Michael Baker International, Inc.
3900 C Street
Suite 900
Anchorage, AK 99503
919-481-5722

Airport Master Plan Update
Unalaska Airport

DRAFT WORKING PAPER #1

Introduction

Airport Setting

Existing Airport Facilities

Forecasts of Aviation Activity

October 8, 2020

Table of Contents

Figures

Tables

Acronyms

AAC	Aircraft Approach Category
AAL	Alaskan Region [FAA]
AASP	Alaska Aviation System Plan
AC	Advisory Circular
ACIP	Airport Capital Improvement Program
ADG	Airplane Design Group
ADO	Airports District Office [FAA]
ADPH	Average Day Peak Hour
ADPM	Average Day Peak Hour
AFD	Airport/Facility Directory
AGL	Above Ground Level
AIP	Airport Improvement Program
AIS	Aeronautical Information Systems
ALP	Airport Layout Plan
ALS	Approach Lighting System
AMSL	Above Mean Sea Level
ANCSA	Alaska Native Claims Settlement Act
AOA	Airport Operations Area
APHP	Average Peak Hour Passengers
APL	Aircraft Parking Line Limit
APRC	Approach Reference Code
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Firefighting
ARP	Airport Reference Point
ASDA	Accelerated Stop Distance Available
ASL	Above Sea Level
ASV	Annual Service Volume
AVGAS	Aviation Gasoline
AVN	FAA's Office of Aviation System Standards
AWOS	Automated Weather Observing System
BTS	Bureau of Transportation Statistics
BRL	Building Restriction Line
CADD	Computer-Aided Drafting and Design
CAAGR	Compound Average Annual Growth Rate
CFR	Code of Federal Regulation
CIP	Capital Improvement Program
CMG	Cockpit to Main Gear Distance
CTAF	Common Traffic Advisory Frequency
DA	Decision Altitude
DH	Decision Height
DME	Distance Measuring Equipment
DOT&PF	Alaska Department of Transportation & Public Facilities
DPRC	Departure Reference Code

DUT	Unalaska Airport
eNASR	National Airspace System Resources Browser
EA	Environmental Assessment
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FEMA	Federal Emergency Management Agency
FOD	Foreign Object Debris
FONSI	Finding of No Significant Impact
GA	General Aviation – Glide Angle
GIS	Geographic Information System
GPS	Global Positioning System
GS	Glide Slope
HIRL	High Intensity Runway Lights
HITL	High Intensity Taxiway Lights
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
ISD	FAA/NOAA, Integrated Surface Database
LAAS	Local Area Augmentation System
LDA	Landing Distance Available
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical Guidance
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MDA	Minimum Descent Altitude
MGW	Main Gear Width
MGW	Maximum Gross Weight
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
NAS	National Airspace System
NAS	National Airspace System
NAVAIDS	Navigational Aids
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPI	Non-Precision Instrument
NPIAS	National Plan of Integrated Airport Systems
OFA	Object Free Area
OFZ	Object Free Zone
P/T	Precipitation and Lightning Sensors

PA	Precision Approach
PAPI	Precision Approach Path Indicator
PCN	Pavement Condition Number
PenAir	Peninsula Airways
POFZ	Precision Obstacle Free Zone
RAIL	Runway Alignment Indicator Light
RDC	Runway Design Code
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
ROFZ	Runway Obstacle Free Zone
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RVR	Runway Visual Range
RWY	Runway
SAC	Stakeholder Advisory Committee
SOP	Standard Operating Procedure
TACAN	Tactical Air Navigation
TAF	Terminal Area Forecasts
TAP	Terminal Area Plan
TCH	Threshold Crossing Height
TDG	Taxiway Design Group
TDZ	Touchdown Zone
TDZE	Touchdown Zone Elevation
TERPS	Terminal Instrument Procedures
TESM	Taxiway Edge Safety Margin
TFMSC	Traffic Flow Management System Counts
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available
TSA	Taxiway Safety Area; Transportation Security Administration
TW	Taxiway
TWY	Taxiway
USGS	United States Geological Survey
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	Terminal Very High Frequency Omnidirectional Range
VORTAC	Terminal Very High Frequency Omnidirectional Range/TACAN

1 INTRODUCTION

1.1 Need for the Update of the Airport Master Plan and Airport Layout

The Alaska Department of Transportation & Public Facilities (DOT&PF) last completed the Unalaska Airport (FAA Location Identifier: DUT) Master Plan Update in 2008. The Airport Layout Plan (ALP) Drawing and other supporting graphical drawings, information and data sheets (collectively referred to as the Airport Layout Plan Drawing Set) was last updated in 2017.

In 2019, using FAA Traffic Flow Management System Counts (TFMSC) and Bureau of Transportation Statistics (BTS) for DUT, an estimated 5,000 aircraft operations occurred throughout the calendar year and a total of 6 (2 Single-engine, 3 multi-engine and 1 ultralight) aircraft were locally based at the airport. During the same period, approximately 27,550 enplaned passengers were reported by the FAA.

The update of the Airport Master Plan is needed to improve the potential for safe and reliable air service essential to the community of Unalaska. The airport offers critical infrastructure used by commercial fishing, residents, health services, and others. Future airport improvements recommended in this update of the DUT Master Plan will help support air carriers in providing regular and safe air service. As part of the update, DOT&PF will focus the validation of past airport facility planning, particularly with respect to identifying needed improvements to its airside, terminal area, and other landside facilities.

Further, revised and updated FAA airport design standards and safety criteria guidance dictate the need to review and plan for needed updates of current airport design geometries and safety-related setbacks. A Master Plan Technical Report will be developed to provide information regarding updated airport development plans and airport design requirements while also addressing key issues, objectives, and goals pertinent to the airport's future development.

The ALP Drawing Set will be developed per guidance offered in FAA's AC 150/5070-6B, *Airport Master Plans*, Chapter 10, Section 1002, *Airport Layout Plan Drawing Set*; and *FAA Airports Division ARP Standard Operating Procedure (ARP SOP) 2.00, FAA Review and Approval of Airport Layout Plans (ALPs).*

These updates will serve to provide the needed planning platform on which to further develop the airport to improve and maximize the safe and efficient development and use of the airport while minimizing potential adverse environmental impacts to the surrounding natural environment.

1.2 Goals of the Airport Master Plan Update

The general goals of DOT&PF regarding the update of the DUT Airport Master Plan and ALP Drawing Set are as follows:

- To further enhance the airport's aeronautical role within DOT&PF's Alaska Aviation System Plan

- To increase safety and efficiency of the airfield's current and likely planned future runway, taxiways, and taxiway connectors
- To attain the highest and best use of on-airport developable land
- To identify potential need for acquisition of adjacent environmentally-compatible land for airport expansion
- To preserve and protect:
  - DOT&PF's capability to leverage existing and planned future aviation assets
  - Likely needed aviation-related facility development and to accommodate anticipated future aviation-related operations and commerce
  - Navigable airspace above and around the airport to accommodate existing and anticipated NextGen-related approach capabilities to and from the airport
  - DOT&PF's ability to accommodate unforeseen or anticipated demand for civilian and military-related aviation operational activities
- The main goals and objectives of the Airport Master Plan and ALP Drawing Set update include:
  - Use of existing and relevant information
  - Documentation of existing airport facilities
  - Develop and receive FAA and DOT&PF approval of a Forecast of Aviation Activity
  - Identification of one or more "Critical" or "Design" aircraft.
  - Identify airport-compatible land use on and in proximity to the airport
  - Update the ALP Drawing Set
  - Clearly identify and verify the present and future role(s) of the airport.
  - Review/identify the size and layout of airside and landside facilities to accommodate projected demand.
  - Review existing compatible land use measures around the airport.
  - Conduct a streamlined and efficient public outreach program.
  - Develop a Capital Improvement Program (CIP) and funding plan for the airport that provides the basis for future federal, state, and local government investment.

The following areas of emphasis will be reviewed and addressed:

- Runway length and Airfield Design,
- Runway Safety Area Determination,
- Airport Perimeter Security Fencing,
- Terminal Area Improvements, and
- Future Hangar Development.

During the planning process these goals were also shared with the Stakeholder Advisory Committee (SAC) and the public.

The overall purpose of this Airport Master Plan Update is to provide reasonable guidelines for future development alternatives to satisfy aviation demand in a cost-effective manner. In support of the purpose and goals identified, the primary objective of this master plan is to create a 20-year development program that will maintain a safe, efficient, economical, and environmentally sustainable airport facility for DOT&PF, the City of Unalaska, and surrounding communities of the Aleutians West Region. The key elements of the planning process are shown in **Figure 1-1**.

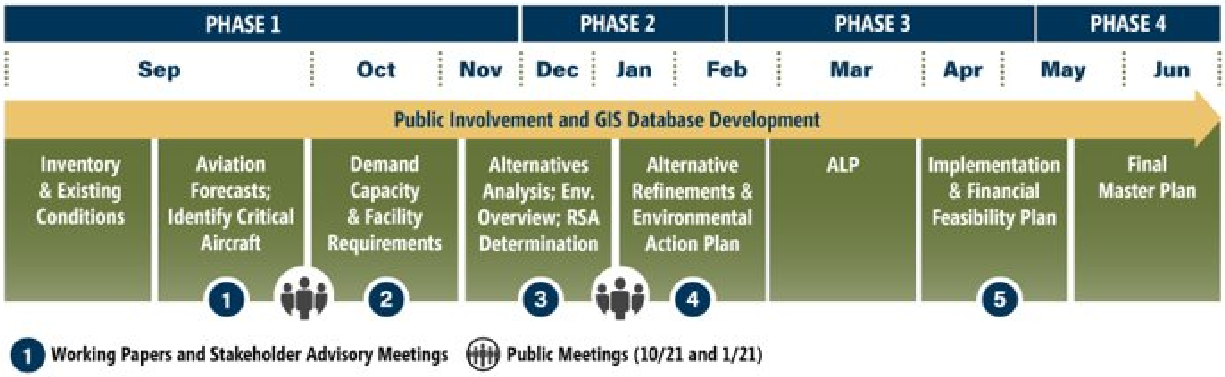


Figure 1-1: Master Planning Process

1.3 FAA Master Plan and ALP Drawing Set Update Guidance and Requirements

The update of the Airport Master Plan and Airport Layout Plan Drawing Set will fully follow guidance listed in the current FAA ALP checklist, and guidance provided in the following FAA documents:

- Advisory Circular 150/5070-6 (Change 2), *Airport Master Plans*,
- ARP SOP 2.00, *Standard Procedure for FAA Review and Approval of Airport Layout Plans (ALPs),*
- Advisory Circular 150/5190-4, *A Model Zoning Ordinance to Limit Height of Objects Around Airports*,
- Advisory Circular 150/5200-33C, *Hazardous Wildlife Attractants on or Near Airports*,
- Advisory Circular 150/5300-13A (Change 1), *Airport Design*,
- Advisory Circular 150/5320-6F, *Airport Pavement Design and Evaluation*,
- Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*,
- Advisory Circular 150/5335-5C, *Standardized Method of Reporting Airport Pavement Strength – PCN*,
- Advisory Circular 150/5340-1M, *Standards for Airport Markings*,
- Advisory Circular 150/5340-30H, *Design and Installation Details for Airport Visual Aids*,
- Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*,
- Order 5100.38D, *Airport Improvement Program Handbook*,
- Order 5200.8, *Runway Safety Area Program*,
- Joint Order JO 7400.2L, *Procedures for Handling Airspace Matters (Change 1),*
- *Order 8260.3D, United States Standard for Terminal Instrument Procedures* (TERPS),
- Order 8260.19I, *Flight Procedures and Airspace*,

- Engineering Brief No. 99A, *Changes to Tables 3-2 and 3-4 of Advisory Circular, 150/5300-13A, Airport Design*,
- Title 14 CFR part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, and
- FAA Order 1050.1F, Environmental Impacts: Policies and Procedures.

Airport planning is a well-documented and FAA-prescribed systematic process used by airport owners to ensure the efficient future development of the airport that remains consistent with DOT&PF's airport development vision and goals, the Alaska Aviation System Plan (AASP), and the FAA's national aviation development goals. A key objective of the DUT Airport Master Plan Update is to assure the effective use of current and planned future airport resources to satisfy future aviation demand at DUT in a timely, financially, and environmentally-feasible manner.

This update of the Airport Master Plan and ALP Drawing Set will serve to represent DOT&PF's current airport development plans for a 20-year planning period that will be divided into Near (1 to 5-year), Intermediate (6 to 10-year), and Long-term (11 to 20-year) planning horizons. The near-term will be specifically examined to identify immediate airport capital improvement needs that have been previously identified and fully-funded. The following five-year Intermediate-term addresses airport facility improvement needs that are anticipated to be needed but have not been either prioritized or identified as part of the airport's CIP. This second five-year planning horizon provides airport owners ample time within which to conduct environmental due diligence and secure local, state and national FAA funding resources. Lastly, the follow-on ten-year planning horizon serves to identify airport development needs that are envisioned to be required within the following 11 to 20-year long-term horizon. It is highly anticipated that these long-term airport developments, while typically not clearly definable and/or ripe for decision making, are needed to fulfil the DOT&PF's vision and to attain the airport's long-range planning goals for continued growth and development through the end of the 20-year planning period.

Following the update of the DUT Master Plan and ALP Drawing Set, DOT&PF will have a coherent and sequentially-structured airport facility development program that will

- provide a graphic representation of existing airport features, future airport development and anticipated land use,
- establish a realistic schedule for implementation of the proposed development,
- identify a realistic financial plan to support the development,
- validate the plan technically and procedurally through investigation of concepts and alternatives on technical, economic, and environmental grounds,
- prepare and present a plan to the public that adequately addresses relevant issues and satisfies local, state, and federal regulations, and
- establish the framework for a continuous planning process.

The updated DUT ALP Drawing Set will include the following drawings:

- Title Sheet
- Airport Data Sheet
- Airport Layout Drawing

- Airport Airspace Drawing
- Inner Portion of the Approach Surface Drawing(s)
- Runway Departure Surface Drawing(s)
- Terminal Area Drawing
- Land Use Drawing, and
- Airport Property Map

The update of the ALP Drawing Set will include the identification, location, and timing of proposed developments as necessary to meet future aviation-related operational demand projections, or to increase or enhance the safe and efficient use of the airport. At the completion of the update of the ALP Drawing Set, the Master Plan Technical Report will provide textual and graphical supporting information and data tables following FAA's Standard Operating Procedure (SOP) – 2.00, *Standard Procedure for FAA Review and Approval of Airport Layout Plans (ALPs),* Effective Date: October 1, 2013.

1.4 FAA Airport Master Plan and ALP Drawing Set Review and Approval Process

Although locally-formulated with the collaborative participation of the FAA and Alaska DOT&PF, the FAA will typically accept, but not formerly require or provide formal approval of the DOT&PF's submittal of the entire updated DUT Airport Master Plan and ALP Drawing Set. The FAA, however, is required to review and approve two specific elements of the Master Plan and ALP Update that are limited to the Forecast of Aviation Activity as documented within the *Airport Master Plan Technical Report*, DOT&PF's adoption of one or more Critical Aircraft or a "family of aircraft" referenced for airport development, and the ALP Drawing. These FAA approval processes are required to ensure that the local airport development goals are reasonable and consistent with other FAA national forecasts and to properly align future airport planning goals with FAA airport design standards.

The Airport Layout Drawing and supporting Airport Data Sheet will be conditionally approved by the FAA and maintained on file for reference and future federal funding participation. It is from these elements that the FAA makes their determination regarding eligibility of federal Airport Improvement Program (AIP) funding for proposed airport facility development projects. All future FAA federal funding participation can only occur if the planned airport facility improvement actions are included within the current on-file copy of the DUT Airport Layout Drawing.

The remainder of this page is intentionally left blank.

2 Airport Setting

2.1 Airport Location and Aeronautical Role

The Unalaska Airport (DUT) is located approximately 790 statute miles from Anchorage, Alaska, and 170 miles from Cold Bay, Alaska. DUT is located on Amaknak Island in the Aleutian Islands, approximately one statute mile north of the City bounded by Unalaska Bay and Dutch Harbor. The airport operates as a Public-use Commercial Service Airport, providing a variety of activities and services to the flying public including passenger service, air cargo, military operations and general aviation. The Alaska DOT&PF owns DUT, and the airport is attended seven days a week, between the hours of 9:00 am to 5:30 pm local time.

Vehicular access to the airport terminal area is provided via Airport Beach Road to Airport Road. Access to the north side of the airport is provided via Airport Beach Road to Ballyhoo Road, then northwest on Tundra Drive. Ballyhoo Road was most recently realigned in 2014 as part of runway safety improvements at the airport.

The City of Unalaska is located on Unalaska and Amaknak Islands and has a total area of 111 square miles. It is the principal city of the Aleutians West Census Area and is the chief population center in the Aleutian Islands, having a 2019 reported population of 4,376.

Detailed location information and data for the airport is provided in **Table 2-1** and **Figure 2-1**.

Table 2-1: Airport Location and Identification

Item	Data
Airport Name	Unalaska Airport
Owner	Alaska DOT&PF Southcoast Region
Distance from CBD	1 Statute mile north of City of Unalaska, AK
Census Area	Aleutians West
FAA Region	Alaskan (AAL)
FAA Site Number	50801.*A
FAA Location ID	KDUT
NPIAS Identifier	02-0082
Airport Reference Point	
Latitude:	53°53’ 56.2” N
Longitude:	166° 32’ 42.1” W
Elevation (feet MSL):	23.3 feet
Acreage	105 acres
Airport Traffic Pattern	Runway 13 - Left Traffic; Runway 31 - Right Traffic

Source: Current ALP; FAA Form 5010; AVN Datasheets; eNASR

Bering Sea
Anchorage
Gulf of Alaska
Unalaska Airport
0 250 500 Miles
N
W
E
S
Amaknak Island
Ballyhoo Road
Tundra
Hog Island
Dutch Harbor
Iliuliuk Bay
Unalaska Airport
Summer Bay Road
Dutch Harbor
East Point Road
Iliuliuk Harbor
Airport Beach Road
Unalaska
Summer Bay Road
East Broadway
Captains Bay Road
Unalaska Lake
0 0.5 1 Miles
Satellite Imagery 2017

2.2 Airport Ownership Management and Development History

Unalaska Airport has a rich history. The airport was built in 1942 by the US Department of Navy as part of the Dutch Harbor Naval Operating Base. The base and Fort Mears, also on Amaknak Island, fulfilled an important role in the Aleutian campaign of World War II. With the cessation of the war, the number of Armed Forces personnel declined sharply, resulting in downsizing and closures of military bases around the country. The Base was later decommissioned in 1947, yet remained under federal control until 1975, when the US Bureau of Land Management transferred surface rights to the Ounalashka Corporation. This regional native corporation was formed under the Alaska Native Claims Settlement Act (ANCSA) of 1971. Ounalashka Corporation later deeded surface estate of the airport to DOT&PF in 1980. The airport was later renamed Tom Madsen Airport in 2002 in honor of Charles Tomas Madsen Sr., Bush Pilot known as the "Aleutian Aviator", and spent years delivering cargo and passengers in the region.

2.2.1 Seafood Industry

After the war, population growth was slow and the local economy was focused on a few fisheries until the late 1970's. Throughout the 1970s and 1980s, the seafood industry became more diversified, resulting in significant population growth. Today, the seafood industry is one of the largest drivers of passenger activity at DUT. Both seafood processors and harvesters rely on the facility throughout the year.

Commercial fishing activity takes place in every month of the year in the Bering Sea and Aleutian Islands which supports activity in Unalaska/Dutch Harbor. A diversified species mix supports year-round operations and stability through harvest and market cycles. High-volume species such as pollock and Pacific cod are playing an increasingly important role as crab, halibut, and sablefish volume and values have declined. The first and third quarter of the year, labeled by the industry as Seasons A and B, are typically the busiest measured by harvesting and processing activity.

Arrivals into Unalaska peak in January, due in part to a variety of pollock, flatfish, and Pacific cod fisheries starting at the beginning of the year (Season A). Of any month of the year, January has the highest number of major fisheries starting in a typical year. Departures climb as fishing activity slows into the second quarter of the year. Arrivals increase again mid-year before the pollock B season with departures normally in the fall.

2.2.1.1 Seafood Processing

Air travel is the primary method for getting workers into Unalaska to fill between 600-2,500 positions in local onshore and offshore processing plants located in Unalaska and Akutan depending on the month. While this region includes some processing activity in other areas like Akutan, processing in Dutch Harbor accounts for more than 90 percent, according to previous McDowell Group research. Key onshore processors include:

- Alyeska
- Icicle Seafoods
- UniSea
- Trident (Akutan)

While data is limited, about two-thirds of processing workers in Dutch Harbor are nonresidents to Alaska. The remaining third of workers included local residents and Alaska residents from other areas in the state. (The local component is likely smaller than the Alaska resident component.)

2.2.1.2 Commercial Fishing

Commercial fishing fleets operating out of Dutch Harbor regularly use the airport for crew changes or additions. The peak of activity also occurs in the first and third quarter of the year, consistent with processing activity.

2.2.2 Previous Master Planning Efforts

A number of important projects were conducted since the airport's initial Airport Master Plan in 1985. The 1985 Airport Master Plan was based upon accommodating the Boeing 737 and proposed a 6,000-foot by 150-foot runway, the addition of 19.5 acres of apron and taxiway, and the relocation of the seaplane ramp. However, these projects were not completed as they were deemed to be cost prohibitive.

Subsequent airport planning efforts were completed by ASCG, Inc. in 2001 and 2003. The 2001 plan identified ten airfield alternatives, both on and off Amaknak Island, using the Boeing 737 as the design aircraft. These alternatives were later refined in 2003 and reduced to four airport development alternatives, based on financial feasibility and ability to meet FAA airport design standards. The four options evaluated proposed runway lengths ranging from 5,200 to 6,000 feet in length. This planning effort also evaluated the feasibility of meeting FAA design standards.

