP (Appendix A) to ensure compliance with substantive requirements of the U.S. Solid Waste Disposal Act and Yap law.

### 3.13.1 Affected Environment

The Proposed Action consists of improvements to the Airport and Seaport on Yap Island, FSM. Current solid waste management on Yap consists of one main public landfill in Colonia, and a number of smaller, unlined waste disposal pits in outlying villages. The FSM government recognizes the need for the expansion of waste services, including hazardous waste and materials storage throughout the country, including on Yap (Secretariat of the Pacific Regional Environmental Programme, 2025). However, the Yap State EPA has not yet set action levels for soil or groundwater contaminants, nor have they regulated disposal of hazardous or special wastes (Department of the Air Force [DAF], 2025a).

A Phase I Environmental Baseline Survey (EBS) was performed at the Airport (Appendix M-1; DAF, 2025a). A Phase I Environmental Site Assessment was performed at the Seaport and the road surrounding Chamorro Bay (Appendix M-2; NAVFAC PAC, 2024a). The current environmental condition of the Proposed Action areas described in these reports are summarized below. Additional environmental condition details are provided by results of screening samples from the Seaport (NAVFAC PAC, 2024a) and Airport (Jacobs, 2024) Proposed Action areas.

#### 3.13.1.1 Hazardous Materials and Waste – Airport

**Petroleum Products**

Fuels and other petroleum products are stored and routinely used at the Airport at the Aircraft Rescue and Fire-Fighting (ARFF) station and training areas, the hangar facility, Airport facilities, car rental facility, and “old” and “new” emergency generator buildings. Additional fuel storage and use was documented at the shops and village residences surrounding the Airport, adjacent to the Proposed Action area, during the 2024 EBS inspection. The EBS report indicates potential releases of petroleum products throughout the Airport area, which are discussed below (DAF, 2025a).

**AFFF**

A 1,000-gallon aboveground storage tank and four 55-gallon drums of Aqueous Film-Forming Foam (AFFF) were observed stored at the ARFF facility, located on the south side of the runway, west of the terminal building. The ARFF also possesses three trucks with AFFF dispensing capability. The use and storage of AFFF, presumed to contain PFAS (persistent environmental contaminants), raises significant health and environmental concerns, especially regarding the island's limited freshwater resources. The host nation is still in the early stages of establishing a comprehensive tracking system for hazardous substances and petroleum products. Inadequate tracking records concerning AFFF usage complicate efforts to assess potential impacts. The EBS report indicates potential releases of AFFF at the runways and maintenance areas of the Airport and the ARFF facility, which are discussed below (DAF, 2025a).

**Other Products**

Hazardous substances are used or stored in various areas at and around the Airport. Activities associated with hazardous substances use include, but are not limited to, aircraft and vehicle maintenance activities, ARFF training and emergency response, atmospheric monitoring, and AC production and preparation. These activities require the use of hydrogen, nitrogen, antifreeze or other liquid coolants, various types of batteries, sealants, paints, adhesives, and

various cleaners. In some instances, the hazardous materials were stored in containers that were placed on the bare ground.

**Spills or Releases**

The ARFF facility is the accumulation point for the Airport. Any flammable substances are burned within the ARFF Burn Pit. Waste petroleum products, hazardous substances, and other materials are stored and burned during ARFF training exercises, raising environmental concerns. It is unknown but unlikely that the pit is lined, and standing water with a heavy oily sheen was observed in the pit during the 2024 EBS, indicating possible contamination that may impact the environment (DAF, 2025a).

Small spills and releases were observed at the village residences, in the drum storage area, the junkyard area, and in the areas used for equipment maintenance at the GPPC, Inc. Facility. In addition, a tarlike substance was observed draining from a gravel stockpile and around the drum storage area.

Potential releases from in-pavement fuel lines possibly damaged during previous apron expansion efforts have not been investigated. No information was available on whether the fuel lines were in use at the time or if any fuel was released.

Suspected releases of AFFF during training and emergency response activities are associated with the ARFF Burn Pit and Station and the Airport runways, taxiways, and maintenance apron.

Screening samples were collected from surface and subsurface soils at the Airport Proposed Action area. Measurable levels of heavy metals were detected including arsenic, barium, chromium, and lead, as well as total petroleum hydrocarbons, polynuclear aromatic hydrocarbons, and organochlorine pesticides. Samples were not analyzed for PFAS compounds. The majority of results were below the Tropical Pacific Environmental Screening Levels (TPESL) for unrestricted land use. No measurable levels of polychlorinated biphenyl (PCB) were found in the samples. Chromium was found in surface soil throughout the Proposed Action area. Six of 20 samples exceeded the TPESL (1,100 mg/kg), ranging from 1,400 mg/kg – 2,000 mg/kg. Due to the elevated level of total chromium, one sample was subjected to hexavalent chromium analysis with a result of 4 mg/kg hexavalent chromium. This value is below the TPESL of 30 mg/kg (Jacobs, 2024).

**Accumulated Wastes**

During the EBS inspection, The GPCC, Inc. facility adjacent to the runway to the southeast was found to contain numerous unlabeled 55-gallon drums, likely holding bituminous materials, and several labeled 55-gallon oil drums. Most were in poor condition and lacking proper containment. Various ASTs containing oil are also present on-site. Notably, a large stockpile of gravel appears to be oozing a significant amount of bituminous material onto the bare soil beneath it. Because improper storage practices lead to soil and environmental contamination, the EBS report recommends further investigation at the site (DAF, 2025a).

Multiple risks from improperly stored hazardous materials were observed within the Airport Proposed Action area, including various waste hazardous substances stored in 55-gallon steel drums on bare soil or gravel. While the state has made significant advancements in waste management, community dump sites remain across nearly all municipalities on the island. There is only one public landfill on the island with limited collection services. Despite

improvements, illegal dumping still poses risks throughout the Proposed Action area and surrounding vicinity (DAF, 2025a).

#### 3.13.1.2 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyls) - Airport

**ACM and LBP**

Due to facility ages and building practices noted in Section 3.13.1.2 above, existing buildings are expected to potentially contain both LBP and ACM.

According to existing as-built drawings examined during the EBS, the airport storm drains include asbestos cement pipes. During an ongoing resurfacing project at the Airport by others, an asbestos cement drainpipe was observed within that project area, indicating the potential to further encounter sections of pipe during construction activities (DAF, 2025a).

**PCBs**

Transformers potentially containing PCBs were observed at multiple locations in the Proposed Action area during the EBS inspection, requiring proper management during construction activities (DAF, 2025a).

**UXO/MEC**

Areas outside developed Airport regions have a high probability of MEC, necessitating adherence to established safety protocols during subsequent field activities (DAF, 2025a).

**WWII Aircraft Wreckage**

The presence of wreckage from WWII-era aircraft in areas outside of the developed portion of the Airport serves as tangible evidence of past aircraft operations. Residual aviation fuel within the aircraft requires proper management during future construction activities. These aircraft may also contain LBP, solvents, lubricants, and potentially radioactive components that complicate environmental assessments (DAF, 2025a).

#### 3.13.1.3 Hazardous Materials and Waste – Seaport

**Petroleum Products**

The fuel farm at Vital FSM PetroCorp is adjacent to and south of the Seaport. Records reviewed during the 2024 Environmental Site Assessment indicated there have been no documented releases or spills at the fuel farm (NAVFAC PAC, 2024a). The facility includes the bulk storage of petroleum products. An underground fuel pipeline transports fuel from the port to the PetroCorp fuel farm. No information was available on whether the pipeline is regularly leak-tested or whether there are any testing results. Soils associated with the existing pipeline have not been assessed, nor were records of releases from the pipeline available. A Tier 1 vapor encroachment screening (VES) was completed as part of the Environmental Site Assessment in general accordance with ASTM E1527-15, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions (ASTM 2015). According to the VES results, because documentation of pressure testing and other leak detection was not available for review, vapor encroachment concerns exist for future structures above the pipeline area (NAVFAC PAC, 2024a).

### Aqueous Film-Forming Foam (AFFF)

The Yap State Fire Department adjoins the road around Chamorro Bay, west of the Seaport. Approximately 40, 5-gallon plastic containers of Ansulite, a 6-percent AFFF concentrate were observed on the lawn on the rear (north side) of the fire station building during inspections conducted as part of the 2024 Environmental Site Assessment (NAVFAC PAC, 2024a). Two containers had small cracks. Interviews indicated that the containers were expired and were being temporarily stored pending proper disposal, and there has been no occasion necessitating the use of the foam in the past five years. Based on this information, the presence of per- and polyfluoroalkyl substances at the subject property cannot be ruled out.

### Other Products

Ongoing commercial activities at the Seaport include the regular use of hazardous materials including fuels, oils, lubricants, coolants, pesticides, herbicides, and other industrial chemicals.

### Spills or Releases

During inspections conducted as part of the 2024 Environmental Site Assessment, a yellow-tinged liquid was observed leaking from the corner of an 8 x 20 shipping container at the Seaport. No odor was noted. Four empty, unlabeled 55-gallon drums were noted near the former tuna processing plant. A stained area was observed around the drums which had a petroleum odor. The VES indicated this is a potential vapor encroachment concern for structures constructed over the area in the future (NAVFAC PAC, 2024a).

An approximately 200-square foot oil stain was observed at the Division of Sea Transportation maintenance shop during the Environmental Site Assessment inspection. Petroleum hydrocarbons were observed to have potentially leached to the underlying soil and may have entered floor and trench drains. According to the VES, a potential vapor encroachment concern exists for future construction (NAVFAC PAC, 2024a).

Screening samples were collected at the Seaport Proposed Action area from surface and subsurface soils and from sediment in proposed dredging areas. Chemical analysis of the proposed dredge sediments indicated elevated concentrations of containments, including heavy metals, were present at the berth, although there was no observed toxicity in bioassay testing (NAVFAC PAC, 2024a).

### Accumulated Wastes

Approximately ninety 55-gallon drums were observed in the port area during the 2024 Environmental Site Assessment inspection. Most were unlabeled, sitting directly on the ground surface, uncovered, and containing some amount of fluid.

Seven fuel tanks previously used by the U.S. Coast Guard were observed in overgrown vegetation to the east of the fenced area. The tanks appear slightly corroded, but no evidence of release was observed. The condition and contents of the tanks are unknown (NAVFAC PAC, 2024a).

Three piles of metal debris primarily consisting of abandoned automobiles and automobile parts were observed in the salvage yard to the east of the fenced area. Nearby, a deteriorated 20-foot metallic aboveground storage tank marked as "unleaded gas" and exhibiting substantial corrosion and perforations was also identified. The condition of the tank may indicate a release

of hazardous substances or petroleum products into the surrounding environment. The metal debris and aboveground storage tank area has not been previously investigated. The actual condition of the surrounding area is currently unknown (NAFVAC PAC, 2024). A stockpile of lead-acid batteries from automobiles and other equipment was observed at the Recycling Center adjacent to the Seaport to the south. Batteries were stored on a concrete floor atop a pool of liquid, identified as rainwater by personnel. Various floor drains were observed in the vicinity of the batteries (NAFVAC, 2024).

