Federated States of Micronesia

Department of Transportation,
Communication and Infrastructure

Pohnpei International Airport

Final Master Plan

JUNE 2012

POHNPEI

LEO A DALY
PLANNING ARCHITECTURE ENGINEERING INTERIORS

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Acronyms

AFIS	Aeronautical/Aerodrome Flight Information Service
AGL	Above Ground Level
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Fire Fighting
CIA	Caroline Island Air
CIP	Capital Improvement Program
DME	Distance Measuring Equipment
DOI	United States Department of Interior
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMAS	Engineered Materials Arresting System
ESA	Endangered Species Act
FAA	United States Federal Aviation Administration
FAR	Federal Aviation Regulations
FSM	Federated States of Micronesia
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rule
MIRL	Medium Intensity Runway Lights
MTOW	Maximum Takeoff Design Weight
NAVAIDS	Navigational Aids
NDB	Non-directional Beacon
NOAA	National Oceanic and Atmospheric Association
NPIAS	National Plan of Integrated Airport Systems
OFA	Object Free Area
PAPI	Precision Approach Path Indicator
PCC	Portland Cement Concrete
PNI	Pohnpei International Airport
PPA	Pohnpei Port Authority
PUC	Pohnpei Utilities Corporation
PVB	Pohnpei Visitors Bureau
PVC	Poor Visibility and Ceiling
REIL	Runway End Identifier Lights
ROM	Rough Order of Magnitude
RPZ	Runway Protection Zone
RSA	Runway Safety Area
USDA	United States Department of Agriculture
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rule
VISAIDS	Visual Aids
VOR	Omnidirectional Range
WFO	Weather Forecast Office

CHAPTER 1: INTRODUCTION

1.1 PURPOSE OF THE MASTER PLAN

The Federated States of Micronesia (FSM) retained LEO A DALY Company to develop the Pohnpei International Airport Master Plan and to identify potential and evaluate necessary improvements to the existing airfield and terminal facilities. These facility improvements are in response to the projected growth of tourism affecting Pohnpei and associated future growth in aviation activities.

The Master Plan establishes a developmental approach to respond to current conditions and includes appropriate conceptual plans to assist the Federated States of Micronesia (FSM) with implementing technically sound programs for the short and long term development of Pohnpei International Airport. Principal concerns are to:

- Enhance the safety of aircraft operations
- Be reflective of community and regional goals, needs, and policies
- Ensure that future development is environmentally compatible
- Prioritize of development and improvements that are consistent with the master plan
- Develop a plan that is responsive to air transportation needs and expectations
- Develop an orderly plan for use of the airport
- Coordinate this master plan with local, regional, state, and federal agencies objectives
- Develop active and productive public involvement throughout the planning process.

1.2 SCOPE OF THE MASTER PLAN

The airport master plan can be thought of as a flight map into the future. The FAA methodology is followed for the core elements of the master plan, as this has been a reliable method to identify existing and forecasted conditions and aids in identifying the various facility upgrades that will be needed to address the specific needs of the airport. In addition to a flight map, the master plan can be used successfully as a funding document. In other words, funding agencies, whether they are government, commercial, or private, typically require that the projects are evaluated and approved by an official, responsible authority. Thus, the master plan approved by the FAA can additionally serve the airport by providing formal justification to various funding agencies and facilitate the

securing of funding for the important capital improvements recommended for in the planning document.

1.3 SCOPE OF PROJECT WORK

The following tasks represent the core elements of the master plan. These are the typical elements called for in all FAA funded master plans and master plan updates.

1.3.1 Existing Conditions/Inventory

Collect and assess all relevant information, historical and current, to evaluate existing facilities and equipment and to form the factual baseline for an informed judgment about the airport and its environment.

1.3.2 Aviation Forecasts

Utilize the most current information available to develop a reasonable aviation forecast for a 20 year planning horizon with five and ten year milestones. Bases of forecasts will be customized to reflect the unique nature of Pohnpei's projected growth rather than the population/business growth model applied to mainland US airports. FAA approval for this unique modeling/forecasting effort will be obtained.

1.3.3 Airport Operations

Aviation forecasts for Pohnpei will consider numerous factors and ultimately be expressed in passenger counts to the island. Once the forecasting methodology and anticipated rates of growth have been reviewed and approved by the Federated States of Micronesia and FAA, this data is converted into peak hour demand in order that FAA formulae can be used accurately for the purpose of determining capacity of airside, landside and terminal facilities. Converting forecast data into peak hour operations involves estimates of airline aircraft mix both current and future. Discussions will be held with the various airlines to best estimate their future aircraft mix.

1.3.4 Demand/Capacity Analysis

This analysis is a key element of the master plan process. Essentially, existing and anticipated levels of activity (demand) will be assessed to determine the facility's ability to handle the demand (capacity) Three separate analyses will be done:

- Airside demand/capacity
- Landside/access demand/capacity
- Terminal facility demand/capacity

These analyses are useful tools that give an indication of which facilities will need upgrading to serve the projected level of activity, and when those facilities need to come on line.

FAA has mathematical models and formulae to guide the efforts for airside capacity and terminal capacity. The landside demand/capacity analysis is less well defined, but this will be supplemented with accepted standards for roadway/access capacity to provide an accurate overall picture of the airport's present and future needs.

1.3.5 Land Use Planning

Review of present airport land use, identification of airport property, and alternate development schemes for aviation related developments on and near airport property will be incorporated within this task. Conducting "think-tank" sessions with airport officials and stakeholders will be encouraged to maximize community participation and help to get the best conceptual ideas going forward.

1.3.6 Utilities

Existing utilities serving the airport will be inventoried and an overall utility plan will be developed for planning purposes. Fuel farms and fuel distribution networks to apron areas will also be included in this effort. Needs for future upgrades will be identified for all appropriate utilities.

1.3.7 Environmental Impact

For the various land use ideas and for various facility upgrades, environmental impacts will be discussed and rough mitigation guidelines provided to ensure development is implemented in an environmentally responsible manner.

1.3.8 Capital Improvement Program/Facilities Requirement Plan

A Facilities Requirement Plan will be developed to provide a comprehensive implementation plan over the twenty-year planning horizon with five and ten years milestones. This plan will identify the recommended capital improvements and when they are anticipated. Rough Order of Magnitude (ROM) budget estimates will be provided for each capital improvement project.

1.3.9 Airport Layout Plan Drawing Set

The Airport Layout Plan (ALP) will be updated to illustrate existing and future developments. The new FAA criteria for ALPs will be followed and will include the various airspace drawings required per the FAA advisory circulars.

1.4 FEDERAL AND LOCAL APPROVAL

The preparation of this master plan is based upon guidelines established by the U.S. Department of Transportation, FAA Advisory Circular AC 150/5070, Airport Master Plans. Preparation of airport layout plans and identification of significant planning data are based on FAA Advisory Circular AC150/5360-9, Planning and Design of Airport Terminal Facilities at Non-hub Locations.

The work for this Master Plan is supported by AIP Grant Project No.3-64-0000-01 and is sponsored by the Federated States of Micronesia in accordance with the terms and conditions of a Grant Agreement under the Airport and Airway Improvement Act as amended by the Airport and Airways Safety Expansion Act of 1987, and the regulations of the FAA.

CHAPTER 2: EXISTING CONDITIONS

2.1 GENERAL BACKGROUND

This planning project is for Pohnpei International Airport (PNI). The airport is situated on the main Island of Pohnpei, which is also the capital state of the Federated States of Micronesia. The Federated States of Micronesia is a sovereign nation in free association with the United States.

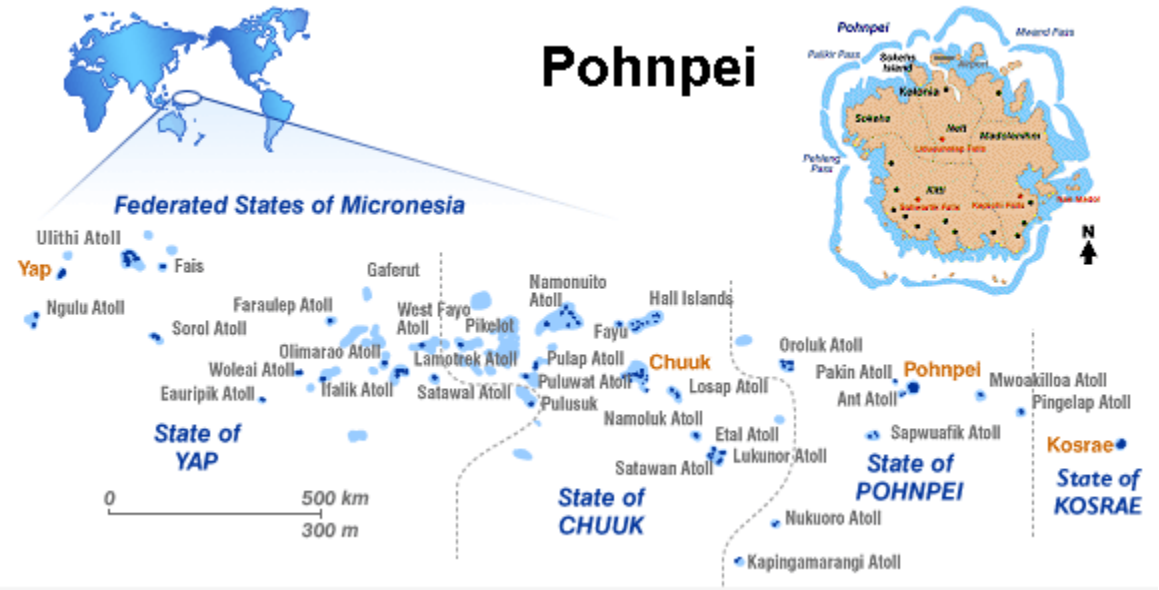


Figure 2-1. Map of the Federated States of Micronesia

The islands of the Federated States of Micronesia are located about 2,500 miles southwest of Hawaii. Pohnpei is one of the four states comprising the FSM. Pohnpei has the largest land area of all the states at 133.4 square miles, most of which is situated on the Island of Pohnpei. The capital city of the FSM, Kolonia, is located on the Island of Pohnpei.

Figure 2-2. Map of Pohnpei

Pohnpei Island is the remnant of an extinct volcano that formed the island 5 million years ago. The land mass is black volcanic basalt. As the Pacific Plate moved from east to west over a "hot spot" in the earth's crust, Pohnpei and the local outer islands were formed by an outpouring of volcanic basalt to heights much in excess of the present mountains of Pohnpei.

One of Pohnpei's most notable attractions is the ancient city called Nan Madol. The city was built using basalt logs to form walls. The city was declared a historical landmark some years ago. Originally it was more of a religious congregation than a city or town. Inside the giant basaltic walls are tombs, shrines, and other religious artifacts.

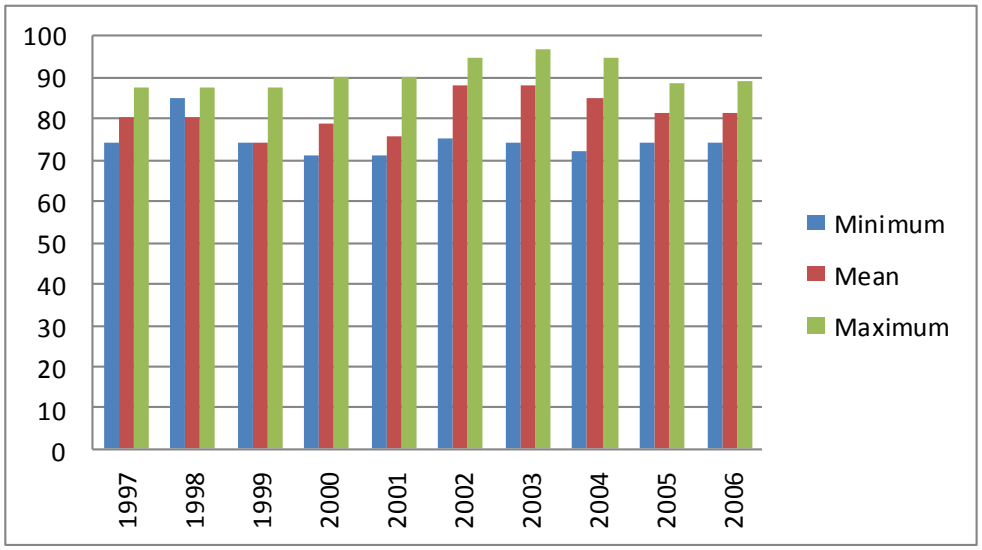
2.2 AIRPORT ENVIRONMENT

2.2.1 Climate and Wind Conditions

Pohnpei has a typical tropical climate, with an average temperature of 82 degrees Fahrenheit. Humidity is high, averaging 85%. While rainfall estimates within Pohnpei's high, mountainous interior can be as much as 330 inches a year, the weather service in Kolonia Town typically measures annual rainfall of 180 inches per year. Pohnpei's

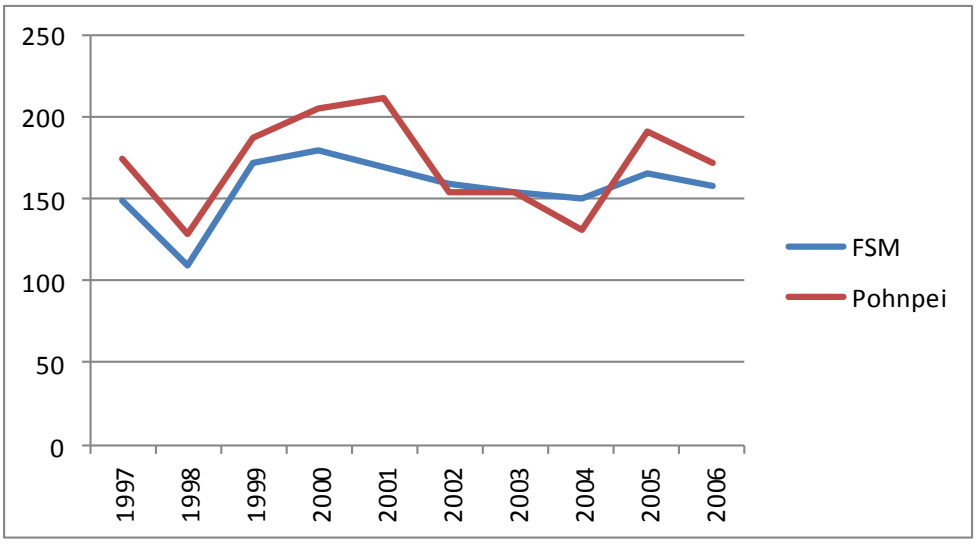
interior is almost completely and continuously cloud covered. The island residents can expect most days to be partly cloudy, with periods of sunshine, overcast skies and rain. Records show that the island experiences approximately 125 partly cloudy days and 240 cloudy days each year with sunshine only about 50% of the time. The ocean currents around Pohnpei are from the east and are part of the Northern Equatorial Current. The ocean temperature is 85°F on the surface. Pohnpei's close proximity to the equator substantially reduces seasonal weather change. Pohnpei is generally south and east of the typhoon belt, but periodically experiences short, severe tropical storms.

Table 2-1. Pohnpei Temperature



Source: FSM Office of Statistics

Table 2-2. Average Rainfall



Source: FSM Office of Statistics

2.2.2 Land Formation and Topography

The State of Pohnpei's main land formation is quite different from the other three states. The main Island of Pohnpei has not a single sandy beach; it is completely covered with deep, thick mangrove forests and swamps. Pohnpei Island is very mountainous in the center and has the tallest mountains in the FSM. Pohnpei International Airport is located on Dekehtik Island located approximately a mile off the northern end of Pohnpei Island. The island is made up of low-lying coral and is almost completely covered in mangrove.

2.2.3 Land Ownership

Land ownership in the FSM can best be characterized as one of small holdings. Most property is held in family trusts and land use rights are passed down from generation to generation within the extended family system. Subsurface property rights are synonymous with surface rights. Land ownership is limited by the Constitution to citizens only. Pohnpei international Airport is located on Pohnpei Port Authority owned land and is part of the Port Authority complex that includes port and harbor facilities.

2.2.4 Socio-Economic Conditions

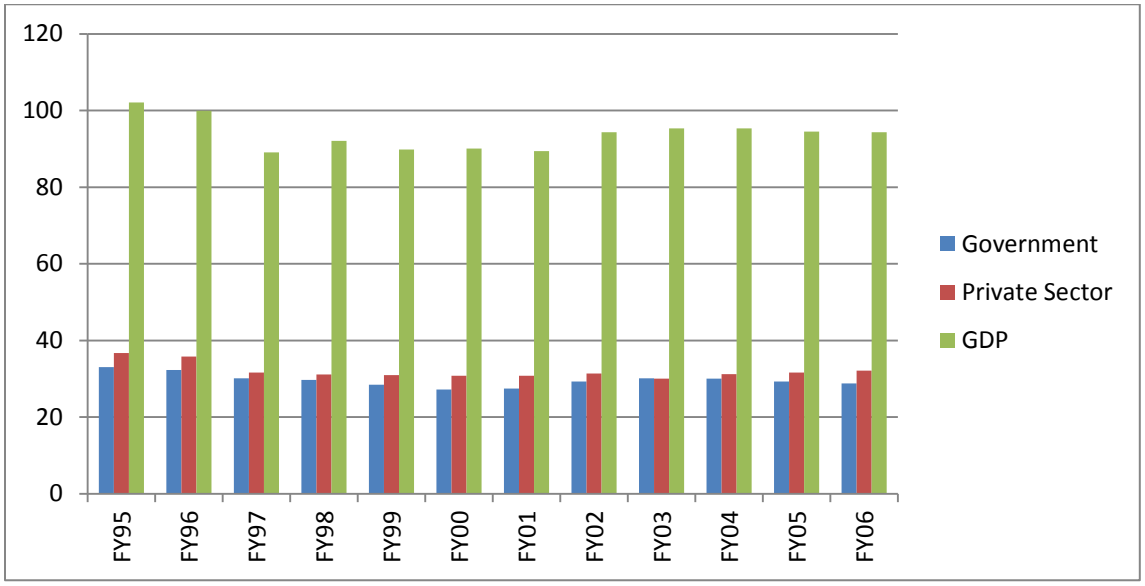
a) Population:

According to the 2000 FSM National Census Report, the total population of the State of Pohnpei was almost 35,000 and is second only to Chuuk. Pohnpei's population represents approximately 32 percent of the total FSM population for that year.

b) Local Economy:

Of all the states, Pohnpei has proven to require the least assistance from the United States Compact funds. Despite that fact, Pohnpei has not experienced any significant economic growth. Initially, Pohnpei was the state that showed the most growth during the initial Compact funds allocation.

Table 2-3. Pohnpei State GDP by Sector (FY95-FY06 US$ Millions)



Source: FSM Office of Statistics

Pohnpei's labor force did have a notable increase from approximately 46 percent of total FSM population in 1994 to roughly 57 percent in 2000. The residents of Pohnpei have the highest average income of all the states at about $6,700 per year in the year 2000.

The main industry for Pohnpei State has been in fisheries. Unfortunately, Pohnpei had over invested in the fisheries sector, which impacted their budgeted funds for other sectors.

2.3 EXISTING LAND USE

Pohnpei International Airport is located on Dekehtik Island. Dekehtik Island is classified as an Industrial Use Zone and is home to a deep water harbor and port facilities. The majority of the island is owned by the Pohnpei Port Authority and the State of Pohnpei.

2.4 POHNPEI INTERNATIONAL AIRPORT (PNI) – Existing Conditions

Pohnpei International Airport is the main airport in the State of Pohnpei. PNI is owned and operated by the Pohnpei Port Authority. The airport is at an elevation of 8 feet mean sea level (MSL) on the Island of Dekehtik, which is a small island strip that is just north of the main Island of Pohnpei. The Airport Reference Code is N06°59.11' E158°12.54'. 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 requirements.

2.4.1 Critical Design Aircraft

The critical design aircraft for PNI is the Boeing 737-800 series operated by Continental Airlines. The Boeing 737-800 series aircraft is the only scheduled aircraft that flies into Pohnpei International Airport and, with more than 250 arrivals and departures, meets the FAA criteria for critical design aircraft.

2.4.2 Airport Reference Code

The airport reference code (ARC) is a system established by the FAA to relate airport design criteria to the operational and physical characteristics of the aircraft currently operating and/or forecast to operate at the airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and correlates to the aircraft approach speed (an operational characteristic). The second component, depicted by a Roman numeral, is the aircraft design group and relates to aircraft wingspan and tail height (physical characteristics). Generally, aircraft approach speed applies to runways and runway facilities and aircraft wingspan or tail height applies to taxiway and taxi lane separation criteria. The ARC for Pohnpei International Airport is D-III. The Airport Reference code is discussed in greater detail in Chapter 6 Facility Requirements.

2.4.3 Runway

PNI consists of a single runway: 9-27, which is 6001 feet long by 150 feet wide. The runway is paved with asphalt, grooved, and currently in fair condition. Roughly 95% of air carrier operations (landings and takeoffs) use runway end 9. On runway 9-27, the surface is bituminous with a weight bearing capacity of 75,000 pounds for single wheel aircraft; 170,000 pounds for duel-wheel aircraft; and 290,000 pounds for dual tandem wheeled aircraft. Pohnpei International Airport has a flexible PCN value of 76/F/C/X/T.

2.4.4 Taxiway

The taxiway is located closer to the western end of the runway and leads south to the apron. The existing taxiway is 75 feet wide, bituminous paved, with no paved shoulders.

2.4.5 Apron

The existing apron is bituminous paved and 450 feet wide parallel to the runway centerline and 446 feet long parallel to the taxiway centerline. There is one Portland Cement Concrete (PCC) hardstand within the apron. The hardstand is 100 feet wide parallel to the runway centerline and 225 feet long parallel to the taxiway centerline.

2.4.6 Airport Lighting, Visual Navigational Aids

Runway 9-27 uses Medium Intensity Runway Lights (MIRL); the runway is labeled with non-precision markings. Each end of the runway is equipped with runway end identifier lights (REIL). For approach purposes, the runway also has a 4-light, precision approach path indicator (PAPI) for each runway end. There is also a non-directional beacon (NDB) for navigational purposes located due south of the touchdown zone for Runway 9. Pohnpei is an uncontrolled airport with no air traffic control tower. Runway lighting can be activated by the pilot via the CTAF frequency. The airport is furnished with a lighted rotating beacon that flashes green and white to indicate that PNI is a land airport.

2.5 EXISTING AIRPORT OPERATIONS AND AIR CARRIERS

Pohnpei International Airport is part of the Pohnpei Port Authority. Presently, Pohnpei International Airport is served by Boeing 737 series aircraft. The airport principally provides its services to commercial air carriers; general aviation does not account for a significant percentage of operations, if any.

2.5.1 Aircraft Operations

a) Scheduled Air Carriers:

Continental Micronesia provides air service to Pohnpei's main island of Pohnpei utilizing a Boeing 737-800 aircraft. Pohnpei is serviced via Continental's "island hopper" flight that flies between Guam, Micronesia, Majuro and Honolulu. This "island hopper" lands in Pohnpei three times per week for each direction (totaling

six times per week). In addition to Continental's "island hopper" route, there is also service between Guam and Pohnpei on one extra day. As a result, service to Pohnpei occurs roughly once a day, every day of the week except on Mondays where there are two flights, and Sunday when there are no flights.. See the following Flight Timetables.