Other improvements were identified in the 2003 airport planning effort:

- Upgrading Medium Intensity Runway Lights (MIRL) to High Intensity Runway Lights (HIRL)
- Installation of Runway Distance-to-Go Markers
- Installation of additional anemometers, automated weather reporting, and weather observation facilities at a second story level
- Expansion of apron area from 21,000 square feet to 26,000 square feet
- Development of a dual-purpose seaplane ramp/water rescue boat ramp in Unalaska Bay,
- Expansion of the passenger terminal from 13,700 square feet to 23,700 square feet
- Paving all parking spaces and adding 60 additional paved parking spaces

The following improvements were also recommended, but would be developed by private or other government entities:

- Expansion of cargo facilities from 5,280 square feet to 13,000 square feet
- Addition of a half-acre of general aviation space for lease lot development or T-Hangars
- Addition of 11,000 square feet of tenant hangar space, and
- Provide on-airport space for fuel storage tank and sales.

In 2004, Alaska Airlines substituted use of the Boeing 737-200 Advanced Combi jet for Peninsula Airway's (PenAir) Saab 340B for passenger service. This action changed the critical design aircraft to the Saab 340B, rendering many of the above recommendations obsolete. Therefore, none of the 2001-2003 planning recommendations were implemented.

In October 2004, the FAA and DOT&PF initiated Project Definition planning to update airport infrastructure in response to the change in critical aircraft and other needs. FAA and DOT&PF's intent was to complete the Project Definition Planning and to initiate an EIS for projects that would enhance the safety, reliability and capability of Unalaska Airport, including runway safety area (RSA) enhancements. This resulted in projecting airport needs for approximately 15 years - which coincided with the approximate lifespan of the Saab 340B.

2.2.2.1.1 2008 Airport Master Plan Update

In March 2006, the Unalaska City Council adopted a resolution to support changing the Airport Reference Code (ARC) from B-II to B-III (if necessary), in order to accommodate a larger critical aircraft. Other changes were occurring during this time period including further rationalization of various fisheries, changes in FAA design standards, and PenAir' s continued research into the modernization of its aircraft fleet. Therefore, the Project Definition planning effort was suspended in lieu of the 2008 Airport Master Plan Update.

Recommendations from the plan include a mix of projects ranging from airfield modifications, navigational aids and lighting, terminal facilities, cargo facilities, apron improvements, and other landside projects. Some of the key improvements recommended in the 2008 DUT Master Plan Update include:

- Extension of Runway 13-31
- Runway Safety Area and Object Free Area improvements
- Terminal apron improvements
- Airport access improvements to Airport Terminal Area via Airport Beach Road
- Hangar improvements

Since 2008, several developmental milestones have occurred at DUT:

- Rehabilitation and remarking of Runway 13-31
- RSA improvements at each end of Runway 13-31
- Realignment of Ballyhoo Road with drop arms and warning lights for vehicle control under Runway 31 approach
- Shoreline extension with Core-Loc Armoring
- Removal of the Torpedo Building

It is important to note that several planning, design and construction projects conducted over the years could not have been conducted without Federal assistance through the FAA's Airport Improvement Program. **Table 2-2** depicts the FAA grant activity at DUT over the past 10 years.

Table 2-2: FAA Grant Activity

Fiscal Year	Project Description	Grant Sequence Number	Original Grant Amount	Entitlement Funds	Discretionary Funds
2011	Rehabilitate Runway 13-20 - Various Surface Preservation	079	$69,160	$69,160	
2012	Rehabilitate Runway 12-30	014	$10,500,000		$10,500,000
2012	Extend Runway 12-30	014	$4,300,000		$4,300,000
2012	Extend Runway Safety Area 12-30 (includes road relocation)	014	$7,755,874	$2,334,251	$5,421,623
2013	Rehabilitate Runway 12-30 - Surface Preservation Maintenance	093	$52,500	$52,500	
2015	Construct Snow Removal Equipment Building	015	$4,466,356	$4,466,356	
2015	Construct Sand and Chemical Storage Building	015	$4,082,000	$4,082,000	
2015	Rehabilitate Runway 13-31 - Accomplish Airport Surface Preservation Maintenance	104	$56,895	$56,895	
2016	Rehabilitate Runway 13-31 - Various Surface Preservation Maintenance	109	$82,402	$82,402	
2017	Acquire Interactive Training System	113	$5,721	$5,721	
2017	Acquire Snow Removal Equipment - Runway Towed Broom	117	$696,082	$696,082	
2017	Rehabilitate Runway 13-31 - Remarking Runway 13-31 (and incidentally Taxiway A)	118	$82,402	$82,402	
2018	Rehabilitate Runway 13-31 - Marking and Crack Seal to Runway 13-31 (and incidentally Taxiway A)	122	$162,974	$162,974	
2019	Acquire Aircraft Rescue & Fire Fighting Vehicle - 1,500 Gallon - Index A - PGL 17-01 Approved	016	$999,255	$999,255	
2019	Rehabilitate Runway 13-31 Various Surface Preservation Maintenance - Rehabilitate Marking on Runway 13-31 (and incidentally Taxiway A)	125	$85,957	$85,957	

Source: DOT&PF. FAA Airport Improvement Program (AIP) Grant Histories

2.2.3 Airport Reference Code

The Airport Reference Code (ARC) is a coded system composed of the Aircraft Approach Category (AAC) and Airplane Design Group (ADG). The ARC relates airport design criteria to the operational and physical characteristics of the aircraft that will operate at the airport. DUT is currently designed in accordance with ARC of B-II design standards and is planned to meet ARC B-III requirements in the future. ARC B-II corresponds to aircraft operations having approach speeds ranging from 91 knots or more to, but less than 121 knots (AAC B), and wingspans and tail heights ranging from 49 feet to, but less than 79 feet and 20 feet up to, but less than 30 feet respectively (ADG II). Existing and future aircraft operations are considered based on FAA-approved aviation demand forecasts and the airport's existing and future role within the air transportation system. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at the airport.

2.2.4 Runway Design Code

The Runway Design Code (RDC) is a coded system composed of the selected AAC, ADG, and approach visibility minimums. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed. The second component is depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height, whichever is most restrictive of the largest aircraft expected to operate on the runway and taxiways. The third component relates to the visibility minimums expressed by RVR values in feet of 1200, 1600, 2400, and 5000. DUT has an existing RDC of B-II-5000 and planned RDC of B-III-5000 in the future.

2.2.5 Taxiway Design Group

Taxiway Design Group (TDG) relates to the undercarriage dimensions of an aircraft. Taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements, are determined by TDG. The TDG is based on the Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG). Based upon a 2019 Critical Aircraft Determination Study, the current critical aircraft (Saab 2000) is classified as TDG 3. The results of this study will be revalidated as part of the DUT Master Plan Update.

2.3 Surrounding Vicinity Airports

Akutan Airport is the lone airport located within a 40 nautical mile radius to DUT and is listed in **Table 2-3**. Akutan is a non-towered public use airport with a single runway that offers published Instrument Approach Procedures (IAPs), with vertically-guided area navigation (RNAV) (global positioning system or GPS), localizer performance with vertical guidance procedures (LPV), and IAP capability. The Unalaska Airport and Akutan Airport are depicted on the FAA's Alaska Section Chart as shown in **Figure 2-2.**

Table 2-3: Surrounding Vicinity Airports					
Airport Code	Name	Number of Based Aircraft	Instrument Approach Capabilities	LPV Vertically-Guided Approach	Distance from DUT (Nautical Miles)
PAUT	Akutan Airport	0	Yes	Yes	36 Northeast

Source: AirNav, LLC., compiled by Michael Baker International, Inc., September 2020.

2.4 National Plan of Integrated Airport Systems

The FAA's National Plan of Integrated Airport Systems (NPIAS) identifies airports included in the national airport system, the role they serve, and the amounts and types of airport development eligible for federal funding under the AIP over five years. The most recent report includes fiscal years 2019 to 2023 and identifies 3,328 public-use airports (3,321 existing and 7 proposed) that are important to national air transportation and estimates a need for approximately $35.1 billion in AIP-eligible airport projects between 2019 and 2023. Airports listed in the NPIAS are eligible for federal funding under the FAA's Airport Improvement Program (AIP). Additionally, the NPIAS defines the role of each airport by one of four basic service levels. These levels are listed in **Table 2-4,** which describes the type of service that the airport currently provides and is expected to provide at the end of the NPIAS five-year planning period. It also represents the funding categories established by Congress to assist in airport development. DUT is classified as a primary commercial service airport. This is important from a funding standpoint because funds are limited for airports in this category in Alaska.

Table 2-4: FAA NPIAS Airport Service Level Classification	
Category	Criteria
Commercial Service – Primary	A public use commercial service airport that enplanes more than 10,000 passengers annually.
Commercial Service – Non-primary	A public use commercial service airport that enplanes between 2,500 and 10,000 passengers annually.
General Aviation – Reliever	A general aviation airport that relieves congestion at a commercial service airport and provides general aviation access to its community. Must have at least 100 based aircraft or 25,000 annual itinerant operations.
General Aviation	All other NPIAS airports.

Source: FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems, December 2000.

The remainder of this page is intentionally left blank.

Sectional Aeronautical Chart

Figure 2-2

2.5 Alaska Airport System Plan

As part of their continuing Alaska Aviation System Plan (AASP), DOT&PF reports that the state has 394 public-use airports, with 239 owned and operated by DOT&PF. The Alaska aviation industry:

- contributes more than $3.8 billion to the state's economy and support 35,000 jobs statewide (7.8 percent of jobs in the state),
- transports groceries, household goods, and construction materials to rural Alaska,
- supports a variety of local industries such as fresh and live seafood markets, and tourism,
- provides crucial aviation support to Alaska's healthcare system for both regular treatment and trauma care, and
- ranks as the 6th largest sector in the state when compared to other economic sectors, ahead of Construction and Manufacturing, Trade, and Hospitality and Leisure.

DOT&PF is currently updating their 2017 Alaska Aviation System Plan which designates Unalaska Airport as a Regional airport. According to the plan, airports in the Regional classification are transportation and economic centers for more than one community but are not international airports. They typically accommodate large aircraft with advanced approaches and aviation facilities and are often Part 139 certified. The AASP defined performance measures as a basis for measuring performance and adequacy of the airport system. The performance measures evaluated in the AASP include:

- Airport Design Standards - Seven factors were evaluated at each airport: Runway Safety Areas (RSA), Obstacle Free Areas (OFZ), Threshold Siting Surfaces (TSS), Runway Protection Zones (RPZ), Runway Visibility Zones (RVZ) Crosswind Coverage, and Parallel Taxiway.
- Airport Service - This index examines the capabilities of Regional airports like DUT to serve their respective markets. It includes criteria for runway length, lighting, instrument approach and taxiway type, and other services such as fuel sales and passenger shelter.

Moving into the future, the AASP identifies a number of key challenges facing Alaska aviation and airports like Unalaska Airport:

- Need for airfield maintenance and improvements,
- Ability to find skilled and dependable labor,
- Increase in fuel costs, and
- Alaska's pilot population of over 8,200 is aging and there is a shortage of pilots entering the industry.

2.6 14 CFR Part 139 Certification of Airports

The FAA prescribes rules governing the certification and operation of airports for commercial operations under Federal Aviation Regulations (FAR) Part 139, Certification of Airports. According to the regulation, Part 139 certification is required for any airport having activity by air carrier aircraft capable of carrying nine or more passengers and requires that all such airports prepare an Airport Certification Manual and establish appropriate safety and security procedures in compliance with FAA standards. FAR Part 139 categorizes airports into four classes shown in **Table 2-5,** based on the type of air carrier operations experienced at the facility. DUT is categorized as a Class 1 airport, ARFF Index A and is required to undergo annual FAA inspections in order to retain their FAR Part 139 Airport Certification.

Table 2-5: FAR Part 139 Airport Classes

Class	Description
Class I	Airports serving all types of scheduled operations of air carrier aircraft designed for at least 31 passenger seats and any other type of air carrier operations.
Class II	Airports that serve scheduled operations of small air carrier aircraft and unscheduled operations of large air carrier aircraft.
Class III	Airports that serve only scheduled operations of small air carrier aircraft.
Class IV	Airports that serve only unscheduled operations of large air carrier aircraft.

Source: FAR Part 139, Certification of Airports.

The remainder of this page is intentionally left blank.

3 Existing Airport Facilities

The initial step in the update of the Airport Master Plan requires developing an inventory of the existing facilities available at DUT. Chapter 3 summarizes information collected in late 2020 regarding the current airfield configuration, existing facilities, and surrounding airspace environment. This is a necessary step for understanding the framework within the airport functions and providing a solid foundation for evaluating the airport's existing and future facility requirements and improvements.

To obtain an accurate depiction of the existing conditions at DUT and its surrounding community, a comprehensive inventory was conducted of the existing physical plant and facilities, on-airport land uses, adjacent and surrounding land uses, historical aviation-related operational data, historical development, historical airport-related land acquisition, and any other relevant data and information that would be deemed useful to address airport planning needs. These assessments were accomplished through the collection of data and information obtained from the following sources:

- Interviews with airport personnel, users, and tenants
- Correspondence with local, state, and federal agencies
- Review of previous airport planning analyses and studies
- Review of aerial photography, mapping, and facility layout plans
- Review of facility directories, published flight procedures for DUT, Alaska Sectional Charts, etc.
- Review and use of applicable FAA publications, activity databases, and planning guidelines
- Review of airport-specific and local/regional FAA operational and aircraft basing statistical reports

Airport facilities support the operation of aircraft and include runways, taxiways, navigational aids (NAVAIDS), airfield lighting and signage, and pavement markings. **Figure 3-1** depicts the current complement of aviation facilities at DUT.

The remainder of this page is intentionally left blank.

EXISTING FACILITIES	
BLDG #	DESCRIPTION
1	REVETMENT HANGAR
2	MISC. STRUCTURES (REVETMENTS)
3	MISC. STRUCTURES (REVETMENTS)
4	AIRPORT ADMIN. BUILDING
5	ARFF
6	RAMP B HANGAR
7	RAMP B HANGAR
8	AEROLOGY BUILDING
9	CARGO BUILDING
10	PASSENGER TERMINAL
11	FIREHOUSE
12 - 16	WWII HISTORICAL STRUCTURES

LEGEND	
ITEM	DESCRIPTION
	PROPERTY LINE
RSA	RUNWAY OBJECT FREE AREA
OFA	RUNWAY SAFETY AREA
	AWOS-3
	NAVIGATIONAL AIDS

Michael Baker INTERNATIONAL

Airport Layout and Facilities

Figure 3-1

3.1 The Airfield

3.1.1 Runway 13-31

The single paved and lighted runway is 4,500 feet long and 100 feet wide and has a northwest/southwest centerline orientation. The standard runway width for a Runway Design Code (RDC) B-II runway is 75 feet. The current width of Runway 13-31 is 100 feet and has an additional 25 feet of paved shoulder on each side of the runway edge, meeting the RDC B-III requirement shown in the ultimate development of the approved 2016 ALP and being validated in this plan. Each end of the runway pavement is designated and marked based on the runway's orientation relative to magnetic north and marked as Runway 13 and Runway 31 (having a centerline magnetic bearing of 130 degrees and 310 degrees), respectively. Runway 13 is equipped with a 4-box VASI and Runway 31 is equipped with a 4-box VASI with a useable distance of 1.4 miles due to mountainous terrain. Each runway end is equipped with Runway End Identifier Lights (REILS). According to the DOT&PF's 2018 Pavement Inspection Report, Runway 13-31 is reported to have a weighted average PCI of 98.93 and preventative maintenance of the pavement is recommended in the future.

When planning and developing runways, FAA-prescribed RDCs are used that signify the airport design standards to which the runway is to be built. The applicable Aircraft Approach Category approach speed (AAC) and ADG, and applicable published minimum approach visibility minimums are combined to form the RDC of a particular runway.

The first component, depicted by a letter, is the AAC and relates to aircraft approach speed. The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height; whichever is most restrictive, of the largest aircraft expected to operate on the runway and taxiways adjacent to the runway. The third component relates to the visibility minimums expressed by Runway Visibility Range (RVR) values express in feet, or as "VIS" when the approach to a runway is limited to visual approach use only. Generally, runway standards are related to aircraft approach speed, aircraft wingspan, and designated or planned approach visibility minimums. Runway to taxiway and taxiway/taxilane to taxiway/taxilane separation standards are related to ADG, TDG, and approach visibility minimums.

The current airport design characteristics of the runway are shown in **Table 3-1**.

Table 3-1: Current Runway Design Characteristics

Item	Runway	
	13	31
Runway Length (feet)	4,500	
Displaced Threshold	300	300
Runway Width (feet)	100	
Runway Design Code (RDC)	B-II-VIS	B-II-VIS
Critical Aircraft[1]	Saab 2000	

Table 3-1: Current Runway Design Characteristics		
Item	Runway	
	13	31
Approach Reference Code (APRC)	B-II-5000	B-II-5000
Departure Reference Code (DPRC)	B/II/5000	B/II/5000
True Bearing (degrees)	136°	316°
Magnetic Declination	8° 42' 00" East ± 0° 23' changing 0° 11' 00" W per year	
Runway End Elevation (MSL)	23.3	14.1
Gradient	-0.2%	0.2%
Shoulder Width (feet)	25	25
Blast Pad Width (feet)	--	150
Blast Pad Length (feet)	--	150
Surface Type and Condition	Asphalt / Good (98.93 Weighted Average PCI)	
Surface Treatment	Grooved	
Weight Bearing Capacity (Thousands of pounds)		
Single Wheel (S):	60.0	
Dual Wheel (D):	--	
(2S):	210.0	
Dual Tandem Wheel (2D):	--	
Runway Markings and Condition	Basic Good	Basic Good
Visual Glideslope Indicator	VASI-4L	VASI-4L
Runway End Identifier Lights (REIL)	Yes	Yes
Approach Lighting System	No	No
Runway Edge Lights	MITL	

Source: Current ALP; FAA Form 5010; AVN Datasheets; eNASR; Compiled by Michael Baker International, Inc, September 2020.
Note 1: Critical Aircraft identified in Critical Aircraft Determination Study, DOT&PF, 2018.

3.1.2 Runway Shoulders

Runway shoulders are an area adjacent to the defined edge of paved runways that provide a transition between the pavement and the adjacent surface. Runway 13-31 has 25-foot wide paved shoulders in good condition. This dimension exceeds the RDC B-III requirement being considered as part of this plan.

3.1.3 Runway Blast Pad

Runway blast pads are paved areas that provide protection from blast erosion beyond the runway ends. A 150 feet long and 150 feet wide blast pad is located at the runway end Runway 31. The blast pad exceeds RDC B-II design guidelines and the pavement and markings are in good condition.

3.1.4 Runway Declared Distances

Declared distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distance performance requirements for turbine powered aircraft. The declared distances are takeoff run available (TORA), takeoff distance available (TODA) which each apply to takeoff; accelerate stop distance available (ASDA), which applies to a rejected takeoff; and landing distance available (LDA), which applies to landing. By treating these distances independently, declared distances is a design methodology that results in declaring and reporting the TORA, TODA, ASDA and LDA for each operational direction.

The airport's runway has a displaced threshold of 300 feet at each end. These displacements are the cause of either safety-related features and or geometrically-constrained setbacks that are typically caused by the existence of an obstacle, incompatible land uses and / or environmental features. These distances, however, must be reported as part of the update of the ALP Drawing and related Data Sheet.

Each of the applicable Declared Distances for Runway 13-31 are listed in **Table 3-2**.

Table 3-2: Runway Declared Distances

Runway	Declared Distances			
	TORA	TODA	ASDA	LDA
13	4,500	4,500	4,200	3,900
31	4,337	4,500	4,200	3,900

Source: FAA Digital Chart Supplement Alaska, 10 SEP 2020 to 5 NOV 2020

3.1.5 Runway Protection Geometry

Safe and efficient operations at the airport require certain areas of the airfield to be clear of objects or restricted to objects with a certain function, composition, or height. A few areas and volumes of airspace have been defined to protect aircraft while operating on the runways. Except for the Runway Safety Area (RSA), which requires longitudinal and transverse grades, the runway protection geometry consists of imaginary areas of land and volumes of airspace intended to protect aircraft, and people and property on the ground. The dimensions of the runway protection geometry affect the on-airport land uses of developable land, as well as off-airport land uses in cases where portions of a runway protections zone may not be completely located within the airport property. The following sections describe these areas, their current associated standards, and any issues.

Currently, the runway protection geometry at DUT meets RDC B-II design standards. However, in recent years the airport has experienced over 500 annual operations of aircraft types with larger wingspans. The resulting facility needs to accommodate design standards associated with larger aircraft activity will be further addressed in Chapter 5, Facility Requirements. **Table 3-3** summarizes the existing dimensions of the runway protection geometry.

Table 3-3: Runway Design Standards

Dimensions	Runway 13-31 RDC B-II	
	13	31
Runway Design Code (RDC)	B-II-5000	B-II-5000
Runway Safety Area (RSA)		
Length beyond departure end (feet):	300	300
Length prior to threshold (feet):	300	300
Width (feet):	150	150
Runway Object Free Area (ROFA)		
Length beyond runway end (feet):	300	300
Length prior to threshold (feet):	300	300
Width (feet):	500	500
Runway Obstacle Free Zone (ROFZ)		
Length beyond runway end (feet):	200	200
Width (feet):	250	250
Approach Runway Protection Zone (RPZ)		
Length (feet):	1,000	1,000
Inner Width (feet):	500	500
Outer Width (feet):	700	700
Acres:	13.77	13.77
Departure Runway Protection Zone (RPZ)		
Length (feet):	1,000	1,000
Inner Width (feet):	500	500
Outer Width (feet):	700	700
Acres:	13.77	13.77

Source: AC 150/5300-13A, Change 1

3.1.6 Runway Safety Area and Runway Object Free Area

The RSA is a surface surrounding the runway, prepared, or suitable, for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The RSA also provides greater accessibility for firefighting and rescue equipment in emergency situations. The dimensions of the RSA are defined by the Runway Design Code (RDC) and the criteria described in AC 150/5300-13A. The RSA is centered on the runway centerline. The dimensions of the existing RSA are shown in **Table 3-3**.