#### 3.13.1.4 Special Hazards (Asbestos Containing Materials, Lead Based Paint, Polychlorinated Biphenyls) – Seaport

**Asbestos Containing Material (ACM)**

The Seaport area was partially developed before 1980 including the Yap State Government and Administration Building, the former tuna processing facility, and smaller structures in its vicinity. These structures may contain ACM due to the year of their construction. Design drawings of the Yap Fishing Authority buildings indicate that ceiling and wall cement boards contain asbestos. This indicates that even structures erected post-1980 have the potential to contain asbestos. Because it is not known whether any ACM abatement was completed, the existence of ACM within the Seaport Proposed Action area cannot be ruled out.

**Lead-Based Paint (LBP)**

Some structures at the Seaport were constructed prior to 1976. Furthermore, the Federated States of Micronesia rely on Asian imports, where the standards pertaining to the use of LBP may differ from the United States. Based on this information, the presence of LBP at the subject property cannot be ruled out.

**Unexploded Ordnance (UXO)/Munitions and Explosives of Concern (MEC)**

During World War II (WWII), the Japanese constructed a major military air installation and airfield approximately one mile south of the Airport. WWII era UXO and MEC are commonly found throughout Yap Island. According to interviews, WWII era UXO/MEC are likely present in the marine areas adjoining the Seaport, based on a history of discovery of MEC in the port waters (NAVFAC PAC, 2024a). No MEC was discovered during the geotechnical investigation of the Seaport and access road (GHD-COWI, 2023).

**Radon**

As part of the radioactive decay process, radon gas can be produced from underlying geologic formations. The gas moves up through the soil to the surface, where it can enter structures through cracks and other holes in the foundation. Radon can accumulate in structures above limestone and could be a concern in Yap.

### 3.13.2 Environmental Consequences

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at the Airport and Seaport on Yap Island.

#### 3.13.2.1 Analysis Method

The analysis of hazardous materials, hazardous waste, and contaminated sites focuses on the potential for these substances to be introduced into the environment during construction and

post-construction period activities undertaken by the U.S. DoW at the Airport and Seaport. Impacts on or from hazardous materials and wastes would be considered significant if a proposed action would result in noncompliance with applicable regulations, or increase the amounts generated or procured beyond current management procedures and capacities. Impacts would be considered significant if a proposed action would disturb or create contaminated sites resulting in negative impacts on human health or the environment, or if a proposed action would make it substantially more difficult or costly to remediate existing contaminated sites.

#### 3.13.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change associated with hazardous materials and waste currently located in the Proposed Action area.

The Phase I EBS and Environmental Site Assessment performed at the Airport and Seaport (DAF, 2025a; NAVFAC PAC, 2024a) provide detailed analysis of contamination and improperly managed hazardous materials and wastes currently in place in the Proposed Action area due to a long history of poor infrastructure, limited resources, and waste management practices. Additional information on the observed current condition of the Proposed Action area are provided in Section 3.13.1 above.

Existing structures at both the Airport and Seaport are suspected to contain ACM and LBP. Asbestos-containing concrete storm drain pipe segments are likely still present beneath the Airport structures. There is potential for the presence of WWII era MEC or UXO. Hazardous waste may be present in unlabeled drums, containers, and derelict WWII aircraft.

The No Action Alternative would result in a significant adverse impact. The marine environment would continue to degrade containment structures if no action is taken to remove or remediate existing risks from improperly managed hazardous materials and wastes. Facilities would also continue to degrade, increasing the likelihood of eventual demolition without appropriate abatement and special waste disposal practices. Without intervention provided by the Proposed Action, these steadily declining conditions would result in increasing potential for risks to human health and the environment over time.

#### 3.13.2.3 Preferred Alternative - Airport Alternate Apron Location and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

The Preferred Alternative includes the construction and post-construction activities at the Airport and Seaport described in the sections below. Additional details of the Airport and Seaport Preferred Alternative are provided in Chapter 2.

**Airport Improvements**

Proposed improvements to the Airport as part of the Preferred Alternative include improvement and expansion of airport runways, taxiways, parking aprons, facilities, and infrastructure associated with the airport. New facilities would include permanent multi-tank fuel storage system with capacity of approximately 840,000 gallons and an expeditionary fuel storage system for up to six containers totaling up to 250,000 gallons of fuel.

**Seaport Improvements**

Proposed improvements to the Seaport infrastructure as part of the Preferred Alternative include demolition and replacement of abandoned buildings and infrastructure. Major proposed improvements include demolition of the existing tuna warehouse and other areas where contamination was noted in the Phase I Environmental Site Assessment (NAVFAC PAC, 2024a).

The Preferred Alternative would include dredging at the Colonia Harbor Channel Entrance, in the turning basin, and adjacent to the Yap Seaport Wharf. Construction of a new berth would allow for larger vessels to enter, dock, and turn around. Sediment sampling from the wharf area has indicated the presence of contamination within the dredge footprint (NAVFAC PAC, 2024a). Dredge material generated from the proposed channel, turning basin, and wharf dredging would be disposed of at sites in Tamil and Rull for beneficial local reuse or used for land reclamation situated farther into the harbor waters. All sites were identified through coordination with local officials and stakeholders.

The Preferred Alternative would include improvements to the Seaport-to-Airport Connector Road. The proposed improvements would provide a continuous two-way paved roadway with drainage improvements. Additional improvements would include pavement repair, soil stabilization efforts, replacement of four damaged guardrails, as well as new striping and signage.

**Post-Construction Activities**

After construction, both the Airport and Seaport would continue to be controlled by Yap State with continued primary use by local users (e.g., private, commercial, and government entities).

One to two military training events per year, which may involve either or both the airport and seaport, are anticipated for a total of up to 14 training days per year. No permanent personnel, full-time aircraft basing, munitions use, or airspace modifications are included in the Proposed Action.

Proposed training at Seaport would consist of approximately one vessel visiting the port per training event with visits lasting one to two weeks.

#### 3.13.2.3.1 Avoidance, Minimization Measures, and Best Management Practices

The appropriate management of hazardous materials and hazardous waste used or generated during construction activities will be detailed in the ECP specific to the Preferred Alternative and prepared under the Environmental SOP in (Appendix A). The documents include BMPs for hazardous material storage and management, stormwater and wastewater management to prevent runoff of hazardous materials and sediment, segregation and removal of contaminated soils and dredge spoils, protection of groundwater and surface water resources, gross petroleum contamination of soil and water, and management of special wastes including ACM, LBP, and PCBs. BMPs specific to hazardous materials and hazardous waste are listed in Section 2.8.

General BMPs within these documents include the preparation of project specific plans for environmental protection, stormwater management, hazardous materials and waste management, and spill prevention and countermeasures. All petroleum products and hazardous materials and waste would be stored in secondary containment that is appropriately sized and rated for the contents. Spill containment and cleanup materials would be kept in the

immediate vicinity of all petroleum products and hazardous materials and waste storage and facilities. Spill kits would be appropriately sized and rated for the materials being stored/used.

In accordance with these documents, hazardous material abatement would occur prior to demolition activities. Abatement activities would be performed by a qualified subcontractor that is licensed to perform hazardous material abatement. Abatement efforts would comply with applicable requirements. Because there are no hazardous waste disposal facilities in Yap, hazardous waste will be appropriately containerized and managed for off-island disposal at a certified facility. Annual military training visits would allow for inspections and maintenance of temporary hazardous materials and waste storage facilities at least annually. Additional action-specific BMPs are provided below where appropriate. Prior to construction activities, potential hazardous waste streams will be identified. Samples of potentially hazardous waste will be submitted for analysis by a certified environmental testing laboratory to provide disposal determination documentation. Temporarily accumulated potentially hazardous waste will be managed and stored in accordance with all applicable regulations and/or guidance documents prior to disposal determination. Waste accumulation logs will be kept for each accumulation point. Signed waste manifests will accompany any hazardous waste removed from the construction site.

#### 3.13.2.3.2 Construction Impacts Airport

Construction at the Airport is expected to continue for up to eight years, including the demolition and excavation around the existing runway and construction of new paved areas and support facilities.

**Hazardous Materials and Waste**

Construction at the Airport would involve significant excavation of the area surrounding the existing runway. Heavy equipment and other tools would be in constant use. Maintenance and refueling of equipment would involve hazardous materials and petroleum products including fuel, oils, lubricants, degreaser, coolants, and other hazardous and/or flammable material. Maintaining the project area may also include the storage and use of herbicides or pesticides.

The specifications document for Airport construction activities includes provisions for the management of hazardous materials for all phases of the Airport construction. All hazardous materials would be kept in appropriately sized and rated secondary containment. Refueling would be done over impervious surfaces to the maximum extent practicable. Spill kits would be kept in the vicinity of all hazardous materials storage and use. Pest control procedures would be documented in a plan and would only be conducted by a certified operator. Because of these robust controls, hazardous materials stored and used onsite during construction would have a less than significant adverse impact on human health and the environment.

There is also the potential for spills or other releases of hazardous materials during construction or maintenance activities. All hazardous waste would be kept in adequate secondary containment for appropriate testing and disposal. Because hazardous waste disposal facilities are not present on Yap, hazardous waste, with the possible exception of demolition waste containing ACM or LBP if approved for local disposal, will be packaged for transportation to an offsite disposal facility capable of accepting hazardous materials. Excavated soil will be reused

and collected groundwater reintroduced within the project footprint. No offsite disposal of soil or accumulated groundwater is expected.

Improperly stored hazardous waste and contaminated soils are currently located throughout the Proposed Action area (DAF, 2025a). The Preferred Alternative would include segregation, removal, and proper disposal of the hazardous materials and wastes. Potential sources of contamination encountered in the construction footprint would be addressed during construction, including proper handling in accordance with substantive regulatory requirements.

Because of the project controls, hazardous waste generated or encountered onsite during construction would have a less than significant adverse impact on human health and the environment. The Proposed Action is expected to have a significant beneficial impact on the Airport area because potential sources of contamination encountered in the construction footprint would be addressed during construction which would decrease the risk of exposure to current and future users.

**Special Hazards**

The Phase I EBS conducted at the Airport indicated that most facilities at the Airport should be assumed to potentially contain ACM and/or LBP. Sections of asbestos-containing concrete drainpipe are potentially still present beneath the Airport project area. Generators with unknown PCB status were also observed in the Airport area (DAF, 2025a). Demolition of structures potentially containing ACM or LBP and removal of potential PCB items under project oversight and using appropriate BMPs would prevent improper disposal of these existing materials and reduce the risk of exposure to current and future users. All special waste encountered during construction, or identified as currently inadequately protected, would be placed into appropriate temporary storage and containment for testing and disposal determination.

The specifications document includes provisions for the identification, testing, abatement, and disposal of ACM, LBP, and PCB items. Because of the project controls, special wastes encountered onsite during construction would have a less than significant adverse impact on human health and the environment. The Proposed Action is expected to have a significant beneficial impact on special wastes present at the Airport area because potential sources of contamination encountered in the construction footprint would be addressed during construction which would decrease the risk of exposure to current and future users.

#### 3.13.2.3.3 Construction Impacts - Seaport

Land activities include demolition and excavation of the existing footprint and construction of new port facilities. Dredging would also occur at the channel mouth, turning basin, and berth areas.

