FLY WENATCHEE

Where will You Go Today?

PANGBORN MEMORIAL AIRPORT
MASTER PLAN

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PANGBORN MEMORIAL AIRPORT MASTER PLAN

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Pangborn Memorial Airport Master Plan Update

Find out more: www.flywenatchee.com/master-plan

ABOUT THE PLAN

The Airport Master Plan (Plan) provides the 20-year development program for the Airport. The Plan records the orderly improvement of facilities, services, and equipment needs that are envisioned by the Airport. As a strategic process, the Plan serves as a roadmap for bringing projects, people, and funding together in a coordinated manner.

Miss Veedol

The Airport Master Plan has comprehensively assessed Airport project needs throughout the 20-year planning period. It is recognized that the project improvements are beyond the Airport's current financial capabilities; however, each project supports a justifiable recommendation as identified by the Airport Master Plan Advisory Committee (PAC) and Airport Sponsor. As a federally obligated facility, projects must also satisfy Federal Aviation Administration (FAA) standards. For this reason, each project recommendation has been included as part of the Master Plan Capital Improvement Plan (CIP) and depicted on the Airport Layout Plan (ALP) drawings. This provides the Airport with reasonable flexibility in accommodating planned or other strategic improvements as demand warrants and the financial resources become available.

ABOUT THE AIRPORT

Founded in 1941, the Airport is named for the historical achievement of Clyde Pangborn, who in 1931 became the first person, along with his co-pilot, to fly non-stop across the Pacific Ocean.

AIRPORT FACILITIES

The Airport has a 7,000' x 150' runway that is capable of handling commercial transport passenger jets. The runway is equipped with an Instrument Landing System for inclement weather flights. The Airport property totals 700 acres and accommodates both aeronautical and non-aviation businesses.

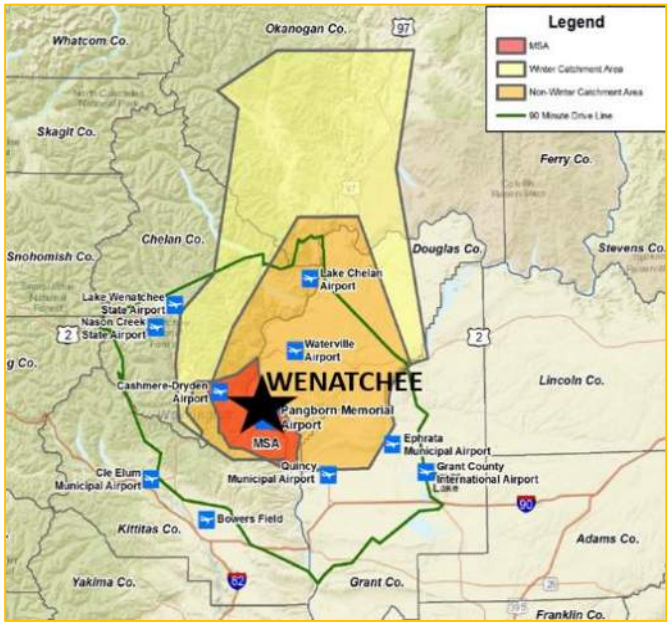
The Pangborn Airport Business Park is located in the south west portion of the Airport property. The Business Park has a total of 20 lots, which make up 70 acres, and is managed by the Port of Douglas County. Three of the lots have airfield access.

AIRPORT USERS

- Alaska Airlines
- Air Cargo (FedEx and UPS)
- US Forest Service
- Central Washington Interagency Communications Center (CWICC)
- Local Businesses
- Agricultural Industries
- Medical Flights
- General Aviation Service Companies
- Sport and Recreational Users

AIRPORT SERVICE AREA

The Airport service area includes 200,000 residents and generates nearly 550,000 air travelers per year. The Airport has initiated airline promotional and service improvements to more reliably capture a larger share of the Wenatchee Valley air traveler market. The Airport is also interested in future facility improvements to expand passenger level of service and improve runway instrument reliability.



AIRPORT IMPACT

The Airport is vital for connecting the North Central Washington Region to the national airspace and international airport system.

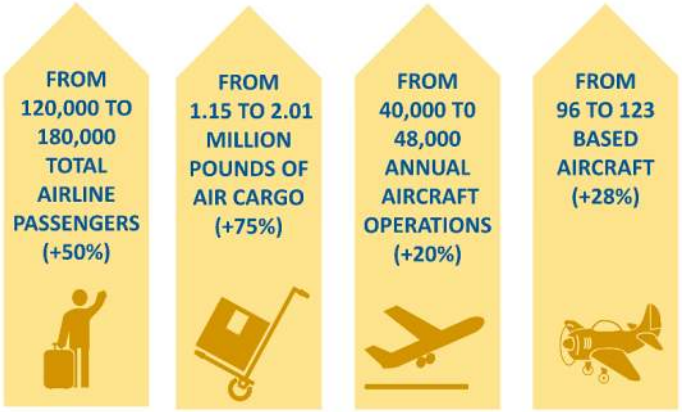
The Airport provides 90 jobs, supports nearly 200 local jobs, and contributes $33.8 million annually to the local economy.

AIRPORT ECONOMIC CONTRIBUTION - DIRECT IMPACTS				
Jobs		Wages, Sales, Spending ($)		Airport (EAT) Annual Total
Airport	Local	Airport	Local	
90	194	$22 Million	$11.8 Million	$33.8 Million

2012 WSDOT Aviation Economic Impact Study (dollars adjusted from 2010 to 2016 amounts).

AIRPORT ACTIVITY

The Plan forecasts projected aeronautical activity levels and was used to identify the type, timing, and allocation of Airport infrastructure, equipment, and service needs. The Federal Aviation Administration (FAA) has formally approved the Airport Master Plan forecasts.



Airline service and passengers are forecast to increase due to the region's population growth, commerce trends, and air service initiatives.

Air service improvements would be brought about through improved flight schedules, additional flight frequency, new city destinations, and large aircraft equipment. The Airport is forecast to transition from an airline turboprop aircraft to a regional jet.

FACILITY NEEDS

The projected change in larger aircraft will have an important impact on the Airport as the airline growth outlook is projected to follow one or a combination of the scenarios below.

Airline Service Scenarios:

Airlines: One + Additional Carrier
Operators: Regional Mainline + Low Cost/Charter
Aircraft (Seats): Turboprop (76) + Jet (76 to 120)
Destinations: Seattle + Other West Coast City

The change in airline passenger demand and level of service would immediately affect the existing airline terminal complex, which is designed for commuter turboprops and is already reaching building, aircraft apron, and auto parking capacity constraints.

The Plan has developed a phased strategy to accommodate demand based on various forecast growth scenarios.

The airline passenger terminal building would be reconfigured internally with an option to expand the building for airline, passenger, and TSA requirements. The airline apron is planned to be expanded and reconfigured to meet FAA design requirements. The auto parking lot and circulation is planned to be expanded to meet design, flow, and Airport patron demands.

FACILITY OPTIONS

The Plan evaluated Airport site location and layout options and provided project recommendations for these following key facility components:

Airfield:
- Pavement Rehabilitation
- Runway Instrument Reliability
- Taxiway System and Configuration
- Crosswind Runway Needs

Terminal-Landside:
- Passenger Terminal Facilities
- General Aviation Facilities
- Airport Support Facilities

Airport Property:
- Airport Land Developments
- Airport Roadway Systems
- Future Airport Property Interests

7-YEAR PROJECTS

The recommended 7-year improvements includes 15 projects to satisfy:

1) Projected forecasts and anticipated user demands
2) Facility and equipment upgrades for a higher level of service
3) Protection of the Airport land use and property interests to the fullest planning extent possible.

The Airport will need to rely heavily on FAA and WSDOT airport-in-aid funding programs as the 20-year recommended project improvements are beyond the Airport's current financial capabilities.

The Plan thoroughly assessed project needs and level of service throughout the 20-year planning period.

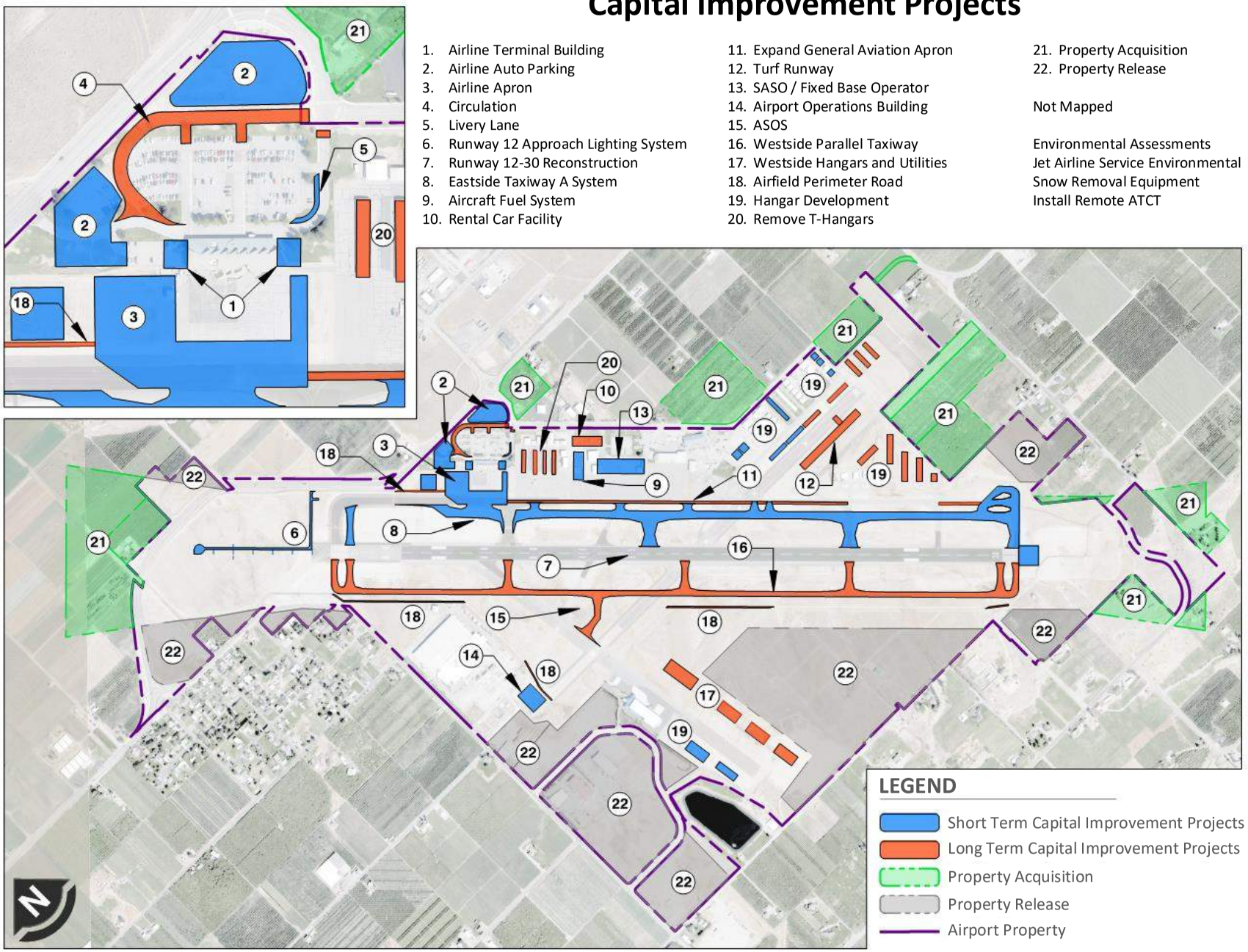
Note that the Airport Master Plan does not constitute a project commitment nor financially obligate the Airport Sponsor, FAA, or WSDOT.

Capital Improvement Projects

1. Airline Terminal Building
2. Airline Auto Parking
3. Airline Apron
4. Circulation
5. Livery Lane
6. Runway 12 Approach Lighting System
7. Runway 12-30 Reconstruction
8. Eastside Taxiway A System
9. Aircraft Fuel System
10. Rental Car Facility
11. Expand General Aviation Apron
12. Turf Runway
13. SASO / Fixed Base Operator
14. Airport Operations Building
15. ASOS
16. Westside Parallel Taxiway
17. Westside Hangars and Utilities
18. Airfield Perimeter Road
19. Hangar Development
20. Remove T-Hangars
21. Property Acquisition
22. Property Release

Not Mapped

Environmental Assessments
Jet Airline Service Environmental
Snow Removal Equipment
Install Remote ATCT



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FLY WENATCHEE

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PANGBORN MEMORIAL AIRPORT

Introduction

INTRODUCTION

CHAPTER OVERVIEW

The Airport Master Plan ("Plan") is being prepared by the Airport Sponsor to assess facility and service needs of the Pangborn Memorial Airport ("Airport"). The Plan serves as a roadmap for bringing projects, people, and funding together in a coordinated manner, and provides strategic direction regarding the Airport's 20-year capital development plan and investment of resources.

As a federally-obligated Airport, the Plan is prepared in accordance with FAA guidance, as per FAA grant assurances and regulatory standards. Conformance with FAA standards enables the Airport Sponsor to apply for federal and state funding to support the maintenance, expansion, and upgrade of Airport facilities. This Plan is funded by the Airport Sponsor, with a grant from the Federal Aviation Administration's (FAA) Airport Improvement Program (AIP) and funds from the Passenger Facility Charge (PFC) program.

1. PLAN BACKGROUND

PLAN PURPOSE

The Airport Master Plan is the 20-year development strategy for the Airport. The Plan documents the orderly improvement of Airport facilities, services, and equipment needs envisioned by the Airport Sponsor. As a strategic process, the Plan provides recommendations to guide future Airport development in order to satisfy aviation demand, while considering environmental, socioeconomic, and funding factors. The Plan provides the basis for justifying projects. As such, the Plan recommendations do not constitute a project commitment or financially obligate the Airport Sponsor and FAA to participate in Plan developments.

PLAN BACKGROUND

The Plan evaluates Airport improvements with respect to up-to-date user trends, facility conditions, and planning standards. The Plan was last updated in 2004; however, due to changing Airport activity trends, FAA design standards, and Airport Sponsor development expectations, the 2004 Plan no longer reflects current Airport needs. This Plan re-assesses activity by commercial operators (airline and air cargo), general aviation, and military users, including facilities to support aeronautical and non-aviation development.

PLAN FOCUS

As identified by the Airport Sponsor, this Plan addresses the following key items:

- Crosswind Runway 7-25 Operational Justification and Length Requirements
- Resolve FAA Hotspots to Runway and Taxiway Geometry
- Address FAA Non-Standard Conditions on the Airport Layout Plan (ALP)
- Terminal Building Facility and Functional Needs
- Airline Market Potential and Opportunities
- On-Airport Revenues and Revenue Generation; Airport Rates and Charges
- General Aviation Service and Facility Needs
- Future Airport Landside Development and Roadway Access
- Future Airport Property Interests
- Future Airport Agricultural Leased Areas
- Update Airport Noise Contours
- Update ALP Per FAA Standards and Checklists
- Prepare 20-Year Airport Capital Development Plan
- Update 5-Year Airport Capital Improvement Program (CIP)

2. PLAN DOCUMENTATION

The following describes the core components of the Plan.

Narrative Report: The narrative report documents the Airport decision-making leading to the recommendations depicted on ALP drawings and carried forward as part of the 20-year airport capital development plan. The narrative is arranged per the following chapters.

- Chapter 1 – Inventory/Environmental Overview
- Chapter 2 – Aviation Demand Forecasts
- Chapter 3 – Facility Requirements
- Chapter 4 – Improvement Alternatives
- Chapter 5 – Implementation and Capital Improvement Plan

Airport Layout Plan Drawings: The final component of this Plan is the ALP, which is a set of drawings that illustrate airport facilities and depict recommended improvements. The ALP drawings, which serve as the Airport's official 'record of planning', are developed in accordance with FAA checklist standards and procedural requirements.

3. PLAN COORDINATION AND PARTICIPATION

The Plan's public involvement process serves to inform and engage stakeholders such as community leaders, businesses and interested residents, with the intent of incorporating public viewpoints into the plan. The outreach includes public meetings conducted at key milestones, stakeholder briefing presentations, and informational materials presented in various formats for public review. The purpose is to build an understanding of the master planning process and to establish realistic expectations for what will be considered and achieved. The following are the key public coordination and participation elements of the Plan:

Airport Stakeholders: The Plan involves coordination and input from multiple local governmental interests, organizations, and constituencies. The following are key stakeholders that are engaged as part of the Plan:

- Port of Chelan County
- Port of Douglas County
- Airport Users and Services Providers

Planning Advisory Committee (PAC): A PAC was established specifically for this Plan because plans that involve diverse community participation are more successful and widely accepted than those without. The PAC serves in an 'advisory' capacity, comprised of airport and community stakeholders focused on guiding Plan recommendations to reflect community interests. The PAC is charged with reviewing interim Plan materials, attending PAC meetings, providing comment on Plan findings, and encouraging awareness and adoption of the Plan recommendations in the communities that they represent. PAC feedback is incorporated, as appropriate, into the final Plan.

Agency Coordination: The FAA is the lead agency for this Plan, and primarily involved with the review of Plan documentation and formal approval of the aviation activity forecasts and ALP drawings. This coordination facilitates dialogue as the Plan progresses, allowing the Airport and the FAA to communicate their shared interests, and to mutually decide key Plan decisions that require FAA input. The Plan includes coordination with local constituencies at key milestones.

Public Outreach and Participation: Public outreach is an important element of the public involvement process and serves as the opportunity for the public-at-large to learn about the Plan progress, interact with stakeholders, communicate concerns, and provide feedback. Public meetings are held at key project milestones, and public insights and suggestions are integrated into the final Plan. Periodic project updates are presented through fact sheets, newsletters, outreach events, social media outlets, and posted on the Airport website.

4. STRATEGIC EVALUATION

The Airport Master Plan is a strategic planning process. The Plan is structured to be responsive to the Airport Sponsor's overall strategic development goals, while being inclusive of broader community needs. As the Airport Sponsor, the Ports have the overall mission to maintain multi-modal transportation assets and long-term infrastructure, and charged with spurring economic development, creating jobs, expanding the region's tax base, and providing leadership for diverse economic growth. The Airport is one of the community's most important economic assets, with scheduled airline passenger service having paramount importance to residents and businesses in Chelan and Douglas counties.

As part of the strategic planning process, a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was performed by the Planning Advisory Committee (PAC). As outlined below, SWOT is a process of identifying the Airport's helpful and harmful attributes. When categorized, the SWOT factors frame the strategic direction to be considered throughout the Plan, for pragmatically assessing Plan recommendations, and guiding the Airport's overall developmental plan.

SWOT TABLE

		Helpful	Harmful
		Positive To Achieving the Objective	Negative To Achieving the Objective
Internal Origin	Attributes Within Airport Influence	Strengths	Weaknesses
External Origin	Attributes Beyond Airport Influence	Opportunities	Threats

Strengths:	Advantageous quality.
Weaknesses:	Disadvantage or deteriorating influence.
Opportunities:	Controlled potential benefit to exploit or capitalize.
Threats:	Uncontrollable potential vulnerability, risk, or detriment.

Source: Mead & Hunt SWOT Template Figure

SWOT STRENGTHS:

1) Airport vital to community's economic well-being
2) Supportive community
3) Airport growing
4) 7,000' Runway 12-30 length
5) 150' Runway 12-30 width
6) Regional service area - Central Washington location
7) Regional location to connect with surrounding Seattle, Pasco, and Spokane
8) Proximity to Wenatchee/Quincy
9) Quality scheduled airline service with Alaska Airlines
10) Highly capable Airport management and operations staff
11) Efficient security/TSA experience
12) Easy and affordable airline auto parking
13) Location of Airport provides extraordinary gliding opportunities
14) Location/access to industrial, commercial, and residential areas
15) Vacant, available land with airfield access and other supportive uses
16) Airport industrial land for private development and for Port lease
17) Space to grow on Port-managed property

SWOT WEAKNESSES:

1) Lack of services near the Airport; including hotel and gas station
2) Absence of a crosswind runway
3) Ramp pavement condition
4) Leverage with airline(s)
5) Aircraft fueling availability
6) Wintertime and weather reliability; schedule reliability due to instrument approach standards (currently the minimum requirement is 1- mile visibility and 300-foot high cloud cover ceiling). This is a huge improvement over the past but it might be improved more
7) Pavement condition
8) Lack of adequate utilities and access
9) Airport operates at financial loss
10) Cost of operation
11) Financial sustainability; Airport operating deficits; limited ability to fund Airport projects

12) Helicopter parking areas
13) Airline passenger pickup
14) Lack of available terminal area space
15) Limited Airport land base
16) Airport land size limits ability to generate non-aviation revenue

SWOT OPPORTUNITIES:

1) Growth in area around Airport
2) Growing local population; demographic changes with baby boomers and millennials
3) Collaborative partners willing to participate in supporting the Airport
4) Marketing to neighbor cities
5) Ground transportation to surrounding communities – Chelan, Leavenworth, Quincy, Methow Valley
6) New airline service; flight frequency, additional direct airline flights to other destinations
7) Increased enplanements/load factor
8) Air package services
9) Advertising to increase passenger numbers
10) Growing tourism/outdoor recreation opportunities; now on the radar
11) Highlight local attractions at Airport
12) Air tourism – rides
13) More aviation-related/dependent business
14) Surrounding industrial lands
15) Real estate development (business park)
16) Business development is more general aviation; and now commercial use
17) Executive Flight building
18) General aviation maintenance
19) New hangar space

SWOT THREATS:

1) Ground transportation to surrounding communities – Chelan, Leavenworth, Quincy, Methow Valley
2) Drive proximity to Seattle-Tacoma International Airport (SEA)
3) Limited airline flight frequency to-and-from Seattle (SEA)
4) Limited airline destinations; consider California
5) Airline flight timing – connections
6) Controlling land uses surrounding the Airport

7) Encroachment of incompatible land uses (housing) translates into actual conflicts, complaints
8) Aircraft non-movement areas
9) Regional competition
10) Pilot shortage
11) Flight cancellations due to weather
12) Loss of commercial airline service
13) Reduced convenience for travelers
14) Ridership changes; other transport options – shuttle/rail/drive
15) Declining general aviation sector
16) Wenatchee terrain; limits approach minimums -- ability to change or improve
17) Passenger levels and the ability to justify more scheduled airline service

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PANGBORN MEMORIAL AIRPORT

CHAPTER 1
Airport Inventory & Environmental Overview

CHAPTER 1 - AIRPORT INVENTORY

CHAPTER OVERVIEW

The inventory documents the Pangborn Memorial Airport's ("Airport") facilities, services, and conditions used to establish the informational basis for recommendations made throughout the Airport Master Plan ("Plan"). Project information was collected through a review of Airport records, published data, and interviews conducted as part of on-site inspections to verify the status and condition of Airport facilities.

The Inventory Chapter is arranged in the following sections:

1) Airport Overview
2) Airfield and Airspace Facilities
3) Terminal / Landside Facilities and Support Services
4) Meteorological Conditions
5) Airport Land Use and Regulations
6) Airport Economic Profile
7) Environmental Overview
8) Financial Overview
9) Inventory Chapter Summary

1. AIRPORT OVERVIEW

This Section provides an understanding of the Airport's operational characteristics.

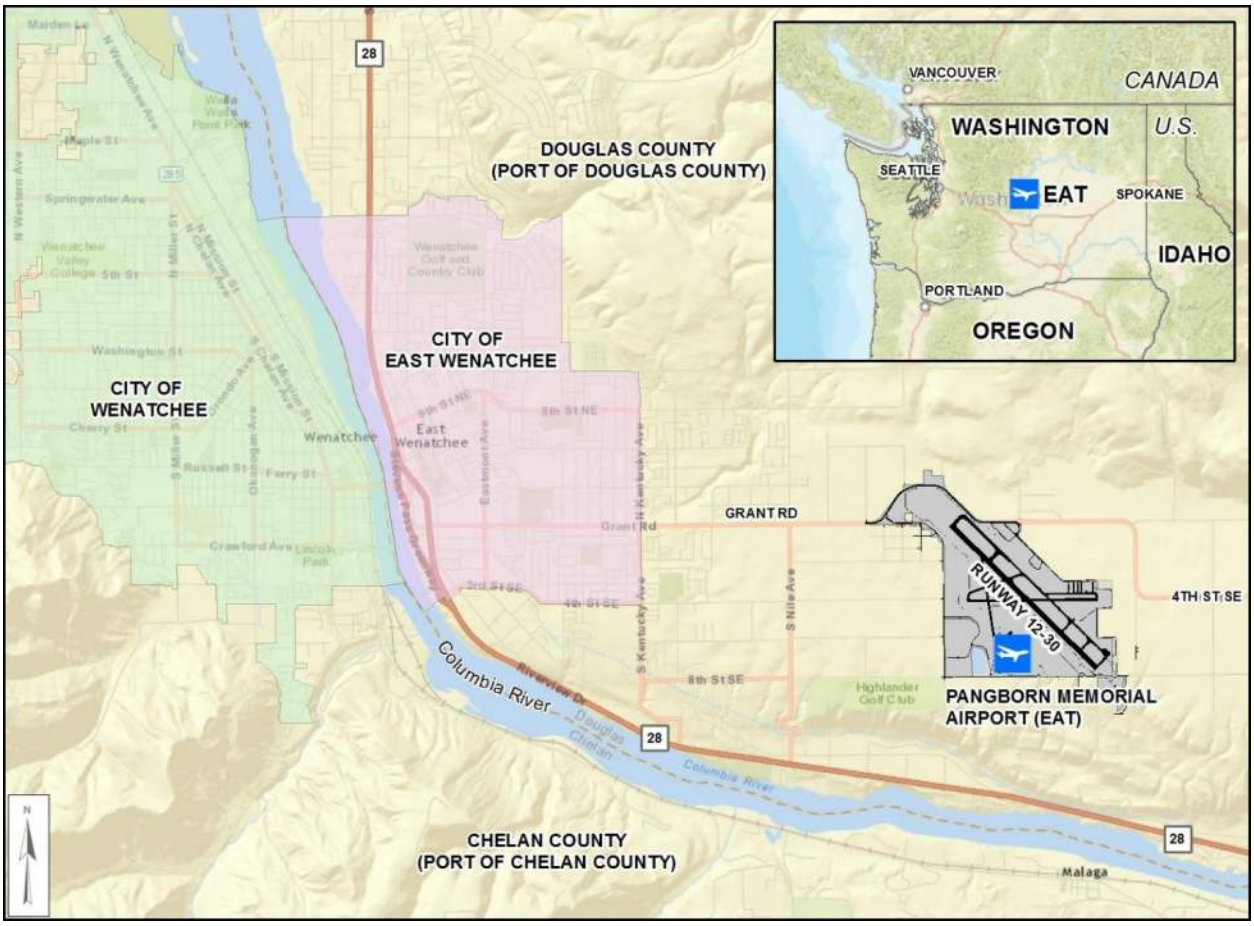
1.1 AIRPORT LOCATION

Exhibit 1.1 depicts the Airport location and geographic proximity in relation to surrounding roadways, population centers, and city limits. The Airport is located in unincorporated Douglas County, situated southeast of the cities of Wenatchee and East Wenatchee. The Airport's primary roadway access is along an east-west corridor, via Grant Road.

1.2 AIRPORT GOVERNANCE

The Airport is owned jointly by the Port of Chelan County and the Port of Douglas County. The Ports operate and manage the Airport under a Joint Operating Agreement, which establishes an Airport Governing Board for providing administrative oversight. The day-to-day operations are managed by a full-time Airport Director and supporting staff, reporting to the Governing Board.

Exhibit 1-1: Airport Location & Vicinity



Source: Mead & Hunt GIS Mapping

1.3 AIRPORT ROLE AND CLASSIFICATION

Table 1.1 describes the key Airport facility and operational attributes. The Airport is a public-use facility accommodating scheduled commercial air carrier passenger service, commercial air cargo, general aviation, and military activity. The Airport is included in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) and classified as a primary non-hub commercial service facility, thus making the Airport eligible to receive Federal Airport Improvement Program (AIP) grants. The Airport is certified by the FAA as a Class I FAA Part 139 facility, which means that it maintains facilities and services intended to serve scheduled passenger aircraft with 30 or more passenger seats.

The Washington State Department of Transportation (WSDOT) classifies the Airport as a 'Commercial Service' facility and is designated as an "Essential Public Facility" pursuant to Revised Code of Washington 36.70A.200. The airfield facilities are intended to accommodate an aircraft fleet representative of narrow-body commercial jet transports and medium to large-cabin general aviation business jets.

Table 1-1: Airport Overview

Airport Attributes	Description
Airport Owner	Port of Chelan County and Port of Douglas County
FAA NPIAS Airport Classification	Primary Commercial Service (Non-Hub)
	Site Number: 26461.A
FAA Part 139 Certification	Class 1
FAA Part 139 ARFF Index	Category 'A'
FAA Airport Reference Code (ARC)	C-III
Critical / Demanding Aircraft	Bombardier Q400 Turboprop
WSDOT Airport Category	Commercial Service
Airport Traffic Control Tower	None
Airport Property	±698 Acres (Total Fee Property Interests)
Navigational Aids	ILS, RNAV (RNP), VOR/DME Station
Weather Station Observations	Automated Surface Weather Observation Service (ASOS)
Aeronautical Communications	Approach/Departure Control (Seattle ARTCC)
	Remote Communications Outlet

Note: See Appendix for list of acronyms.
Sources: FAA Publications and Airport Records Obtained June, 2015.

1.4 AIRPORT AVIATION ACTIVITY

Activity Overview

In 2015, the Airport processed approximately 120,000 air carrier passengers (62,000 enplaned passengers), experienced 40,700 aircraft operations, and is the domicile for 104 based aircraft. Aircraft operational traffic, as a non-towered facility, are estimates as obtained from FAA published records. The Airport is the 6th busiest commercial service airport in the State of Washington.

Air Carrier Passenger Enplanements: Number of passengers (revenue and non-revenue) boarding a scheduled commercial flight; excludes pilot and crew members.
Aircraft Operations: The count of aircraft takeoffs and landings, classified as local (aircraft took off and landed at the same airport) and itinerant (aircraft took off and landed at different airports).
Based Aircraft: Aircraft stored at the Airport in either hangars or tie-downs; excludes temporary visiting aircraft or registered at another airport.

Airport Activity/Runway Utilization

Table 1.2 summarizes operational activity as conducted by user category, operational type, and runway end. Of the total 40,749 annual aircraft operations, nearly 6,000 are commercial air carrier and cargo operations (15 percent of total operations) and 35,000 (85 percent) are general aviation operations. Itinerant operations account for nearly 40 percent of the traffic and local operations 60 percent, with local traffic attributed largely to US Forest Service firefighting activities. Wind data suggests that Runway 30 captures about 75 percent of arrival and departure traffic, and Runway 12 about 25 percent.

Table 1-2: Airport Activity Summary (2015 Baseline Year)

Aircraft Operations	Airport Total	Airport Percent	Runway 12 (Operations)	Runway 12 (% Operations)	Runway 30 (Operations)	Runway 30 (% Operations)
TOTAL	**40,749**	**100.0%**	**9,894**	24.3%	**30,856**	75.7%
Operational Type						
Itinerant Operations	15,628	38.4%	**3,614**	23.1%	**12,015**	76.9%
Scheduled Air Carrier	2,030	5.0%	406	20.0%	1,624	80.0%
Other Commercial/Cargo	3,840	9.4%	768	20.0%	3,072	80.0%
General Aviation	9,658	23.7%	2,415	25.0%	7,244	75.0%
Military	100	0.2%	25	25.0%	75	75.0%
Local Operations	25,212	61.9%	**6,280**	24.9%	**18,841**	74.7%
General Aviation	25,121	61.6%	6,280	25.0%	18,841	75.0%
Military	0	0.0%	0	0.0%	0	0.0%

Note: Traffic estimated from Airport data provided to FAA. Percent runway arrival and departure traffic estimated from wind data information in consideration of users, aircraft size and operating conditions. Closed crosswind Runway 7-25 excluded.
Source: FAA published data, Airport activity records, Wind observation data, Airport Staff estimates (July 2016).

The following summarizes activity by user category:

Scheduled Air Carrier: Commercial air carrier service is provided by Alaska Airlines using the 76-seat Bombardier Q400 turboprop aircraft, operating up to three daily nonstop flights to the Seattle-Tacoma International Airport (SEA). In 2015, Alaska Airlines conducted 2,200 aircraft arrival and departure operations, carried 120,175 total passengers, with monthly enplanements ranging from 8,000 to 11,300 passengers.

Scheduled Air Cargo: Air cargo is conducted by three carriers, including Empire Airlines (contracted by FedEx), Ameriflight (contracted by UPS), and Alaska Airlines, each operating propeller aircraft including the Beechcraft Model 99, Swearingen Merlin 3, Fairchild Dornier SA-227DC Metro, Cessna 208 Caravan, and the Bombardier Q400. In 2015, the dedicated air cargo operator activity accounted for 2,950 annual aircraft operations and totaled 1.27 million cargo pounds (freight, packages, mail) transported to and from the Airport.

General Aviation: General aviation accounts for nearly 35,000 annual operations, or 87 percent of the total Airport traffic, as comprised of 90 percent by fixed-wing aircraft and 10 percent helicopters. Nearly 72 percent of operations are conducted by piston-engine aircraft, 12 percent by turboprops, 6 percent by business jets, and 10 percent helicopters. There are 104 based aircraft, including 82 single-piston engine, 6 multi-piston, 2 business jets, and 3 helicopters. There are 9 based sailplane gliders and 2 ultralights.

United States Forest Service (Firefighting) Activity: The US Forest Service (USFS), with an on-Airport Central Washington Interagency Communications Center, engages in aerial firefighting, rescue/rappelling activities, and multiple-agency fire dispatch services. The USFS conducts between 1,000 and 7,500 annual operations, depending on the severity of the fire season. The peak fire season typically occurs between mid-June and September. Although not permanently based at EAT, the USFS operates helicopter and fixed-wing aircraft, commonly the Bell 204/205/206/210, Kaman K-Max, Sikorsky S-61/S-64, Eurocopter AS350, Cessna 337/340, Aero Commander, and Beechcraft King Air.

Agricultural Operations: The aviation agricultural activities are mostly linked with the fruit industry, with general aviation aircraft used to spray, monitor produce production, and extensive helicopter activity associated with displacing water build-up on the cherry crop. The agricultural activity totals 2,500 annual operations.

Glider/Sailplane Activity: Gliders (sailplane plus fixed-wing tow plane) perform an average of 800 annual operations. Glider operations are staged along the east-side hangar area.

Military: The military conducts 100 annual operations. These operations are primarily performed by helicopters.

1.5 SURROUNDING AIRPORTS

Airports provide various facilities and services which uniquely distinguishes operational capabilities. An understanding of these factors provides insight into an airport's service role and ability to accommodate aviation demand.

Factors that make EAT unique when compared to surrounding airports (described below) include:

1) scheduled passenger and cargo service;
2) proximity to the population and employment centers of Wenatchee and East Wenatchee;
3) longer, wider, stronger runway;
4) presence of precision ILS instrument approach;
5) 24 hour on-call pilot and aircraft services (fuel) and amenities, and;
6) aircraft fire and rescue service.

Surrounding public-use airport characteristics:

Lake Chelan Airport (S10)

- Owner: City of Chelan / Port of Chelan County
- Longest Runway / Instrument Procedures: Paved 3,503' x 60': 12,000 Lbs. / None
- Activity: 47 based aircraft | Services: FBO, fuel

Waterville Airport (2S5)

- Owner: Port of Douglas County (Port of Douglas County also owns the Mansfield Airport - 84W)
- Longest Runway / Instrument Procedures: Paved 2,978' x 50': 5,000 Lbs. / None
- Activity: 13 based aircraft | Services: None

Cashmere-Dryden Airport (8S2)

- Owner: Chelan County
- Longest Runway / Instrument Procedures: Paved 1,800' x 50': 8,000 Lbs. / None
- Activity: 40 based aircraft | Services: Aircraft maintenance

Quincy Municipal Airport (80T)

- Owner: City of Quincy
- Longest Runway / Instrument Procedures: Paved 3,660' x 50': NA / None
- Activity: 6 based aircraft | Services: None

1.6 AIRPORT HISTORY

Founded in 1941, the Airport is named for the historic achievement of Clyde Pangborn, who in 1931 became the first person along with co-pilot Hugh Herndon to fly non-stop across the Pacific Ocean intending to land in Seattle, Washington but instead landed in East Wenatchee due to fog. In 1945 Northwest Airlines initiated the Airport's first commercial air service. Originally operated under the City of Wenatchee ownership, the Airport was transferred to the Port of Chelan County in 1965.

In 1974, the Port of Douglas County became a co-sponsor, as further recognition to the regional importance and economic benefit on the surrounding area. Significant developments include a new passenger terminal building constructed in 1992, the establishment of west side hangar and business park developments in the late 1990's, substantial executive hangar construction through the 1990's, the extension of Runway 30 and installation of an instrument landing system (ILS) in 2006, and a 1,300-foot Runway 12 extension in 2016.

2. AIRFIELD AND AIRSPACE FACILITIES

This section summarizes Airport assets to quantify facility size, infrastructure condition, and note operational deficiencies. The airfield facilities include the runway, taxiway, and navigational aid systems directly used to support aeronautical activities. Exhibit 1.2 illustrates the airfield layout and runway configuration.