The RSA must meet the following standards:

- Be cleared and graded and not have potentially hazardous ruts, humps, depressions, or any other surface variation.
- Be drained by grading or storm sewers to prevent water accumulation.
- The RSA must be capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting (ARFF) equipment, and the occasional passage of aircraft without causing damage to the aircraft.
- Be free of objects, except for objects that need to be located in the RSA because of their function.

3.1.7 Runway Protection Zone

The runway protection zone (RPZ) is a two-dimensional (i.e., ground level) designated land area designated for the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. Generally, the RPZ begins at 200 feet beyond the end of the runway. However, the RPZ may begin at a location other than the runway end to meet other standards. When the RPZ begins at a location other than 200 feet beyond the end of the runway, two RPZs are required, a departure RPZ, and an approach RPZ. For Runway 13-31, each approach RPZ begins 200 feet beyond each runway's displaced threshold, while the departure RPZs for each runway begin at the end of the TODA. Currently, all RPZs extend over water and Ballyhoo Road is located within the approach and departure RPZs of Runway 31. The dimensions of the runway protection zones are shown in **Table 3-3**.

3.1.8 Runway Obstacle Free Zone

The runway obstacle free zone (ROFZ) is a three-dimensional volume of airspace which protects aircraft during the transition period to and from the runway. The OFZ clearing standards preclude taxiing and parked airplanes and object penetrations, except for frangible NAVAID locations that are fixed by function. Under certain circumstances, vehicles, equipment, and personnel may be authorized by air traffic control to enter the area. The OFZ is comprised of the inner-approach OFZ and the inner-transitional OFZ. However, the inner-approach OFZ applies only to runways equipped with an approach lighting system (ALS), and the inner-transitional OFZ only applies to runways with lower than ¾ stature mile approach visibility minimums. Therefore, the inner-approach OFZ and inner-transitional OFZ standards are not applicable to Runway 13-31. The dimensional requirements for the ROFZ for each runway end are shown in **Table 3-3**.

3.2 Taxiways and Apron Areas

3.2.1 Taxiways

The airfield has two taxiways at the southeast end of the airport. Taxiway A is a 220-foot by 454-foot taxiway that connects the runway to the terminal apron, also known as Ramp A, and the terminal building on the south side. Taxiway B is a 200-foot by 92-foot taxiway that connects to the hangar apron, also known as Ramp B, and hangars on the north side. Both Taxiways connect to the Runway 31 end. Taxiway A's surface is asphalt, while Taxiway B's is concrete. According to the 2018 DOT&PF Pavement Inspection Report, Taxiway A is reported to have a weighted average PCI of 0-39 and reconstruction of the taxiway is recommended in the future. Taxiway B is reported to have a weighted average PCI of 60-69 and corrective maintenance is recommended.

3.2.2 Apron Areas

The airport has two apron areas, Ramp A and Ramp B. Ramp A, also known as the terminal apron, is located adjacent to Dutch Harbor on the east side of the airport, south of Runway 31. The Terminal Apron is approximately 30,000 square yards. Due to Federal Aviation Regulations (FAR) Part 77 surface limitations, only 15,000 square yards of pavement is usable for aircraft parking.

Ramp B, also known as the hangar apron, is located adjacent to Dutch Harbor, but south of the runway. Ramp B is a concrete constructed apron that is approximately 6,700 square yards in area. Due to FAR Part 77 surface limitations, only 4,000 square yards are usable for aircraft parking. Ramp B provides parking for transient aircraft and access to the seaplane ramp via a seaplane stop-gate system.

The airport also has a seaplane ramp located east of Ramp B approximately halfway between the northern and southern edges of the ramp.

According to DOT&PF's 2018 Pavement Inspection Report, both apron areas are reported to have a weighted average PCI of 0-39 and are recommended for reconstruction in the future.

3.3 Airfield Lighting, Signage, and Marking

The airfield is marked, signed, and fully satisfies current FAA airport design standards. Runway 13-31 is equipped with pilot radio-controlled medium intensity runway edge lights (MITL) and REILs at the ends of the runway to aid in the aircraft pilot's rapid and positive identification of the runway environment. The runway has non-precision runway markings consisting of runway designation, displaced threshold, runway aiming point, runway side stripe, and centerline markings. Pilot-controlled stop lights and traffic gate arms for vehicle traffic crossing the threshold of Runway 31 are also provided.

Taxiways A and B are equipped with medium intensity taxiway edge lights (MITL), and has taxiway edge, centerline and runway holding position markings. Runway holding position markings for Taxiways A and B are positioned in accordance with Airport Reference Code B-II design guidelines.

3.4 Electronic, Visual, and Satellite Aids to Navigation

Electronic, visual, and satellite aids to navigation (NAVAIDS) increase the safety and utility of the airport. In addition, the availability of NAVAIDS is critical because it has a direct impact on the overall capacity of the airport. The availability of instrument approach and departure procedures, particularly the availability of specific approach and departure minimums is directly related to the availability of certain NAVAIDS. Existing navigational aids at DUT are discussed in the sections below.

3.4.1 Airport Rotating Beacon

The airport's Airport Rotating Beacon is located adjacent to the passenger terminal and is in good condition. The colors of the beacon are alternating clear (white) and green indicating a Civil Airport. The beacon helps pilots identify the airport at night and operates from sunset to sunrise.

3.4.2 Wind Cone and Segmented Circle

The airport's Segmented Circle and Wind Cone are located west of the runway approximately mid-field. Supplemental Wind Cones are also located east of the runway near the ends of Runways 13 and 31. The Wind Cone visually indicates prevailing wind direction and velocity. The Segmented Circle (with Traffic Pattern Indicators) provides rapid overhead identification of the Wind Cone location and indication that the airport traffic pattern operates with right- or left-hand turns. At DUT, Runway 13 has a left traffic pattern and Runway 31 has a right traffic pattern.

3.4.3 Visual Glideslope Indicator System

Each runway is served by 4-light visual approach slope indicators (VASIs). The VASI serving Runway 13 is located on the left side of the runway approximately 773 feet from the runway end and provides a threshold crossing height (TCH) of 38.1 feet along a 3-degree visual approach glide path. The VASI serving Runway 31 is located on the right side of the runway approximately 582 feet from the runway end and provides a TCH of 31.7 feet along a similar 3-degree visual approach glide path. **Table 3-4** summarizes the characteristics of the DUT VASI system.

The remainder of this page is intentionally left blank.

Table 3-4: Visual Glideslope Indicators

Item	Runway 13-31	
	13	**31**
Type	VASI-4L	VASI-4L
Latitude	N53° 54' 04.46"	N53° 53' 46.54"
Longitude	W166° 32' 55.82"	W166° 32' 26.08"
Elevation (feet)	19.3	15.3
Distance from threshold (feet)	773	582
Angle	3.00°	3.00°
Threshold Crossing Height (TCH) (feet)	38.1	31.7
Aligned with RNAV (GPS) LPV descent angles	No	No

Source: FAA AVN Datasheets, 2020.

3.4.4 Non-Directional Beacon

A non-directional beacon (NDB) is a radio beacon that transmits nondirectional signals whereby the pilot of an aircraft properly equipped can determine bearings and navigate based on the station. At DUT, there is one NDB station paired with distance measuring equipment (DME). The Dutch Harbor NDB/DME is located on Mount Ballyhoo about ½ mile northwest of the airport.

The Dutch Harbor NDB/DME is used as the initial approach fix (IAF) for the NDB-A approach discussed later in this chapter.

3.4.5 Automated Weather Observing System

The airport is equipped with an FAA-certified Automated Weather Observing System (with precipitation and lightning sensors) (AWOS P/T). The AWOS-3P/T provides current altimeter setting, density altitude, temperature, dew point, wind speed and direction with gust indication, visibility, cloud height and sky conditions, precipitation identification and intensity, and thunderstorm reporting with local-area lightning tracking once each hour, 24 hours per day. The AWOS is located approximately 400 feet south of the Runway 13-31 centerline and approximately 250 feet west of Ramp A. **Figure 3-2** identifies the AWOS location and its associated 500-foot critical area designed to protect weather equipment from outside interference.

3.5 Passenger Terminal Building

The airport is served by a single Passenger Terminal Building that encompasses approximately 13,700 square feet. The two-story passenger terminal is owned by the City of Unalaska and includes ticket and check-in counters, a restaurant, rental car agents, travel agents, the Alaska Weather Operations Service, administrative offices, communications storage, passenger boarding area, and baggage claim. The various functions and approximate square footages of the existing facility are indicated below.

- Baggage Claim Area – The baggage claim area is approximately 900 square feet with a single baggage claim unit. According to the 2008 Airport Master Plan, this area is inadequate during peak passenger demand periods.
- Passenger Hold Room – The passenger hold room area is roughly 1,100 square feet and capable of accommodating about 60 passengers, or two full flights of passengers boarding the Saab 340B aircraft. According to the 2008 Airport Master Plan, the passenger hold room is insufficient to accommodate all the passengers, baggage, and meters/greeters that assemble in the area during peak period demand.
- Concourse and Lobby – The concourse and lobby area total 3,450 square feet, and is reported to be overcrowded during peak passenger demand periods.
- Airline Space – Airline terminal space includes airline ticketing, airline office, and baggage hold rooms. There is 2,500 square feet of terminal space available for these functions.
- Restrooms – The men's and women's restrooms are a combined 450 square feet. These facilities are the only restrooms in the terminal building and do not meet the current needs of the traveling public and employees.
- Restaurant – The restaurant and bar measures 2,150 square feet. According to the 2008 Airport Master Plan, these facilities do not meet demand during peak hour travel periods and are adequate during other periods.
- Miscellaneous Aviation Support Areas – The City of Unalaska offers lease space in the terminal facility for airport-related businesses, including rental car and travel agencies. Lease areas currently encompass 850 square feet.

3.6 Cargo Facilities

The airport's cargo facility is located next to the terminal on the east side. This cargo facility is approximately 8,000 square feet in area and is owned by Alaska Central Express (ACE) Air Cargo and operated under lease agreement with DOT&PF. The building also houses a shipping company, an electronics company and a car rental business. A second abandoned cargo building (approximately 2,500 square feet) is located further east of the terminal building. According to DOT&PF, this leasehold parcel is slated for future redevelopment.

3.7 Aircraft Storage Facilities

The airport currently has two aircraft storage hangars located on the north side of Ramp B. The hangar to the west has an approximate area of 12,200 square feet. The second hangar facility to the east is currently used by DOT&PF for SRE and chemical storage, and measures approximately 16,700 square feet.

3.8 Support Facilities

Several additional facilities are important to keeping the airport operational and for the provision of key capabilities at DUT. In general, support facilities ensure the smooth and efficient airport operation. Facilities not documented in other sections of this chapter include the Aircraft Rescue and Firefighting, airport maintenance and snow removal equipment facilities. The existing characteristics of these facilities are documented in this section for further use in subsequent phases of this master plan.

3.8.1 Airport/Airfield Maintenance, Equipment, and Facilities

Staff from DOT&PF are responsible for the day to day maintenance functions on the airfield, including record keeping, and repairs. Pavement maintenance includes crack sealing, seal coating, and striping. Other general maintenance responsibilities include safety area repairs, mowing, general electrical repairs, and snow removal. Equipment and materials to perform these general maintenance functions are available and stored in the corresponding maintenance equipment storage facilities. Airport maintenance facilities and administrative offices are located north of the runway accessible via Tundra Drive. The complex includes facilities for the storage and repair of maintenance equipment.

3.8.2 Snow Removal Equipment Storage

The airport currently has and maintains snow removal equipment (SRE) in accordance with their 14 CFR 139.313 Snow and Ice Control Plan. Snow removal and deicing of airfield pavements are only performed during maintenance duty hours. Snow removal equipment is stored in both the maintenance shop and second hangar facility. In addition to equipment storage, the hangar facility accommodates storage for Urea deicer (20,000-gallon tank), E36 potassium acetate-based runway deicer (20,000-gallon tank), and a mixing station. A listing of airport snow removal equipment is shown in **Table 3-5** below.

Table 3-5: Snow Removal Equipment Inventory

Equipment Type	Brand	Model	Mfg Year	Size/Capacity
Lane striper	EZ Liner	2500	2000	Mount in truck bed
TRK Deicer	Ford	3500 heavy duty	1997	Spray truck for De-icing/ 500 gallons
Dump truck	Volvo		1990	8 yard/plow sander
Runway Broom/Snow Blower	Oshkosh		2009	18 ft Broom head
Loader	Case	821C	2010	
Grader	Caterpillar	160M	2011	37,000 pounds
Cradle Broom/Plow	MB Companies, Inc.		2011	
Pickup Truck	Ford	F350	2009	3500 Super Duty 4X4
Utility Wagon	Chevrolet		2004	Bowmonk Tappley fixture

Source: DOT&PF, 2020

3.8.3 Airport Rescue and Firefighting Facility

The Airport Rescue and Firefighting (ARFF) facility is located north of the Runway 31 threshold at the base of Mount Ballyhoo and accommodates additional airport administrative offices and maintenance storage facilities. DUT is currently classified as an ARFF Index A airport. However, the airport owns one Aircraft Rescue and Firefighting vehicle, which has a 1,500-gallon capacity required under ARFF Index B standards, and is stored and maintained in the ARFF facility that is collocated with the airport's maintenance facility. ARFF equipment is staffed during periods of large air carrier operations only. Details associated with the ARFF equipment is shown in **Table 3-6** below.

Table 3-6: Existing ARFF Equipment						
Model Year	Make/Model	Water Capacity (Gallons)	AFFF Capacity/ Concentration (Gallons)	Dry Chemical Type	Dry Chemical Capacity (Pounds)	Max. Turret Discharge Rate (Gallons per Minute)
2004	E-ONE/P501	1,500	205 / 3%	Potassium -Based	500	750

Source: DOT&PF, 2020

3.8.4 Aircraft Fuel Storage

Currently, there are no above-ground aviation fuel storage facilities at DUT. However, aviation Jet A and AvGas fuel is provided by Delta Western and Apun under lease agreement with DOT&PF. Fuel is supplied by wholesalers Delta Western and North Pacific Fuel. The operators maintain two 10,000-gallon Jet A fuel trucks and a 1,000-gallon trailer-mounted AvGas tank along the west edge of the Terminal Apron area as shown in **Figure 3-2**.

3.9 Access, Circulation and Parking

Access, circulation and parking information contained in the following sections will be used by the DUT master plan team during alternatives development to address future facility and infrastructure needs.

3.9.1 Airport Access Roads

Figure 3-1 shows the existing airport access roads. Primary access to Unalaska Airport is provided from Airport Beach Road, a two-lane roadway. Access to the Passenger Terminal and Cargo facilities on the south side of the airport is provided via Airport Road from Airport Beach Road. This terminal loop road begins as a two-lane road which provides access to the Cargo facility and adjoining Long-term Parking Lot. Airport Road later turns into a two-lane one-way loop road providing access to the Passenger Terminal, Cargo Building and the Terminal Parking Lot. A third lane is provided for passenger loading/off-loading directly in front of the Passenger Terminal.

Access to the northside of the airport is provided via Tundra Drive (unpaved) from Ballyhoo Road, a two-lane roadway.

3.9.2 Vehicle Parking

Vehicular parking associated with the passenger terminal and air cargo facilities were identified as part of the inventory of existing facilities. The information depicted in this section is used later in this study to identify future parking needs.

3.9.2.1.1 Passenger Terminal Parking

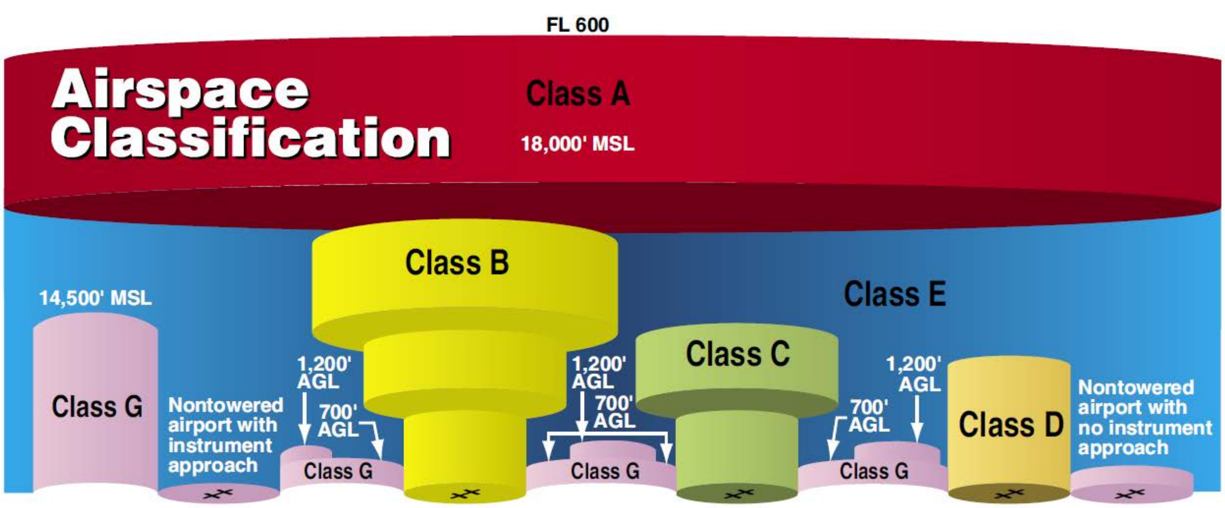
The Passenger Terminal Parking Lot is located directly in front of the Passenger Terminal and Cargo Building and has a capacity of ___ parking spaces. The area is accessible via the Airport Road loop. The parking lot is subdivided into areas marked for passenger terminal, employee, business, and rental car parking. During the inventory site visit, the pavement was observed to be in fair condition.

3.9.2.1.2 Long-Term Parking

The Long-Term Parking Lot is located on the north side of the Cargo Building. This area has a capacity of 50 parking spaces and is accessible from Airport Road. Parking in this lot is limited to a maximum of 28 days. During the September 2020 inventory site visit, the pavement was observed to be in good condition.

3.10 Protected Navigable Airspace and Instrument Approach Procedures

The National Airspace System (NAS) is an integrated set of control, procedures, and policies established and regulated by the FAA to maintain safe and efficient aircraft operations. However, it is the responsibility of the Airport Sponsor to take the appropriate actions to assure that the terminal airspace required to protect instrument and visual operations to the airport has been adequately cleared and protected by removing, lowering, relocating, marking, lighting, or other acceptable mitigation methods. In addition, establishment or creation of future hazards should be prevented. **Figure 3-3** shows the General Airspace Classification.



Source: Adapted from Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B)

Figure 3-2: General Airspace Classification

3.10.1 Navigable Airspace

To provide the required safety and management of Instrument Flight Rules (IFR), operations within the airspace above and around the airport is designated as being *Class E Airspace* supporting a non-towered airport with instrument approaches. Unalaska Airport and nearby

Akutan Airport are depicted on the FAA's Alaska Section Chart as previously shown in **Figure 2-2.**

3.10.2 Civil Airport Imaginary Surfaces

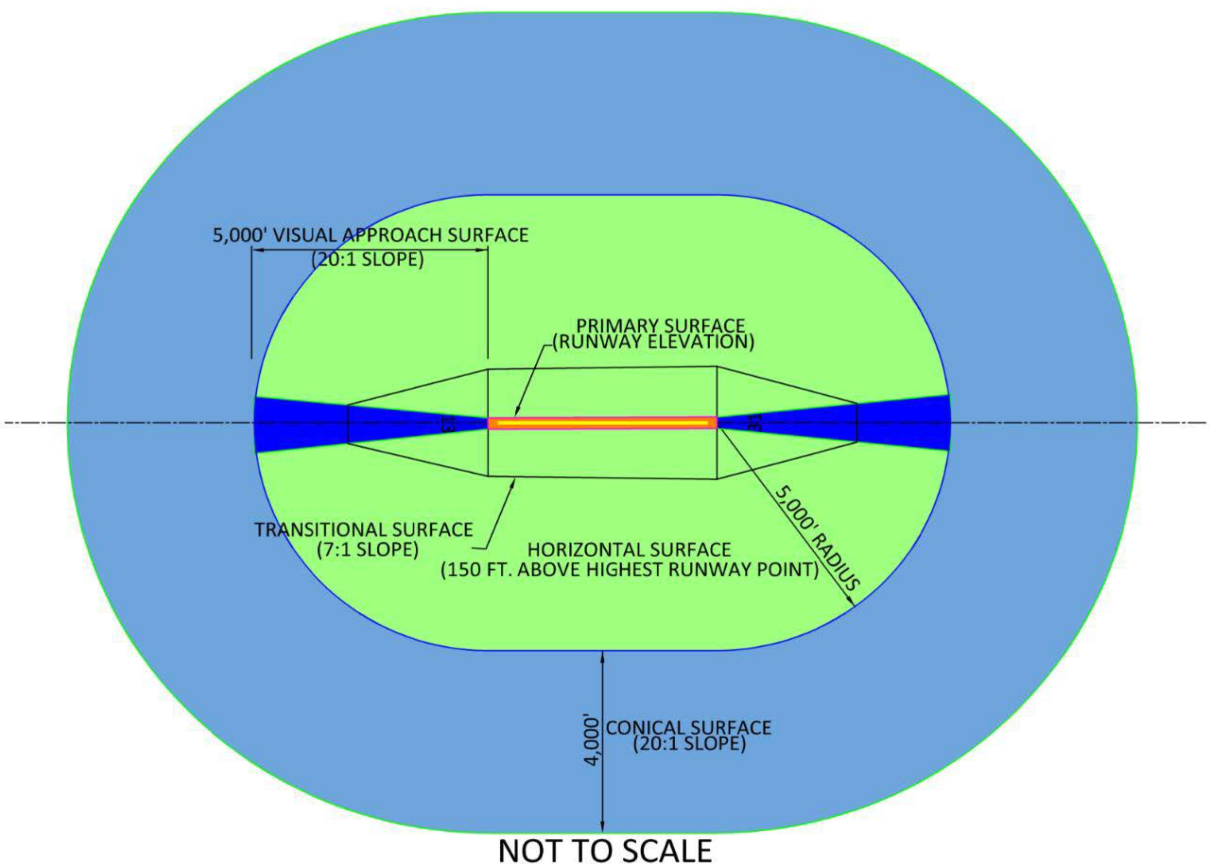
Existing part 77 surfaces (14 CFR part 77 – *Safe, Efficient Use, and Preservation of the Navigable Airspace*) are summarized in **Table 3-7**. Temporary natural or man-made objects that penetrate the part 77 imaginary surfaces may be considered obstructions to air navigation and require analysis by the FAA. Once the analysis is completed, the FAA makes a determination and provides details of the findings. Good planning practices suggest that future airport facility developments should be planned to avoid penetrations to part 77 surfaces. Unmitigated penetrations to the part 77 imaginary surfaces may have an impact on the instrument procedures which may affect the overall capacity of the airport. Further analysis regarding CFR Part 77 will be discussed in the following chapters as part of the update of the Airport Master Plan and ALP Drawing Set.