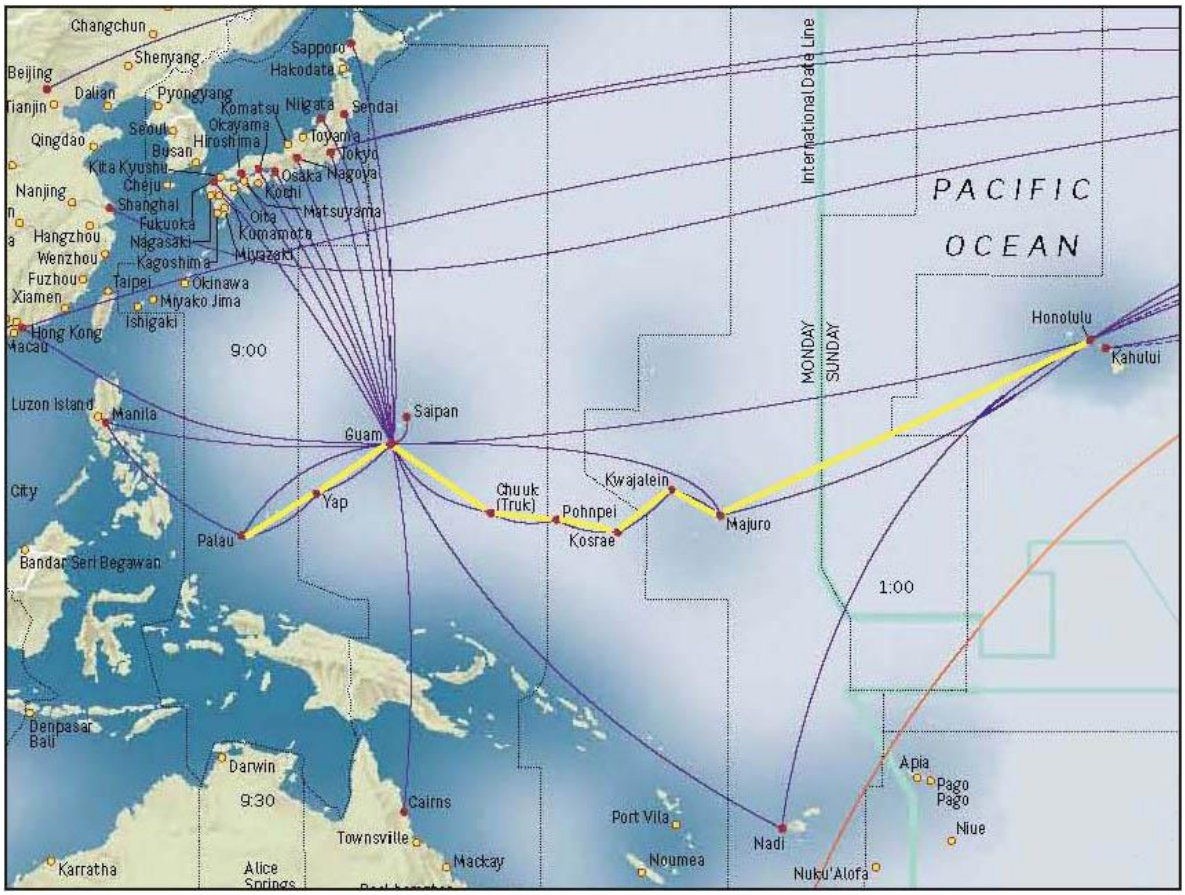


Figure 2-3. Continental Micronesia Route Map

Table 2-4. Continental Micronesia Flight Schedule

FLIGHT NUMBER	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
956	A12:58PM		A 12:58PM		A12:58PM		
	D 1:45 PM		D 1:45 PM		D 1:45PM		
957		A2:20PM		A 2:20PM		A2:20PM	
		D3:00PM		D 3:00PM		D3:00PM	
958	A12:30AM						
959	D 1:25AM						

b) Commuter Airlines:

Caroline Island Air (CIA) is the only commuter airline operating out of Pohnpei. CIA flies to the outer islands of Pohnpei and Chuuk. Caroline Island Air is subsidized by the FSM National Government, operating three nine seat Britten Norman Islander (BN2) aircraft. These are the only based aircraft at PNI.

c) Cargo Carriers:

Pohnpei receives cargo from both Continental Micronesia flights and also Asia Pacific Airlines, a cargo carrier. Cargo from Continental Micronesia is transferred by all flights through Pohnpei utilizing their 737 series aircraft. Asia Pacific utilizes Boeing 727-200 aircraft for their cargo flights. Asia Pacific is operated more on an as-needed, on-demand basis, but they do fly fairly regularly to Pohnpei.

Figure 2-4. Asia Pacific Airlines Route Map

d) General Aviation/Business Jets:

General Aviation at Pohnpei International Airport is a small fraction of the overall aviation activity. General Aviation flights rarely occur.

e) Flight Schools/Tourism/ Military Operations:

No other services, such as aircraft flight schools, helicopter sight-seeing services, or military operations, operate from Pohnpei International Airport.

2.6 EXISTING AVIATION RELATED FACILITIES

2.6.1 Passenger Terminal

Completed in late 1980's, the Pohnpei International Airport terminal is located to the south of the runway, closer to the approach end of Runway 9. The terminal is a single story building and has three sections: departures on the right, arrivals on the left, and a center terminal area (viewed from landside). The terminal is approximately 12,000 square feet. In 2011, the Terminal Expansion Project was completed consisting of a new 14,692 sq. ft. facility to be used as the arrival terminal area and renovation of the existing terminal building to be the departure terminal area. This project also included a new parking area and the procurement and installation of x-ray security equipment, baggage handling equipment and a baggage trolley.

2.6.2 Aircraft Rescue and Fire Fighting (ARFF) Facility

A new ARFF station is being constructed at PNI. The ARFF will be located mid-airfield next to the Taxiway and is expected to be complete by the end of 2012. Currently, a large shed located near the apron acts as an ARFF vehicle garage for housing the emergency response vehicles.

2.6.3 Cargo Facility

Continental Air Cargo Building is adjacent to the Main Terminal Building. The facility is owned, operated, and maintained by Continental Airlines and is not the responsibility of Airport Management.

2.6.4 Small Plane Hangar/ARFF Vehicle Garage Facility

The Small Plane Hangar/ARFF Vehicle Garage Facility is a one-story structure with a mezzanine for an office located within the hangar portion. The hangar is home to Caroline Island Air. It has a small ticketing area and passenger queuing area, all enplaning of deplaning passengers and cargo take place at the hanger. The hangar is also the temporary home for the ARFF vehicles while the new ARFF building is being constructed.

2.7 OTHER EXISTING BUILDINGS

2.7.1 Pohnpei Port Authority Administration Building

The Port Authority Office building is located to the west of the Airport Parking area. It is a two story structure containing all Port Authority administration offices, including the airport manager's office.

2.8 ACCESS AND PARKING

There is a single airport access road that originates from the town of Kolonia to Pohnpei International Airport on Dekehtik Island. The access road is a paved causeway that leads directly into the parking area and passenger terminal. Currently, there are approximately 80 public parking stalls at PNI.

2.9 EXISTING UTILITIES

2.9.1 Water Supply

Pohnpei's water system is owned and managed by the Pohnpei Utilities Corporation (PUC). Over the last few years, the potable water system has been extended to include all of Kolonia and most areas within three other municipalities. The expansion has included part of Madolenihm and evolved with the transfer of the management and operations of the capital water system from the FSM government to the PUC. Water supply is achieved by river diversion and multiple wells.

2.9.2 Sewer System

Wastewater management, collection, and treatment are limited to the population center of Kolonia and the surrounding areas. Sanitary sewage at the airport is through an onsite septic tank and leach field.

2.9.3 Electrical Power

The electricity for the airport is provided by the Pohnpei Utilities Corporation (PUC). PUC is a unit of the government of the State of Pohnpei. It was established in 1991 by the Pohnpei State Legislature with the responsibility of providing electrical power for Pohnpei.

2.9.4 Communications

The FSM Telecommunication Corporation, the FSM-owned communication company headquartered in Pohnpei, provides the telephone, cell-phone and internet systems for the island. The airport has phone and wireless internet connectivity.

2.10 CURRENT CAPITAL IMPROVEMENTS PROJECTS

The following are recent and current capital improvements projects at Pohnpei International Airport:

a) Runway, Taxiway and Apron Rehabilitation Project includes asphalt repavement of the apron, taxiway and apron areas, as well as new asphalt turnarounds, runway shoulders, and a new concrete hardstand for the apron area. Also included in this project are new runway and taxi lights, new apron flood lights, a new electrical vault facility, new security perimeter fence and road, shoreline revetment work, and clearing of the runway safety area.

b) Aircraft Rescue and Firefighting Facility (ARFF) Project consists of a new two-story ARFF facility including new septic tank, fence enclosure, parking lot and lighting. Also included are a new asphalt access road to the ARFF facility and a concrete road connecting the facility to the airport runway.

c) Runway Expansion Project calls for the land reclamation of approximately 866 feet for the runway extension. This extension will add 578 feet to the existing runway and includes a 200 feet blast pad, and an 80 feet runway safety area. Also included in this project is an apron expansion of 400 sq. ft. and installation of visual ads.

CHAPTER 3: AVIATION FORECASTS

3.1 INTRODUCTION

This chapter describes the objectives, methodology, and preliminary findings for future aviation demand at the Pohnpei International Airport.

3.2 OBJECTIVES

This Master Plan sets forth the short, intermediate and long-range (5-, 10-, and 20-year) development plans for Pohnpei International Airport. A primary objective of the Master Plan is to identify the present and future need for a full range of facilities to serve anticipated air carrier, commuter and general aviation demand. To achieve this objective, an aviation forecast is developed to identify the magnitude of potential future civil aircraft operations. Aggregated demand of commercial aviation activity, including aircraft mix, enplaned passengers, and type of flight operations are of specific interest in this chapter.

This forecast identifies the various drivers of Pohnpei's economy and evaluates the potential for major economic growth. The validity of this forecast is dependent upon properly identifying the various drivers to the economy and their relative weight upon the overall forecast. Typically, for a U.S. mainland airport, the significant variables in the determination of demand are population, employment and income of the community being served, along with the potential for business development. However, in a unique case such as Pohnpei's, the traditional determinants of demand may be of lesser significance in comparison to tourism, Pohnpei's primary driver of growth.

A reasonable forecast of aviation activity is essential in determining future aviation facilities needs. Forecasts of commercial airline passengers are the basis for sizing and phasing of airside, landside and terminal facilities. The adequacy of existing airfield facilities is assessed using the number and types of current and projected aircraft activity. The adequacy of both air and landside facilities is influenced by the estimated level of activities at peak arrival and departure intervals. For example, this level of detail is helpful specifically when evaluating the size of terminal hold-rooms needed to meet future aviation demand.

The validity of any forecast may be affected by numerous variables and is dependent upon the uncertainty of future events. As such, the reliability of demand forecasts is

dependent on some known and some unforeseeable factors. These forecasts become more speculative as one looks further into the future. It may be reasonable to predict as much as three to five years out with a relatively high level of confidence, but with less confidence for projections beyond five years, particularly in an air travel and tourism industry subject to dynamic fluctuations.

The research that has been done to develop this aviation forecast for Pohnpei International Airport tends to emphasize the relative stability of Pohnpei's tourism industry. The various long-term trends in the region support the premise that Pohnpei's tourism industry will stay constant or increase slightly. As a result, two growth cases to discuss are evaluated in this report: a most likely "base case" and a high "optimized case." A third case, the low case, examines the "constrained case" i.e. low to negative outcomes going forward. While these negative outcomes are not anticipated, they are plausible and must be discussed in this section.

3.2.1 Base Case

The assumptions made for this "base case" forecasting are summarized as follows:

- The domestic economies of growing Asian markets will be stable. These markets include Japan, China, Taiwan, Philippines, Korea, etc.
- Pohnpei's ability to attract tourists from these markets based primarily upon Pohnpei's unique eco-tourism niche market
- Gradual, yet steady, tourism growth creating demand for additional hotel facilities, and an economic climate where developers are able to obtain financing for design/construction
- Continued upgrades to Pohnpei's basic infrastructure to minimize the constraints to increase tourism
- Gradual, yet steady, systemic improvement with the worldwide credit markets and main street economies
- Steady and growing tourism interest from Asia, with charter flights transitioning to scheduled air service to Pohnpei

3.2.2 Optimized Case

The assumptions made for this "optimized case" are summarized as follows:

- The domestic economies of growing Asian markets will recover much faster than European/U.S. economies. This faster recovery will strengthen the 'middle classes' of these countries and develop a base of potential travelers from Japan, China, Taiwan, Philippines, Korea, etc.
- Pohnpei's ability to attract high-spending tourists from Asia and from U.S. markets is based primarily upon Pohnpei's unique eco-tourism niche market
- Moderate and steady tourism growth, revenue, etc., creating demand for additional hotel development and the ability to obtain financing for design/construction of resort related developments
- Continued upgrades to Pohnpei's basic infrastructure, increased level of "green" technology, upgraded internet service island-wide, and elimination of growth constraints due to infrastructure deficiencies
- Quick rebound and steady, systemic improvement with the worldwide credit markets and main street economies
- Sustained tourism interest from Asia, with charter flights transitioning to scheduled air service to Pohnpei
- Increased and steady tourism from Guam-based military personnel on rest and recreation tours
- Development of outer island airports and resumption of commuter flights connecting these outer islands with Pohnpei

3.2.3 Constrained Case

The assumptions made for this "constrained case" are summarized as follows:

- Worldwide economy continues to decline or does not recover in a timely fashion
- Tourist market does not develop as planned
- Continental Airlines raises prices and/or reduces service to Pohnpei
- Commuter services continue to operate infrequently

3.3 METHODOLOGY

Forecasting for a typical system or master plan for a business-oriented U.S. mainland airport is based on economic growth factors, population growth, income, employment, domestic and business oriented enplanements and international travel. However, these forecasting tools do not apply to the FSM, including forecasting tools published in the applicable FAA Advisory Circulars.

The Federated States of Micronesia has a very unique passenger and travel profile. The factors that affect the FSM economic growth are based more on travel and tourism. As such, the economic forecast and growth trends for the Master Plan are weighted more toward tourism, travel, and the world events and natural disasters that affect tourism and travel.

3.3.1 Forecast Resources

Several Sources served as bases for the evaluation of future demand:

- FSM Division of Statistics- Statistical Yearbook 2008
- Continental Airlines
- Interview with Airport Manager
- Meeting with Pohnpei Tourism Authority
- Meeting with Department of Land & National Resource – Office of Tourism & Parks
- FAA Terminal Area Forecast
- International Visitor Arrivals Report for October 2007 to December 2008
- 2005 Household and Income Survey Report
- Asian Development Bank: Asian Development Outlook 2009: Rebalancing Asia's Growth
- Asian Development Bank – Country Operations Business Plan Federated States of Micronesia 2007–2009
- United States of America, Department of the Interior – Insular Areas Energy Assessment Report 2006

3.3.2 Commercial Aviation Trends

The Federated States of Micronesia continue to be serviced by only one major carrier: Continental Micronesia. Continental continues to operate Boeing 737 series aircraft to each of the four states of the FSM and services this region through Honolulu, Guam, and Manila. Pohnpei can be reached through Guam with a stop in Chuuk or through the Honolulu "island hopper" route. The "island hopper" route begins in Honolulu and makes stops in Majuro, Kwajalein, and Kosrae before stopping in Pohnpei.

3.3.3 Corporate, Commuter, Military and General Aviation Trends

Total operation of corporate, commuter, military, cargo and general aviation aircraft has decreased over the past ten years. In 2008 Caroline Island Air, the only commuter airlines servicing Pohnpei and Chuuk, briefly went out of business due to the rising cost of fuel and aircraft maintenance, but has since returned to service, operating infrequently.

3.4 SOCIO-ECONOMIC REVIEW

The propensity to travel by air or any other transportation mode generally correlates closely with three principal statistically significant variables – population, employment, and income. An evaluation of the population forecast and income of Pohnpei's residents can help establish trends useful in the forecasting of commercial and general aviation activity.

3.4.1 Local Demographic Characteristics

a) Population:

Pohnpei's population has steadily increased throughout the years and has risen to slightly over 32 percent of the total FSM population in the year 2000.

Table 3-1. Population Distribution: 1930 to 2008 Federated States of Micronesia

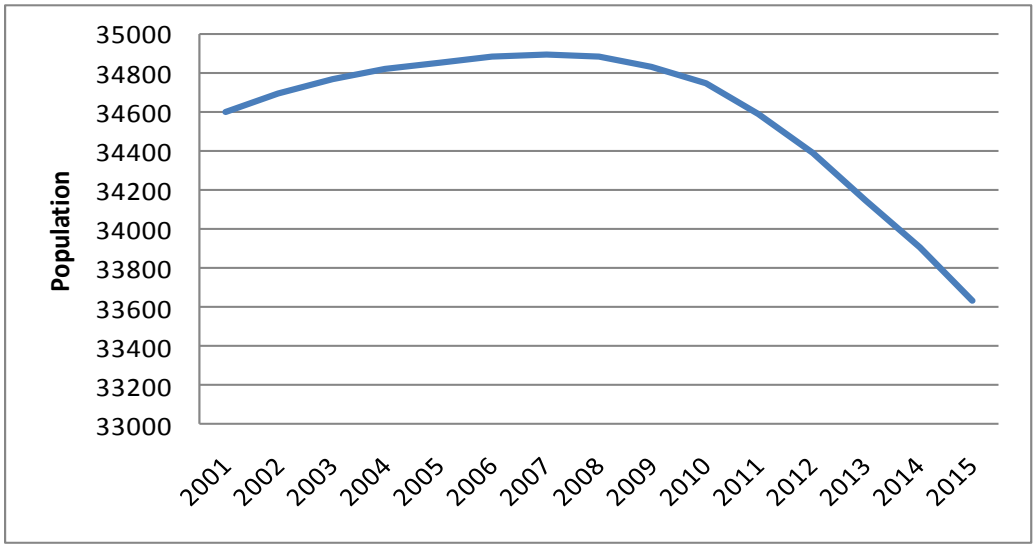
STATE	1930	1958	1967	1973	1980	1989	1994	2000	2008 projected
Total	29,727	39,284	50,172	62,731	73,159	95,551	105,506	107,008	108,100
Yap	6,486	5,540	6,761	7,870	8,099	10,431	11,178	11,241	11,700
Chuuk	15,200	20,124	25,107	31,609	37,488	47,616	53,319	53,595	53,300
Pohnpei	7,051	11,253	15,044	19,263	22,081	30,669	33,692	34,486	34,900
Kosrae	990	2,367	3,260	3,989	5,491	6,835	7,317	7,686	8,200

Source: FSM Office of Statistics

Initially, the growth rate was substantial but, during more recent years, the growth has noticeably slowed to just a little more than 1 percent per year. The 2008

projection of population growth shows a slight increase of 1.01 percent to 34,900. However, beginning in 2009 a dramatic decrease is projected so that in the year 2015, the FSM Office of Statistics is projecting that Pohnpei's population will be a little more than 33,600.

Table 3-2. Pohnpei Projected Population Growth: 2001 to 2015



Source: FSM Office of Statistics

b) Employment:

The FSM government and the state of Pohnpei are the major employers in Pohnpei. There is a state fishing fleet and often one or two foreign fishing fleets are seen in the Pohnpei harbor. Education, including the headquarters for the College of Micronesia, represents a significant segment of the employment in Pohnpei. Subsistence living is also a major lifestyle.

Pohnpei has the second highest number of people in the labor force. In the year 2000, people residing in Pohnpei accounted for over 31 percent of the total labor force in the FSM, which is second only to Chuuk. That was, however, a decrease of approximately 3 percent from the previous census in 1994. The total number of persons of the age of 15 increased approximately 10 percent from approximately 46 percent in 1994 to over 57 percent of the total Pohnpeian population in the year 2000. (Source: 2000 FSM Census)

According to the 2004 census there were 7,085 people employed in Pohnpei. By sector he employers were private - 2,938; public enterprise - 592; national government – 851; state government - 1221; municipal government - 327; non-governmental organizations - 221; and government agencies - 786, with the remaining 149 employed by religious, volunteer and other organizations. (Source: DOI Energy Assessment, 2006.)

Pohnpei has the most broad-based business and commercial economy of any of the FSM states. With the FSM national government located in Pohnpei, a wide range of wholesale and retail business, as well as many professional service organizations, there is a market for purchase of goods and services. Although exact figures were not available for the specifics of the business and commercial sector, there was evidence that the economy was operating reasonably well. The new Compact II has witnessed a slower flow of funds compared to the earlier Compact I, and it has taken the economies of all the FSM states time to adjust, Pohnpei appears to have adjusted better than any other state.

c) Income:

The average annual household income for Pohnpei actually decreased from $12,412 in 1994 to $11,249 in 2000. In 1994, Pohnpei had the highest average income of all the FSM states. In 2000, after the slight decrease, Pohnpei was second only to Kosrae in average annual income. The main reason for such a relatively high annual income is due to the fact that Pohnpei is the capital state in the FSM and thereby offers more governmental job opportunities.

Low wage earners increased slightly from 1994 to 2000. A little more than 20 percent of income-earners reported an income of less than $1,000 in the 2000 census. That was an increase of approximately 4 percent from the previous census in 1994. Pohnpei showed greater disbursement of higher wages than some of the other states. Slightly less than half of the population reported incomes higher than $5,000 for the year 2000. The large number of low to mid-income wage earners continues to indicate that the resident population of Pohnpei will not be able to contribute to any major growth in air traffic. Although Pohnpei may seem to have more potential than some of the other states, most of this growth will be generated by attracting outside visitors and the tourism industry. (Source 2000 FSM Census)

The average salary in 2004 was $8,319.00. Salaries by the respective employment sectors were: private sector - $4,519; public enterprise - $11,351; national government - $11,393; state government - $10,652; municipal government - $4,137; non-governmental organizations - $6,044 and government agencies - $10,137. The minimum wage in Pohnpei is $1.35 per hour. (Source: DOI Energy Assessment, 2006)

3.4.2 Visitors and Foreign Tourism Trends

Over the past decade, Pohnpei has seen a steady increase in the number of visitors to the island. This increase can be attributed to the fact that the capital of the FSM government is located in Pohnpei.

Table 3-3. Tourism and Visitors to Pohnpei by Region of Citizenship: 1997 to 2006

Tourism & Visitors	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Asia	383	491	617	761	708	1,073	1,107	1,511	1,162	1,047
Australia	322	346	398	530	309	348	355	504	521	556
Canada	42	48	69	83	53	63	90	95	89	80
Europe	302	294	311	299	319	302	564	356	340	715
Japan	2,156	1,707	1,473	1,637	1,780	1,783	2,313	1,628	1,667	1,294
New Zealand	79	90	73	55	58	109	98	188	103	127
Pacific Islands	427	440	372	506	389	831	673	795	532	700
Philippines	388	350	496	598	563	625	626	839	883	896
USA	2,119	1,970	2,424	2,651	2,841	3,501	3,191	3,124	3,300	3,560
Other	54	31	26	48	41	44	53	64	34	53
Total	6,272	5,767	6,259	7,168	7,061	8,679	9,070	9,104	8,631	9,028

Source: FSM Office of Statistics

The Pohnpei Visitors Bureau (PVB) plans to grow the visitor/tourism industry by promoting its two primary attractions - its culture and its environment. The PVB believes that it is best to grow the tourism industry slowly in order for Pohnpei to meet the needs of the visitors, while protecting both its culture and environment. One avenue has been to promote itself as an eco-tourism destination.

The PVB is working on raising the domestic awareness to tourism and the opportunities it can offer the people of Pohnpei. Working with the Office of Tourism and Parks, the Visitors Bureau has been cleaning up the parks and public areas by removing trash and

waste. This beautification effort is an attempt to showcase the natural beauty of Pohnpei.

The PVB has begun promoting the culture by developing two programs which have enjoyed initial success: offering a homestay program and a cultural dinner. The home-stay program allows visitors to live with a local Pohnpeian family and experience their daily life. Currently, there are ten homes that are open to visitors but in the next few years the PVB expects to double that number. The cultural dinner allows visitors to attend traditional meals as the personal guests of the village chiefs. Sitting next to the chief, guests experience the culture from a front row vantage point.

By expanding the runway at Pohnpei International Airport, Pohnpei will be able to receive flights directly from Asia and other parts of the world. PVB is already working with Japan Airlines to schedule charter flights to Pohnpei on its 767 aircraft. Each charter flight has the potential of bringing 200 visitors directly to Pohnpei. The Visitors Bureau believes that in the near future it will have from three to four charters per year. In the long term, it expects to accommodate one charter flight a month from Japan.

For this to happen, PVB recognizes that improvements need to be made to existing infrastructure and hotels to meet international standards. According to PVB there are only 135 usable rooms on island and a potential for an additional 70 rooms if two hotels were to reopen. The Pohnpei National and State governments are aware of this issue and are in the planning stage of building a “five-star” resort on island to help attract visitors to Pohnpei.