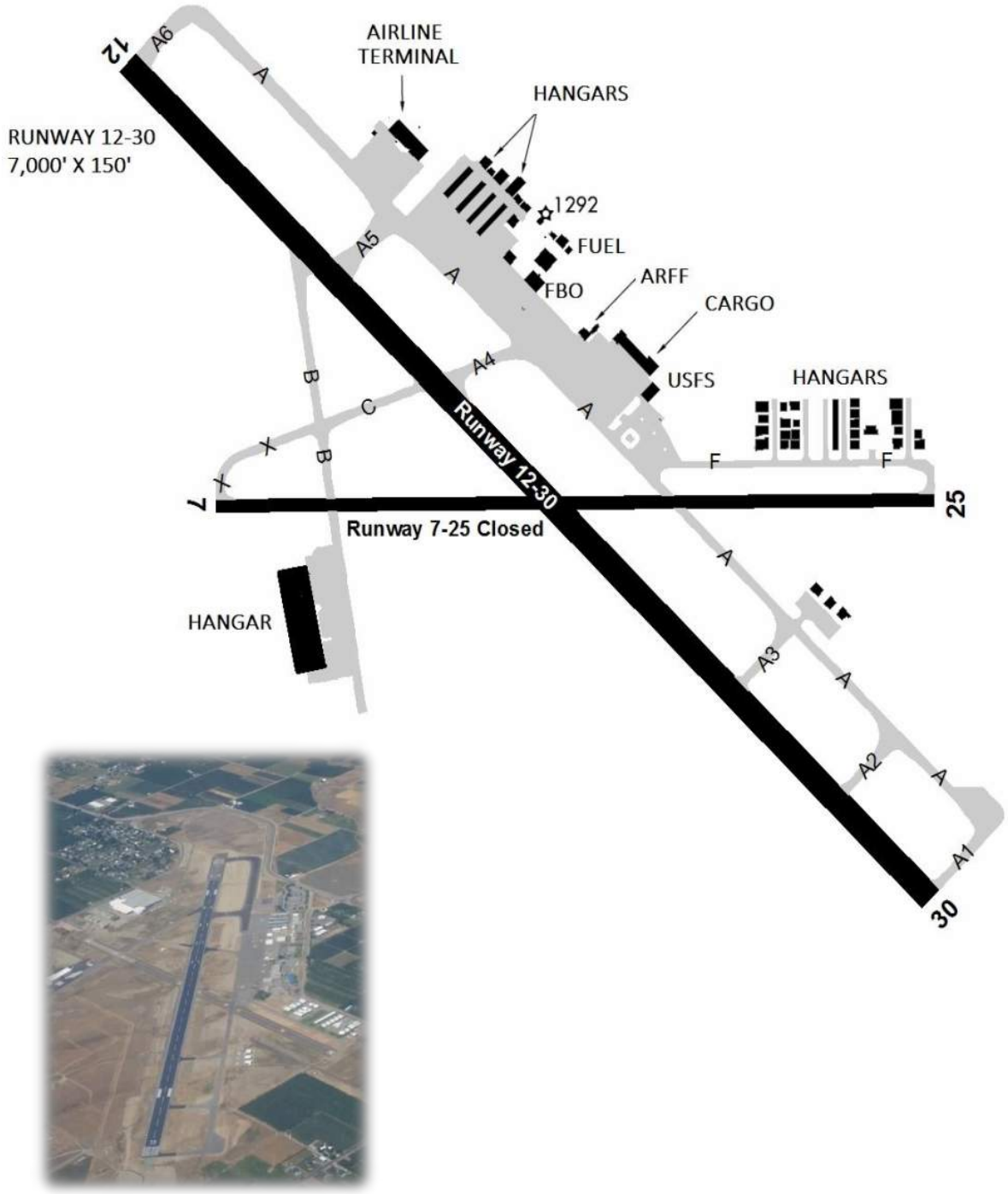
2.1 AIRFIELD FACILITIES

The following describes the runway and taxiway systems:

Runway System: The airfield comprises of a single runway aligned in a northwest-southeast orientation. Runway 12-30 is 7,000' x 150' (extended 1,300' to the northwest in 2016) and has precision instrument capabilities. The former 4,460' x 75' visual crosswind Runway 7-25 was closed in 2009 due to deteriorating pavement condition (the crosswind runway facility information is included as part of the inventory data for master plan assessment considerations). Table 1.3 summarizes the runway facilities, equipment, and standards per runway end.

Taxiway System: The taxiway system totals nearly 16,000 linear feet, and consists of a full-length parallel, exits, and connectors ('A', 'B', 'C', and 'F') to support the ingress and egress of aircraft between the runway and terminal area facilities. The airfield taxiway configuration was previously developed to serve the former three-runway system, with taxiways sections subsequently re-purposed or closed. In 2016, Taxiway 'A' segments were reconfigured as part of the parallel taxiway extension associated with the Runway 12-30 extension. Table 1.4 summarizes details of the taxiway system, facilities, and equipment capabilities.

Exhibit 1-2: Airport Diagram



Note: Runway 7-25 is closed until further notice due to pavement deterioration.
Source – Aerial: FAA Photo Source (August, 2016).
Source – Airport Diagram: FAA Airport Facility Directory (Modified by Mead & Hunt).

Table 1-3: Runway Facilities and Equipment

RUNWAY SYSTEM				
Facility Component	**Runway 7-25 (Crosswind)**		**Runway 12-30 (Primary)**	
	Runway End 7	**Runway End 25**	**Runway End 12**	**Runway End 30**
Runway Design Code (RDC)	A-I (Small Aircraft)		C-III (Large Aircraft)	
Taxiway Design Group (TDG)	Group 1A		Group 5 (FAA Standard)	
Critical Planning Aircraft	Single Engine Piston		Regional Transport Turboprop	
Design Aircraft	Beech Bonanza 36		Bombardier Q400	
Runway Length x Width	4,460’ x 75’		7,000’ x 150’	
Runway Type	Crosswind		Primary	
Runway Shoulder Width	±30' Asphalt Width Varies		±20' Asphalt Width Varies	
Runway Blast Pad	None	None	150' x 200'	None
Runway Displaced Threshold	None	None	None	None
Stopway Distance	None	None	None	None
Land & Hold Short (LASHO)	None		None	
In-Line Taxiway	None	None	None	None
Pavement Surface Course	Asphalt (Not Grooved)		Asphalt (Grooved)	
Pavement Markings	Basic		Precision	
Distance-to-Go Markers	No	No	Yes	Yes
Pavement Strength - Pounds (Aircraft Gear Type)	77,000 (DWL) 136,000 (DTWL)		100,000 (DWL) 250,000 (DTWL)	
Runway Edge Lights	None		High Intensity (HIRL)	
Runway Visibility Range (RVR)	No	No	None	None
Runway Lighting Systems	None	None	PAPI-4L, REIL	PAPI(P2L), RAIL, REIL
Runway Instrument Approaches	Visual	Visual	ILS, RNAV (RNP), VOR/DME	RNAV (RNP), VOR/DME
Approach Minimums (Lowest)	N/A	N/A	1-Mile / 318’ (A, B, C)	1-Mile / 391’ (A, B, C)
RUNWAY NAVIGATIONAL AID SYSTEMS				
Navaid Systems (On-Airport)	ILS, RNAV (RNP), VOR/DME			

Note: Runway 12-30 extended from 5,700’ to 7,000’ in 2016.
Note: Runway 7-25 is closed until further notice due to pavement deterioration; facility data included for inventory purposes.
Note: See Appendix for definitions and acronyms.
Source: FAA Form 5010-1; FAA Instrument Procedures; EAT ALP Drawings.

Table 1-4: Taxiway Facilities and Equipment

TAXIWAY SYSTEM				
Taxiway Segment	**TWY 'A'**	**TWY 'A-1'**	**TWY 'A-2'**	**TWY 'A-3'**
Type	Parallel	Entrance	Exit/Connector	Exit/Connector
Dimension (Length x Width)	6,935’ x 50' to 75’	440’ x 50’	440’ x 50’	440’ x 50’
Runway Design Code (RDC)	C-III/IV	C-III	C-III	C-III
Taxiway Design Group (TDG)	3 to 5	3	3	3
Paved Shoulder Width	Partial Stabilized	No Shoulder	No Shoulder	No Shoulder
Pavement Surface Course	Asphalt	Asphalt	Asphalt	Asphalt
Edge Lighting	MITL	MITL	MITL	MITL
Pavement Strength (Gear Type)	250,000# (DTWL)	250,000# (DTWL)	250,000# (DTWL)	250,000# (DTWL)
Runway-Taxiway CL Separation	540’	--	--	--
Hold Short Separation	--	250’	250’	250’
Taxiway Signs	Yes	Yes	Yes	Yes
Taxiway Segment	**TWY 'A-4'**	**TWY 'A-5'**	**TWY 'A-6'**	**TWY 'B'**
Type	Exit/Connector	Exit/Connector	Entrance	Connector
Dimension (Length x Width)	480’ x 50’	428' x 75'	428’ x 75’	2,725’ x 50’
Runway Design Code (RDC)	C-III	C-III/IV	C-III/IV	C-III
Taxiway Design Group (TDG)	3	5	5	3
Paved Shoulder Width	No Shoulder	No Shoulder	---	5' (Asphalt)
Pavement Surface Course	Asphalt	Asphalt	Asphalt	Asphalt
Edge Lighting	MITL	MITL	MITL	MITL
Pavement Strength (Gear Type)	250,000# (DTWL)	250,000# (DTWL)	250,000# (DTWL)	250,000# (DTWL)
Runway-Taxiway CL Separation	--	--	--	--
Hold Short Separation	250’	250’	--	250’
Taxiway Signs	Yes	Yes	Yes	Yes
Taxiway Segment	**TWY 'C'**	**TWY 'F'**	**--**	**--**
Type	Connecting	Partial Parallel	--	--
Dimension (Length x Width)	655’ x 50’	1,680’ x 35’	--	--
Runway Design Code (RDC)	C-III	A/B-I	--	--
Taxiway Design Group (TDG)	3	2	--	--
Paved Shoulder Width	No Shoulder	No Shoulder	--	--
Pavement Surface Course	Asphalt	Asphalt	--	--
Edge Lighting	MITL	MITL/Reflectors	--	--
Pavement Strength (Gear Type)	250,000# (DTWL)	136,000# (DTWL)	--	--
Runway-Taxiway CL Separation	--	220'	--	--
Hold Short Separation	250’	125'	--	--
Taxiway Signs	Yes	No	--	--

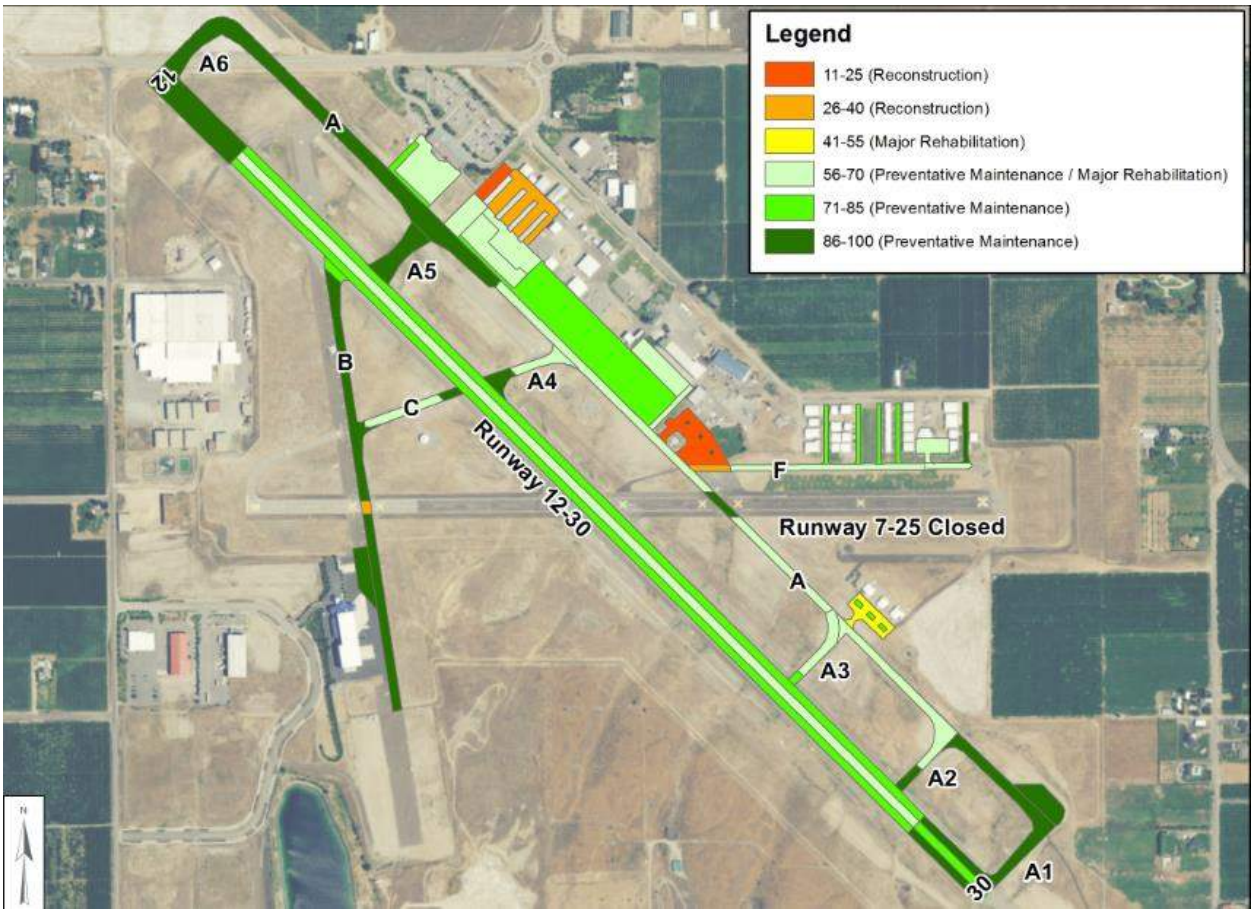
Note: Taxiway 'A' section between A5 and A6 is 75' wide with stabilized shoulders.
Note: Pavement strength obtained from FAA Form 5010-1, Airport Pavement Design.
Source: FAA 5010 Form, FAA AVN Publications, Aerial Mapping.

2.2 AIRFIELD PAVEMENT CONDITIONS

Exhibit 1.3 depicts the airfield pavement conditions and rated values based on the latest Pavement Condition Index (PCI) inspection. Pavement maintenance represents one of the largest airport capital investments, and is monitored using the PCI, which is the standard system for visual analysis of airport surface distresses.

The PCI, which is conducted by WSDOT about every five years, assesses usable runway, taxiway, and apron pavement rated in numerical terms, ranging from 100 (excellent) to 0 (failed), and indexed by color-code to correspond with the types of pavement repairs anticipated. The airfield pavement areas total 3.0 million square feet (excludes the closed Runway 7-25 that was not evaluated). As of 2012 PCI, nearly 58 percent of pavement areas were rated as 'preventative maintenance', 36 percent 'major rehabilitation', and 6 percent 'reconstruction'.

Exhibit 1-3: Airfield Pavement Condition Index – PCI (2012 Pavement Inspection)

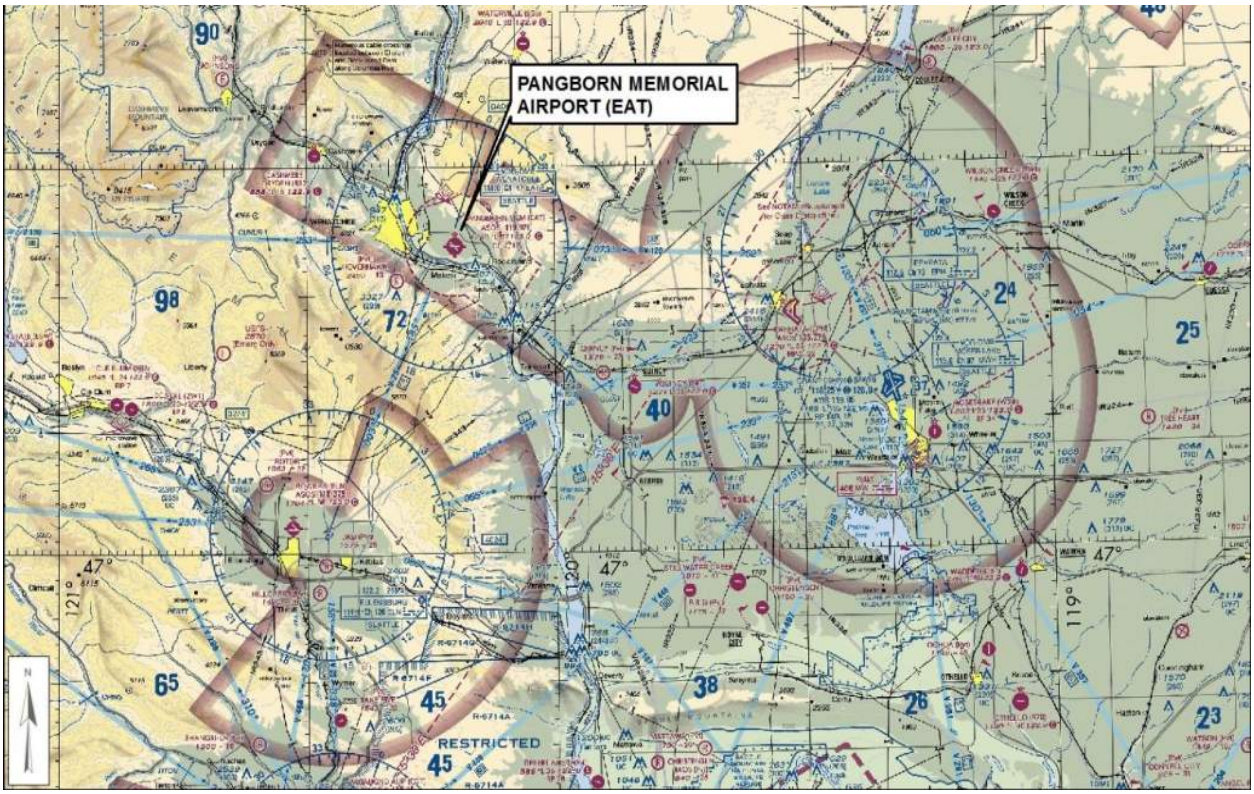


Note: Runway 7-25 was not included in PCI Study; runway closed until further notice due to pavement deterioration.
Note: Runway 12-30 extension was not included in PCI Study, but is assumed to be in good condition due to recent construction.
Source: Washington DOT (WSDOT Aviation), Airport Pavement Management Database (2012). Revised by Mead & Hunt (2016).

2.3 AIRSPACE SYSTEM

Exhibit 1.4 shows the aeronautical chart for the surrounding airspace structure, navigational routes, and public use airports. The Airport is within FAA Class G airspace, bordered by Class E airspace, which is controlled and uncontrolled airspace configured to contain instrument flight procedures at non-towered facilities. The Class E airspace control zone contains the instrument approach and departure procedures, which also inter-connects with the Class E airspace associated with the Quincy (80T), Ephrata (EPH), and Moses Lake (MWH) Airports. Air traffic control services within the Airport vicinity are provided by the Seattle Air Route Traffic Control Center (ARTCC), with the Seattle Flight Service Station (FSS) providing flight planning and advisory services. The surrounding airspace does not contain any designated restricted or special-use airspace, other than traffic patterns reserved for nearby public and private airports. The EAT VOR Station provides multiple civilian airway routes for visual and low-level instrument flight conditions, and also supports the Airport's instrument approach and missed approach procedures.

Exhibit 1-4: Aeronautical / Airspace Chart



Source: Federal Aviation Administration Website; Obtained August, 2016.

Airport Air Traffic Pattern

The Airport publishes a standard left-hand traffic pattern for Runway 30 and a right-hand traffic pattern for Runway 12, in which the non-standard patterns are established on Runways 12 to provide greater separation from higher terrain to the northeast and to avert traffic pattern conflicts with glider and other utility aircraft traffic. Gliders landing on Runway 12-30 must plan their landing and rollout and expedite clearing the runway. No gliders are permitted to takeoff or land with an aircraft on final approach.

Powered aircraft and glider right of way procedures are as follows:

1) emergency operations,
2) air carrier (Alaska Airlines) operations,
3) powered aircraft, and
4) glider operations.

A radio-controlled flying strip is located 1.5 miles east of the Airport.

2.4 INSTRUMENT PROCEDURES

Table 1.5 identifies the Airport's instrument approach procedures by type, allowable aircraft categories, and lowest approach minimums. The Airport has six instrument approach procedures, four to Runway 12 and two to Runway 30. Runway 12 provides precision procedures with the lowest approach minimums. The surrounding terrain extending beyond the runway ends impacts the instrument approach and obstacle departure procedures, resulting in higher than standard minimums. The higher minimums affect Airport flight schedule reliability. Alaska Airlines has established propriety RNAV instrument approach procedures separate from those published by the FAA in order to achieve lower FAA published Airport minimums.

Precision: Horizontal and vertical guidance.
Non-Precision: Horizontal guidance only.
Minimums: The lowest visibility/altitude at which the procedure is still valid.
Obstacle Departure: A flight procedure to keep aircraft clear of known obstacles on departure.

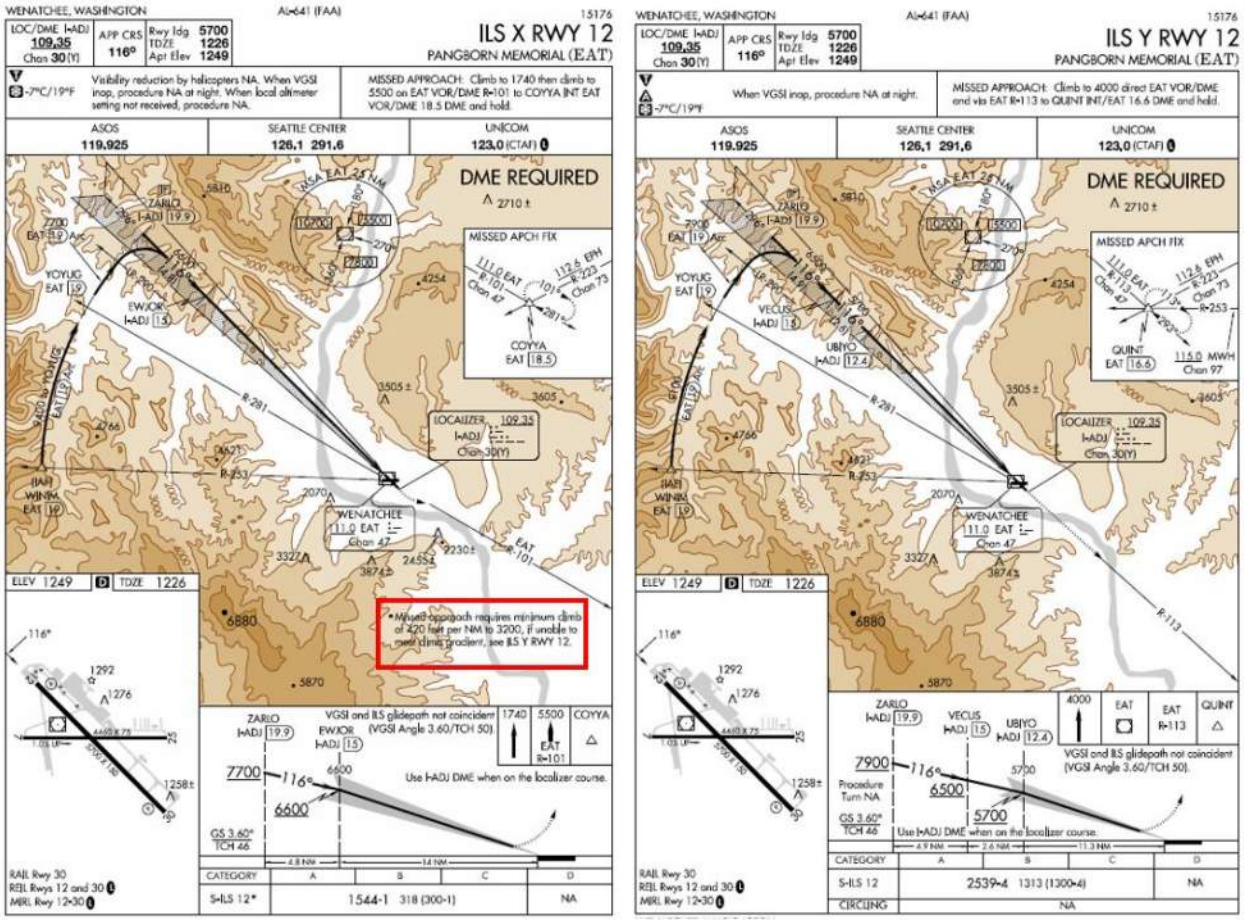
Table 1-5: Instrument Approach Procedures

Runway End	Procedure	Procedure Type	FAA Aircraft Categories	Minimum Descent Altitude (Feet AGL)	Visibility Minimums (Statute Mile)
12	ILS X	Precision	A, B, C	1,544'	1
	ILS Y	Precision	A, B, C	2,539'	4
	RNAV (RNP)	Non-Precision	A, B, C, D	1,995'	2¾
		Non-Precision	A, B, C, D	2,071'	3
		Non-Precision	A, B, C, D	2,368'	4
	VOR/DME-C	Non-Precision	A	2,660'	1¼
		Non-Precision	B	2,660'	1½
		Non-Precision	C, D	2,660'	3
30	RNAV (RNP)	Non-Precision	A, B, C	1,623'	1
		Non-Precision	A, B, C	1,674'	1¼
		Non-Precision	A, B, C	1,728'	1½
	VOR/DME-A	Non-Precision	A	3,180'	1¼
		Non-Precision	B	3,180'	1½
		Non-Precision	C, D	3,180'	3

ILS: Instrument Landing System, RNAV(GPS): Area Navigation (Required Navigation Performance)
VOR/DME: VHF Omni-Directional Range/Distance Measuring Equipment | AGL: Above Ground Level
Note: Does not include Alaska Airlines proprietary instrument approach procedures
Source: FAA Terminal Procedures Publication, May 2016.

Exhibit 1.5 shows the instrument approach procedures for the precision instrument landing system (ILS), which includes the ILS X and ILS Y procedures. The ability of the aircraft to meet climb rates as part of the missed approach procedure dictates the ability to execute either the ILS X or Y approach, which provides differences in instrument approach minimums.

Exhibit 1-5: Instrument Approach Procedures (Precision)



Source: Federal Aviation Administration Published Approaches; Obtained August, 2016.

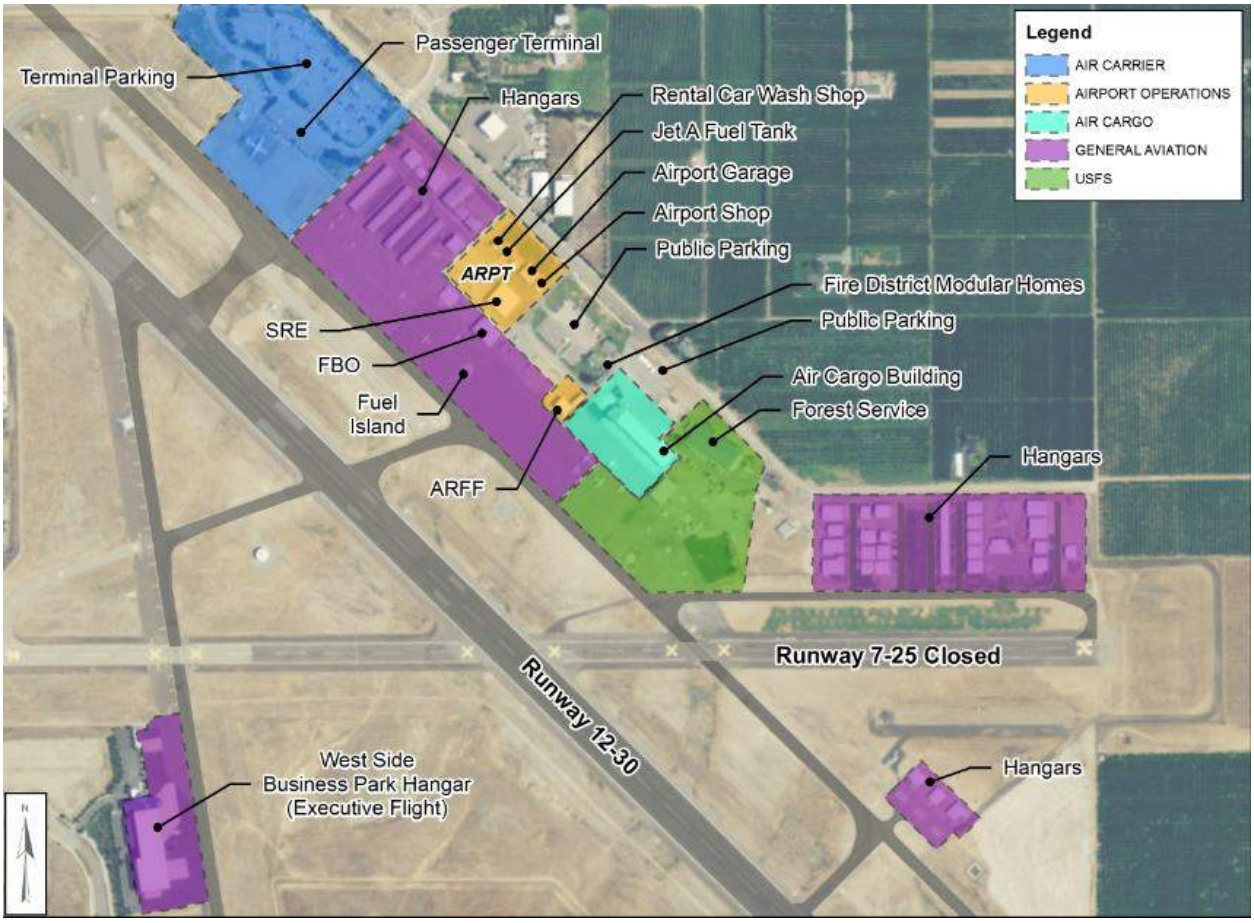
3. TERMINAL AND LANDSIDE FACILITIES AND SUPPORT SERVICES

As illustrated in Exhibit 1.6, the landside facilities occupy 70 acres, with terminal facilities predominately situated in the northeast quadrant of the Airport. The northeast landside area is confined between the airfield and Airport Way Road, with the aircraft parking aprons situated between Taxiway 'A' and the flightline buildings. Nearly 85 percent of the available flightline is occupied by buildings and facilities, with limited expansion capabilities.

The following are the landside space allocations, by major user component:

- Air Carrier Facilities
- Airport Operations and Support Facilities
- Air Cargo Facilities
- General Aviation/Tenant Facilities
- US Forest Service (USFS)

Exhibit 1-6: Terminal Facility Locations



Source: GIS Mapping (Photo Dated July, 2015).

3.1 AIR CARRIER FACILITIES

The air carrier facilities occupy 10 acres, consisting of the airline passenger terminal building, aircraft apron, and vehicle parking lot facilities. The air carrier facilities are physically separated from other aviation related facilities, which provides a self-contained secured area. Exhibit 1.7 depicts the location of the air carrier facilities, including the vehicle parking lot allocations (lots A, B, C and D).

Exhibit 1-7: Air Carrier Facility Locations (Terminal Building, Apron, Auto Parking Lots)

Source: GIS Mapping (Photo Dated July, 2015).

Passenger Terminal Building

The commercial passenger terminal building is 19,000 square-foot, a single-story structure constructed in 1992. The building provides airline and passenger processing facilities, and accommodates the Transportation Security Administration (TSA), rental car tenants, a restaurant and food vending area, and the Airport administrative and operations offices.

The terminal building structure is in good condition with adequate mechanical systems. The building exterior consists of board-formed concrete, with floor-to-ceiling aluminum framed storefront windows and sliding doors, and a gable type standing seam metal roof. The building interior, designed with a mixture of wood concrete and steel structure, is arranged in a linear fashion along a common hallway, which provides a center corridor for the sequential processing of departing and arriving passengers.

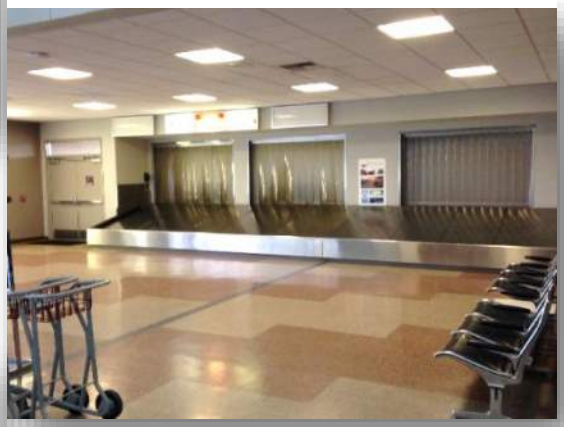
The secured building areas consist of a single passenger security screening checkpoint (SSCP), a secured passenger departure hold room with 105 seats, air carrier gate counter positions, separate women and men restrooms, and air carrier and TSA operating areas. The passenger departure lounge has three at-grade gate-door access points (no passenger loading bridge), with the middle door currently used for scheduled airline service. Deplaned passengers enter the building through a dedicated entryway.

The building was designed for handling passengers prior to the advent of current FAA/TSA passenger and baggage security directives, which presents some operating and level of service challenges.

Exhibit 1.8 illustrates the terminal building floorplan configuration. Table 1.6 lists the terminal building function areas, space allocation and level of service.

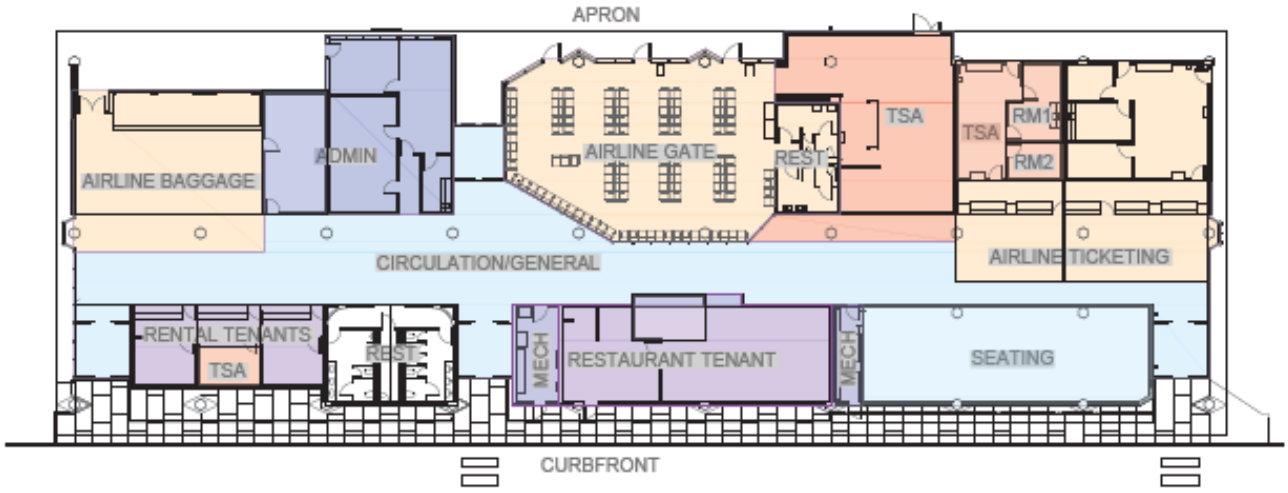
Building Landside Entrance

Passenger Baggage Claim



Passenger Departure Lounge

Exhibit 1-8: Air Carrier Terminal Building Floorplan Diagram



Source: Airport Records, DOH Associates base terminal building drawing, modified by Mead & Hunt, July 2016.

Table 1-6: Terminal Building Functional Areas

BUILDING TOTALS - BY FUNCTIONAL AREAS

Airline Operations/Passenger Processing	Seating	% Building Area (SF)	Building Area (SF)
Airline Operating Areas	98	32%	6,085
Transportation Security Administration (TSA)	--	13%	2,345
Non-Airline Operating Space	**Public Seating**	**% Building Area (SF)**	**Building Area (SF)**
Airport Administrative / Facilities	--	10%	1,910
Tenant Lease Space (Rental Cars, Restaurant, Advertising)	16	11%	2,040
General Circulation - Foyer	76	34%	6,370
TOTAL	**190**	**100%**	**18,750**

Source: Airport Site Inspection / Pangborn Memorial Airport Website, Modified; July 2016.

Air Carrier Apron

The air carrier apron is 90,000 square feet (250' x 350') of which 63,000 square feet (180' x 350') is outside of the taxiway safety area. The apron includes two marked parking positions for regional turboprop aircraft but does not provide wingtip separation for simultaneous gate utilization or for aircraft parked overnight. The apron accommodates air carrier ground handling equipment used to service aircraft and passenger processing, in addition to space to allow for fueling and de-icing activities.

Air Carrier Vehicle Circulation and Parking Lots

The terminal building is served by a loop roadway, Pangborn Drive, which connects with Grant Road. The loop road provides three public parking access points, and one access to the administrative lot. The one-way three-lane curbfront provides 225 linear feet of building frontage for the temporary parking for passenger loading and unloading. The passenger terminal parking lot is 148,400 square feet with 379 parking positions. The lot includes areas for short-term, long-term, rental car, and employee/tenant parking. The short and long-term lots are not manned. In order to collect parking revenue, passengers pay a fee at

a kiosk. Combined, the short and long-term passenger lots total 110,400 square feet and 280 parking spaces, with the long-term lot providing 80 percent of the passenger space allocation. The peak public parking revenue month is around March, and the peak rental car revenue month is around August. Table 1.7 quantifies the automobile parking facilities by lot.

Table 1-7: Air Carrier Automobile Parking Lots

Lot and Parking Function	Public Use (Revenue/Lease)	Marked Auto Parking Spaces	Marked Auto Parking Spaces (%)	Parking Area (SF)	Parking Area (% Total)
Short-Term	Public (Revenue)	**45**	**12%**	**24,000**	**16%**
Lot A - Handicap	"	5	--	2,000	--
Lot B	"'	40	--	22,000	--
Long-Term	Public (Revenue)	**235**	**62%**	**86,400**	**58%**
Lot A	"	49	--	21,800	--
Lot B	"	41	--	21,800	--
Lot C	"	100	--	36,000	--
Lot D	"	45	--	36,000	--
Rental Car	Tenant (Leased)	**69**	**18%**	**25,500**	**17%**
Employee/Tenant	Tenant	**30**	**8%**	**12,500**	**8%**
Lot A (Main Lot A)	"	8	--	3,000	--
Lot B (North of Building)	"	22	--	9,500	--
TOTAL	--	**379**	**100%**	**148,400**	**100%**

Note: Parking areas (SF) exclude perimeter circulation roadway system.
Source: On-Site Airport Inspect and Airport Aerial Mapping; June, 2016.