**Hazardous Materials and Waste**

Both land-based construction and dredging would utilize heavy equipment. Maintenance and refueling of equipment would involve hazardous materials and petroleum products including fuel, oils, lubricants, degreaser, coolants, and other hazardous and/or flammable material. Maintaining the project area may also include the storage and use of herbicides or pesticides.

All hazardous materials would be kept in appropriately sized and rated secondary containment. As often as practicable, refueling would be done on land over impervious surfaces. Refueling of dredging equipment would include specific spill controls. Spill kits would be kept in the vicinity of all hazardous materials storage and use. Pest control procedures would be documented in a plan and would only be conducted by a certified operator. Because of these robust controls, hazardous materials stored and used onsite during construction would have a less than significant adverse impact on human health and the environment.

There is the potential for spills or other releases of hazardous materials during construction or maintenance activities. All hazardous waste would be stored temporarily in adequate secondary containment for appropriate testing and disposal. Because hazardous waste disposal facilities are not present on Yap, hazardous waste, with the possible exception of demolition waste containing ACM or LBP if approved for local disposal, will be packaged for transportation to an offsite disposal facility capable of accepting hazardous materials. All excavated soil will be reused and collected groundwater reintroduced within the project footprint. No offsite disposal of soil or accumulated groundwater is expected.

Improperly stored hazardous waste, contaminated soils and dredge spoils are currently located throughout the Proposed Action area. The Phase I Environmental Site Assessment conducted at the Seaport indicated potential vapor encroachment concerns for future construction due to petroleum contamination (NAVFACPAC, 2024). The Preferred Alternative would include segregation, removal, and proper disposal of the hazardous materials and wastes. Potential sources of contamination encountered in the construction footprint would be addressed during construction, including proper handling in accordance with substantive regulatory requirements.

Contaminated spoils dredged from the Seaport berth area would be segregated and removed. The Dredging Strategy Report (NAVFAC SW, 2024) includes measures to segregate and test spoils from known areas of sediment contamination to be disposed of appropriately.

Because of the project controls, hazardous waste generated or encountered onsite during construction would have a less than significant adverse impact on human health and the environment. The Proposed Action is expected to have a significant beneficial impact on the Seaport area because potential sources of contamination encountered in the construction footprint would be addressed during construction and would decrease the risk of gross exposure or vapor encroachment to current and future users.

Infrastructure improvements associated with the Proposed Action include repair, replacement, or updates as necessary to waste treatment and disposal facilities which would result in reduced exposure to and discharge of contaminants than current conditions. Improvements to wastewater and stormwater management systems would reduce contaminant infiltration and discharge.

The Phase I Environmental Site Assessment report for the Seaport discusses the existing risks due to inadequate local waste management practices (NAVFAC PAC, 2024a). The Preferred Alternative would mitigate these risks through education of local personnel and the addition of annual inspections. However, the low frequency of visitation would limit the potential effect.

**Special Hazards**

The Phase I Environmental Site Assessment conducted at the Seaport indicated that due to age and sampling results indicating potential use of unregulated building materials, most facilities at the Seaport should be assumed to potentially contain ACM and/or LBP. Generators with unknown PCB status were also observed in the Seaport area (NAFVAC PAC, 2024). Demolition of structures potentially containing ACM or LBP and removal of potential PCB items under project oversight and using appropriate BMPs would prevent improper disposal of these existing materials and reduce the risk of exposure to current and future users. All special wastes encountered during construction, or identified as currently inadequately protected, would be placed into appropriate temporary storage and containment for testing and disposal determination.

The 100% Construction Submittal (NAVFAC, 2025) Drawing CD002 - Environmental Protection Site Plan And Notes includes provisions for the abatement and disposal of ACM, LBP, and PCB items. Because of the project controls, special wastes encountered onsite during construction would have a less than significant adverse impact on human health and the environment. The Proposed Action is expected to have a significant beneficial impact on special wastes present at the Seaport area because potential sources of contamination encountered in the construction footprint would be addressed during construction which would decrease the risk of exposure to current and future users.

#### 3.13.2.3.4 Post-Construction Impacts—Airport

Post-construction period activities at the Airport would have a less than significant adverse impact to human health and the environment. Annual military training visits would allow for inspections and maintenance of temporary hazardous materials and waste storage facilities at least annually. This would reduce hazardous materials release incidents. Because of the limited number of training exercises, the cumulative impact to the Airport area from aircraft, vessels, or human presence would be negligible.

#### 3.13.2.3.5 Post-Construction Impacts—Seaport

Post-construction period activities at the Seaport would have a less than significant adverse impact to human health and the environment. Annual military training visits would allow for inspections and maintenance of temporary hazardous materials and waste storage facilities at least annually. This would reduce hazardous materials release incidents. Because of the limited number of training exercises, the cumulative impact to the Seaport area from aircraft, vessels, or human presence would be negligible.

### 3.13.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (In-Channel Dredge Disposal) Improvements Potential Impacts

The Alternative 2 is similar to the Preferred Alternative, except for a shifted footprint for planned aircraft parking apron. Also, dredged spoils would be disposed of in the deeper areas of the Colonia Harbor Channel instead of on land for reuse.

Additional details of the Airport and Seaport Alternative 2 are provided in Chapter 2.

#### 3.13.2.4.1 Avoidance, Minimization Measures and Best Management Practices

The guidance documents presented in Section 3.13.2.3.1 would also apply to the Action Alternative 2. Avoidance practices, minimization measures, and BMPs for the Alternative 2 are not expected to differ from the Preferred Alternative.

#### 3.13.2.4.2 Construction Impacts

Soils excavated from cut areas surrounding the Airport and dredge spoils assumed to be impacted with contaminants above TPESLs would be segregated for screening and appropriate disposal. Because Alternative 2 would only include areas that have been previously assessed, construction impacts for the Alternative 2 are not expected to differ from the Preferred Alternative.

#### 3.13.2.4.3 Post-Construction Impacts

The post-construction period impacts for Alternative 2 are not expected to differ from the Preferred Alternative.

### 3.14 Socioeconomics

The economic and social context for this socioeconomic analysis reflects the unique characteristics of Yap as a small island community with strong cultural traditions and limited land and infrastructure resources. Economic activity includes a mix of government employment, small business, tourism, and subsistence practices. Yap's status within the Compact of Free Association (CoFA) also plays an important role in fiscal and economic conditions through federal assistance and development programs. In addition, a small but important tourism sector contributes to economic activity. Subsistence fishing, farming, and gathering remain an important component of daily life and household food security. Because of Yap's remote location and limited transportation connections, the local economy depends in part on imported food, fuel and consumer goods delivered by air and sea.

Due to these characteristics, particularly the relatively small population, limited housing, and the importance of subsistence and customary land systems, changes in in population, economic activity, or land use associated with major construction projects can have proportionally greater local effects than similar projects in larger communities. The following sections evaluate potential socioeconomic impacts of the Proposed Action on seven areas: 1) population and demographics, 2) subsistence practices, 3) events, festival and cultural ceremonies, 4) cultural practices and customs, 5) housing, 6) employment and economic activity, and 7) schools.

**Oral History Interviews**

In addition to demographic and economic data from government reports, census data and academic studies, targeted key informant interviews were conducted to document community perspectives on project-related issues that may not be fully captured in published statistics.

Ten cultural consultants from the municipalities of Rull, Dalipebinaw, and Weloy were interviewed in October 2025. The interviews were conducted in person and focused on several socioeconomic and cultural themes including graves and mortuary areas; historic and archaeological sites; traditional practices; religious sites and practices; food and subsistence resources, cultural protocols and stewardship. The information obtained from these interviews was used to supplement available quantitative data and provide additional context for

evaluating potential socioeconomic impacts of the Proposed Action. The oral history report (Pacheco and Napolitano, 2026) is included as Appendix N.

## 3.14.1 Affected Environment

### 3.14.1.1 Population and Demographics

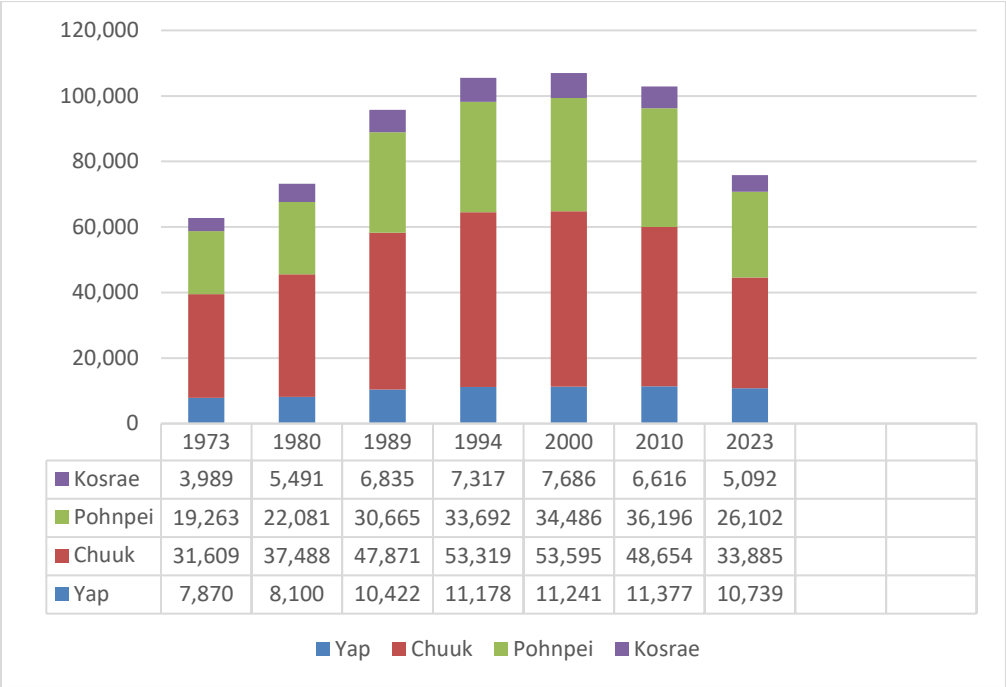
Socioeconomic data presented in this section are derived primarily from the 2010 Population and Census Data conducted by the FSM government through its Division of Statistics. National censuses are conducted periodically to support planning and administrative purposes, including in 1994, 2000, 2010 and 2023. Limited data for 2023 is available from the FSM Division of Statistics and is cited in this section. For other indicators, the analysis relies on the Summary Analysis of Key Indicators from the FSM 2010 Census (FSM Division of Statistics, 2024), supplemented by available projections and regional datasets. Limited 2020 population data are available through the Pacific Data Hub, and additional demographic summaries are available from agencies such as the U.S. Department of Health and Human Services Health Resources and Services Administration.

Based on the most recent data from the Division of Statistics, the 2023 population of FSM is 75,817 persons and 10,739 for Yap, representing about 14 percent of the national total. Among FSM states, the largest population is in Chuuk (33,885) followed by Pohnpei (26,102), Yap and Kosrae (5,092).

Population growth in FSM has generally stabilized since the late 1980s following a period of rapid growth between 1973 and the late 1980s when fertility rates were among the highest in the Pacific Region (FSM Division of Statistics, 2010). Since that time, fertility rates have declined and overall population growth has slowed.