Along with the potential for attracting new visitors through charter flights, Pohnpei has been recently recognized as having one of the world’s best surf breaks and has begun to attract surfers from around the world, bringing in about 250 visitors during the surf season that runs from October through April. As this surf break has only recently been promoted by magazines and television, it is expected that there could be a source ofmajor growth potential.

Pohnpei has also been able to attract many workshops and conferences. The Pohnpei Convention Center has the ability to accommodate 3,000 people. Currently the PVB says that it averages about one conference/workshop every three months with attendance varying from a low of fifty to more than a thousand people. As the home of the national government and the center of Micronesia as a whole, the PVB believes that

Pohnpei is the ideal location for state, national and regional events and has begun to promote itself as such.

Hindering the growth of tourism and the visitor industry is the reliance on a single carrier operating high priced flights to a remote geographical location. A one-way coach ticket on Continental Airlines from the United States (Los Angeles, California) is currently anywhere from $1,238 to $1,605. The same one-way ticket to Pohnpei leaving from Tokyo, Japan costs between $1,682 to $2,000. With Japan and the United States being the two largest groups of visitors to the State of Pohnpei, prices like these have a direct impact on the island's ability to attract visitors.

Table 3-4. Cost of One-Way Airfare to Pohnpei

FLIGHTS	PRICE (US DOLLARS)
Los Angles, California to Pohnpei One-Way	$1,238 to $1,605
Tokyo, Japan to Pohnpei One-Way	$1,682 to $2,000
Hawaii to Pohnpei One-Way	$1,052 to $1,610
Pohnpei to Chuuk One-Way	$291 +
Pohnpei to Guam One-Way	$512 +

Source: Fares taken from Continental.com November 2010

Despite the high cost of travel, Pohnpei is taking prudent steps to grow its tourism/visitor industry. With the extension of the runway and the development of new programs and industries, the PVB expects to be able to double the number of visitors to Pohnpei over the next thirty years.

3.5 HISTORICAL AVIATION ACTIVITY

3.5.1 Aircraft Operations

According to the data provided by the Pohnpei Port Authority, there has been an overall decline in airport operations at Pohnpei International Airport. In 1997, PNI had a total of 940 aircraft arrivals. That number dropped to 593 in 2008. The numbers of flights into Pohnpei have fluctuated annually, but have continued to decrease during the 11 year period from 1997 to 2008.

Table 3-5. Annual Number of Landings at Pohnpei International Airport 1997- 2008

YEAR	SCHEDULED PASSENGER FLIGHT		CARGO	CIA	MILITARY	OTHER	TOTAL
	CONTINENTAL	OTHER AIRLINES					
1997	533	180	171	-	26	30	940
1998	437	242	133	-	29	21	862
1999	419	213	87	14	36	23	792
2000	365	198	169	149	31	18	930
2001	364	34	204	112	22	17	753
2002	380	0	119	216	48	43	806
2003	363	0	126	98	24	31	642
2004	366	38	96	105	24	45	674
2005	387	0	87	113	11	27	625
2006	369	0	120	63	14	46	612
2007	367	0	180	143	8	38	736
2008	362	0	145	58	12	16	593

Source: Pohnpei Port Authority

Commercial aircraft arrivals were at a high of 713 in 1997 and dropped to a low of 362 in 2008. During this time, cargo service, military, commuter and all other flights to PNI have fluctuated annually, but continue on a downward trend.

Data provided by Continental Airlines for annual operations between the years 2000-2008 vary slightly from those provided by the Pohnpei Port Authority. When determining future operations and average passenger counts the data provided by Continental will be used. Continental is the sole provider of commercial activity into Pohnpei.

Table 3-6. Continental Airlines Operations 2000-2008

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008
Arrival	362	362	374	366	363	382	366	364	359
Departure	362	361	374	366	363	382	365	365	359

Source: Continental Airlines

3.5.2 Based Aircraft and Aircraft Mix

There is only one based aircraft at Pohnpei International Airport. Operated by Caroline Island Air is a Britten Norman Islander (BN2) with twin piston engines with seating for nine passengers. Table 3-7 below shows the current aircraft mix at Pohnpei International Airport.

Table 3-7. Aircraft Mix

AIRCRAFT MIX	
Continental Airlines	737-800 series
Asian Pacific Airlines	727-300 series
Caroline Island Air	Britten Norman Islander (BN2)
U.S. Military	C-12 C-17 C-130

3.5.3 Enplaned Passengers

The number of enplaned passengers on Continental flights has stayed relatively consistent over the past nine years, averaging about 20,716 passengers a year, with a high of 22,826 passengers in 2004. Since then, there has been a slight decline in the number of departing passengers to a total of 20,827 in 2008.

Table 3-8. Enplaned Passengers per Year 2005-2008

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008
Departures	17,523	19,373	20,642	21,165	22,826	21,347	21,492	21,248	20,827

Source: Continental Airlines

Table 3-9 shows the number of passengers arriving and departing as provided by the Pohnpei Port Authority. These numbers vary from those provided by Continental. It is assumed that the numbers from PPA would be higher as they would include passengers on Caroline Island Air. In most cases the PPA numbers are approximately 1,500 fewer than Continental's.

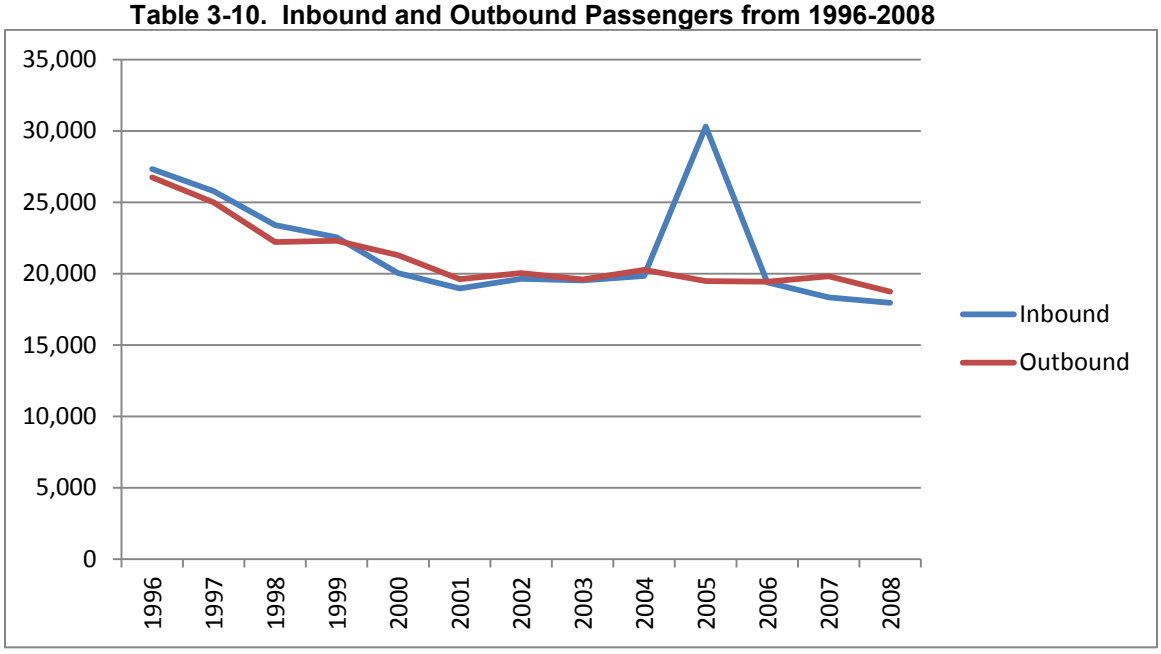
Table 3-9. Inbound and Outbound Passengers from PNI (1996- 2008)

	ARRIVAL	DEPARTING
1996	27,324	26,734
1997	25,778	24,986
1998	23,388	22,216
1999	22,541	22,293
2000	20,041	21,298
2001	18,968	19,617
2002	19,627	20,028
2003	19,508	19,592
2004	19,838	20,266
2005	30,312	19,481
2006	19,391	19,420
2007	18,330	19,821
2008	17,951	18,738

Source: Pohnpei Port Authority

According to the Port Authority's data, both arrivals and departures have decreased. Outbound enplaned passengers at Pohnpei International Airport have averaged 21,114.6 per year. The highest number of enplaned passengers departing PNI was 26,734 in 1996. The year with the least amount of enplaned passengers departing was 2008 with 18,821. The average arrivals over that same time period is 21,769, with a high of 27,324 in 1996 and a low of 17,951 in 2008. Table 3-10 below uses the PPA data to show the relationship between arriving and departing passengers over the past thirteen years.

Table 3-10. Inbound and Outbound Passengers from 1996-2008



Source: Pohnpei Port Authority

3.5.4 Air Cargo

Mail is delivered to Pohnpei by Continental Airlines. While the amount of mail shipped out of Pohnpei has steadily increased over the past decade, the inbound mail has fluctuated over the same time period from a high of 297,898 pounds in 2003 to a low of 81,052 pounds in 2007. Table 3-11 below shows, the total inbound and outbound mail for PNI over the past ten years. It is important to note that the amount of mail delivered is dependent on the number of flights flown by Continental, so Continental's annual operations will have a direct effect on the amount of mail delivered.

Table 3-11. Inbound and Outbound Mail (lbs.) 1998-2008

Year	Inbound	Outbound
1998	181,872	77,890
1999	203,275	80,707
2000	129,550	93,714
2001	153,927	79,516
2002	228,675	85,105
2003	297,898	83,255
2004	280,655	119,444
2005	109,058	103,781
2006	96,977	101,344
2007	81,052	121,461
2008	110,990	210,475

Source: Pohnpei Port Authority

Pohnpei receives cargo from both Continental Micronesia flights and Asia Pacific Airlines, a regional cargo carrier. Cargo from Continental Micronesia is transferred by all flights through Pohnpei utilizing their 737 series aircraft. Asia Pacific utilizes Boeing 727-200 aircraft for their cargo flights. Asia Pacific is on more of an as-needed, on-demand basis, but they do fly very regularly to Pohnpei.

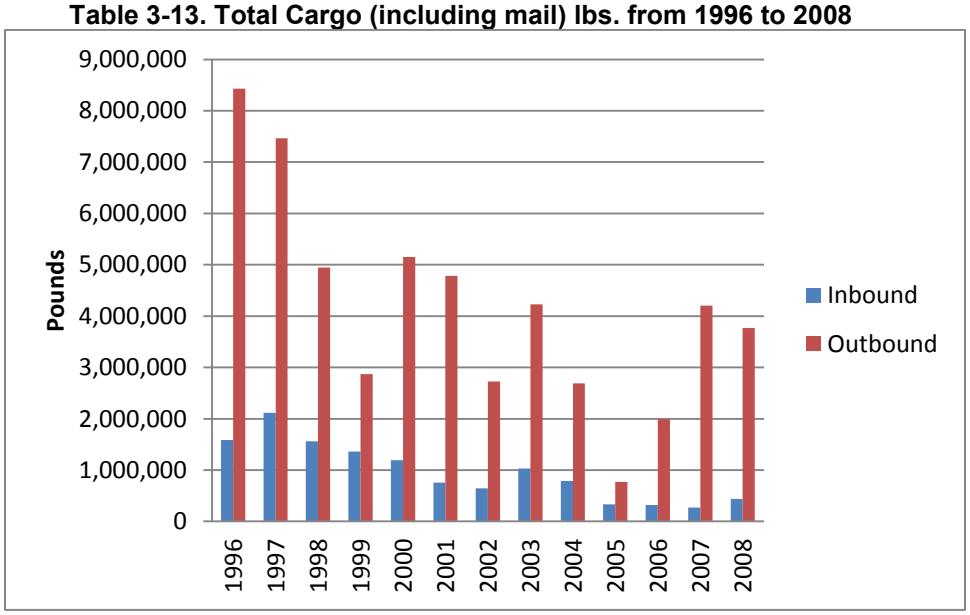
Table 3-12. Inbound and Outbound Cargo (lbs.) 1996-2008

Year	Inbound	Outbound
1996	1,234,000	8,306,000
1997	1,793,311	7,378,157
1998	1,377,170	4,868,201
1999	1,161,375	2,787,937
2000	1,061,766	5,057,976
2001	604,714	4,705,646
2002	418,953	2,638,870
2003	734,357	4,145,801
2004	508,838	2,567,473
2005	223,329	668,226
2006	226,127	1,888,679
2007	188,779	4,084,670
2008	325,694	3,555,752

Source: Pohnpei Port Authority

Table 3-13 shows the total for both inbound and outbound mail and cargo:

Table 3-13. Total Cargo (including mail) lbs. from 1996 to 2008



Source: Pohnpei Port Authority

3.5.5 Aircraft Load Factors

Aircraft load factors essentially equate to the average number of passengers per flight. To arrive at a realistic ratio of numbers of passengers per flight, we need to derive a correlation between aircraft arrivals and the number of arriving passengers using historic data for visitor/transit passengers, as well as historic data for the number of aircraft departures. Table 3-14 shows the average load factor for Continental Airlines flights departing Pohnpei.

Table 3-14. Passengers per Flight into PNI (2000-2008)

YEAR	FLIGHTS	PASSENGERS	PAX PER FLIGHT
2000	362	17,523	48
2001	361	19,373	54
2002	374	20,642	55
2003	366	21,165	58
2004	363	22,826	63
2005	382	21,347	56
2006	365	21,492	59
2007	365	21,248	58
2008	359	20,827	58

3.6 AVIATION FORECAST

Using demographic indicators of population, employment and income, the data shows that while Pohnpei is projected to have a decline in population, there is potential growth in employment and income. The economy of Pohnpei is probably the most diverse of any of the FSM states, primarily because Pohnpei is the site of the national government and benefits from all of the service businesses and headquarter activities that are coincident with government centers. Except in outer islands and rural areas, the economy of Pohnpei has emerged as a reasonably well-functioning cash and market society.

The National and State governments have made a commitment to increase their tourism and visitor industry with programs engineered to exploit the natural beauty that Pohnpei has to offer and to upgrade infrastructure and accommodations to meet international standards. Also, the potential occasioned by the expansion of the airport runway opens the door to direct flights from Asia and elsewhere to Pohnpei.

The forecast for Pohnpei International Airport is between a two percent growth (base case) and four percent growth (optimized case). While the constrained case projects no growth over the forecasted period and aviation activity will stay at or around its current level.

3.6.1 Annual Aircraft Operations

a) Commercial Aircraft:

Continental Airlines is the only commercial airline that flies into Pohnpei International Airport. It is expected to remain the only commercial airline to fly into Pohnpei as there is a lack of demand for more carriers into the Western Pacific. Continental Micronesia currently uses a Boeing 737-800 series aircraft. This is the only regularly scheduled aircraft into PNI. It is expected that, even with a slight growth in other areas, the number of operations flown by Continental will remain the same at about 365 a year.

b) Corporate, Military and General Aviation

There is no expectation of an increase of corporate, military and general aviation activity at PNI. The current level of operations should be maintained throughout the forecasted period.

c) Chartered Flights

With the expansion of the runway, Pohnpei International Airport will be able to service charter flights from Japan and elsewhere around the world. The Pohnpei Visitors Bureau has been working with Japanese airlines to fly 767's into Pohnpei. It expects to have three to four charters a year in the upcoming years, but expects to average one flight per month over time.

d) Commuter

Caroline Island Air is still expected to be the only commuter airline flying into and out of Pohnpei International Airport, but should see an increase in operations. It is expected that the increase in CIA's operations should correlate with the increase of traffic at PNI.

e) Cargo

With an increase of travelers to Pohnpei the need to import goods should grow. As the private sector develops, there will also be a need to export more goods. This should mean that APA cargo operations into and out of Pohnpei would increase as the demand arises.

3.6.2 Based Aircraft and Aircraft Mix Forecast

There is no expectation that the number of based aircraft will increase. The only based aircraft will be those operated by CIA. The Aircraft Mix is expected to remain the same, with the exception of the addition of the 767 operated by Japan Airlines which may be used for charters.

3.6.3 Critical Aircraft Forecast

The forecast of aircraft mix is used to determine future design, structural, and equipment needs for the airport. The critical aircraft is the most demanding aircraft expected to regularly use the airport within the ultimate (20-year) plan.
Continental Micronesia currently uses a Boeing 737-800 series aircraft. This is the only regularly scheduled aircraft into Pohnpei and is projected to be the only scheduled

aircraft to meet the requirements for critical design aircraft. The critical design aircraft is discussed in greater detail in Chapter 5 Demand Capacity.

3.6.4 Enplaned Passengers

Table 3-15 shows the forecasted growth of enplaned passengers over the forecasted period. The table does not include passengers on CIA flights or other aircraft besides Continental Micronesia.

Table 3-15. Forecast of Enplaned Passengers Departing

Year	Enplaned Passengers		
	Constrained	Base	Optimized
2010	20,716	21,130	21,545
2015	20,716	23,330	26,212
2020	20,716	25,758	31,891
2025	20,716	28,439	38,801
2030	20,716	31,399	47,207

Table 3-16 shows the forecasted growth for passengers per flight for departing aircraft. The number of aircraft operations by Continental Airlines at Pohnpei is expected to stay constant at 365 operations per year. The number of passengers per flight was derived by dividing the forecast of enplaned passengers by the projected number of flights.

Table 3-16. Forecast of Aircraft Passengers per Flight

Year	Passengers		
	Constrained	Base	Optimized
2010	* 57**	58	59
2015	57	64	72
2020	57	71	87
2025	57	78	106
2030	57	86	129

*Numbers rounded to the nearest whole number
** Ten year average

3.6.5 Enplaned and Deplaned Cargo

Tables 3-17 and 3-18 below show the projected forecast for inbound and outbound cargo at Pohnpei International Airport. The tables do not include mail as the amount of mail shipped in and out of Pohnpei is directly related to the number of annual operations by Continental.

Table 3-17. Forecast of Inbound Air Cargo (lbs.)

YEAR	INBOUND		
	Constrained	Base	Optimized
2010	758,339	788,976	820,220
2015	758,339	871,094	997,923
2020	758,339	961,758	1,214,126
2025	758,339	1,061,858	1,477,170
2030	758,339	1,172,377	1,797,203

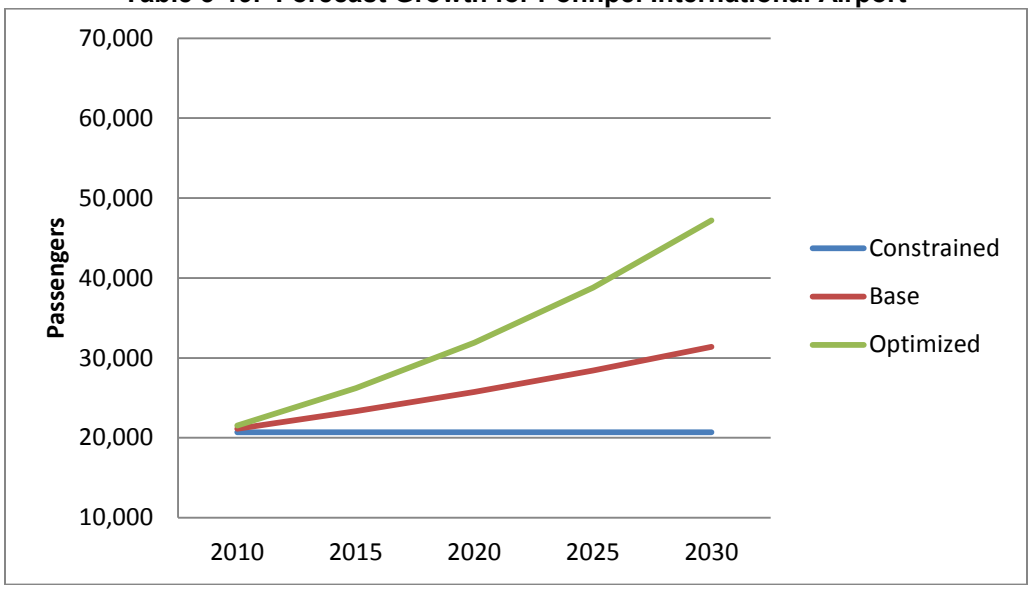
Table 3-18. Forecast of Outbound Air Cargo (lbs.)

YEAR	OUTBOUND		
	Constrained	Base	Optimized
2010	105,060	4,213,891	4,380,762
2015	105,060	4,652,476	5,329,867
2020	105,060	5,136,710	6,484,598
2025	105,060	5,671,343	7,889,505
2030	105,060	6,261,621	9,598,789

3.6.6 Forecast Summary

The National and State Governments are making strides in developing both the private sector and the tourism/visitor industry which should have a positive effect on aviation activity in Pohnpei. With the expansion of the runway, travelers from Japan will be able to fly directly to Pohnpei. Table 3-19 shows the projected forecast for Pohnpei International Airport.

Table 3-19. Forecast Growth for Pohnpei International Airport



The “base case” is shown with a two percent per year growth rate, while the “optimized case” indicates a four percent growth rate and the constrained case specifies a flat growth rate.

Subsequent chapters will utilize the “base case” growth rate as this applies to passenger counts, numbers of flight operations, peak hour conditions, and other parameters that will be useful in determining when facility improvements are needed.

CHAPTER 4: DEMAND CAPACITY ANALYSIS

AIRPORT CAPACITY: AIRSIDE

4.1 INTRODUCTION

Airport capacity can be calculated using the procedures in FAA Advisory Circular 150/5060-5. The title of this Advisory Circular is "Airport Capacity and Delay." The Advisory Circular is over 20 years old, but the procedures, methodology and principles included therein are reasonably appropriate for today's aircraft and operations. However, because this manual is primarily applicable to high volume/high operations airports that are approaching capacity, and plan to increase their capacity, or develop an entirely new airport, it is not appropriate for calculating annual capacity since the demand at Pohnpei International Airport is so far below even the most restricted Instrument Flight Rule capacity.

The FAA methodology for capacity analysis involves a step-by-step process that addresses three components of the airfield's capacity which are determined using the method in FAA AC 150/5060-5, including the hourly capacity of the runways, the annual service volume, and the annual aircraft delay.

Hourly Capacity of Runways: This basic measure of capacity is related to peak hour activity, and regulates the maximum number of aircraft operations that can take place in one hour.

Annual Service Volume: This number refers to the annual capacity or maximum level of aircraft operations that can occur at an airport during one year. This volume can be used as a reference in planning the runway system.

Annual Aircraft Delay: This is a measure of the total delay incurred by all aircraft on the airfield in one year.

4.2 FACTORS AFFECTING CAPACITY

Airfield capacity is defined as the number of aircraft operations that an airfield configuration can process or accommodate during a specified interval of time when there is a continuous demand for service (i.e., an aircraft is always waiting to depart or land).

The capacity of an airport is affected by several factors including the runway/taxiway system (airfield layout), meteorological conditions, aircraft mix, touch and go operations, and percentage of arrivals. These items are described below.

4.2.1 Runway/Taxiway System Capacity

The capacity of the runway/taxiway system is a primary determinant of the level of activity that can take place at the airport. An airport is assumed to reach capacity when the average delay for an arrival or departure exceeds a certain predetermined level. PNI has one runway (9-27) and a single stub taxiway. The layout of both the runway and taxiway are constrained to the current configuration by the lack of available land and Pohnpei's geographical terrain.

4.2.2 Meteorological Condition

Aircraft operating parameters are dependent upon the weather conditions, such as the cloud ceiling height and visibility range on and near the airfield, and more importantly wind, because aircraft land and takeoff into the wind. As weather conditions deteriorate, pilots must rely on instruments to define their position both vertically and horizontally. Capacity is lowered during such conditions because aircraft are spaced further apart when they cannot see each other. Also, some airports such as Pohnpei International Airport may have limitations with respect to their instrument approach capability which impacts capacity during bad weather. The FAA defines three general weather categories, based upon the height of the clouds above ground level and the visibility:

- Visual Flight Rule (VFR): Cloud ceiling is greater than 1,000 feet above ground level (AGL) and the visibility is at least three statute miles. All airports are able to operate under these conditions.