Commercial Ground Transportation Services

Ground transportation services include on-demand taxis, private livery, and hotel shuttles. The Airport is not served by Link Transit, which is a public transit bus service providing year-round scheduled routes and paratransit service for communities in Chelan and Douglas Counties.

3.2 AIR CARGO TERMINAL FACILITIES

The air cargo facilities occupy 3.5 acres, consisting of a sort building, aircraft apron, and vehicle access and parking lot. The air cargo facilities are used by Empire Airlines primarily using turbine aircraft. Alaska Airlines processes belly cargo through the air carrier terminal. The air cargo sort building is 20,000 square feet, which includes office space and sort and storage space accessed from the airside by bi-fold doors. The air cargo apron is 50,000 square feet, with space to accommodate up to three parked aircraft, and maneuvering space for integrated delivery trucks to process the loading and unloading of aircraft cargo. Exhibit 1.9 shows the air cargo location and facilities.

3.3 UNITED STATES FOREST SERVICE (AERIAL FIREFIGHTING TENANT)

The US Forest Service maintains on-airport facilities that support fixed-wing planes and helicopters used by USFS to combat wildfires. The USFS facilities are located immediately south of the apron used by air cargo carriers, and include an administrative building, and paved apron with dedicated helicopter landing pads. The aircraft are used to provide reconnaissance, transport firefighters, deploy smokejumpers, deliver equipment and supplies, and drop fire retardant, in addition to other fire dispatch function supported from

the Central Washington Interagency Communications Center. The larger USFS transports do not operate from the Airport. As reported by the USFS website, the department is highly interested in new technologies and envisions the potential to operate Unmanned Aircraft Systems (UAS) to support a host of natural resource management activities in the future, including forest health protection, wildfire suppression, research, recreational impacts, and law enforcement.

Exhibit 1-9: Air Cargo Facilities

Source: GIS Mapping (Photo Dated July, 2015).

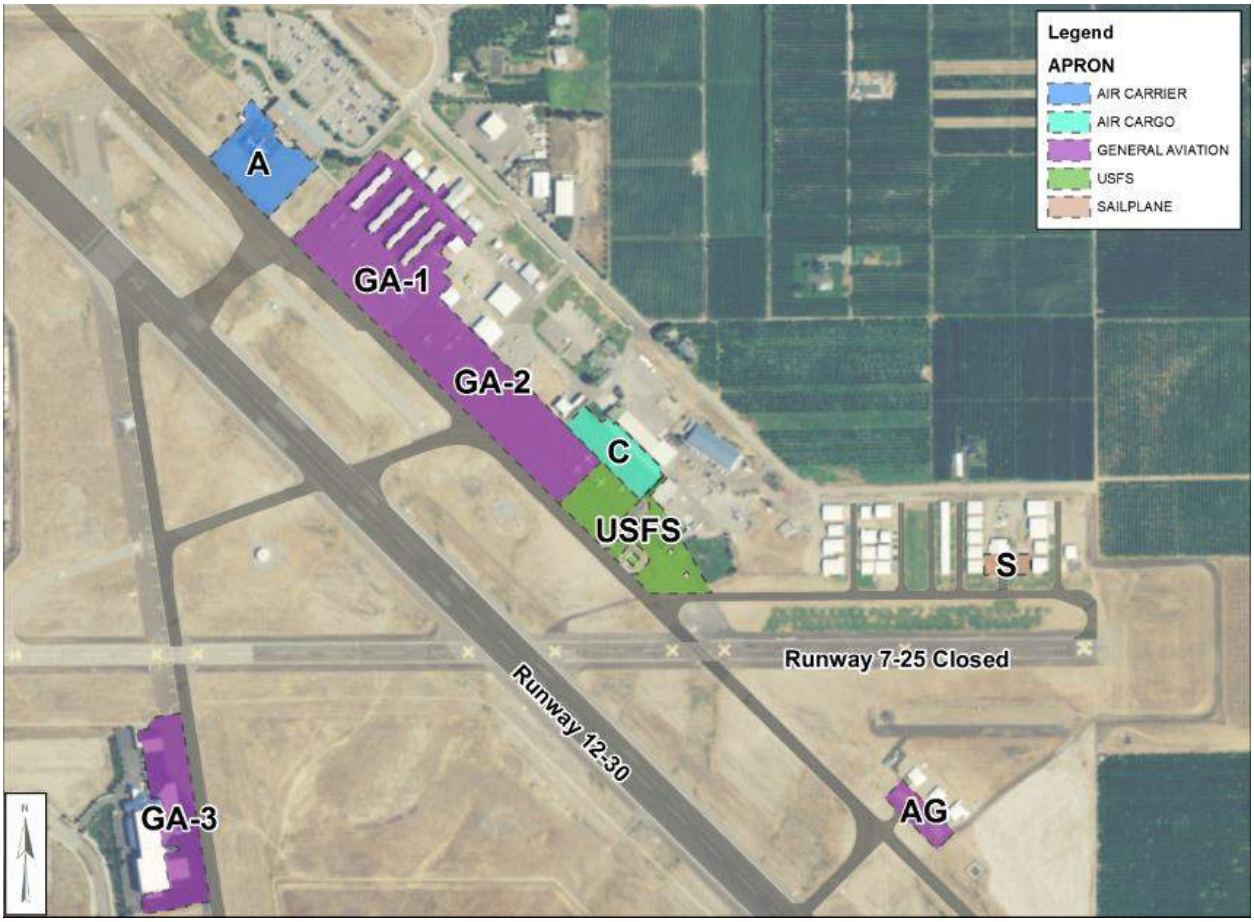
3.4 GENERAL AVIATION TERMINAL FACILITIES

The general aviation facilities, which provide aircraft and pilot services for transient and based users, occupy 50 acres on the east side of the airfield and five acres on the west side. These areas consist of hangars, support buildings, paved aircraft parking areas, and automobile parking occupied by various tenant service providers. The fixed base operator, Pangborn Flight Center, operates from an office-hangar building located along the main general aviation apron, and is managed by the Airport.

The following general aviation services are offered:

- Aircraft Ground Handling/Servicing (FBO Provider)
- Aircraft Fueling - Truck Dispensing and Self-Service (FBO Provider)
- Pilot Amenities / Flight Planning Supplies
- Major and Minor Aircraft Maintenance, Repair, Refurbishment, Aircraft Parts
- Flight Training and Instruction
- Aircraft Rental
- Agricultural (Seasonally Based)
- Glider/Sailplane Soaring (Club)
- Manufacturing of ultralight & light sport aircraft/parachutes
- Reproduction of historic and classic aircraft

Exhibit 1-10: General Aviation Facility Locations



Source: GIS Mapping (Photo Dated July, 2015).

General Aviation Aircraft Parking Aprons

Combined, the two main public-use general aviation aprons total 297,500 square feet and provide 52 marked tie-down/parking positions to accommodate fixed-wing and helicopter aircraft. Aircraft parking aprons are described below in Table 1.8 and shown in Exhibit 1.10.

Table 1-8: General Aviation Aircraft Aprons

Apron Area (Designation)	Apron Function	Apron Dimension	Area (SF)	Pavement Surface	Parking Spaces (Marked Small/Large)
GRAND TOTAL	--	--	**545,750**	--	**62 Tie-Downs - Small** **10+ Tie-Downs - Large**
GENERAL AVIATION PUBLIC USE AIRCRAFT PARKING AREAS					
General Aviation (GA-1 North)	GA Based/Transient Parking; GA Hangar Access	550' x 200'	110,000	Asphalt	28 Tie-Downs - Small
General Aviation (GA-2 Center)	FBO Ramp Parking, Aircraft Fueling, Transient Parking.	750' x 250'	187,500	Asphalt	20 Tie-Downs - Small 4+ Tie-Downs - Large
General Aviation (GA-3 South)	GA Transient Parking, ARFF Access, US Forest Service Overflow.	370' x 350'	80,000	Asphaltic Concrete	12 - Small Aircraft
SUB TOTAL	--	--	**377,500**	--	**60 Tie-Downs - Small** **6+ Tie-Downs - Large**
GENERAL AVIATION TENANT / PROPRIETARY AIRCRAFT PARKING AREA					
Air Cargo Ramp (Part of GA-3)	Air Cargo Aircraft Parking-Ground Handling, Equipment.	380' x 175'	64,750	Asphaltic Concrete	2 - Air Cargo Turboprop
USFS/Firefighting (USFS)	Aircraft Parking and Staging	350' x 150'	60,000	Asphalt	4 - Helicopter Pads Fixed Wing Not Marked
Soaring Club (SOAR)	Aircraft Parking and Staging	90' x 150'	13,500	Asphalt	Parking Positions Not Marked
Agricultural Spray (AG)	Aircraft Parking and Staging	90' x 150'	30,000	Asphalt	Parking Positions Not Marked
SUB TOTAL	--	--	**168,250**	--	**2+ Tie-Downs - Small** **4+ Tie-Downs - Large**

Note: Small Aircraft = Single/Twin Piston Aircraft | Large Aircraft = Turbine/Helicopter Aircraft.
Source: On-Site Airport Inspection and Airport Aerial Mapping; August, 2016.

General Aviation Aircraft Hangars

Hangars are comprised of 39 building structures, consisting of 76 individual storage units and a combined floor area of over 200,000 square feet. Approximately 96 percent of the based aircraft are stored in hangars, the remaining stored on the apron tie-downs. The hangar composition includes T-hangars (42,200 SF = 20 percent) and executive/common hangars (165,800 SF = 80 percent), principally located along the east side of the airfield. The largest hangar is the Executive Flight building (36,200 SF), located on the west side of the airfield. Hangars are principally occupied for private aircraft storage, with multiple executive/common hangars used for aeronautical business purposes and having public terminal area vehicle access. Most recently, there has been a trend towards the construction of individual executive-type hangars, built north of the former Runway 25 end.

3.5 AIRPORT SUPPORT FACILITIES

Aircraft Fuel Storage/Dispensing

Table 1.9 summarizes the aircraft fuel storage facilities, dispensing, and volumes. Jet-A fueling is dispensed from a fuel truck, and the 100LL Avgas from a pump station on the apron. Historically, Jet-A sales constitute about 70 percent of the fuel volume, and 100LL Av Gas is 30 percent. The peak fuel sale months are July and August.

Table 1-9: Aircraft Fuel Storage

Storage Type	Lessee / Owner	Facilities
Storage and Dispensing		
Fuel Storage Tanks	Airport Operated (Bulk Storage)	Jet-A: (1) 20,000 Gallon Tank Abovegound; North of Airport FBO Building Dispensing: Fuel Truck (No Direct Aircraft Dispensing)
		100LL Avgas: (2) 10,000 Gallon Tank Underground; FBO GA Apron Dispensing: Aircraft Direct and Self-Serve
	Executive Flight (Proprietary)	Jet -A: (2) 12,500 Gallon Tank Located North of Building/Hangar
Fuel Dispensing Trucks	Airport Operated/Owned	2,500 Gallon Jet-A Truck
Annual Fuel Volume Sales (Average Range)		
Jet-A	100,000 to 120,000 Gallons (Peak Month: June to September)	
100LL	40,000 to 60,000 Gallons (Peak Month: July to September)	

Note: Jet-A fuel used by turbine powered aircraft, 100LL Avgas used by piston-powered aircraft.
Source: Airport Records (Obtained July, 2016).

Aircraft Rescue and Firefighting (ARFF)

As a commercial passenger service facility, on-site Airport Rescue and Firefighting (ARFF) services are provided. The ARFF station, Station 222, is located along the main general aviation apron, north of the air cargo facility. The Airport provides firefighting staffing through a mutual aid agreement with Douglas County Fire District #2. ARFF staff are available during commercial flight operations and assist in the surrounding areas of Douglas County when not needed at the Airport. The ARFF building involves spatial and operational deficiencies.

Airport Maintenance/Equipment Storage (SRE)

The Airport has a 10,000 square-foot equipment storage building, a 4,200 square-foot garage, and a 3,000 square-foot shop building which are located north east of the general aviation terminal building. The SRE buildings involves spatial and operational deficiencies.

3.6 SURFACE TRANSPORTATION

The Douglas County Six Year Transportation Improvement Program 2016-2021 identifies three roadway projects planned within the Airport vicinity. The first is an intersection project planned at Grant Road and South Van Well Avenue in order to improve safety. The second is a project that will connect 10th Street SE to South Ward Avenue along with realignment, widening, and reconstruction of current road. The third is intersection improvements at South Van Well Avenue and 4th Street SE to improve safety.

3.7 AIRPORT UTILITIES

Table 1.10 summarizes the on-Airport utilities to generally describe the types, location, capacities, and recognize service deficiencies and potential improvements. Separate utility systems serve the Airport and Pangborn Airport Business Park.

4. METEOROLOGICAL CONDITIONS

Meteorological conditions impact aircraft performance and influences aviation activities, as largely influenced by winds, temperature, cloud conditions, and precipitation types. Table 1.10 summarizes the climatic weather characteristics for the Airport region.

4.1 WIND PATTERNS

Wind patterns are an important meteorological factor in assessing runway utilization and for determining runway design requirements in accordance with FAA aircraft category standards. Exhibit 1.11 plots the prevailing wind patterns from Airport wind observations for all-weather and instrument conditions.

The prevailing winds and peak-gusts are predominately from the west, and to a lesser extent, from the east. Annually, calm to light winds (0-11 knots) occurs 86 percent of the time, with gusty winds (greater than 16 knots) occurring 5 percent of the time. Winds greater than 11 knots but less than 16 knots occur at the airport 9 percent of the time. Runway 12 captures about 25 percent of traffic and Runway 30 about 75 percent with respect to prevailing wind patterns. It should be noted that runway approach and departure utilization is largely influenced by wind direction, but also instrument procedures, and pilot preference in consideration of the desired parking destination.

Table 1-10: Airport Utility Systems

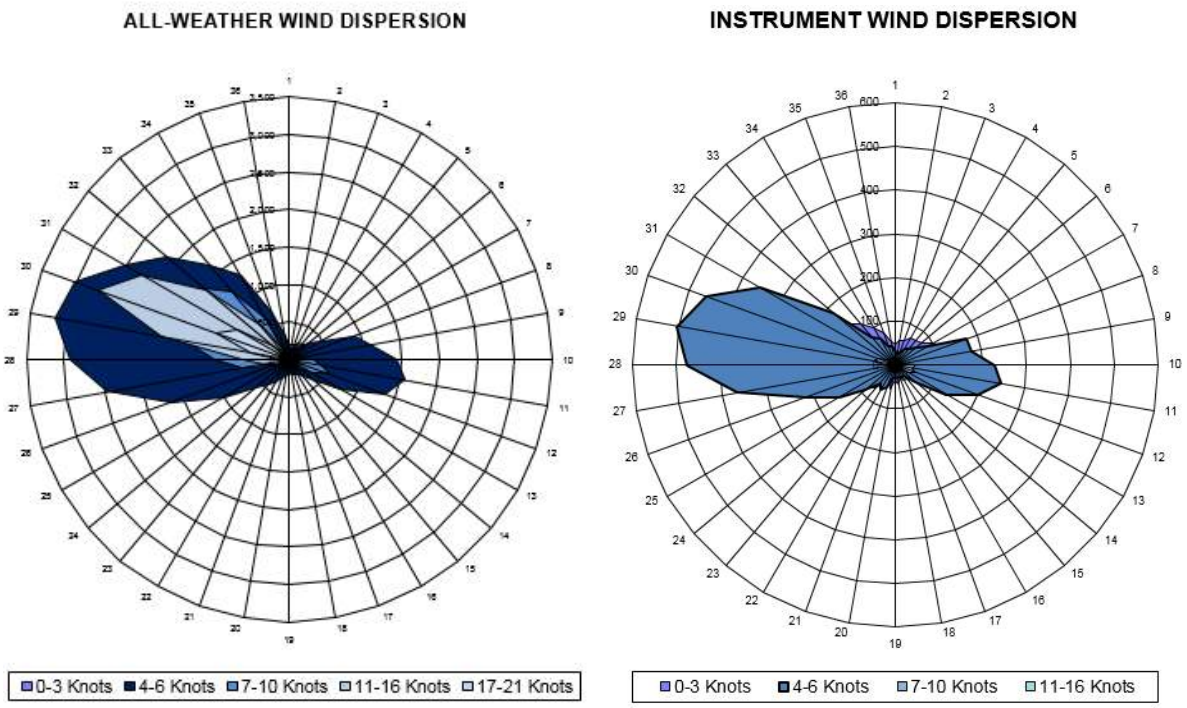
Utility	Service Provider	System / Capacities / Remarks
Electric Power	Douglas County Public Utility District	Airport power is supplied primarily through underground cables. Two substations supply the Airport including the South Nile Substation located to the west and the Pangborn Substation located to the east. The Veedol Substation is under construction to the northeast. Electric power generally supplies heat to the newer Airport buildings, while fuel oil is used for the older buildings.
Water	East Wenatchee Water District	Airport water system consists of both private and public water mains, ranging from 2" to 12" in diameter. The Nile pump station is located to the west. The Veedol Water Reservoir is located to the northeast.
Sanitary Sewer	Douglas County Sewer District	Two pump stations serve the Airport. The Batterman pump station located northeast of the Airport extends the regional system south to the air carrier terminal building (continuation of the regional line along the east side terminal area has been proposed from the Douglas County Sewer District facility east of Union Avenue). The Pangborn Pump Station is within the Pangborn Airport Business Park and provides domestic sewer service to the west side of the Airport property.
Gas	Cascade Natural Gas	The natural gas system provides service to the the western portion of the Airport, including several lots within the Pangborn Airport Business Park.
Stormwater Systems	Pangborn Airport	The Airport's stormwater system was largely constructed in the 1940's, with various stormwater expansions and modifications occurring since, mostly connected with major Airport improvements. The stormwater system for the runway includes a series of catch basins and pipes that outlet to the southwest or into infiltration galleries. Drywells accommodate stormwater in the terminal and general aviation areas. The Pangborn Airport Business Park is served by a separate stormwater system maintained by the Port of Douglas County, installed in the late 1990's, and extended in 2014 to accommodate runoff throughout the site.
Irrigation System	Operator: Greater Wenatchee Irrigation District (GWID) Owner: US Bureau of Reclamation	The Greater Wenatchee Irrigation District (GWID) has irrigation mains on the west, south, and east sides of the Airport and a reservoir and pump station near the southwest corner of the Airport. Irrigation water is provided to the Airport and used to irrigation landscaping at the terminal building and around the terminal facilities.
Communications	Frontier	High speed fiber extends to the Airport air carrier terminal building and is installed to the Pangborn Airport Business Park.

Source: Airport Staff and RH2 Data (Obtained August, 2016).

4.2 RUNWAY CROSSWIND CONDITIONS

Table 1.12 lists the all-weather and instrument runway crosswind coverage for 10.5, 13, 16, and 20 knot crosswind components. Wind conditions affect aircraft to varying degrees. The ability to land and takeoff with a crosswind varies according to aircraft characteristics and pilot capabilities. Generally, smaller aircraft are more greatly affected by crosswinds. Runway 12-30 achieves an excess of 95 percent crosswind coverage at 10.5 knots, which means that it also provides over 95 percent coverage for the 13, 16, and 20 knot crosswinds. Per FAA design standards, the existing single runway provides sufficient crosswind capabilities to accommodate each aircraft type during all-weather, visual, and instrument wind crosswind conditions.

Exhibit 1-11: Wind Diagrams (All Weather and Instrument)



Source: FAA AGIS Wind Data Observations – EAT Airport (Obtained July, 2016)

Table 1-11: Climatic / Meteorological Summary

Climate Event	Climate Description	Value
Temperature	Annual Mean	51.3° F
	Annual Monthly Mean Maximum	74.2° F (August)
	Annual Monthly Mean Minimum	27.9° F (December)
	Mean Month Maximum (Month)	88.7° F (July)
	Hottest Month (Extreme)	105° F (July)
	Average Annual Days Above 65F	176 Days
	Average Annual Days Above 90F	37 Days
Precipitation	Average Annual Days with Precipitation	67.9 Days
	Average Annual Mean Rainfall Total	8.0 Inches
	Mean Maximum Monthly Precipitation	1.4 Inches
	Annual Days More Than .10"	25.1 Days
	Snowfall Average Annual Mean Total	26 to 33 Inches
	Snowfall Mean Maximum Month	12.9 Inches
Sky Conditions	Visual Flight Rule (VFR) Conditions	88%
	Instrument Flight Rule (IFR) Conditions	10%
	Low Instrument Flight Rule (IFR) Conditions	2%
	Days with Fog	56
	Days with Thunderstorms	6
Winds	Prevailing Wind Direction (From)	Westerly
	Average Prevailing Wind Direction (From)	7 Knots

Source: NOAA Climatic Meteorological Data Disk and NOAA Website Data, Obtained July 2016.

Table 1-12: Crosswind Wind Coverage

Runway	10.5-Knot Component	13-Knot Component	16-Knot Component	20-Knot Component
ALL-WEATHER WIND DATA OBSERVATIONS (PERCENT COVERAGE)				
Runway 12-30	**98.92%**	99.44%	99.79%	99.94%
Runway 7-25 (Closed)	96.52%	98.78%	99.72%	99.95%
Runway 12-30 & Runway 7-25 Combined	99.78%	99.89%	99.95%	99.98%
INSTRUMENT WIND DATA OBSERVATIONS (PERCENT COVERAGE)				
Runway 12-30	**99.86%**	99.92%	99.96%	99.98%
Runway 7-25 (Closed)	99.78%	99.88%	99.95%	99.99%
Runway 12-30 & Runway 7-25 Combined	99.93%	99.95%	99.97%	99.99%

Note: Crosswind component computed using runway true bearings (135.018, 90.023)
Note: Crosswind component computed using FAA windrose calculation program.
Note: All weather conditions: period of record: 2006 to 2015 with 102,364 observations.
Note IFR weather conditions: period of record: 2006 to 2015 with 17,324 observations.
Note VFR weather conditions: period of record: 2006 to 2015 with 85,409 observations.
Source: FAA AGIS Wind Data Observations (Obtained July, 2016)

5. AIRPORT LAND USES AND REGULATIONS

Airport land use compatibility is regulated through zoning ordinances to govern property development consistent with aviation operations and facilities, ensure the protection of runway safety and clear zones for the protection of public safety; and to attract compatible businesses.

5.1 GOVERNMENTAL JURISDICTION

The Airport, situated two miles east of the East Wenatchee city limits and one-mile east of the East Wenatchee Urban Growth Area (UGA) boundary, is located within an unincorporated area zoned by the Douglas County Board of County Commissioners. A northwest portion of the Airport traffic pattern overlays the UGA. Per the Douglas County Countywide Comprehensive Plan, the Airport is designated an Essential Public Facility under the Growth Management Act (GMA) with prescribed land use goals and policies. It is intended that minimum requirement criteria be included in the development regulations of the comprehensive plan, intended to preserve the Airport such that it can change with the community to meet the needs of the County, its residents, and businesses. The Airport is within the Pangborn Industrial Service Area, a 1,449-acre island UGA planning area boundary, which does not include residential or commercial activities due to incompatibility.

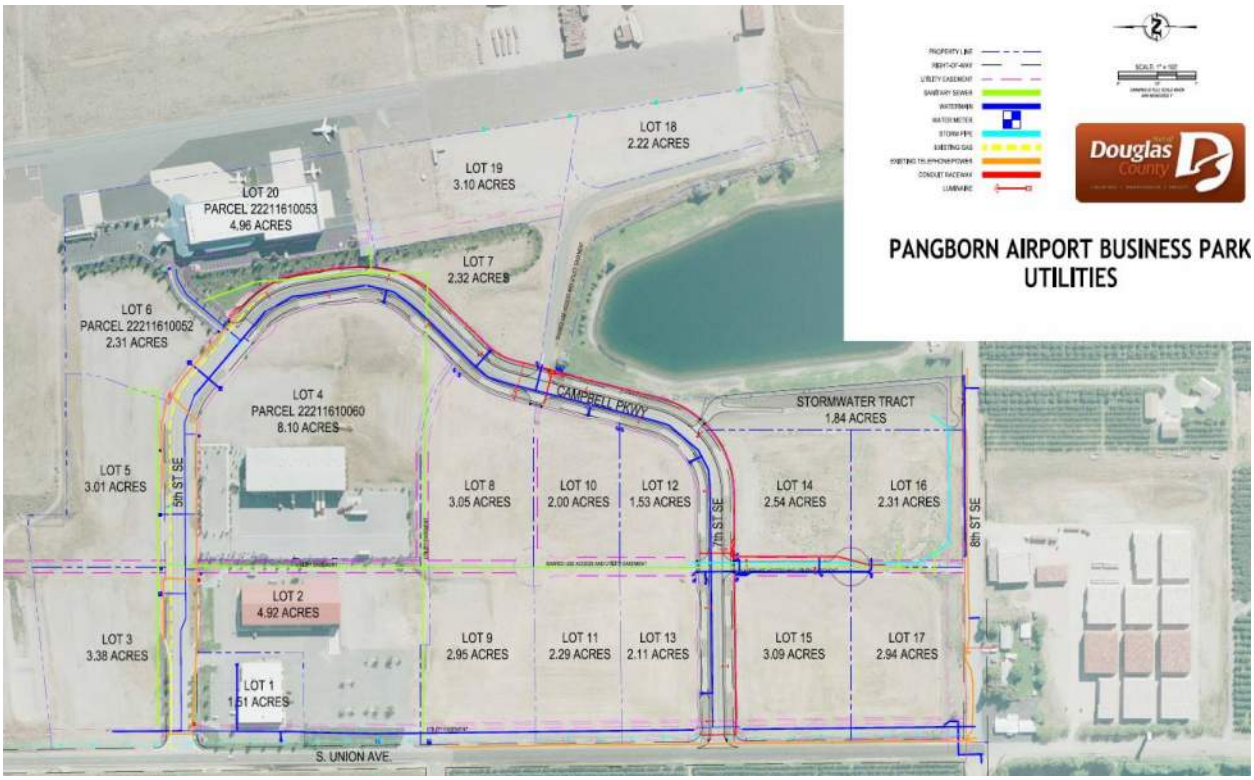
The Pangborn Industrial Service Area is located within the Greater East Wenatchee Sub-Area Plan. Activities located in this area are designed to be compatible with both airport activities and surrounding agricultural resource land.

5.2 ON-AIRPORT LAND USES

The Airport property totals 700 acres, comprised of four land use categories as designated by past Airport planning studies, including: Airfield Operation/Approach Protection (AO); Air Carrier Terminal Area (TA); General Aviation/Cargo/Aircraft Storage (GA); and Non-Aviation Use (NAU). The aeronautical land uses, which include AO, TA and GA, are committed to existing and future aviation developable areas, and combined, occupy nearly 530 acres (75 percent) of the total Airport property. The NAU, which totals 170 acres (25 percent), is comprised of a mix of existing leased business sites including the Airport Business Park, areas for temporary ground lease storage and activities, and farmed areas. The former on-Airport farming area, predominately located along the south airfield quadrant, had occupied 40 acres and is fallow.

Exhibit 1.12 depicts the Pangborn Airport Business Park and lot layouts, located within the southwest quadrant of the Airport, with roadway access via South Union Avenue. The business park, which is managed by the Port of Douglas County, occupies 70 acres and is comprised of 20 lots which vary from about 1.5 to 4.1 acres. Three lots extending along Taxiway B, including the Executive Flight hangar, have access potential to the airfield.

Exhibit 1-12: Airport Business Park Lots



Source: Pangborn Memorial Airport Business Park, Douglas County Mapping, Obtained June, 2017.

5.3 SURROUNDING AND ZONED LAND USES

The Airport is surrounded mostly by large-parcel agricultural land uses, with residential subdivision to the northwest, sparse large-lot residential to the south, and commerce centers to the north and northeast. The following list the Airport and surrounding Douglas County zoning districts, as depicted by Exhibit 1.13.

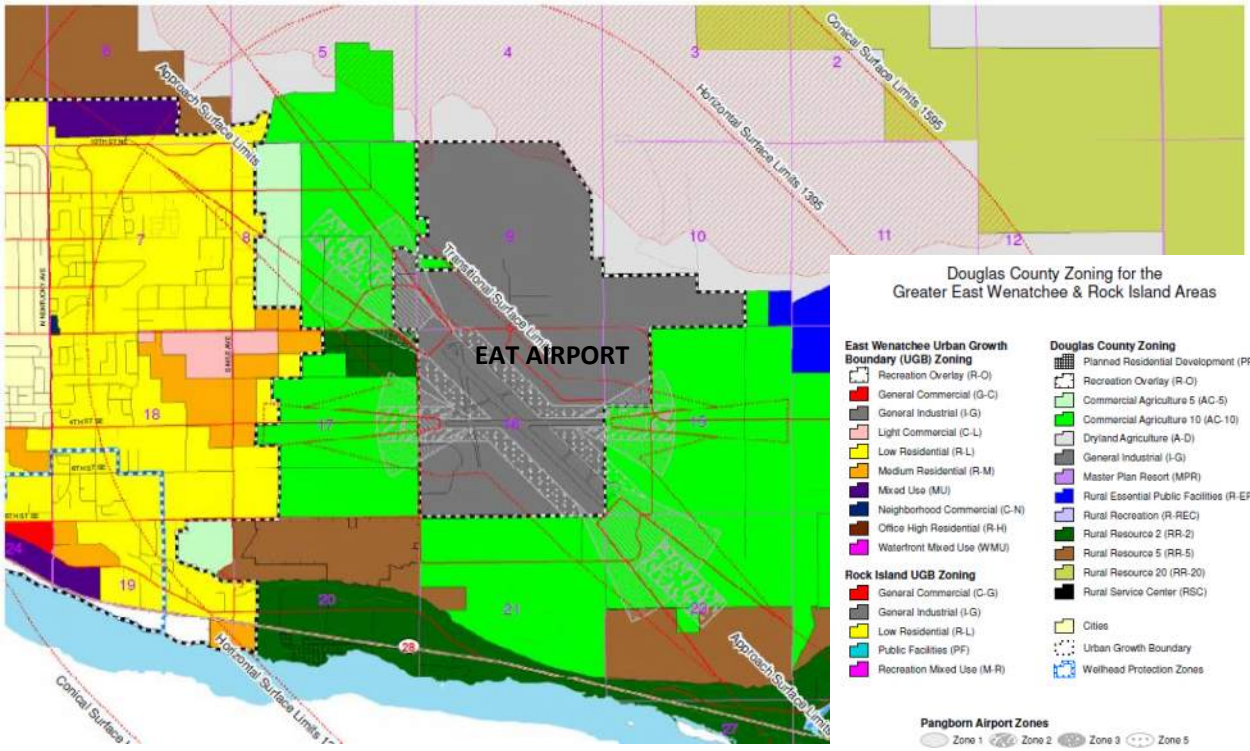
Douglas County On-Airport Zoning Districts:

- General Industrial (I-G)
- Commercial Agricultural 10 (AC-10)

Douglas County Zoning Districts Surrounding Airport:

- North - General Industrial (I-G)
- East, South, West - Commercial Agricultural 10 (AC-10)
- Southwest - Rural Resource 5 (RR-5)
- Northwest - Rural Resource 2 (RR-2)

Exhibit 1-13: Airport and Surrounding Zoning Districts



Note: Exhibit does not reflect existing Runway 12-30 extension to 7,000' or Runway 7-25 closure.
Source: Douglas County Zoning Ordinance Map (March, 2015).

5.4 AIRPORT LAND USE ORDINANCES

Airports face unique land use compatibility and encroachment challenges, in which incompatible development can impact the operating capability of the Airport as well as endanger the lives of people in the air and on the ground. The Airport's area of land use and airspace influence extends and overlays multiple governmental jurisdictions; including the Port of Douglas County, Port of Chelan County, Douglas County, Chelan County, City of East Wenatchee and surrounding local communities. In addition, the Douglas County Comprehensive Plan consists of several volumes that are incorporated by reference; Bridgeport Urban Area Comprehensive Plan, Greater East Wenatchee Area Comprehensive Plan, Mansfield Urban Area Comprehensive Plan, Rock Island Comprehensive Plan, Waterville Urban Area Comprehensive Plan, Douglas County Transportation Element, Douglas County Capital Facilities Plan. To

ensure that the Airport function is maintained, land use planning tools and ordinances have been adopted to ensure that Airport land use conflicts are minimized to the greatest extent possible, including the height of objects, safety area zones, and noise.

The Douglas County Board of Commissioners has adopted an Airport Overlay District AP-O zoning district that is codified in Chapter 18.65 of the Douglas County Code. This district establishes Airspace Zones based on FAA Part 77 imaginary surfaces and Airport Compatibility Zones (Zones 1, 2, 3, 5) based on NTSB safety data prescribed by WSDOT Aviation Land Use Compatibility.

The AP-O district protects the viability of the Airport as a significant resource to the community by encouraging compatible land uses, densities, and reducing hazards that may endanger the lives and property of the public and aviation users. The ordinance prescribes development standards and site planning requirements per boundary of the AP-O district. The AP-O Airport Compatibility Zones do not extend into other surrounding governmental jurisdictions; however, the Airspace Zones do extend beyond the Urban Growth Area (UGA), and extend as an overlay into multiple governmental jurisdictions within Douglas County and Chelan County.

5.5 AIRPORT OPERATING REGULATIONS AND ORDINANCES

Regulatory ordinances have been adopted, including "Minimum Standards for Commercial Activities" used to regulate the conduct of commercial airport users and specify uniform thresholds for an operator engaged in commercial aeronautical activities at the Airport, and "Airport Rules and Regulations" used to regulate the conduct of airport users.

6. AIRPORT ECONOMIC PROFILE

Table 1.13 quantifies the Airport's economic impact, measured in jobs, spending, and sales. The Airport contributes to 284 full-time equivalent jobs resulting in $12 million in wages ($44,000 per job) and has business sale impact totaling $41.0 million. Annual local and state tax revenue generated from the Airport totals $1.03 million.

Table 1-13: Airport Economic Impact (Adjusted for 2016 Dollars)

Economic Impact	Jobs from Airport Business	Jobs from Visitor Spending	Wages from Airport Businesses	Wages from Visitor Spending	Airport Business Sales	Visitor Spending Business Sales
Direct Impact	90	81	$4,300,000	$2,700,000	$17,100,000	$8,800,000
Indirect Impact	65	48	$2,500,000	$2,500,000	$7,400,000	$7,700,000
Individual Total	155	129	**$6,800,000** ($44,000 Per Job)	**$5,200,000** ($41,000 Per Job)	**$24,500,000**	**$16,500,000**
Combined Total	**284**		**$12,000,000 ($43,000 Per Job)**		**$41,000,000**	

Note: 2010 study values adjusted to 2015 dollars.
Direct Impact: amount of initial purchase that remains within the local economy.
Indirect Impact: result from purchases made to another industry and expenditures of employee wages.
Source: WSDOT Aviation Division website.

6.1 AIRPORT REGIONAL TRANSPORTATION AND ECONOMIC ROLE

The Airport serves a broad economic value as a commerce center and critical component of the region's transportation system. As an Essential Public Facility, the Airport fosters one of the primary goals of the Greater Wenatchee Area in the desire to shift from a commuter economy to a jobs-based economy.

Wenatchee is known as the "Apple Capital of the World". Agriculture is the leading industry in Chelan and Douglas counties, with over 21 percent of the combined employment. Agriculture employment directly links to nonfarm employment in the area through food processing, food packaging, and transportation. In addition to agriculture, tourism plays a vital role to the area's economy. Every year from the last week of April to the first week of May, Wenatchee hosts the Washington State Apple Blossom Festival which brings a large amount of tourists to the area. During the summers many tourists travel to Wenatchee to visit the area's orchards, wineries, and the Pybus Public Market. These visitors have a great effect on the hotel bookings, air carrier tickets, spending, and sales tax for the area.

7. FINANCIAL OVERVIEW

This section presents a snapshot of the Airport's financial structure, historical budgeting patterns, and other influencing factors regarding the Airport's revenue position.

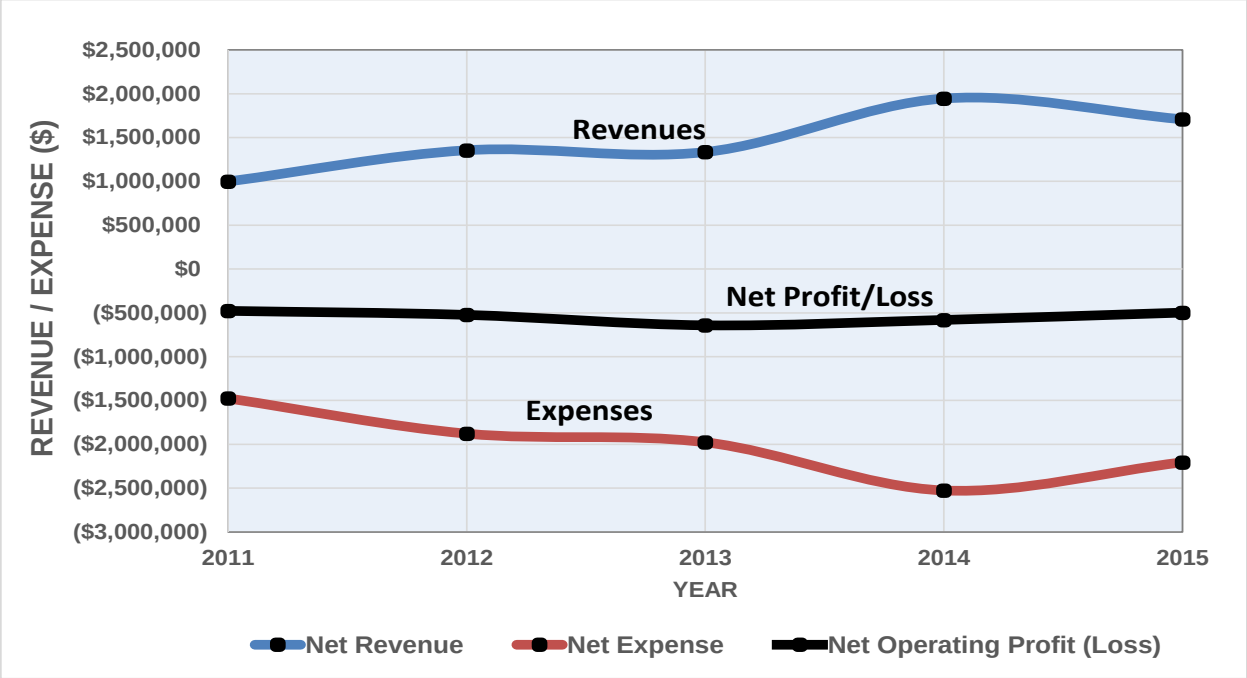
7.1 AIRPORT FINANCIAL STRUCTURE

The Airport Governing Board is the authorizing body responsible for the financial obligations to own, manage, and improve Airport facilities. The Airport Governing Board approves of the annual budgets for maintenance and operation, and for capital expenditures. As a public operated facility, fiscal duties must be conducted in accordance with the federal grant assurance agreements and compliances, and other local and state business requirements.