The bar charts and data in Table 3-41 below provides a summary of population changes in FSM between 1973 and 2023.

**Table 3-41 FSM Population from 1973 to 2023**




| | 1973 | 1980 | 1989 | 1994 | 2000 | 2010 | 2023 | | |
|---|---|---|---|---|---|---|---|---|---|
| Kosrae | 3,989 | 5,491 | 6,835 | 7,317 | 7,686 | 6,616 | 5,092 | | |
| Pohnpei | 19,263 | 22,081 | 30,665 | 33,692 | 34,486 | 36,196 | 26,102 | | |
| Chuuk | 31,609 | 37,488 | 47,871 | 53,319 | 53,595 | 48,654 | 33,885 | | |
| Yap | 7,870 | 8,100 | 10,422 | 11,178 | 11,241 | 11,377 | 10,739 | | |

Demographic indicators also reflect gradual changes in household structure and age distribution during this period. From a relatively young median age in the 1970s, FSM median age increased to approximately 22 years in 2010, and increased further to 25.4 years in 2023. In Yap State, the median age increased from 26.3 years in 2010 to 29.5 years in 2023.

Household composition has also changed over time. Although total FSM population declined between 2000 and 2010, the number of households increased from 15,723 to 16,767. During this period, average household size in FSM declined from approximately seven persons per household in 2000 to six persons in 2010. In Yap, average household size in 2010 was 4.9 and the average family size was 5.6 persons. These trends are consistent with declining fertility rates and a gradual shift toward smaller family sizes across FSM.

Educational attainment and literacy rates are relatively high. According to the 2010 census, approximately 40.9 percent of individuals aged 25 years and older nationwide had attained high school level education, while 11.8 percent had attained college or higher-level education. In Yap State, 58.9 percent of residents were high school graduates, with a higher percentage (66.3 percent) reported for Yap proper.

The estimated national literacy rate in 2010 was 90 percent for individuals aged five years and older. In Yap State, literacy rates were similar, with many residents literate in both English and local languages. Approximately 67 percent of residents reported literacy in both English and at least one additional language, most commonly Yapese or a Yapese outer island language.

### 3.14.1.2 Subsistence Practices

Subsistence food production remains an important component of daily life in Yap. Many households participate in some form of subsistence agriculture or fishing that supplements purchased foods and supports traditional cultural practices.

Yapese villages traditionally include constructed taro patches where swamp taro (*Cyrtosperma chamissonis*) is cultivated as a staple crop. These taro patches are typically excavated pits designed to retain water and are often bordered by stone paths and retaining walls that regulate irrigation. Taro patches are generally owned and maintained by individual families within each village. In addition to taro cultivation, many households maintain garden plots in nearby upland areas where crops such as yams, bananas, breadfruit, and other fruits are grown (Lingenfelter and Skoggard, 2006).

Fishing is also an important subsistence activity, particularly because most villages are located near the coast. Reef fish harvested using nets, spears, and fish traps provide an important source of protein for many households. Cultural consultants interviewed as part of the oral history study indicated that traditional practices such as fish trapping and the harvesting of marine resources including sea cucumbers and rabbitfish continue to occur, although several interviewees expressed concern that some marine resources have declined in recent decades (Pacheco and Napolitano 2026).

Subsistence production also reflects traditional gender roles. Women typically maintain taro patches and manage garden plots, while men commonly engage in fishing and other marine harvesting activities. In households where men participate in wage labor, purchased foods such as canned fish and meats may supplement subsistence production (Lingenfelter and Skoggard, 2006).

#### 3.14.1.3 Events, Festivals, and Cultural Ceremonies

Yap Day, held annually around March 1, is the premier multi-cultural festival in Micronesia. This two-day to week-long celebration includes cultural celebrations and demonstrations, showcasing traditional skills. Events during Yap Day include traditional canoe racing and a stone money ceremony, honoring this traditional ancient currency. Fishing tournaments are also held periodically.

Prior to the introduction of western Christianity, Yapese conducted traditional religious ceremonies; today, the only persisting form of traditional ceremonies are the sitting dances, which provide a public drama of storytelling and recounting of myth (Lingenfelter and Skoggard, 2006). The predominant religion in Yap today is Roman Catholic Christianity, with Catholic churches present in every major district on the islands. Events on the religious calendar center around Christmas, Easter, and strict observance of Sunday as a day of rest and worship.

#### 3.14.1.4 Cultural Practices and Customs

Cultural traditions and social organization remain central to community life in Yap. Many aspects of land use, resource management, and community decision-making are guided by customary practices and traditional leadership structures.

Land outside the existing Airport and Seaport boundaries is generally privately owned and used for traditional purposes, including subsistence agriculture, fishing, and community activities. Access to land and resources is often organized through the *tabinaw* system, a traditional social structure that links extended families to specific lands and responsibilities within a village.

Traditional leadership plays an important role in community governance. Village and municipal chiefs are responsible for communicating information, facilitating discussions within the community, and representing village interests in matters affecting land and resources.

Interviews conducted for the oral history study emphasized the importance of respecting these cultural protocols when discussing project activities or potential impacts.

Burial areas and cemeteries are also culturally important features within the landscape. Several cemeteries and graves located near the Airport expansion area continue to be visited and maintained by local families. Protection and respectful treatment of burial areas are considered particularly important within Yapese cultural traditions (Lingenfelter and Skoggard 2006).

### 3.14.1.5 Housing

Residential development on Yap is concentrated in villages distributed throughout the island, with the largest population center located in and around the town of Colonia. Housing generally consists of single-family dwellings occupied by extended family members.

Rental housing is limited. Most housing is owner-occupied or occupied by extended family members rather than rented on the open market. Visitor accommodation is also limited. Based on available information, Yap has approximately 100 hotel or guesthouse units which accommodate tourists, visiting government officials, and other short-term visitors.

#### 3.14.1.5.1 Housing Characteristics

**Housing Construction**

Traditional Yapese housing has historically consisted of structures constructed with locally available materials. Today, most homes are constructed using a combination of modern and traditional materials. Typical houses are built with plywood or bamboo walls and corrugated metal roofing, often with wood plank or cement floors. Some houses are constructed of concrete block or poured concrete to reduce vulnerability to termite damage and weather exposure. In coastal and sandy areas, houses are often elevated on posts above ground level to improve ventilation and reduce flood risk (Lingenfelter and Skoggard 2006).

The 2010 census data indicated that of all occupied units, 89 percent were single-family detached units and most are constructed of metal/tin (42.5 percent) or concrete (32.7 percent), with roofs made of metal or tin (76.5 percent). The median number of rooms is three and the median household size at the time was approximately five persons, reflecting the prevalence of extended family households.

**Water and Sanitation**

According to the 2010 census data, nearly half (46 percent) of the Yap occupied units have their main source of drinking water from a household tank. Other sources include community water systems (29.6 percent) and public utility connections (2.5 percent).

Sanitation infrastructure also varies. Flush toilets are found in 42.8 percent of homes; 39.3 percent rely on outhouses; and the remainder have no formal toilet facilities.

In terms of wastewater disposal, nearly half of the occupied housing units in 2010 had no sewage disposal system (48.8 percent), while 31.7 percent are connected to septic tank and 11.2 percent are connected to a sewer line.

**Housing and Land Tenure**

Homeownership is common in Yap. According to the 2023 FSM Census of Population and Housing summary tables, Yap State had 2,362 total housing units, of which 90.5 percent were

owned (either with a mortgage/loan or owned free and clear), and the remainder either rented or occupied by other arrangement. Land ownership patterns reflect customary land tenure systems in which land is typically controlled by Yapese families or lineage groups. Land ownership in Yap is generally restricted to Yapese citizens.

### 3.14.1.6 Employment and Economic Activity

#### 3.14.1.6.1 Overview

The FSM utilizes the U.S. dollar as its national currency. The economy of the FSM, and the economy of Yap, is heavily supported by subsidies and financial assistance from the United States government through the Compact of Free Association (CoFA). CoFA agreements govern the relationship between the U.S. and the sovereign Pacific nations of FSM, the Republic of the Marshall Islands (RMI), and the Republic of Palau. The Compacts provide these nations with self-governance while the U.S. provides for their national defense and grants citizens of these countries the ability to live and work in the U.S.

The CoFA has a major effect on the national economy by providing substantial direct U.S. financial assistance (grants and trust funds). The economic provisions of CoFA were renewed in March 2024 for another 20 years, providing the FSM with $3.3 billion during this period, or approximately $165 million annually in grant assistance. The FSM national government allocates its CoFA funds to its four states (Yap, Chuuk, Pohnpei, and Kosrae) under the oversight of the Joint Economic Management and Financial Accountability Committee. The Committee is composed of U.S. and FSM representatives. The U.S. funding for the subject Airport and Seaport improvements is separate and independent from the CoFA allocation.

#### 3.14.1.6.2 Employment and Labor Force

Employment in FSM is dominated by the public sector, with public employees comprising over 50 percent of all formal employment. The private sector, mainly retail and hospitality, relies heavily on imported labor (FSM, nd).

According to the 2010 FSM census, the working age population, defined as people aged 15 years and older, accounted for 66,146 people representing an increase of 2,310 people (3.6 percent) since the last census in 2000.

The national FSM labor force in 2010 comprised of 37,919 people (22,076 males, 15,843 females) had a national labor force participation rate of 57.3 percent (66.1 percent for males and 48.4 percent for females). Of this group, 83 percent (31,789 people) considered themselves employed, while 16.2 percent (6,130) reported to be unemployed. Over time, while the size of the labor force has remained relatively stable, there has been a moderate increase in number of people who are employed. One of the main contributing factors to this improvement at the national level is increased employment in the informal sector (subsistence).

Those in the employed category consisted of 15,131 people working for salaries and wages plus 16,658 people engaged in subsistence activities in the 7 days before the 2010 census. Unemployed people consisted of people who actively searched for paid employment in the 7 days before the census.

For Yap, labor force participation was above the FSM average at 67 percent (69.1 percent for males and 65.7 percent for females). Of this group, 94 percent (4,871) considered themselves employed and 6.0 percent (310) unemployed. Of the individuals who reported they were employed, about half were involved in formal work (2,465) and the other half worked in home production (2,406). Home production included both subsistence and market-oriented production.

#### 3.14.1.6.3 Economic Activity

The economy of Yap reflects a mixed system that combines formal wage employment with traditional subsistence activities. Many households rely on a combination of government or private-sector wages together with fishing, farming, and food sharing networks to meet daily needs. Subsistence and exchange systems provide an important supplement to household income and help maintain food security in a community where imported goods are relatively expensive due to transportation costs and geographic isolation.

The major economic industries in Yap are tourism (especially scuba diving and cultural tourism) and subsistence agriculture and fishing. Tourism is a key driver of economic growth, and Yap is a popular destination for snorkelers, kayakers, and scuba divers attracted by its marine life. Yap has professional sportfishing charter operations that are locally owned and offer full-service charters on a regular basis. Cultural tourism also adds to the economy, drawing visitors interested in experiencing local customs and history, including Yap's famous stone money (Rai stones).