3.10.3 Instrument Approach and Departure Protection Standards

The approach surfaces described in this section are not the approach surfaces defined in 14 CFR Part 77. Approach surfaces protect the use of the runway in both visual and instrument meteorological conditions near the airport. The approach surface typically has a trapezoidal shape that extends away from the runway along the centerline at a specific slope, expressed in horizontal feet by vertical feet, with a starting point at or near the runway threshold elevation. The specific size, slope, and starting point of the trapezoid depends on the visibility minimums and the type of procedure associated with the runway end. For planning, objects must remain clear of the surfaces as listed in **Table 3-8** and shown on **Figures 3-3** and **3-4**. The FAA Flight Procedures Team mitigates existing obstacles that penetrate instrument procedures that cannot be removed, relocated, or lowered.

The remainder of this page is intentionally left blank.

Table 3-7: CFR part 77 Civil Airport Imaginary Surfaces		
Item	Runway 13-31	
	13	31
Width of the primary surface and approach surface width at inner end (feet)	500	500
Radius of the horizontal surface (feet)	5,000	5,000
Approach surface width at end (feet)	3,500	3,500
Approach surface length (feet)	5,000	5,000
Approach slope	20:1	20:1
Conical surface	20:1	20:1
Transitional surface	7:1	7:1

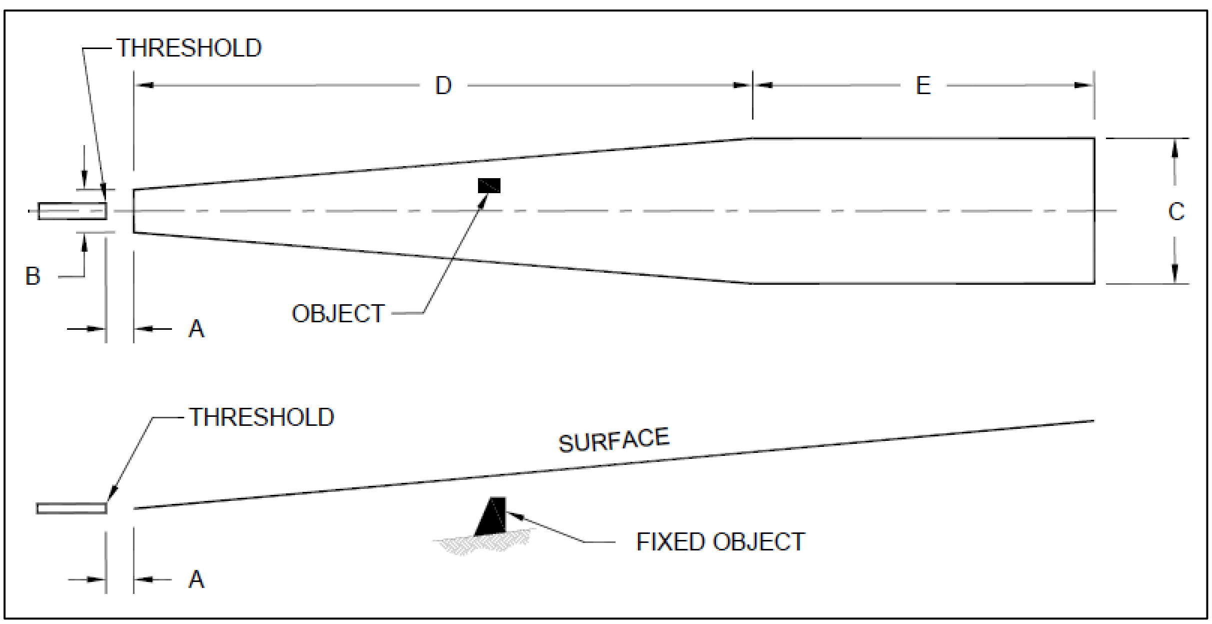


Source: 14 CFR Part 77

Table 3-8: DUT Approach and Departure Standards

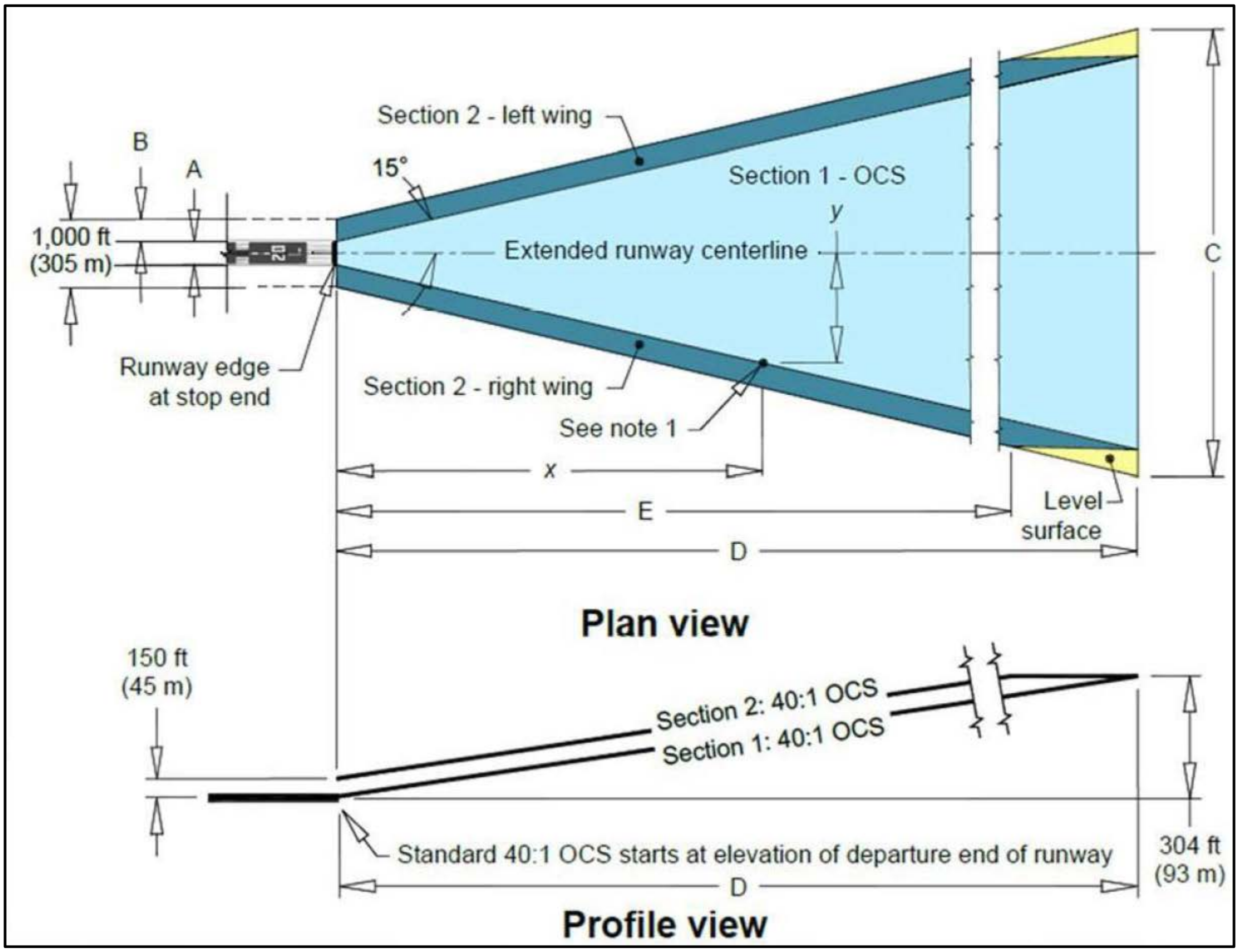
Runway	Runway Type		Dimensional Standards					
			A	B	C	D	E	Slope
13	4	Approach end of runways expected to accommodate instrument approaches having visibility minimums less than ¾ statute mile (see *Figure 3-3*).	200	400	3,400	10,000	0	20:1
	7	Departure runway ends used for any instrument operation (see *Figure 3-4*).	Runway Width (RW)	500 - ½ RW	7,512	12,152	6,160	40:1
31	4	Approach end of runways expected to accommodate instrument approaches having visibility minimums less than ¾ statute mile (see *Figure 3-3*).	200	800	3,400	10,000	0	20:1
	7	Departure runway ends used for any instrument operation (see *Figure 3-4*).	Runway Width (RW)	500 - ½ RW	7,512	12,152	6,160	40:1

Source: FAA Engineering Brief 99A, July 24, 2020



Source: Adapted from FAA AC Airport Design Change 1

Figure 3-3: Standard Approach Surface Dimensions



Source: FAA Engineering Brief 99A, July 24, 2020

Figure 3-4: Standard Departure Surface Dimensions

3.10.4 Standard Instrument Procedures

The FAA develops standard instrument procedures to facilitate safe navigation around obstructions and obstacles identified through the analysis of the airspace surfaces discussed previously. Standard instrument procedures are developed in accordance with 14 CFR Part 97, Standard Instrument Procedures, and FAA Order 8260.3D, United States Standard for Terminal Instrument Procedures (TERPS).

3.10.5 Alternate Minimums and Obstacle Departure Procedures

Alternate minimums, obstacle departure procedures, and non-standard takeoff minimums are published in the FAA Aeronautical Information Systems (AIS) approach chart booklet. Due to the rapidly rising terrain (mountains) that reach above 2,000 feet MSL east, south, and west of the airport, the departure procedures require that visual conditions must be maintained from takeoff until established over the JADPI departure fix at or above 400 feet MSL. Once the aircraft reaches JADPI at 400 feet MSL, it is to climb on the 360-degree bearing from DUT NDB/DME to 5,500 feet MSL before proceeding on course.

3.10.6 Published DUT Instrument Approach Procedures

Instrument approach procedures facilitate the transition from the airspace to the airport. IAPs are critical to the airport, because they may directly affect (enhance) the overall capability and capacity of the airport to handle aircraft operations during low ceilings and low visibility. IAPs may be affected due to penetrations of part 77 imaginary surfaces or the obstacle clearance surfaces.

The airport has two non-precision circling instrument approaches, an NDB-A and an RNAV (GPS)-B. The current NDB-A approach allows operations with ceilings no lower than 2,900 feet above ground level (AGL) at 1¼-mile visibility.

The space based RNAV GPS-B approach allows operations with ceilings no lower than 2,000 feet AGL at 3-mile visibility and does not support vertically guided IAPs.

Table 3-9 lists the IAPs available at DUT.

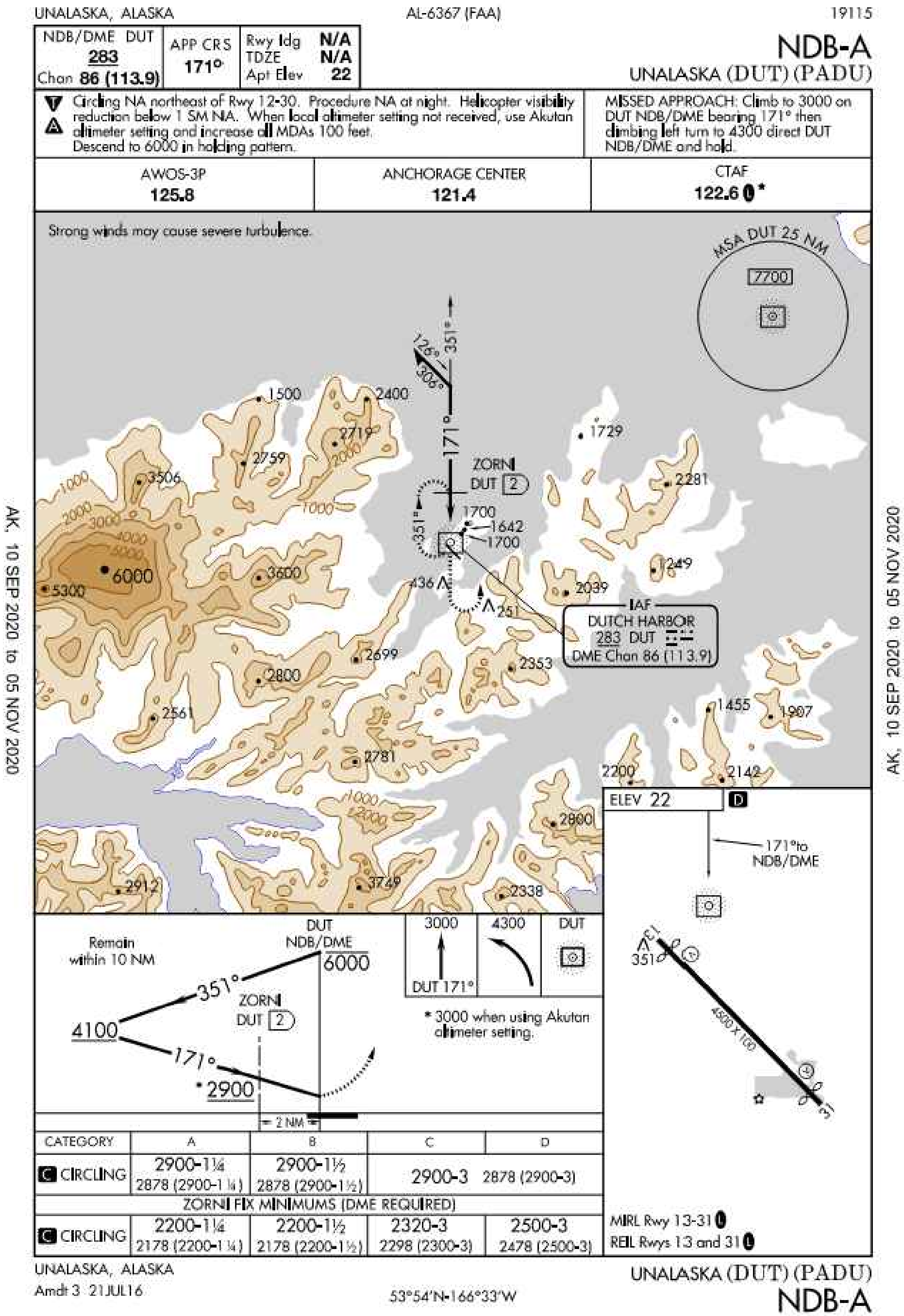
Table 3-9: DUT Instrument Approach Procedure Summary

Description	NAVAID Type	NAVAID Identifier	Amendment	Date
NDB-A	NDB/DME	CH 086X (113.9)	3	07/21/2016
RNAV (GPS)-B	APP CRS	N/A	N/A	07/21/2016

Source: FAA Instrument Approach Procedures AK with effective date September 10, 2020 – November 5, 2020

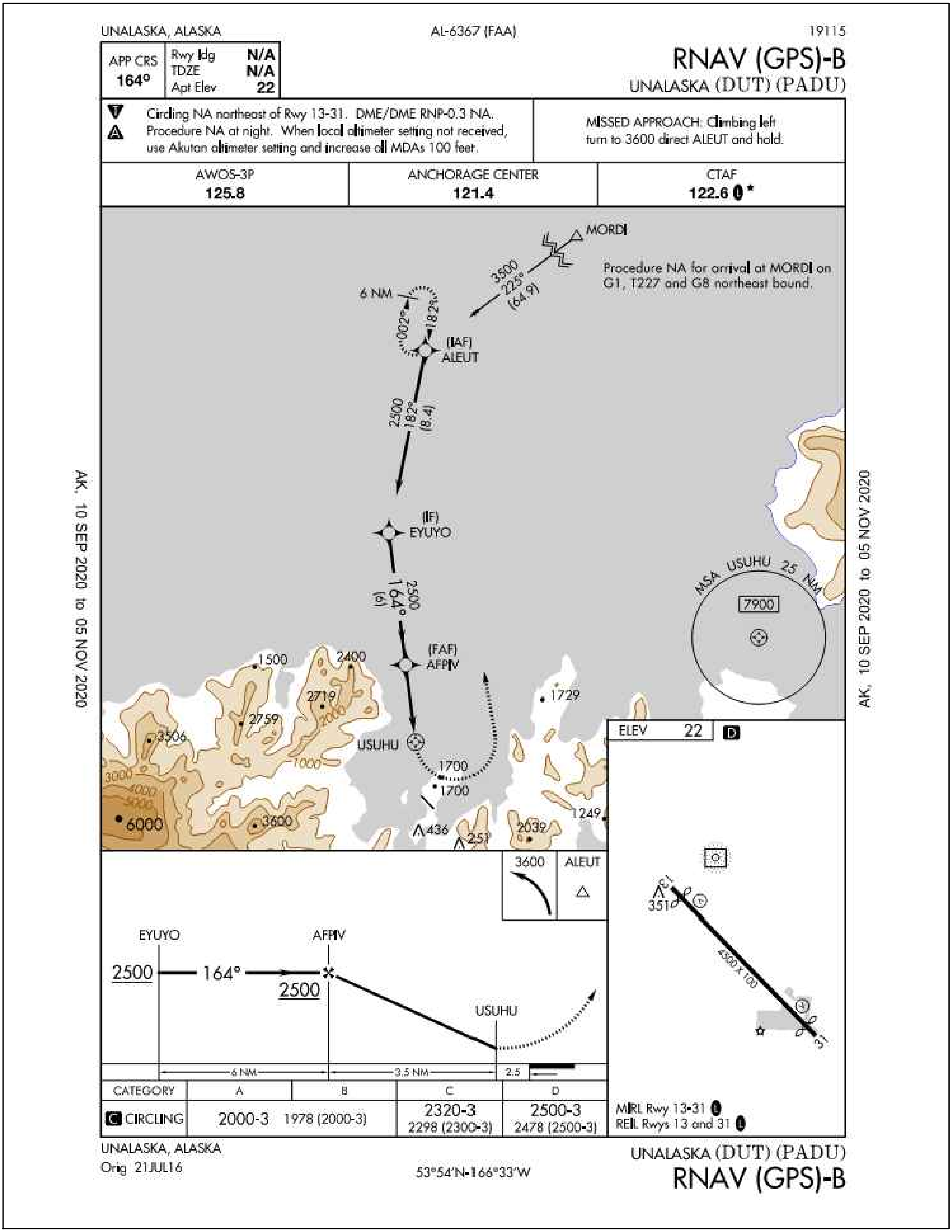
The current published IAPs are depicted in **Figures 3-5 and 3-6**.

The remainder of this page is intentionally left blank.