7.2 AIRPORT FINANCIAL OVERVIEW (FISCAL YEARS 2011 TO 2015)

Airport income statements for fiscal years 2011 to 2015 were reviewed to identify trends, income patterns and major operating revenue and expense factors. During this fiscal period, operating revenues averaged $1.46 million annually, while operating expenses (excluding depreciation) averaged $2.10 million, with net profit/loss operating deficit averaging $545,000 per year. Nearly 50 percent of the Airport's operating revenue is generated from building/hangar rents, of which 80 percent is derived from 'aviation' tenants and 20 percent from 'non-aviation' tenants. Nearly 40 percent of the Airport's operating expenses are dedicated to salaries, benefits, taxes, and 30 percent attributed to fuel operations, which generates a positive Airport revenue. In the last five years the Airport has shown an operating deficit, in which the Port contributions have averaged $745,000, of which 60 percent was committed towards 'operating' expenses and 40 percent towards 'capital' expenses. The Airport's general fund carry-over per year is $20,000.

Exhibit 1-14: Airport Financial Historical Profile (2011 to 2015)



Source: Airport Budget Statements (2011 to 2015).

8. ENVIRONMENTAL OVERVIEW

The Environmental Overview is a preliminary review and initial screening of critical environmental resources, intended to assist in the avoidance and minimization of environmental effects considered through the Airport Master Plan process. Environmental overview conditions were assessed primarily through research of existing studies and documents, agency database searches, local inquiry, and with limited field investigation and agency coordination.

The following is an analysis of the environmental considerations for these specific categories:

- Air Quality
- Section 4(f) and Historical Properties
- Threatened and Endangered Species
- Water Quality
- Wetlands
- Farmland & Soils
- Floodplains
- Cultural Resources (Historical Buildings)
- Compliance with Critical Areas/Ordinances

8.1 AIR QUALITY

According to the Environmental Protection Agency (EPA) Green Book of Nonattainment Areas for Criteria Pollutants, the Airport is considered by the Office of Air Quality Planning and Standards to be in 'attainment' for all criteria pollutants (i.e. ozone, particulate matter, sulfur dioxide, lead, carbon monoxide, and nitrogen dioxide), which is in compliance with National Ambient Air Quality Standards (NAAQS).

8.2 SECTION 4(F) AND HISTORICAL PROPERTIES

Section 4(F) refers to the section name of the U.S. Department of Transportation act of 1966 which provided consideration of parks and recreation lands, wildlife and waterfowl refugees, and historic sites during transportation developments. Before a project can be approved using Section 4(F) property it must be determined that there is no feasible and prudent alternative that avoids the Section 4(F) property. The Airport does not contain any known Section 4(F) properties. The nearest section 4(F) property is Kenroy Park, located four miles west of the Airport. The nearest National Register of Historic Places site is the Rock Island Railroad Bridge located 2.6 miles southwest of the airfield.

8.3 THREATENED AND ENDANGERED SPECIES

The United States fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS) was used to determine potentially occurring species listed in the Endangered Species Act (ESA) within the Airport property area. According to the USFWS ECOS, the listed ESA species which have the potential to occur within the Airport include the: Yellow-billed Cuckoo (Coccyzus americanus), Bull Trout (Salvelinus confluentus), Gray wolf (Canis lupus), and Washington ground squirrel (Urocitellus washingtoni). The Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database was also reviewed. The WDFW PHS does not list any priority habitats or species records for the Airport Area. In addition, the FAA Wildlife Strike Database was reviewed to determined known occurrences of wildlife species near the Airport. The species listed on the FAA Wildlife Strike Database are common species, namely American kestrel, Horned lark, Eurasian collared dove, Dark-eyed junco, American pipit, Gray partridge, Chukar, Sparrows, American robin, Finches, European starling, Swallows, Barn swallow, Rock pigeon, White-throated swift, Tree swallow, Bank swallow and other unknowns birds of various sizes. Due to the existing disturbed areas resulting from Airport infrastructure and operations, lack of standing bodies of water, and ongoing agriculture activities, it is unlikely that any of the above mentioned ESA listed species would be impacted by actions within the Airport area.

8.4 WATER QUALITY

The Airport is located within the Greater East Wenatchee Stormwater Utility boundary, as managed by Douglas County. Mapping of the existing Airport stormwater system, including topography, impervious surfaces, and drainage bases was conducted in 2016 as part of an Airport Stormwater Management Plan. This plan includes mapping of the existing stormwater system and an operations and maintenance plan. Per Douglas County Code Chapter 20.34, all Airport runoff shall be retained and disposed on-site or in a system designed for such runoff and which does not flood or damage other properties. Stormwater systems are designed using the one-hundred year twenty-four hour Type II SCS synthetic rainfall event.

Public entities that operate a Municipal Separate Storm Sewer System (MS4) that discharge stormwater must get a permit to do so under U.S. Environmental Protection Agency rules. In Washington State, Department of Ecology issues this permit which is a Phase II Municipal Stormwater Permit. The Airport would be a secondary permittee. Regardless of whether a Municipal Permit is sought, construction of any new facilities will need to be reviewed for current permitting requirements.

8.5 WETLANDS

The US Fish and Wildlife Service online National Wetlands Inventory (NWI) mapping system identifies one wetland area within Airport property, a manmade detention pond within the Columbia Marketing International, Inc. (CMI) leased premises, which does not appear to be a regulated wetland. Any impacts to wetlands are to be coordinated with the United States Army Corps of Engineers.

8.6 FARMLAND AND SOILS

The NRCS online web soil survey system was used to identify Airport soil types. Mapping and table details regarding the mapped soils within the Airport area are contained within the USDA/NRCS Soil Report. Airport soils are comprised of the following:

- Pogue fine sandy loam (3% to 8% slopes): “Prime farmland if irrigated”
- Torriorthents (very steep): “Not prime farmland”
- Peshastin fine sandy loam, compacted substratum (3% to 8% slopes): “Prime farmland if irrigated”
- Pogue loam (8% to 15% slopes): “Farmland of unique importance”

According to the NRCS, the Pogue fine sandy loam with 3 to 8 percent slope is the dominant soil type accounting for approximately 90 percent of Airport area. This soil type is associated with prime farmland if it is irrigated. Potential impacts to this soil type, as well as similarly classified soils within the study area, would require coordination with the NRCS to determine applicability or exemption to the Farmland Protection Policy Act (FPPA).

8.7 FLOODPLAINS

The Airport is built on top of a 600-foot-high flood deposit terrace, with an elevation ranging from 1,100 to 1,300 feet above sea level. The Washington Department of Ecology identifies the Airport within the Moses Coulee Watershed Water Resource Inventory Area (WRIA). The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) identify the Airport and surrounding vicinity within the “Zone B” floodplain, a region defined by areas between limits of the 100 and 500-year flood; or areas of 100-year shallow flooding with depth less than 1-foot.

8.8 CULTURAL RESOURCES (HISTORICAL BUILDINGS)

A review of the Washington Department of Archaeology and Historic Preservation’s Washington Information System for Architectural and Archaeological Records Data (WISAARD) did not reveal any properties listed on the National Register of Historic Places (National Register) located on Airport property. This is also supported by field surveys conducted on the Pangborn Airport Business Park in March 1997 and February 2012. This review did not include research or evaluations to determine whether inventoried buildings qualify as eligible for listing in the National Register. As part of future Airport developments, it is recommended that the Washington State Department of Archaeology and Historic Preservation, State Historical Preservation Officer (SHPO) be contacted prior to disturbances involving buildings older than 45 years.

8.9 COMPLIANCE WITH CRITICAL AREAS/ORDINANCES

Under the GMA, critical areas contained within the study area must adhere to applicable City or County ordinances. Douglas County has developed codes, contained in Section 8.08, regarding the use and safety of the Airport. The codes outline permits pertaining to property, fire prevention, aircraft operation, and motor vehicle operations. The following are land use planning, zoning, and development regulations applicable or referenced by way of governing Airport operating and land use:

Airport Mechanisms:

- Pangborn Memorial Airport, Ports of Chelan and Douglas Counties, Airport Master Plan.
- Douglas County Code, Chapter 18.65, Airport Overlay District AP-O Zoning District, May 2010.
- Douglas County Code, Section 8.08, Pangborn Field Airport: Code current through Ord. 15-14-50B, passed December 1, 2015 and Resolution 14-01-50B passed October 28, 2014.

Local Jurisdiction Mechanisms:

- Douglas County Countywide Comprehensive Plan, 2015
- Douglas County Zoning for the Greater East Wenatchee & Rock Island Areas
- Douglas County Code of the West, 2011
- Greater East Wenatchee Comprehensive Plan - City of East Wenatchee, 2015
- Port of Douglas Strategic Plan Summary, 2011
- Port of Douglas Economic Leadership Roundtable, 2015
- Chelan County Comprehensive Plan, 2015
- Port of Chelan Comprehensive Plan, 2013

8.10 ENVIRONMENTAL CONCLUSION

This overview identifies potential considerations that may require more detailed environmental documentation for project approval and permitting. Early identification of these environmental factors may help avoid impeding future development plans. The overview is not intended to fulfill the environmental clearance requirements outlined in FAA Order 1050.1F, Environmental Impacts and Procedures, nor satisfy the requirements pursuant to the National Environmental Policy Act (NEPA) and Washington's State Environmental Policy Act (SEPA) statutory requirements. This overview does not constitute a formal biological/habitat assessment, wildlife hazard site visit, or wetland delineation.

9. INVENTORY CHAPTER SUMMARY

The following summarizes the key inventory items to be considered further as part of the airport master plan facility requirements and improvement alternatives. These inventory items were identified through a review of published Airport records and interviews with Airport Staff and stakeholders.

Airfield:

- Airfield pavement conditions; to support existing and future aircraft
- Improved Runway 12-30 instrument procedures (minimums)
- Parallel taxiway system geometry and design; number and location of exit taxiways
- Taxiway system and configuration supporting west airfield facilities
- Future disposition of the closed crosswind Runway 7-25.
- Future VOR Station disposition.
- ASOS condition and future location.
- Airport continuous perimeter service roadway network.
- Airport perimeter fencing upgrades (southeast quadrant).

Terminal Area:

- Airline apron - size, condition, design standards, aircraft deicing capabilities.
- Airline terminal building – airline, passenger demand, and level of service needs.
- Airline parking lot – configuration, capacity, and circulation.
- Future disposition of aging Airport buildings and hangars.
- ARFF building (bay) dimension for accommodating current-generation ARFF vehicles.
- Hangar size and height to accommodate general aviation turbine aircraft.
- Limited Snow Removal Equipment (SRE) building vehicle maneuvering area.
- Future Fixed Base Operator (FBO) support facilities
- On-Airport rental car facilities
- US Forest Service operating space and facilities
- Aircraft fuel storage condition, location, and capacity
- Extension of regional utilities to serve terminal/landside areas
- Designated parking areas for general aviation aircraft (piston, turbine, helicopters)

Landside / Property:

- Potential development and re-development areas
- Airport ownership of Runway Protection Zones (RPZ).
- Future disposition of on-Airport non-aeronautical property areas.
- Roadway improvements to proposed Airport development areas.

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WHERE WILL YOU GO TODAY?
PANGBORN MEMORIAL AIRPORT

CHAPTER 2
Aviation Activity Forecasts

CHAPTER 2 - AVIATION ACTIVITY FORECASTS

CHAPTER OVERVIEW

This chapter presents the 20-year aviation activity forecasts for the Pangborn Memorial Airport (Airport or EAT). The master plan forecasts provide projections of aeronautical activity used to identify the type, timing, and allocation of Airport infrastructure, equipment, and service needs. These projections provide guidance in the development of the master plan facility needs, alternatives, and funding strategies.

Chapter sections are arranged as follows:

1) Forecast Approach
2) Forecast Resources and Aviation Trends
3) Airport Forecast Factors and Influences
4) Airport Area of Influence
5) Master Plan Forecast Scenarios
6) Master Plan Forecast Methods
7) Forecast Summary and FAA TAF Comparison

1. FORECAST APPROACH

As described in this chapter, the master plan forecasts focus on local airport and community influences in order to quantify a reasonable level of future aviation activity. The forecast approach is consistent with Federal Aviation Administration (FAA) Advisory Circular 150/5070-6B, Airport Master Plans technical guidance and procedural requirements. The forecast methods apply FAA-acceptable statistical means to develop aviation demand levels for each forecast component. This process leads to selection of a single preferred forecast to carry forward throughout the master plan.

Forecasts are developed for the following aviation components:

- Airline
  - Service Demand
  - Scheduled Passengers (Enplanements)
- Air Cargo Freight Volumes
- Annual Aircraft Operations
  - Operations by User Category
  - Operations by Aircraft Type
  - Demand/Critical Aircraft
  - Operational Peaking
- Based Aircraft

Forecast Timeline: Forecasts are prepared for each year in the 20-year planning horizon, which extends through 2035. Forecasts are identified in five-year increments within three planning phases: the short-term (2016-2020); the mid-term (2021-2025); and the long-term (2026-2035). Consistent with the Inventory Chapter, 2015 is the base year, for which 12 full months of published activity records are available. The forecasts reflect the FAA fiscal year from October to September, unless otherwise noted.

Forecast Statistical Analysis: Forecast methods are quantified using statistical means, including time-series trend, regression, comparative analysis, and market share techniques. The forecast analysis establishes data relationships to embody a comprehensive forecast story that is reasonable and sustainable on the basis of past trends and anticipated conditions. Forecast values have been rounded, with year-to-year activity levels expressed by net change and compounded annual growth rate (CAGR).

Forecast Planning Activity Levels: Per FAA Advisory Circular 150/5070-6B, planning activity levels, rather than specific years, should guide the thresholds for triggering Airport project improvements. This approach considers constrained and unconstrained forecasts, as a matter of "reviewing the operational factors and events implicit in the forecast to determine if differing assumptions regarding those factors have affected the forecast results". Because actual year-to-year activity can deviate from forecast levels, the master plan should conform to the tracking of planning activity levels.

Airport Forecast Vision: The forecasts should align with the Airport's strategic direction and vision. As documented by the Port's Comprehensive Plan, the Airport is the "key Port responsibility", and "should maintain the highest realistic service standards in providing for efficient and cost-effective air transportation of people and goods". The community vision for the Airport, as reported from the *Our Valley, Our Future Action Plan (2017-2021)* outreach, is to "expand airline carriers and service at the Pangborn Memorial Airport, including direct flights to other cities in addition to Seattle".

2. FORECAST RESOURCES AND AVIATION TRENDS

2.1 AVIATION FORECAST RESOURCES

Aviation forecast data was sourced from Airport records, FAA studies, USDOT reports, and other industry publications. Local community and economic data was collected from individual governmental entities and data vendors (see appendix page 2 and 3 for references).

In addition, existing sources of published aviation and socioeconomic forecasts were reviewed (see appendix page 2 and 3 for references). In some instances, multiple data sources and forecast projections exist for the same activity component. In these cases, the data was reconciled and indexed to the 2015 base year prior to considering in the master plan forecasts. The following aviation-industry publications were reviewed to substantiate historical and projected aeronautical activity patterns for application to the master plan forecasts.

FAA Terminal Area Forecast (TAF)

The FAA Terminal Area Forecast (TAF) serves as the master plan baseline for historical and forecast activity. The FAA prepares the TAF annually as the official forecast of aviation activity for airports included in the FAA *National Plan of Integrated Airport Systems (NPIAS)*. The TAF, which is developed in a top-

down manner, includes forecasts for airline enplaned passengers, aircraft operations, and total based aircraft – it does not include air cargo or critical aircraft. The TAF forecast methodology and details for individual airports are unpublished, therefore the TAF may not always accurately reflect the snapshot of current activity, nor take into account key airport factors or locally-driven forecast events.

The January 2017 TAF was compared through year 2035, in which 2016 is the first forecast year. The Airport's TAF forecast is described below and summarized in **Table 2.14**.

- **Passenger Enplanements:** Passenger enplanement projections show a 20-year increase of 35,675, from 59,577 in 2016 to 95,252 in 2035. This is a 37.5 percent overall growth and a 2.4 percent annual rate.
- **Aircraft Operations:** Operations projections show a 20-year increase of 13,117, from 40,750 in 2016 to 53,867 in 2035. This is a 24.4 percent overall growth and a 1.4 percent annual rate.
- **Based Aircraft:** Based aircraft projections show a 20-year increase of 38, from 106 in 2016 to 144 in 2035. This is a 26 percent overall growth and a 1.5 percent annual rate.

FAA Aerospace Forecasts

The FAA Aerospace Forecasts (Fiscal Years 2016 to 2036) provides aviation industry projections by aeronautical sector. The FAA prepares this document annually to identify the 20-year demands on the nationwide airport and airspace system. Referenced extensively throughout this chapter, this FAA data is used to identify forecast relationships to Airport activity, including recent industry trends, direction of future demand, and challenges of growth.

Washington State Aviation (WSDOT) Forecasts

The Washington State Long-Term Air Transportation Study (LATS), published in 2009, provides activity forecasts through 2030. The LATS passenger enplanement forecast for the Airport increased 32,900, from 59,600 in 2015 to 92,500 in 2030, a 55-percent overall growth and a 2.2 percent annual rate. The LATS also projects aircraft operations and based aircraft forecasts but was compiled only for the regional transportation planning organization and not individual airports. The 2009 WSDOT Aviation System Plan data is not accessible due to on-going updates, in which the WSDOT forecasts were not referenced for this master plan.

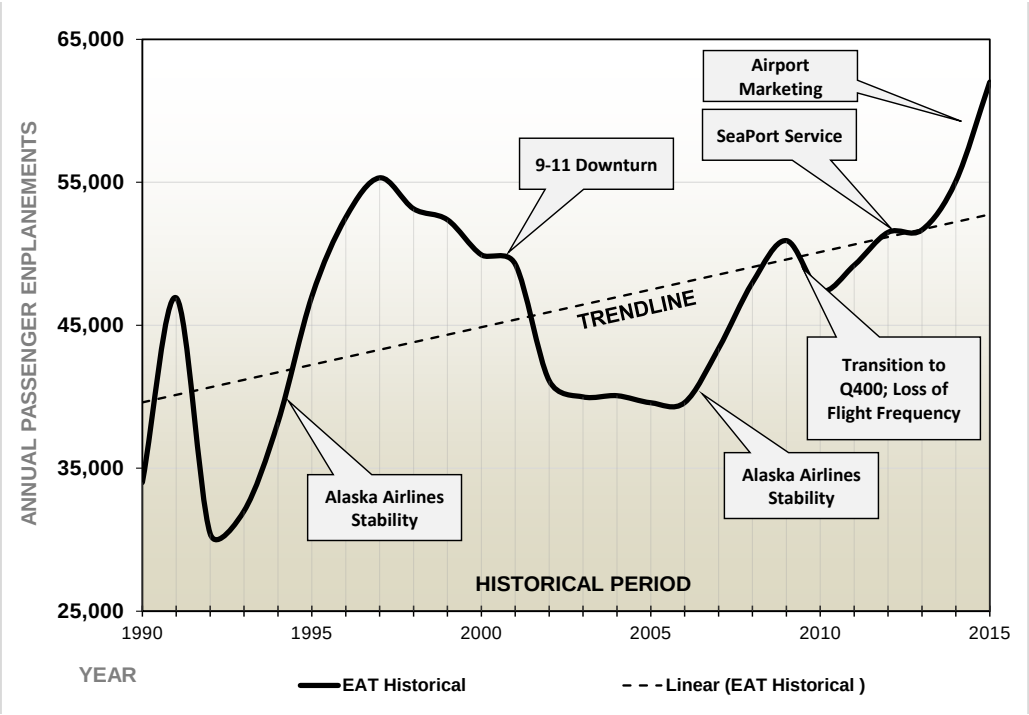
2.2 AVIATION INDUSTRY TRENDS

Aviation industry trends provide insight into drivers of past change and potential future direction. As described below, the master plan forecasts consider trends and forecast implications, by aeronautical sector, for the underlying factors potentially influencing airline, air cargo, and general aviation activities.

Airline Industry-Wide Trends (Regional Airline Sector)

The Airport has regional airline service, defined by the FAA as aircraft operating with less than 90 seats (Q400 Twin Turboprop) on shorter routes, such as Seattle-Tacoma International Airport (SEA), feeding the mainline air carrier affiliates (Alaska Airlines). The *FAA Aerospace Forecasts* show the regional airline sector has experienced nationwide market share contraction and shrinking aircraft capacity, resulting in declining passengers, seat capacity, and yields (fare paid per mile).

The FAA Aerospace Forecasts projects a competitive and profitable regional airline industry, characterized by increasing air travel demand and stable airfares. Quantified by available aircraft seat miles and revenue passengers, the regional airlines are forecast by the FAA Aerospace Forecasts to expand between 1.8 to 2.2 percent annually over the next 20 years, assuming continued growth of the national economy. The regional turboprop fleet will shrink by two-thirds in the short-term due to replacement of the smaller 50-seat regional jets with more fuel efficient 70 to 90-seat jets.

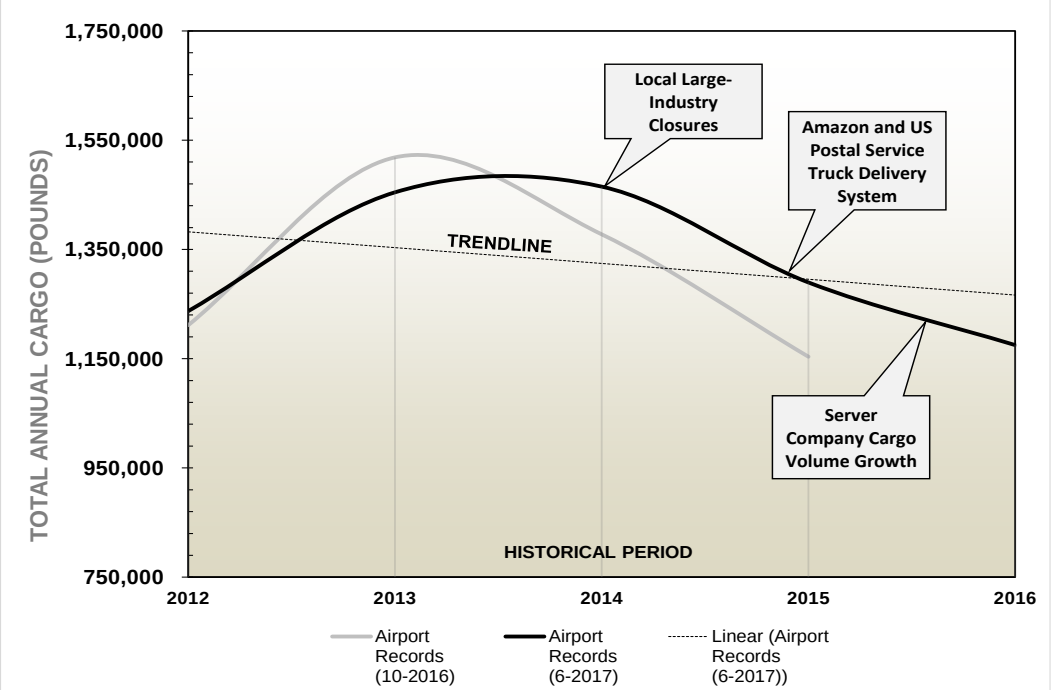


Source: FAA Terminal Area Forecast – TAF (Obtained December 2016)

EAT Forecast Implications: The Airport's regional airline activity is somewhat insulated from these national trends, as demonstrated by EAT passenger enplanement growth exceeding national trends. Therefore, EAT air service growth could reasonably continue at or above national trends. Per a phone conversation with Alaska Airlines Station Manager and Fleet Planning Department, no significant service, route, or destination changes are anticipated at EAT in the next one to three years. However, airports served by a single regional carrier tend to be susceptible to changing airline practices (hub, route, airfare, flight frequency, aircraft equipment). Common with national trends, future EAT challenges might involve the transition from turboprop to regional jet service and the balancing of competitive airfares to support jet airline operating yields, in addition to incentivizing air travelers not to use alternate commercial airports.

Air Cargo Industry-Wide Trends

The FAA Aerospace Forecasts reports a maturation of the domestic air cargo market, having declined -0.4 percent annually over the last 10 years. The most notable air cargo industry changes have been caused by global economic contraction, a shift from air-to-truck modes, higher fuel costs, more stringent Transportation Security Administration (TSA) air cargo security regulations, and the decline in mail caused by electronic substitutes. Per FAA forecasts, all-cargo revenue ton mile (RTM) growth is expected through increased rates paid for shipment of air cargo, and not through expanded tonnage. The FAA forecasts a 0.5 to 1.0 percent annual RTM increase over the next 20 years.



Source: USDOT Bureau of Transportation Statistics (Obtained December 2016)

EAT Forecast Implications: The Airport's air cargo market and service have exhibited stability. Future cargo volumes are expected to coincide with local commerce growth. Air cargo is traditionally correlated with gross domestic product patterns. The air cargo operators (AmeriFlight operating for UPS and Empire Airlines operating for FedEx), based on phone conversations with the district manager, did not anticipate significant changes to future activity or route logistics. Data provided by Port of Douglas Cross Dock Feasibility Study shows that 95 percent of Wenatchee-area produce is shipped by truck and 5 percent is shipped by rail; 70 percent of the cherry volume is express ground-shipped through west coast airports. The future shipment of agricultural produce by air, while more viable with the 2016 runway extension to 7,000 feet, is not expected by Airport Staff to become a significant Airport activity.

General Aviation Industry-Wide Trends

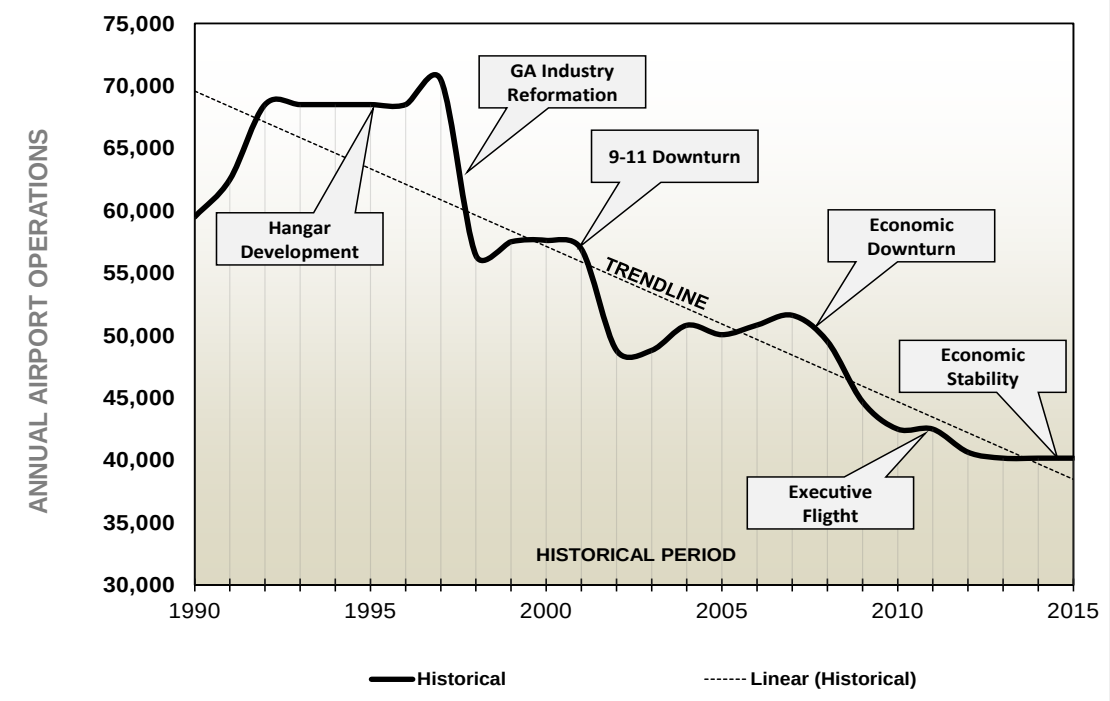
On a national level, general aviation is experiencing prolonged slow growth. The FAA Aerospace Forecasts reports the differences among the general aviation sectors and aircraft fleet. In terms of aircraft production and flight hour utilization, the piston fleet is declining by -0.5 percent annually, while the turbine (turboprop and business jet) fleet is growing at 2.5 percent annually. The following summarizes, by aircraft type, the general aviation fleet size and hourly utilization changes from 2015 to 2035, as projected in the FAA Aerospace Forecasts:

- Single-Piston: -0.6 % Fleet Size | -0.5 % Hourly Utilization
- Twin-Piston: -0.4 % Fleet Size | -0.2 % Hourly Utilization
- Turboprop: +1.5 % Fleet Size| +1.7 % Hourly Utilization
- Business Jets: +2.8 % Fleet Size| +3.6 % Hourly Utilization
- Helicopters: +2.5 % Fleet Size| +3.0 % Hourly Utilization
- Experimental/Sport: +1.4 % Fleet Size| +1.4 % Hourly Utilization

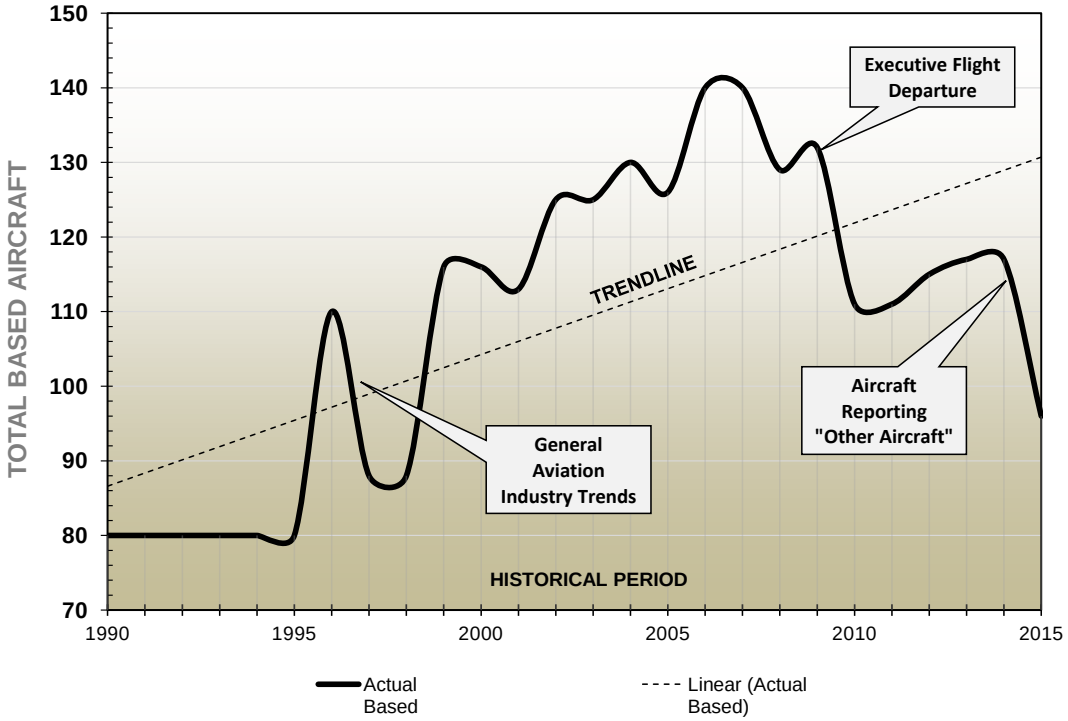
The nationwide aircraft fleet continues to undergo transition. The single and multi-engine piston aircraft fleet is experiencing continued attrition, coupled with declining production of new piston aircraft. Turboprop aircraft utilization is increasing, but with stagnant new aircraft production. The business jet, helicopter, and experimental/light sport piston aircraft segments are seeing continued increases in aircraft utilization and production rates. Per the FAA 2014 *General Aviation and Air Taxi Survey,* the general aviation industry is experiencing growth resulting from corporate aircraft utilization, fractional ownership programs, commercial pilot training, and growth of the experimental/sport aircraft segment.

Factors impeding industry growth involve escalating aircraft operating costs (e.g. purchase price, rental, maintenance, fuel, insurance and taxes), an overall decline in student/private pilot populations, increasing pilot and aircraft regulatory requirements, and competing interests for personal income and leisure time.

EAT Forecast Implications: The Airport's general aviation activity fluctuates and tends to follow industry-wide utilization trends and in-step with national economic patterns. This cyclical change of Airport activity is expected throughout the forecast planning period.



Source: USDOT Bureau of Transportation Statistics (Obtained December 2016)



Source: FAA Terminal Area Forecast – TAF (Obtained December 2016)

Unmanned Aircraft Emerging Trends

An Unmanned Aircraft System (UAS), sometimes referred to as a 'drone', is an aircraft controlled by an operator on the ground. The *FAA Aeronautical Forecasts* include UAS activity levels, in which UAS commercial models are projected to increase from 600,000 units in 2015 to 2.7 million by 2020. The FAA reports pent-up UAS market demand and commercial investment will evolve rapidly once on-going UAS rule-making regulations are finalized. The Pacific Northwest appears to have industries, such as Amazon, with large-scale UAS interests.

EAT Forecast Implications: UAS activity has the potential to occur at the Airport within the 20-year planning period. Activity could be conducted by a remote operator or a based UAS tenant, possibly involving various UAS missions and models. Due to unforeseen UAS industry developments, UAS activity has not been forecast as part of the master plan. However, as potential UAS activity unfolds, future Airport plan updates would need to consider airfield and airspace utilization, parking area, and possible support facilities.

3. AIRPORT FORECAST FACTORS AND INFLUENCES

The forecast considers airport, community, and aviation industry factors in order to develop realistic projections. From the Strength, Weakness, Opportunity, and Threat (SWOT) analysis, the Planning Advisory Committee (PAC) identified the overarching upward (+) and downward (-) aspects that could reasonably influence the Airport's 20-year activity. These factors, as listed separately for airline/commercial and general aviation, are considered as part of framing the qualitative and quantitative statistical methods used in developing the 'low', 'medium', and 'high' forecast scenarios.