The subsistence economy centers on traditional practices like taro cultivation and fishing. Men and women have distinct, complementary roles in the local economy, with men engaged in fishing, particularly for reef fish and women tending the taro patches and gardens.

Yap economic indicators for Fiscal Year (FY) 2022 show real gross domestic product (GDP) at $38.7 million, or $3,307 per capita. FY 2022 employment shows 2,152 people employed by institutions (i.e., government) with an average annual real wage of $4,804. This compares to FSM-wide statistics of $2,694 per capita GDP, and average annual real wage of $5,594.

### 3.14.1.7 Schools

Schools on Yap are part of the broader FSM education system, and include public and private schools for elementary, secondary, and post-secondary levels. The Yap State Department of Education establishes policies, academic standards, school calendars and budgets for public schools.

Public elementary schools are located throughout the main island. Secondary education is provided at Yap High School in Colonia. Private education options include the K-12 Seventh-day Adventist (SDA) School and other faith-based schools.

Post-secondary education is available through the College of Micronesia-FSM which operates a campus on Yap with an enrollment of about 200 students and offering certificate and non-credit programs. The FSM Fisheries and Maritime Institute is also located in Yap. This institution is part of the College of Micronesia system and provides specialized training related to fisheries and maritime industries.

The 2010 FSM census shows that at the national level, 40.9 percent of people 25 years of age and older had attained high school level education, while 11.8 percent had attained college or

higher-level education. For the State of Yap, the percentage of high school graduates (58.9 percent) was higher than the national average, and even higher for Yap proper (66.3 percent).

At the national level, the FSM census data for 1994 to 2010 showed improvements in education: a declining trend of "no schooling" (from 22.8 percent in 1994 to 8.1 percent in 2010); and progress in completion of elementary education (from 59.7 percent in 1994 to 72.6 percent in 2010). However, the data showed limited progress in high school completion (from 36.1 percent in 1994 to 36.2 percent in 2010); and modest increases in college-level attainment during this period (AA degree: from 10.7 percent in 2000 to 11.8 percent in 2010). The 2010 census analysis suggested that this pattern may partially reflect migration of individuals with higher education levels to locations outside the FSM (FSM Division of Statistics, 2010).

## 3.14.2 Environmental Consequences

The analysis of socioeconomic impacts evaluates how the Proposed Action may affect a number of factors: population characteristics, economic conditions, housing, public services and social and cultural activities. The analysis also considers effects on subsistence activities, traditional cultural practices, and other traditional customs that contribute to community well-being and social cohesion.

### 3.14.2.1 Analysis Method

The socioeconomic analysis examines whether the Proposed Action could affect economic, social or cultural conditions on Yap. Potential effects could occur during the construction period as a result of construction activities, dredging, and the temporary presence of up to 275 construction workers. Effects could also occur following construction due to residual construction-related changes or periodic DoW training activities at the Airport and Seaport.

Project effects are evaluated by comparing baseline conditions described above to conditions that could occur under the Proposed Action.

The analysis focuses on potential effects on the following:

- Population and demographics, including temporary changes associated with construction workers and training activities
- Economic activity, including potential effects on tourism, visitor activity, hotels, restaurants and bars, fishing, farming, and local businesses
- Employment and income, including temporary construction employment and indirect economic effects
- Housing availability and affordability, particularly potential effects of the temporary construction workforce on rental housing and occupancy levels
- Schools, including potential changes in enrollment and effects on student well-being
- Subsistence activities including fishing, farming, gathering, and other traditional uses of land and marine resources
- Cultural practices and community life, including traditional roles, social cohesion, and customary practices

As noted previously, the socioeconomic analysis relies on both quantitative and qualitative information. Available government statistics, reports, and planning documents are

supplemented by the key informant interviews and oral histories conducted with Yap community members and stakeholders as part of the EIS process. These sources provide information on local economic conditions, cultural practices, and community perspectives that may not be fully captured in published data.

Where data is limited, the analysis combines available information with reasonable assumptions about construction activities, workforce presence, and project operations to assess the potential for project related change. The analysis considers whether potential changes would be beneficial, neutral, or adverse; their duration; and the population that could be affected.

Impact significance is evaluated by considering its intensity, duration, geographic extent, and reversibility of potential effects, as well as whether the Proposed Action could measurably alter baseline socioeconomic conditions or community well-being. Because Yap has a relatively small population and limited housing, even temporary increases in population or economic activity could have proportionately greater local effects than would occur in larger communities.

#### 3.14.2.2 No Action Alternative

Under the No Action Alternative, no Airport or Seaport improvements would occur and there would be no construction jobs or construction employees moving to the island. The population would remain stable with no change in housing demand, employment, or economic activity. Although this alternative avoids the temporary social disruption associated with a large number of construction employees, in the long-term, there would be none of the project's beneficial impacts. Forgone benefits include a safer airfield with capacity for larger aircraft, a safer Seaport and entrance channel with enhanced ATONs, and available dredged material for beneficial reuse.

#### 3.14.2.3 Alternative 1 (Preferred Alternative) Improvements Potential Impacts

##### 3.14.2.3.1 Avoidance, Minimization Measures and Best Management Practices

**Construction**

To avoid impacting the local housing stock and public infrastructure, the project will construct work camps ("worker camps") to provide temporary housing for construction employees coming from outside Yap. The fully mobilized camps are expected to be in operation for approximately 7.25 years at the Airport (6.5 years construction period plus mobilization/demobilization) and for 3 years at the Seaport, with a reduced number of lodging units needed to support the initial mobilization and final demobilization periods. Separate construction camps for the Airport and Seaport workforce are planned and will be able to accommodate the full workforce, estimated to average about 100 personnel at any one time. The construction contractor would be responsible for providing food, water, utility and limited health care services to camp residents for the duration of each project.

Until the worker camps are constructed, temporary lodging may be needed for about 15 to 20 construction workers (including project manager, superintendent) for approximately two months. The construction contractor would coordinate with local hotels to arrange for temporary accommodation, avoiding peak visitor periods. If hotels are unable to accommodate these individuals, other temporary housing will be provided by the contractor. The build out of

the worker camps is expected to be phased starting prior to the start of Airport and Seaport construction in early 2027 and coincide with the phase up of construction personnel.

**Post-Construction**

In the post-construction period, DoW training exercises will be scheduled to avoid major community events (e.g., Yap Day, Manta Fest) to the extent possible. During airport training exercises, transient, modular lodging (expeditionary camps) would be set up with all food, water and supplies provided for training participants at the airport. It is possible that up to 40 management personnel may choose to stay at local hotels. If commercial accommodations are not available at the time, alternative lodging will be arranged, including transportation to and from the training sites.

Public access to the Seaport for fishing, boating, and commercial activities would be maintained throughout the construction period. During improvements to the Airport-to-Seaport connector road, access will be maintained through temporary lane closures and detours. During road work close to schools, safety and traffic control personnel would be posted to safely direct vehicles and pedestrians during morning drop off and afternoon pick up hours. Contractors will coordinate with school personnel to minimize traffic inconvenience and maximize student safety. Contractor transport of heavy machinery and materials will be required to avoid peak school traffic periods to the extent possible.

#### 3.14.2.3.2 Construction Impacts

Overall, construction of the Proposed Action would result in a less than significant adverse impact on socioeconomic conditions. This was determined through evaluating the individual resource areas discussed below.

Construction of the Proposed Action would temporarily increase population on Yap due to the presence of a peak construction workforce and associated project activities. During this period, there could be temporary disruptions to some socioeconomic conditions, including increased traffic near schools, construction noise affecting nearby communities and educational facilities, and potential short-term effects on subsistence practices, cultural resources, and community access to certain areas during construction. Concerns related to these issues were also raised during the oral history interviews conducted for the project.

At the same time, construction would provide temporary employment opportunities for some Yap residents and may generate limited additional economic activity through project-related spending in the local economy. Because construction workers would be housed in contractor-provided housing, and construction-related disturbances would be temporary and localized, the project would not substantially alter baseline socioeconomic conditions.

##### 3.14.2.3.2.1 Population and Demographics

During construction, the project could temporarily increase the population of Yap due to the presence of construction workers. Construction could involve up to approximately 275 workers during peak construction periods. Based on the estimated 2023 population of 10,739 people, this workforce represents an approximate 2.5 percent temporary increase in resident population.

The construction workforce would fluctuate over time depending on the phase of work. Workforce levels would likely be lower during early project phases (mobilization, site preparation, and demolition) and increase during peak construction activities, including Airport earthwork and Seaport wharf construction. Workforce levels would then decline as construction activities are completed and facilities are inspected and commissioned. This estimate represents the maximum anticipated workforce, not the number present throughout the entire construction period.

Of the estimated 275 workers, approximately 40 workers are expected to be FSM residents, including Yap residents. The remainder will be non-FSM citizens, recruited for specialized construction activities. As a result, the temporary workforce may include individuals of diverse nationalities, languages, and cultural backgrounds. Project planning assumes that non-local workers would be housed in temporary workforce housing and would not be accompanied by family members.

Temporary worker housing and food services would be provided within the designated workforce camps to reduce demand on local housing and services. As a result, interaction between the construction workforce and local residents would likely occur primarily during non-work hours such as weekends or recreational periods when workers may patronize local businesses and services.

Overall, the presence of construction workers would result in a temporary increase in population and demographic diversity on Yap during the construction period. However, because the workforce presence would be temporary and accommodated in the dedicated work camps, the effect on overall population would be short-term and reversible. The project would not be expected to alter long-term demographic trends on Yap.

#### 3.14.2.3.2.2 Subsistence Practices

During the oral history interviews conducted for this EIS, many participants identified subsistence food resources as an important concern associated with the proposed Airport and Seaport improvements. Interviewees noted that construction activities such as grading, dredging, vegetation clearing, and sediment runoff could potentially affect resources used for subsistence production.

Specific concerns raised by interviewees included potential disturbance of taro patches near the airport, sediment runoff affecting downstream mangrove and reef habitats, and potential effects of dredging on fishing areas and fish trap locations. Some participants also expressed concern about possible impacts to nipa palm (*Nypa fruticans*), which is used locally for roof thatching, and to other plant resources used for food or construction materials.

These concerns are informed in part by community observations of environmental effects associated with previous construction projects on Yap. At the same time, several interview participants acknowledged that infrastructure improvements may provide economic and transportation benefits and expressed a willingness to accept some level of environmental change if appropriate protections are implemented.

Potential construction-related effects on subsistence practices could include:

- Localized disturbance of agricultural areas, including taro patches located within or adjacent to the airport expansion area

- Temporary sedimentation or turbidity increases that could affect mangroves, seagrass beds, or reef habitats used by fish and other marine resources
- Temporary access restrictions near construction areas that could limit use of nearby fishing or harvesting areas
- Vegetation removal affecting plant resources such as nipa palm or trees used for building materials

Project design, BMP and other measures described in this and other sections of the EIS—including erosion and sediment control measures, dredging management practices, and resource protection measures—are intended to minimize these effects. With implementation of these measures, impacts on subsistence practices would likely be localized and limited to the construction period. Because subsistence resources are distributed broadly across Yap and construction activities would occur in defined project areas, the project is not expected to substantially affect the overall availability of subsistence resources on the island.