- Instrument Flight Rule (IFR): Cloud ceiling is at least 500 AGL but less than 1,000 feet AGL and/or the visibility is less than three statute miles but more than one statute mile. Aircraft operations are limited if the aircraft and the airport are not equipped with the proper instrument facilities.

- Poor Visibility and Ceiling (PVC): Cloud ceiling is less than 500 feet AGL and/or the visibility is less than one statute mile. Most airports, even those with precision instrument capabilities, have limited operations during these conditions.

This factor is important in determining the percent of time that aircraft operations are conducted under VFR and IFR conditions or below visibility minimums, as the capacity of the airport differs under VFR versus IFR conditions.

4.2.3 Aircraft Mix Index

The operational fleet at an airport influences an airfield's capacity based upon differing aircraft requirements. Various separations are set by the FAA for a number of safety reasons. For example, an airfield's capacity is influenced by the time needed for the aircraft to clear the runway either on arrival or departure. As an aircraft's size and weight increase, so does the time needed for it to slow to a safe taxiing speed or to achieve the necessary speed for takeoff. Therefore, a larger aircraft generally requires more runway occupancy time than a smaller aircraft would. Thus, as additional larger aircraft enter an airport's operating fleet, the capacity for that airfield will be lowered.

There are four categories of aircraft used for capacity determinations under the FAA criteria. These aircraft classifications are based upon the maximum certificated takeoff weight, the number of engines, and the wake turbulence classifications.

Table 4-1. Aircraft Classifications

AIRCRAFT CLASSIFICATIONS			
Aircraft Class	**Maximum Certificated Takeoff Weight (lbs)**	**Number of Engines**	**Wake Turbulence Classifications**
A	12,500 or less	Single	Small
B	12,500 or less	Multi	Small
C	12,500 – 300,000	Multi	Large
D	Over 300,000	Multi	Heavy

Source: FAA AC 5360-5, Change 2, "Airport Capacity and Delay."

The aircraft mix at Pohnpei International Airport contains class A, B and C aircraft. Continental Airlines 737-800 series is the only scheduled aircraft currently using the airport. The mix index is the mathematical expression of the aircraft mix, and is the percent of C aircraft plus three (3) times the percent of D aircraft [%(C+3D)]. The mix index for Pohnpei International Airport is 100 percent.

4.2.4 Percentage of Arrivals and Percentage of Touch and Go's

The percentage of aircraft arrivals is a factor of the ratio of landing operations to the total operations of the airport. This percentage is considered because aircraft approaching an airport for landing require more runway occupancy time than aircraft departing the airfield. The percentage of touch and go's is the ratio of landings with an immediate takeoff to total operations. There are currently no touch and go's at PNI. Arrivals and Departures at the airport are equal, thus arrivals comprise 50 percent of the total operations.

4.3 AIRFIELD CAPACITY ANALYSIS

Pohnpei International Airport should not experience any runway related capacity problems during the planning period. Pohnpei was designed with a paved runway together with a connecting taxiway to the terminal apron to be used for Commercial Service operations (Airport Classification, ARC, D-III), The capacity of the single runway configuration was evaluated within the parameters of US FAA Advisory Circular, AC 150/5060-5 together with the National Plan of Integrated Airport Systems service level criteria and has been determined to be adequate for the foreseeable future.

Flights are managed through the prior notification process for arriving and departing aircraft at Pohnpei International Airport. Ground Communication Facilities under airfield jurisdiction, required operating procedures, the Common Traffic Advisory Facility (CTAF), observation from airport ground vehicles and the Aircraft Rescue and Fire Fighting Station assure the runway is clear.

The runway capacity is assured and adequate for the foreseeable future, subject to the above capability of airport management.

4.4 AIRPORT CAPACITY: LANDSIDE

"Landside" relates to the terminal area facilities that are used primarily for the passenger movements. This area includes the terminal/administrative buildings, the aircraft aprons, fueling area, ARFF facility general aviation facilities, parking and access roads. The following subsections address the abilities of these landside facilities to accommodate existing demand, and to identify the requirements needed to handle future projections.

For the purpose of this Master Plan, the Terminal building is not in these subsections, but will have its own section below.

Design standards for non-hub airports are set forth in Advisory Circular (AC) 150/5360-9, "Planning and Designs of Airport Facilities at Non-hub Locations". Per this advisor circular, facility size requirements, in a number of parameters are generally based on peak hour passenger activity. Although the data provided are general in nature, they are valuable in obtaining a basis to evaluate the capacity and demand at Pohnpei International Airport.

Airport terminals and related vehicle access and parking are planned, sized, and designed to accommodate peak passenger demands of the forecasted period. But planning for absolute peak demands (the greatest demands anticipated), will result in impractically oversized and under-utilized facilities except on rare occasions.

Based upon observations of peak hour operations, the landside and access facilities should accommodate both existing and forecasted demand through the planning horizon. However, there is a correlation between the capacity of landside/access facilities and airline arrivals/departures. It is important to emphasize the role of airport management in taking a proactive role in establishing operational time slots for airlines' arrivals and departures as necessary. Operational control emanating from airport management is crucial in regulating the arrivals/departures throughout the day to avoid congestion and situations that could overwhelm the terminal and landside capacity. A good example would be to avoid having more than two aircraft at a time executing arrival/departure operations simultaneously. This scenario would overtax PNI facilities.

4.4.1 Apron Parking Area

An Aircraft parking apron is usually located adjacent to the passenger terminal. The loading and unloading of passengers, baggage, cargo, and mail, as well as the fueling, servicing, and light maintenance of the aircraft take place at the aircraft parking apron. The distance between the passenger terminal and adjacent runways and taxiways is determined in part by the depth of apron required for the maneuvering and parking of the aircraft. Adequate depth for the apron should be preserved for maneuvering and parking of both current and future aircraft and for apron activities.

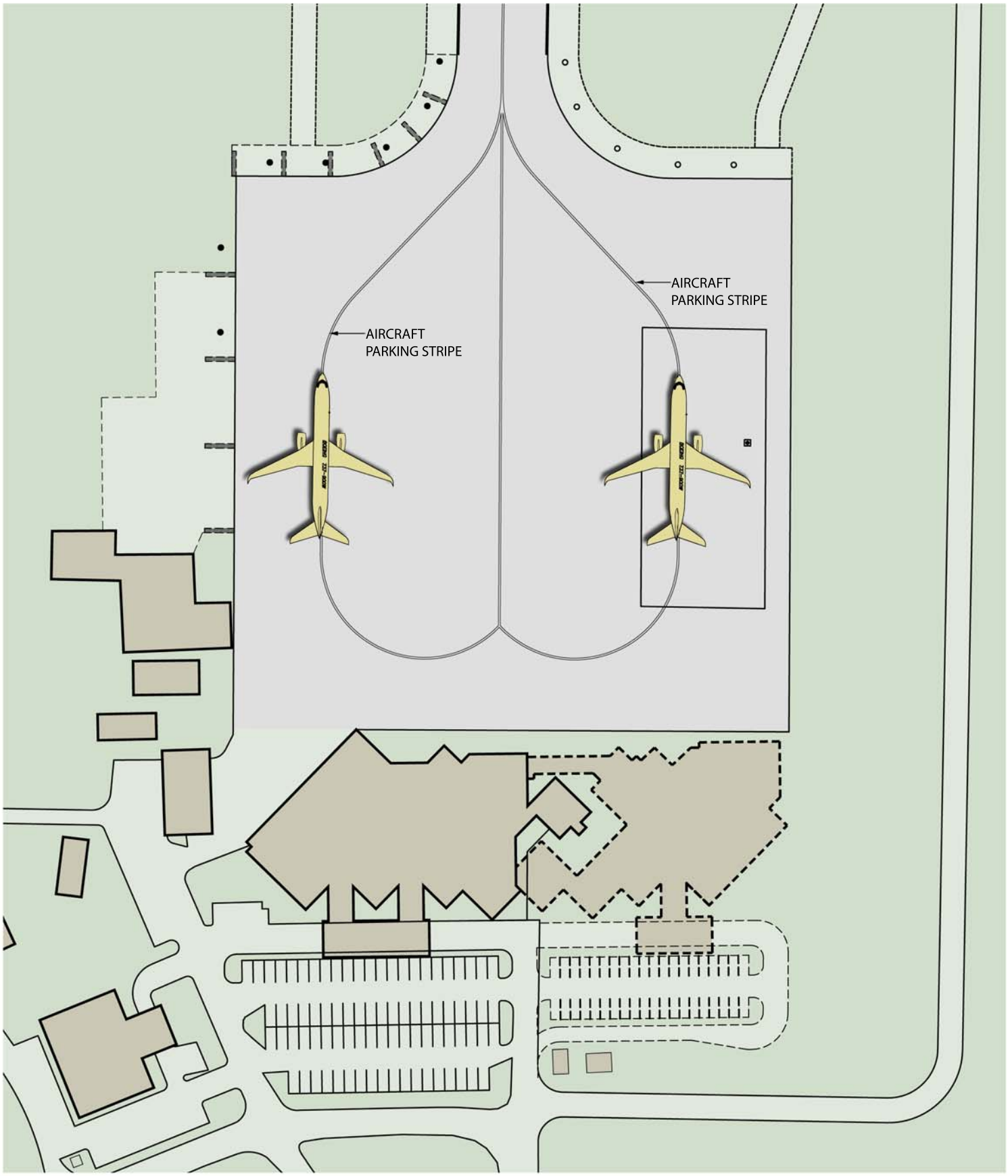


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FIGURE 4-1. APRON LAYOUT PLAN

The existing apron is 450 feet wide parallel to the runway centerline and 446 feet long parallel to the taxiway centerline. There is one concrete hardstand within the apron. The hardstand is 100 feet wide parallel to the runway centerline and 225 feet long parallel to the taxiway centerline. The existing apron has enough parking for two jet aircraft and meets current demand. Currently under construction is an apron expansion; this expansion will take place in front of the CIA hanger area, giving them more room to operate. The expansion is approximately 400 square feet.

4.4.2 Fueling Area

Air carrier and large aircraft jet fuel is obtained via a hose reel and pump/filter system at the east edge of the apron. The pipes serving this system are above ground and are relatively old. They are also single wall and have no leak detection systems. The pipes extend outside the airport to the petroleum tank farm across the road from the terminal. This tank farm is operated by the FSM Petroleum Corporation. This Corporation also operates the portion of the fueling system within the airport and is responsible for its maintenance. The fuel system should have a leak detection system to minimize environmental damage risks. General aviation and other fueling is accomplished via drums and fueling vehicles as necessary.

4.4.3 Commuter Facility

The Small Plane Hangar/ARFF Vehicle Garage Facility is a one-story structure. The hangar is home to Caroline Island Air and the temporary home for the ARFF vehicles while the new ARFF building is being constructed. Once complete, the whole structure should be turned over to CIA to allow for enough space to house its three based aircraft. If CIA purchases any new aircraft or replaces any of its current aircraft with a larger aircraft, the hangar would no longer meet the needs of CIA.

4.4.4 Parking

The AC 150/5360- 9 recognizes that parking requirements and characteristics vary from airport to airport and its guidelines may not meet specific airports needs. Data analyzed at many airports revealed that public automobile parking requirements are more accurately relatable to annual enplaned passengers than to peak hour passengers. According to AC 150/5360-9, the general rule for non-hub airports is that there are 50 parking stalls for every 25,000 annual enplaned passengers. Normally 15% to 25% of

the total public spaces should be allotted to short-term parking (up to 3 hours' duration), with the remaining stalls used for long-term parking.

The existing parking lot is rectangular in shape and consists of two lanes plus the terminal access frontage road. Based on the layout plan, there are approximately 80 vehicle parking spaces in the lot. Several vehicles can also park on the terminal access road for limited periods of time. During several flight arrivals and departures, the lot was observed to be completely filled except for the five spaces reserved for governmental officials that were almost always empty. This figure includes the parked vehicles on the terminal access road. Vehicle counts varied widely, but at the highest peak observed there were more passenger cars and vans in the lot than there were available spaces. This was partially due to improperly parked vehicles and vans occupying as many as four spaces. When the new terminal building is opened, there will be a new terminal access road and two additional lanes of parking containing 40 more parking spaces. These additional stalls will meet the capacity demands for parking at PNI.

4.4.5 Airport Access Road

The terminal roadway system includes the roadway serving the terminal building and associated parking areas as well as the service roads which provide access to terminal support facilities, to the airfield and other nonpublic areas. AC 150/5360-9 states that an adequate vehicular access, efficient circulation, and parking are essential to the success of a passenger terminal.

The airport access road leads to the airport and harbor complex, including both Port Authority and private facilities. This road serves the airport and harbor as well as other public and private facilities. The road is under the jurisdiction of the State government and is reasonably well maintained. However, the road is over 20 years old and should be overlaid, if possible, in the near future. The public enters the airport parking lot and terminal frontage road through the main entrance from the road to the airport and harbor complex.

Access to the airport secure area is through a gate on the west side of the terminal building. This opening is fairly narrow and the roof of the adjacent cargo building has been hit more than once by large vehicles.

4.5 AIRPORT CAPACITY: TERMINAL

Terminal Area Capacity is the ability of the terminal area to accept the passengers, cargo, and aircraft that the airfield accommodates. After determining the airfield capacity, the potential capacity of the terminal can be estimated. Individual elements within terminal areas can also be evaluated to determine overall terminal capacity.

The recently completed Terminal Expansion Project consists of a new 14,692 sq. ft. facility used as the arrival terminal area and the renovation of the existing terminal building has the departure terminal area. The new terminal building (expansion plus existing) will total 35,123 sq. ft. more than doubling the size of the old terminal. This more than meets the expected demand for the terminal building for this planning horizon. The new terminal also improves passenger movement as it has completely separates processing of passengers for arrivals and departures. The Terminal Expansion Project was designed by Nippon Koei Company based in Japan. Figure 4-2 shows the New Terminal Building,

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TERMINAL RENOVATION AND EXPANSION DESIGNED BY JAPAN AIRPORT CONSULTANTS, INC.

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NOT TO SCALE

LAD PROJECT #081-10015-009

TERMINAL PLAN
(UNDER CONSTRUCTION)

FIGURE 4-2

CHAPTER 5: FACILITY REQUIREMENTS

5.1 DESIGN STANDARD ISSUES

Airport design standards are spelled-out in several FAA publications. Design standards for civil airports are set forth in the FAA's Airport Design Advisory Circular. These standards have been applied in the determination of facilities requirements for Pohnpei International Airport. These circulars also recognize that each airport is unique and that some adjustments need to be made to best fit each airport's needs.

5.2 AIRSIDE FACILITIES

"Airside" relates principally to the airfield facilities, which include the runways, taxiways, runway approach surfaces, runway protection zones and navigational aids (NAVAIDS). The following subsections address the ability of airside facilities to accommodate existing and future traffic loads, and to identify the requirements needed to handle future traffic loads.

5.2.1 Critical Design Aircraft

FAA AC 150/5325-4B provides guidance for determining the potential range of critical design airplanes through establishing a "substantial use threshold" of 500 or more annual itinerant operations at the airport (landings and takeoffs are considered as separate operations). If an aircraft were to meet this substantial use threshold, it would be eligible for consideration as a design aircraft. The critical design aircraft for this study is the Boeing 737-800 series. The Boeing 737-800 series aircraft is the only scheduled aircraft that flies into Pohnpei and, with more than 250 arrivals and departures, meets the FAA criteria for critical design aircraft. Continental Airlines, the only scheduled air service provider, has talked about the possibility of changing from the 737 aircraft to a 757 aircraft. If this change were to happen it would switch the critical design aircraft from the 737 to the 757.

Table 5-1. Design Aircraft Criteria

AIRCRAFT	APPROACH SPEED (KNOTS)	MAXIMUM TAKEOFF WEIGHT (LB)	MAXIMUM LANDING WEIGHT (LB)	WINGSPAN (FEET)	LENGTH (FEET)	MAX TAIL HEIGHT (FEET)
Boeing 737-800	142	174,200	146,300	112.6	129.5	41.4
Boeing 757-300	143	273,000	224,000	124.8	178.6	44.8

Source: Boeing

5.2.2 Airport Reference Code

The FAA Advisory Circular 150/5300-13, *Airport Design*, has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the airport reference code (ARC), has two components. The first component, depicted by a letter, is the aircraft approach speed (operational characteristic); the second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan primarily relates to separation criteria involving taxiways, taxi lanes, and landside facilities. Aircraft in lower ARC would be accommodated by a higher ARC (i.e., A-I or a B-II fits into a C-III).

According to AC 150/5300-13, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

- ***Category A:*** Speed less than 91 knots.
- ***Category B:*** Speed 91 knots or more, but less than 121 knots.
- ***Category C:*** Speed 121 knots or more, but less than 141 knots.
- ***Category D:*** Speed 141 knots or more, but less than 166 knots.
- ***Category E:*** Speed greater than 166 knots.

Based on the critical design aircraft's tail height and wingspan, the airplane design group for Pohnpei International Airport is Design Group III.

Table 5-2. Airplane Design Groups

AIRPLANE DESIGN GROUPS (ADG)		
GROUP #	**TAIL HEIGHT (FT)**	**WINGSPAN (FT)**
I	<20	<49
II	20 - <30	49 - <79
III	30 - <45	79 - <118
IV	45 - <60	118 - <171
V	60 - <66	171 - <214
VI	66 - <80	214 - <262

Source: FAA Advisory Circular 150/5300-13, *Airport Design*

The design aircraft (737-800) would give the airport an existing airport reference code (ARC) of D-III. The ARC is not anticipated to change throughout the planning period. However, there is a possibility that Continental Airlines--the only commercial carrier

servicing PNI--is looking into the possibility of using a Boeing 757 for its route through Micronesia. If Continental were to change aircraft, the ARC would change to C-IV.

Table 5-3. Airport Reference Code

AIRCRAFT	AIRPORT REFERENCE CODE
Boeing 737-800	D-III
Boeing 757-300	C-IV

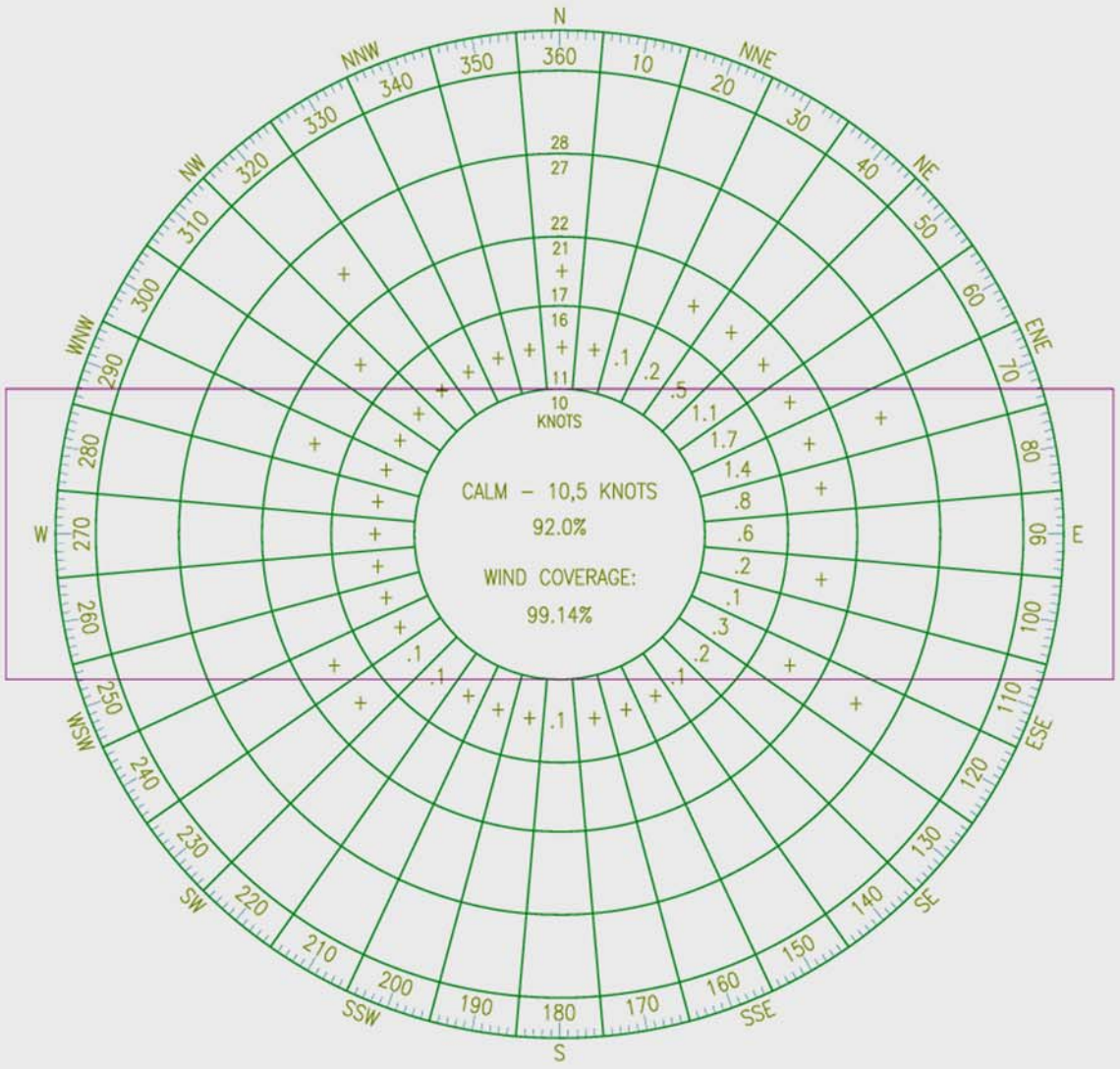
5.3 RUNWAY REQUIREMENTS

5.3.1 Wind Analysis

A factor influencing runway orientation and number of runways is wind. Ideally, a runway should be aligned with the prevailing wind. Wind conditions affect all airplanes in varying degrees. The most desirable runway orientation based on wind is the one which has the largest wind coverage and minimum crosswind components. Wind coverage is the percent of time crosswind components are below an acceptable velocity. Wind coverage is calculated using a wind rose, which graphically depicts wind data collected from the National Oceanographic and Atmospheric Administration (NOAA). The wind rose is essentially a compass rose with graduated concentric circles representing wind speed. Each box in the wind rose represents a compass direction and, when filled, indicates the percentage of time wind travels in that direction at that speed. The desirable wind coverage for an airport is 95 percent, based on the total numbers of weather observations. Pohnpei International Airport exceeds the desired wind coverage with 99.9 percent coverage (Data taken between 1999-2008).

5.3.2 Runway Length Analysis

The runway length required is based on standards presented in FAA AC 150/5300-13, *Airport Design*, Chapter 3 and FAA AC 150/5325-4A, *Runway Length Requirements for Airport Design*. The recommended length for a primary runway at an airport is determined by considering either the family of airplanes having similar performance characteristics, or a specific aircraft requiring the longest runway. This need is based on the aircraft or family of aircraft that use the airport on a regular basis, where regular basis is typically defined as a minimum 500 itinerant operations per year. Additional factors considered include critical aircraft approach speed, maximum certificated takeoff weight, useful load and length of haul, the airport's field elevation above sea level, the mean daily



POHNPEI WIND DATA

1999 - 2008

CALM	0.4%
0-3 KNOTS	6.7%
4-6 KNOTS	44.4%
7-10.5 KNOTS	40.5%
	92.0%

RUNWAY 9-27 - 99.9% COVERAGE AT 16 KNOTS

SOURCE: NOAA NATIONAL DATA CENTERS
U.S. DEPARTMENT OF COMMERCE

POHNPEI WIND ROSE
STATION NUMBER 91348
FILE NAME AN91348A.PRN
NAME POHNPEI, PI
ANNUAL SUMMARY
1999 - 2008
CEILING/VISIBILITY: ALL
PRESENT WEATHER: ALL
HOURS: ALL

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FIGURE 5-1. WIND ROSE

maximum temperature at the airfield, and typical runway surfaces, such as wet and slippery conditions.

Pohnpei International Airport has a single runway, Runway 9-27 the design aircraft 737-800 series needs a runway at maximum takeoff weight (174,200 lbs) of 7,500 feet during VFR conditions.