AIRLINE/COMMERCIAL AVIATION: UPWARD (+) FORECAST INFLUENCERS

+ Small Community Air Service Development Program marketing initiatives have invigorated passenger interest, including a new California destination (*Airport Staff, 2014 EAT Marketing Wenatchee Air Service Study*)
+ The Runway 12-30 extension to 7,000 feet benefits larger and more demanding aircraft used for commercial transport. Installation of high-intensity lighting improves instrument reliability (*Airport Staff*). The Airport Staff reports an energized public awareness, community support, and media promotion resulting from the runway extension project (*PAC and Airport Staff*)
+ The Wenatchee Valley MSA commerce grew 4.2 percent annually from 2010 to 2015 *(Woods & Poole).* Historically, agriculture has served as the commerce base; however, industry is shifting towards more specialized high-tech businesses, attracted by low-cost energy generated by the surrounding Public Utility District hydroelectric dams (*Wenatchee Center for New West Study*)
+ Population growth resulting from quality-of-life lures including recreation areas, parks, tourist and resident resorts such as the Mission Ridge Ski Resort (*Wenatchee Center for New West Study*)

AIRLINE/COMMERCIAL AVIATION: DOWNWARD (-) FORECAST INFLUENCERS

- Airport financial deficit which degrades funding and investment capabilities (*Port and Airport Staff*)
- Airline passenger leakage is nearly 80 percent, with travelers driving to Seattle-Tacoma International Airport (SEA), Portland International Airport (PDX), and Spokane International Airport (GEG). SEA accounts for 60 percent of leakage due to drive time distance (*2014 EAT PDA Air Service Study*)
- Airport is subject to a captive airline market, meaning a single regional air carrier operator, single destination, single turboprop aircraft type, and single-airline fare structure. Not ideal SEA flight departure/arrival frequency and connection times. Airline flight cancellations reach 3 to 4 percent, and more prolonged during wintertime fog conditions (*PAC SWOT Input and 2014 EAT PDA Air Service Study*)
- Components of the local-area economy are experiencing stagnation; workforce declines from idle/closed large-scale manufacturing industries (Alcoa); regional housing shortages, development and investment constraints; and comparatively low wage rates to state (*Washington Employment Security Department*)

GENERAL AVIATION: UPWARD (+) FORECAST INFLUENCERS

+ Runway extension and Instrument Landing System availability (Airport Staff, PAC SWOT Input)
+ Size and population of Airport geographic catchment area (PAC SWOT Input)
+ Attractive user rates compared with Seattle-area (Airport Staff)
+ US Forest Service activities; potential USFS Winthrop relocation to the Airport (Airport Staff); potential unmanned aircraft system (UAS) activity by USFS at the Airport (USFS Website)

GENERAL AVIATION: DOWNWARD (-) FORECAST INFLUENCERS

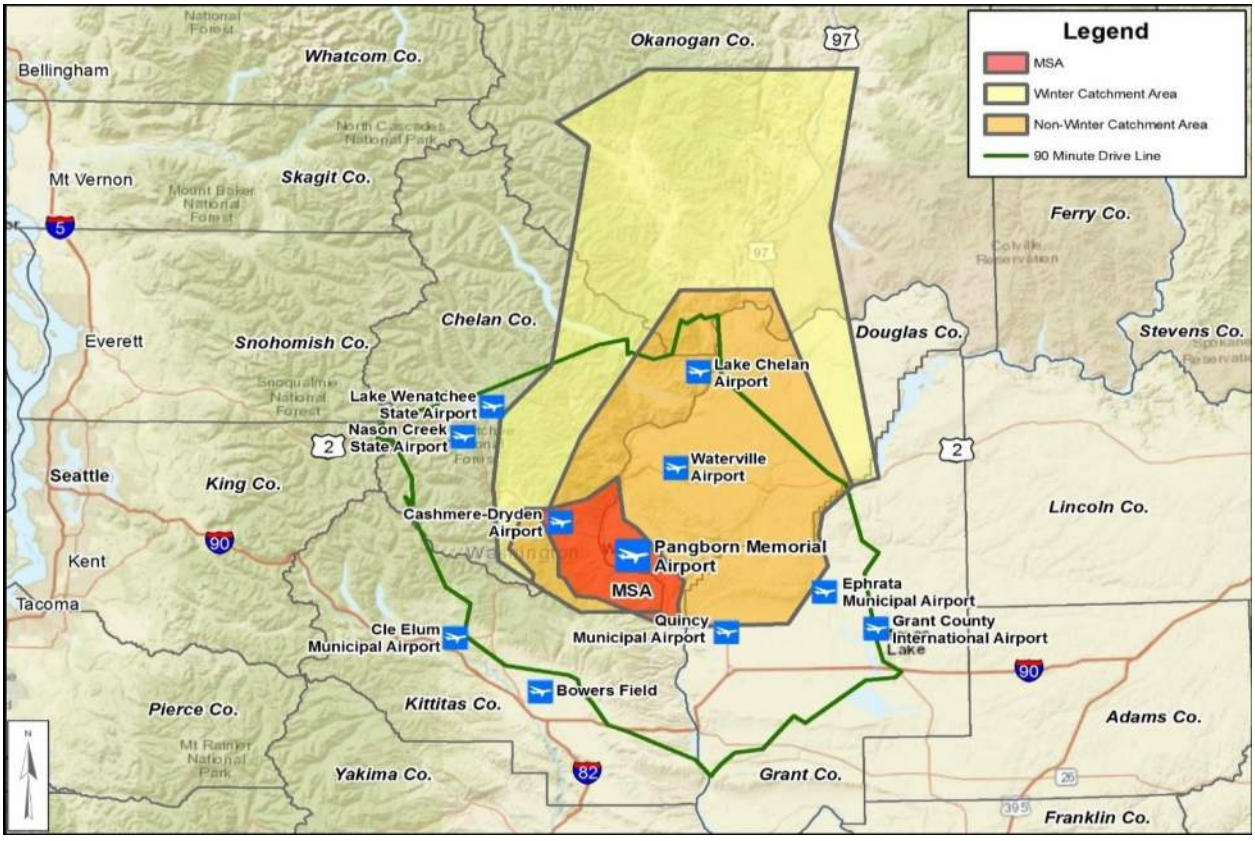
- Airport financial deficit which degrades funding and investment capabilities (*Port and Airport Staff*)
- Decline in based aircraft, total aircraft operations, and flight training (*PAC SWOT Input*)
- Loss of Executive Flight for FBO, charter services, and aircraft maintenance-repair *(PAC SWOT Input)*
- Competition of surrounding public and private general aviation airports (*PAC SWOT Input*)
- Lack of a large hangar to accommodate large business-class turbine aircraft (*PAC SWOT Input*)
- General aviation investment into facilities (FBO building) and support services (*PAC SWOT Input*)

4. AIRPORT AREA OF INFLUENCE

4.1 AIRPORT CATCHMENT AREA AND METROPOLITAN STATISTICAL AREA

Exhibit 2.1 depicts the Airport in relation to the Airport Catchment Area and the Metropolitan Statistical Area (MSA) boundaries. The airport catchment area contains a population which attracts air travelers served by airport facilities and services, established using drive-time distances based on competing services offered at surrounding airports. The MSA is a geographical region with a high-density population having a similar economic statistical core. These boundaries define the Airport's area of influence.

Exhibit 2-1: EAT Area of Influence (MSA and Catchment Areas)



Note: 90-Minute Drive-Time Contour previously identified in the 2014 EAT Marketing Wenatchee Air Service Study
Source: 2016 Mead & Hunt Master Plan Forecast – Airline Analysis.

The EAT Airline Catchment Area is comprised of two boundaries: a 'primary' and expanded 'seasonal' boundary. The seasonal boundary, which nearly doubles the geographic area, results from the closure of highway passes to the north during the winter months, typically December to mid-May. The primary catchment area population is 150,000, and it expands to 175,000 for the seasonal area. The seasonal catchment area population was used for airline forecast analysis.

The Airport is within the Wenatchee-East Wenatchee MSA, which encompasses the City of Wenatchee, the City of East Wenatchee, Bridgeport, Cashmere, Chelan, Leavenworth, Sunnyslope, and Waterville (outlying communities beyond the MSA and within the Airline Catchment Area reflects U.S. Census Bureau socioeconomic data). The use of the MSA as a socioeconomic statistical base is reinforced by FAA airport classification criteria per FAA General Aviation: National Asset, in that "an airport located within an MSA makes it more likely to support business activity".

The 2015 MSA population is 115,600, of which the City of Wenatchee and East Wenatchee comprise two-thirds. The MSA population, forecast by Woods and Poole, is projected to reach 141,250 by 2035, a 0.95 percent annual growth rate. In addition, the State of Washington, Office of Financial Management (OFM) prepares county-wide population forecasts (low, medium, high scenarios) used for local planning purposes. As reported for 2015, the OFM-combined Chelan and Douglas County population is 115,020. As forecasted by OFM, the 'low' population is projected to reach 115,100 (0.0 percent growth) by 2035; 139,400 (1.0 percent growth) for the 'medium' scenario; and 175,000 (2.1 percent growth) for the 'high' scenario.

These population projections support the master plan forecast analysis, for instance, in which the MSA population shows a high statistical correlation (0.96) with Airport passenger enplanements.

4.2 REGIONAL SOCIOECONOMIC PROFILE

Socioeconomic data provides an understanding of demographic profiles and commerce trends. The purpose of this data is to quantify community development characteristics, and to identify socioeconomic indicators connected with Airport activity patterns. Per FAA AC 5070-6B guidance, the key indicators for aviation forecasting purposes are population, employment, and per capita personal income.

Table 2.1 summarizes the major MSA historical and forecast socioeconomic indexes, expressed in values and percent year-to-year change. The MSA, measured as a composite of indexes, has historically grown at an annualized 3.2 percent rate between 1970 and 2015, with a higher 4.2 percent rate from 2010 to 2015. As projected by Woods and Poole, the overall composite MSA performance is forecast to grow at 2.1 percent between 2015 and 2035, a similar rate as historically experienced between 2000 and 2015.

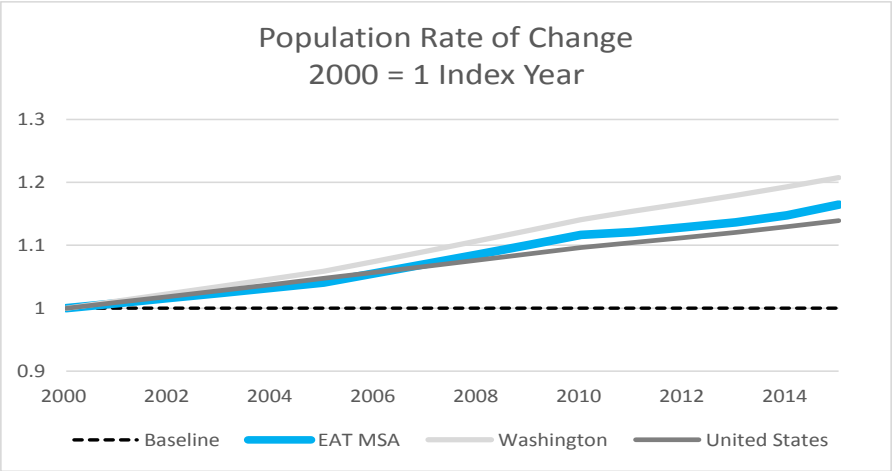
Exhibit 2.2 graphs MSA socioeconomic indicators from 2000 to 2015 with state and national levels. This indexed comparison provides a benchmark indication of MSA data relative to state and national trends. In all cases graphed below, the MSA indicators coincide with state and national rates, providing confidence in using historical MSA trends with respect to state and national socioeconomic forecasting data.

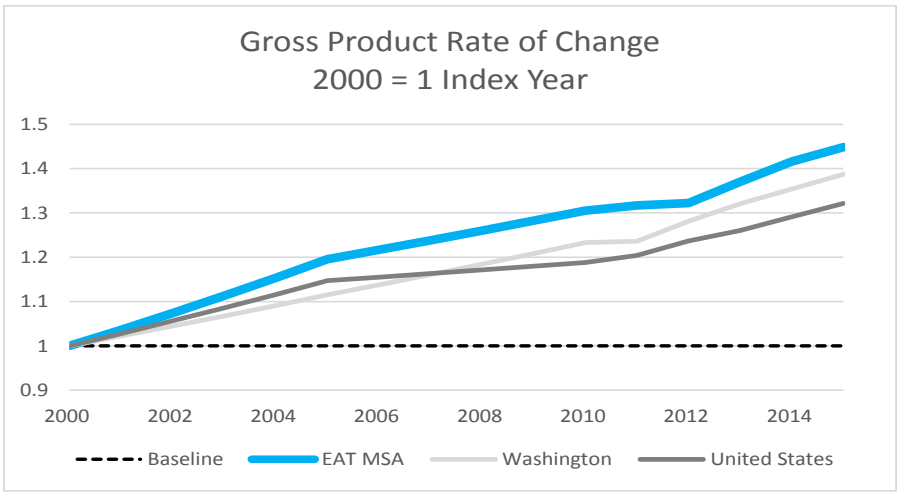
Table 2-1: Socioeconomic Metrics (Historical and Projected)

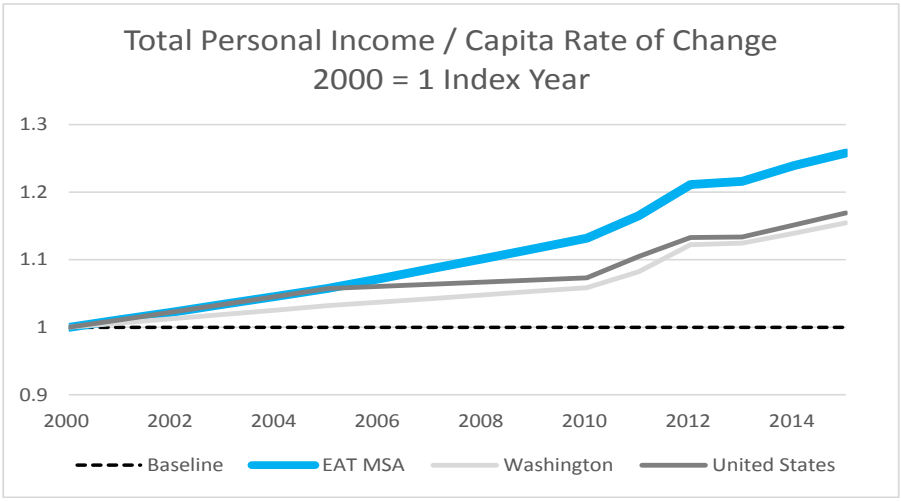
Economic Metric Category (Values)	Values - Historical Periods			Values - Forecast Periods		
	1970	2000	2015	2020	2025	2035
Total Population	57,931	99,322	115,662	121,850	128,294	141,250
Total Employment	28,819	56,908	68,421	73,522	78,490	87,772
Total Earnings ($ Millions)	802	1,999	2,670	2,974	3,291	3,953
Total Personal Income ($ Millions)	1,038	2,978	4,361	4,925	5,549	6,764
Net Earnings ($ Millions)	742	1,812	2,387	2,647	2,930	3,529
Total Personal Income Per Capita ($ Millions)	1,038	2,978	4,361	4,925	5,549	6,764
Total Mean Household Personal Income ($ Millions)	52,213	79,926	95,696	102,049	109,728	124,767
Total Retail Sales ($ Millions)	545	675	740	752	906	1,133
Gross Regional Product ($ Millions)	1,369	3,227	4,674	5,206	5,763	6,933
Economic Metric Category (Percents)	**% Change - Historical Periods**			**% Change - Forecast Periods**		
	1970-2015	**2000-2015**	**2010-2015**	**2015-2020**	**2015-2025**	**2015-2035**
Total Population	1.55%	1.02%	2.27%	1.05%	1.04%	1.00%
Total Employment	1.94%	1.24%	2.26%	1.25%	0.81%	1.25%
Total Earnings	2.71%	1.95%	3.33%	2.18%	2.11%	2.18%
Total Personal Income	3.24%	2.58%	5.88%	2.22%	1.43%	2.22%
Net Earnings	2.63%	1.85%	3.26%	2.09%	2.07%	2.09%
Total Personal Income Per Capita	5.34%	3.48%	7.30%	3.49%	3.76%	3.49%
Total Mean Household Personal Income	5.02%	3.14%	6.87%	3.38%	3.76%	3.38%
Total Retail Sales	2.62%	1.74%	3.00%	1.78%	1.67%	1.78%
Gross Regional Product	2.77%	2.50%	3.91%	2.18%	2.12%	1.99%
COMPOSITE AVERAGE:	**3.1%**	**2.2%**	**4.2%**	**2.2%**	**2.1%**	**2.2%**
	3.2%			**2.1%**		

Source: US Census Population Data obtained through Woods & Poole, Inc.

Exhibit 2-2: Socioeconomic Index Comparisons (MSA, State, and Nation)







Source: US Census Population Data obtained through Woods & Poole, Inc.

5. MASTER PLAN FORECAST SCENARIOS

The master plan forecasts include 'no/low', 'medium', and 'high' planning activity level scenarios for the airline, cargo, and general aviation components. These scenarios reflect the underlying forecast influences previously noted, and a reasonable bracket in considering constrained and unconstrained forecast conditions. The order of magnitude used to define the 'no/low', 'medium' and 'high' parameters are framed from Airport and community growth expectations, as largely determined from SWOT findings by the Planning Advisory Committee, interviews with the Port, County and City officials, along with a review of local planning studies (see appendix for sources). The three forecast scenarios are characterized below:

No/Low Growth Forecast Scenario Description: Activity levels parallel recent Airport trends and reflect the overall steady-state of the aviation industry. The Wenatchee Valley sees commerce gains by smaller locally-based businesses, with persistent workforce and residential housing market challenges. Overall, this represents a year-to-year growth change generally not exceeding 1 percent.

Medium Master Plan Forecast Scenario Description: Activity levels reflect more robust Airport utilization that exceeds national aviation trends. The Wenatchee Valley commerce expects a broadening base of nationally-owned industry sectors, tourism expansion, as well as residential growth constraints. Overall annual growth falls between 1 to 3 percent.

High Master Plan Forecast Scenario Description: Airport activity represents a proliferation of business and corporate use of aviation services that exceeds national aviation trends. The Wenatchee Valley commerce base experiences an optimized expansion of external commercial investment and residential growth, brought about by a diversifying sector of larger hi-tech industry. Overall annual growth does not generally exceed 4 percent.

6. MASTER PLAN FORECASTS

This section describes the Airport's aviation demand forecasts for each of the four activity components listed below. Each component is similarly documented, including a summary of historical trend activity since 2005; identification and description of the 'no/low', 'medium' and 'high' projection scenarios; and the rationale for selection of the preferred forecast.

- Forecast Component #1: Airline Passenger Demand
- Forecast Component #2: Air Cargo Freight Volumes
- Forecast Component #3: Annual Aircraft Operations
- Forecast Component #4: Based Aircraft

FORECAST COMPONENT #1: AIRLINE PASSENGER DEMAND

6.1 Airline Forecast Factors

The following describes airline market-based information used in developing the passenger enplanement forecasts. This background information provides a historical context of factors that could reasonably influence future passenger demand levels and the airline supply of services. Overall, this data helps substantiate the forecast methods, the range of forecast scenarios, and the rationale used in selection of a preferred forecast.

Historical Airline Service: Alaska/Horizon Airlines has continuously provided service since 1984, and in 2008 transitioned from a 37-passenger seat Bombardier Q200 to the 76-seat Q400 turboprop transport aircraft. SeaPort Airlines operated from March to December 2012, provided scheduled service with 12-seat Cessna Caravan single-engine turboprop on daily flights to Portland (PDX) via Yakima (YKM). As of 2016, Alaska Airlines provided 2.8 daily flights or 1,040 annual departures to the Seattle-Tacoma International Airport (SEA), with an average of 60 passengers-per-departure, equating to a load factor ranging between 65 to 85 percent.

Historical Airline Passenger Activity: The Airport reported 62,010 enplaned passengers in 2015 and 60,062 in 2016. However, for 2016, neither the Airport's Alaska Airlines Summary Report nor TAF reflect the 21 cancelled airline flights during the July runway closure (10 full consecutive days or 2.7% of the year). This equates to nearly 2,000 foregone enplanements assuming normal flight schedules and load factors. Had the runway not been closed, it is expected that EAT would have attained 61,700 enplaned passengers in fiscal year 2016.

Since 2005, enplanements have increased 2,500 to 3,000 passengers per year, or 4.5 percent annually, which has exceeded the Washington statewide rate of 3.0 percent and Unites States nationwide rate of 0.6 percent during the same period. Since 2010, the average ratio of passengers enplaned (boarding) versus deplaned (arriving) has been evenly split, with a trend towards a greater proportion of enplaned passengers, as indicative of the boardings by seasonal agricultural workers. In 2016, the enplaned passengers accounted for 51.4 percent and deplaned 48.6 percent. The Airport enplanement-to-MSA population ratio was 0.54 in 2015 (62,010 enplaned ÷ 115,662 population), which is a common forecast index used for assessing passenger utilization and airline market share.

Surrounding Commercial Airport Comparison (FAA TAF): Table 2.2 shows the 20-year FAA TAF commuter passenger projections for surrounding commercial service airports within the State of Washington. As shown, EAT Airport enplanements are forecast to grow at 2.6 percent annually between 2015 and 2035, a similar rate compared with other surrounding airports, and the same rate as the combined Washington airports.

EAT True Market Passengers: Table 2.3 summarizes the Airport's true air passengers, market share, and average fares as reported from the 2014 EAT Passenger Demand Analysis (2014 PDA). A true passenger is an air traveler booking travel from within the EAT Airline Catchment Area. This includes EAT Airport enplaned (outbound boarding) and deplaned (inbound arriving) passengers, in addition to air travelers driving to-or-from the surrounding commercial airports (Seattle-SEA, Spokane-GEG, Tri-Cities-PSC, and Portland-PDX).

Table 2-2: 20-Year Passenger Enplanement Forecast Changes (FAA TAF)

Year (Fiscal)	'Commuter' Passenger Enplanements at Surrounding WA Commercial Airports								
	EAT	SEA	PSC	PUW	YKM	GEG	ALW	BLI	WA State
2017	**61,826**	**3,695,223**	**255,132**	**46,768**	**58,605**	**545,500**	**40,245**	**118,284**	**4,850,807**
2035	**95,252**	**6,482,887**	**412,942**	**106,495**	**89,522**	**952,087**	**71,658**	**162,202**	**8,417,259**
Change	**33,426**	2,787,664	157,810	59,727	30,917	406,587	31,413	43,918	3,566,452
CAGR	**2.4%**	3.2%	2.7%	4.7%	2.4%	3.1%	3.3%	1.8%	3.1%

SEA = Seattle-Tacoma International Airport, PSC = Tri Cities Airport, PUW = Pullman-Moscow Airport
YKM = Yakima Air Terminal, GEG = Spokane Airport, ALW = Walla Walla, BLI = Bellingham Airport
Source: FAA TAF (Obtained January, 2017)

Based on the 2014 PDA, there are 542,057 total true passengers (nearly 275,000 enplaned) generated from the EAT Airline Catchment Area. The City of Wenatchee accounts for 31 percent of the travelers and the City of East Wenatchee 18 percent, with the remaining 51 percent from surrounding communities within the catchment area. EAT captures nearly 20 percent of true passengers, with the remaining 80 percent driving, or leaked, to the Seattle-SEA, Spokane-GEG, Tri-Cities-PSC, and Portland-PDX airports. The drive time to Seattle-SEA, Spokane-GEG, and Tri-Cities-PSC is generally around three hours.

As reported by the 2014 PDA, the 80-percent passenger leakage is attributed to the SEA drive convenience, EAT flight cancellations (mostly occurring during wintertime), inconvenient SEA connecting flight times and layover periods, and airfare sensitivity. Airport Staff believes that these factors are compounded by the few number of daily flights between EAT and SEA.

Table 2-3: True Airline Market / Passengers (EAT Airline Catchment Area)

True Market Airports (EAT Catchment Area)	EAT Drive Distance (Miles)	EAT True Market Passengers (2013)		Average Fare (2013)
		Total Passengers	% Capture	
Wenatchee (EAT)	**-**	**101,900**	**19%**	**$194**
Seattle (SEA)	162	321,978	59%	$180
Spokane (GEG)	166	70,469	13%	$168
Tri-Cities (PSC)	133	29,714	6%	$127
Portland (PDX)	291	17,996	3%	$126
Totals / Averages	**188**	**542,057**	**100%**	**$159**

Note: Enplaned passengers (boardings) are approximately 50% of the total passengers.
Note: 2009 EAT Passenger study identified 221,200 true passengers and a 47% EAT true passenger capture.
Source: Passengers and fares from 2014 EAT PDA Study; Drive distance from Google Maps

Air Fares: The 2014 PDA reported the mean departure fare out of EAT is $194, an average of $18 higher than the four alternate drive-destination airports (SEA, GEG, PSC, PDX). While fare price alone may not compel a traveler to use an alternate commercial airport as an origin or destination, the $18 fare difference does not offset the associated travel costs (fuel, parking, tolls) and time in driving to an alternate airport.

Destinations (Airport/City-Pair Market): Historically, the Seattle-Tacoma International Airport (SEA) has served as the Airport's primary origin and destination route. However, the 2014 PDA found that 98 percent of passengers in the EAT Airline Catchment Area are continuing travel on flights beyond the Seattle area.

As part of the forecast analysis, new non-stop destinations (city-pair markets) were assessed using information from the 2014 PDA and the Airport's ongoing airline marketing initiatives. The new destination potential represents a significant forecast service event, which is important to consider as part of developing passenger enplanement forecast scenarios. This method of analysis provides a means to assess passenger demand in direct connection with specific destinations and airline operating logistics. **Table 2.4** summarizes the top market destinations and passenger demands from the 2014 PDA, as determined from an analysis of the 542,059 total true passengers.

The analysis of true passenger demand and top destination markets involved:

Step #1: The volume of daily passengers was ranked to identify the top potential destinations, as measured by passenger demand each way (PDEW is the number of passengers traveling between destinations each day).

Step #2: Each potential new destination was further assessed based on the Airport's percent capture of the true market passengers per destination, as consideration of the passengers-per- departure, flight route distance, airport destination hub function, and aircraft type and seating capacity (load factor).

The analysis identified 11 potential city-pair destinations which could support some level of non-stop service; as a condition of the type of airline operator (scheduled airline, scheduled charter, non-scheduled charter), flight frequency (semi daily-weekly-monthly), and aircraft type and available seating (transport turboprop or jet aircraft models). It should be noted that passenger demand levels would not reasonably support multiple city-pair combinations simultaneously, and that potential air service would be subject to operating, economic, and financial considerations arranged between the Airport and airline operator on a case-by-case basis.

Table 2-4: Top True Passenger Markets and Potential Destinations

Rank #	Airport Destination (City Market)	Total True Passengers	EAT Market Passengers	EAT Actual Passengers	EAT Daily Market Pax. (PDEW)	EAT NonStop Destination Potential	Aircraft Type
--	**Seattle**	**19,564**	--	**19,564**	**27.2**	**Existing Service**	**Turboprop**
1	**Las Vegas**	**67,525**	**62,926**	**4,599**	**92.5**	**Potential - Charter**	**Jet**
2	**Los Angeles Area**	**60,152**	**50,516**	**9,636**	**82.4**	**Potential - Scheduled**	**Jet**
3	**San Francisco Area**	**45,260**	**39,055**	**6,205**	**62.0**	**Potential - Scheduled**	**Jet**
4	Denver	**32,047**	29,565	2,482	43.9	--	--
5	**Phoenix/Mesa Area**	**28,105**	**23,798**	**4,307**	**38.5**	**Potential - Charter**	**Jet**
6	**San Diego**	**26,207**	**22,776**	**3,431**	**35.9**	**Potential - Charter**	**Jet**
7	Sacramento	**20,075**	17,009	3,066	27.5	--	--
8	Anchorage	**12,775**	10,074	2,701	17.5	--	--
9	Chicago Area	**12,483**	11,023	1,460	17.1	--	--
10	**Guadalajara (Mexico)**	**11,753**	**7,884**	**3,869**	**16.1**	**Potential - Charter**	**Jet**
11	Minneapolis	**11,753**	10,731	1,022	16.1	--	--
12	**Portland**	**11,315**	**6,862**	**4,453**	**15.5**	**Potential - Scheduled**	**TP/Jet**
13	Kahului (Hawaii)	**9,855**	8,760	1,095	13.5	--	--
14	**Salt Lake City**	**9,198**	**8,103**	**1,095**	**12.6**	**Potential - Scheduled**	**Jet**
15	**Boise**	**7,446**	**5,840**	**1,606**	**10.2**	**Potential - Scheduled**	**TP**
16	Washington, DC Area	**7,227**	5,840	1,387	10.2	--	--
17	San Antonio	**7,254**	6,570	684	9.6	--	--
18	Dallas Area	**6,935**	5,621	1,314	9.5	--	--
19	**Reno**	**5,621**	**4,380**	**1,241**	**7.7**	**Potential - Charter**	**TP/Jet**
20	New York Area	**5,548**	4,672	876	7.6	--	--
--	**Spokane**	--	--	--	--	**Potential - Connecting**	**TP/Jet**
TOP 1-20 DESTINATIONS		**418,098**	**342,005**	**76,093**	**573**		
TOTAL EAT POTENTIAL		**272,582**	**232,140**	**40,442**	**373**		
TOTAL EAT TRUE MARKET		**542,057**	--	**100,900**	**743**		

PDEW = Passenger Trips per Day, Each Way (based on true market origin and destination passengers).
TP = Turboprop Engine Transport Aircraft | Jet- Jet Engine Transport Aircraft.
Note: Non-Stop Service: A flight with point-to-point route – does not include any stops.
Note: "Potential-Scheduled" – Semi-daily/weekly/month flight schedule.
Note: "Potential-Charter" – Semi-monthly on-dem and flights.
Note: "No-Distance/Yield" – Destination unlikely due to airline route logistics and revenues.
Source: FAA TAF and Mead & Hunt Forecast Projections (March 2017)

Airline Service Events: Table 2.5 identifies airline service events potentially occurring within the 20-year forecast period. This is a key airline forecast table, as it shows potential airline service 'events', likely to occur or otherwise dismissed from consideration throughout the planning horizon. The event scenarios, outlined in five-year increments, identify potential air service occurrences which could measurably influence the forecast of passenger demand.

These events involve a potential change in flight times, route frequency, destinations, aircraft equipment (turboprop/jet transports) and new air carrier operators. Alaska Airlines was consulted, on multiple occasions, regarding future Airport service expectations, flight schedules, aircraft fleet planning (Q400 phase out), and other potential destinations. In some instances, the trigger for an airline event may be a condition of other air service factors.

Table 2-5: Airline Forecast Scenario Events

Event #	Airline Event Description	Planning Period			Ultimate (20+ Yrs)
		Short (1-5 Yrs)	Mid (6-10 Yrs)	Long (11-20 Yrs)	
EAT AIRPORT INFLUENCES:					
1	Improved Airline Reliability (Runway Length, HIRL Lights)	X	---------->	---------->	---------->
2	Airport Captures Larger 'True Passenger' Market Share	X	---------->	---------->	---------->
3	Airport Promotes Increased Passenger Awareness	X	---------->	---------->	---------->
EXTERNAL AIRLINE AND AIRPORT SERVICE INFLUENCES:					
4	Airline Market/Hub Service Changes - at SEA			COND #17	---------->
5	Airline Market/Hub Service Changes - Other Western Hub(s)			COND #10	---------->
6	Airline Service Changes at Yakima, Spokane, Tri-Cities				
ALASKA AIRLINES INFLUENCES AT EAT:					
7	EAT Improved Flight Schedule/Times - to SEA	X	---------->	---------->	---------->
8	Added EAT Flight Frequency - to SEA	X	---------->	---------->	---------->
9	Aircraft Type Change - to SEA (Prop to Jet)			X	---------->
10	Added New Destination - To Other Western Hub (Prop)		COND #15		---------->
11	Added New Destination - To Other Western Hub (Jet)		COND #15		---------->
12	Ceases Service at EAT				
NEW ENTRANT AIRLINE INFLUENCES (REGIONAL, MAJOR AND LOW COST AIR CARRIERS):					
13	Regional EAT Service - to SEA (Prop)			COND #4	---------->
14	Regional EAT Service - to SEA (Jet)			COND #4	---------->
15	Regional EAT service - to Other Western Hub(s)	X		---------->	---------->
16	Major Initiates EAT Service - to SEA (Prop or Jet)				
17	Major Initiates EAT Service - to Western Hub (Prop)			COND #5	---------->
18	Major initiates EAT Service - to Western Hub (Jet)				X
19	Low Cost Carrier - Seasonal Service to Southwest US Airport	X		---------->	---------->
20	Low Cost Carrier - Seasonal Service to Eastward US Airport				X
21	New Regional Airline Replaces Alaska Airlines Service				
22	New Major Airline Replaces Alaska Airlines Service				

Legend:

X Event Occurrence at EAT

----> EAT Occurrence Continues

COND Event Conditional at EAT upon other Event Occurrence(s)

Prop = Turbopropeller Aircraft

Jet = Jet Aircraft

Airline Category and Examples:

Major Airline: Alaska, Delta, United, American, Southwest

Regional Airline/Affiliation: Horizon, Delta Connection, United Express, American Eagle, PenAir

Low Cost/Charter Airline: Allegiant, Frontier

Source: Mead & Hunt Airline Service (Obtained December 2016)

The following airline events were selected by the Airport Staff for passenger forecast consideration:

- Event #7: Alaska Airlines improves flight times and connections to SEA
- Event #8: Alaska Airlines adds daily or semi-weekly flights to SEA
- Event #9: Alaska Airlines introduces daily or semi-weekly regional jet service to SEA
- Event #15: New West Coast destination with daily or semi-weekly service
- Event #19: New Low-Cost/Charter Air Carrier with semi-monthly flights

For forecasting purposes, the timeline of these events establishes a relationship into how airline developments might unfold. As identified in Table 2.4, the true passenger data indicates that San Francisco-SFO, Sacramento-SAC, and Portland-PDX are the most viable new-airport destinations, potentially served on a semi-daily/monthly basis with either a turboprop and/or regional jet. It should be noted that during the preparation of the master plan forecasts, the Airport Staff was pursing new service to San Francisco-SFO, which anticipated semi-daily flights using a 60 to 80 seat regional jet. The 'airline event' scenario is the Airport Staff's favored forecast methodology, because it relates directly to actual and on-going EAT airline service initiatives. Traditional forecast enplanement methods (trend, regression, market share) were also developed for consideration. However, these statistical aggregate methods offer a less 'causal' projection, when considered against EAT airline and passenger service initiatives, and events likely to unfold in the near future.

6.2 Airline Passenger Forecast Scenarios

Multiple forecast techniques were developed for consideration, which initially resulted in 10 forecast scenarios that ranged between 75,000 to 130,000 annual enplanements by 2035.

A total of 36 statistical enplanement projections were developed for consideration. Most of the 36 projections use traditional statistical techniques (trend, regression, etc.). While the statistical techniques may provide 'correlation', they do not necessarily establish causation. Therefore, computing the 36 enplanement projections is helpful for delineating the potential low-to-high range of passenger demand levels. From the 36 enplanement projections, ten (10) were selected as the most reasonable candidates, in terms of their forecast method and long-term projection values. Following discussions with the Airport Staff and PAC, these were narrowed to three forecast scenarios which best suited a favored forecast approach, and a reasonable range of 'low', 'medium', and 'high' scenarios. The preferred forecast method uses the 'Air Service Event' approach, as outlined below:

Step #1: Devise EAT Market Destination and Passenger Demand Scenarios (from Table 2.4)

Step #2: Formulate Possible EAT Airline Service Events and Timelines (from Table 2.5)

Step #3: Group EAT Airline Service Events per the 'Low', 'Medium' and 'High' Scenarios

Step #4: Calculate the 20-Year 'Low', 'Medium' and 'High' Forecast Scenarios

The 'Air Service Event' approach calculates annual enplaned passengers for each discrete airline service event, using the following variables to calculate the year-to-year passenger forecast output:

- Type of airline operator (major, regional, low-cost/charter)
- Timeframe (year or period for air service event to occur)
- Flight frequency
- Aircraft type (turboprop or jet models)
- Aircraft size (available passenger seats)
- Passenger demand-per-departure (load factor) per route/destination
- Future passenger growth per route/destination (annual percent change)

In the case of new service being introduced, the enplaned passenger levels are incrementally added. While in the case of aircraft equipment change and flight frequency, passenger levels take into account the overall net change in service events. An advantage of this forecast technique is the ability of the Airport to continuously modify projections based on actual implementation of airline service events or adjusted metrics.

The three forecast scenarios (low, medium, and high) are preferred and selected by the Airport Staff, as each method can be discretely quantified by on-going or anticipated EAT airline service initiates (SCASDP program). The Airport Staff believes the three (3) EAT airline events reflect a real forecast circumstance, and the strongest forecast cause-and-effect. Therefore, these three forecast scenarios best identify with a reasonable forecast expectation with regard to future airline service improvements and passenger growth opportunities. In addition, the EAT airline event scenarios correspond directly with the methodology used to determine airline facility requirements; such as passenger building, apron, auto parking. For instance, future airline terminal building space is evaluated using airline service events (number of airline operators, destinations, aircraft types/seating capacity, route frequency, etc.). Consequently, using a pure statistically-based enplanement projection lacks insight into how airline service would reasonably unfold. The Airport Staff feels strongly that future passenger growth will track with the 'medium' passenger enplanement forecast, per the 'medium' airline event scenario.

Exhibit 2.3 graphs the forecast scenarios, as described below.

Low Scenario:	Airline Service Sector – Low (85,300 by 2035)
Medium Scenario (Preferred):	**Airline Service Sector – Medium (93,600 by 2035)**
High Scenario:	Airline Service Sector – High (107,900 by 2035)
FAA TAF:	Enplanement Projection (95,252 by 2035)

Low Forecast: Airline Service Sector 'Low Projection': This forecast method calculates passenger demand through the introduction of the following air service events and the modest timing and increase of air service variables. This forecast results in 85,300 enplaned passengers by 2035, a 37-percent total growth over 2015 levels. This forecast scenario was dismissed from further consideration because it does not reflect annualized passenger growth trends occurring during the past five to ten year period, a rate of growth expected to continue during the next five year period because of Airport marketing promotions, regional economic prosperity, and the anticipated timing of new destination service.

Low Airline Forecast Events: #7/8 + #15 + #8 (reference Table 2.5 for event #)

- By 2020, Alaska Airlines improves/adds SEA daily or semi-weekly flights (Event #7/8)
- By 2025, New West Coast destination with small regional turboprop aircraft (Event #15)
- By 2030, Added semi-weekly/daily flights to SEA/West Coast destination (Event #9)

Medium Forecast (Preferred): Airline Service Events 'Medium Projection': This forecast method incrementally calculates passenger demand through the introduction of the following air service events and the assertive increase of air service variables. This forecast results in 93,600 enplaned passengers by 2035, a 50-percent total growth over 2015 levels. This forecast scenario was preferred because it is realistic with past EAT air service factors, the introduction of on-going air service initiatives (SFO service), reflects a realistic catchment of true passengers, and reflects future annualized growth experienced in the past five to ten years.