Published Instrument Approach Procedure NDB-A

Figure 3-5



UNALASKA, ALASKA
AL-6367 (FAA)
19115
APP CRS 164°
Rwy ldg N/A
TDZE N/A
Apt Elev 22
RNAV (GPS)-B
UNALASKA (DUT) (PADU)
Circling NA northeast of Rwy 13-31. DME/DME RNP-0.3 NA. Procedure NA at night. When local altimeter setting not received, use Akutan altimeter setting and increase all MDAs 100 feet.
MISSED APPROACH: Climbing left turn to 3600 direct ALEUT and hold.
AWOS-3P 125.8
ANCHORAGE CENTER 121.4
CTAF 122.6
MORDI
Procedure NA for arrival at MORDI on G1, T227 and G8 northeast bound.
3500 225° (64.9)
6 NM
(IAF) ALEUT
2500 182° (8.4)
(IF) EYUYO
2500 164° (6)
(FAF) AFPIV
USUHU
MSA USUHU 25 NM
7900
AK, 10 SEP 2020 to 05 NOV 2020
ELEV 22
3600
ALEUT
EYUYO
AFPIV
2500
164°
2500
USUHU
6 NM
3.5 NM
2.5
CATEGORY A B C D
CIRCLING 2000-3 1978 (2000-3) 2320-3 2298 (2300-3) 2500-3 2478 (2500-3)
4500 X 100
MIRL Rwy 13-31
REIL Rwys 13 and 31
UNALASKA, ALASKA
Orig 21JUL16
53°54'N-166°33'W
UNALASKA (DUT) (PADU)
RNAV (GPS)-B

3.11 Local Meteorological and Prevailing Wind Conditions

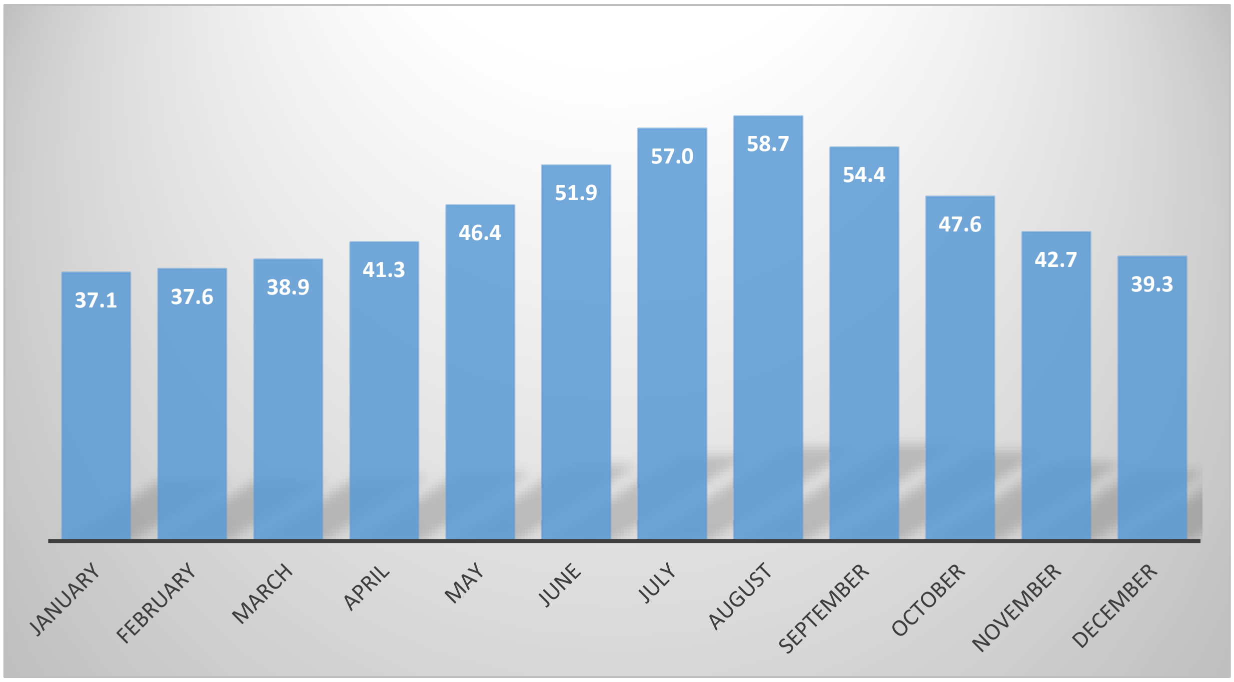
Prevailing meteorological conditions (maximum daily temperatures and precipitation) and the direction and velocity of wind directly affect aircraft performance during takeoffs and landings. Hottest day conditions increase the required available runway length requirements for most aircraft that typically operate at DUT. The wind direction affects the safe operation of aircraft during those same operations and dictates the directional layout of the runway to provide the greatest runway wind coverage with the least crosswind. These meteorological considerations will be used to evaluate the current ability of the airport's single runway to safety accommodate existing and projected future aircraft operations.

3.11.1 Mean-Maximum Hottest Day Temperatures

The mean-maximum hottest day temperatures for Dutch Harbor (Unalaska, Alaska) as recorded by the National Oceanic and Atmospheric Administration's (NOAA's) National center for Environmental Information for the 30-year period (1981 to 2010) is shown in Figure 3-7.

The hottest month is August, having a mean-maximum daily temperature of 58.7 degrees Fahrenheit. This mean-maximum daily temperature will be used within the DUT Master Plan Update to determine required minimum runway takeoff lengths for the most demanding "Design" aircraft that regularly currently use, or are projected to use, the airport within the 20-year planning period.

The remainder of this page is intentionally left blank.



Source: NOAA 1981-2010 U.S. Climate Normals, Dutch Harbor, Unalaska, Alaska

Figure 3-7: Mean-Maximum Hottest Day Temperatures

3.11.2 Local Aeronautical Meteorological Operating Conditions

For distinguishing meteorological conditions during flight operations to or from an airport, two locally-recorded meteorological conditions were documented; *visual meteorological conditions* (VMC) and *instrument meteorological conditions* (IMC). VMC occurs when the ceiling is greater than 1,000 feet, and visibility is greater than 3 miles. IMC occur when the ceiling is less than 1,000 feet and/or visibility is less than 3 miles.

Prevailing meteorological conditions for a 10-year period were recorded by the airport's AWOS-3 facility. These weather observations provide an approximate indicator representing the amount of time aircraft are capable of operating to and from the airport using Visual Flight Rules (VFR) or Instrument Flight Rules (IFR), respectively.

3.11.3 Runway Orientation and Wind Coverage

Runway orientation and runway wind coverage are key factors for safe and efficient operation of any airport. Local prevailing meteorological conditions such as wind direction, cloud ceiling heights, and visibility have a direct influence on the development, orientation, and use of an airport's runway system. In some circumstances, there may be the need for multiple runways to accommodate seasonal changes in local prevailing wind patterns. Ideally, any runway should be aligned with the prevailing winds that, to varying degrees, have a direct effect on all aircraft. Generally, the smaller the aircraft, the more it is affected by the wind, particularly crosswind components.

For airport planning, runway wind coverage is determined by measuring and statistically quantifying the wind direction, wind speed, cloud base ceiling, and visibility for each observation over a 10-year period using the airport's AWOS-3 facility. By statistically analyzing the runway's wind coverage and resultant crosswind components, the ability of the runway to safety accommodate aircraft operations can be measured and assessed.

The validation and update of the airport's runway wind coverage considered wind speed and direction of origin, and the orientation of the airport's single runway during *VMC* and *IMC*.

The analysis was conducted for both bidirectional and single-direction using FAA/NOAA-recorded surface observation data compiled by the National Climatic Data Center (NCDC) located in Asheville, North Carolina. Statistical analysis of wind by velocity and direction of origin was analyzed using the FAA's Geographic Information System (GIS) Windrose Generator for the 2009 through 2018 calendar period. A total of 255,351 surface observations and wind observations were recorded and analyzed as part of this update of the airport's runway wind coverage analysis. The airport's surface observation data was obtained from the FAA's Airport Data and Information Portal, that can be accessed via website: (https://adip.faa.gov/agis/public/#/windAnalysisTools).

Since surface winds usually cross the runway at an angle during landings and takeoffs, the wind exerts both headwind and crosswind components. For operational safety considerations, pilots desire to use runways that, to the greatest extent practicable, offer the greatest headwinds and least crosswinds. Each aircraft (by factory design) has a maximum recommended demonstrated crosswind velocity limit, which is the crosswind component for which adequate control of the airplane was demonstrated during takeoff and landing. As a rule, most airplanes are limited to a crosswind component of 20 percent of the maximum certificated weight stall speed with recommended landing flaps. Runway wind coverage, as used in airport planning, measures the percent of time crosswind components are below maximum acceptable velocity limits.

The crosswind component is the resultant vector of the runway direction and existing wind that acts at a right angle to the runway. FAA Advisory Circular (AC) 150/5300-13A, *Appendix 2*, Wind Analysis recommends that at least 95 percent crosswind coverage be provided by the runway system (one or more runways) at any airport. If the runway wind coverage is less than 95 percent, an additional runway(s) should be provided, with an orientation such that the combination of all runways provides 95 percent or better bi-directional wind coverage. The most desirable runway orientation provides the greatest runway wind coverage with the least crosswind component.

Currently, Runway 13-31 can fully accommodate RDC B-II aircraft having AAC speeds ranging from 91 knots up to, but not including 121 knots, and ADG II wingspans ranging from 49 feet up to, but not including 79 feet. However, based on the desire to meet aircraft with larger wingspans in the future, runway wind coverage for Runway 13-31 was determined by applying maximum crosswind components of 10.5 nautical miles per hour (knots), 13 knots, 16 and 20 knots.

Using current and proposed future airfield approach instrumentation capabilities, three separate meteorological scenarios of cloud ceiling height and horizontal visibility were used to provide information required for the runway wind coverage analysis and the resultant operational (favorable, or adverse) impacts of winds on the airport's existing single runway system:

- All Weather – All observed ceiling heights and horizontal visibility reported.
- VMC – Observed conditions when ceiling height was greater than, or equal to, 1,000 feet AGL and horizontal visibility was greater than, or equal to, three statute miles. Flight operations during these conditions may be conducted under VFR. VMC at the airport occur approximately 85.51 percent of the time.
- IMC – Observed conditions when ceiling height was less than 1,000 feet AGL and/or horizontal visibility was less than three statute miles. Flight operations during these conditions are conducted under IFR when aircraft pilots are required to conduct instrument approach operations to Runway 13-31 using the published RNAV (GPS) LPV IAP. IMC at the airport occurs 16.02 percent of the time.

Table 3-10 lists the single runway wind coverage during three different meteorological conditions based on bidirectional operations and unidirectional runway heading. As shown, the runway's current orientation relative to local prevailing winds provide adequate (e.g., 95 percent or greater) runway wind coverage to safely accommodate aircraft operations by aircraft with larger wingspans (i.e. RDC B-III) without the need for an additional crosswind runway. The wind rose information presented in this section will be used to determine facility needs and formulate development alternatives in later chapters of this report.

The three respective wind roses are shown in Figures 3-8, 3-9, and 3-10.

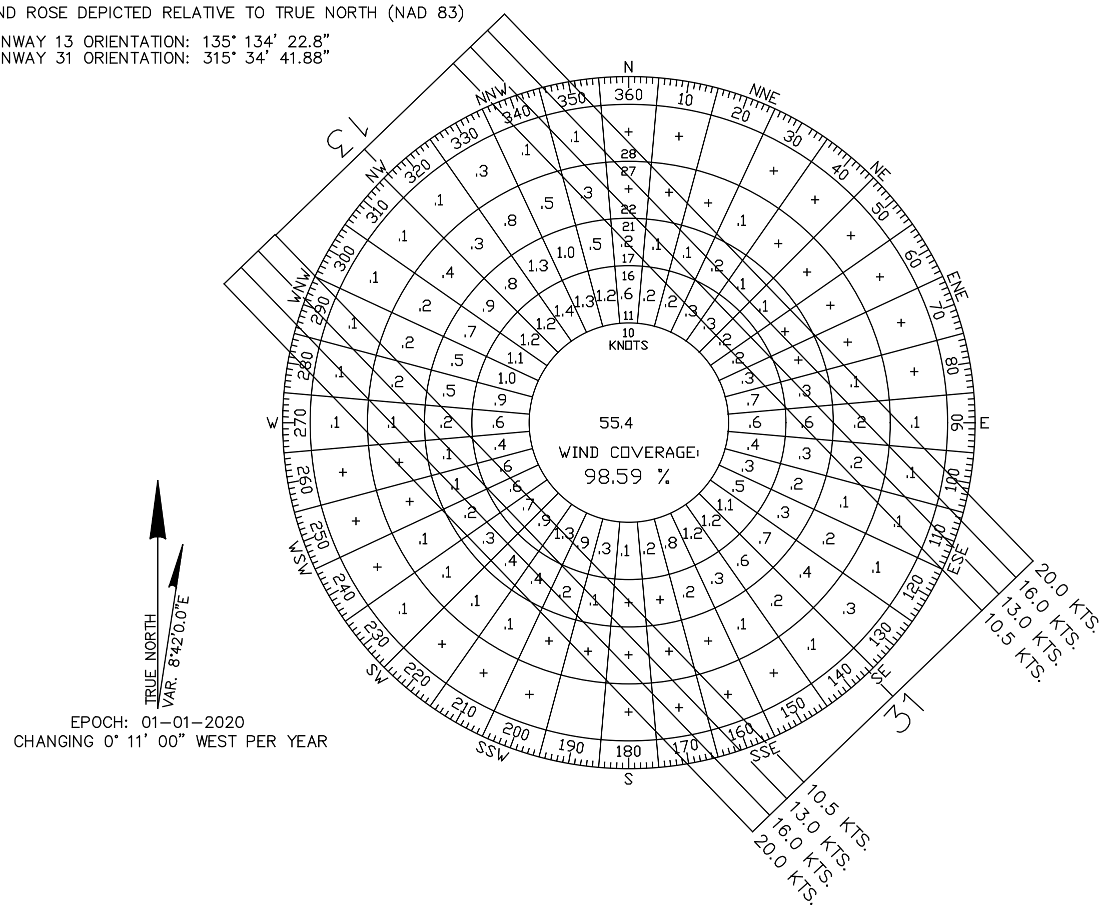
The remainder of this page is intentionally left blank.

Table 3-10: DUT Runway Wind Coverage						
Meteorological Condition	Runway Designation	Wind Coverage Percentage (%) Allowable Crosswind Component (Knots)				Relative Percent of Occurrence
		10.5	13	16	20	
All Weather	Bidirectional Operation					126,708 Observations 100%
	13-31	84.64	90.50	95.83	98.59	
	Unidirectional by Runway Heading					
	13	46.85	49.68	52.63	54.09	
	31	49.27	52.31	54.71	56.04	
Visual Meteorological Conditions (VMC)	Bidirectional Operation					108,347 Observations 85.51%
	13-31	84.72	90.56	95.91	98.64	
	Unidirectional by Runway Heading					
	13	48.12	51.08	54.10	55.55	
	31	47.21	50.11	52.47	53.77	
Instrument Meteorological Conditions (IMC)	Bidirectional Operation					20,296 Observations 16.02%
	13-31	84.70	90.60	95.62	98.46	
	Unidirectional by Runway Heading					
	13	39.66	41.79	44.23	45.69	
	31	61.35	65.13	67.73	69.11	

Source: Federal Aviation Administration, Airport Data and Information Portal, https://adip.faa.gov/agis/public/#/windAnalysisTools
Surface Observation Data Obtained from AWOS Weather Station: 704890, Dutch Harbor, Unalaska, Alaska
Airport Identifier: (IATA: DUT, ICAO: PADU, FAA LID: DUT)
Record Period: 2010-2019.
Compiled by Michael Baker International, Inc., September 2020

The remainder of this page is intentionally left blank.

WIND ROSE DEPICTED RELATIVE TO TRUE NORTH (NAD 83)
RUNWAY 13 ORIENTATION: 135° 134' 22.8"
RUNWAY 31 ORIENTATION: 315° 34' 41.88"



METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT				OBSERVATIONS
		10.5 KTS (12 MPH)	13 KTS (15 MPH)	16 KTS (18 MPH)	20 KTS (22 MPH)	
ALL WEATHER		BI-DIRECTIONAL OPERATION				126,708 100.00%
	13-31	84.64	90.50	95.83	98.59	
		SINGLE DIRECTION BY RUNWAY HEADING				
	13	46.85	49.68	52.63	54.09	
	31	49.27	52.31	54.71	56.04	

NOTES:

1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT THE MAXIMUM ACCEPTABLE CROSSWIND COMPONENTS OF 10.5, 13, 16, AND 20 KNOTS RESPECTIVELY. MAXIMUM ALLOWABLE CROSSWIND COMPONENT:

   10.5 KNOTS (RDC A-I AND B-I)
   13 KNOTS (RDC A-II AND B-II)
   16 KNOTS (RDC A-III, B-III, C-I THROUGH D-III, D-I THROUGH D-III)
   20 KNOTS (RDC A-IV AND B-IV, C-IV THROUGH C-VI, D-IV THROUGH D-VI, E-I THROUGH E-VI)

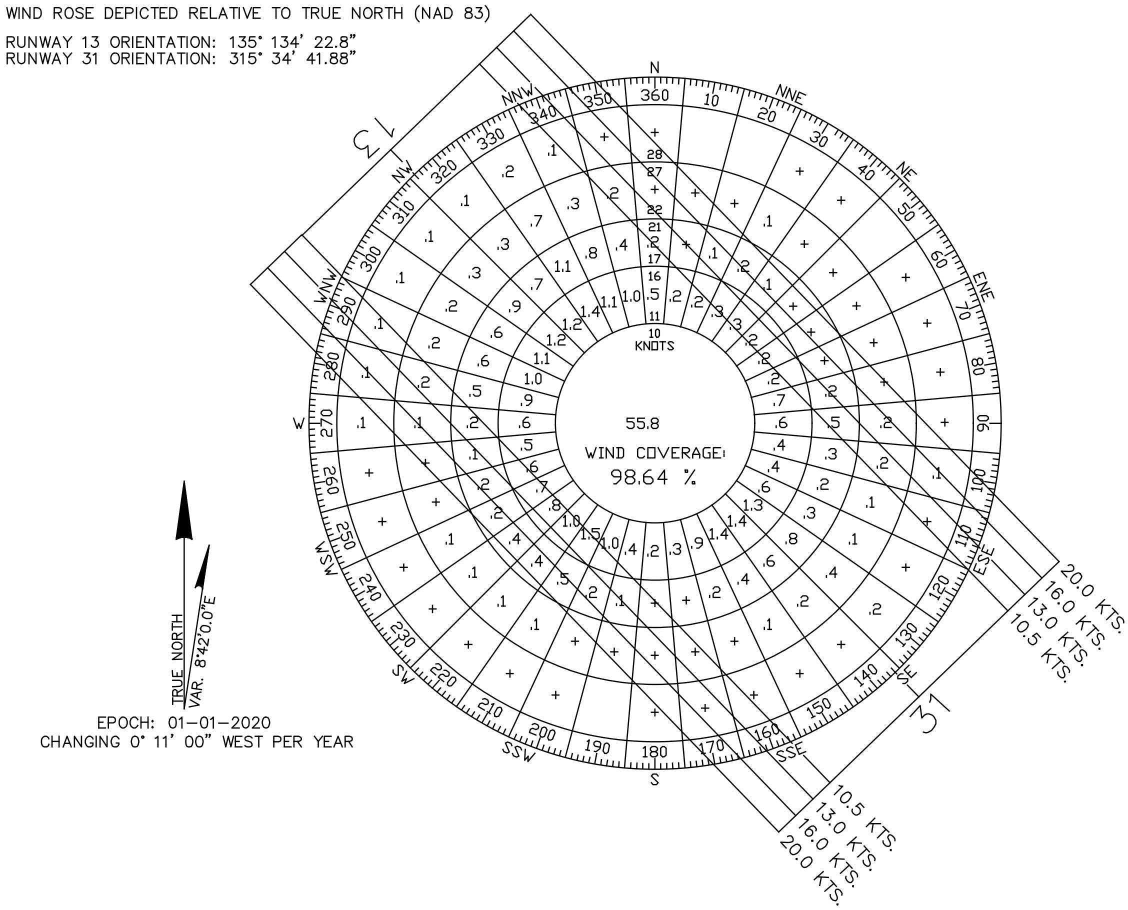
   THE AIRFIELD COVERAGE CAPABILITY FOR EACH RUNWAY IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE APPROPRIATE CROSSWIND LIMITATION RECTANGLE.

2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS.

SOURCE:

FEDERAL AVIATION ADMINISTRATION, AIRPORT DATA AND INFORMATION PORTAL, https://adip.faa.gov/agis/public/#/windAnalysisTools
SURFACE OBSERVATION DATA OBTAINED FOR AWOS WEATHER STATION: 704890, DUTCH HARBOR, UNALASKA, ALASKA
RECORD PERIOD: 2010-2019
ALL-WEATHER OBSERVATIONS: 126,708 (100% OF ALL OBSERVATIONS)
AIRPORT IDENTIFIER: (IATA: DUT, ICAO: PADU, FAA LID: DUT)

COMPILED BY MICHAEL BAKER INTERNATIONAL, SEPTEMBER 9, 2020



METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT				
		10.5 KTS (12 MPH)	13 KTS (15 MPH)	16 KTS (18 MPH)	20 KTS (22 MPH)	OBSERVATIONS
VISUAL	BI-DIRECTIONAL OPERATION					108,347 85.51%
	13-31	84.72	90.56	95.91	98.64	
	SINGLE DIRECTION BY RUNWAY HEADING					
	13	48.12	51.08	54.10	55.55	
	31	47.21	50.11	52.47	53.77	

NOTES:

1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT THE MAXIMUM ACCEPTABLE CROSSWIND COMPONENTS OF 10.5, 13, 16, AND 20 KNOTS RESPECTIVELY. MAXIMUM ALLOWABLE CROSSWIND COMPONENT:

   10.5 KNOTS (RDC A-I AND B-I)
   13 KNOTS (RDC A-II AND B-II)
   16 KNOTS (RDC A-III, B-III, C-I THROUGH D-III, D-I THROUGH D-III)
   20 KNOTS (RDC A-IV AND B-IV, C-IV THROUGH C-VI, D-IV THROUGH D-VI, E-I THROUGH E-VI)

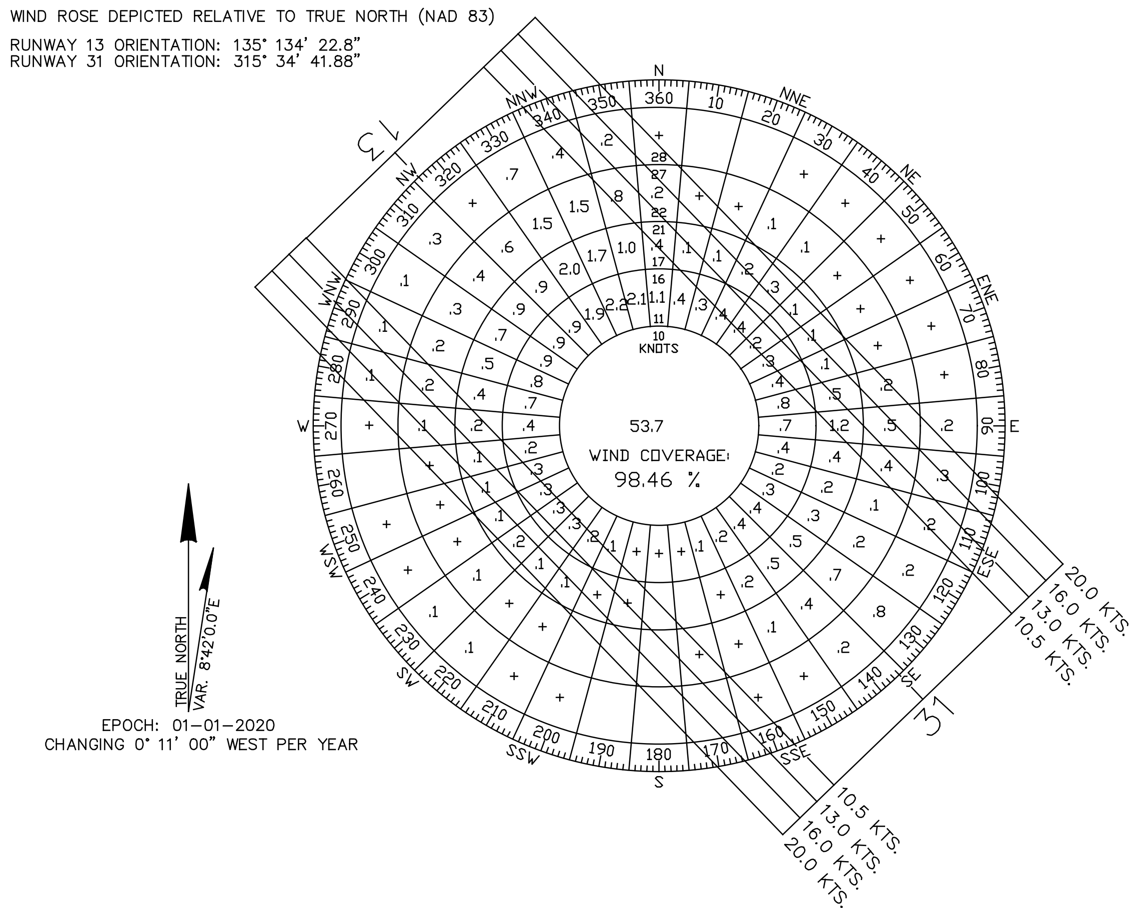
   THE AIRFIELD COVERAGE CAPABILITY FOR EACH RUNWAY IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE APPROPRIATE CROSSWIND LIMITATION RECTANGLE.