The current critical design aircraft for Pohnpei is the Boeing B-737-800. It is the design aircraft based on current operations and determinations based on application of the Federal Aviation Administration-National Plan of Integrated Airports System Plan (NPIAS) and grant funding priority under the Airport Improvement Program as amended. The above parameters are within programming planning criteria even though this location may have less than 500 total annual operations and less than a minimum of 2,500 enplanements. This location is grandfathered based on prior grants and being programmed within the NPIAS.

a) Aircraft Landing and Takeoff Calculations

Aircraft Performance is calculated from guidance in US FAA Advisory Circular AC 150/5325-4B, "Runway Length Requirements for Airport Design "for the Boeing B 737-800 Aircraft. The Advisory Circular Guidance for runway design is not to be used for flight operations. Flight operations must be conducted in accordance with applicable aircraft flight manuals.

Table 5-4. Airport and Aircraft Data

AIRPORT AND AIRCRAFT DATA		
Airport Elevation - Sea Level	Zero Wind	Maximum Temp - 86˚F(Standard Day + 27˚F)
Auto Spoilers Operating	Anti-Skid Operating	Maximum Differences in Runway Elevation – 2 ft (Pacific Supplement)

Table 5-5. Aircraft Landing and Takeoff Calculations

BOEING B-737-800	
Max. Landing Design Weight	146,000 lbs.
Max. Takeoff Design Weight	174,200 lbs.
Landing Length - 30˚ Flaps	Wet Runway 6,200 feet, Dry Runway 5,800 feet
Takeoff Length	8,100 feet

The FAR Landing and Takeoff Runway Length Requirements for landing aircraft indicate a dry runway requirement of 5,800 feet and wet runway requirement of 6,200 feet. There is an 8,100 foot takeoff requirement for a maximum takeoff design weight (MTOW) of 174,000 lbs. The Advisory Circular guidance is for airport runway design and is not to be used for flight 0operations. Flight operations must be operated in accordance with the applicable aircraft manual.

b) User Aircraft Landing and Takeoff Recommendations-System Operation Data

Commercial Air Carrier Service for Pohnpei International Airport is provided by Continental Micronesia Airlines. The data in Table 5-6, Runway Landing Length-Airline User Data, includes the landing distances for various aircraft operational configurations and runway conditions. Local and area weather may cause variation in the airport environs and impact aeronautical operations. The scenarios in Table 5-6 include ground operational changes based on a dry runway with light rain, to moderate rain or heavy rain causing a wet runway surface resulting in poor braking action. The data in the table specifies the Runway Condition and Braking Action associated with Normal and Non Normal Landing Conditions.

Table 5-6. Runway Landing Length – Airline User Planning Data

RUNWAY LANDING LENGTH - AIRLINE USER PLANNING DATA				
Runway Conditions	Normal Landing	Non Normal Landing	Landing	Non Normal Landing
Braking Action (BA)	Configuration	Configuration	Configuration	Configuration
	Flap 40 degree	One-Engine Inoperative	Anti-Skid Inoperative	One Engine Inoperative
	Braking Maximum V Ref 40 knots	Flaps 1 to 15 degrees	Flap 1 to 40 degrees	Hydraulics A/B System Inoperative
	Landing Distance	Landing Distance	Landing Distance	Landing Distance
New, Dry, Clean, Normal (BA)	3298 feet	3338 feet	5302 feet	4956 feet
Island, Day, Intermittent Rain, Good (BA)	4618 feet	4730 feet	5922 feet	6158 feet
Moderate Rain, Fair (BA)	6235 feet	6814 feet	7524 feet	8550 feet
Heavy Rain, Poor (BA)	8758 feet	9354 feet	10,100 feet	11058 feet

Two major impacts to planning aeronautical facilities and aircraft operations in Micronesia are the distances between airports and changes in the weather. The

Weather Forecast Office (WFO-Guam) provides routine daily forecasts for the FSM. Heavy weather alerts and Tsunami forecasting are also part of their services.

Normal operations are conducted in light to moderate rain. All runways are grooved to increase braking action. The non-normal and anti-skid inoperative landing distance in moderate rain covers a range of 6,235 to 7,524 feet. For planning purposes, the landing length for the design aircraft Boeing B 737-800 at maximum design landing weight on a dry runway is 5,800 feet and for the wet runway is 6,200 feet. In a balanced runway concept, a runway landing length between 6,235 and 6,814 feet, fair breaking action in moderate rain (wet runway) is an applicable planning parameter for a normal and/or non-normal landing with one engine inoperative. Based on consideration of available land area, a cost analysis and using the balanced runway concept, a 6,500 foot landing runway length would be acceptable in the initial 5 year planning time period. This allows the air carrier to plan for enroute landing weights at those airports with lesser loads and variable operational cycles.

The following landing runway length for a Current (5 year), Intermediate (6 to 10 year), and Long Term (10 to 20 year) plan for Pohnpei International Airports is based on the design aircraft operational requirements and to meet forecast utilization and needs.

Table 5-7. Recommended Runway Length

RUNWAY LENGTH			
	0 to 5 years	6 to 10 years	10 to 20 years
Pohnpei International Airport	6,500 feet	6,500 feet	6,500 feet

With the runway extension currently under construction, PNI runway will be expanding from 6,000 feet to 6,579 feet. This meets the minimum recommended runway length.

5.3.3 Runway Width

Runway width is a dimensional standard that is based upon the physical characteristics of the aircraft using the Airport. The most important physical characteristic is the wingspan. The FAA Advisory Circular 150/5300-13, “Airport Design,” recommends a

runway width for a Design Group III aircraft of 100 feet with 20 foot shoulders, unless the airport is used by aircraft exceeding 150,000 pounds, in which case the runway width should be increased to 150 feet and the shoulders increased to 25 feet. Presently, Runway 9-27 is 150 feet wide with 25 foot shoulders. Thus, a runway widening is not necessary.

5.3.4 Pavement Strength

Aircraft weight characteristics also affect the design of an airport. Pavement design of the runways, taxiways, and aprons is based on a design aircraft. The design aircraft is different from the critical aircraft described previously. The design aircraft is determined by landing gear configuration (i.e., single wheel, double tandem, etc.), and the known or forecast number of operations of aircraft with the heaviest maximum gross takeoff weights. The dual wheel main gear, 174,200 pound maximum takeoff weight Boeing 737-800 series is expected to be the most demanding aircraft to frequent PNI. The current strength rating on Runway 9-27 is 75,000 lbs. for a single wheel aircraft, 170,000 lbs. for a dual wheel aircraft and 290,000 lbs. for a double tandem wheeled aircraft.

The International Civil Aviation Agency, (ICAO), standard for reporting airfield pavement strength is the Pavement Classification Number, (PCN). The United States FAA is presently transitioning airport pavement strength reporting into this international system. The information and guidance for determining the PCN is provided in FAA Advisory Circular AC 150-5335-2B. Two approaches may be used to calculate the airport PCN. These are the “using” aircraft method or the “technical” evaluation method. Briefly, the “using” aircraft method determines the Aircraft Classification Number (ACN), of the most critical aircraft using the airport. See the Advisory Circular for more information on the definition and determination of the aircraft ACN. Generally this aircraft ACN number is then published as the airport PCN. The “technical” method allows evaluation of a range of aircraft including those that might use the airport in an emergency situation or for expansion of air services to the community. This method provides a PCN value that considers the aircraft wheels and the pavement structure that must support the aircraft loads.

The “technical” evaluation method was used to prepare PNI’s PCN values. The Pohnpei International has a flexible PCN value of 76/F/C/X/T. This value will permit reasonable unrestricted use by any civilian or military aircraft that might chose to operate at the

airport. A rigid PCN value was not calculated due to the condition of the exiting rigid hardstand.

5.3.5 Pavement Condition Index

Proper maintenance of airfield pavements is considered an important part of airport safety and economic operation of airports. The Federal Aviation Administration (FAA) has also recognized the significant benefit of having some formal requirement for a pavement maintenance program at all airports and has encouraged airports to have such a program in place. The advantage of using a formal pavement maintenance program with regularly scheduled maintenance activity ensures that the cost of pavement maintenance is reduced and pavement performance optimized.

The MicroPAVER™ procedure describes the pavement condition by assigning a value from 0 – 100 to the represent the pavement condition. This value is known as the Pavement Condition Index (PCI) of the pavement. A brand new pavement is assigned a PCI of 100 at the time of completion. A major project, such as an overlay, is also assigned a PCI of 100. As each subsequent pavement survey is made, the information is used to compute a new PCI. Each individual airport can create its own standards, but the US Air Force guidelines recommend that localized preventive work should be continuous at all times. When the PCI declines to 70 global preventive maintenance work should be undertaken to inhibit further rapid deterioration. In the event the pavement declines to a PCI of 50, major rehabilitation projects should be undertaken.

A maintenance survey was conducted in 2011 using MicroPAVER™, the runway PCI was calculated as 100 in 2011. A complete reconstruction of the Runway was completed in April of 2011.

5.3.6 Runway Grades

The FAA Advisory Circular 150/5300-13, "*Airport Design*," allows a maximum longitudinal grade of 2.0% for A and B type runways and 1.5% for C and D runways. Gradient changes shall be such that any two points five feet above the runway centerline shall be mutually visible for the complete length of the runway. The effective gradient of the existing runway is 0.00% according to the Airport Layout Plan.

5.3.7 Runway Blast Pad

Runway Blast Pads for ARC D-III airports are required to be 140 feet wide, except when serving Group III aircraft with a maximum takeoff weight greater than 150,000 pounds. For these aircraft, the width of the blast pad is required to be 200 feet wide, which is the same required width for ARC C-IV airports. The required length for runway blast pads for both ARC D-III and C-IV is 200 feet. The two existing blast pads are 70 feet long and 150 feet wide. The pads will be widened to 200 feet in width as part of the runway shoulder project currently underway.

5.4 SAFETY AREA STANDARDS

The FAA has established several safety surfaces to protect aircraft operational areas and keep them free from obstructions that could affect their safe operation. These include the runway safety area (RSA), object free area (OFA) and runway protection zone (RPZ). The dimensions of these safety areas are dependent upon the critical aircraft ARC and approach visibility minimums. The entire RSA is required to be on airport property. If necessary design standards push the RSA beyond the airport property line, then fee simple acquisition will need to be undertaken. The OFA and RPZ can extend beyond airport bounds as long as obstructions do not exist in these areas. It is not required that the RPZ be under airport ownership, but it is strongly recommended.

5.4.1 Runway Safety Area (RSA)

RSA standards are defined in AC 150/5300-13 section 305, while construction standards are found in AC 150/5370-10 P-152. According to AC 150/5300-13 section 305, the RSA must be centered on the same line as the center of the runway and the RSA must be cleared, graded and have no hazardous surface variations. For ARC C-III airports the RSA length must be 1,000 feet beyond the runway end, and its required width is 500 feet, these requirements are also the design standards for an ARC C-IV airport.

The current RSA's are non-standard falling well short of the dimensions mandated by AC 150/5300-13.

Table 5-8. Runway Safety Area

RUNWAY	REQUIRED LENGTH	ACTUAL LENGTH	REQUIRED WIDTH	ACTUAL WIDTH
9	1,000 ft.	70 ft.	500 ft	500 ft.
27		80 ft.		500 ft.

Source: FAA AC 150/5300-13 Table 3-3

An Airport Certificate holder in accordance with US Federal Aviation Administration (FAA), Federal Aviation Regulation (FAR) Part 139, Section 139.309, Safety Areas, must maintain for each runway and taxiway that is available for air carrier use, a Safety Area of at least the dimensions that; (1) existed on December 31,1987 if no reconstruction or significant expansion of the runway or taxiway was begun after January 1,1988 or (2) were authorized at the time construction, reconstruction or expansion began after January 1, 1988. While the current runway expansion would appear to require PNI to upgrade its RSAs to meet FAA and ICAO standards, however, expansion of the RSA would mean reclaiming land on each end of the runways which at this time is not feasible. The FAA ruled that Pohnpei international Airport can retain its “grandfather” status and operate with non-standard length RSAs.

A Runway Safety Area (RSA) Inventory was completed in September 2000 by the Federal Aviation Administration for airports certificated under Federal Aviation Regulation (FAR) Part 139 using guidance included in FAA Order 5200.8, Runway Safety Area Program. Those runway ends which could not meet the standard due to natural obstacles, property limitations, environmental constraints and local developments required the evaluation of alternatives to conform to the safety requirements expected from the 1000 foot long and 500 foot wide RSA standard.

Engineered Materials Arresting System (EMAS) provides a level of safety that is generally equivalent to a full Runway Safety Area (RSA) built to the dimensional standards in US Federal Aviation Administration (FAA) Advisory Circular AC 150/5300-13, Airport Design. At locations with natural obstacles, environmental constraints, local development and/or property limitations to providing the standard 1000 foot safety area at each end of the existing runway or a planned runway extension, the FAA has accepted the use of EMAS subject to an economic or cost benefit evaluation. A 600 foot long EMAS installation is considered by FAA to be functionally comparable to the standard 1000 foot safety area.

EMAS is not acceptable for providing additional safety area due to the short runway length at Pohnpei International Airport. Without reclaiming more land at the runway ends, installation of EMAS would shorten the operational length of the runway. It is recommended that the runway safety area be designed to use existing runways and not reduce operational lengths.

5.4.2 Object Free Area (OFA)

The runway Object Free Area (OFA) is "a two-dimensional ground area, surrounding runways, taxiways, and taxi lanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The OFA is centered on the runway, extending out in accordance to the critical aircraft design category utilizing the runway. For ARC D-III aircraft, the FAA calls for the OFA to be 800 feet wide (centered on the runway), extending 1,000 feet beyond each runway end. Runway 9-27 currently does not meet OFA standards. The airport is surrounded by mangrove forest. The forest creeps within the 800 feet wide boundary of the OFA, necessitating that the mangroves be cleared to establish the OFA.

5.4.3 Approach Surfaces and Runway Protection Zones

The approach surface and the runway protection zone are important elements in the design of runways that help insure the safe operations of aircraft. A brief description of these two are as follows:

- The approach surface is an imaginary inclined plane beginning at the end of the primary surface, and extending outward to distances up to 10 miles, depending on runway use. The approach surface governs the height of objects on or near the airport. Objects should not extend above the approach surface. If they do, they are classified as obstructions and must either be marked, lowered or removed.

- The runway protection zone (RPZ) is an area at ground level that provides for the unobstructed passage of landing aircraft through the above airspace. The runway protection zone begins at the end of the primary surface, and has a size which varies with the designated use of the runway.

Federal Aviation Regulation Part 77 indicates that the approach surface should be kept free of obstructions to permit the unrestricted flight of aircraft in the vicinity of the airport. As the approach to a runway becomes more precise, the approach surface increases in size, and the required approach slope becomes more restrictive. The existing and ultimate Part 77 surfaces for the runway are listed below in Table 6-5.

The runway protection zone is the most critical safety area under the approach path and should be kept clear of all obstructions. No structure should be permitted within the runway protection zone. It is therefore desirable that the airport owner acquire adequate

property interests in the runway protection zone to insure compliance with the above. The required size of the runway protection zone is shown in Table 6-5.

Table 5-9. Runway Protection Zone

RUNWAY PROTECTION ZONE			
	Runway End	9	27
	Approach Category	D	D
	Visibility Minimums	Greater Than 1 Mile	Greater Than 1 Mile
RPZ	Length – L	1,700 feet	1,700 feet
	Inner Width – W1	500 feet	500 feet
	Outer Width – W2	1,010 feet	1,010 feet
	Acres	29.5	29.5
Approach	Length	10,000 feet	10,000 feet
	Inner Width	500 feet	500 feet
	Outer Width	4,000 feet	4,000 feet
	Slope (H=Horiz. V+vert.)	34:1	34:1

Source: FAA AC 150/5300-13

5.5 TAXIWAYS REQUIREMENTS

FAA Advisory Circular AC 150/5300-13 provides taxiway and taxi lane criteria for pavement width, shoulder width and safety area width. The criteria also provide dimensions for the distance from the taxiway or taxi lane centerline to any object. The dimensions for taxiways and taxi lanes serving Group III and Group IV aircraft are:

Table 5-10. Taxiway Requirements

CRITERIA	REQUIRED WIDTH (FEET)		CENTERLINE TO EDGE (FEET)	
	Group III Aircraft	Group IV Aircraft	Group III Aircraft	Group IV Aircraft
Pavement width	50	75	25	37.5
Shoulder width	20	25	45	62.5
Safety area width	118	171	59	85.5
Taxiway Object free area width	186	259	93	129.5
Taxi lane Object free area width	162	225	81	112.5

Source FAA AC 150/5300-13

The required width for ARC D-III taxiway is 50 feet, except for Class III airplanes with a wheel base greater than or equal to 60 feet. The standard taxiway width for these aircraft is 60 feet. The existing taxiway is 75 feet wide with no paved shoulders. The taxiway rehabilitation project will maintain the taxiway width at 75 feet wide in the central portion between the apron and runway but will have wide tapers at each end. This design will

permit easy turning by aircraft to and from the runway and apron. The future taxiway will also have 25 foot wide paved shoulders.

a) Taxiway Safety Areas:

The taxiway safety area, centered on the taxiway centerline, should be 118 feet wide for Group III aircraft and 171 feet wide for Group IV aircraft. The larger width for Group IV aircraft is available at the Pohnpei taxiway. Except for the structural pavement, the entire safety area is unpaved. Some portions of this safety area flood during high tides. There is plant growth on this surface and it requires constant mowing. The surface becomes soft during periods of heavy rain and high tides. The entire area should be graded sufficiently to be above the high tides and compacted to support aircraft loads.

b) Taxiway Obstacle Free Areas:

There are two criteria that might apply to this taxiway. The taxiway object free area criteria require larger clearances than the taxi lane criteria. Taxi lane criteria are intended to apply to areas where the pilots are aware of limitations and are exercising greater care in maneuvering the aircraft. The taxiway object free area width is 186 feet for Group III aircraft and 259 feet for Group IV aircraft. There are no objects within this restricted area. There are no criteria that require this area to be filled or able to support vehicles. However, the plan should provide for this area to be filled and capable of supporting crash rescue equipment, as well as maintenance equipment. This will also facilitate efforts by the airport in keeping the growth within this area under control.

5.6 APRON REQUIREMENTS

The existing apron is 450 feet wide parallel to the runway centerline and 446 feet long parallel to the taxiway centerline. There is one hardstand within the apron. The hardstand is 100 feet wide parallel to the runway centerline and 225 feet long parallel to the taxiway centerline.

a) Apron Safety Areas:

Except on the terminal building and the southern portion of the west sides, there are no obstacles within 92 feet of the other three edges of the apron. Assuming the

aircraft centerline is at least 37.5 feet inside the edge of the apron, the taxiway safety area criteria are met for Groups III and IV aircraft.

b) Apron Object Free Areas:

There are two criteria that may apply to the apron. The taxiway obstacle free criteria require larger clearances than the taxi lane criteria. Taxi lane criteria are intended to apply to areas where the pilots are aware of limitations and are exercising greater care in maneuvering the aircraft. Taxi lane criterion applies to the apron. The taxi lane obstacle-free dimension width from the centerline used by the aircraft on the apron is 81 feet for Group III aircraft and 112.5 feet for Group IV aircraft. On the portion of the apron closest to the runway these criteria are met. However, buildings and other objects alongside the western portion of the apron require careful maneuvering of aircraft to preclude hitting anything. These criteria are met by locating the aircraft guidance stripes at the proper distance from any obstructions and providing aircraft specific wingtip clearances discussed below.

c) Apron Wingtip Clearances:

These criteria may be used for specific aircraft in specific locations. At Pohnpei these criteria apply to the clearances from the aircraft to any other object, including aircraft. The required wingtip clearance for Group III aircraft is 21 feet and 27 feet for Group IV. This clearance can be available for both aircraft types at this airport. However, the existing striping precludes adequate wingtip clearance for larger aircraft. Clearance can be provided by manual guidance on an occasional basis or by providing new striping.

5.7 AIRFIELD MARKING, LIGHTING, AND NAVIGATION REQUIREMENTS

5.7.1 Airfield Markings

Guidance for marking airfield pavements is set forth in AC 150/5340-1F, Marking of Paved Areas and Airports. As stated in the AC, “Runway and taxiway markings are essential for the safe and efficient use of airports, and their effectiveness is dependent upon proper maintenance to maintain an acceptable level of conspicuity.”

a) Runway Markings:

The runway at Pohnpei International Airport currently has only non-precision markings. The basic elements comprising this type of marking are as follows:

- Marking colors (runway marking is white)
- Runway centerline marking
- Designation marking (runway end identity)
- Threshold marking
- Fixed distance marking (to inform pilot of remaining available pavement)
- Holding position markings (for taxiway/runway intersections)
- Touchdown zone markings (an aiming point usually 1,000 feet from the landing threshold)
- Side stripes (edge of runway)

Blast pads, stopways, and paved safety areas must also be appropriately marked in accordance with the AC. It is emphasized that frequent maintenance is essential in assuring that pavement markings are clearly visible.

The runway is presently marked as a non-precision instrument runway conforming to FAA and ICAO criteria. The current projects will provide precision instrument runway markings.

b) Taxiway Markings:

The current stub taxiway shall continue to be appropriately marked in accordance with the FAA Advisory Circular. These markings include:

- Marking colors (taxiway marking is yellow)
- Taxiway centerline marking
- Taxiway edge marking
- Holding position markings (at runway intersection)

The taxiway markings will conform to current FAA and ICAO criteria when the current project is completed.

5.7.2 Airfield Lighting

Guidance for airfield lighting is set forth in FAA AC's 150/5340-4C, -19, and -24. These AC's refer to runway and taxiway edge lighting, runway and taxiway centerline lighting, and touchdown zone lighting. Airfield lighting is necessary to operate the airport during periods of darkness and low visibility due to inclement weather conditions.

The existing runway has Medium Intensity Runway Lighting (MIRL). An airport beacon (white/green) signifying a lighted land airport, and a lighted wind indicator/segmented circle are also part of the airfield lighting system. Runway lighting can be activated by the pilot via the CTAF frequency.

Under PNI's current capital improvement project the airfield lighting is being updated to meet all design requirements.

5.7.3 Airfield Signage

The Standard for Airport Sign Systems, AC 150/5340-18B is the guidance for signage on airports. There are three basic color-coded sign types that provide information to the pilots on the airfield. The three types are as follows:

- Mandatory instruction signs (intersections and critical areas)
- Information signs
- Runway distance remaining signs

Under PNI's current capital improvement project the airfield signage is being updated to meet all design requirements.

5.7.4 Airspace and Navigation Aids

Enroute and terminal navigational aids help increase the overall airport and airway systems for VFR pilots, IFR pilots and the general public through increases in communications and in controlled aircraft separations. Typical enroute instrument aids include Nondirectional Radio Beacons (NDB), Very High Frequency Omnidirectional Range (VOR), and Distance Measuring Equipment (DME). Typical terminal area visual aids include Visual Approach Slope Indicators (VASI), Precision Approach Path Indicators (PAPI) and Runway End Indicator Lights (REIL).

The lack of visual and navigational aids at an airfield can limit the airport's ability to accommodate aircraft operations during periods of darkness and poor visibility associated with inclement weather. For this reason, an analysis of both visual aids (VISAIDS) and electronic navigational aids (NAVAIDS) is an important part of an airport's expansion planning.

a) Visual Aids (VISAIDS) to Navigation:

The current visual aids at Pohnpei International Airport include:

- Runway End Identifier Lights (REIL) for both runways 9 and 27
- Visual Approach Slope Indicator (VASI) for both runways 9 and 27

These visual aids are connected to the airfield lighting circuit and can be activated by pilots in the area via an air to ground interface by utilizing the CTAF frequency. The full complement of airfield lighting and visual aids can be activated without need for on duty ground personnel. This level of airfield lighting and VISAIDS allows night flight operations.

b) Electronic Navigation Aids (NAVAIDS):

Pohnpei International Airport is currently served with a single Non-Directional-Beacon (NDB) which is coupled with Distance Measuring Equipment (DME).

CHAPTER 6: UTILITIES

A Facilities and Systems Maintenance Plan for Pohnpei International Airport was recently completed and covers existing structures, infrastructure, and supporting systems that are currently in place to facilitate airport operations. This Maintenance Plan identifies tasks, frequency and budget costs for implementation of the Plan to ensure that Pohnpei International Airport can continue to safely operate and provide reasonable passenger accommodations at the current level of service.