Medium Airline Forecast Events: #7/8 + #19 + #15 + #9 (reference Table 2.5 for event #)

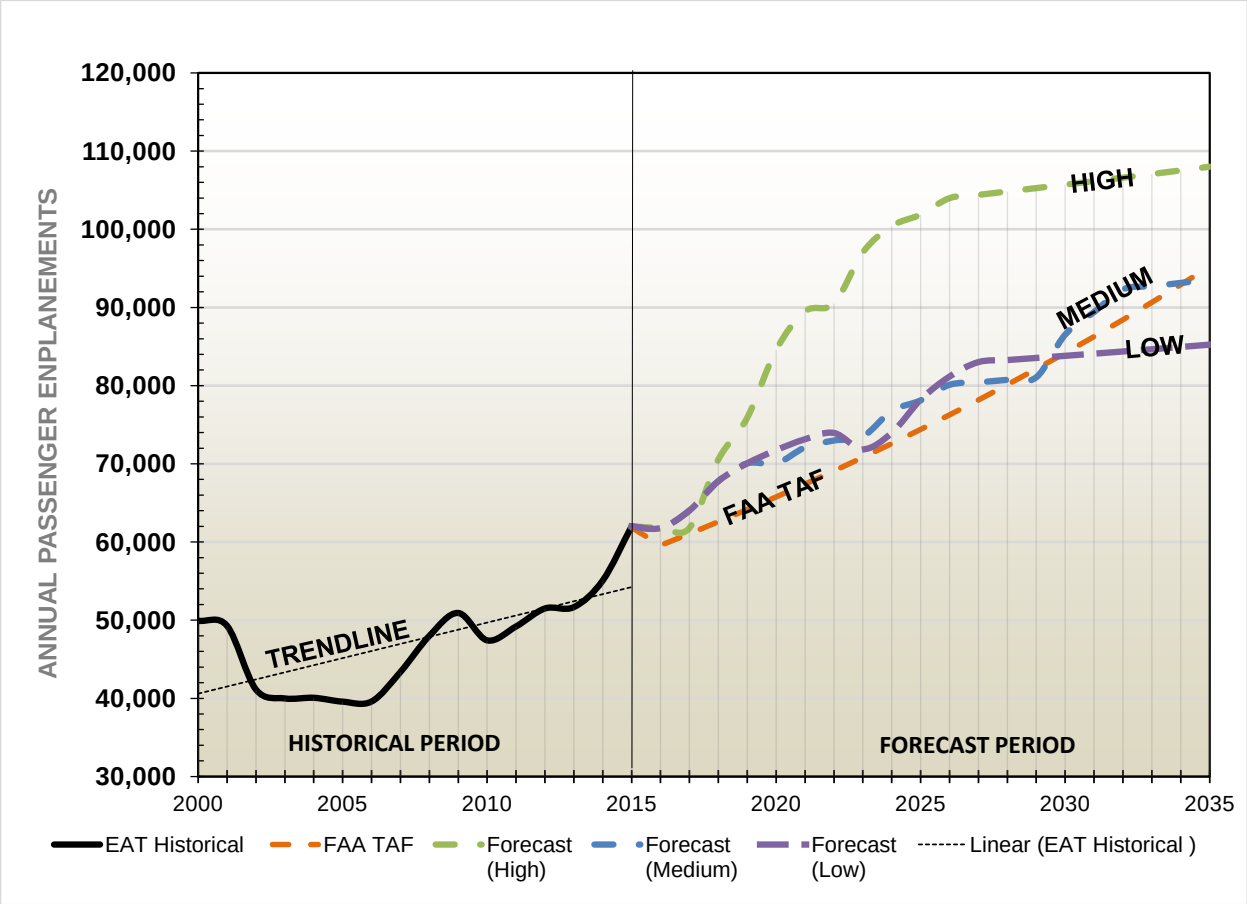
- By 2020, Alaska Airlines improves/adds SEA daily or semi-weekly flights (Event #7/8)
- By 2025, New low-cost/charter operator provides semi-monthly flights (Event #19)
- By 2025, New West Coast destination with large regional turboprop aircraft (Event #15)
- By 2030, Added semi-weekly/daily flights to SEA/West Coast destination (Event #9)

High Forecast: Airline Service Events 'High Projection': This forecast method incrementally calculates passenger demand through the introduction of the following air service events and the moderately aggressive increase of air service variables. This forecast results in 107,900 enplaned passengers by 2035, a 74-percent total growth over 2015 levels. This forecast scenario was dismissed from further consideration because it represents an optimum level of service events which appears to outperform future service improvements indicated by Alaska Airlines (EAT Station Manager), a catchment of true passenger leakage, and is optimistic regarding the ability of the airlines to mobilize service and aircraft assets for a regional-type airport.

High Airline Forecast Events: #7/8 + #15 + #19 + #15 (reference Table 2.5 for event #)

- By 2020, Alaska Airlines improves/adds SEA daily or semi-weekly flights (Event #7/8)
- By 2020, New West Coast destination with regional jet aircraft (Event #15)
- By 2030, New low-cost/charter operator provides semi-monthly flights (Event #19)
- By 2030, Added West Coast destination flights with regional jet aircraft (Event #15)

Exhibit 2-3: (EXHIBIT & TABLE) 20-Year Airline Enplanement Forecast
(PREFERRED FORECAST: MEDIUM SCENARIO)



Year	FAA TAF	Enplanement Forecast (Low)	Enplanement Forecast (Medium)	Enplanement Forecast (High)
2015	61,826	62,010	62,010	62,010
2020	65,769	71,700	70,000	84,500
2025	74,406	78,200	78,100	101,800
2030	84,183	83,800	86,500	105,700
2035	95,252	85,200	93,500	107,900
20-Year Change	33,426	23,190	31,490	45,890
20-Year % Change	54.1%	37.4%	50.8%	74.0%
% CAGR	2.2%	1.6%	2.1%	2.8%

Source: FAA TAF and Mead & Hunt Forecast Projections (March 2017)

Table 2.6 shows airline activity projections commensurate with the preferred passenger enplanement forecast. The air carrier transport aircraft operations would largely be conducted by 'scheduled' airlines, and also expected to include 'non-scheduled' operators offering on-demand service, perhaps involving connecting service.

Table 2-6: Airline Activity Summary – Preferred Passenger Forecast

Year (Fiscal)	Annual Airline Passengers			Annual Airline Aircraft Operations		
	Enplaned	Deplaned	Total	Scheduled	Non-Scheduled	Total
2005	39,577	37,955	**77,532**	N/A	N/A	N/A
2010	47,418	45,474	**92,892**	2,248	N/A	**2,248**
2015	62,010	58,569	**120,579**	2,080	0	**2,080**
2020	70,000	67,100	**137,100**	2,320	60	**2,380**
2025	78,100	74,900	**153,000**	2,550	80	**2,630**
2030	86,500	82,900	**169,400**	2,780	110	**2,890**
2035	93,500	89,700	**183,200**	2,960	125	**3,085**
CAGR (05-15)	4.6%	4.4%	4.5%	N/A	N/A	N/A
CAGR (15-35)	2.1%	2.2%	2.1%	1.8%	N/A	2.0%

** Change in 2005 to 2010 operations resulting from Alaska Airlines swtiching to a larger aircraft.*

Year	Airline	Aircraft Type	Aircraft Model	Aircraft Seats	Average Daily Departures	Average Load Factor
2005	Alaska	Turboprop	Q200	37	N/A	N/A
2010	Alaska	Turboprop	Q400	76	N/A	N/A
2015	Alaska	Turboprop	Q400	76	2.8	80%
2020	Multiple	Turboprop / Jet	Q400/CRJ-700	76	3.2	80%
2025	Multiple	Jet	CRJ-700/900	76	3.5	80%
2030	Multiple	Jet	CRJ-700/900	76 to 90	3.8	81%
2035	Multiple	Jet	EMB-170/175	76 to 90	4.1	82%

Passengers = Enplanements and Deplanements, Operations = Takeoffs and Landings
Load Factor = Seats/Passengers. Load Factor includes Enplaning and Deplaning Passengers
TP = Turboprop Engine Transport Aircraft | Jet – Jet Engine Transport Aircraft
Source: FAA TAF and Mead & Hunt Forecast Projections (March 2017)

Preferred Airline Passenger Forecast Summary

The following provides a comparison of the preferred 20-year passenger enplanement forecast in relation to industry trends, growth rates, and activity indexes, to highlight the preferred airline activity forecasts in terms common airline operating factors and practices.

- Forecast passenger increases are in-line with annualized historical passenger growth numbers and rates. The 20-year annual passenger forecast growth rate of 2.1 percent is below the 5.1 percent experienced since 2005, while consistent with the longer-term 1.7 percent growth rate experienced since 1990.
- Forecast passenger demands will exceed the existing airline flight frequency and available departure seats. The forecasts indicate an increase in the average daily flights from 2.8 in 2015 to 4.1 by 2035, the increase of passengers-per-departure from 59 to 63 by 2035, and an increase in aircraft departure seats from 79,000 to 115,000. This additional flight frequency and aircraft seat capacity is required by 2020 in order not to exceed the FAA Aerospace Forecasts industry load factor of 85-percent; in which much higher load factors tend to result in routine overbooking and passengers being denied boarding due to over-capacity.

- Forecast passenger demands may involve a transition to a larger transport aircraft. Based on existing airline service conditions (flight frequency, aircraft type/seats), passenger levels would be sustainable by 76-seat aircraft (Q400) through 2020, without exceeding an 85-percent load factor. Beyond 2020, additional seat capacity, in the form of larger aircraft, might be realized through the introduction of a larger turboprop or regional jet. Although not ordered by Alaska Airlines, Bombardier began offering the Q400NextGen in 2016, a 86 to 90-seat high capacity Q400 variant. The regional jet fleet entails multiple aircraft with 70 to 90-plus seat capacity which may economically serve the Airport in the future, including the Bombardier CRJ 700/900/1000, Mitsubishi MRJ 70/90, Embraer 140/145, and the larger narrow-body Embraer 170/175 and Bombardier CS100.
- Forecast levels are consistent with the Airport's potential to capture a larger segment of the EAT true passenger market, which totaled 542,000 passengers in 2015 and is conservatively estimated to grow to 667,000 passengers by 2035, using the 0.95 percent MSA population growth rate projected by Woods and Poole. The preferred enplanement forecasts represent a retention rate of 28-percent of the true market by 2035, up from 22-percent in 2015. Each percent capture of the true passenger market equates to about 2,700 enplaned passengers (542,000 x 1% = 5,420/2 = 2,700), a sustainable level of growth achieved by the Airport during the past five years.

FORECAST COMPONENT #2: AIR CARGO

6.3 Air Cargo Forecast Background and Factors

Three operators provide air cargo services at the Airport: AmeriFlight operating for UPS to Boeing Field; Empire Airlines operating for FedEx to Spokane (GEG); and Alaska Airlines operating to Seattle (SEA). FedEx and UPS are integrated cargo operators using aircraft for shipping time-sensitive express packages, while Alaska Airlines primarily carries US Postal Service items. FedEx operates a package sort facility at the Airport. UPS conducts sorting at a downtown Wenatchee location.

As shown in **Table 2.7**, the three cargo operators combined transport 1.3 million pounds annually by air, with 65 percent shipped inbound and 35 percent shipped outbound, which suggests a stronger consumer market as opposed to a producer market. On an annual average, UPS and FedEx process a nearly equal amount of total air cargo volume. As a regional freight feeder service facility, the Pangborn Memorial Airport is at a competitive disadvantage to larger cargo hub gateway airports (Seattle and Portland) that have existing air cargo capacity, network connectivity, and greater bases of origin-and-destination air cargo. Even after a recent history of prolonged air cargo industry financial losses, larger cargo hub airports still have measurable economic advantage over regional feeder service. The air cargo low-weight and high-value transport benefits rarely can compete with the high-weight, low-value of truck and rail transport.

Although challenging, the Airport's air cargo growth options entail incentivizing shippers to avoid the larger hub gateway congestion and freight clearance timeframes, attracting more high-tech industry with high-value components, and attracting distribution-type businesses which rely heavily on higher cargo volumes. The recent emergence of high-tech server businesses locating to Wenatchee Valley is reported by FedEx and UPS to be contributing to growth of inbound and outbound air cargo. However, as reported by FedEx and UPS, overall air cargo volumes have been impacted by Amazon packages now being delivered by truck and deposited directly into the US Postal Service delivery system. Amazon air cargo services are not expected at the Airport.

Per discussions with the FedEx and UPS district managers, their business expectations are that the cargo volumes (70% inbound and 30% outbound), frequency of air cargo flights, and delivery schedules will remain similar to current activity levels. In addition, neither cargo operator anticipates aircraft cargo volumes would regularly exceed the usable payload of the dedicated turboprop aircraft currently being operated. As an industry standard practice, when total cargo sort volumes increase, trucks rather than aircraft are commonly used to accommodate fluctuating volumes.

Table 2-7: Air Cargo Activity (2012 to 2015)

Average Pounds (2012 to 2015)	Air Cargo Activity (Average of 2012 to 2015)				
	Alaska Airlines	UPS (AmeriFlight)	FedEx (Empire)	Grand Total	Total Less Alaska Airlines
Total Pounds (Average of 2012 to 2015)					
Cargo Total	22,910	617,938	720,360	**1,361,208**	1,338,298
Cargo Inbound	16,342	429,152	434,878	**880,372**	864,030
Cargo Outbound	6,568	188,786	285,482	**480,836**	474,268
Total % (Average of 2012 to 2015)					
Cargo Inbound	71%	69%	60%	**65%**	65%
Cargo Outbound	29%	31%	40%	**35%**	35%

Source: Existing data from EAT Airport Records
Source: Future data from Mead & Hunt Forecast Projections (March 2017)

Both FedEx and UPS are expected to use trucks to supplement fluctuations in bulk cargo volumes, and during high volume seasons, would likely add an additional daily flight for the higher-priority express packages. This is also true when aircraft cannot be dispatched due to weather or other operating conditions. However, when the volume of inbound or outbound express packages changes during peak seasons, supplemental flight frequency and larger turboprop aircraft equipment is often used. Neither FedEx nor UPS have expressed plans to change flight routes (destinations), aircraft type, or sort facility logistics during the 20-year planning period, including the future use of jet air cargo aircraft.

6.4 Air Cargo Forecasts Scenarios

The air cargo forecast is based on the analysis of four years of air cargo data, from 2012 to 2015. This time period reflects the extent of available air cargo data records. Both UPS and FedEx have reported seeing higher and longer peak season air cargo volumes, indicative of the aggregate air cargo volumes starting to return. As reported by UPS and FedEx, outbound cargo is expected to grow at a higher proportion than inbound air cargo, attributed to the high-tech server companies locating to the Wenatchee Valley. These companies are showing a high volume of express package shipments. While air cargo volumes are expected to grow slightly beyond levels experienced in the past, the forecast growth is not expected to result in a significant change to current air cargo service or logistics, infrastructure, or facility improvements.

Exhibit 2.4 show the 20-year forecast of air cargo pounds, which is projected to increase between 1.5 and 2.2 million pounds by 2035. The following describes the forecast scenarios under consideration:

Low Scenario:	EAT Growth Trend (1.51 Million Pounds by 2035)
Medium Scenario (Preferred):	**Combined EAT Trend, Gross Domestic Product, and FAA Cargo Industry Projection (2.01 Million Pounds by 2035)**
High Scenario:	Combined EAT Trend and FAA Cargo Industry Growth Rate (2.28 Million Pounds by 2035)
FAA TAF:	Not Forecasted by FAA

Low Forecast – EAT Growth Trend: This projection uses trend-series to calculate cargo volumes individually for each of the air cargo operators. The trend-series method involves averaging the annual cargo volume change from 2012 to 2015, using a revolving five-year historical trendline technique. The total cargo volume is the sum of each air cargo operator. This forecast approach was dismissed from further consideration because trend-series alone does not likely reflect the potential for anticipated air cargo demand.

Medium Forecast (Preferred) – Combined EAT Trend, Gross Domestic Product, and FAA Cargo Industry Projection: This forecast uses the gross domestic product and FAA Cargo Industry Growth Rate projection method. This approach projects EAT 20-year air cargo volumes based on:

- EAT Historical Trends Analysis
  (for the 1- to 5-year forecast period)
- Wenatchee 15-year Historical MSA GDP rate of 2.95 percent CAGR
  (for the 6- to 15-year forecast period)
- FAA Aerospace Forecasts 'low' projected air cargo industry growth rate of 0.75 percent CAGR
  (for the 15- to 20-year forecast period)

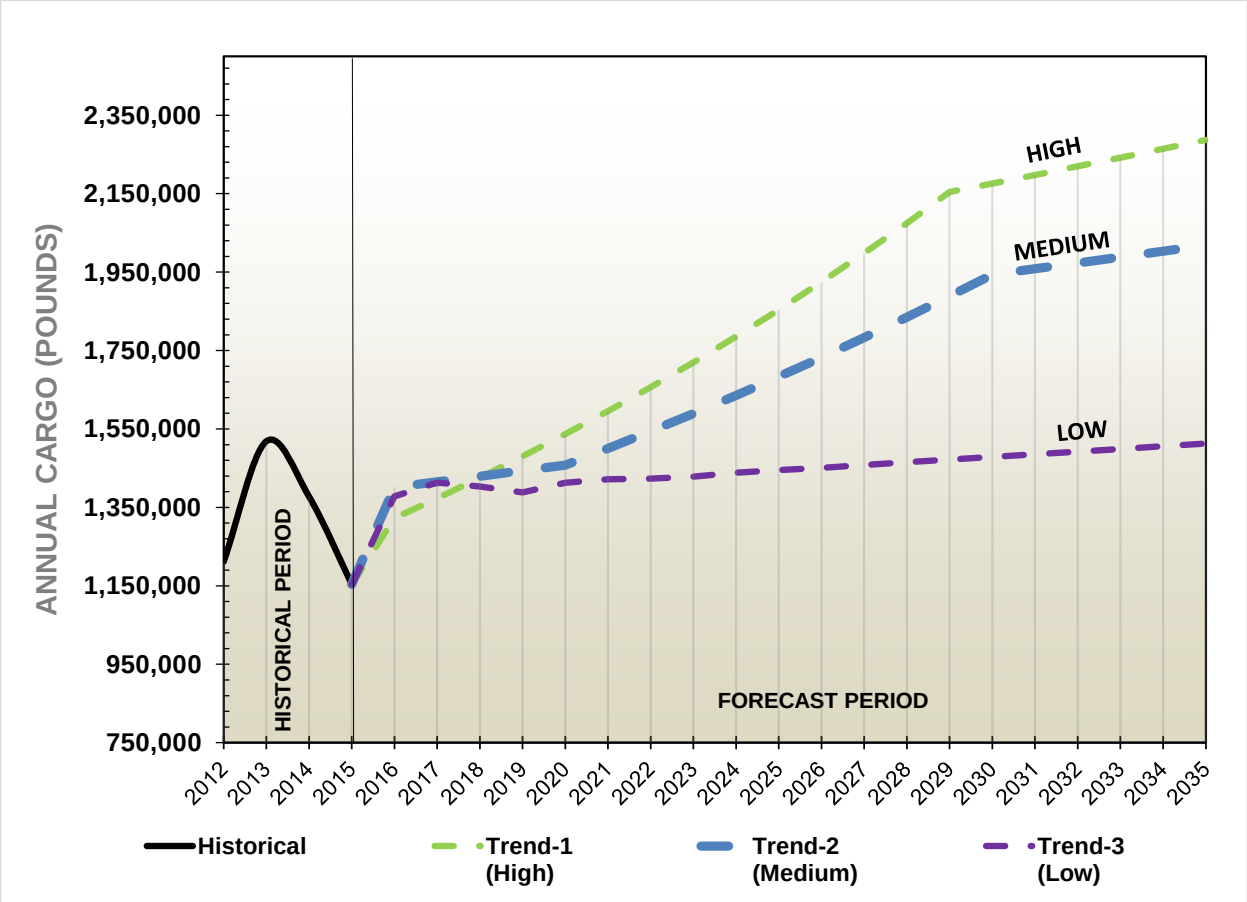
This forecast results in 2.01 million pounds by 2035, a 75-percent total growth, in which the cargo operators carry a similar proportion of total, inbound, and outbound cargo volumes. The basis for the forecast demand is an overall growth in commerce realized through the gross domestic product expansion within the Wenatchee Valley. This forecast assumes expanded air cargo demand in support of the emerging high-tech industry and outlying commercial resort locations, in which higher volumes of express package shipments would come from beyond the Seattle area, and the inability to support with just-in-time trucking. In absence of these factors, Airport air cargo would likely track closer to the 'low' forecast.

High Forecast – Combined EAT Trend and FAA Cargo Industry Growth Rate: This projection uses a combined local economic expansion and air cargo industry projection. This approach projects EAT 20-year air cargo volumes based on:

- Historical 5-year MSA Composite Economic Growth Rate of 3.9 percent
  (for the 1- to 15-year forecast period)
- FAA Aerospace Forecasts 'high' projected air cargo industry growth rate of 1.0 percent CAGR
  (for the 16- to 20-year forecast period)

This more aggressive forecast approach was dismissed from further consideration since the projections grow at a higher rate than sustained in the past and appears to out-perform cargo volumes anticipated by the air cargo operators.

Exhibit 2-4: (EXHIBIT & TABLE): 20-Year Air Cargo Volume Forecast
(PREFERRED FORECAST: MEDIUM SCENARIO)



Year	FAA TAF	Air Cargo Forecast (Low)	Air Cargo Forecast (Medium)	Air Cargo Forecast (High)
2015	N/A	1,154,000	1,154,000	1,154,000
2020	N/A	1,413,000	1,458,000	1,537,000
2025	N/A	1,446,000	1,684,000	1,854,000
2030	N/A	1,479,000	1,944,000	2,176,000
2035	N/A	1,513,000	2,019,000	2,288,000
20-Year Change	N/A	359,000	865,000	1,134,000
20-Year % Change	N/A	31.1%	75.0%	98.3%
% CAGR	N/A	1.4%	2.8%	3.5%

Source: Existing from USDOT Bureau of Transportation Statistics
Source: Future data from Mead & Hunt Forecast Projections (March 2017)

FORECAST COMPONENT #3: AIRCRAFT OPERATIONS AND FLEET MIX

6.5 Aircraft Operational Forecast Background and Factors

Exhibit 2.5 depicts the forecast of total annual operations over the 20-year forecast period. Aircraft operations, defined as either a takeoff or a landing, determine the year-by-year total number of annual operations. The Airport reported 40,200 aircraft operations in 2015, and 41,500 operations in 2016. The 2016 activity includes 782 foregone aircraft operations due to the runway closure in July 2016, which is not reflected in the FAA TAF. Historically, operations have declined since 2008 as a result of the economic recession and the reduction of Executive Flight activity. Operational activity appears to have bottomed out in the past three to five years as shown by the 1,300-operation growth from 2015 to 2016.

6.6 Aircraft Operational Forecast Scenarios

Aircraft activity was assessed by aircraft-type category, as each activity segment is characterized by unique industry influences and user factors. This operational segmentation allows a more comprehensive analysis for future commercial and general aviation activity levels. The following describes the forecast scenarios under consideration:

Low Scenario:	EAT Historical Annual Change (35,200 Operations by 2035)
Medium Scenario:	EAT Historical Operations per Based Aircraft (43,600 Operations by 2035)
High Scenario (Preferred):	**Combined FAA Growth Projections (48,200 Operations by 2035)**
FAA TAF:	Operations Projection (53,867 by 2035)

Low Forecast – EAT Historical Annual Change: Airport operations historically have exhibited year-to-year fluctuations of growth and decline that tend to run in three- to five-year cycles. Overall, operations have exhibited a downward trend from 2000 to 2015. The forecast projection uses the variable trend-series methodology, calculated using these average historical annual operational changes: 0 operations for 2013 to 2015; -350 operations for 2012 to 2015; and -750 operations for 2010 to 2015. This forecast approach was dismissed from further consideration because it does not reflect the bottoming out of operations evident from 2012 to 2015 based on aircraft utilization rates, or account for the positive general aviation influences described in **Section 2.3**.

Medium Forecast – EAT Historical Operations per Based Aircraft: Airport operations tend to be gauged relative to the number of total based aircraft. This forecast projection uses the ratio of aircraft operations to based aircraft by applying the averaged historical operations per based aircraft values as calculated for the following time periods: 393 for 2000 to 2015; 378 for 2010 to 2015; and 418 for 2015. This forecast approach was dismissed from further consideration due to inconsistencies with historical total based aircraft relative to total annual operations and does not account for the positive general aviation influences anticipated within the short and medium planning phases.

High Forecast (Preferred) – Combined FAA Growth Projections: This approach uses the Airport's FAA TAF annualized forecast growth of 605 operations per year and the *FAA Aerospace Forecasts* annual general aviation fleet growth rate of 0.4 percent. The FAA TAF represents the aggressive growth periods, while the *FAA Aerospace Forecasts* represents the minimal growth periods. The two rates were applied in alternating three- to five-year cycles to mimic the historical operational patterns. This forecast results in 48,200 operations by 2035, a 20-percent total growth. The preferred forecast is sustainable with continued economic expansion, higher aircraft use by existing and new Airport tenants, and activity realized from the positive general aviation influences.

6.7 Aircraft Fleet Mix Forecast

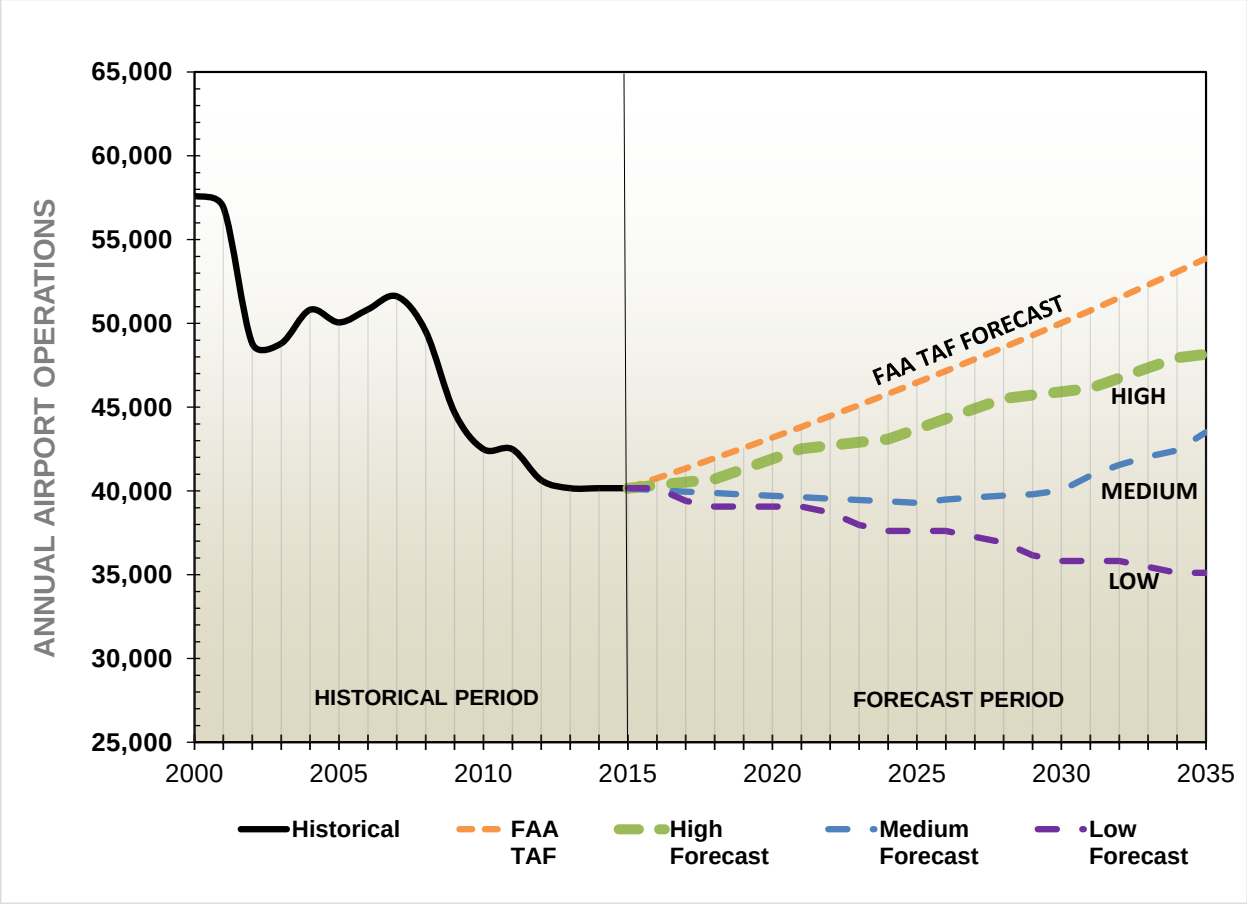
Table 2.8 identifies the 20-year operational aircraft fleet mix traffic, expressed as a number and percent of annual operations. The fleet mix forecast is categorized by user group, aircraft type, and other activity conditions including itinerant/local, visual/instrument and day/night. The assignment of fleet mix percentages was determined from Airport Staff observations, Airport stakeholder interviews, and data substantiated by general aviation fleet mix and utilization information from the *FAA Aerospace Forecasts*. An overview of the major fleet mix user groups is described below.

Scheduled Airline Operations: In 2015, Alaska Airlines conducted 20 flights per week, which equates to 1,040 flights per year, or 2,080 annual operations. In 2008, Alaska Airlines transitioned from the Bombardier Q200 to the Q400 aircraft, which increased available seat capacity, but reduced the number of annual operations – which was taken into account when making projections of commercial airline operations based on trend analysis. The 20-year forecast of airline traffic increases by 880 operations, from 2,080 to 2,960, representing an overall 42 percent growth and a 1.8 percent annual rate. The TAF does not show a forecast change in the airline operations, despite a 2.6 percent forecast growth in passenger enplanements.

Scheduled Air Cargo Operations: In 2015, UPS and FedEx conducted a combined 24 weekly flights, totaling about 1,500 annual operations. The 20-year forecast of air cargo traffic increases by 240 operations, from 1,500 to 1,750, representing 16 percent growth, or a 0.8 percent CAGR. The air cargo aircraft operational forecast excludes operations by Alaska Airlines, which are counted as part of the airline passenger operations. There is no separate FAA TAF for air cargo operations, which are otherwise included in the 'Air Taxi and Commuter' reporting category.

Military Operations: Military traffic accounts for 100 itinerant operations per year, constituting a small percent (0.25 percent) of the total Airport operations. Since 2005, military traffic has not exceeded 500 annual operations. The forecast of military operations used the FAA TAF, which results in no change to the 100 itinerant operations over the 20-year planning period.

Exhibit 2-5: (EXHIBIT & TABLE): 20-Year Total Annual Aircraft Operations
(PREFERRED FORECAST: HIGH SCENARIO)



Year	FAA TAF	Operations Forecast (Low)	Operations Forecast (Medium)	Operations Forecast (High)
2015	40,164	40,164	40,164	40,164
2020	43,189	39,100	39,800	42,000
2025	46,473	37,700	39,300	43,800
2030	50,027	35,900	40,100	46,000
2035	53,867	35,200	43,600	48,200
20-Year Change	**13,703**	**-4,964**	**3,436**	**8,036**
20-Year % Change	34.1%	-12.4%	8.6%	20.0%
% CAGR	1.5%	-0.7%	0.4%	0.9%

Source: Existing data from FAA Terminal Area Forecast – TAF
Source: Future data from Mead & Hunt Forecast Projections (March 2017)

General Aviation Operations: General aviation operations include aircraft flown for private and business purposes, comprising recreational, corporate, charter, agricultural, flight instruction, glider activity, and the US Forest Service.

The following are sources of general aviation operational activity:

Source #1: EAT Airport Records: Reflective of the FAA TAF. No available traffic counts.

Source #2: FAA TAF: The TAF consistently reports 30,000 to 40,000 total general aviation operations between 2000 and 2015. The TAF projects total general aviation operations increasing to 46,600 by 2035.

The January, 2017 TAF reports:

- General Aviation Total = 34,779
  - General Aviation Local = 25,121 (72%)
  - General Aviation Itinerant = 9,658 (18%)

Source #3: FAA TFMSC: Identified an estimated 5,500 general aviation operations for 2015, or about 15 percent of the total traffic.

Source #4: IFR Data: Identified an estimated 4,200 general aviation operations for 2015, or about 12 percent of the total traffic.

Source #5: Operations Per Based Aircraft (OPBA) Method: Based on FAA TAF activity levels, the OPBA has ranged between 350 and 500, and currently around 400 OPBA. The OPBA was used to validate the level of local and itinerant operations, and not used to estimate GA operations as a bottom-up means.

In 2015, the general aviation traffic totaled an estimated 35,000 annual operations, as derived from the FAA TAF. This traffic includes operations conducted by transient users, based aircraft owners, US Forest Service, medical flights, flight training, flight clubs (glider association), and Airport aviation events, as estimated for the following:

- Transient = 11,000
- Based Aircraft = 12,500
- USFS = 6,500
- Flight Training = 3,500
- Medical = 800
- Glider Club = 850

The Airport's declining general aviation traffic since 2007 is attributed to the departure of the Executive Flight aircraft, lower piston-aircraft utilization, and a drop in flight training. However, since 2014, the operations per based aircraft (OPBA) ratio has shown a higher aircraft utilization rate, suggesting a bottoming out of the general aviation operations. This reflects nationwide trends towards a more qualified pilot population (in terms of certifications and ratings), bolstered sport and recreation activities, infusion of aircraft technologies, and adaptation to operating costs and evolving aircraft-airmen regulatory requirements. Other considerations that could not be factored or quantified into the mix forecast at this time entail the tremendous potential of UAS. The 20-year forecast of general aviation traffic increases 6,730 operations, from 35,200 to 41,900, representing an overall 19-percent growth and a 0.9-percent annual rate.

Itinerant and Local Operations: Itinerant traffic accounts for 40 percent of the total operations, and local traffic is 60 percent. ('Local' operations is traffic that remains in the airport traffic pattern, executes simulated instrument approaches or low passes, and flights within a 20−mile radius of the airport. 'Itinerant' operations is traffic operating beyond the local airport area). Local operations are comprised mostly of flight training/instrument proficiency, US Forest Service activity, and sport/recreational flights between nearby general aviation airports. Touch and go operations, which is traffic that lands and departs on a runway without stopping or exiting the runway, is estimated to account for 20-percent of the local operations, or 5,000 and 6,000 operations per year. The ratio of itinerant, local, and touch and go traffic is expected to remain similar throughout the 20-year forecast period.

2015 Operations: Itinerant = 15,400 Operations (38%) | Local = 24,700 (62%)
2035 Operations: Itinerant = 19,500 Operations (40%) | Local = 28,700 (60%)

Visual and Instrument Operations: Operations occurring during visual conditions (no cloud or visibility constraints) account for about 92 percent of the traffic, while operations during instrument conditions (cloud and/or visibility restrictions) accounts for eight percent of the traffic. The ratio of visual to instrument traffic is expected to remain similar throughout the 20-year forecast period, with a shift towards instrument operations as evidence of the *FAA Aerospace Forecasts* that indicate more trained instrument-rated pilots and more advanced IFR-equipped aircraft.

2015 Operations: Visual = 36,950 Operations (92%) | Instrument = 3,200 (8%)
2035 Operations: Visual = 43,300 Operations (90%) | Instrument = 4,850 (10%)

Day and Night Operations: Day traffic (7:00 a.m. to 7:00 p.m.) accounts for 85 percent of the total operations and night traffic (7:00 p.m. to 7:00 a.m.) 15 percent. The ratio of day-to-night traffic is expected to remain similar throughout the 20-year forecasts period.

Table 2-8: 20-Year Aircraft Operations Forecast (User Group and Aircraft)

Operational Classification	2015	2020	2025	2030	2035
Operation Type	**40,164**	**42,000**	**43,800**	**45,900**	**48,200**
Itinerant Operations	**15,414**	**16,480**	**17,470**	**18,560**	**19,510**
Scheduled Air Carrier	2,080	2,320	2,550	2,780	2,960
Scheduled Air Cargo	1,500	1,560	1,620	1,680	1,750
Other Commercial/Medical	1,350	1,400	1,500	1,500	1,500
General Aviation/USFS	10,384	11,100	11,700	12,500	13,200
Military	100	100	100	100	100
Local Operations	**24,750**	**25,600**	**26,400**	**27,400**	**28,600**
General Aviation/USFS	24,750	25,600	26,400	27,400	28,600
Military	0	0	0	0	0
Fleet Mix - Aircraft Type	**40,164**	**42,000**	**43,800**	**45,900**	**48,200**
Single Piston	25,705	26,200	26,800	27,800	28,600
Twin Piston	3,213	3,200	3,100	2,800	2,700
Turboprop	5,864	6,400	7,100	7,700	7,800
Small Business Jet	402	510	640	740	870
Medium/Large Business Jet	161	260	310	370	410
Regional Jet	0	280	420	670	1,350
Transport Jet	0	30	70	120	150
Helicopter	4,820	5,300	5,600	6,000	6,600

Note: Forecast values rounded, may not total.

Operation Classification	2015	2020	2025	2030	2035
Operation Type	**100%**	**100%**	**100%**	**100%**	**100%**
Itinerant Operation	**38%**	**39%**	**40%**	**40%**	**41%**
Scheduled Air Carrier	5%	6%	6%	6%	6%
Scheduled Air Cargo	4%	4%	4%	4%	4%
Other Commercial/Medical	3%	3%	3%	3%	3%
General Aviation/USFS	26%	26%	27%	27%	27%
Military	0%	0%	0%	0%	0%
Local Operations	**62%**	**61%**	**60%**	**60%**	**59%**
General Aviation/USFS	62%	61%	60%	60%	59%
Military	0%	0%	0%	0%	0%
Fleet Mix - Aircraft Type	**100%**	**101%**	**101%**	**101%**	**101%**
Single Piston	64%	63%	61%	61%	59%
Twin Piston	8%	8%	7%	6%	6%
Turboprop	15%	15%	16%	17%	16%
Small Business Jet	1%	1%	1%	2%	2%
Medium/LargeBusiness Jet	0%	1%	1%	1%	1%
Regional Jet	0%	1%	1%	1%	3%
Transport Jet	0%	0%	0%	0%	0%
Helicopter	12%	13%	13%	13%	14%

Source: Mead & Hunt Forecast Projections (March 2017)

6.8 Aircraft Mix and Critical Aircraft Forecast

Table 2.9 is a breakdown of traffic by FAA aircraft category to identify the critical aircraft. **Exhibit 2.6** depicts the existing and future critical aircraft, and performance information. The critical aircraft is the most demanding aircraft (or family of aircraft) to regularly use the Airport, either through scheduled service or by exceeding 500 operations per year.

The FAA category of critical aircraft is determined with respect to airplane physical and performance characteristics, in particular the final approach speed, wingspan, tail height, and taxiway design group standards. The identification of the critical aircraft is the basis for determining the airfield and terminal area structural standards for various geometric dimensions, setbacks, separations, airspace clearances, safety areas, and other design considerations. Described below, are the FAA Advisory Circular 150/5300-13 *Airport Design* critical aircraft classifications:

- AAC – Aircraft Approach Category: alphabetic letter designating approach speed.
- ADG – Airplane Design Group: a roman numeral designating wingspan and tail height.
- TDG – Taxiway Design Group: number and alphabetic letter designating wheel configuration.