Overall, impacts on subsistence practices during construction are expected to be a less than significant adverse effect.

#### 3.14.2.3.2.3 Events, Festivals, and Cultural Ceremonies

The Proposed Action will have no impact on the occurrence of events, festivals and cultural ceremonies, as construction activities would be limited to operational areas of the Airport and Seaport. However, during the project construction period, some of the construction employees may attend these local festivals, adding to the typical attendance.

Given that Yap is a religious, primarily Roman Catholic community, many of its cultural events and ceremonies center around the church. It is likely that some of the 275 construction employees would choose to participate in regular services and religious events in the local community.

#### 3.14.2.3.2.4 Cultural Practices and Customs

Potential impacts on cultural practices and customs are primarily associated with land acquisition, disturbance of cultural sites, and potential disruption of access to areas used for traditional purposes. As described in Section 3.6 (Cultural Resources), construction activities near the Airport and Seaport could affect cultural sites, including burial areas and traditional land holdings.

Interview participants emphasized that disturbance or relocation of graves is a particularly sensitive issue for the community. If relocation of burial sites is necessary, consultation with affected families and adherence to traditional cultural protocols would be essential (Pacheco and Napolitano 2026).

Construction activities could also temporarily affect the use of nearby land or marine areas traditionally used for fishing, gathering, or other customary activities. These effects would generally be limited to areas directly affected by construction activities or temporary access restrictions.

Several interview participants also discussed broader concerns about potential cultural and social changes associated with the temporary presence of non-local construction workers. These concerns reflect broader community perspectives regarding cultural continuity and

modernization. However, because the construction workforce would be temporary and largely housed in dedicated accommodations, interactions with local communities are expected to be limited.

With implementation of cultural resource protection measures and adherence to traditional consultation protocols, there is expected to be a less than significant adverse impact on cultural practices and customs during construction.

#### 3.14.2.3.2.5 Housing

Temporary construction and dredging contractors recruited from outside Yap would be housed at designated workforce housing (often referred to as "worker camps") established specifically for the project. This workforce housing is intended to avoid placing additional demand on local housing resources. The worker camps would accommodate the non-local construction workforce and would provide housing, meals, and support services for employees.

Local construction workers from Yap would continue to reside in their existing homes. Workers from other FSM states may choose to access the worker camps or find their own accommodations. Because the workforce camps will be sized to meet peak housing demand, the project is not expected to create substantial demand for housing within the local residential market.

A limited number of project management personnel may seek short-term housing in local visitor accommodations or rental housing. However, this number is expected to be small relative to the total construction workforce because the project will provide employer-sponsored housing and transportation options for most employees.

During the early mobilization phase of the project (estimated at approximately two to four months), some project personnel may temporarily stay in local hotels or guesthouses until workforce housing facilities are completed. Given the approximately 100 available hotel units on Yap, this temporary demand could increase hotel occupancy levels for a limited period.

Major events such as Yap Day, World Tuna Day, Manta Fest, and the Micronesia Expo periodically increase visitor demand for accommodations. Project scheduling would seek to minimize overlap with these events where feasible to avoid unnecessary pressure on available hotel capacity.

Because the majority of non-local workers would be housed in dedicated workforce accommodations and temporary hotel demand would be limited in duration and scale, the project is not expected to substantially affect the availability or cost of housing for local residents. Construction-related effects on housing are therefore expected to be minor, temporary, and a less than adverse impact.

#### 3.14.2.3.2.6 Employment and Economic Activity

The peak construction workforce of approximately 275 workers represents about six percent of the currently employed workforce in Yap (4,871 people), based on 2010 census data. It is estimated that the project will employ approximately 40 full-time equivalent Yap/FSM residents. These jobs may include construction trades, equipment operation, inspection, and support services. Although most specialized construction personnel are expected to be hired from outside Yap, the project would provide short-term income opportunities for local workers

and businesses. The approximately 40 positions for Yap and FSM residents represent less than one percent of the currently employed workforce.

In addition, project-related spending on materials, equipment, and services could generate indirect economic activity through purchases from local vendors. Although the magnitude of this spending cannot be quantified with available data, construction personnel may contribute to the local economy through purchases of food, supplies, and recreational services during non-working hours. Because these effects would occur only during the construction period, they would represent temporary beneficial economic effects.

#### 3.14.2.3.2.7 Schools

The primary impact on schools during the construction period will be temporary increases in noise and traffic, discussed in Section 3.7 (Noise) and Section 3.11 (Transportation). Several educational facilities are located near the Airport or along the proposed Airport-to-Seaport roadway that would be reconstructed and used as a construction haul route. These include Yap Catholic High School, immediately southwest of the Airport; Yap High School and College of Micronesia-Yap Campus, located about a half mile east of the Airport; and several elementary schools located closer to Chamorro Bay.

The project noise analysis (Section 3.7) indicates that noise from road construction will be of short duration at any single location. Mitigation will rely on scheduling construction activities around school exam periods and proactive community communication. Airport construction activities may generate higher noise levels for longer periods. Potential effects could include temporary classroom disruption, difficulty hearing instruction, and distraction for students and staff.

Mitigation measures would include coordination with school administrators to avoid particularly disruptive construction during major exam periods where feasible, advance notification of schools regarding construction schedules, and implementation of contractor noise control measures.

Construction traffic would also increase along the Airport-to-Seaport roadway, which would serve as the primary haul route for project materials. Although the roadway would remain open during construction, traffic may be reduced to one lane or rerouted during certain construction activities at the contractor's discretion. Increased truck traffic could affect travel conditions near schools located along the route.

To reduce potential safety risks, mitigation measures would include avoiding heavy truck deliveries during morning student drop-off and afternoon pick-up periods where feasible and providing traffic control personnel near schools during these times.

The project will have negligible effect on school enrollment, as construction employees from outside the FSM would not be accompanied by their families or dependent children.

### 3.14.2.3.3 Post-Construction Impacts

Overall, post-construction impacts on socioeconomic conditions would result in a less than significant beneficial impact. The individual resource areas are discussed below.

Following construction, the primary socioeconomic effects of the Proposed Action would relate to periodic training activities at the Airport and the long-term improvements to transportation

infrastructure. Training exercises would result in temporary aircraft noise affecting nearby schools and other sensitive land uses during limited periods each year. Noise impacts will be mitigated through operational scheduling, flight planning and community engagement BMPs.

Recapitalized Airport and Seaport infrastructure would improve infrastructure resilience and security, support long-term economic activity by enhancing transportation reliability and safety and facilitating travel, trade, and tourism. It would also facilitate DoW's HADR responsibilities under the CoFA which would support a faster return to normalcy than under the no action alternative. The project would also generate limited economic activity during periodic DoW training events through the use of local services such as lodging, food, and transportation. Because these effects would be intermittent and the scale of long-term economic changes cannot be quantified with available data, the project would not substantially alter existing socioeconomic conditions.

#### 3.14.2.3.3.1 Population and Demographics

Following completion of construction, the temporary construction workforce would demobilize and leave the island. As a result, the short-term population increase due to construction activities would cease. If any non-FSM residents wish to remain on island, they would need to apply to the FSM and Yap governments for longer term work permits or visas.

Long-term operation of the improved Airport and Seaport is not expected to require a substantial permanent workforce beyond existing staffing levels. Twice yearly DoW training exercises will bring up visiting personnel to Yap for short durations, and would not result in sustained population changes. No measurable long-term impacts on population or demographics are anticipated.

#### 3.14.2.3.3.2 Subsistence Practices

Some construction-related effects on subsistence resources could persist if permanent land disturbance occurs within the Airport expansion area. For example, taro patches or vegetation located within areas permanently converted to airport infrastructure would not be restored.

Conversely, the project is expected to reduce existing erosion and sediment runoff in the Airport and Seaport project areas through improved drainage and erosion control. These improvements would provide long-term benefits to downstream ecosystems, including mangrove and reef habitats that support subsistence fishing.

Several interview participants noted that subsistence resources on Yap are already experiencing pressures from factors such as environmental change and broader economic transitions. These broader trends are not directly related to the proposed project.

Improved Airport and Seaport infrastructure could also influence subsistence practices indirectly by increasing the availability of imported foods or expanding opportunities for export of locally harvested products. These changes could have mixed effects on local subsistence patterns but would occur gradually and would be influenced by broader economic conditions beyond the project itself.

Overall, in the post-construction period, there is expected to be less than significant adverse impact to subsistence practices.

#### 3.14.2.3.3.3 Events, Festivals, and Cultural Ceremonies

During the post-construction period, twice-yearly DoW training events would be scheduled to avoid conflicts with major community festivals and events to the extent possible. However, noise from periodic DoW aircraft operations would have a significant adverse impact on several public and cultural institutions including schools and churches. This is discussed in Section 3.7, Noise.

#### 3.14.2.3.3.4 Cultural Practices and Customs

Following construction, the project is not expected to directly affect cultural practices or customs. However, periodic DoW training activities at the Airport will generate periodic but substantial aircraft noise that could occur during community activities such as worship services. Noise impacts and proposed mitigation are discussed in Section 3.7.

Improved transportation infrastructure could indirectly influence cultural practices over the long term by facilitating travel, trade, and exchange with other regions. Increased connectivity may increase exposure to outside ideas, goods, and cultural influences. Interview participants expressed mixed views regarding these potential changes, noting both possible benefits (such as increased economic opportunities and education access) and concerns about social change.

These broader social dynamics reflect ongoing regional and global influences rather than impacts attributable solely to the proposed project. As a result, the project is not expected to substantially alter cultural practices or customs on Yap.

#### 3.14.2.3.3.5 Housing

Following construction, the temporary workforce housing facilities would be removed or demobilized and construction workers would depart the island. As a result, the temporary housing demand associated with construction activities would cease.

Periodic DoW training exercises at the Airport and Seaport will bring up to 200 training personnel to Yap. Most participants would be housed at the designated defense training site using modular shelters or temporary accommodations. A limited number of personnel—estimated at up to 40 individuals during training events—may stay in local hotels or guesthouses.

Training activities will occur twice annually for up to two weeks. To the extent practicable, scheduling of these activities would avoid major community events that increase visitor demand for accommodations.

Given the provision of temporary housing at the training site and the limited duration of training, the project is not expected to measurably affect housing availability or rental prices on Yap. In the post-construction period, there will be a less than significant adverse impact on housing.

#### 3.14.2.3.3.6 Employment and Economic Activity

Improvements to the Airport and Seaport may support long-term economic activity by improving air and sea transportation capability, safety, reliability, and efficiency. Enhanced transportation infrastructure may facilitate tourism, commercial shipping, and government operations that rely on air and maritime transportation. Improved Airfield and Seaport facilities will support more robust CoFA related HADR efforts by the United States, accelerating return to normal conditions (e.g., reopening of schools and commercial establishments). However, the extent to which these improvements would result in measurable increases in employment or economic growth cannot be quantified with available data.

Periodic DoW training activities associated with the Proposed Action may generate limited short-term spending in the local economy, particularly in the hospitality and service sectors. Because these training events would occur only twice a year, associated economic effects would be temporary.