This Utilities Chapter uses information from the Maintenance Plan to show existing conditions and recommended routine maintenance. Unlike the Maintenance Plan, this section will also recommend ways to enhance airport operations, as well as plans for the future needs.

It is noted that there are several new facilities either under construction or planned for construction in the near future such as:

1. New Arrivals wing for the Main Terminal Building.
2. Departure Wing for the Main Terminal Building – contracted construction project to convert the existing terminal building into the Departure Wing of the Main Terminal Building.
3. Replacement Generator/Power Vault (under construction).
4. Aircraft Rescue and Fire Fighting (ARFF) Facility (under construction).

These facilities are not addressed by this Utilities Chapter; also not included in this chapter are Continental's Air Cargo Building adjacent to the Main Terminal Building and the Pohnpei Port Authority Administration Building. Continental's Air Cargo Building is not included since it is owned, operated, and maintained by Continental Airlines and is not the responsibility of Airport Management. The Pohnpei Port Authority Administration Building is not included as it is not strictly or directly involved in the everyday operations of the airport complex.

6.1 POWER

Electricity for the airport is provided by the Pohnpei Utilities Corporation (PUC). PUC is a unit of the government of the State of Pohnpei. It was established in 1991 by the Pohnpei State Legislature with the responsibility of providing electrical power for Pohnpei.

6.1.1 Airfield Electrical Systems Responsibilities

Responsibilities for electrical systems associated with airfield operations are divided. The FAA is ultimately responsible for all maintenance associated with their systems, even though they may request assistance from Pohnpei State personnel for simple tasks.

FAA Electrical Systems:

- Precision Approach Path Indicator (PAPI)
- Non-Directional Beacon (NDB)
- Distance Measuring Equipment (DME)
- Runway End Identifier Lights (REIL)
- Aeronautical/Aerodrome Flight Information Service (AFIS) Radio and Antenna
- NDB/DME Antenna Tower

FAA power vault located adjacent to the existing Pohnpei State Power Vault for the Airfield. This vault supports the PAPI and REIL power supplies and includes:

- Engine-generator set
- Automatic transfer / isolation-bypass switches
- Daytank

Pohnpei State Maintained Electrical Systems:

- Windsocks – multiple locations on the airfields. All the wind cones are equipped with floodlighting. Some of the wind cones are energized by the Airfield Power Vault, while the remaining wind cones utilize photovoltaic panels and storage batteries to serve as stand-alone devices.
- Rotating Beacon – located on top of a pole near the Generator/Power Vault.
- Series circuit regulators/constant current transformers for runway, threshold, and taxiway edge lights.
- Edge lighting is provided for taxiway and the main runway. Threshold lights are provided at both ends of the runway.
- Non-Illuminated runway distance markers and directional signage are being utilized.
- Aviation lighting system is energized from two (2) series circuit regulators/constant current transformers. 10 kVA, 208 volt, 60 Hz, 54 FLA, single phase input with 4.8/5.5/6.6 ampere output current steps.
- The existing two (2) each series circuit regulators/constant current transformers for airfield lighting are both energized. One of the units supplies runway lights and the

second unit supplies taxiway and apron lights.

The series circuit for lighting system components that Pohnpei State is responsible to maintain (versus FAA responsibility) is located within the generator/power vault located between the Continental Airline Air Cargo building and the Caroline Island Air Hangar/ARFF Vehicle Garage.

6.1.2 Generator/Power Vault

The Power Vault Structure houses an electrical equipment room and the AFIS office.

The AFIS office will eventually be relocated to the new ARFF. However, as the timing of the new ARFF construction is not clearly defined, the AFIS office will need to be maintained for an indefinite basis.

The Power Vault receives incoming secondary voltage utility power via an overhead server drop from Pohnpei Utilities Corporation (PUC). This secondary service feeder originates at a 3-75kVA (225kVA total) transformer bank on a utility pole that is 4 pole spans away from vault location. This overhead secondary service is tapped along its path to also supply power to the Airport Administration Building and a commercial warehouse before reaching the vault location. It also supplies the Small Plane Hangar / ARFF Vehicle Garage described below.

The electrical room houses the power supplies and controls for airfield electrical and lighting systems. The power vault does not have its own emergency generator to backup Pohnpei State's airfield electrical equipment. Backup power is supplied by the FAA's generator located in the FAA vault immediately adjacent to the Pohnpei State Power Vault. PUC utility meter 64-704-421 is used for utility company billings for airfield electrical systems power consumption.

A new Generator/Power Vault is currently under construction and will replace the existing power vault entirely. However, the old Power Vault will need to remain operational to service the AFIS office until it can be relocated to the planned Aircraft Rescue and Fire Fighting (ARFF) facility in the future.

6.1.3 Main Terminal Building Electrical Systems

a) Incoming Power Service

Incoming power from Pohnpei Utilities Corporation (PUC) is delivered at 13.8 kV, 3 phase, 3 wire. Primary power (13.8 kV) is delivered from the PUC overhead distribution system along the public roadway fronting the airport compound. A three 75-kVA each pole-top service transformer bank (225kVA total capacity) is used to step down from 13.8 kV to the 208Y/120 volts, 3 phase, 4 wire secondary distribution voltage. The transformer bank is mounted on a utility pole along the public roadway immediately fronting the Main Terminal Building parking lot. A secondary service feeder is routed underground from the transformer bank to the Main Terminal Building and terminates at a main disconnect switch within the Utility Room of the facility.

b) Emergency Power Supply

The Main Terminal Building relies solely upon PUC for its power needs. There is no engine-generator set to support the facility in the event of a utility power outage. There are no provisions to hookup a portable emergency generator set in the event of an extended utility power outage. Continental Airlines has installed an emergency generator to support its operations within the Utility Room. Airport Management has no responsibility for use or maintenance of this generator.

c) Electrical Service Equipment

Electrical Service Equipment is located within the Utility Room of the Main Terminal Building. Individually mounted circuit breakers, disconnect switches, and panelboards are used as service disconnecting means and to subdivide incoming secondary power for the various users occupying the Main Terminal Building.
The service disconnecting means receives incoming secondary service from the 225 kVA transformer bank on the utility pole fronting the Main Terminal Building.

Each major user of electricity has his consumption monitored by a billing meter. The following meters are located within the Utility Room:

a. Meter 24-458-376, Continental Airlines
b. Meter 56-691-270, User unidentified

c. Meter 24-348-969, User unidentified
d. Meter 3409464, Customs Office
e. Meter 2125606, Immigration Office
f. Meter 3410036, User unidentified
g. Meter 3410026, User unidentified
h. Meter 3410023, User unidentified

There exists insufficient space between existing electrical equipment and the Continental Airlines emergency generator to provide electrical code mandated clear workspace access. Many of the covers for electrical equipment have been removed, exposing live busses, terminals and wirings.

The utility room door has been removed, thus exposing electrical equipment to the weather and salt laden air. This further aggravates the missing cover condition noted above. Wiring methods used to interconnect electrical equipment do not conform to code. PVC plumbing pipes with 90-degree elbows (versus sweep bends for electrical conduit) is prevalent and poses a significant electrical code violation, as well as excessive stress upon the integrity of conductor insulation.

6.1.4 Hangar Electrical Systems

a) Incoming Power Service

Incoming secondary power from Pohnpei Utilities Corporation (PUC) delivered at 208/120 volts, single phase, 3 wires via overhead service drop. Overhead service drop tied into the same secondary service used to deliver power to the Airfield Power Vault. The secondary service originates at a 3-75 kVA (225 kVA total) transformer bank on a utility.

b) Emergency Power Supply

The Small Plane Hangar/ARFF Vehicle Garage relies solely upon PUC for its power needs. There is no engine-generator set to support the facility in the event of a utility power outage. There are no provisions to hook up a portable emergency generator set in the event of an extended utility power outage.

c) Electrical Service Equipment

Electrical Service equipment is located within the hangar bay of the building. The

secondary service drop is routed to two billing meters that are identified as 2598966 and 2865981. The area served by each meter is unknown. There are no main circuit breakers or disconnect switches at the billing meters – a serious violation of electrical code.

Wiring methods used to interconnect meters and electrical equipment do not conform to code. PVC plumbing pipes with 90-degres elbows (versus sweep bends for electrical conduits) is prevalent and poses a significant electrical code violation, as well as excessive stress upon the integrity of conductor insulation.

6.2 COMMUNICATION

a) Main Terminal Building

There is no telephone EPBAX system utilized for administrative phones. Land line phones are located only at point of use. Pay phones are located in the terminal area for public use. The Main Terminal Building also has WiFi (wireless) connectivity for the general public. The WiFi system is owned and operated by PUC.

b) Hangar Facility

There is no telephone EPABX system used for the administrative phones. Land line phones are located at point of use, and there is one public pay phone existing.

c) Radio System

Radio system is used for airport security operations. Security personnel carry portable radios to remain in contact with each other. Head-end equipment is located in the AFIS office.

6.3 POTABLE WATER / SANITARY SYSTEM / STORM WATER SYSTEM

6.3.1 Potable Water

Pohnpei's water system is owned and managed by the Pohnpei Utilities Corporation (PUC). Over the last few years, the potable water system has been extended to include all of Kolonia and most areas within three other municipalities. The expansion has included part of Madolenihm, and resulted in the transfer of the management and

operations of the capital water system from the FSM government to the PUC. Water supply is achieved by river diversion and multiple wells. PUC provides water to Pohnpei International Airport.

a) Terminal Building (Existing Terminal Bldg/Future Departure Wing)

PNI's terminal has standard plumbing for building occupancy in use within the Main Terminal Building, consisting of lavatories (15 each), water closets (18 each), and urinals (6 each). There are also janitor service sinks (2 each) in different areas of the Main Terminal Building and one (1) kitchen sink for the VIP departure lounge.

Water heating is not provided for general use within the Main Terminal Building. The existing single (1) water storage tank in the utility room of the Main Terminal Building provides a supply of water in the event of the utility water system outage. A pump is used to draw water from a catchment system to fill the storage tank.

b) Hanger Facility

The hangar facility has standard plumbing for building occupancy in use, consisting of lavatories, water closets, and urinals. Water heating is not utilized.

6.3.2 Sanitary Sewer

Wastewater management, collection, and treatment are limited to the population center of Kolonia and the surrounding areas. Sanitary sewage at the airport is through an onsite septic tank and leach field.

6.3.3 Storm Water System

a) Runway Drainage Systems.

Drainage is by sheet flow, essentially sloped perpendicular away from the centerline of the runway. There are no paved or unpaved drainage ditches within the safety area dimensions. There are no underground drainage systems within the limits of the runway safety areas. The runoff is directed through the mangroves on both sides of the runway.

b) Taxiway Drainage Systems

Drainage is by sheet flow. There are no paved or unpaved drainage ditches within the safety area dimensions.

c) Apron Drainage Systems

There are no paved or unpaved drainage ditches within the apron safety area. There are no underground drainage systems within the limits of the apron safety areas. Drainage is by sheet flow to the sides. This flow enters the drainage ditches flowing on the sides of the apron.

6.4 AIRCRAFT FUELING SYSTEM

Air carrier and large aircraft jet fuel is via a hose reel and pump/filter system at the east edge of the apron. The pipes serving this system are above ground and are relatively old. They are also single wall and have no leak detection systems. The pipes extend outside the airport to the petroleum tank farm across the road from the terminal. This tank farm is operated by the FSM Petroleum Corporation. This Corporation also operates the portion of the fueling system within the airport and is responsible for its maintenance. Some concern was expressed about having the fuel line above ground. If placed underground, it must be properly constructed to protect it from the corrosive salt water below the airfield. The fuel system should have double line fuel piping and a leak detection system to minimize environmental damage risks. General aviation and other fueling is accomplished via drums and fueling vehicles as necessary. Maintenance of the fueling system is the responsibility of FSM Petroleum Corporation.

6.5 REMEDIAL WORK REQUIRED

a) Airfield

- As the existing Power Vault will be replaced in the near future, remedial electrical work would result in a waste of resources since the airport has been fully operational to date. Therefore, there are no recommendations for remedial electrical work.

- Even for the existing AFIS office, it has been assumed that ARFF facility construction will take place in the relatively near future. Therefore,

maintenance efforts could be restricted to an "as-needed" basis for the anticipated limited duration while awaiting completion of ARFF construction.

b) Main Terminal Building(Existing Terminal Bldg./Future Departure Wing)

- The electrical room door needs to be replaced to prevent exposure of critically important electrical equipment to the weather and salt laden air.
- All electrical equipment covers need to be put back into place. In some cases, cover replacement may not be possible since a previous modification to the electrical installation has resulted in overfilling of equipment enclosures with taps, splices, and new wiring. In such instances, equipment replacement will be necessary.
- All PVC plumbing pipes used for electrical installation needs to be replaced with electrical code conforming wiring methods.
- The Continental Airlines emergency generator needs to be relocated to permit code mandated access and clearances for operation and maintenance of both the electrical installation and the generator itself.
- Damaged floodlights should be repaired or replaced to restore uniform lighting on the airfield side of the Main Terminal Building.

c) Hangar Facility

- Electrical service installation needs to be replaced with electrical code conforming service disconnects at billing meter locations.

- All PVC plumbing pipes used for electrical installation needs to be replaced with electrical code conforming wiring methods.

6.6 FUTURE NEEDS

a) Fire Hydrants

It is recommended that two fire hydrants be provided to serve the expanded terminal complex area. These ideally should be located on the landside of the terminal complex.

b) Water & Sewer Line Connection

These two infrastructure upgrades are intended to connect the water and sanitary sewer systems that serve the airport environment to the island's existing infrastructure.

CHAPTER 7: LAND USE PLAN

The primary objective of the Airport Land Use Plan is to provide a review of the current land use and to develop guidelines for the future land use at and surrounding Pohnpei International Airport. The Master Plan contains forecasts of aviation demand to help define the physical requirements for airport development over the next 20 years.

Unlike most airport master plans that look at airport compatible land use and ways to minimize the number of people exposed to frequent and/or high levels of airport noise or high cumulative noise levels, this chapter does not analyze the effect of noise level on the surrounding land use. With the limited number of scheduled and unscheduled operations per day at Pohnpei International Airport, the noise level produced at the airport is regarded as negligible.

This chapter will examine the physical setting, existing land use, potential aviation related uses for airports lands and discuss the potential need to expand airport property. It will also focus on preserving the airport airspace to minimize the risk of potential aircraft accidents in the vicinity of the Airport by avoiding the development of land uses and land use conditions, which pose hazards to aircraft in flight.

7.1 PHYSICAL SETTING/ EXISTING LAND USE

Pohnpei International Airport is located on Dekehtik Island which is connected to the main island of Pohnpei by a man-made mile long cause way. The total land area of Dekehtik Island is approximately 425 acres, of which 110 acres are used by the Airport. Before the island was used as an airport it was completely covered by mangrove; today the majority of the island is still covered by mangrove. Dekehitk Island is classified as an Industrial Use Zone. The Island is also home to a deep water harbor and port. There is also a fuel farm, hotel, small business and land fill located on the island.

Figure 7-1. Aerial View of Pohnpei International Airport

7.2 AVIATION RELATED LAND USE

The following narrative discusses the various aviation related land use planned facilities, for airside, landside, and terminal that should be considered going forward. This discussion does not include the FAA ACIP funded projects already completed, or in the construction phase, for Pohnpei International Airport. These newly completed facilities, and those currently under construction, include:

- ARFF Facility, new ARFF Trucks and Airport Access Road
- Runway rehabilitation and runway extension (See Figure 7-5, Runway Extension Schematic
- Airfield Lighting and Signage
- New paved shoulders and turnarounds
- Major Terminal Building Complex expansion (See Figure 4-2, Terminal Layout)
- New airport perimeter fence

The following discussion identifies various recommended aviation related land uses for the airside, landside, and terminal complex areas of the airport.

7.2.1 Airside

CIA Commuter Airline Facilities

A key factor in any successful airport master plan is the accurate forecast of aviation activity, including assessments of aircraft fleet mix and size that a given airport is expected to support throughout the planning horizon. At Pohnpei International Airport, there is a key growth factor that needs to be identified and discussed. Presently, the government operates a small commuter airline, CIA, which is based in Pohnpei. Their facilities, including aircraft hangar and small terminal area, are located on the eastern edge of the aircraft apron area and these facilities are of proper size and capacity to serve the existing operation.

There are current discussions at the national level of FSM to expand this local airline, although the size of the expansion and the number/type of aircraft have not yet been determined. From preliminary discussions with FSM officials, the aircraft will likely be twin turboprop commuter aircraft with a seating capacity of roughly 20 to 35 passengers per aircraft. The number of aircraft for the expansion could range from between 2 and 5, depending on a number of factors. Due to the importance of planning airfield improvements to best accommodate the actual number of based aircraft, as well as the limited area at and around the airfield, it is critical to provide a measure of planning/layout such that future facilities are optimally sized. Towards that goal, there are three distinct options that will be address in this land use plan:

a) CIA Airline remains at its present size/operations.

In this scenario, it is recommended that the CIA airlines hangar and terminal facilities remain as is, with perhaps minor cosmetic upgrades. A new airport maintenance facility is recommended to be constructed at the site of the existing FAA electrical vault, which is planned to be phased out of service once the new vault is completed. See Figure 7-3, Apron Area Land Use Plan, Option 1.

b) CIA Airline goes forward with a modest expansion of 2 to 3 new aircraft.

For the purposes of discussion and sizing, the new aircraft is assured to be Dash 8-100 Series which has a capacity of 37 passengers and a wingspan of 85 feet. In this scenario, it is recommended that an upgraded hangar/terminal complex replace the existing facility, more or less on the same footprint towards the east edge of the apron. Along with the expanded facility, parking and access road would be added to support the operations. This scenario is illustrated in Figure 7-3, Apron Area Land Use Plan Option 1. As in the base option discussed above, it

is recommended that a new airport maintenance facility be constructed at the site of the existing FAA electrical vault.

c) CIA Airline goes forward with a more robust expansion with 3 to 5 new aircraft.
The Dash-8 series 100 aircraft is also assumed for this expansion. In this scenario, it is recommended that the CIA facilities be relocated to the western edge of an expanded apron area, as illustrated on Figure 7-4, Apron Area Land Use Plan Option 2. With the larger number of based aircraft, and higher frequency of operations, larger facilities are needed. The layout per Figure 7-4 shows the new terminal, parking area, access road, and hangar located on the western edge of an expanded apron area. In this scenario, the old CIA hangar/terminal facility will be converted to a maintenance shop.

Each of the three scenarios discussed above will have a new airport access road, located east of the existing apron edge. This access road will be open to the public (non-AOA) and will provide access to helicopter operations (discussion below) as well as CIA operations and maintenance facility.

Facilities to Support Helicopter Operations

In recent years, helicopter operations have begun at Pohnpei International. These aircraft are used by offshore fishing fleets to spot schools of fish for the fishing vessels. There are presently two helicopters operating out of Pohnpei International, with the possibility of one or perhaps two more helicopters being utilized for this purpose. To support this aviation activity, it is recommended that modest facilities be planned for the airfield. While the master planning process will recommend identify and recommend locations of facilities, the development of these facilities should be considered the domain of third party investors. It should be noted here that these helicopter facilities, the apron expansion, hangars, and access road, discussed below, are the same for all three scenarios listed above under the CIA Commuter Airline discussion.

a) Expansion of west apron area
The northwest corner of the existing aircraft apron area has already been earmarked for a modest apron expansion to the west. This expansion is limited by an existing sewage treatment plant. It is recommended that this expansion of the apron area be extended to the north and west to provide as much apron area as possible to support the helicopter operations. Helipad markings are appropriate

for this corner of the aircraft apron. See Figures 7-2, Land Use Plan Overview and Figure 7-3, Apron Area Land Use Plan Option 1.

b) Hangars

Due to the highly corrosive natural environment, it is recommended that three T-hangars be located on the northern edge of this area to provide weather protection for the helicopters. A vehicle parking lot to serve these facilities and an airport access road connecting this area with the landside area is shown on Figures 7-2, Land Use Plan Overview and Figure 7-3, Apron Area Land Use Plan Option 1. A new perimeter fence along this access road will preserve the AOA and provide public access to the helicopter operations and for the CIA airline operations area.

c) Security Facility

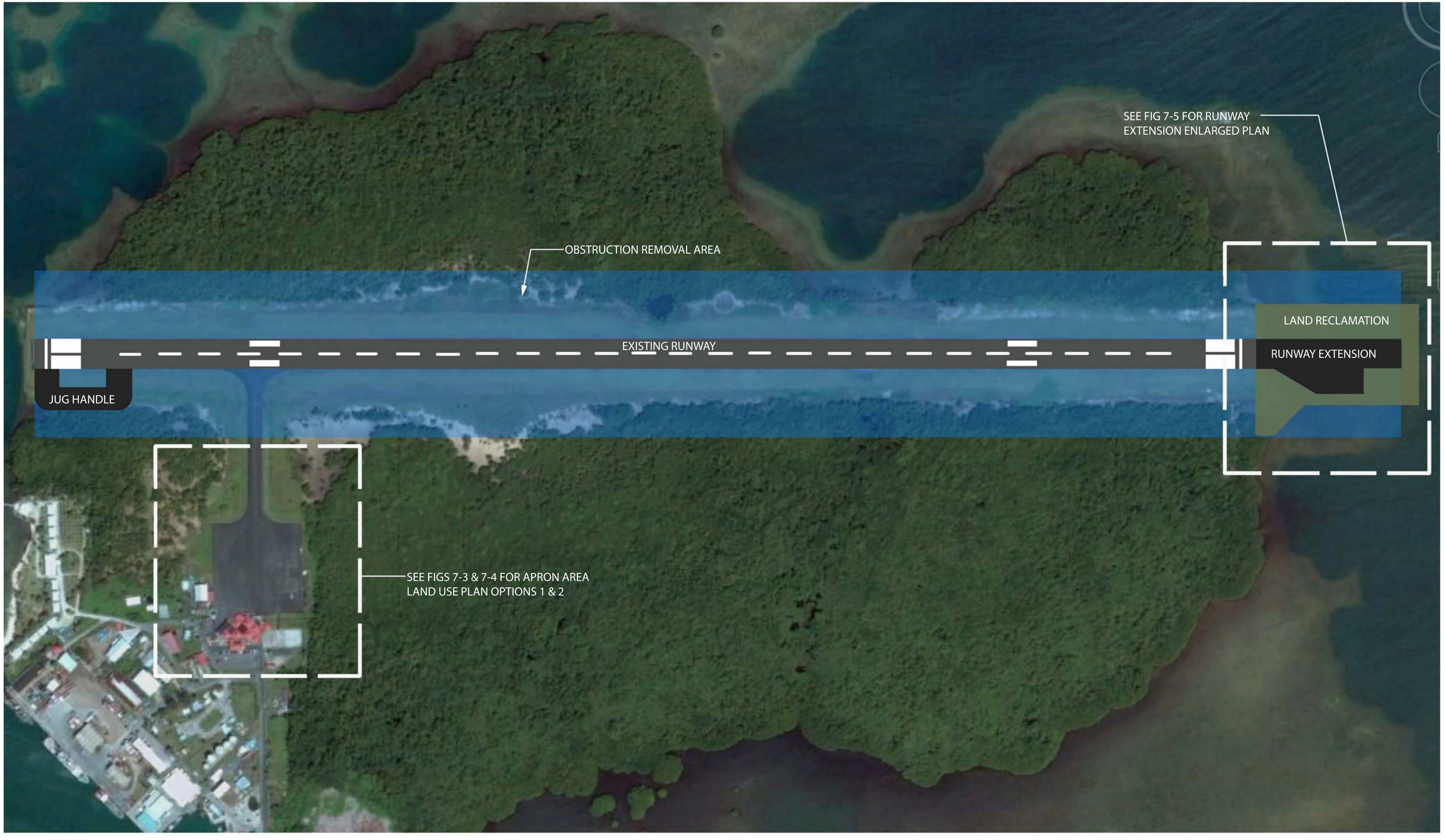
A security facility, including a guard shack and a small administrative office serves as the main entrance to the Airport Operations Area (AOA) and is located southwest of the terminal complex area. This is an ideal location for both guard shack/entry control to the AOA as well as the co-joined facility for administration support. See Figure 7-3, Apron Area Land Use Plan Option 1.