2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS.

SOURCE:

FEDERAL AVIATION ADMINISTRATION, AIRPORT DATA AND INFORMATION PORTAL, https://adip.faa.gov/agis/public/#/windAnalysisTools
SURFACE OBSERVATION DATA OBTAINED FOR AWOS WEATHER STATION: 704890, DUTCH HARBOR, UNALASKA, ALASKA
RECORD PERIOD: 2010-2019
VFR (VMC) OBSERVATIONS: 108,347 (85.51% OF ALL OBSERVATIONS)
AIRPORT IDENTIFIER: (IATA: DUT, ICAO: PADU, FAA LID: DUT)

COMPILED BY MICHAEL BAKER INTERNATIONAL, SEPTEMBER 9, 2020



METEOROLOGICAL CONDITION	RUNWAY	RUNWAY WIND COVERAGE BY PERCENT				
		10.5 KTS (12 MPH)	13 KTS (15 MPH)	16 KTS (18 MPH)	20 KTS (22 MPH)	OBSERVATIONS
INSTRUMENT		BI-DIRECTIONAL OPERATION				20,296 16.02%
	13-31	84.70	90.60	95.62	98.46	
		SINGLE DIRECTION BY RUNWAY HEADING				
	13	39.66	41.79	44.23	45.69	
	31	61.35	65.13	67.73	69.11	

NOTES:

1. THIS GRAPHICAL CHART PLOTS, FOR THE DATA PERIOD LISTED, THE RECORDED OCCURRENCES (IN PERCENT) OF WIND BY DIRECTION AND SPEED WHILE THE RECTANGULAR BOXES REPRESENT THE MAXIMUM ACCEPTABLE CROSSWIND COMPONENTS OF 10.5, 13, 16, AND 20 KNOTS RESPECTIVELY. MAXIMUM ALLOWABLE CROSSWIND COMPONENT:

   10.5 KNOTS (RDC A-I AND B-I)
   13 KNOTS (RDC A-II AND B-II)
   16 KNOTS (RDC A-III, B-III, C-I THROUGH D-III, D-I THROUGH D-III)
   20 KNOTS (RDC A-IV AND B-IV, C-IV THROUGH C-VI, D-IV THROUGH D-VI, E-I THROUGH E-VI)

   THE AIRFIELD COVERAGE CAPABILITY FOR EACH RUNWAY IS THUS DETERMINED BY TOTALING ALL OCCURRENCES FALLING WITHIN THE APPROPRIATE CROSSWIND LIMITATION RECTANGLE.

2. RUNWAYS ARE NUMBERED USING MAGNETIC HEADINGS WHILE WIND DATA IS PRESENTED USING TRUE HEADINGS.

SOURCE:

FEDERAL AVIATION ADMINISTRATION, AIRPORT DATA AND INFORMATION PORTAL, https://adip.faa.gov/agis/public/#/windAnalysisTools
SURFACE OBSERVATION DATA OBTAINED FOR AWOS WEATHER STATION: 704890, DUTCH HARBOR, UNALASKA, ALASKA
RECORD PERIOD: 2010-2019
IFR (IMC) WEATHER OBSERVATIONS: 20.296 (16.02% OF ALL OBSERVATIONS)
AIRPORT IDENTIFIER: (IATA: DUT, ICAO: PADU, FAA LID: DUT)

COMPILED BY MICHAEL BAKER INTERNATIONAL, SEPTEMBER 9, 2020

4 Forecasts of Aviation Activity

4.1 Introduction and Background

Aviation activity forecasts (i.e., projections of future number of aircraft operations and locally-based aircraft) provide the basis for justifying the planning and proposed development identified in the airport sponsor's Airport Capital Improvement Program (ACIP). Aviation activity forecasts are typically prepared as part of an update of an airport's Master Plan, but may also be updated independently as the first step in assessing the relative impacts of changes in activity upon an airport's needs. Aviation activity forecasts should be realistic, based on the most recent data available, and reflect the current and anticipated future conditions at the airport.

Forecasts of future aviation activity for the Unalaska Airport (DUT), serves as key components of the airport sponsor's efforts to bring the airport up-to-date with current information, standards, and requirements. For example, an updated Airport Master Plan incorporates assessments of current airport facility and aircraft traffic activity levels, includes an update of the forecasts of future aviation activity specific to the airport, and assesses airfield design and safety-related measures relative to current Federal Aviation Administration (FAA) airport guidance and facility design standards.

Aviation activity forecasting actions, collectively, facilitate the prudent planning and timely development of airport facilities. They provide the platform for development decisions related to the purpose, size, location, and appropriate geometric design of planned and appropriately-phased airport facility development. These actions typically include, but are not limited to:

- airfield pavements (i.e., runways, taxiways, and itinerant ramp/aprons);
- visual and electronic navigational aids;
- approach lighting systems;
- airfield pavement edge lighting;
- aircraft hangar and tiedown facilities;
- airport traffic control towers;
- landside facilities; and
- terminal space.

Failure to properly plan for the future can result in negative consequences to an airport's capacity, activity, safety, and efficiency. A primary objective of forecasting is to provide information needed to determine whether existing airport facilities would adequately serve future needs. In most growth scenarios, the estimated levels of future demand may suggest the expansion, renewal, strengthening, or other improvements to airport structures or facilities.

Forecasts of future aviation activity levels at DUT not only serve to reveal potential future airport facility development needs, but also provides information regarding the approximate timing of airport facility capital expenditures. The last comprehensive forecasting effort was completed as part of the 2008 Unalaska Airport Master Plan Update, with a planning period beginning in 2011 and extending through 2026.

The aviation activity forecast developed conducted as part of the update of the DUT Airport Master Plan similarly projects commercial, general aviation, military, and air cargo activity over a 20-year planning period beginning with a 2019 (“Base Year”) and extending through the year 2039, reflecting a five-year short-term (2019 through 2024), a second five-year intermediate-term (2025 through 2029), and a ten-year long-term (2030-2039). This 20-year forecast of aviation activity will be subsequently referenced and used as part of the development of the Airport Master Plan’s recommended phased-development of airport facility improvements and the commensurate ACIP.

4.2 Unique Air Service Market and Operating Conditions

As well documented within 2008 Unalaska Airport Master Plan Update, DOT&PF’s 2011 Alaska Aviation System Plan Forecasts, and the 2018 McDowell Group Unalaska Seafood/Airport Brief, aviation activity, particularly passenger activity and the outbound movement of processed seafood, has been, and will continue to drive aviation activity at DUT.

Unalaska/Dutch Harbor, home to both seafood processors and harvesters are directly dependent upon the airport and its ability to provide consistent and adequate levels of scheduled and on-demand airlift of passengers and freight throughout the year.

While commercial fishing activity within the Bering Sea and Aleutian Islands occurs throughout the year, the level of passenger traffic to and from the airport corresponds directly with the local seafood processing industry’s need to transport between 600-2,500 seasonal employees to and from Unalaska, particularly within the first and third quarter of the year. It is estimated that, in any given year, about two-thirds of processing workers in Dutch Harbor are nonresidents to Alaska. The remaining third of workers include local residents and Alaska residents from other areas in the state

As reported by the Unalaska Seafood/Airport Brief, DUT’s (average five-year) number of monthly passenger arrivals (deplaned passengers) peaks in January (locally referred to as the “A” Season) due, in part, to a variety of pollock, flatfish, and Pacific cod fisheries initiating their respective processing operations in that month. Similarly, the number of departing (enplaning) passengers increases within the second quarter of the year as fishing activity decreases. A second peak of arriving passengers occurs mid-year before the pollock “B” Season with similar increases in the number of departing enplaned passengers through the last quarter of the year.

Air travel is the primary method for getting workers to and from Unalaska to fill positions in local processing plants depending on the month. Based upon the McDowell Group research, it is estimated that number of seafood processing jobs in the Aleutians West Census Area (including but not limited to other areas like Adak, processing in Dutch Harbor accounts for more than 90 percent the seafood processing jobs. Passenger movements at DUT in support of crew changes or additions for commercial fishing fleets operating out of Dutch Harbor.

It is important to reiterate that the fishing industry is the main driver of demand at DUT. The forecast that follows is based upon an assumption that regulations and fishing quotas for the Northern Pacific Ocean and Bering Sea will remain constant during the 20-year planning horizon.

4.2.1 City- / Airport-Pair Air Service Activity

Through the use of the US Department of Transportation (DOT's) Bureau of Transportation Statistics (BTS) T-100 Domestic Segment database, historical five-year (2015-2019) levels of enplaned (departing) and deplaned (arriving) passenger activity for the five-year period 2015 through the forecast's Base Year 2019 were reviewed. Each BTS record provided:

- Date of Aircraft Operation
- Origin/Destination Airport
- Air Carrier
- Aircraft Make/Model
- Departure/Arrival Seats, and
- Enplaned/Deplaned Passengers, Freight and Mail

As published within the BTS T-100 Domestic Segment database, scheduled or regular on-demand departing flights from DUT were conducted during the 2019 calendar year to: Anchorage, Akun, Atka, St. George Island, Nikolski, Sandpoint, Cold Bay, St. Paul, Akutan, and Egegik; with ten or less departures to Adak Island, King Cove, False Pass, Dillingham and King Salmon. Similarly, for that same period, scheduled or regular on-demand arriving flights to DUT were conducted from: Anchorage, Akun, Cold Bay, Sandpoint, Atka, Nikolski, St. George Island, King Salmon, Dillingham, St. Paul, and Akutan with ten or less arrivals from King Cove, False Pass, Adak Island, Bethel, and Kodiak.

4.2.2 Approach to Forecasting Regional Carrier and Air Cargo Demand

Recognizing that previous sophisticated and rigorous aviation demand forecasting studies have been conducted during the past updates of DUT's Airport Master Plans, or as a aggregated top-down approach to similar aviation activity forecasting developed as part of the Alaska Aviation System Plan, the projections of future demand for aviation activity at DUT have historically included relevant event- or factor-based considerations, that have included, but were not limited to:

- Petrochemical Exploration
- Potential for Ecotourism
- Potential for Fuel Price Escalation
- Unmet Passenger Demand
- Transient Local Seafood Processing Workforce
- Likely Changes in Regional Airliner (Life-cycle) Fleet Mix
- Levels of Connecting Traffic
- Military/Coast Guard Support Activities, and
- Potential for Accelerated Outmigration

The forecast (i.e., projection) of future aircraft activity at DUT as developed specifically for the update of this airport master plan takes a far less rigorous approach to the quantification of past, current, and future movements of scheduled regional air carrier or on-demand air taxi passengers demand, related aircraft operations, air cargo volumes (freight and mail), local general aviation and itinerant military aircraft operations, and the local basing of general aviation aircraft.

4.2.3 Constraints to Aviation Activity

Unique to DUT, the forecast of aviation activity is primarily driven by, or because of the existence or prevalence of the following conditions and/or circumstances:

- Relative Location, Population and Economic Generating Industries of Unalaska
- Available Land for Airport / Airfield Development
- Available Runway Length
- Required Smaller Aircraft Size and Associated Payload Carrying Capabilities
- Prevailing and Seasonal Weather Conditions, and
- Lack of Straight-in Published Instrument Approach Procedures

While this update to the airport master plan will identify viable and prudent runway, taxiway and terminal apron facility development alternatives, the "existing conditions", and the forecast of aviation activity throughout the master plan's twenty-year planning horizon is predicated upon these constraints, some of which cannot be mitigated or ameliorated.

4.3 Forecast Assumptions

The development of a 20-year multi-term forecast of aviation activity for DUT includes considerations regarding past and anticipated future opportunities to provide properly-sized aircraft for the year-round and high seasonal activity of passengers, freight and mail air transport.

4.3.1 Increased Aircraft Gauge

Inspection of ten-year historical records of published BTS and FAA informational statistics provided a vast amount of data regarding the make, model, size and payload carrying capabilities and their associated number of annual operations (i.e., arrivals or departures) that have served to characterize aviation activity demand at DUT. Through inspection of passenger enplanement/deplanement, city-pair market, air cargo freight and mail movement activity levels, it would appear that, (as very likely-specific to DUT) year-over-year changes in aviation activity at DUT have experienced limited fluctuations with no apparent long-term upward or downward trend. This would suggest that the air service market at DUT has matured over time based upon steady-state demand or the existence of constraints previously mentioned and will likely potentially increase or further evolve only when: 1) the local seafood processing industry expands, 2) needed and desired improvements to the airport are brought to fruition (i.e., increased available runway length), and/or 3) new demand for air travel to and from DUT is generated by other market-driven influences (i.e., oil exploration to name only one).

The current air service market- and supply-driven factors influencing DUT are primarily driven or highly influenced by the required use of smaller 9- to 50-seat regional commuter aircraft. While these aircraft are fully capable of safely and efficiently operating within the runway's available 4,500-foot usable length, these types and sizes of regional commuter aircraft do not provide airline operators the opportunity to fully exploit economic opportunities related to the need to satisfy existing latent demand for enhanced air service at DUT that includes, but is not limited to providing increased passenger and freight carrying capacity. While the decision as to what aircraft may likely enter and/or exit the local (DUT-specific) city-pair market while satisfying air service demand, the decision to operate at DUT rests solely with airline operators.

The 20-year forecast of regional airline/air taxi aircraft operational activity at DUT is predicated upon the assumption that the majority of aircraft providing these types of services will have Runway Design Code (RDC) B-III operational and dimensional characteristics. Recognizing that 2015-2019 the mix of scheduled commercial operations that were generated by the De Havilland Canada Dash 8-100/300 Series and Saab 2000 and Air Taxi operations that were generated by the Beech 1900, Beech Super King 200, and Cessna Conquest cabin-class general aviation aircraft, would, on the whole, result in a slightly smaller average number of available passenger seats per trip. Therefore, a "composite" 48-seat aircraft was used to calculate future aircraft departures and arrivals throughout the entire twenty-year forecast period. Further to this approach to the forecasting of aircraft operations, it was assumed that the derived 2019 calendar year respective aircraft passenger load factor percentages would likely remain unchanged throughout that same forecast period. By virtue of the use of the larger composite 48-seat aircraft, and static passenger load factors, the resultant number of future forecasted aircraft operations will be lower than previously reported levels using a mix of smaller aircraft having fewer available seats (as shown in **Table 4-16**).

The demand for local general aviation activity is extremely low based upon the relative geographic location of the airport and its proximity to other general aviation airports within the West Aleutian Borough. The lack of demand and/or associated utility of general aviation activity by smaller recreational single- and multi-engine propeller-drive aircraft is evidenced through inspection of 10-year historical aircraft activity levels for these types of recreational-use aircraft, as well as the historically low number of locally (DUT) based aircraft. That said, however, demand for on-demand Air Taxi or private use of larger cabin-class turboprop and jet aircraft operating under CFR parts 91 and 135 will continue and is reflected in the assumed use of the (composite) 48-seat aircraft when projecting all other civil aircraft activity at DUT.

Lastly, historical levels of military operations to and from DUT have been primarily generated by the US Coast Guard's use of C-130 aircraft as part of their seasonal or event-driven servicing operations at, to or from the airport. The projected annual number of future forecast horizon year military aircraft operations was held constant throughout the entire 20-year forecast period as required by FAA forecasting guidance.

4.4 Historical Aircraft Operational and Passenger Activity

As shown in **Tables 4-1** and **4-2** and **Figures 4-1** and **4-2**, scheduled regional commuter / on-demand air taxi aircraft operational activity and associated passenger enplanement / deplanement levels have fluctuated and have experienced a continued, albeit gradual decrease over the five -year period 2015 through 2019.

While the annual number of aircraft operations have decreased, the associated aircraft load factors have increased thus likely more realistically reflecting either: 1) reductions in the number of offered scheduled flights with associated increased passenger load factors, 2) basic economic demonstration of elasticity of demand associated with lower fares prices, or increased scheduling of flights to better match seafood facility processing employee transport demand based upon seasonal or random year-over-year increases in catch yields.

[Note: As part of the finalization of the draft Forecast of Aviation Activity for submittal to the FAA for their review approval, additional discussions with airport users, airlines, City representatives, and participating Master Plan Update Stakeholders will be conducted to identify and assess pertinent and meaningful information regarding underlying causal factors that further explain the most recent five year trends.]

Table 4-1: Historical Aircraft Operational Activity

Year	Arriving Aircraft	Departing Aircraft
2015	3,001	2,997
2016	2,612	2,610
2017	2,275	2,271
2018	2,367	2,357
2019	2,377	2,373

Source: Air Carrier Statistics (Form 41 Traffic), All Carriers Database, CY 2019.
Compiled by Michael Baker International, Inc., September 2020.

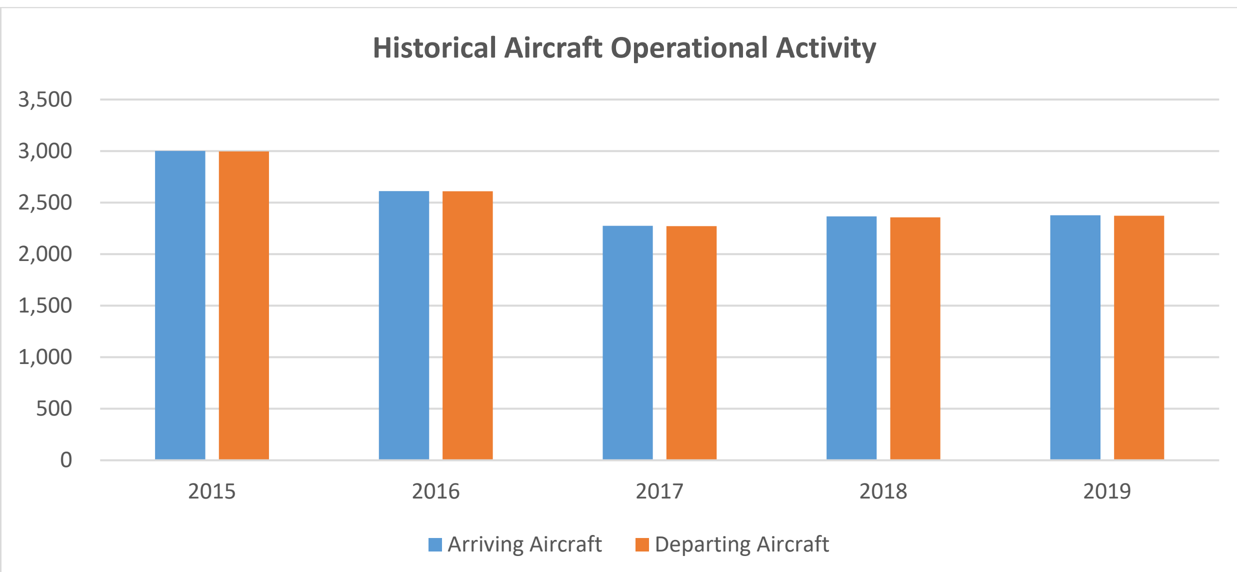


Figure 4-1: Historical Aircraft Operational Activity (2015-2019)

Table 4-2: Historical Passenger Activity				
Year	Arriving Seats	Deplaned Passengers	Departing Seats	Enplaned Passengers
2015	58,969	30,532	58,881	31,957
2016	52,834	30,646	52,926	31,694
2017	47,353	29,337	47,237	30,405
2018	47,534	29,084	47,321	29,767
2019	44,045	27,905	44,019	27,552

Source: Air Carrier Statistics (Form 41 Traffic), All Carriers Database, CY 2019.
Compiled by Michael Baker International, Inc., September 2020.