The dredged material turned over to the municipalities of Tamil and Rull would be available for their beneficial reuse, and the 2.2 acres of reclaimed land at Nungoch would be available for public recreational use. These may have beneficial impacts on local economic activity.

Fiscal analysis typically focuses on the impact of the project on government revenues and expenditures. Given that the Yap and FSM economies rely heavily on direct U.S. assistance, no substantial long-term fiscal impacts are anticipated. The project would not affect Yap's baseline CoFA allocation going forward.

#### 3.14.2.3.3.7 Schools

The primary post-construction impact on schools would be aircraft noise associated with periodic DoW training exercises at the Airport

As discussed in Section 3.7 (Noise), post-construction aircraft exercises are expected to create the potential for learning disruption at nearby schools due to increases in loud events during school hours. These loud events would only occur during the twice-yearly training exercises, which would be spread out over up to 14 days. BMPs such as coordination by DoW and local officials with the Yap community would reduce the chances of disruption on critical learning days such as exam days. See Section 3.7 for detailed discussion of impacts to schools.

### 3.14.2.4 Alternative 2 - Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal) Improvements Potential Impacts

The socioeconomic impacts from Alternative 2 would be nearly identical to the preferred alternative. There would be no discernable difference during the construction and post-construction periods to population, subsistence or cultural practices, housing, employment and economic activity, or schools. Under Alternative 2, take-off and landing patterns would remain the same and general noise impacts on schools, as well as other noise sensitive land uses, would remain the same. The difference between the alternatives would be undistinguishable by the public. In both alternatives, noise impacts during DoW training would be substantial and require implementation of operational and physical BMPs.

Alternative 2's in-channel dredge disposal would have different work vessel movements within the harbor and channel (obviating the vessel runs between the outer channel dredging sites and the Rull and Tamil dredge material transfer sites). Harbor operators and construction contractors would ensure that temporary impacts to fishing and recreational users would be minimized. Due to the disposal of dredged material in the channel, there would be no opportunities for beneficial reuse.

## 3.15 Summary of Potential Impacts to Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative is presented in Table 3-42.

**Table 3-42 Summary of Potential Impacts to Resource Areas**

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| ***Topography, Geology, and Soils*** | **Less than significant adverse impact**<br>No change to baseline geology, topography or soils. However, no improvements to Airport and Seaport drainage infrastructure will result in continued erosion and sedimentation issues, with negative effects on downstream users, water quality, and coastal and marine biota. | **Construction: Less than significant adverse impact**<br>Work at the Airport would involve substantial earthwork, including excavation, grading, and placement of fill. However, these activities would occur within the defined project footprint. Potential effects such as erosion, sediment transport, and soil instability would be minimized through project design measures and implementation of BMPs, including erosion and sediment control measures, slope stabilization, and stormwater management. Stockpiling of sediment will incorporate stabilization methods.<br>**Post Construction: Less than significant beneficial impact**<br>Project improvements including upgraded drainage systems, detention ponds, and erosion control features, would improve stormwater management and erosion compared to existing conditions. Following placement, dredged material stockpiles will be turned over to the local governments and there will be no lingering adverse effects on topography, soils, or geologic conditions. | **Construction: Less than significant adverse impact**<br>Slightly more earthwork at Airport than Preferred Alternative but use of design measures and BMPs keep effects at less than significant.<br>**Post Construction: Less than significant beneficial impact**<br>Improvements to drainage systems and stormwater management at Airport and Seaport would have beneficial effects.<br>In-channel disposal of dredge material eliminates need for Yap long-term management of stockpiles, but is also a lost opportunity for beneficial reuse |
| ***Water Resources*** | **Less than significant adverse impact**<br>Existing water quality issues would continue at the Seaport and Airport. The lack of stormwater management and treatment at the Seaport and Airport would continue to allow untreated stormwater flow into Chamorro Bay | **Construction: Significant adverse impact**<br>Potential impacts from construction period pollutants entering groundwater or marine waters, excavation associated with airfield improvements resulting in runoff, and dredging sedimentation impacts to the marine environment. BMPs would reduce construction period impacts to less than significant. Minor direct impacts anticipated to fringe mangrove at the Rull and Tamil dredge disposal areas. Significant adverse impact associated with disturbance of approximately 26.2 acres of wetlands at the Airport, however, in accordance with the substantive standards of the Clean Water Act, mitigation would be required to offset those impacts. | **Construction: Significant adverse impact**<br>Similar to the Preferred Alternative except that the alternate apron location would necessitate a greater overall area of ground disturbance at the Airport and the same disturbance to wetlands. Dredging would result in greater impacts to marine water quality at Waneday Channel (due to in-channel disposal), but there would be no impacts at the Rull and Tamil dredge material offloading sites. |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | and areas downstream from the airport. | **Post Construction: Significant beneficial impact**<br>In the long-term, the Airport and Seaport expansions would result in increased impervious surface, but the stormwater systems installed at the improved Airport and Seaport would be designed to manage and treat additional stormwater flows. These stormwater management systems would result in a substantial improvement to surface and marine water quality when compared with baseline conditions. Standard BMPs at the fuel storage facility (i.e., secondary containment, leak detection, and spill response plans) would minimize the potential risk of fuel spills contaminating water resources. | **Post Construction: Significant beneficial impact**<br>Same as the Preferred Alternative. |
| ***Air Quality*** | **Less than significant adverse impacts**<br>Deteriorating paved and unpaved roadways at and near the Airport and Seaport would continue to generate fugitive dust emissions, including particulate matter, from ongoing vehicle traffic and lack of roadway improvements. | **Construction: Less than significant adverse impacts**<br>Potential impacts from fugitive dust and fossil fuel emissions. BMPs and compliance with Yap ambient air quality standards and the substantive standards of the Clean Air Act will ensure impacts are less than significant.<br>**Post Construction: Less than significant adverse impacts**<br>Post-construction air emissions are anticipated to be dominated by aircraft activity, vessel operations at the Seaport during DoW training exercises. BMPs and compliance with Yap ambient air quality standards and the substantive standards of the Clean Air Act will ensure impacts are less than significant. | **Construction: Less than significant adverse impacts**<br>Similar impact to the Preferred Alternative. The relocation of apron at the Airport and the in-channel dredge disposal for the Seaport is not expected to result in significant changes to the air emissions estimates.<br>**Post Construction: Less than significant adverse impacts**<br>Same as the Preferred Alternative. |
| ***Marine Biological Resources*** | **No Impact** | **Construction: Significant adverse impact**<br>Short- and long-term, less than significant adverse construction period impacts on marine vegetation (from increased sedimentation, turbidity, in-water construction, dredging, and land reclamation activities). Short-term, less than significant adverse impacts on fish (from loss/alteration of habitat, elevated noise levels, increased turbidity and sedimentation, potential introduction of pollutants, and marine artificial light pollution) and non-coral benthic invertebrates (from increased turbidity and | **Construction: Significant adverse impact**<br>Similar to Preferred Alternative<br>**Post Construction: Less than significant adverse impact**<br>Similar to Preferred Alternative |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | | sedimentation and shading of corals, potential introduction of pollutants, potential for direct contact, loss/alteration of habitat). Short-term, less than significant adverse impacts to marine mammals (from temporary displacement during in-water construction, pile driving, or dredging due to visible human presence, noise, and turbidity); and sea turtles (from in-water and in-air noise, and lighting). Short- and long-term, significant adverse impacts on coral are expected during construction (from direct harmful contact, increased turbidity and sedimentation, potential introduction of pollutants, elevated noise levels, habitat alternation, and marine artificial light pollution). Short-term, less than significant adverse impacts to special status marine mammals, sea turtles, fish, and benthic invertebrates) are expected from construction dredging, stockpiling, ATON replacement, habitat loss/alteration, and turbidity/sediment deposition. Short- and long-term significant adverse impacts to special status corals directly impacted by in-water work. Implementation of avoidance, minimization, BMPs (e.g., silt curtains, avoiding coral spawning periods, biological monitors, shutdown zones, pile driving soft starts), and mitigation would reduce adverse impacts.<br>**Post Construction: Less than significant adverse impact**<br>Long-term, less than significant adverse post-construction period impacts on marine vegetation, fish, coral, and benthic invertebrates. Long-term, less than significant adverse impacts to special status marine mammals and sea turtles (from noise and lighting); coral (shading from new structures); fish (from additional vessel activity); and benthic invertebrates. Avoidance and minimization measures and BMPs would be implemented and reduce potential adverse impacts. | |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| ***Terrestrial Biological Resources*** | **Less than significant adverse impact.** Airfield stormwater runoff would continue to adversely impact downstream mangrove forest | **Construction: Less than significant adverse impact** Short- and long-term, less than significant adverse impacts are expected on vegetation and wildlife, including special status species (from temporary disturbance of vegetation and soil compaction during construction, permanent vegetation removal for new facilities and infrastructure, potential erosion due to increased stormwater runoff, potential fuel/contaminant spills, construction noise, dust, artificial lighting, human activity, habitat loss, potential for increased invasive species introduction).<br>**Post Construction: Significant adverse impact** Less than significant adverse impact on vegetation and wildlife (from potential environmental contaminants and invasive species introduced during training and maintenance activities, training related noise). Long- and short-term significant adverse impacts on Yap flying fox, a special status species (from training related noise at the Airport).<br>Avoidance, minimization measures, BMPs, and conservation measures developed as part of DoW's ESA consultation with Yap State would be implemented and reduce potential adverse impacts. | **Construction: Less than significant adverse impact** Similar to Preferred Alternative<br>**Post Construction: Significant adverse impact** Similar to Preferred Alternative |
| ***Cultural Resources*** | **No Impact** | **Construction: Significant adverse impact** Construction of the Preferred Alternative would result in a significant adverse impact at the Airport (34 eligible historic properties, most of which are grave sites), Seaport (potential intact subsurface deposits), Chamorro Bay laydown area (retaining wall), and in Waneday Channel (shipwreck). Construction of the Airport would adversely impact traditional uses or customary land ownership areas due to land acquisition by Yap State on behalf of the US government. Dredge storage/placement in Rull and Tamil coastal areas has the potential to disrupt access to those | **Construction: Significant adverse impact** Same as Preferred Alternative<br>**Post Construction: Pending Consultation under the Cultural Resources SOP** Same as Preferred Alternative |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | | areas and may disrupt people's ability to fish or collect food.<br>**Post Construction: Pending Consultation under the Cultural Resources SOP**<br>If historic properties at the Airport are not removed during construction (i.e., preserved in place) they may be subject to post-construction impacts. Therefore, the determination of effect for archaeological resources is pending forthcoming consultation under the Cultural Resources SOP. | |
| ***Noise*** | **No Impact** | **Construction: Less than significant adverse impact**<br>Based on conservative noise modeling assumptions, operation of construction equipment and vehicles during Airport construction would result in less than significant adverse impacts to sensitive receptors (e.g., schools, private residences, community center, worship spaces, government buildings), but would not pose a risk to hearing. Standard construction BMPs are likely to achieve acceptable sound levels at sensitive receptors, but mitigation may be needed at some receptors may be needed to reduce noise levels to the target interior levels. Road construction noise near any individual sensitive receptor would be short-lived as the activities move along the roadway, resulting in less than significant impacts. Pile driving at the wharf is expected to occur over approximately 111 days (average of 2.4 piles/day). Each pile would receive about 35 minutes of vibratory and impact hammering (total). Four government facilities that are in close proximity may experience less significant adverse impacts during pile driving (e.g., communication disruption), but BMPs such as soft starts and pile cushioning material are planned that would minimize adverse pile driving noise impacts. DoW is assessing BMPs and mitigation measures to address adverse construction noise impacts. | **Construction: Less than significant adverse impact**<br>Similar to the Preferred Alternative except for some Airport construction noise sources being farther from some sensitive receptors<br>**Post-Construction: Significant adverse impact**<br>Same as the Preferred Alternative |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | | **Post-Construction: Significant adverse impact**<br>The Preferred Alternative would result in significant adverse impacts to several sensitive receptors in the form of sleep, learning, and worship disturbances but would not pose a risk to hearing. BMPs and potentially site specific mitigation would be needed to reduce disruptions due to the Preferred Alternative. Several residences and schools would likely require additional mitigations to ensure they remain land use compatible under the Preferred Alternative. Post-construction activities at the Airport-to-Seaport connector road and the Seaport are expected to result in less than significant adverse noise impacts due to the relatively low frequency and intensity of additional activities at those locations. DoW is assessing potential BMPs and mitigation measures to avoid or minimize significant adverse impacts associated with its training activities. | |
| *Land Use* | **No Impact** | **Construction: Significant adverse impact**<br>Construction activities would occur mostly on private lands with the potential to adversely impact private owners. There may also be adverse impacts on adjacent land uses (e.g., noise, dust, traffic, etc.), but these effects would be minimized through the use of avoidance, minimization measures, and BMPs. The Airport expansion would entail acquisition of approximately 63.6 acres of private land by the FSM/Yap State Government and funded by the U.S. DoW. Additionally, the navigational dredging would remove 6.8 acres of community-owned reefs (an additional 2.4 acres would be removed at the Tamil and Rull dredge landing sites to support beneficial reuse of the coral material by those communities). The U.S. DoW has coordinated the dredging process with the respective owners to ensure beneficial reuse of the dredge material to support the respective communities. | **Construction: Significant adverse impact**<br>Similar to the Preferred Alternative except that the permanent land acquisition for the airport boundary expansion would be shifted to accommodate for the alternate apron location. Lands in this area are also vacant and similar impacts are anticipated. Additionally, Alternative 2 would not include beneficial reuse of dredge material for the Rull and Tamil communities.<br>**Post Construction: Less than significant adverse impact**<br>Same as the Preferred Alternative |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | | **Post Construction: Less than significant adverse impact**<br>The expansion of the Airport and its proposed use for U.S. DoW training purposes would introduce additional noise exposure to nearby land uses. U.S. DoW training would be closely coordinated with Airport and Seaport operators and BMPs would be implemented to avoid and minimize potential disruptions for nearby land uses. | |
| ***Airspace*** | **No Impact** | **Construction: No impact**<br>Temporary changes in commercial and cargo flights at the Airport would not affect its navigable airspace.<br>**Post Construction: Less than significant adverse impact**<br>Preferred Alternative would increase airspace usage at the Airport during the up to 28 annual training days, resulting in a less than significant adverse impact to airspace. | **Construction: No impact**<br>Same as Preferred Alternative<br>**Post Construction: Less than significant adverse impact**<br>Same as Preferred Alternative |
| ***Infrastructure and Utilities*** | **Less than significant adverse impact**<br>Airport airfield nonconformities would not be corrected, and current FAA standards would not be met; Seaport deferred maintenance would not be corrected and navigational hazards would remain. DoW would have greater challenges to meet its CoFA defense obligations. | **Construction: Less than significant adverse impact**<br>Construction period impacts would be temporary, comply with established SOPs/BMPs, and would be closely coordinated with Yap State utility system and port managers. Construction contractor would have backup plans in the event Yap infrastructure and utility services are not available, and utility providers would be compensated for their services.<br>**Post Construction: Significant beneficial impact**<br>The aging Airport and Seaport facilities and the interconnecting Airport-Seaport Road would be recapitalized to meet contemporary standards and DoW would have improved facilities to meet its CoFA defense obligations. Civilian operations would resume to normal pre-construction service levels. New storm water management systems would significantly improve existing stormwater quality. | **Construction: Less than significant adverse impact**<br>Same as Preferred Alternative<br>**Post Construction: Significant beneficial impact**<br>Same as Preferred Alternative |
| ***Transportation*** | **Less than significant adverse impact** | **Construction: Less than significant adverse impact**<br>During the construction period, improvements to the airport and seaport would be phased to avoid and minimize | **Construction: Less than significant adverse impact** |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | Major transportation infrastructure including roadways, the Airport, and the Seaport, would not be repaired and/or upgraded by the U.S. DoW. These significant transportation investments would require alternate funding sources which could result in significant or indefinite postponement of these important projects for Yap State. | potential impacts to normal operations for air and ocean transportation. Based on traffic counts conducted in November 2025 and estimated construction-related trips, roadways are expected to continue to operate within capacity with the implementation of avoidance and minimization measures (e.g., avoid peak-hour construction hauling, develop a traffic control plan, etc.).<br>**Post Construction: Significant beneficial impact**<br>The proposed U.S. DoW training exercises (up to 4 weeks per year) would be coordinated well in advance with the Yap State Government to minimize potential impacts to air, ocean, and land transportation during the exercises. The proposed improvements to the Airport, Seaport, and roadways would significantly improve transportation infrastructure, safety, and service in Yap State. | Similar to the Preferred Alternative except that the alternate apron location would result in more hauling traffic and a longer construction period at the airport, and there would be no traffic related impacts associated with the Rull and Tamil Dredge disposal sites.<br>**Post Construction: Significant beneficial impact**<br>Same as the Preferred Alternative. |
| ***Public Health and Safety*** | **Less than significant adverse impact**<br>The Airport runway would co remain in violation of RSA obstruction and FAA safety standards, particularly for larger aircraft. At the Seaport there would be no improvements to navigational aids, and vessels would continue to operate without range markers in the entrance channel. The narrow channel conditions and shallow areas would still present | **Construction: Less than significant adverse impact**<br>During construction and dredging activity, Airport and Seaport safety will be maintained through clear and visible signage and other access controls to delineate work areas. Construction contractor will provide its own security and medical personnel to provide care to construction employees to minimize impacts to local services. Local Yapese workers would have access to these resources.<br>**Post Construction: Less than significant beneficial impact**<br>Airport and Seaport improvements will enhance aviation and marine operational safety. The proposed sidewalks to be installed around Chamorro Bay would improve safety and public health. Increased ship activity associated with periodic training can be effectively managed through port scheduling. Impacts of training aircraft noise will be reduced through BMPs. Improvements to Airport and Seaport transportation infrastructure enhances emergency response capability and new training partnerships with U.S. | **Construction: Less than significant adverse impact**<br>Same as Preferred Alternative<br>**Post Construction: Less than significant beneficial impact**<br>Same as Preferred Alternative |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | a safety challenge for larger vessels. | creates opportunities to support future public health initiatives. | |
| ***Hazardous Materials and Wastes*** | **Significant Adverse impact**<br>Existing documented hazardous materials and wastes would not be addressed by the DoW. Documented sources of hazardous materials and wastes would continue to degrade, increasing the likelihood of eventual demolition without appropriate abatement and special waste disposal practices. These steadily declining conditions would result in increasing potential for risks to human health and the environment over time. | **Construction: Less than significant beneficial impact**<br>Hazardous materials stored and used onsite during construction would comply with all applicable standards and BMPs. All hazardous waste encountered during demolition and construction would be placed in appropriate temporary storage and shipped off island for disposal. Potential sources of contamination encountered in the construction footprint would be addressed during construction which would decrease the risk of exposure to current and future users.<br>**Post Construction: Less than significant adverse impact**<br>Annual military training visits would allow for inspections and maintenance of hazardous materials and waste storage, management, and disposal facilities at least annually. This would minimize the potential for hazardous materials release incidents. Because of the limited number of training exercises, the cumulative impact to the Seaport area from aircraft, vessels, or human presence would be negligible. | **Construction: Less than significant beneficial impact**<br>Same as Preferred Alternative<br>**Post Construction: Less than significant adverse impact**<br>Same as the Preferred Alternative |
| ***Socioeconomics*** | **No Impact** | **Construction: Less than significant adverse impact**<br>Temporary population increase due to presence of construction workforce may cause temporary disruption to some socioeconomic conditions, increased traffic, construction noise, and short-term effects on subsistence practices. Construction would provide temporary employment opportunities and may generate limited additional economic activity in local economy. Because workers will have contractor-provided housing, and disturbances are temporary and localized, project would not substantially alter baseline socioeconomic conditions | **Construction: Less than significant adverse impact**<br>Same as Preferred Alternative<br>**Post Construction: Less than significant beneficial impact**<br>Same as Preferred Alternative |