d) Obstruction Removal

Trees and vegetation on the northern side of the runway are in violation of the 7:1 side slope guidelines cited in the FAA Advisory Circulars. It is important, for the sake of reducing instrument approach minimums, to ensure that these obstructions are mitigated whenever practicable. Trimming of trees and vegetation is feasible and the recommended mitigation. This will also increase the likelihood of providing a GPS precision approach facility, similar to the Beta site project cosponsored by FAA and Continental Air Micronesia at the Guam International Airport. The area needed attention is displayed on Figure 7-2, Land Use Plan Overview

e) "Jug Handle" Turnaround

Presently, there are turnarounds located at the ends of Runway 9/27 and these function reasonably well in terms of providing areas for aircraft to make a U-turn post landing and taxiing back to the terminal complex without having to execute a more extreme U-turn within the runway proper. A proposal is to convert one, or both of the turnaround areas to a short parallel taxiway, what looks like a 'jug handle'. This modification would provide the aircraft the benefit of a less extreme



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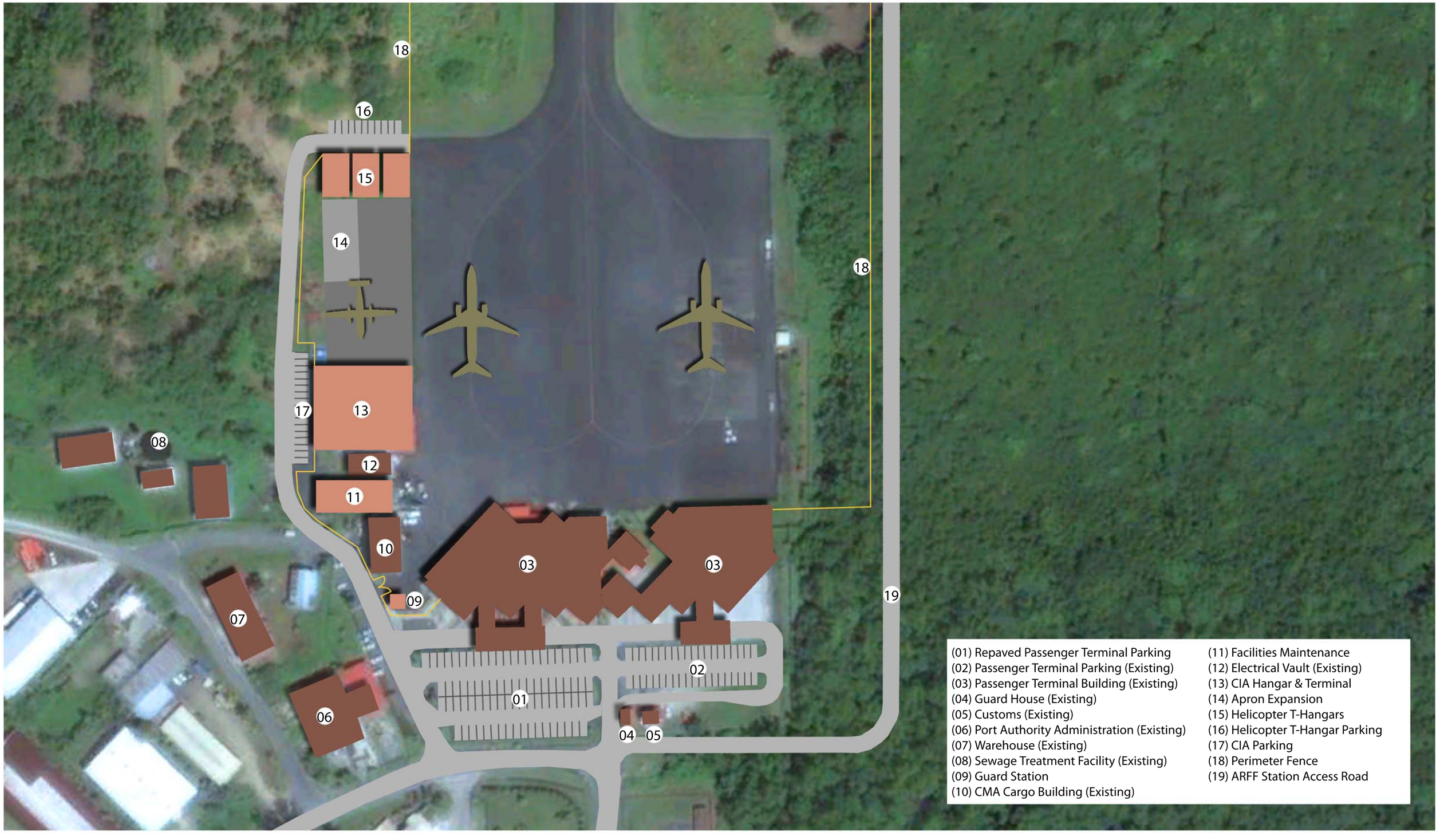
NOT TO SCALE	LAD PROJECT #081-10015-009
LAND USE PLAN OVERVIEW	FIG 7-2



(01) Repaved Passenger Terminal Parking
(02) Passenger Terminal Parking (Existing)
(03) Passenger Terminal Building (Existing)
(04) Guard House (Existing)
(05) Customs (Existing)
(06) Port Authority Administration (Existing)
(07) Warehouse (Existing)
(08) Sewage Treatment Facility (Existing)
(09) Guard Station
(10) CMA Cargo Building (Existing)
(11) Facilities Maintenance
(12) Electrical Vault (Existing)
(13) CIA Hangar & Terminal
(14) Apron Expansion
(15) Helicopter T-Hangars
(16) Helicopter T-Hangar Parking
(17) CIA Parking
(18) Perimeter Fence
(19) ARFF Station Access Road

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APRON AREA LAND USE PLAN
OPTION 1

FIG 7-3

(01) Repaved Passenger Terminal Parking
(02) Passenger Terminal Parking (Existing)
(03) Passenger Terminal Building (Existing)
(04) Guard House (Existing)
(05) Customs (Existing)
(06) Port Authority Administration (Existing)
(07) Warehouse (Existing)
(08) Sewage Treatment Facility (Existing)
(09) Guard Station
(10) CMA Cargo Building (Existing)
(11) Electrical Vault (Existing)
(12) Facilities Maint (Former CIA Hangar)
(13) Access Road
(14) Apron Expansion
(15) Helicopter T-Hangars
(16) Helicopter T-Hangar Parking
(17) Perimeter Fence
(18) CIA Hangar
(19) CIA Parking
(20) CIA Terminal
(21) ARFF Station Access Road

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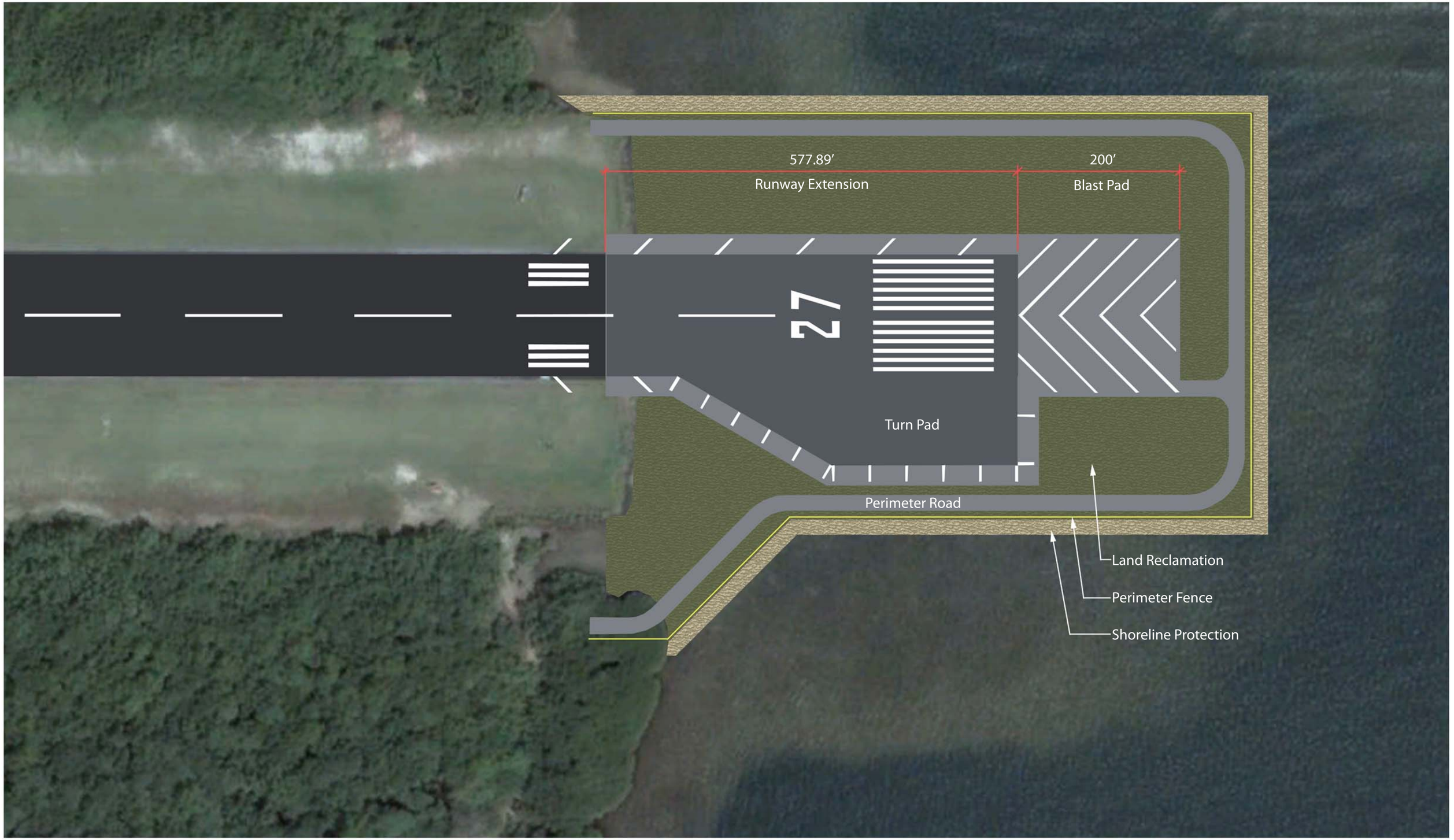
APRON AREA LAND USE PLAN
OPTION 2

FIG 7-4



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NOT TO SCALE	LAD PROJECT #081-10015-009
RUNWAY EXTENSION PLAN	FIG 7-5

turnaround, has the advantage of providing an area to an aircraft with mechanical issues off of the main runway, and would provide mitigation options for the airport management in this or similar scenarios. In effect, the jug handle could allow for the runway (and airport) to remain open during these times rather than having an aircraft posing an obstruction on the runway. See Figure 7-2, Land Use Plan Overview.

f) Shoreline Revetment and Protection of Airside

In recent years it has been noted by the Pohnpei Port Authority that the ocean levels have been steadily rising. Due to the airport's proximity to the ocean, and the low elevation of airport lands, it is important to consider upgrades to the shoreline revetment and protection of the airside proper.

7.2.2 Landside

a) Rental Car Kiosk

The new vehicle parking lot area, south of and adjacent to the expanded terminal complex, is an ideal place for rental car kiosks. It is recommended that the first row of parking positions be the location for rental car kiosks(s).

b) Fire Hydrants

It is recommended that two fire hydrants be provided to serve the expanded terminal complex area. These ideally should be located on the landside of the terminal complex.

c) Overlay Asphaltic Concrete Vehicle Parking Lot

The parking lot area fronting the older section of the terminal complex needs to be overlaid, restriped, and area lighting upgraded for this area. See Figure 7-5, Apron Area Land Use Plan Option 1. With the additional parking area provided by the new expanded Terminal Complex, adequate overall vehicle parking will be available.

d) Upgrades to water and sanitary sewer systems

These two infrastructure upgrades are intended to connect the water and sanitary sewer systems that serve the airport environment to the island's existing infrastructure.

7.2.3 Terminal

The terminal complex at Pohnpei International Airport has recently undergone a major expansion and upgrade. The old terminal complex area, on the western side of the complex, has been retrofitted to serve as the departure complex, complete with check in, baggage makeup, security screening, multiple hold rooms, VIP Departure Lounge, concessionaire areas and airline offices. The new 'half' of the complex, located to the east, serves as the arrivals complex, complete with arrivals hall, baggage claim, Customs/Immigration, arrivals concourse, and a quarantine facility. See Figure 4-2, Terminal Layout.

This new terminal complex is planned to accommodate the anticipated demand throughout the 20 year planning horizon.

7.3 NON AVIATION RELATED USE

Pohnpei Port Authority has developed a detailed Capital Development/Land Use Plan (Shown in figure 7-6) for Port Authority owned land surrounding PNI. The Pohnpei Port Authority is also proposing to modify its shipping lanes to provide easier access to its harbor facilities (Shown in Figure 7-7).

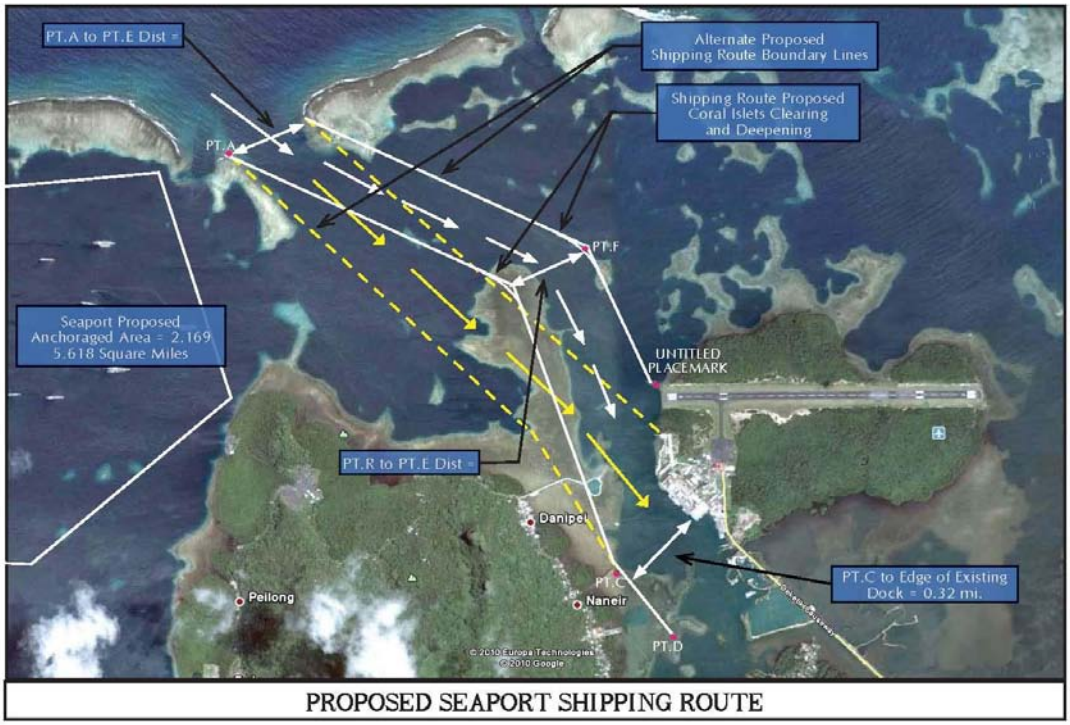

Figure 7-5. Proposed Seaport Shipping Route

Figure 7-6. Proposed Seaport Improvement And Development

The Pohnpei State landfill is located across from the southern proposed dock extension. This land was original owned by the Port Authority, but was turned over to Pohnpei State Government, which in turn leased it to the PUC for a term of 50 years. The PUC had planned to develop the land and build a sewage treatment plant for the airport. This never happened and the area was turned into the local landfill.

The landfill is a wildlife concern as it attracts birds, cats and dogs. Also, it has caught on fire several times in the past years, causing large clouds of black smoke which could affect the visibility of approaching aircraft. As of this year, the PUC has hired consultants to help relocate the landfill some six miles away and convert the landfill into a flat grassy area. Once this is completed, the Port Authority would like to see the land returned to its original purpose and a sewage treatment plant built and connectivity provided to the airport and port facilities.

7.4 COMPATABLE LAND USE

When looking at airport compatible land use, the major concern is that developments on, near or around the airport comply with accepted restrictions on location, height, and

activities that provide for safe aircraft movement and airport operations. Particular areas near airports are vulnerable to various levels of accident potential. Identifying and protecting these specific areas through effective land use controls is essential for the safe and efficient operation of an airport.

Most of the risk involved with air transportation is associated with the takeoff and landing portions of flights. The critical areas at an airport that need to be secured and protected from a land use compatibility standpoint include the approach paths and departure paths to and from the runways. To enhance airport safety, it is important to maintain obstruction-free airport airspace and a reasonable amount of vacant land at both ends of each runway.

Safety issues are a primary area of concern with compatible land uses. Areas around the airport should be free of development that could pose a hazard to pilots operating aircraft in the airport environments. Four primary characteristics of land use that reflect safety related issues are:

- High Concentrations of People
- Height Obstructions
- Visual Obstructions
- Wildlife and Bird Attractants

Pohnpei International Airport has or is currently addressing these four primary areas of concerns. High concentrations of people can be defined as the number of people within a particular land area and is often measured by the number of people per unit of area. Density may be categorized as high, medium, or low depending on the number of people that a development contains. Pohnpei State Government has already zoned the airport and its surrounding areas for industrial and commercial use only. There are no residential areas in the approach paths on either end of runway 9-27 or the surrounding airport area. Zoning the airport and surrounding area as Industrial/Commercial Use ensures a low density of people.

An Obstruction Survey is currently under way at Pohnpei International Airport in order to update the existing FAA/NOAA database on terrain at and near the airport environment. This data is routinely used to determine the minimum descent altitude (minimums) for published instrument approaches into the airport. NOAA (US Federal Agency) was previously responsible for data collection and providing obstruction surveys to the FAA.

Under new guidelines, FAA has taken responsibility for the new obstruction surveys and has developed guidelines for the survey. These guidelines include the need for aerial photography (photogrammetry) along with land based survey efforts.

Height restrictions are necessary to ensure that objects will not impair flight safety or decrease the operational capability of the airport. Federal Aviation Regulation (FAR) Part 77 defines a series of imaginary surfaces surrounding airports. Any object or structure which would penetrate any of these imaginary surfaces is considered by the FAA to be an obstruction to air navigation. While an obstruction to air navigation may not necessarily be a hazard to air navigation, the FAA presumes it to be and treats is as such until an FAA aeronautical study has determined that it does not have a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft.

Federal Aviation Regulations (FAR) Part 77 imaginary surfaces to determine height restrictions for natural and man-made objects are as follows:

a) *Primary Surface*: A surface longitudinally centered along the runway, extending 200 feet beyond each end of the paved runway and having a total width of 250 feet.
b) *Horizontal Surface*: A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by scribing an arc 5,000 feet out from the center of each end of the primary surface and connecting the arcs with tangents.

c) *Conical Surface*: A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

d) *Approach Surface*: A surface longitudinally centered on the extended runway centerline, extending outward and upward from each end of the primary surface at a slope of 20 to 1 for a length of 5,000 feet. The width of this surface starts the same as the Primary Surface, 250 feet, and flares to 1,250 feet at 5,000 feet.

e) *Transitional Surface*: A surface extending outward and upward from the sides of the primary surface and from the sides of the approach surfaces at a slope of 7 to 1.

Figure 7-8 illustrates the FAR Imaginary Surfaces.

Visual obstructions are obstructions that obscure pilot visibility and should be limited to ensure safe navigation. Visibility can be obscured by a number of items including: dust, glare, light emissions, smoke, and steam. PNI management needs to make sure that any activities that may cause issues with visibility are regulated and do not occur during aircraft approaches and departures.

Bird strikes to aircraft have land been a hazard to aviation safety. This issue is a growing concern. Island airports in the Western Pacific have recorded several bird strikes within the last year. PNI, with the assistance of the United States Department of Agriculture (USDA), is in the process of developing a Wildlife Hazard Management Plan, including a mitigation plan, for the airport. Prior to the development of this plan, there will be a data collection phase lasting12 months to gather actual data on types, quantity, and locations of birds on and near the airport. The data collection for Pohnpei International Airport was completed in November 2010; a completed Wildlife Management Hazard Plan is currently under review by the FAA.

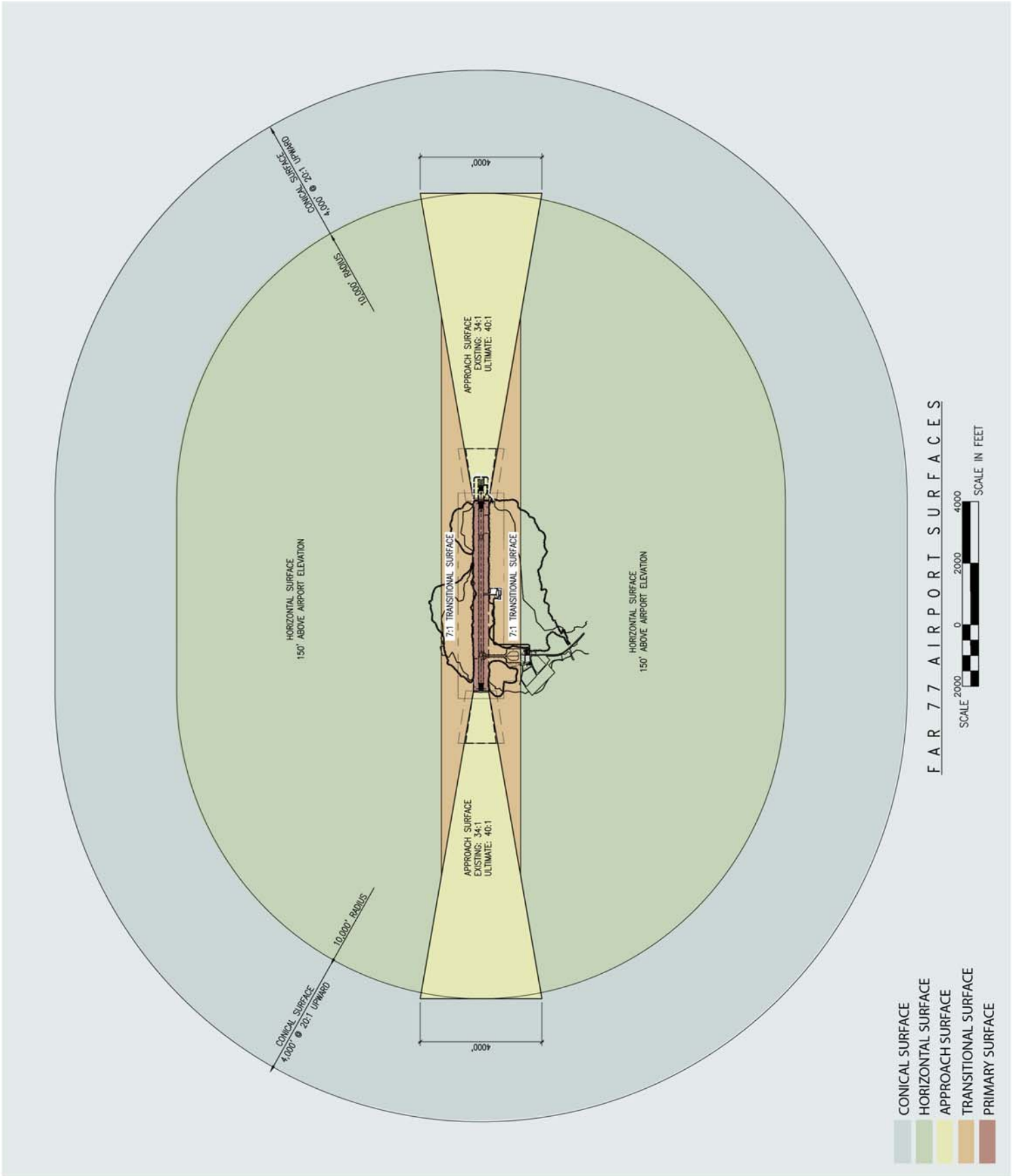

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FIGURE 7-7. FAR 77 IMAGINARY SURFACES

CHAPTER 8: ENVIRONMENTAL INVENTORY

8.1 INTRODUCTION

The purpose of considering environmental factors in airport master planning is to identify the potential key environmental impacts of the various airport development alternatives so that those alternatives can, when possible, avoid or minimize impacts on sensitive resources. The environmental review should provide information that will help expedite subsequent environmental processing.