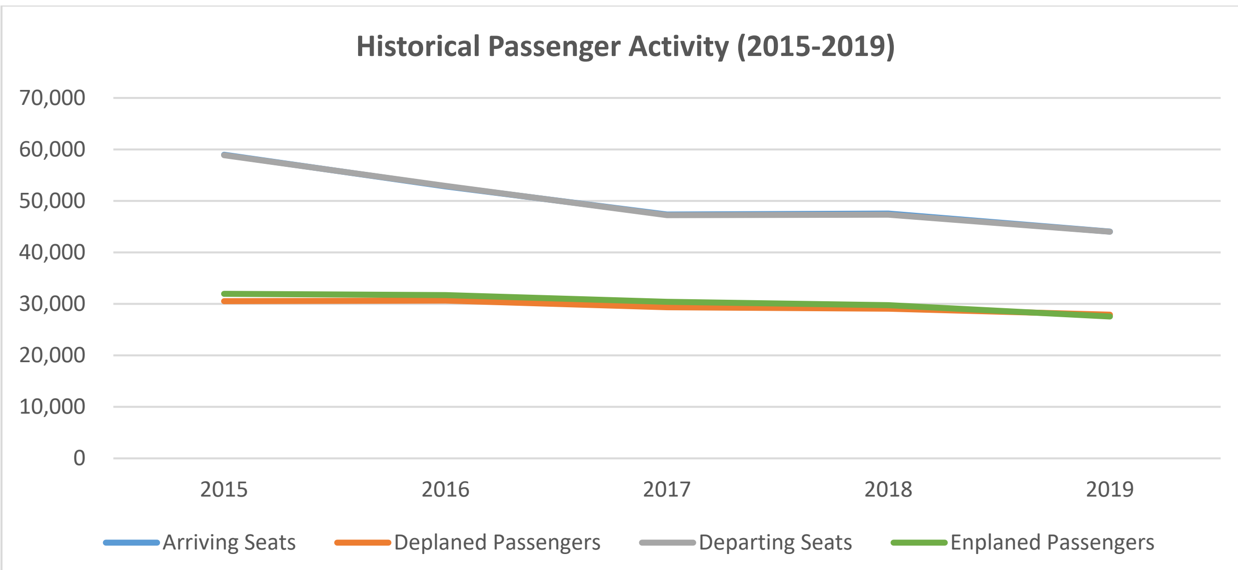


Figure 4-2: Historical Passenger Activity

As shown in **Table 4-3** and **Figure 4-3**, a review of the DOT's BTS Air Carrier Statistics (Form 41 Traffic) Annual Aircraft Load Factor Percentiles for calendar years 2015 through 2019 were reported to be 69.17 percent (notably for both deplaned and enplaned passengers). This single reported percent value was found to be slightly higher than DUT-specific deplanement and enplanement passenger load factor percentages (listed in **Table 4-7**) that were developed specifically for this forecast using 2019 BTS-reported passenger movement and available seat data.

Table 4-3: Historical Regional / Charter Passenger Load Factors		
Year	**Deplaned Load Factor**	**Enplaned Load Factor**
2015	57.14%	57.14%
2016	63.77%	63.77%
2017	69.84%	69.84%
2018	69.76%	69.76%
2019	69.17%	69.17%

Source: Air Carrier Statistics (Form 41 Traffic), All Carriers Database, CY 2015-2019.

Note: These reported 2019 Deplaned / Enplaned Total Aircraft Load Factor Percentiles do not match Michael Baker International, Inc. calculated values, however, with 5 to 6 percent difference.

Compiled by Michael Baker International, Inc., September 2020.

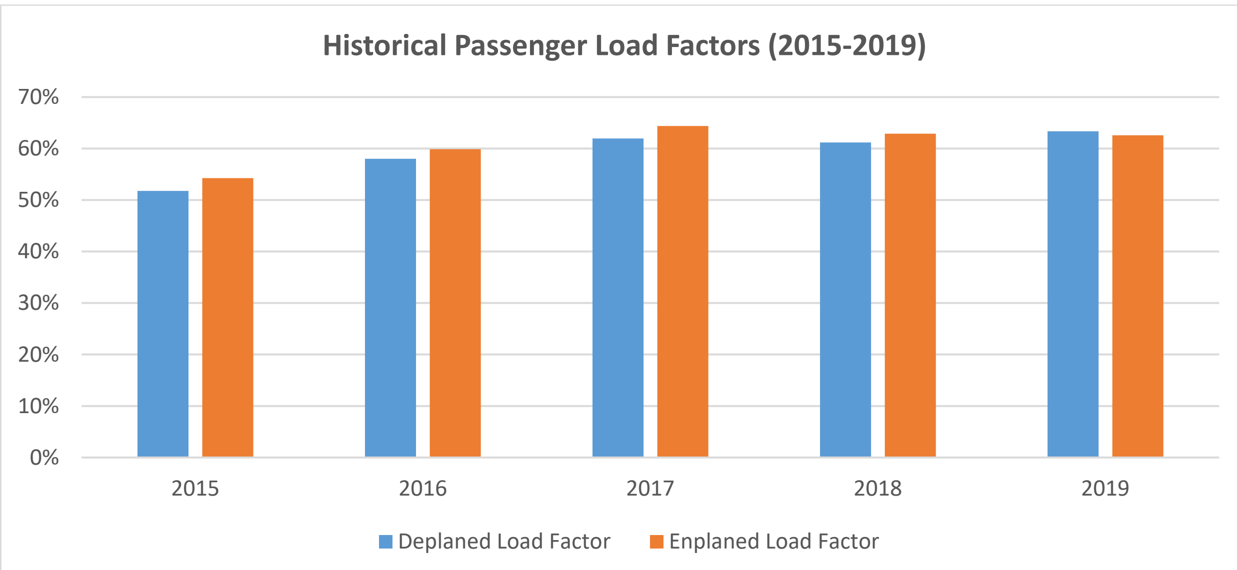


Figure 4-3: Historical Regional / Charter Passenger Load Factors (2015-2019)

As clearly evidenced through the inspection of **Table 4-4** and **Figure 4-4**, the relative split between enplaned and deplaned air cargo freight has historically shifted over the five-year period 2015 through 2019 with each experiencing both positive and negative annualized trend rates. As shown in **Table 4-5** and **Figure 4-5**, annualized enplanements and deplanements of air cargo mail at DUT have steadily decreased over that same period. This trend may be more reflective of the paradigm shift in consumer adoption of Electronic Web-based Commerce that reduced reliance upon the delivery of “paper-based” information and commerce.

Table 4-4: Historical Air Cargo Freight Activity		
Year	Deplaned Freight (Pounds)	Enplaned Freight (Pounds)
2015	1,322,398	1,110,410
2016	1,193,179	1,139,320
2017	1,134,995	1,337,644
2018	1,287,190	1,224,263
2019	1,528,560	822,941

Source: Air Carrier Statistics (Form 41 Traffic), All Carriers Database, CY 2019.
Compiled by Michael Baker International, Inc., September 2020.

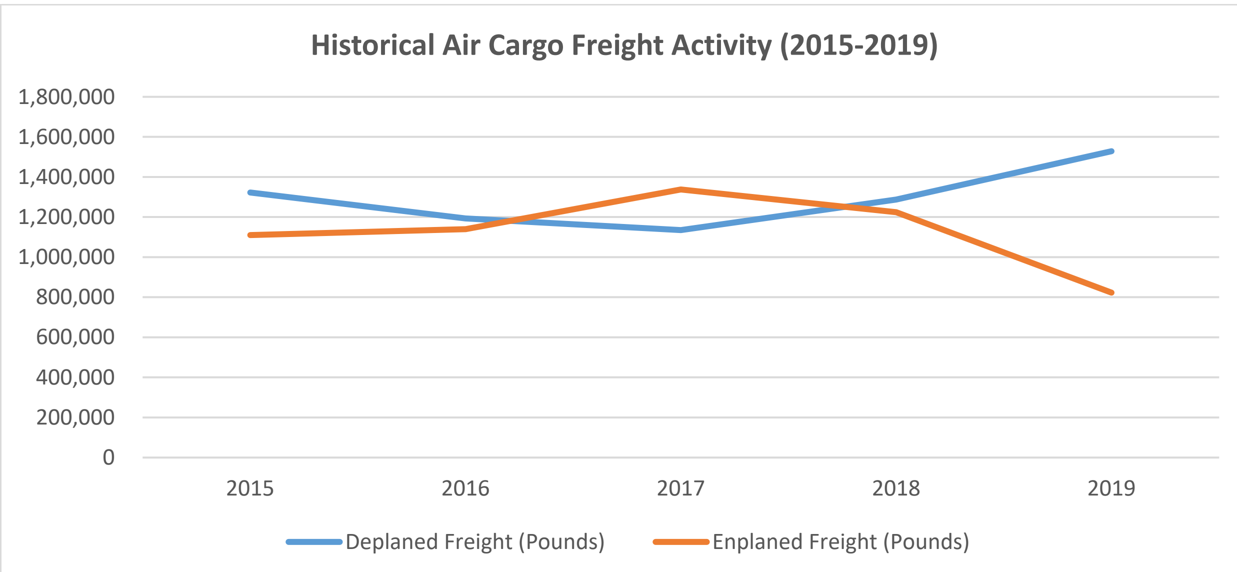


Figure 4-4: Historical Air Cargo Freight Activity (2015-2019)

The remainder of this page is intentionally left blank.

Table 4-5: Historical Air Cargo Mail Activity		
Year	**Deplaned Mail (Pounds)**	**Enplaned Mail (Pounds)**
2015	921,966	395,232
2016	972,723	420,243
2017	903,148	386,824
2018	907,864	316,205
2019	825,137	310,813

Source: Air Carrier Statistics (Form 41 Traffic), All Carriers Database, CY 2015-2019.
Compiled by Michael Baker International, Inc., September 2020.

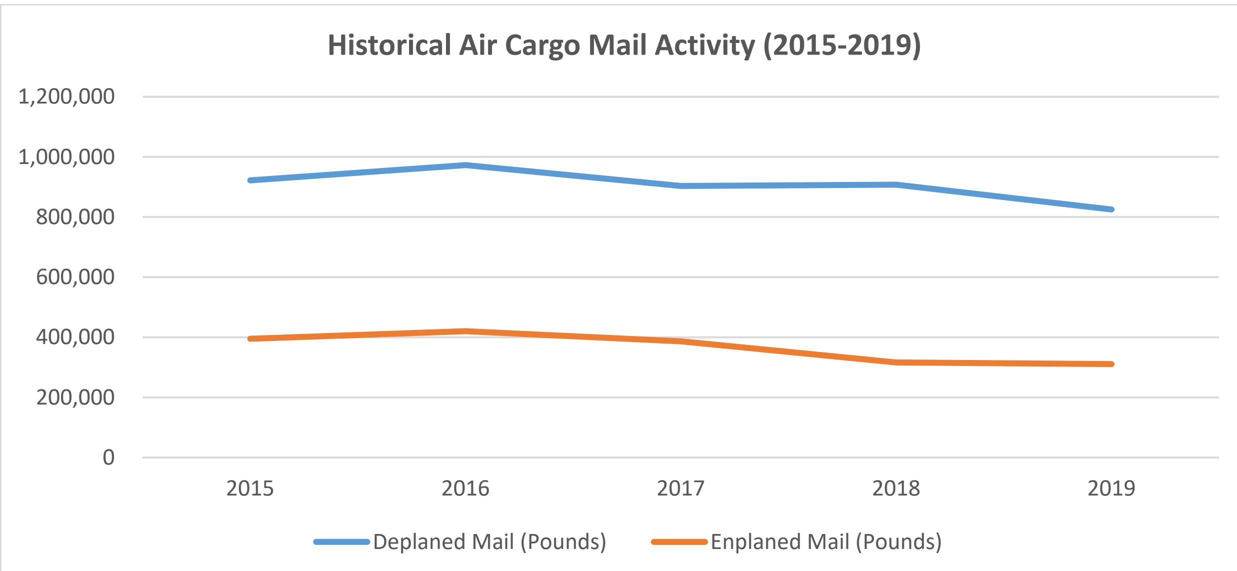


Figure 4-5: Historical Air Cargo Mail Activity

Although the FAA's February 2020 Terminal Area Forecast (TAF) for DUT was available for inspection and use in developing a forecast of aircraft operational activity, as shown in **Table 4-6**, the TAF provides only static levels of historical levels of aircraft operations and was considered to offer no significant or meaningful information.

The remainder of this page is intentionally left blank.

Table 4-6: Historical FAA DUT TAF Aircraft Operations											
Year	Itinerant (IT) Activity						Local (LOC) Activity				Total Operations
	Air Carrier	Air Taxi	GA	Military	IT Total	% Total	Civil	Military	LOC Total	% Total	
2000	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2001	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2002	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2003	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2004	594	100	50	0	744	100.0%	0	0	0	0.0%	6,206
2005	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2006	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2007	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2008	594	100	50	0	744	100.0%	0	0	0	0.0%	744
2009	594	100	50	50	744	100.0%	0	0	0	0.0%	744
2010	594	100	50	50	744	100.0%	0	0	0	0.0%	744
2011	1,095	100	50	50	1,295	100.0%	0	0	0	0.0%	1,295
2012	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2013	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2014	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2015	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2016	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2017	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2018	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
2019	2,500	100	50	50	2,700	100.0%	0	0	0	0.0%	2,700
CAAGR 2000-2019	7.86%	0.00%	0.00%	-	7.02%	-	0.00%	0.00%	0.00%	0.00%	7.02%

Sources: FAA DUT TAF and Michael Baker International, Inc., 2020.

The remainder of this page is intentionally left blank.

4.5 2019 Base Year Aviation Activity

Table 4-7 serves to provide a single source listing of the primary segments of the airport's measurable activity levels as reported and later projected for: scheduled regional air carriers, air cargo movements, itinerant military, and general aviation for the forecast Base Calendar Year 2019.

4.5.1 Airline / Charter

Although the total number of aircraft operations was slightly higher than 2018 reported levels, there was a slight decrease (approximately 8 percent) in the number of 2019 annual passenger movements. This is likely associated with the brief interruption and subsequent reduction of regional air carrier service between October 18, 2020 and November 14, 2020 following the crash of the PenAir flight 3296 Saab 2000 (50-seat) aircraft on October 17, 2019. Immediately following the crash, RavnAir Group, owner of PenAir, ceased all Saab 2000 operations at DUT. Between October 18, 2020 and November 14, 2020, interim non-scheduled chartered flights served to provide limited air service using a smaller 37-seat Bombardier DHC8-100 turboprop aircraft operated by Ravn Alaska until regularly scheduled air service was reinitiated on November 14, 2020 by Ravn Alaska using the same DHC8-100 aircraft. It is likely for this reason for the slight year-over-year downturn in the annual scheduled regional air carrier enplanements as reflected in the reported 2019 calendar year totals.

The 2019 calendar year number of passenger deplanement and enplanement aircraft load factors are listed as calculated using the BTS-reported number of aircraft operation, available seats and deplaned/enplaned passengers. As noted earlier, these derived passenger load factors are slightly lower, 63.36 percent for deplaned passengers and 62.59 percent for enplaned passengers, were lower than the BTS-reported value of 69.17% previously listed in Table 4-3. Based upon the more reasonable and varying derived aircraft passenger load factor percentages for each mode of travel (i.e., arriving vs. departing), these passenger load factor percent values were considered to be reasonable and were held constant and utilized for the forecast horizon year calculation of regional air carrier and air charter aircraft departure and arrival operations throughout the 20-year forecast period.

4.5.2 Air Cargo

The 2019 calendar year number of reported air cargo freight and mail movements are also listed and were later utilized for the development of projected air cargo movements for each forecast horizon year throughout the 20-year forecast period. It should be noted that because of the unique nature of DUT, pass through flights to and from other Aleutian Island airports, belly cargo movements of freight and mail using smaller commercial regional aircraft typically occurs based on airline and pilot decision regarding aircraft-specific space available and takeoff weight allowed capabilities that vary based upon the type and size of aircraft utilized. For forecasting of future freight and mail air cargo movements, it was assumed that cargo movement capacity to and from DUT or other airports is unconstrained. Variations in annual cargo movements that have historically occurred has, and likely will continue to reflect typical air cargo movement demand as well as unforeseen variability in seasonal changes based upon factors such as, the supply of, or demand for perishable processed seafood, to name only one example.

4.5.3 Military

Military operations to and from DUT are primarily generated by the US Coast Guard's C-130 aircraft that are based out of Coast Guard Air Station Kodiak. These aircraft periodically operate at DUT in support of their vital aeronautical function of providing search and rescue operations, maritime reconnaissance, and the patrolling of offshore fisheries within the Gulf of Alaska, Bristol Bay, the Bering Sea, and Alaska's Pacific coast.

Because DUT does not operate as one of the nation's 21 Joint Use Airports, federal law does not allow FAA to consider forecasts of aviation activity that would be part and parcel of airport facility improvement considerations that, by nature of the project or improvement, may potentially solely benefit another federal agency (e.g., the Department of Defense). Therefore, based upon FAA guidance regarding the forecast of military activity at civilian airports, the BTS-reported number of 2019 calendar year military operations were held constant throughout the 20-year forecast period.

4.5.4 General Aviation

As listed in **Table 4-7**, general aviation activity (aircraft operations) at DUT is conducted under CFR part 91 and CFR part 135 (Air Taxi) operating rules. As reported by the FAA's TFMSC and the DOT BTS, and for the expressed purpose of addressing general aviation operation at DUT, this forecast treats all current and projected future "local" activity generated by locally-based light single- and multi-engine propeller- driven aircraft that operate to and from other nearby Aleutian island airports separately from larger private recreation and 'for hire" cabin-class aircraft having far greater operating capabilities that are included within the regional air carrier activity forecasts. The forecast, therefore, assumes that general aviation activity generated by smaller locally-based general aviation aircraft will continue to represent a very small segment of aviation activity at DUT.

The remainder of this page is intentionally left blank.

Table 4-7: 2019 Base Year Aviation Activity

Airline / Charter					
Item	Operations	Seats	Average Seats (Seats ÷ Operations)	Passengers	Load Factor (Passengers ÷ Seats)
Arrival/Passenger Deplanement Factors					
Domestic	2,377	44,045	18.52	27,905	63.36%
Total	**2,377**	**44,045**	**18.52**	**27,905**	**63.36%**
Departure/Passenger Enplanement Factors					
Domestic	2,373	44,019	18.55	27,552	62.59%
Total	**2,373**	**44,019**	**18.55**	**27,562**	**62.59%**
Total Airline Factors					
Total	**4,750**	**88,064**	**18.54**	**55,457**	**62.97%**

Source: BTS T-100 Domestic Segment Database

Note: Limited to CY 2019 Scheduled Commercial Charter Airline Operators Reporting Passenger Enplanements/ Deplanements. 2019 Load Factor Calculated Does Not match BTS Annual Deplaned / Enplaned Annual Aircraft Load Factor Summary for DUT. Compiled by Michael Baker International, Inc., September 2020

Air Cargo (Dedicated and Belly)		
Item	Operations	Freight (Pounds)
Inbound/Deplaned		
Freight	2,167	1,528,560
Outbound/Enplaned		
Freight	2,399	822,941
Total	**4,566**	**2,351,501**

Source: BTS T-100 Domestic Segment database

Note: Limited to CY 2019 Scheduled Commercial Charter Airline Operators Reporting Freight and / or Mail.

Compiled by Michael Baker International, Inc., September 2020

Military	
Item	Operations
Itinerant Operations / % of Total	25 / 100%
Local Operations / % of Total	0 / 0.00%
Total Operations	**25 / 100%**

Sources: Traffic Flow Management System Counts (TFMSC), Aviation System Performance Metrics (ASPM)

Compiled by Michael Baker International, Inc., September 2020.

Table 4-7: 2019 Base Year Aviation Activity	
General Aviation	
Item	Operations or Based Aircraft
Itinerant and Local Operations	
Itinerant Operations / % of Total	200 / 16.67%
Local Operations / % of Total	1,000 / 83.33%
Total Operations	**1,200**
Operations by Aircraft Type	
Single-Engine Piston	1,088
Multi-Engine Piston	24
Turboprop	24
Jet	14
Helicopter	50
Total Operations	**1,200**
Based Aircraft by Type	
Single-Engine Piston	2
Multi-Engine Piston	3
Turboprop	0
Jet	0
Helicopter	0
Ultralight	1
Total Based Aircraft	**6**

Note: Local / Itinerant General Aviation Operations Estimated
Source: FAA DUT TFMSC, 2019
Compiled by Michael Baker International, Inc., September 2020

4.5.5 2019 Regional Airline / Charter Activity

The passenger movements associated with each BTS-reported regional airline or CFR part 135 operator that operated to or from DUT during the forecast Base 2019 calendar year is listed in **Table 4.8**. The Table reports operator-specific information regarding their respective number of aircraft operations, passenger enplanements/deplanements, seats available, passenger load factor, and air cargo movements.