| *Resource Area* | *No Action Alternative* | *Alternative 1 (Preferred Alternative)* | *Alternative 2 – Airport (Alternate Apron Location) and Seaport (Upland and In-Channel Dredge Disposal)* |
|---|---|---|---|
| | | **Post Construction: Less than significant beneficial impact** Socioeconomic effects relate to periodic training and long-term improvements to Airport and Seaport infrastructure. Aircraft noise during training to be addressed through various BMPs. Training periods may generate limited economic activity through use of local services. Transportation infrastructure improvements may support long-term economic activity and various government initiatives. | |

Note: Table 3-1 summarizes range of impact determinations used in the EIS

# 4 Other Considerations Required by NEPA

## 4.1 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment. Raw construction materials (e.g., cement, asphalt, aggregate, steel, water, and fossil fuel) and labor would be expended during demolition and construction activities and fossil fuels would be expended during post-construction training. Natural and cultural resources would be impacted during the construction of the Proposed Action (e.g., wetland and vegetation removal, impacts to archaeological sites, dredging of coral reefs); however, the U.S. DoW is coordinating with FSM and Yap State to develop mitigation that would help to address and/or offset these adverse impacts. Therefore, implementing the Proposed Action would not result in significant irreversible or irretrievable commitment of resources.

## 4.2 Relationship between Short-Term Use of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site. In the short term, effects to the human environment with implementation of the Proposed Action would primarily relate to the construction activity itself. Wetlands and water resources, air quality, terrestrial and marine ecosystems, cultural resources, and noise would be impacted in the short term. In the long-term, post-construction training activities for up to four weeks per year would result in noise and air quality impacts to the human environment. These short- and long-term environmental effects would be addressed by the proposed mitigation efforts developed collaboratively between the U.S. DoW, FSM, and Yap State and therefore, the Proposed Action is not anticipated to result in impacts that would significantly reduce environmental productivity in the long-term. Additionally, this proposed investment in Yap State's infrastructure represents a significant benefit to the public and is in alignment with FSM and Yap State's Infrastructure Development Plan. Therefore, the Proposed Action is consistent with long-term planning goals for the Airport and Seaport and would not result in any impacts that would permanently narrow the range of beneficial uses of the environment.

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