Table 2-9: Aircraft Mix – Critical Aircraft

Year	2015	2020	2025	2030	2035
Total Airport Operations	**40,164**	**42,000**	**43,800**	**45,900**	**48,200**
AAC Aircraft Operations					
AAC A	22,260	23,000	23,000	23,000	23,600
AAC B	9,180	9,400	10,100	10,700	11,300
AAC C (Critical Aircraft)	**3,710**	**4,300**	**5,000**	**6,000**	**6,500**
AAC D	170	270	320	330	390
Helicopter	4,810	5,200	5,500	5,900	6,500
ADG Aircraft Operations					
ADG I	22,970	23,100	23,700	24,300	25,000
ADG II	9,360	10,200	10,700	11,300	11,600
ADG III (Critical Aircraft)	**3,000**	**3,300**	**3,800**	**4,100**	**5,000**
Helicopter	4,810	5,200	5,500	5,900	6,500

Note: Bold Box denotes FAA ARC designation per planning period.
Note: AAC – Aircraft Approach Category | ADG – Aircraft Design Group
Note: Helicopters not included as AAC or ADG.
Source: Mead & Hunt Forecast Projections (March 2017)

Exhibit 2-6: Exhibit 2.6: Airport Critical Aircraft (Existing and Future)

Critical Aircraft (Existing)

Aircraft Design Characteristics:	
Aircraft Type:	Turboprop Transport
FAA ARC/TDG:	C-III; TDG 5
Approach Speed:	129 Knots
Wingspan:	93'
Length:	107'8"
Tailheight:	27.4'
Maximum Weight:	65,200 Pounds
Seating Configuration:	70 to 76 Passengers
Cockpit to Main Gear (CMG)	45.8'
Wheelbase	45.8'
Main Gear Width (MGW)	33.2'

Critical Aircraft (Future)

Aircraft Design Characteristics:	
Aircraft Type:	Regional Jet Transport
FAA ARC/TDG:	C-III; TDG 2
Approach Speed:	138 Knots
Wingspan:	85'
Length:	103'9"
Tailheight:	31.9'
Maximum Weight:	82,700 Pounds
Seating Configuration:	77 to 88 Passengers
Cockpit to Main Gear (CMG)	42.0'
Wheelbase	37.5'
Main Gear Width (MGW)	17.0'

Source: FAA Aircraft Performance Database - Excel File (Obtained March 2017)

Existing Critical Aircraft: The Airport's existing critical aircraft is the Bombardier Q400, with an Airport Reference Code (ARC) C-III and TDG-5 classification. The existing critical aircraft is represented by the Bombardier Q400, which is a twin-turboprop transport aircraft currently operated by Alaska Airlines.

Future Critical Aircraft: As planned from the fleet mix forecast, the future critical aircraft is a narrow-body regional jet aircraft, such as the Embraer EMB 175 transport jet, with an ARC C-III and TDG-2 classification. Based on conversations with Alaska Airlines Fleet Management Department, the EMB 175 is a likely replacement for the Q400 once retired from the fleet. The EMB 175 is a similar dimensional size to the Q400, but is heavier with large ground maneuvering and turning requirements. For future planning purposes, the Airport's FAA design standards should accommodate aircraft with an AAC approach speed less than 141 knots, an ADG aircraft wingspan up to 117 feet, and a tail height up to 44 feet.

6.9 Aircraft Operational Peaking Forecast

Table 2.10 is the operational peaking forecast of total annual operations broken-down by month, day, and hour. Operational peaking enables assessment of airfield user patterns, quantifying of capacity levels and analysis of various facilities for level of service. The design-day and design-hour activity levels reflect the Airport's busy periods, rather than the absolute peak periods, in order to avoid constructing for capacity rarely used. Peaking activity is derived from the aggregate annual Airport operations and is calculated using FAA Advisory Circular 150/5060-5 *Airport Capacity and Delay* peaking guidance.

Table 2-10: Aircraft Operational Peaking

(ASSUMES HIGH OPERATIONS FORECAST SCENARIO)

Operational Peaking	Peaking Calculation	Activity Demand (Civilian Operations)				
		2015	2020	2025	2030	2035
Total Annual Operations	--	**40,164**	**42,000**	**43,800**	**46,000**	**48,200**
Peak Month	11.0%	4,418	4,620	4,818	5,060	5,302
Average Week	Avg Day/7	770	805	840	882	924
Average Day - Operations	365 Days	110	115	120	126	132
Average Day - Flights	Ops/2	55	58	60	63	66
Average Day Peak Month	30.5 Days	145	151	158	166	174
Peak Hour	15%	22	23	24	25	26
Peak Hour - Itinerant	38%	4	4	5	5	5
Peak Hour - Local	62%	7	7	7	8	8
Peak Hour - IFR	30%	3	3	4	4	4
Peak Hour - VFR	70%	8	8	8	9	9

Note: Forecast values rounded, may not total.
Source: Mead & Hunt Forecast Projections (March 2017)

FORECAST COMPONENT #4: BASED AIRCRAFT

6.10 General Aviation Based Aircraft Forecast Background

Based aircraft forecasts, including the total number and type, directly influence future Airport operations, space allocation, and property assets. Based aircraft include fixed-wing and helicopters, and those stored at the Airport under a hangar/tie-down rental or lease provision. The FAA classifies based aircraft as registered by single-engine piston, multi-engine piston, jet (which includes jets and turboprops), helicopter, and other. Other predominately includes glider, light sport, and experimental aircraft. Per FAA National Based Aircraft Inventory Program policy, these aircraft are not always registered or counted as based aircraft, and do not conform to a FAA ARC classification.

Existing Based Aircraft

The Airport reports 107 total aircraft, of which 96 are counted based aircraft, in addition to 11 "other" aircraft. Historically, the Airport has counted aircraft classified as "other" (currently comprised of two ultralights and nine glider/sailplanes) as part of the based aircraft, which has tended to overstate the number of actual based aircraft as currently defined by the FAA National Based Aircraft Inventory Program guidance. The FAA TAF indicates 104 total based aircraft, including 13 "other" aircraft. To reconcile this difference for master plan forecasting purposes, the TAF forecast count has been adjusted by setting the 2015 TAF level equal to the Airport's 2015 based aircraft level.

Since 2007, there have been two precipitous based aircraft declines, a consequence of the national recession and the departure of the Executive Flight turbine aircraft. Since 2013, single-engine based aircraft declines appear to have stabilized at 82 aircraft, with the bottom-out also substantiated from the operations-per-based-aircraft utilization ratio. In terms of based aircraft demand, all but one to two hangars are typically occupied.

6.11 Based Aircraft Forecast Scenarios

Assessment of the based aircraft activity is by aircraft-type category, as unique operator and industry factors influence each segment. In addition, development of the forecast scenarios considered and incorporated the following factors, which could influence the unconstrained based aircraft forecasts:

- Recently completed runway extension
- Potential relocation of US Forest Service from Winthrop to EAT
- Hangar build-out capacity reached at Cashmere-Dryden Airport (8S2) – affecting only piston aircraft
- Seattle metropolitan area capacity overflow and Airport competitive rates

Exhibit 2.7 summarizes the 20-year total based aircraft forecast. **Table 2.11** summarizes the 20-year based aircraft forecast by aircraft type. The following describes the forecast scenarios under consideration:

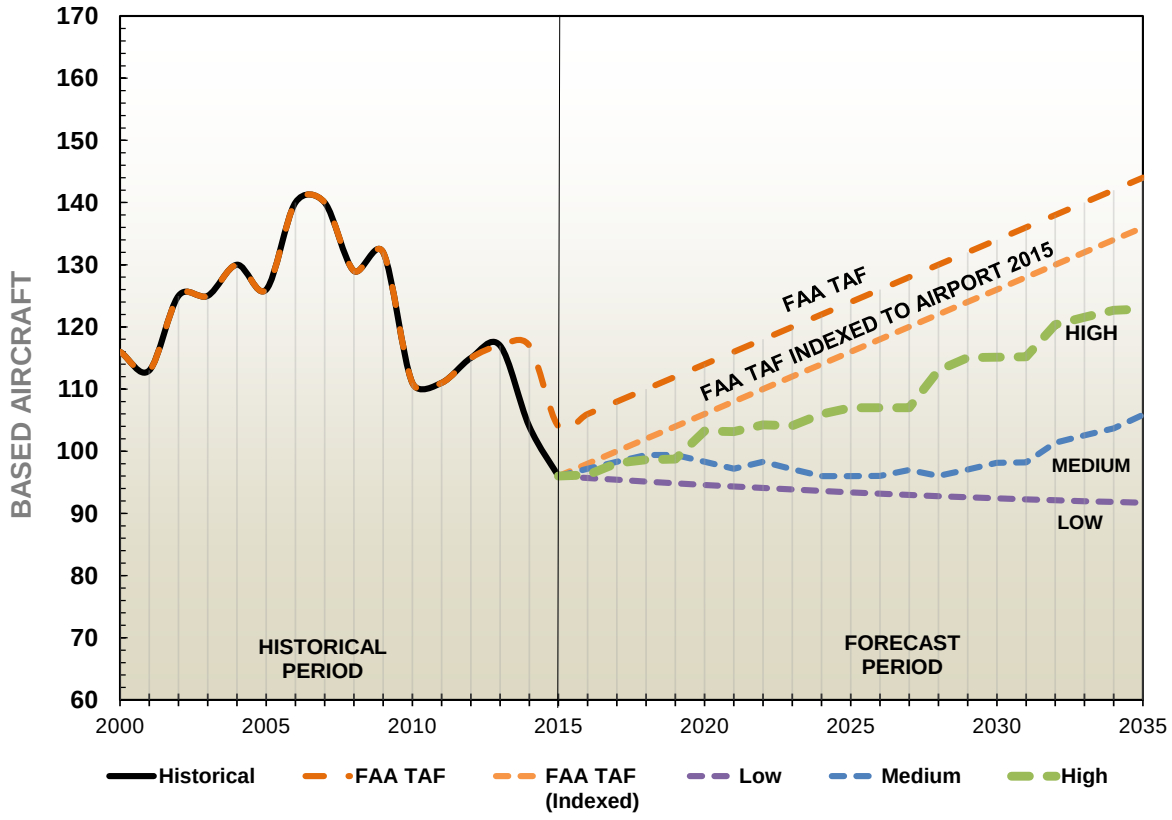
Low Scenario: FAA Aerospace Forecast Sector Growth Rates (92 Based Aircraft by 2035)
Medium Scenario: EAT Indexed Trend (108 Based Aircraft by 2035)
High Scenario (Preferred): EAT Adjusted Indexed Trend (123 Based Aircraft by 2035)
FAA TAF: Based Aircraft Projection (144 Based Aircraft by 2035)
FAA TAF (Indexed): Based Aircraft Projection (136 Based Aircraft by 2035)

Table 2-11: Based Aircraft – By Type

Year	Single-Engine Piston	Multi-Engine Piston	Turboprop (Single/Twin)	Business Jet	Helicopter	TOTAL
2015	82	5	2	4	3	**96**
2020	88	5	3	4	3	**103**
2025	90	5	4	5	3	**107**
2030	96	5	6	5	3	**115**
2035	100	6	7	7	3	**123**
20-Year Change	**18**	**1**	**5**	**3**	**0**	**27**
20-Year % Average	**84%**	**5%**	**4%**	**5%**	**3%**	**100%**
20-Year % Change	**22.0%**	**10.8%**	**250.0%**	**75.0%**	**10.8%**	**28.0%**
% CAGR	**1.0%**	**0.5%**	**6.5%**	**2.8%**	**0.5%**	**1.2%**

Source: Mead & Hunt Forecast Projections (March 2017)

Exhibit 2-7: (EXHIBIT & TABLE): 20-Year Based Aircraft Forecast
(PREFERRED FORECAST: HIGH SCENARIO)



Year	FAA TAF	FAA TAF (Indexed)	Based AC Forecast (Low)	Based AC Forecast (Medium)	Based AC Forecast (High)
2015	104	96	96	96	96
2020	114	106	95	98	103
2025	124	116	93	96	107
2030	134	126	92	98	115
2035	144	136	92	106	123
20-Year Change	**40**	**40**	**-4**	**10**	**27**
20-Year % Change	**38.5%**	**41.7%**	**-4.5%**	**10.3%**	**28.0%**
% CAGR	**1.6%**	**1.8%**	**-0.2%**	**0.5%**	**1.2%**

Source: Existing data from FAA Terminal Area Forecast – TAF
Source: Future data from Mead & Hunt Forecast Projections (March 2017)

Low Forecast – FAA Aerospace Forecast Sector Growth Rates: This is a bottom-up forecast approach, applying annualized forecast growth rates for 2015 to each of the major aircraft categories (single piston, twin piston, turboprop, business jet, helicopter) derived from the *FAA Aerospace Forecasts* (from Table 28). The annual growth rates are: -0.6 percent for single engine piston, 1.4 percent for single engine

sport/experimental, -0.4 percent for twin-engine piston, 1.5 percent for single turboprop, 1.5 percent for twin turboprop, 2.8 percent for light/small cabin business jets, 2.2 percent for medium/large cabin business jets, and 2.5 percent for helicopters. In addition, general aviation aircraft production rates published by the General Aviation Manufacturing Association (GAMA) were reviewed to provide a more detailed understanding of delivery trends for particular aircraft models, such as the small-, medium-, and large-cabin business jets, and piston versus turbine helicopter production. This forecast approach was dismissed from further consideration due to the continued downward decline of piston aircraft and the assumption of un-revitalized recreational general aviation industry sector, and not accounting for the potential of based aircraft influences previously identified (future FBO tenants, impacts to surrounding general aviation airports, Seattle overflow). In addition, this forecast does not adequately characterize past Airport based aircraft potential, in terms of the number or composition of based aircraft.

Medium Forecast – EAT Indexed Trend projection: This approach is a linear trend-series of total based aircraft extrapolated back to 1990, as indexed to the 2015 count of 96 based aircraft. The forecast composition of aircraft type was projected from the 2015 based aircraft ratio: 86 percent for single-engine piston, 5 percent for twin-engine piston, 2 percent for single/twin turboprop, 3 percent for small cabin business jets, 1 percent for medium/large cabin business jets, and 3 percent for helicopters. This forecast approach was dismissed from further consideration because it does not reflect historical based aircraft levels experienced during prolonged economic-vibrant periods, does not realistically project the composition of based aircraft types in the *FAA Aerospace Forecasts* fleet projections, or account for the Airport's potential unconstrained based aircraft influences (future FBO tenants, impacts to surrounding general aviation airports, Seattle overflow).

High Forecast (Preferred) – EAT Adjusted Indexed Trend: This projection uses the EAT Indexed Trend projection as the forecast baseline, adjusted individually for each aircraft type to accommodate unconstrained based aircraft factors previously identified (future FBO tenants, runway extension, bolstered flight training, surrounding general aviation airport impacts, Seattle overflow). This forecast also assumes aircraft upgrades and additional based turboprop and business jets resulting from the emerging high-tech industries locating in the Wenatchee Valley. Also, this forecast anticipates additional based piston aircraft to coincide with the economics of providing future hangar development, in which hangar units are commonly constructed to accommodate multiple aircraft, to improve return on investment. This forecast results in 123 based aircraft by 2035, a 28-percent total growth. Since 2000, the Airport has historically reported eight years in which based aircraft exceeded the forecast 123 level.

The based aircraft forecast accounts for the following factors, whether individually or in combination:
#1: Growing community population
#2: Growth in IT (Server) businesses
#3: Growth in fruit produce companies
#4: Seattle aviation spillover
#5: Cashmere hangar capacity/spillover
#6: Executive Flight outcome

These potential forecast influences would likely result in based aircraft tracking along the 'high' forecast scenario, and not likely to be lower than the 'low' forecast scenario.

7. FORECAST SUMMARY AND FAA TERMINAL AREA FORECAST (TAF) COMPARISON

This section summarizes the preferred aviation demand forecasts. It includes an overview of forecast direction, a description of reasonableness, and comparison with the FAA Terminal Area Forecasts (TAF). The section concludes with an explanation of how aviation forecasts are applied to subsequent master plan efforts.

7.1 FORECAST SUMMARY OVERVIEW

Table 2.12 illustrates the Airport activity trends for each forecast component, as noted for the aviation industry, Airport historical, and Airport preferred forecast. **Table 2.13** summarizes the preferred 20-year forecasts, by 5-year increments, for each aviation component.

Table 2-12: Forecast Summary – Directional Changes

Forecast Component	Nationwide Industry Trend	Airport Historical Trend	Airport Forecast Projection	EAT Forecast Remarks
Passengers (Enplanements)	⇧	⇧	⇧	Moderate growth, resulting from population and commerce growth
Air Cargo (Domestic Pounds)	⇕	⇕	⇕	Moderate growth, resulting from population and commerce growth
Aircraft Operations	⇕	⇩	⇕	Mostly steady, increasing with commercial and business general aviation
Airline	⇧	⇧	⇧	Increases resulting from additional frequency, destinations, operators
Air Cargo	⇕	⇕	⇕	Constant to slight increases, resulting from aircraft volume utilization
US Forest Service	**N/A**	⇕	⇕	Dependent upon fire season, assumes no significant change in based assets
GA Business/Corporate	⇧	⇧	⇧	Greater utilization resulting from executive tenant(s)
GA Recreational	⇩	⇩	⇕	Constant to slight increases; dependent on GA industry and economy
Based Aircraft	⇕	⇩	⇕	Decline in piston aircraft; increases in business-class based aircraft
Business/Corporate	⇧	⇧	⇧	Increases in turbine aircraft
Private/Recreational/Training	⇩	⇩	⇕	Loss of low-utilization based aircraft; minimal flight training

Source: Mead & Hunt Forecast Projections (March 2017)

Table 2-13: Forecast Summary – Phase Comparison

Forecast Component	Base Year Level 2015	Base Year + 5yrs. 2020	Base Year + 10yrs. 2025	Base Year + 15yrs. 2030	Base Year + 20yrs. 2035
Passengers	**121,500**	**137,100**	**153,000**	**169,400**	**183,200**
Enplaned	62,100	70,000	78,100	86,500	93,500
Deplaned	59,400	67,100	74,900	82,900	89,700
Annual Aircraft Operations	**40,164**	**42,000**	**43,800**	**45,900**	**48,200**
Itinerant	**15,414**	**16,480**	**17,470**	**18,560**	**19,510**
Air Carrier	2,080	2,320	2,550	2,780	2,960
Air Cargo	1,500	1,560	1,620	1,680	1,750
Commuter/Air Taxi	1,350	1,400	1,500	1,500	1,500
General Aviation	10,384	11,100	11,700	12,500	13,200
Military	100	100	100	100	100
Local	**24,750**	**25,600**	**26,400**	**27,400**	**28,600**
General Aviation	24,750	25,600	26,400	27,400	28,600
Military	0	0	0	0	0
Instrument Operations	**3,213**	**3,401**	**3,548**	**3,805**	**3,970**
Peak Hour Operations	**22**	**23**	**24**	**25**	**26**
Cargo/Mail (Total Tons)	**1,154,000**	**1,458,000**	**1,684,000**	**1,944,000**	**2,019,000**
Based Aircraft (Counted)	**96**	**103**	**107**	**115**	**123**
Single Engine Piston	82	88	90	96	100
Multi Engine Piston	5	5	5	5	6
Turboprop	2	3	4	6	7
Jet Engine	4	4	5	5	7
Helicopter	3	3	3	3	3
Other	11	11	11	11	11
Average Aircraft Size (Seats)	**76**	**76**	**76**	**85**	**90**
Air Carrier	76	76	76	85	90
Commuter	--	--	--	--	--
Average Enplaning Load Factor	**79.8%**	**80.0%**	**80.5%**	**81.5%**	**82.5%**
Air carrier	79.8%	80.0%	80.5%	81.5%	82.5%
Commuter	--	--	--	--	--
GA Operations Per Based Aircraft	**366**	**355**	**356**	**347**	**340**

Note: Forecast values rounded, may not total.
Source: Mead & Hunt Forecast Projections (March 2017)

7.2 PREFERRED FORECAST SUMMARY AND REASONABLENESS:

The following are the preferred forecasts by aviation activity component:

COMPONENT #1: AIRLINE PASSENGER
Forecast Scenario: Medium
Forecast Method: Airline Service Sector – Medium
2035 Forecast Activity: 93,600 enplanements

Reasonableness: The enplanement forecast reflects continued growth of passenger demand and schedule air service improvements. Future gains in passenger enplanements will result from scheduled air service marketing and promotion efforts to reduce the leakage of passengers to surrounding commercial airports, capturing an expanding commerce market within Wenatchee Valley, and through air service developments such as improved flight schedules, additional flight frequency, new destinations, and the possible transition to a larger transport aircraft.

The preferred forecast presents a reasonable activity level with respect to the Airport's historical airline events and trends, and the volume of passengers generated within the Airport catchment area. Since 2005, enplanements have grown from 40,000 to 62,000 (35 percent), while the Airport still captures nearly 20 percent of the true catchment passengers – representing a large residual passenger market to expand airline services. The passenger forecast anticipates airline service improvements will appeal and retain a growing percentage of catchment area passengers, and that airline resources and assets will be provided to meet the growing passenger demand.

COMPONENT #2: AIR CARGO
Forecast Scenario: Medium
Forecast Method: Combined EAT Trend, Gross Domestic Product, and FAA Cargo Industry Projection
Forecast 2035 Activity: 2.01 Million Pounds

Reasonableness: Air cargo volumes will likely increase commensurate with regional commerce expansion, with proportional cargo growth in support of the emerging high-tech businesses that rely on just-in-time shipments.

The preferred forecast is reasonable in that there are no logistical changes expected to the air cargo service, routes, or aircraft equipment type.

COMPONENT #3: AIRCRAFT OPERATIONS
Forecast Scenario: High
Forecast Method: Combined FAA Growth Projections
Forecast 2035 Activity: 48,200 Annual Operations

Reasonableness: The preferred forecast is sustainable with continued economic expansion, higher aircraft use by new and existing Airport tenants, and activity realized from the positive general aviation influences. The airline operations are commensurate with passenger demand levels, while the air cargo operations are commensurate with cargo volumes. The general aviation operations are reasonable in that the activity would return to levels experienced prior to the 2008 economic downtown.

This would be realized through greater user and tenant utilization, particularly those operating turbine-powered business aircraft. In addition, there are forecast factors that could be capitalized in the near future, including the benefits of a longer runway, spillover of demand from Seattle, and re-establishment of full-service FBO amenities.

COMPONENT #4: BASED AIRCRAFT
Forecast Scenario: High
Forecast Method: EAT Adjusted Indexed Trend
Forecast 2035 Activity: 123 Based Aircraft

Reasonableness: The general aviation operations and based aircraft forecasts are anticipated to respond to continued economic prosperity within the Wenatchee Valley, largely brought about by attracting national firms and improvements to local housing market conditions.

The preferred based aircraft forecast is reasonable in that the activity would return to levels experienced prior to the 2008 economic downtown. This would be realized through an expansion of high-tech businesses expanding or locating to the Wenatchee Valley. Similar to general aviation operations, there are forecast factors that could be capitalized in the near future, including the benefits of a longer runway, spillover of demand from Seattle, and re-establishment of full-service FBO amenities.

7.3 FAA FORECAST REVIEW AND APPROVAL

The airport master plan forecasts require review and approval by the FAA, as advised per "FAA Review and Approval of Aviation Forecasts" dated June 2008. Forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if the forecasts differ by less than 10 percent in the five-year forecast period, and 15 percent in the 10-year forecast period. The FAA bases primary considerations in forecast review and approval on forecasts using reasonable planning assumptions, current data, and appropriate forecast methods.

The master plan forecasts, once approved by the FAA, are commonly accepted as the future FAA TAF forecast. **Table 2.14** compares the preferred master plan forecasts with the FAA TAF. Overall, projections indicate that activity levels will track more closely with the FAA TAF. Each of the master plan forecast components are below the 2015 FAA TAF activity forecast or threshold levels, and otherwise within the specified TAF thresholds for FAA acceptance.

7.4 MASTER PLAN FORECAST APPLICATIONS

The subsequent master plan chapters use these aviation projections to define facility requirements to satisfy future facility, equipment, and service needs. The relationship between the forecast and capacity levels helps to evaluate the type, size, and location of capital improvements, including the planning activity level time periods that trigger improvements, and the financial and environmental recommendations considered as part of the Airport development plan.

Table 2-14: Forecast Comparison with FAA Terminal Area Forecasts (TAF)

Forecast Component	Year (Fiscal)	Master Plan (Preferred Forecast)	FAA TAF	Airport/TAF (% Difference)
Airline Passenger Enplanements				
Base Year	2015	61,826	61,826	0.0%
Base Year + 2	2017	64,037	61,068	6.4%
Base Year + 5	2020	70,000	65,769	6.4%
Base Year + 10	2025	78,100	74,406	5.0%
Base Year + 15	2030	86,500	84,183	2.8%
Base Year + 20	2035	93,500	95,252	-1.8%
Commercial Aircraft Operations				
Base Year	2015	5,240	5,814	-9.9%
Base Year + 2	2017	5,355	5,928	-9.7%
Base Year + 5	2020	5,582	6,106	-13.5%
Base Year + 10	2025	5,947	6,421	-11.7%
Base Year + 15	2030	6,315	6,761	-11.8%
Base Year + 20	2035	6,637	7,126	-12.9%
Total Airport Aircraft Operations				
Base Year	2015	40,164	40,164	0.0%
Base Year + 2	2017	40,525	41,347	-2.8%
Base Year + 5	2020	42,000	43,189	-2.8%
Base Year + 10	2025	43,800	46,473	-5.8%
Base Year + 15	2030	45,900	50,027	-8.2%
Base Year + 20	2035	48,200	53,867	-10.5%
Total Based Aircraft				
Base Year	2015	96	104	-7.7%
Base Year + 2	2017	98	108	-9.4%
Base Year + 5	2020	103	114	-9.4%
Base Year + 10	2025	107	124	-13.7%
Base Year + 15	2030	115	134	-14.1%
Base Year + 20	2035	123	144	-14.7%

Note: FAA TAF published January, 2017.
Note: Commercial Aircraft Operation include scheduled airline and air cargo, and air taxi.
Note: Based Aircraft include officially counted.
Note: Forecast values rounded, may not total.
Source: Mead & Hunt Forecast Projections (March 2017)

SUPPLEMENTAL ATTACHMENT – FAA REVIEW PURPOSES:

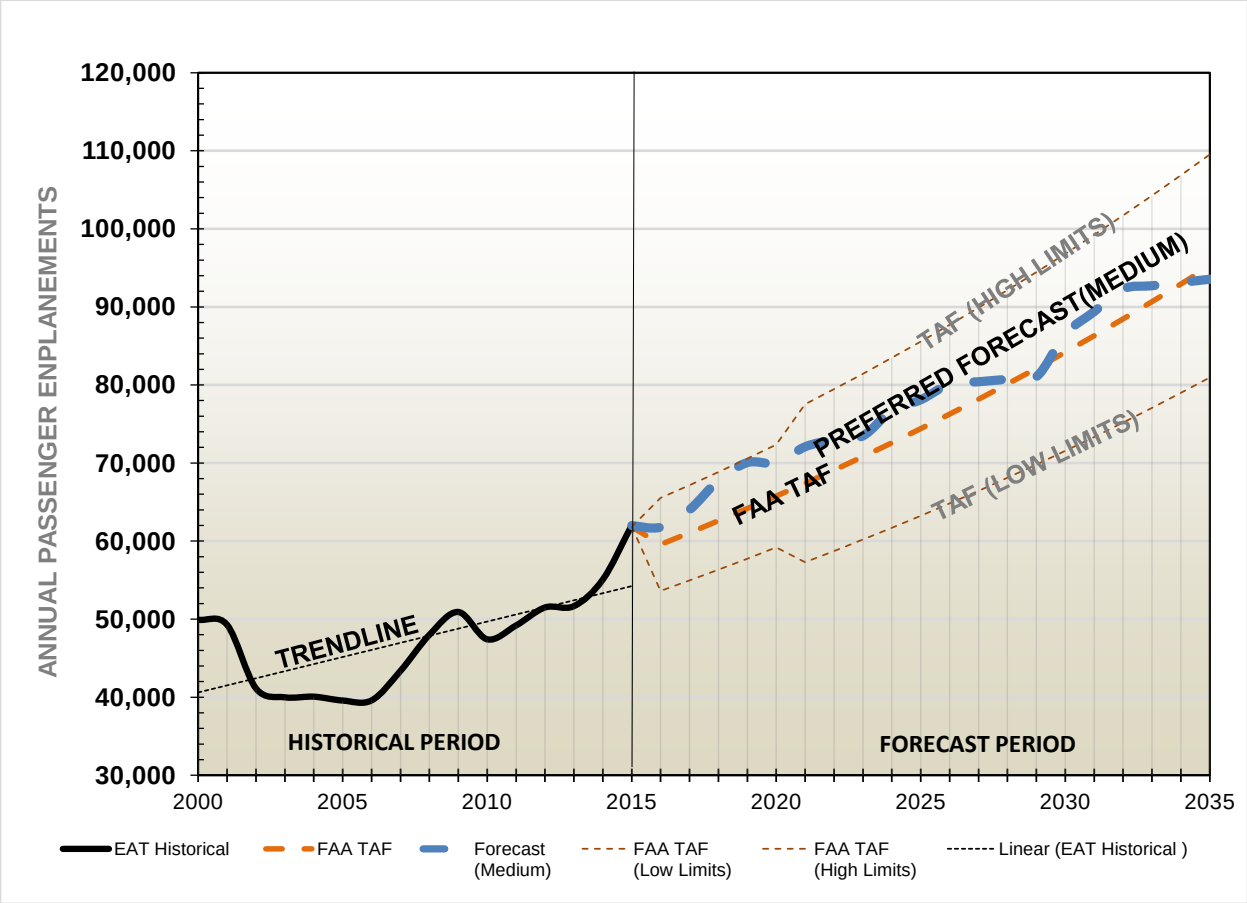
Table 2-15: EAT Historical Activity (1990 to 2016)

Year	Enplaned Passengers (FY)	Total Annual Operations (FY)	Total Based Aircraft	Total Cargo Pounds
1990	34,000	59,500	80	--
1991	46,915	62,500	80	--
1992	30,423	68,500	80	--
1993	32,004	68,500	80	--
1994	38,204	68,500	80	--
1995	47,014	68,500	80	--
1996	52,532	68,500	110	--
1997	55,313	70,500	88	--
1998	53,149	56,412	88	--
1999	52,380	57,508	116	--
2000	49,930	57,616	116	--
2001	49,277	56,924	113	--
2002	41,128	48,800	125	--
2003	39,988	48,800	125	--
2004	40,071	50,814	130	--
2005	39,577	50,058	126	--
2006	39,594	50,832	140	--
2007	43,375	51,615	140	--
2008	47,990	49,526	129	--
2009	50,920	44,681	132	--
2010	47,418	42,492	111	--
2011	49,194	42,492	111	--
2012	51,499	40,640	115	1,211,314
2013	51,668	40,164	117	1,518,502
2014	55,078	40,164	104	1,377,596
2015	61,826	40,164	96	1,153,588
2016	60,062	40,750	96	1,322,806

Note: 2016 Enplanement values vary between published sources.
Note: 2016 Enplanement reflects US DOT Bureau of Transportation Statistics (BTS)
Note: 2016 FAA TAF = 59,577
Note: 2016 and 2016 based aircraft reflect EAT Airport Records.
Sources: See Reference Notes Above

SUPPLEMENTAL ATTACHMENT – FAA REVIEW PURPOSES:

Table 2-16: EAT Passenger Enplanement Chart (FAA TAF to Preferred Forecasts)



Sources: See Reference Notes Above

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CHAPTER 3
Airport Facility Requirements

CHAPTER 3 - AIRPORT FACILITY REQUIREMENTS

CHAPTER OVERVIEW

This chapter documents the Airport facilities satisfy the 20-year aviation forecast demand for the Pangborn Memorial Airport (EAT or "the Airport"). The recommended facility improvements are identified as necessary to resolve existing deficiencies, accommodate user demand, meet FAA design standards, and address developments envisioned by the Airport. The facility requirements bridge the gap between what the Airport currently has, and what the Airport needs.

The Airport facility components include:

1) Airport Classifications and FAA Standards
2) Airfield – Runway Systems
3) Airfield - Taxiway Systems
4) Navigational Aids / Air Traffic Systems
5) Airport Terminal and Landside Facilities
6) General Aviation Terminal and Landside Facilities
7) Aviation Tenants and Support Facilities
8) Airport Land Use and Property Interests

1. AIRPORT CLASSIFICATION AND FAA STANDARDS

Aviation facility requirements coincide with the Airport's role and FAA service level classification. The Airport is expected to remain a FAA primary commercial service facility, operated under Part 139 Airport Certification.

FAA AIRPORT DESIGN STANDARDS

Airport facility design is governed by FAA standards, which prescribe geometric dimensions, safety areas, separations, setbacks, height limitations, and buffer areas. The FAA design standards assure facilities are designed and operated in a safe and efficient manner. For planning, environmental, and funding purposes, it is essential that recommended facilities conform to FAA design standards, preferably without a FAA deviation or modification.

AIRPORT CRITICAL DESIGN AIRCRAFT AND FAA DESIGN CLASSIFICATION (ARC AND RDC)

The application of FAA design standards for airfield planning is determined by the critical design aircraft. The critical aircraft is the most demanding aircraft, or composite group of similar aircraft, that perform 500 or more itinerant operations per year.

The critical aircraft is defined using the following aircraft characteristics:

- Aircraft Approach Category (AAC): alphabetic letter designating approach speed, in knots.
- Airplane Design Group (ADG): a roman numeral designating wingspan and tail height, in feet.
- Taxiway Design Group (TDG): number designating aircraft wheel gear configuration.
- Runway Visibility Range (RVR): instrument approach visibility minimums, in feet.

The following are critical aircraft for airport design standard requirements:

Airport Planning Critical Aircraft: The Airport's existing and future critical aircraft is a C-III category passenger transport aircraft; as representative of the existing Bombardier Q400 turboprop and future Embraer EMB-175 narrowbody regional jet. The Q400/Q400NextGen is a more demanding aircraft in terms of taxiway standards, while the EMB-175 is more demanding in terms of pavement strength and runway takeoff performance requirements. For future planning purposes, the Airport's FAA design standards should accommodate aircraft with an AAC approach speed less than 141 knots, an ADG aircraft wingspan up to 117 feet, a tail height up to 44 feet, and a TDG 5 gear configuration. **Exhibit 3.1** identifies the critical design aircraft characteristics.

FAA Airport Reference Code (ARC) and Runway Design Code (RDC) Classifications: Combined, the AAC and ADG yields the Airport Reference Code (ARC), which is the FAA classification for the airfield design. The AAC, ADG, and RVR yields the Runway Design Code (RDC), which is the FAA design classification for individual runway systems. The Airport is a C-III ARC and RDC classification based on the C-III critical design aircraft. The instrument visibility minimum is not lower than 1-mile, which corresponds to a 5000-foot RVR category, therefore, Runway 12-30 is a FAA Runway Design Code C-III-5000 classification.

Exhibit 3-1: Critical Aircraft Characteristics (Existing and Future)

Critical Aircraft (Existing)

Aircraft Design Characteristics:	
Aircraft Type:	Turboprop Transport
FAA ARC/TDG:	**C-III; TDG 5**
Approach Speed:	±121 Knots
Wingspan:	93'
Length:	107'8"
Tailheight:	27.4'
Maximum Weight:	65,200 Pounds
Seating Configuration:	76 to 90 Passengers
Cockpit to Main Gear (CMG)	43.0'
Wheelbase	45.8'
Main Gear Width (MGW)	31.2'

Critical Aircraft (Future)

Aircraft Design Characteristics:	
Aircraft Type:	Regional Jet Transport
FAA ARC/TDG:	**C-III; TDG 3**
Approach Speed:	124 Knots
Wingspan:	85.3'
Length:	103.9'
Tailheight:	32.3'
Maximum Weight:	82,700 Pounds
Seating Configuration:	77 to 88 Passengers
Cockpit to Main Gear (CMG)	41.3'
Wheelbase	37.5'
Main Gear Width (MGW)	20.5'

Source: FAA Aircraft Performance Database - Excel File (Obtained March 2017)

2. AIRFIELD – RUNWAY SYSTEMS

RUNWAY/AIRFIELD AIRCRAFT OPERATIONAL CAPACITY

From FAA Advisory Circular 150/5060-5, '*Airport Capacity and Delay'*, the single Runway 12-30 and associated parallel taxiway configuration provides an airfield capacity of 230,000 aircraft operations per year. Current operations are 40,750, and forecast to reach 48,200 operations by 2035, which equates to 20 percent of the available capacity (48,200÷230,000). FAA guidance recommends planning for airfield capacity improvements when the demand exceeds 60 percent of capacity. Therefore, based on operational levels, airfield capacity and delay are adequate during normal peak-hour operations, and during visual and instrument weather conditions.

Recommendation: Runway 12-30 provides sufficient airfield operational capacity throughout the 20-year planning period.

PRIMARY RUNWAY 12-30 SYSTEMS

Runway 12-30 Length

The Runway 12-30 length is 7,000 feet. Runway length requirements, for the critical and planned aircraft with similar characteristics, is determined from the greater of the takeoff or landing performance characteristics of the critical design aircraft; as the takeoff distance is typically more demanding than the landing length. Per FAA guidance Advisory Circular 150/5325-4B '*Runway Length Requirements for Airport Design*', runway length requirements are a function of: 1) aircraft performance (engine type, takeoff configuration, range, and operating weights), 2) airport operating conditions (airfield elevation, temperature, winds, and runway surface moisture), and 3) regulatory operating requirements plus safety margin factors (FAA aircraft and crew certification, aircraft manufacturer requirements, company aircraft/crew authorizations, insurance standards).

Critical Aircraft: The Bombardier Q400 is the existing critical aircraft, and for standard Airport conditions, requires approximately 5,600 feet of takeoff distance for dry runway conditions. The Embraer EMB-175 is the future critical aircraft, and for standard Airport conditions, requires approximately 5,800 feet of takeoff distance for dry runway conditions. Longer aircraft takeoff and landing distances may be required for the critical aircraft in order to satisfy balanced field performance and FAA safety margin requirements (typically 15 to 20 percent of the total runway length), and for flights operating during non-standard Airport conditions; such as high density altitude, contaminated pavement surfaces, adverse meteorological conditions, aircraft equipment, crew authorizations, and crosswind/tailwind factors.