Table 4-8: 2019 Regional Airline / Charter Activity						
Commercial Airline / Charter	Aircraft Operations	Seats	Passenger Enplanements	Load Factor	Freight	Mail
Enplanements						
Alaska Central Express	721	2,736	1,493	55%	649,133	150,813
Corvus Airlines, Inc d/b/a Era Aviation d/b/a Ravn Alaska	150	5,254	3,739	71%	566	150
Grant Aviation	806	6,899	2,050	30%	161,057	154,667
Iliamna Air Taxi (Charter)	12	108	39	36%	-	-
Katmai Air (Charter)	1	9	6	67%	-	-
Lynden Air Cargo Airlines (Dedicated Charter)	12	-	-	-	10,407	-
Maritime Helicopters, Inc.	26	156	19	12%	825	-
Peninsula Airways Inc.	641	28,830	20,197	70%	953	5,333
Ryan Air f/k/a Arctic Transportation (Charter)	3	27	9	33%	-	-
Deplanements						
Alaska Central Express	724	2,720	1,625	60%	1,096,398	774,468
Corvus Airlines, Inc d/b/a Era Aviation d/b/a Ravn Alaska	154	5,357	2,249	42%	5,824	4,158
Grant Aviation	805	6,889	1,909	28%	9,331	16,749
Iliamna Air Taxi (Charter)	12	108	61	56%	1,372	0
Katmai Air (Charter)	1	9	2	22%	0	0
Lynden Air Cargo Airlines (Charter)	12	0	0	-	403,613	0
Maritime Helicopters, Inc.	25	150	21	14%	2,365	0
Peninsula Airways Inc.	640	28,785	22,029	77%	298	29,762
Ryan Air f/k/a Arctic Transportation (Charter)	3	27	9	33%	0	0

Source: BTS T-100 Domestic Segment database CY 2019.

Compiled by Michael Baker International, Inc., 2020.

4.6 Forecast of Passenger Movements

The forecast of passenger enplanements and deplanements associated with regional airline and/ or CFR part 135 general aviation charter service is listed in **Table 4-9** and reflects a constant 20-year annualized average growth of 1.00 percent.

4.7 Forecast of Regional Aircraft Operations

The forecast of annual regional airline aircraft operations for each forecast horizon year is presented in **Table 4-10**. The projected future aircraft operational levels were derived by assuming that passenger movements would increase at a constant annual rate of 1.00 percent throughout the 20-year forecast period. Applying the 2019 passenger load factors previously listed in **Table 4-7** and the available number of "composite" airliner seats (48), this simplistic, but straight forward approach inherently results in lower projected regional airline aircraft operations going forward.

Table 4-9: Forecast of Passenger Movements

Year	Enplanements	Deplanements	Total
2019	30,065	27,905	57,970
2024	31,598	29,328	60,927
2029	33,210	30,824	64,035
2034	34,904	32,397	67,301
2039	36,685	34,049	70,734
CAAGR 2019-2039	1.00%	1.00%	1.00%

Source: Michael Baker International, Inc., September 2020

Table 4-10: Forecast of Regional Aircraft Operations

Year	Enplanements	2019 Load Factor 62.59% Held Constant			Deplanements	2019 Load Factor 63.36% Held Constant			Total Operations
		Available Seats	Taken Seats	Departures		Available Seats	Taken Seats	Arrivals	
2019	27,552	44,019	27,552	2,373	27,905	44,045	27,905	2,377	4,750
2024	28,957	48	30.04	964	29,328	48	30.42	964	1,928
2029	30,435	48	30.04	1,013	30,824	48	30.42	1,013	2,026
2034	31,987	48	30.04	1,063	32,397	48	30.42	1,065	2,130
2039	33,619	48	30.04	1,119	34,049	48	30.42	1,119	2,238
CAAGR 2019-2039	1.00%	0.0%	0.0%	-3.69%	1.00%	0.0%	0.0%	-3.70%	-3.69%

Note: Future available seats based upon anticipated relative percentile mix of Regional Air Carrier aircraft likely to serve DUT city pair market.
Source: Michael Baker International, Inc., September 2020

4.8 Forecast of Freight and Mail Movements

Commercial air freight and mail movement at DUT is primarily provided through a combination of belly freight and air freight operators (i.e. ACE using Beech 1900 aircraft and Lynden using civilian C-130 aircraft). However, it is anticipated based upon current trends that continued growth in air freight and mail movements will continue to be handled as belly and dedicated freight. A breakdown of typical freight patterns by carrier is characterized previously in **Table 4-8**. The forecast of freight and mail enplanements and deplanements associated with regional airline and/or CFR part 135 general aviation charter service is listed in **Tables 4-11 and 4-12,** reflecting a constant 20-year annualized average growth of 3.77 percent and 1.0 percent, respectively.

Table 4-11: Forecast of Freight Movements (Pounds)

Year	Deplanements	Enplanements	Total
2019	1,288,322	1,317,692	2,606,015
2024	1,549,828	1,585,159	3,134,988
2029	1,864,415	1,906,917	3,771,332
2034	2,242,857	2,293,987	4,536,843
2039	2,698,115	2,759,624	5,457,739
CAAGR 2019-2039	3.77%	3.77%	3.77%

Source: Michael Baker International, Inc., September 2020

Table 4-12: Forecast of Mail Movements (Pounds)

Year	Enplanements	Deplanements	Total
2019	907,460	366,588	1,274,048
2024	953,749	385,288	1,339,037
2029	1,002,400	404,942	1,407,342
2034	1,053,533	425,598	1,479,130
2039	1,107,273	447,307	1,554,581
CAAGR 2019-2039	1.00%	1.00%	1.00%

Source: Michael Baker International, Inc., September 2020

4.9 Forecast of General Aviation Operations

The forecast in **Table 4-13** utilized historic trends experienced at DUT to project future growth through 2039. The forecast assumes that general aviation activity at DUT will grow at a CAAGR of 1.00 percent, which increases the number of general aviation operations from 1,200 in 2019 to 1,464 by 2039.

Table 4-13: Forecast of General Aviation Operations			
Year	Departures	Arrivals	Total
2019	600	600	1,200
2024	631	631	1,261
2029	663	663	1,326
2034	697	697	1,393
2039	732	732	1,464
CAAGR 2019-2039	1.00%	1.00%	1.00%

Source: Michael Baker International, Inc., September 2020

4.9.1 General Aviation Fleet Mix Forecast

As shown in **Table 4-14**, the number of general aviation aircraft that operated at DUT in 2019 was extracted from the FAA's TFMSC database. The growth of general aviation operations by aircraft type was forecast using historic trends experienced at DUT. Operations are projected to grow at a constant 20-year annualized average growth of 1.0 percent.

Table 4-14: Forecast of General Aviation Operations by Aircraft Type						
Year	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Total GA Operations
2019	1,088	24	24	14	50	1,200
2024	1,143	25	25	15	53	1,261
2029	1,202	27	27	15	55	1,326
2034	1,263	28	28	16	58	1,393
2039	1,328	29	29	17	61	1,464
CAAGR 2019-2039	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

Source: Michael Baker International, Inc.
Compiled by Michael Baker International, Inc., September 2020

4.9.2 Forecast of Local/Itinerant General Aviation Operations

As shown in **Table 4-15**, historic annualized average growth of 1.0 percent was applied to forecast general aviation activity throughout the forecast period at DUT. An historic split of approximately 17 percent itinerant and 83 percent local general aviation operations was applied to the forecast.

Table 4-15: Forecast of Local / Itinerant General Aviation Operations					
Year	Itinerant (IT)		Local (LOC)		Total GA Operations
	Operations	% Total	Operations	% Total	
2019	200	16.67	1,000	83.33	1,200
2024	210	16.67	1,051	83.33	1,261
2029	221	16.67	1,105	83.33	1,326
2034	232	16.67	1,161	83.33	1,393
2039	244	16.67	1,220	83.33	1,464
CAAGR 2019-2039	1.00%	-	1.00%	-	1.00%

Source: Michael Baker International, Inc.

Compiled by Michael Baker International, Inc., September 2020.

4.10 Forecast of Combined Aircraft Operations

Table 4-16 presents a summary of aircraft operations forecasts categorized by type for DUT. These projections will be considered in the next chapter where they will be compared to existing and planned airport facilities at DUT. The intent of this comparison will be to determine the ability of current/planned facilities to meet projected demand.

Table 4-16: Forecast of Combined Aircraft Operations										
Year	Itinerant (IT)					Local (LOC)				Total Operations
	Regional Carrier / Air Taxi	Military	General Aviation	Total	Percent	Military	General Aviation	Total	Percent	
2019	4,750	80	200	5,030	83%	0	1,000	1,000	17%	6,030
2024	1,928	80	210	2,218	68%	0	1,051	1,051	32%	3,269
2029	2,026	80	221	2,327	68%	0	1,105	1,105	32%	3,432
2034	2,130	80	232	2,442	68%	0	1,161	1,161	32%	3,603
2039	2,238	80	244	2,562	68%	0	1,220	1,220	32%	3,782
CAAGR 2019-2039	-3.69%	0.00%	1.00%	-3.32%	-	0.00%	1.00%	1.00%	-	-2.30%

Compiled by Michael Baker International, Inc., 2020.

4.10.1 Based Aircraft Forecast

As shown in **Table 4-17**, general aviation-based aircraft are projected to grow from 6 aircraft in 2019 to 15 total aircraft in 2039. This represents a CAAGR of 4.69 percent of the 20-year forecast period.

Table 4-17: Forecast of Based Aircraft by Type

Year	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Ultra-Light	Total GA Based Aircraft
2019	2	3	-	-	-	1	6
2024	3	3	1	1	1	1	10
2029	4	3	2	1	1	1	12
2034	4	3	2	1	2	1	13
2039	5	4	2	1	2	1	15
CAAGR 2019-2039	4.68%	1.45%	-	-	-	0.00%	4.69%

Source: FAA Master Record - Unalaska Airport (DUT)
Compiled by Michael Baker International, Inc., September 2020.

4.11 Peaking Forecasts

This section identifies the peaking forecasts for operational activity to determine whether there will be any needed terminal area, apron and landside improvements during the planning period at DUT. Peaking forecasts were identified for operations to evaluate whether the airport's infrastructure will require improvements. The operational peaking forecasts for all operations were developed using the procedures outlined below and are summarized in **Table 4-18**.

- Average Peak Month (APM) – Through a review of historical activity records, it was found that the APM represented 10.0 percent of annual activity in 2019 (the peak month in 2019 occurred in January).
- Average Day Peak Month (ADPM) – For 2019, activity data was pulled for the 31 days of the year that experienced the most operations.
- Average Day Peak Hour (ADPH) – The ADPH was estimated at approximately 50 percent of the ADPM. The itinerant and local peak hours were also calculated based on the same percentage of their respective peak day forecast.

Table 4-18: Peaking Forecasts				
Year	Total Operations	Peak Month (January 10%)	ADPM	ADPH
2019	6,030	603	19	10
2024	3,269	327	11	6
2029	3,432	343	11	6
2034	3,603	360	12	6
2039	3,782	378	12	6
CAAGR 2019-2039	-2.30%	-2.30%	-2.27%	-2.52%

Source: Michael Baker International, Inc., September 2020.

4.12 Required FAA Review and Approval of Airport Master Plan Forecasts

The FAA has a responsibility to review and approve aviation activity forecasts developed by others that are submitted to the agency in conjunction with airport planning, including Airport Master Plans and associated environmental studies. The FAA reviews such forecasts with the objective of including them in its Terminal Area Forecast (TAF) prepared specifically for DUT, and the National Plan of Integrated Airport Systems (NPIAS). In addition, aviation activity forecasts are an important input to benefit-cost analyses associated with airport development. The FAA reviews these analyses when Airport Sponsor-based requests for federal funding are submitted.

As developed specifically for this update of the DUT Airport Master Plan, the review and approval of the aviation activity falls upon the FAA's Alaskan Region Airports Division (AAL-600) located in Anchorage, Alaska.

The FAA reviews the sponsors' data with a particular focus on the justification and timing of proposed development projects. Along with airport operators, sponsors include state and local planning agencies. The federally-funded plans must be consistent with FAA forecasts of aeronautical activity, follow FAA guidelines, and be reviewed and accepted by FAA personnel familiar with local conditions and should be

- realistic;
- based on the latest available data;
- reflect the current conditions at the airport;
- supported by information in the study; and
- provide an adequate justification for airport planning and development.

As defined in FAA Order 5090.5, Formulation of the National Plan of Integrated Airport Systems (NPIAS) and the Airports Capital Improvement Plan (ACIP), the regional office must approve the Airport Sponsor's aviation activity forecasts and the determination of one or more Critical Design Aircraft. Aviation activity forecasts supplied by the Airport Sponsor should be consistent with the FAA's TAF published for the airport.

Forecasts of annual scheduled [Regional Commuter] Commercial Service and/or Air Taxi passenger enplanements, number of locally-based aircraft, and total aircraft operations (a landing or takeoff) are considered consistent with the TAF if the forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period. If the forecast is not consistent with the TAF, differences must be resolved if the forecast is to be used in FAA decision-making. This may involve revisions to the airport sponsor's submitted forecasts, adjustments to the TAF, or both.

The FAA's forecast approval process typically constitutes an approval for planning only, which allows the Airport Sponsor to plan future airport facility improvement projects that are considered to be consistent with the long-term growth expectations as graphically depicted and denoted on the FAA-Conditionally-approved Airport Layout Plan Drawing (ALD) and (ALP) Drawing Set. In most cases, prior to issuing a federal funding Grant, the FAA will require updated information demonstrating that a proposed project is justified by activity at the time, or by activity that would directly result from the implementation of the proposed project. This policy helps to ensure that funding is directed towards critical projects throughout the United States.

Because the DUT TAF issued January 2020 reflects static (i.e., nonchanging without annualized increased or decreases) beyond 2019, all comparisons between the Airport Master Plan's forecast of passenger enplanements, aircraft operations and based general aviation aircraft and that presented in the DUT TAF, reflect increasing differences beyond 2019 and through the forecast year 2039. As shown in Table 4-19, all but the comparisons for passenger enplanements for the 5- and 10-year forecast years far exceed the FAA's 10- and 15- percent forecast comparison exceedance limits.

The remainder of this page is intentionally left blank.

Table 4-19: TAF Comparison Table						
Item	**2019**	**2024**	**2029**	**2034**	**2039**	**CAAGR 2019-2039**
Enplanements						
Master Plan	27,552	28,957	30,435	31,987	33,619	1.00%
2019 TAF	28,638	28,638	28,638	28,638	28,638	0.00%
Difference	1,086	319	1,797	3,349	4,981	-
Percent	3.8%	1.1%	6.3%	11.7%	17.4%	
Operations						
Master Plan	6,030	3,269	3,432	3,603	3,782	,%
2019 TAF	2,700	2,700	2,700	2,700	2,700	0.00%
Difference	3,330	569	732	903	1,082	-
Percent	123.3%	21.1%	27.1%	33.4%	40.1%	
Based Aircraft						
Master Plan	6	10	12	13	15	4.69%
2019 TAF	6	6	6	6	6	0.00%
Difference	-	4	6	7	9	-
Percent	0.0%	66.7%	100.0%	116.7%	150.0%	

4.13 Identification of Critical Aircraft

The FAA's standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other airfield facilities at civil airports are prescribed in FAA AC 150/5300-13A, Airport Design, (Changes inclusive). However, when airport airfield geometric designs are solely based upon existing the existing fleet or mix of aircraft that typically operate and an airport, failure to anticipate or project operational needs of future aircraft can severely limit the ability the airport to expand and fully accommodate future requirements need of larger, more demanding aircraft.

The FAA's airport geometric design standards reference three aircraft operational and dimensional parameters specifically: Aircraft Approach [speed] Category AAC, Airplane Design Group (ADG) addressing aircraft wingspan, and/or tail heights, and Taxiway Design Group (TDG) addressing aircraft wheelbase width and main gear location. These standards are used for the design of runways and taxiways, their centerline separation, safety-related setbacks, and the protection of people and property on the ground beyond each runway end.

To determine the appropriate airport design standards for DUT for existing conditions and for the planning of future anticipated airfield facility improvements, the existing and future Critical Aircraft (also stated as Critical Design Aircraft) was determined.

The Critical Aircraft is defined by the FAA as representing a either a specific aircraft make and model, or composite or family of several aircraft having similar operational and physical characteristics that currently operate at, or are anticipated to make regular use of the airport. According to FAA Order 5090.5, Formulation of the NPIAS and Airport Capital Improvement Program (ACIP), the Critical Aircraft is used to identify the appropriate Airport Reference Code for airport design criteria (such as dimensional standards and appropriate pavement strength) and is contained within FAA AC 150/5300-13A. The specific rules and guidelines for determining the applicable critical aircraft is contained in the current version of FAA AC 150/5000-17, Critical Aircraft and Regular Use Determination.

The Critical Aircraft is the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing. Similar characteristics refers to the practice of grouping aircraft by comparable operational performance and/or physical dimensions. This is to recognize that it is sometimes necessary for airfield planning and development to group aircraft with similar characteristics together instead of requiring a single aircraft type to exceed the regular use threshold alone. For example, aircraft with similar wingspans and/or approach speeds may be grouped to determine the most demanding AAC and/or ADG, respectively. Aircraft with similar runway length requirements can be grouped to determine the future runway length at an airport.

The identification and determination of the DUT Base Year Critical Aircraft was accomplished through inspection and use of the 2019 calendar year TFMSC records for DUT that reports aircraft operational activity either that operated either to, or from DUT as conducted under Instrument Flight Rules (IFR) and documented through the required origin airport-to-destination airport filing of an IFR Flight Plan. Through the review and use of the TFMSC aircraft operational data, it was recognized that most, if not all aircraft activity to or from DUT were included in the 2019 TFMSC data.

As listed in Table 4-20, the make and model of each TFMSC-reported aircraft operation at DUT is listed along with the respective number of annual operations, AAC, and ADG.

As shown in Tables 4-21 and 4-22, 500 or more annual operations at DUT were generated by aircraft having AAC B approach speeds and ADG III wingspans and/or tail heights. This statistical reporting clearly indicates that the current Critical Aircraft has these operational and physical characteristics.

Looking forward, it is anticipated that the relative mix of aircraft operating at DUT will remain unchanged. Accordingly, for the purpose of the DUT Master Plan Update, all future airfield planning, layout and design considerations should fully reference and adhere to Runway Design Code (RDC) B-III airport design criteria as prescribed in FAA AC 150/5300-13A throughout the 20-year master planning period.

Table 4-20: 2019 Aircraft Activity by Aircraft Type				
RDC	FAA ID/Aircraft Make/Model	Operations	Subtotal	Percent
A-I	BE36 - Beech Bonanza 36	1		
	DA42 - Diamond Twin Star	2		
	P28A - Piper Cherokee	1		
	PA31 - Piper Navajo PA-31	2		
	SF20 - Sisler SF-2 Cygnet	2	8	0.17%
A-II	DHC6 - DeHavilland Twin Otter	9		
	PC12 - Pilatus PC-12	100	109	2.36%
B-I	BE9L - Beech King Air 90	2	2	0.04%
B-II	B190 - Beech 1900/C-12J	1,807		
	B350 - Beech Super King Air 350	2		
	BE20 - Beech 200 Super King	653		
	BE30 - Raytheon 300 Super King Air	2		
	C25B - Cessna Citation CJ3	2		
	C441 - Cessna Conquest	167		
	C560 - Cessna Citation V/Ultra/Encore	12		
	C56X - Cessna Excel/XLS	1		
	F900 - Dassault Falcon 900	4		
	SF34 - Saab SF 340	2	2,652	57.38%
B-III	DC6 - Boeing (Douglas) DC 6	2		
	DH8A - Bombardier DHC8-100	313		
	DH8C - Dash 8/DHC8-300	3		
	SB20 - Saab 2000	1,411	1,729	37.41%
B-IV	C17 - Boeing Globemaster 3	2	2	0.04%
C-I	LJ31 - Bombardier Learjet 31/A/B	2		
	LJ45 - Bombardier Learjet 45	12	14	0.30%
C-II	CL60 - Bombardier Challenger 600/601/604	2	2	0.04%
C-IV	C130 - Lockheed 130 Hercules	15		
	C30J - C-130J Hercules; Lockheed	61		
	E3TF - Boeing Sentry TF33/E3C	2	102	2.21%
D-I	LJ35 - Bombardier Learjet 35/36	2	2	0.04%
		4,622		100%

Source: FAA CY 2019 Traffic Flow Management System Counts (TFMSC) - 01/2019 To 12/2019, Unalaska Airport (DUT)
Note: TFMSC Operational Totals Will Not Necessarily Match BTS T-100 Totals.
Compiled by Michael Baker International, Inc., September 2020

Table 4-21: 2019 Aircraft Activity by Critical Aircraft Designation		
Aircraft Approach Category (AAC)	Operations	Percent
A	117	2.53%
B	**4,385**	**94.87%**
C	118	2.55%
D	2	0.04%
Total	4,622	100%
Airplane Design Group (ADG)	Operations	Percent
I	26	0.56%
II	2,763	59.78%
III	**1,729**	**37.41%**
IV	104	2.25%
Total	4,622	100%

Source: FAA CY 2019 Traffic Flow Management System Counts (TFMSC) - 01/2019 To 12/2019, Unalaska Airport (DUT)
Note: TFMSC Operational Totals Will Not Necessarily Match BTS T-100 Totals.
Compiled by Michael Baker International, Inc., September 2020

Table 4-22: 2019 Aircraft Activity by Runway Design Code													
Type User	A-I	A-II	B-I	B-II	B-III	B-IV	C-I	C-II	C-III	C-IV	D-I	Total	Percent
Air Carrier	-	6	-	1,729	1,729	-	5	2	-	24	1	3,744	80.99%
General Aviation	8	103	2	675	-	-	9	-	-	0	1	798	17.28%
Military	-	-	-	-	-	2	-	-	-	78	-	80	1.73%
Total	8	109	2	2,652	1,729	2	14	2	-	102	2	4,622	-
Percent	0%	2%	0%	57%	37%	0%	0%	0%	0%	3%	0%	-	100%

Source: FAA CY 2019 Traffic Flow Management System Counts (TFMSC) - 01/2019 To 12/2019, Unalaska Airport (DUT)
Note: TFMSC Operational Totals Will Not Necessarily Match BTS T-100 Totals.
Compiled by Michael Baker International, Inc., September 2020