8.2 GENERAL CONDITIONS

The general conditions look at the current state of the environment surrounding Pohnpei International Airport.

8.2.1 History/Culture

It is believed that the islands of Micronesia, including Pohnpei, were settled approximately 2,000 to 3,000 years ago. The society in Pohnpei before contact with outside civilizations was organized by matrilineal lineages and family clans. There was a centralized system of governance that reached its peak in power between approximately AD 500 and AD 1500 under the Saudeleur Dynasty, at which time the population was about 25,000. It was during this period that the city of Nan Madol was built in the present day Madolenihmw district. The city is made up of almost 100 man-made islets, linked by a series of canals.

The first contact between Pohnpei and the Western world occurred in 1595, when the Spanish sailor Pedro Fernandez de Quiros noted seeing the island on his way to Indonesia, but did not make an attempt to land. The next known contact did not occur until 1825, when an Australian ship attempted to land but was chased away by native canoes. A few years later, however, a Russian ship was able to trade some items with the local population, which was the beginning of regular contact from trading ships and whaling vessels over the next several decades. In 1852, a group of Protestant missionaries arrived in Pohnpei from the United States and established permanent residence on the island.

The beginning of colonial rule over Pohnpei (and all of the current Federated States of Micronesia) began in 1886 when the Spanish claimed the islands, then known as the Caroline Islands, and began to exert its political authority. Political control over the region was later sold to Germany in 1899, during which time the feudal system was abolished, forever changing the native way of life. The Japanese took control in 1914 at the beginning of World War I. The next several decades were marked by general economic growth and development through sugar cane, fishing, mining, and tropical agriculture, but mostly for the benefit of the Japanese and not the native population. In 1945, after intense bombing and widespread destruction during World War II, The United Nations created the Trust Territory of the Pacific Islands (TTPI), which consists of the present day Federated States of Micronesia, Palau, The Marshall Islands, and the Northern Marianna Islands. The United States was named as the trustee for the TTPI with the goal to "promote the economic advancement and self-sufficiency of the inhabitants."

The move towards Independence began in 1978 when the people of the Trust Territories of the Pacific Islands developed and approved a constitution, written by elected delegates, forming the Federated States of Micronesia government, consisting of the States of Kosrae, Chuuk, Pohnpei, and Yap. Palau and the Marshall Islands chose not to join the newly formed FSM. There was a transition period until complete independence was gained on 03 November 1986 through the Compact of Free Association with the United States. The capital for the new national government was established on the island of Pohnpei. A President, elected by the National Congress, heads the national government, which includes executive, legislative and judicial branches. Each state remains internally self-governing, with its own parliamentary body and governor.

8.2.2 Air Quality

Air quality is managed by the Pohnpei State EPA through the Air Pollution Control Standards and Regulations. The current air quality at the airport would be considered normal for an Industrial area. The majority of pollution is caused by emissions released into the air by vehicles, ships, and dust kicked up by ongoing construction projects. The state landfill which is located on Dekehtik Island also affects the air quality. At times it has caught on fire releasing fumes and smoke into the air.

8.2.3 Water Quality

Over the last few years, the potable water system has been extended to include all of Kolonia and most areas within three other municipalities. Pohnpei's water system is owned and managed by the Pohnpei Utilities Corporation (PUC). Water collection is supplied by river diversion and multiple wells. The airport is connected to the state water system.

8.2.4 Terrestrial Environment

The island of Pohnpei consists of a high volcanic island surrounded by an outer barrier reef. The mountainous interior of the island is made up of mostly dense juggle. There are more than 750 species of plants on Pohnpei, 250 of them indigenous to the island. There are 50 species of birds, five of which are endemic, more than 70 species of lizards, wild pigs, deer and the nimble Pohnpei Flying Fox. The coastline of Pohnpei is surrounded by mangrove forest. These wetlands are a habitat for a variety of migratory seabirds, waterfowl and forest birds as well several species of monitor lizard, and mangrove crabs.

8.2.5 Marine Environment

According to Marine Biodiversity of the Federated States of Micronesia (February 2002), Pohnpei Island has a well-developed barrier reef and associated lagoon. Pohnpei's extensive reefs and lagoon feature a wide diversity of productive and relatively intact natural habitats, including barrier reefs, fringing reef flats, reef passages, seagrass beds and mangroves. These habitats support a remarkable abundance of marine life, including more than 650 species of fish and nearly 350 species of coral. There are eleven Marine Protected Areas (MPAs) in Pohnpei

8.2.6 Endangered Species

According to the Pohnpei State EPA there are no endangered species located near or at the airport.

8.2.7 Land Use

a) Traffic:

Traffic in Pohnpei is for the most part very light. The highest concentration of traffic takes place in Kolonia, which can become heavy during early morning and late afternoon when work and school begin and when they let out. The area near or around the airport is considered to have a low volume of traffic. The airport is located on Dekehtik Island which is classified as Industrial. The island is connected to Kolonia by an approximately mile long causeway.

b) Noise:

The noise level in Pohnpei varies from place to place, but for the most part its noise level is quite low. In the more developed areas, the noise is similar to any small urban area. The majority of the noise is caused by traffic and local business. In rural areas, there is barely any noise. The noise around the airport area is mostly caused by aircraft and ongoing construction projects. This noise has no effect on the general public as the airport is not located near any residential areas.

8.3 POSSIBLE IMPACTS TO ENVIRONMENT

8.3.1 Methodology for Assessing Impacts

This section looks at the environmental impacts of proposed actions, reasonable alternatives to that action, and environmental effects that cannot be avoided should the proposed actions be implemented. It is required that consideration of impacts includes the context, intensity, duration, type and measures to mitigate impacts.

Impacts are considered at their local, national, and regional context as appropriate.

Intensity is a measurement of the severity of an impact. The intensity of an impact may be:

- *Negligible* – when the impact is at its lowest level of detection
- *Minor* – when the impact is low but detectable
- *Moderate* – when the impact is evident and considerable
- *Major* – when the impact is severe

The duration of an impact is a measure of how long the effects of an impact will last. The duration of impacts are categorized as short-term and long- term.

- *Short term* – impacts that last less than a year
- *Long term* – impacts that last longer than a year

Types of impact

- *Adverse* – impacts that change the affected environment in a manner tending away from the natural range of variability
- *Beneficial* – impacts that change the affected environment toward the natural range of variability
- *Direct* – impacts caused by the action and occur at the same time and place
- *Indirect*– impacts caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable
- *Cumulative* – impacts on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

8.3.2 Potential Impacts

The following section takes a generic look at possible environmental impacts that may result from the proposed capital improvements recommended by this Master Plan. There will be a need, however, to complete coordination with federal, state, and local agencies when the recommended projects are initially designed. Without mitigation or implementation of an environmental management plan, environmental impacts can occur during both construction and operation of major infrastructure projects. Such impacts are widely documented and are summarized in the matrix shown as Table 8-1.

TABLE 8-1. Potential Impacts Caused by Capital Improvement Projects

CONSTRUCTION ACTIVITIES	POTENTIAL ENVIRONMENTAL IMPACT
Surveying and demarcation of work site	• Loss of vegetation and disruption of historical sites • Social impact upon nearby population
Earth moving activities (digging, excavations, cut and fill activities)	• Accidental discovery of archaeological assets, sites or resources • Soil erosion, silt generation and increased runoff • Sediment contamination of nearby water ways (ocean, rivers, and streams) • Turbidity in near-shore and reef environments • Loss of land uses
Contractor mobilization	• Wastes generated at construction camps • Various social impacts
Aggregate extraction	• Removal of coral damages reefs and depletes marine resources • Removal of beach gravel removes shoreline protection, changes littoral drift and accelerates erosion • Dust generated affects air quality • Noise creates negative effect on community
Vehicle Operation (machinery, trucks, etc.)	• Emission of exhaust from vehicles and machinery • Dust generated by heavy vehicles transporting materials • Traffic delays • Noise pollution
Run-off, discharges	• Increased siltation • Water pollution –streams, rivers, ocean • Hazardous effects to marine life
Emergency or accidental spills	• Soil contamination • Potential contamination of water supply sources such as groundwater • Risk to people and animals • Air pollution

8.4 FEDERAL AND STATE LAWS

The following Table summarizes some major environmental laws that may have an effect on capital improvement projects at Pohnpei International Airport. Before undertaking in any construction, contractors and consultants should meet with State and National EPA to make sure regulations listed below are up to date and to ensure that all applicable environmental laws are followed.

The Federated States of Micronesia national government is responsible for setting minimum standards and providing technical assistants to the state level agencies responsible for environmental protection. The Pohnpei State Environmental Protection Agency (EPA) is responsible for enforcing state regulations. Regulations and laws for the United States are also listed has they may be applicable for projects that are funded by United States' grants and loans.

Table 8-2 Environmental Laws

NATIONAL GOVERNMENT	POHNPEI STATE	UNITED STATES
Environmental Protection Act	Pohnpei Environmental Protection Act	National Environmental Policy Act
Environmental Impact Assessment Regulations	Environmental Impact Assessment Regulations	National Historic Preservation Act
Earthmoving Regulations	Earthmoving and Sedimentation Control Regulations	Endangered Species Act
FSM Endangered Species Act	Solid Waste Regulation	Department of Transportation Act, Section 4(f)
	Marine and Fresh Water Quality Regulation	Clean Air Act
	Pohnpei Historic Preservation Regulation	

8.5 AGENCIES

The following is a list of government and public agencies that should be contacted for environmental consultation and direction before any capital improvements are performed.

- FSM Department of Transportation, Communication and Infrastructure
- FSM Department of Economic Affairs
- FSM Department of Health and Social Affairs
- National Oceanic Resource Management
- Office of Environment and Emergency Management
- Secretariat of the Pacific
- Pohnpei State Environmental Authority
- Pohnpei Department of Land
- Pohnpei Department of Forestry
- Pohnpei Marine Resources and Development
- Pohnpei Port Authority
- Office of Historic Preservation and Cultural Affairs
- The Nature Conservancy
- Conservation Society of Pohnpei

It should be noted that if U.S. funds are used, the corresponding U.S. Federal agencies should be consulted.

CHAPTER 9: CAPITAL IMPROVEMENT PROGRAMS

The Capital Improvement Program (CIP) represents a phasing and cost estimate for implementing the airport improvements that emerged from the AMP process. The CIP is divided into three phases: short-term (2012-2016), near term (2017-2021), and long-term (2022-2031). The CIP must be viewed as a constantly evolving vision for planned development. Planning for Pohnpei International Airport should remain flexible and should incorporate annually updated estimates of costs and priorities. The CIP is structured in a manner that presents a logical sequence of improvements, while attempting to reflect available funding from available sources to the airport. Such as loans and grants from various foreign agencies.

Projects in the ACIP respond to FAA's emphasis on the following goals:

- Ensure that the air transport of people, services and goods is provided in a safe and secure environment.
- Preserve and upgrade the existing airport system in order to allow for increased capacity as well as to ensure reliable and efficient use of existing capacity.
- Improve the compatibility of airports with the surrounding communities.
- Provide sufficient access to an airport for the majority of the population.

Using these emphases, key development projects for the airport's future have been identified and developed. In summary, these projects address existing demands and projected demands on the airport. The initial project phase, addresses many pressing issues on the airside or airfield, and follows a program of development which focused on the landside, i.e., new terminal, new passenger parking and circulation, and so on. Pohnpei International Airport has several capital improvement projects that are under construction or recently completed, which have given the airport a complete face lift, the following is a list of these projects:

- Runway, Taxiway and Apron Rehabilitation Project includes asphalt repavement of the apron, taxiway and apron areas, as well as new asphalt turnarounds, runway shoulders, and a new concrete hardstand for the apron area. Also included in this project are new runway and taxi lights, new apron flood lights, a new electrical vault facility, new security perimeter fence and road, shoreline revetment work, and clearing of the runway safety area.

- Aircraft Rescue and Firefighting Facility (ARFF) Project consists of a new two-story ARFF facility including new septic tank, fence enclosure, parking lot and lighting. Also included are a new asphalt access road to the ARFF facility and a concrete road connecting the facility to the airport runway.

- Runway Expansion Project calls for the land reclamation of approximately 866 feet for the runway extension. This extension will add 578 feet to the existing runway and includes a 200 feet blast pad, and an 80 feet runway safety area. Also included in this project is an apron expansion of 400 sq. ft. and installation of visual ads.

- Terminal Expansion Project consists of a new 14,692 sq. ft facility to be used as the arrival terminal area and renovation of the existing terminal building to be the departure terminal area. This project also includes a new arrivals parking area and the procurement and installation of x-ray security equipment, baggage handling equipment and a baggage trolley.

9.1 Facilities Phasing Plan

The planning horizon for this master plan update is 20 years with 5, 10 and 20-year milestones shown in Table 10-1.

Table 9-1. Facilities Phasing Plan

PHASE	YEAR
Phase I	2012 to 2016
Phase II	2017 to 2021
Phase III	2022 to 2031

The overall phasing and scheduling of developments mentioned in this chapter are a merging of Pohnpei International Airport's existing Capital Improvement Program and the recommended facilities and projects that are the output of this Airport Master Plan Update.

For airfield upgrade and infrastructure projects, the recommended early phasing of these types of projects is primarily due to the anticipated life span of the FAA ACIP program. This program, implemented by the FAA Airports Division, has literally transformed the airports in the Federated States of Micronesia in terms of bringing up the level of airport infrastructure, airfield paving, signage/lighting, ARFF facilities and trucks, and various training programs to transfer expertise and technical skills to the staff and management of these airports and public works sectors. As such, it is important to achieve the most important airport infrastructure projects remaining for Pohnpei International Airport in order to take advantage of the FAA's funding for these elements.

For Pohnpei International Airport, a variety of airfield upgrades and improvements will need to be undertaken to improve the basic infrastructure and provide additional measures of safety to support ongoing aircraft operations. Both the Phase 2 and Phase 3 projects provide the Airport with an outlook of future needs. As they move closer into the near term horizon over time, they need to be re-assessed as demand changes or funding sources are better defined. Phase 2 provides two options for capital development, both options call for the development of the Apron Area. Caroline Island Air is planning on expanding its service, these options provide different apron development scenarios depending on the size of growth by Caroline Island Air.

Order-of-magnitude engineering costs were developed for each of the master plan projects and can be found in the tables below. The cost estimates associated with the Master Plan projects reflect allowances for Sponsor administration, engineering/design, contingencies, and construction management of 30%. In addition, project costs include an assumption of 5% simple interest to account for future inflation in Phase 2 and Phase 3 projects.

9.2 Phase 1 Improvements (2012 – 2016)

Phase 1 development consists of the following capital projects:

- Airside Erosion Control /Response to Rising Tides
- Airfield Perimeter Fence
- Remove/Mitigate Obstructions: Approach and Airfield Environment
- GPS Approach
- LED Lighting Upgrade
- Rehabilitation of Departures Parking Lot
- Central Security Facility/AOA Access
- Sanitary Sewer: New line to Connect Terminal to Sewer Line
- Upgrade Area Lighting (Landside)
- Fire Hydrants: Public (Landside) Of Terminal Building

Table 9-2. Capital Improvement Program – Phase 1 2012-2016

CAPITAL IMPROVEMENT PROGRAM- PHASE I (2012-2016)	
PROJECTS	**COST (US DOLLARS)**
Airside Erosion Control /Response to Rising Tides	$1,690,000
Airfield Perimeter Fence	$1,500,000
Remove/Mitigate Obstructions: Approach and Airfield Environment	$780,000
GPS Approach	$520,000
LED Lighting Upgrades	$650,000
Rehabilitation of Departures Parking Lot	$910,000
Central Security Facility/AOA Access	$292,500
Sanity Sewer: New line to Connect Terminal to Sewer Line	3,900,000
Upgrade Area Lighting (Landside)	$195,000
Fire Hydrants: Public (Landside) Of Terminal Building	$97,500
TOTAL	**$10,535,000.00**

9.3 Phase 2 Improvements (2017 – 2021)

Phase 2 Option One development consists of the following capital projects:

- Runway/Taxiway Seal Coat and Marking Upgrades
- Remove/Mitigate Obstructions: Approach and Airfield Environment
- Facilities Maintenance Structure
- New CIA Terminal/Hangar Complex
- Access Road/Parking: CIA Complex & Helicopter/T Hangars
- Apron Fillet Area (next to Helicopter Operations)
- Helicopter T Hangars
- Perimeter Fence
- ARFF Station Access Road

Table 9-3. Capital Improvement Program – Phase 2 Option #1 2017-2021

APRON AREA OPTION #1	Cost (US Dollars)
Runway/Taxiway Seal Coat and Marking Upgrades	$1,450,000
Remove/Mitigate Obstructions: Approach and Airfield Environment	$725,000
Facilities Maintenance Structure	$290,000
New CIA Terminal/Hangar Complex	$5,800,000
Access Road/Parking: CIA Complex & Helicopter/T Hangars	$1,305,000
Apron Fillet Area (next to Helicopter Operations)	$435,000
Helicopter T Hangars	$1,450,000
Perimeter Fence	$725,000
ARFF Station Access Road	$1,232,500
TOTAL	**$13,412,500.00**

Phase 2 Option Two development consists of the following capital projects

- Runway/Taxiway Seal Coat and Marking Upgrades
- Remove/Mitigate Obstructions: Approach and Airfield Environment
- Facilities Maintenance Structure
- Access Road/Parking: Helicopter/T Hangars
- Apron Fillet Area (next to Helicopter Operations)
- Helicopter T Hangars
- New CIA Terminal Building
- New CIA Hangar
- Apron Expansion
- Perimeter Fence
- ARFF Station Access Road/Parking for/CIA Terminal & Hangar

Table 9-4. Capital Improvement Program – Phase 2 Option #2 2017-2021

APRON AREA OPTION #2	Cost (US Dollars)
Runway/Taxiway Seal Coat and Marking Upgrades	$1,450,000
Remove/Mitigate Obstructions: Approach and Airfield Environment	$725,000
Facilities Maintenance Structure	$108,750
Access Road/Parking: Helicopter/T Hangars	$1,450,000
Apron Fillet Area (next to Helicopter Operations)	$435,000
Helicopter T Hangars	$725,000
New CIA Terminal Building	$4,350,000
New CIA Hangar	$2,900,000
Apron Expansion	$8,700,000
Perimeter Fence	$725,000
ARFF Station Access Road/Parking for/CIA Terminal & Hangar	$1,250,000
TOTAL	**$22,818,750.00**

9.4 Phase 3 Improvements (2022 – 2031)

Phase 3 development consists of the following capital projects:

- Remove/Mitigate Obstructions: Approach and Airfield Environment
- Runway Seal Coat and Airfield Marking Upgrades
- Upgrades to Airfield Lighting & Signage
- Runway Rehabilitation
- ARFF Rehabilitation
- Terminal Rehabilitation

Table 9-5. Capital Improvement Program – Phase 3 2022-2031

CAPITAL IMPROVEMENT PROGRAM- PHASE 3 (2022-2031)	
PROJECTS	**COST (US DOLLARS)**
Remove/Mitigate Obstructions: Approach and Airfield Environment	$525,000
Runway Seal Coat and Airfield Marking Upgrades (X2)	$3,500,000 ($1,750,000 per)
Upgrades to Airfield Lighting & Signage	$2,187,500
Runway Rehabilitation	$59,500,000
ARFF Rehabilitation	$2,100,000
Terminal Rehabilitation	$3,500,000
Jug Handle Taxiway	$4,200,000
TOTAL	**$71,487,500.00**

9.5 Capital Improvement Plan Total Cost (2011 -2031)

The following is a breakdown of the total cost of the Airport Capital Improvement Plan

Table 9-6. Capital Improvement Program Total Cost 2012-2031

CAPITAL IMPROVEMENT PROGRAM (2012-2031)	
Phase 1	$10,535,000
Phase 2 - Option One	$13,412,500
Phase 2 - Option Two	$22,818,750
Phase 3	$75,512,500
Total Using Phase 2 -Option One	**$99,460,000**
Total Using Phase 2 -Option Two	**$108,866,250**

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FIGURE 9-1. CAPITAL IMPROVEMENT PROGRAM SCHEDULE

C.I.P. PROJECTS	PHASE I					PHASE II					PHASE III										
	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
AIRSIDE IMPROVEMENTS																					
Airfield Perimeter Fence																					
Airside Erosion Control/Response to Rising Tides																					
Remove mitigate Obstructions: Approach and Airfield Environment																					
GPS Precision Approach																					
LED Lighting (Airfield)																					
Runway Seal Coat & Marking Upgrades																					
Runway Rehabilitation																					
Upgrade to Airfield Lighting & Singage																					
APRON AREA OPTION #1																					
Facilities Maintenance Structure																					
New CIA Terminal/Hangar Complex																					
Access Road/Parking: CIA Complex & Helicopter/T Hangars																					
Apron Fillet Area (next to Helicopter Operations)																					
Helicopter T Hangars																					
Perimeter Fence																					
ARFF Station Access Road																					
APRON AREA OPTION #2																					
Facilities Maintenance Structure																					
Access Road/Parking: Helicopter/T Hangars																					
Apron Fillet Area (next to Helicopter Operations)																					
Helicopter T Hangars																					
New CIA Terminal Building																					
New CIA Hangar																					
Apron Expansion																					
Perimeter Fence																					
ARFF Station Access Road/Parking for/CIA Terminal & Hangar																					
TERMINAL IMPROVEMENTS																					
Terminal Rehabilitation																					
LANDSIDE IMPROVEMENTS																					
ARFF Rehabilitation																					
Security Building/AOA Access																					
Rehab Exist Parking Lot and Perimeter Fence																					
Expansion of PPA/Airport Management Offices																					
Sanitary Sewer: New Line to Connect Term to Sewer Connect																					
Car Rental Kiosks																					
Area Lighting (Parking Lot Areas)																					
Fire Hydrants, Landside Area																					

CHAPTER 10: AIRPORT LAYOUT PLANS

The Airport Layout Plan (ALP) is a set of drawings that show improvements recommended by this Master Plan. In addition to the proposed airport improvements, the ALP set also shows existing runways, taxiways, airport property boundary, and other existing facilities. The ALP set includes a number of individual drawings. Several of these drawings are required while others may be included in the ALP set to provide detailed drawings that provide a clear picture of recommended capital improvements. Information that is usually included are drawings that show runway details and data, approach and departure profiles, airspace protection surfaces, obstruction information, terminal area plans, land-use information and airport property maps. The ALP is prepared in conformance with the FAA's AC 150/5070-6B, "Airport Master Plans." The FAA provides guidance in the development of the ALP set and is responsible for review and approval of the ALP set.

- Title Sheet –Contains approval signature blocks, airport location maps, and other pertinent information as required by the FAA.
- Airport Layout Plan – illustrates the existing and future airport facilities. The drawing also includes required facility identifications, description labels, imaginary surfaces, runway protection zones, runway safety areas and basic airport and runway data tables.
- Airport Surfaces: Airport Airspace/ Inner Portion of the Approach Surface – 14 CFR Part 77, Objects Affecting Navigable Airspace, define this as a drawing depicting obstacle identification surfaces for the full extent of all airport development. It also should depict airspace obstructions for the portions of the surfaces excluded from the inner portion of the approach surface drawing.
- Terminal Area Layout– Consists of two drawings showing current and planned improvements, presenting a large-scale depiction of areas with significant terminal facility development.
- Land Use Plan Existing and Land Use Plan Proposed. On and off airport drawings that depict the land uses within and adjacent to the airport property boundary.
- Airport Property Map – A drawing depicting the airport property boundary, the various tracts of land that were acquired to develop the airport, and the method of acquisition.