Planned Aircraft (Similar Characteristics): Runway 12-30 is also planned to accommodate other similar transport jets, with comparable takeoff and landing performance characteristics to the future critical aircraft (EMB 175). Based on the master plan airline forecast scenarios, similar commercial transports include regional jets such as the EMB 170/190 Series, CRJ 200/700/900/1000, MRJ 70/90, and low-cost/charter narrowbody jets such as the Airbus 318/319/320, Boeing MD-80/90 Series, Boeing-737 Series, Bombardier CS100/300. The Airport also experiences traffic by large-cabin general aviation business jets, representative of the Cessna Citation 600/700 Series, Challenger 600 Series, Learjet 40/50/60 Series, Gulfstream 400/500 Series.

For planning purposes, the actual takeoff and landing requirements of these similar jet aircraft are undeterminable, due to unknown factors regarding the specific aircraft operators (airline), aircraft models/engine types, and various route profile parameters. Furthermore, these jets are not planned to conduct more than 500 annual operations at the Airport and would not constitute the future critical planning aircraft used for determining runway length requirements.

Existing Condition: **7,000 Feet**
Existing and Future Requirement (Planning Critical Aircraft): **±5,800 Feet**
Facility Recommendation: **7,000 Feet**

Recommendation: Airport users-operators have not expressed a deficiency with the Runway 12-30 length. The 7,000-foot length accommodates the existing and future critical aircraft, for takeoff and landing distance performances during normal operating conditions. The 7,000-foot length is also expected to accommodate other planned commercial transport jets with similar characteristics. Therefore, Runway 12-30 is not planned to be extended beyond the current 7,000-foot length.

Runway 12-30 Width

The Runway 12-30 width is 150-feet. Runway width standards are determined from the critical/design aircraft, including aircraft size (airplane design group), aircraft operating weights (maximum takeoff weight-MTOW), and runway visibility minimums (statute miles). The following are FAA facility design standards pertaining to RDC C-III width standards for Runway 12-30:

Existing Condition**: 150 Feet Wide**
Existing and Future Requirement (Aircraft Less than 150,000 Pounds)**: 100 Feet Wide**
Facility Recommendation (Aircraft Greater than 150,000 Pounds)**: 150 Feet Wide**
Note: See alternatives chapter for the analysis of design considerations regarding 150,000-pound aircraft.

Runway 12-30 Shoulders

The runway paved shoulders are 10 to 25 feet wide. Shoulders, including paved or non-paved, mitigate soil erosion from jet blast and accommodate Airport maintenance and emergency vehicles. The airfield soil types and conditions are susceptible to erosion from turbine engine blast.

Existing Condition**: 10 to 25 Feet Wide**
Existing and Future Requirement (Aircraft Less than 150,000 Pounds)**: 20 Feet Wide**
Facility Recommendation (Aircraft Greater than 150,000 Pounds)**: 25 Feet Wide**

Recommendation: Runway shoulders can be stabilized or paved per FAA ADG III standards. Paved shoulders are recommended based on transport aircraft utilization, jet blast considerations, and Airport snow removal operations and vehicle/maintenance access.

Runway 12-30 Blast Pads

Paved blast pads provide overrun protection and minimize jet blast and soil erosion impacts. The Runway 30 end does not have a paved blast pad.

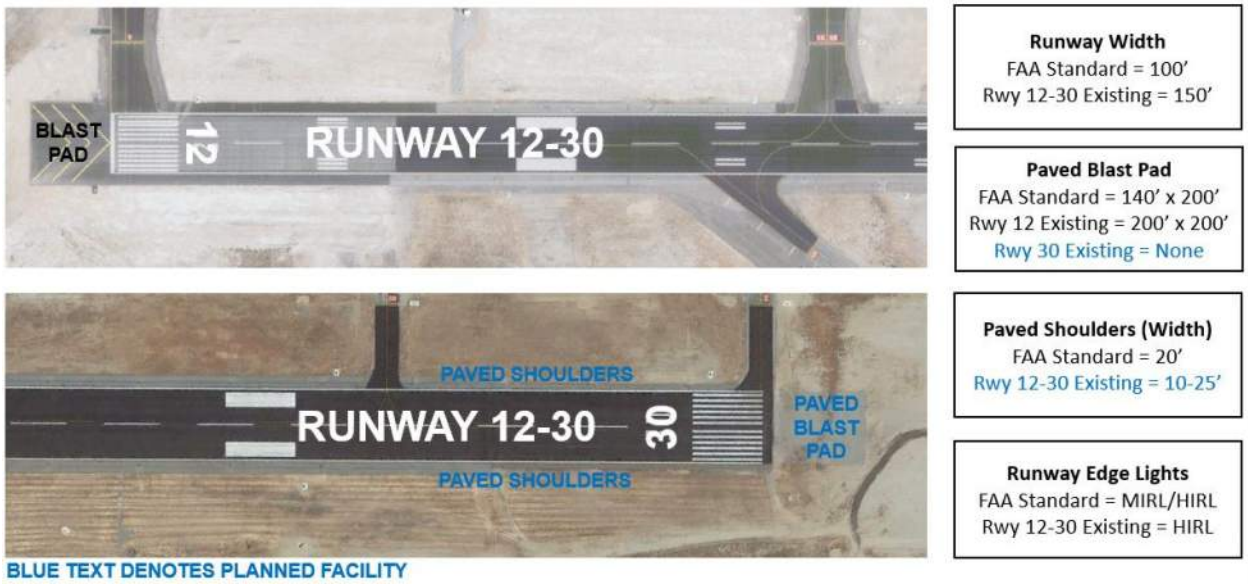
Existing Condition**: Runway 12: 200 Foot Length x 200 Feet Wide | Runway 30: None**
Existing and Future Requirement (Aircraft Less than 150,000 Pounds)**: 200 Foot Length x 140 Feet Wide**
Facility Recommendation (Aircraft Greater than 150,000 Pounds)**: 200 Foot Length x 200 Feet Wide**

Recommendation: Construct a paved blast pad beyond the Runway 30 end.

Summary of Runway 12-30 Dimensional Standards

Exhibit 3.2 illustrates the recommended runway facility improvements based on planning recommendations for the ARC C-III critical aircraft design category. FAA runway standards for FAA C-III aircraft are determined by the thresholds for aircraft weighing less-than and greater-than 150,000 pounds MTOW. The future critical aircraft is an ARC C-III narrowbody regional airline jet transport, representative of the Embraer 170/175, which has a MTOW less than 150,000 pounds. The existing Runway 12-30 width (150' wide), paved shoulders (±25' wide) and blast pad dimension (200' x 200') reflects FAA design standards for aircraft with a maximum takeoff weight (MTOW) greater than 150,000 pounds. The existing Runway 12-30 pavement strength is 192,000 pounds for dual wheel gear (DWG) aircraft (PCN 46/F/A/X/T). For aircraft with a MTOW at or less than 150,000 pounds, the FAA standards runway width is 100 feet, the shoulder width is 20', and the runway blast pad width is 140 feet. Runway 12-30 is designed to accommodate aircraft weighting greater than 150,000 pounds. Justification regarding the facility recommendations for runway width, paved shoulder width, and blast pad dimension exceeding FAA design standards for 150,000-pound aircraft MTOW is documented in the Alternatives Chapter.

Exhibit 3-2: Recommended Runway Dimensional Requirements (Shown by Runway End)



Source: Mead & Hunt Figure

Runway 12-30 Pavement Strength

Pavement strength is largely determined by the critical aircraft maximum takeoff operating weights, in consideration of aircraft wheel configuration, flight frequency, along with less frequent flights conducted by aircraft with similar characteristics. The existing Runway 12-30 pavement is 192,000 pounds for dual wheel gear (DWG) aircraft, which equates to 250,000 pounds for dual tandem wheel gear (DTWG). The Runway 12 extension was constructed at 120,000 pounds DWG, while the remaining runway is estimated to range between 100,000 and 192,000 pounds DWG (PCN: 46 / F / A / X / T from Airport PCN Determination Report dated September, 2017). The forecast projects larger and heavier transport aircraft traffic, operating by 2020.

Table 3.1 shows the recommended airfield pavement strengths based on aircraft weight characteristics. As identified, the Bombardier Q400, at 65,500 pounds maximum takeoff weight, is not the most demanding aircraft in terms of pavement design or strength. The large-cabin general aviation business jets, such as the Gulfstream 400/500, Challenger 600/800, and Falcon 50/900 series, along with the US Forest Service aircraft, such as the Lockheed P-3 Orion, have an equivalent and higher maximum takeoff weight.

In addition, the regional transport jets, as the anticipated replacement or substitution of the Bombardier Q400 turboprop, have a maximum takeoff weight ranging between 80,000 and 150,000 pounds dual wheel gear. Also, the low-cost charter aircraft, including the popular Airbus 318/319/320 and Boeing 737 series, are anticipated to operate at the Airport by 2025, if not sooner. These narrowbody jet transports have a (MTOW) up to 172,000 pounds and a maximum landing weight (MLW) up to 146,000 pounds. Most narrowbody jet transports, with similar characteristics, have a dual wheel gear configuration, with a maximum takeoff weight ranging between 120,000 and 170,000 pounds.

Recommendation: The recommended minimum Runway 12-30 pavement strength is 150,000-pounds to accommodate narrowbody transport jets with dual wheel gear (DWG) configuration. The 150,000-pound strength will accommodate the planned transition to regional airline jets (EMB-170/175), the anticipated low-cost charter airline narrowbody transport jet service (Airbus-320 Series, Boeing-737 Series, MD-80/90 Series), and other similar commercial transport aircraft (CS100/300 Series, EMB-190 Series). The associated taxiway system should be constructed to the same pavement strength as the runway.

Table 3-1: Aircraft Weight Characteristics / Airfield Pavement Strength

Aircraft Type/Category	Aircraft Seats (Typical)	FAA ARC	Aircraft Type	Aircraft Maximum Takeoff Weight (MTOW) - Pounds	Gear Type	Applicable Airfield Pavement
Existing Runway 12-30 Pavement Strength: (120,000 Lbs. (DWG) - Runway 12 Extension | 100,000 Lbs. (DWG) - Remaining Sections)						
AIRPORT CRITICAL PLANNING AIRCRAFT						
Bombardier Q400 - Existing	76	C-III	Regional Turboprop	64,500	DWG	Runway 12-30
EMB-170/175 - Future	76 to 92	C-III	Regional Jet	82,700	DWG	Runway 12-30
REPRESENTATIVE FUTURE CRITICAL DESIGN AIRCRAFT						
Bombardier CRJ Series	70 - 100	C-II to C-III	Regional Jet	75,000 to 92,000	DWG	Runway 12-30
Mitsubishi MRJ 70/90	70 - 100	C-II	Regional Jet	80,000 to 92,000	DWG	Runway 12-30
Bombardier CS100	100 - 130+	C-III	Regional Jet	135,000 to 150,000	DWG	Runway 12-30
Airbus A-318/319/320	120 - 140+	C-III	Narrowbody Jet	150,000 to 172,000	DWG	Runway 12-30
Boeing 737 Series	120 - 140+	C-III	Narrowbody Jet	135,000 to 187,700	DWG	Runway 12-30
Boeing MD-80 Series	110 - 130+	C-III	Narrowbody Jet	140,000 to 160,000	DWG	Runway 12-30
Lockheed P-3 Orion (USFS)	N/A	C-III	Transport Turboprop	130,000 to 140,000	DWG	Runway 12-30
Lear 30/40/50/60 Series	4 - 8	C-II to D-I	GA Business Jet	15,000 to 22,000	DWG	GA Apron
Gulfstream 400/500	6 - 10	C-III	GA Business Jet	65,000 to 90,000	DWG	GA Apron
Beechcraft King Air	4 -10	B-III	GA Turboprop	10,500 to 15,000	DWG	GA Apron
Helicopters (USFS)	4 - 8	N/A	Turbine	20,000 to 50,000	--	GA Apron
Cessna C-172/182	4	A-I	GA Single-Piston	2,500 to 4,500	SWG	GA Taxilane

MTOW: Maximum Takeoff Weight | GA – General Aviation.
Note: The gear type and configuration dictate how the aircraft weight is distributed to the pavement and determines the pavement response to aircraft laodings. (SWG): Single-Wheel Gear Aircraft – each landing gear is supported by a single tire. (DWG): Dual-Wheel Gear Aircraft – each landing gear consists of a single axle with two tires per axle that equally share the weight of the aircraft and provide for greater weight distribution.
Source: FAA Aircraft Performance Database - Excel File and Aircraft Manufacture Manuals

Runway 12-30 Instrument Procedures / Navigational Instrumentation

Runway 12-30 is planned to remain a precision instrument runway with positive vertically-guided approaches. The Instrument Landing System (ILS) to Runway 12 is will be the principal precision approach procedure throughout the 20-year planning period. Runway 30, which is aligned more favorably with the prevailing instrument winds, will retain GPS-based procedures providing approaches with vertical guidance. With future FAA NextGen improvements, it is possible that future GPS-technology might be able to provide 'curved' precision approach procedures and permit narrower obstruction clearance surfaces, which might permit lower instrument minimums in the future. Therefore, the transition by commercial and general aviation operators towards greater use of GPS-based procedures is likely in the future.

Runway 12-30 Visibility Range (RVR) Equipment

The Runway Visibility Range (RVR) equipment measures the horizontal visibility, expressed and published in linear feet (ex. 4000 RVR corresponds lower than 1-mile but not lower than ¾-mile visibility). The RVR, which is installed along the runway environment, supports RVR-based minimums, and potentially lowers instrument approach minimums. An ILS CAT-I runway requires a single touchdown RVR, with more than one RVR possible with an ILS CAT-I with Special Authorization (SA). High intensity edge lights (HIRL), which are already installed for Runway 12-30, are required with RVR-based minimums.

Runway 12-30 Approach Lighting Systems (ALS)

The Runway 12 and 30 ends are not installed with an approach lighting system, which involves a sequence of lights extending beyond the runway end to improve visual ground acuity when executing an actual instrument approach procedure. The ALS system provides improved approach reliability, particularly in consideration of scheduled commercial flights. FAA US Terminal Instrument Procedures (TERPS) standards allows a credit for lower visibility minimums with the installation of an approach lighting system. The existing Instrument Landing System (ILS) minimums provide 1-mile visibility, 330 feet minimum descent, at 3.60° glideslope angle, for Category A, B, and C aircraft. For runways *without* an approach lighting system, a 3.60° glidepath angle permits a ¾-mile visibility minimum for Category A and B aircraft, and a 1-mile visibility minimum for Category C aircraft (approaches with a glidepath angle greater than 3.10° cannot be utilized by D and E category aircraft). A 3.60° glidepath angle for a runway *with* an ALS can achieve a ½-mile visibility minimum for Category A and B aircraft, and a ¾-mile visibility minimum for Category C aircraft. The installation of an ALS would allow for lower visibility minimums. A full approach lighting system (medium intensity-MALS-R light system extends 2,400' beyond runway end) allows for a minimum descent altitude not lower than 200 feet, with a runway visual range not lower than 1,800 feet (½-mile). The installation of an intermediate approach lighting system (medium intensity-MALS-F light system extends 1,400' beyond runway end) allows for a minimum descent altitude not lower than 200 feet, with a runway visual range not lower than 4,000 feet (¾-mile).

Recommendation: install an intermediate approach lighting system (MALS-F) for the Runway 12 end (Phase 1) and Runway 30 end (Phase 2), which could permit ILS or RNP minimums down to ¾-mile visibility, and a height above touchdown (HAT) not less than 250 feet for Category A, B, and C aircraft.

Runway 12-30 Centerline (RCL) and Touchdown Zone Lighting (TDZ) Systems

Runway lighting systems provide the opportunity to lower the instrument visibility minimums, which improves reliability during inclement weather conditions (low ceilings and visibility), and reduces flight delays and cancelations, particularly during the foggy winter months. The installation of runway centerline lights (RCL) and touchdown zone lighting (TDZ) lights allows for ILS CAT I (Special Authorization) and runway visibility range as low as 1,400 feet for aircraft equipped with a flight director, autopilot, or heads-up-display.

Recommendation: install TDZ and RCL lighting systems as necessary to lower the runway instrument visibility minimums to 2400' RVR (TDZ and RCL are capable of lowering minimums to 1,800' to 1,400' RVR). Lighting installation would normally occur as part of the next major Runway 12-30 pavement reconstruction project.

Table 3.2 summarizes the existing and recommended airfield facility and equipment items for attaining lower instrument visibility and descent approach minimums to the Runway 12 and 30 ends.

Table 3-2: Runway 12-30 Instrument Approach Recommendation

Runway Facility Component	Runway 12 End		Runway 30 End	
	Runway 12 End (Existing Condition)	Runway 12 End (Future Condition)	Runway 30 End (Existing Condition)	Runway 30 End (Future Condition)
Approach Type	APV-Vertical Guidance (Not Less than 250')	**Precision (<250')**	APV-Vertical Guidance (Not Less than 250')	APV-Vertical Guidance (Not Less than 250')
Approach Equipment	ILS and RNP	ILS or RNP	RNP	RNP
Aircraft Categorized	A, B, C	A, B, C	A, B, C	A, B, C
Runway Edge Lighting	HIRL (Intensity)	HIRL (Intensity)	HIRL (Intensity)	HIRL (Intensity)
Centerline Lights (CL)	No	CL Recommended * (See Note 1)	No	CL Recommended * (See Note 1)
Touchdown Zone Lights (TDZ)	No	TDZ Recommended * (See Note 1)	No	TDZ Recommended * (See Note 1)
Approach Light System (Type)	No	**Intermediate (MALS-F)** (See Note 2)	No	Intermediate (MALS-F) Recommended * (See Note 2)
RVR (Equipment)	No	Recommended * with HIRL and <1-Mile	No	Recommended * with HIRL and <1-Mile
Visibility Minimum	1-Mile	2,400' RVR * (<3/4-Mile; >1/2-Mile)	1-Mile	2,400' RVR * (<3/4-Mile; >1/2-Mile)
Descent Minimum - Feet AGL	330' AGL	**<250' AGL** (See Note 2)	363' AGL	**>250' AGL** (See Note 2)
Glidepath	3.6 Degrees	±3.6 Degrees (Est)	3.6 Degrees	±3.6 Degrees (Est)
Threshold Crossing Height	58'	58'± (Estimate)	60'	60'± (Estimate)
Clear Glidepath Qualification Surface (GQS)	To Be Determined (See Note #2)	Yes	To Be Determined (See Note #2)	To Be Determined (See Note #2)
RPZ (Approach) - FAA Standard	500' x 1,010' x 1,700'	**1,000' x 1,750' x 2,500'**	500' x 1,010' x 1,700'	**1,000' x 1,510' x 1,700'**
RPZ (Departure) - FAA Standard	500' x 1,010' x 1,700'	500' x 1,010' x 1,700'	500' x 1,010' x 1,700'	500' x 1,010' x 1,700'
Part 77 Approach - Dimension	1,000' x 10,000' x 16,000'	1,000' x 10,000' x 16,000'	1,000' x 3,500' x 10,000'	**1,000' x 4,000' x 10,000'**
Part 77 Approach - Slope	50:1	50:1	34:1	34:1
TERPS Surface (Ch #3, Sec #3)	20:1	34:1	20:1	20:1
Precison PA Approach Surface	Not Required	Clear	Not Required	Not Required

Dark Blue Text: Recommended planning change per FAA AC, 150/5300-13A, Table 3-4.
Light Blue Text: Planning recommendation, although not a FAA requirement per FAA AC, 150/5300-13A, Table 3-4.
Note 1: Requires flight director (FD), autopilot (AP), or heads-up-display (HUD) for 1,400' to 1,800' RVR.
Note 2: Per FAA Airspace Analysis (equipment requirements, approach/missed TERPS procedures, obstructions/terrain)
Source: FAA 150/5300-13A, *Airport Design*

The following is the recommended Runway 12-30 instrument facility implementation sequence:

Sequence 1: FAA Airspace Study (3/4-Mile, 4,000-RVR Minimums)
Runway 12 Install Runway Visual Range (RVR) Equipment – RVR-Based Minimums
(4,000-RVR) Install MALS-F Approach Light System

Sequence 2: FAA Airspace Study (3/4-Mile, 2,400-RVR Minimums)
Runway 12 Runway 12 End: Acquire precision RPZ (1,000' x 1,750' x 2,500')
(2,400-RVR) Install Runway Centerline Lights (RCL) – as required for approach minimums
Install Runway Touchdown Zone Lights (TDZ) – as required for approach minimums

Sequence 3: FAA Airspace Study (3/4-Mile, 4000-RVR Minimums)
Runway 30 Install MALS-F Approach Light System
(4000-RVR)

ADDITIONAL RUNWAY (DISPOSITION OF FORMER RUNWAY 7-25 AND FORMER TURF STRIP)

This section provides a facility requirement analysis of the former paved Runway 7-25 and turf landing strip in terms of FAA runway types and feasibility:

Crosswind Runway: wind coverage on the primary runway is less than 95% (FAA eligible).
Additional Runway: runway does not meet crosswind or secondary requirements (FAA non-eligible)

Former Paved Crosswind Runway 7-25: The former east-west Runway 7-25 was 4,460 by 75 feet, which also included paved shoulders resulting from the runway originally being constructed at 150-feet wide. The former Runway 7-25 was deactivated due to failing pavement condition (moderate to severe cracking as indicated by the WSDOT Pavement Condition Index-PCI inspections) which was not conducive for landing and takeoff operations by fixed-wing aircraft. In addition, the former Runway 7-25 involved non-standard FAA compliance with runway safety area (RSA) grading and encroachment of the runway protection zone (RPZ) beyond the Runway 27 end. The former Runway 7-25 was a visual runway predominately used by small general aviation piston aircraft, including glider/sailplane and tow-plane landing operations. During Executive Flight operations, occasional turbine aircraft reportedly used the former Runway 7-25. The former Runway 7-25, which was closed during the winter months, accounted for about 5 to 15 percent of the total Airport traffic.

Based on annual wind observations, Runway 12-30 achieves 98.2 percent crosswind coverage at 10.5-knots, while the former Runway 7-25 achieved 96.5 percent. Runway 12-30 obtains more favorable crosswind coverage being better aligned with the prevailing winds. The former Runway 7-25 provided an additional 0.86 percent (99.78% Combined - 98.92% Runway 7-25 = 0.86%) all-weather crosswind capability, which equates to about 3 days of annual crosswind benefit. Per FAA guidance, Runway 12-30 provides sufficient crosswind capabilities (greater than 95% crosswind coverage at 10.5-knots) to accommodate all aircraft categories during all-weather, visual, and instrument wind conditions. Therefore, per FAA design standards, the former Runway 7-25 is not required for meeting crosswind purposes, airfield capacity, or other unique Airport operating situations. Consequently, a 'crosswind' runway would not be eligible to receive FAA funding; and therefore, would become a 100-percent local Airport cost.

For facility planning consideration, the FAA recommended paved runway length is 3,400 feet, in accordance with FAA Advisory Circular 150/5325-4B, "Runway Length Requirements for Airport Design", Figure 2-1: Small Aircraft with Fewer than 10 Passenger Seats, 95% of the Fleet Curve as adjusted for Airport field elevation of 1,249 feet and a mean maximum temperature of 88.6°F. The minimum FAA runway length for instrument approach capabilities is 3,200 feet. The minimum FAA paved runway length is 2,500'. Therefore, the former Runway 7-25 dimension (4,460' x 75') would be in-excess of current FAA runway dimensional standards. The estimated reconstruction cost of the former paved crosswind Runway 7-25 at 3,400 by 60 feet would be $2.5 to $3.5 million; or about $1,200 per flight.

Recommendation: Based on FAA airport planning guidance and runway utilization, a paved additional or crosswind runway is not recommended (see Alternatives Chapter for further additional runway planning analysis).

Former Non-Paved (Turf) Landing Strip: The former non-paved landing strip was approximately 1,100 by 75 feet, and had been used predominately for glider-sailplane landings, tow-plane landings, and small single piston-engine aircraft (RDC A-I small aircraft with approach speeds less than 50-knots) operations; particularly light sport utility taildraggers. The turf landing strip, which was closed during the winter months, accounted for less than 5 percent of the total Airport traffic. The turf strip was deactivated because it did not meet FAA standards for safety areas, hold-short separation, object setbacks, building/hangar airspace clearances, and approach clearances. In addition, the former non-paved turf involved other Airport operating considerations, including limited function during nighttime and inclement weather conditions, reliability (closure) during the winter months, drainage and soil erosion factors (wildlife burrowing), safety margin factors such as pilot visibility and runway end awareness, maintenance obligations, operating costs, and Airport Sponsor liability. For facility planning consideration, the recommended non-paved turf length is approximately 1,000', which would accommodate glider/sailplane landings, and accommodate light-sport utility aircraft, which are airplanes with a maximum gross takeoff not greater than 1,320 pounds.

Recommendation: Based on FAA airport planning design standards, a non-paved turf landing strip is a planning recommendation, however, the former turf landing strip location is not permissible because it did not meet FAA standards (see Alternatives Chapter for further non-paved turf landing strip planning analysis).

AIRFIELD SYSTEM SUMMARY

Tables 3.3 identifies the recommended airfield system improvements for the primary Runway 12-30, including a summary table of facility requirements associated with the FAA C-III design standard thresholds for aircraft weighing less-than and greater-than 150,000 pounds maximum takeoff weight (MTOW). Per FAA Advisory Circular 150-5300-13A, Airport Design, Appendix 7, for airplanes greater than 150,000 pounds, the standard runway width is 150 feet, the shoulder width is 25 feet, and the runway blast pad width is 200 feet. For airplanes with a maximum certificated takeoff weight of 150,000 pounds or less, the standard runway width is 100 feet, the shoulder width is 20 feet, and the runway blast pad width is 140 feet. The Airport's forecast vision is to accommodate large narrowbody transport jets. **Tables 3.4** identifies the airfield facilities associated with the additional (crosswind) runway planning considerations.

Table 3-3: Airfield Systems and Facilities: Runway 12-30

Facility Component	FAA Facility Standard (Existing Condition)		FAA Facility Standard (Future Condition)	
	Runway 12 End	Runway 30 End	Runway 12 End	Runway 30 End
FAA Runway Classification	Primary		Primary	
Runway Design Code (RDC)	ARC C-III: <150,000 Pounds MTOW		ARC C-III: <150,000 Pounds MTOW	
Critical/Design Planning Aircraft Type	Regional Airline Transport		Regional Airline Transport	
Runway Length x Width	7,000' x 100'		7,000' x 100'	
Runway Shoulder Width	20' Per Side (Paved)		20' Per Side (Paved)	
Runway Blast Pad (Wide x Beyond)	140' x 200'	140' x 200'	140' x 200'	140' x 200'
Pavement Surface Course	Asphalt (Grooved)		Asphalt (Grooved)	
Taxiway-Runway Hold Short	250' (263' Elevation Adjusted-See Note)		250' (263' Elevation Adjusted-See Note)	
Runway-Taxiway CL Separation	400' (From Centerline)		400' (From Centerline)	
Pavement Markings	Precision		Precision	
Distance-to-Go Markers	Yes	Yes	Yes	Yes
Pavement Strength (Gear Type) Pavement Values - PCN	±192,000 (DWG) PCN: 46 / F / A / X / T		±192,000 (DWG) PCN: 46 / F / A / X / T	
Runway Lights	High Intensity (HIRL) Runway Centerline Lights (CL) * Touchdown Zone (TDZ) *		High Intensity (HIRL) Runway Centerline Lights (CL) * Touchdown Zone (TDZ) *	
Runway Visibility Range (RVR)	RVR (Touchdown Visibility Sensor) *		RVR (Touchdown Visibility Sensor) *	
Runway Lighting Systems	PAPI-4L,REIL MALSF	PAPI-4L,REIL, MALSF *	PAPI-4L,REIL MALSF	PAPI-4L,REIL, MALSF *
Runway Instrument Approaches	ILS, RNAV (RNP), VOR/DME	RNAV (RNP), VOR/DME	ILS, RNAV (RNP), VOR/DME	RNAV (RNP), VOR/DME
Planned Lowest Approach Minimums (Aircraft Category)	2400 RVR / 250'+ (A,B,C)	4000 RVR / 250'+ (A,B,C)	2400 RVR / 250'+ (A,B,C)	4000 RVR / 250'+ (A,B,C)
Navaid Systems (On-Airport)	ILS, LOC, VOR/DME, RNAV (GPS), RNP		ILS, LOC, VOR/DME, RNAV (GPS), RNP	
Weather Observation Station	ASOS		ASOS	
Facility Component	**FAA Facility Standard (Existing Condition)**		**FAA Facility Standard (Future Condition)**	
	Runway 12 End	**Runway 30 End**	**Runway 12 End**	**Runway 30 End**
Taxiway System	See Separate Taxiway Table		See Separate Taxiway Table	
Taxiway Design Group (TDG)	TDG 5		TDG 5	
Pavement Strength (Gear Type) Pavement Values - PCN	Same as Runway Pavement Strength		Same as Runway Pavement Strength	
West Side Parallel Taxiway Pavement Strength Pounds (Gear)	±100,000 (DWG)		±100,000 (DWG)	

RUNWAY SYSTEM FACILITY SUMMARY (FAA STANDARDS ITEMS FOR 150,000-POUND AIRCRAFT MTOW THRESHOLD)						
Runway Facility Component	**Existing Condition**		**FAA Standard**		**Plan Recommendation**	
	Rwy 12 End	**Rwy 30 End**	**RDC C-III <150,000 LBS. (See Note 1)**	**RDC C-III >150,000 LBS. (See Note 2)**	**Rwy 12 End**	**Rwy 30 End**
Runway Width	150' Wide		100' Wide	150' Wide	150' Wide	
Runway Shoulder (Per Side)	±25' Wide (Paved Width Varies)		20' Wide	25' Wide	25' Wide - Full Length (Paved)	
Runway Blast Pad (Wide x Beyond)	200' x 200'	None	140' x 200'	200' x 200'	200' x 200'	**200' x 200'**

Note: * FAA 'recommended' design standard.
Note: Taxiway-to-Runway centerline separation does not require an airfield altitude adjustment.
Note: Hold Short Distance: This distance is increased 1 foot for each 100 feet above sea level.
Note: Table reflects recommendations for FAA design standards pertaining to 150,000-pound MTOW threshold.
Note: Blue text denote a recommended planning change.
Note: MTOW = Maximum Takeoff Weight
Note 1: <150,000 LBS = FAA ARC C-III Standards for Aircraft 'Less' than 150,000 Pounds MTOW
Note 2: >150,000 LBS = FAA ARC C-III Standards for Aircraft 'Greater' than 150,000 Pounds MTOW
Source: FAA 150/5300-13A, *Airport Design*

Table 3-4: Airfield Systems and Facilities: Non-Paved Turf Strip

RUNWAY SYSTEM FACILITY SUMMARY		
Facility Component	**Future Non-Paved Turf**	
	Runway 7 End	**Runway 25 End**
Runway Type	Additional	
Runway Design Code (RDC)	A/B-I (Small Aircraft)	
Critical Planning Aircraft Design Aircraft	Light Sport Utility Single Piston and Sailplane-Glider Landings	
Taxiway Design Group (TDG)	Group 1A	
Runway Visibility Category (RVR)	Visual	Visual
Runway Length x Width	1,000'± x 60' (FAA Standard Width) (Sailplane Club Indicated 75' Wide)	
Runway Shoulder Width	None	
Surface	Turf (Non-Paved)	
Taxiway-Runway Hold Short	125'	125'
Runway-Taxiway CL Separation	150'	150'
Pavement Markings	Visual (No Markings)	
Runway Edge Lights	None	
Runway Edge Marking System	Per FAA Standards	Per FAA Standards
Facility Component	**Future Non-Paved Turf**	
	Runway 7 End	**Runway 25 End**
Taxiway System	Connector Taxiway (Paved or Turf)	

Note: Turf construction must meet FAA design standards.
Note: Runway facilities to accommodate gliders and small light sport utility aircraft.
Note: Airport glider association indicated 900-foot minimum length and 75-foot turf width.
Note: Based on aircraft manufacturer manuals, certain sport utility aircraft can operate on a 1,000-foot turf landing strip (per FAA design standards, the turf surface increases the paved takeoff distance by a factor of 1.2).
Source: FAA 150/5300-13A, *Airport Design*

3. AIRFIELD SYSTEMS - TAXIWAY FACILITIES

The Airport continues to reconfigure their former three-runway system where some existing taxiway segments are circuitous or do not meet FAA taxiway design standards. This section identifies improvements to the taxiway system for more efficiency in support of east and west airfield developments.

TAXIWAY SYSTEM – FAA DESIGN STANDARDS

Taxiway geometry standards are based on the critical aircraft, as determined by the Airplane Design Group (ADG) and Taxiway Design Group (TDG). The TDG is based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance.

The following are the design standards applicable to the planned taxiway systems:

- East Parallel Taxiway System (Upgrade): ADG III, TDG 5 (Bombardier Q400)
- West Parallel Taxiway System (Planned): ADG II, TDG 3 (Transport/Large-Cabin Business Jet)

The following are FAA non-standard conditions for the east side taxiway system. The east side taxiway system meets FAA design standards (Taxiway Object Free Area - TOFA, Taxiway Safety Area -TORA, separation and setback distances, aircraft wingtip clearances) unless otherwise noted.

Non-Standard Taxiway Items (Existing Condition):

- Taxiway 'A' elevation is penetrated by the Runway 12-30 primary surface.
- Taxiway 'A' segments do not meet TDG 5 width (75') and paved or stabilized shoulders standards (30'). For airplanes with maximum certificated takeoff weight of 150,000 pounds or less, the FAA standard shoulder width is 20 feet. Paved shoulders are recommended for taxiways and taxilanes accommodating ADG-III aircraft.
- Taxiway 'A4', 'B', and 'C' are Acute (non-90 degree) Taxiway(s): Taxiways should be designed such that turns are 90 degrees, and the nose gear steering angle is no more than 50 degrees. Taxiways are designed for "cockpit over centerline" taxiing with pavement being of sufficient width to allow a certain amount of wander.
- Taxiway 'A4' and 'A3' Exit Connections: Taxiways should not lead directly from an apron or hangar ramp to a runway without requiring a turn. This invites pilot confusion regarding entry to the parallel taxiway or runway.
- Taxiway 'A2' Exit Taxiway Location and Separation Interval: Position taxiway exit locations and intervals to maximize various aircraft types (piston, turboprop, and jet), in consideration of landing distances, braking actions, and terminal parking destinations.
- Parallel Taxiway 'A' Separation (exceeds FAA minimum standards): Current separation between the runway centerline and Taxiway 'A' centerline is 527.5' to 540'. The standard is for 400' separation.
- Taxiway Hold/By-Pass: Due to commercial traffic, construct bypass taxiway connector to provide for a north-end aircraft bypass to access the runway.
- Taxiway Strength: Taxiway system to be constructed to the same strength as the associated runway.

EAST SIDE PARALLEL TAXIWAY SYSTEM

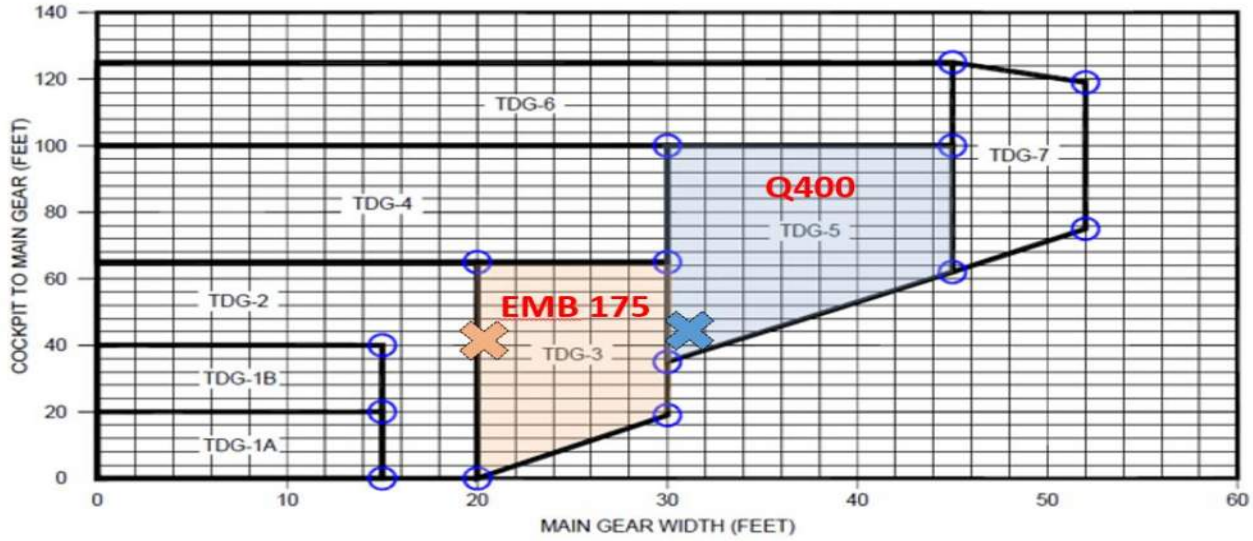
East Side Taxiway System – Taxiway Width Standards (Width, Shoulders, Strength)

The east side parallel taxiway system totals 13,000 linear feet: the north 3,000 feet has been constructed to ADG III standards (75-foot wide, shoulders) and the remaining 10,000 feet previously constructed to ADG II standards (50-feet wide, no shoulders). The Bombardier Q400 turboprop is the existing critical aircraft, an ADG III and TDG 5 category. The Q400 is a TDG 5 because of the wide Main Gear Width (MGW) of 31.2 feet, resulting from the main gear co-located with the engine nacelles. The MGW for TDG 5 requires a 15-foot Taxiway Edge Safety Margin (TESM) which requires a 75-foot taxiway width.

The EMB-175 regional jet is the future critical aircraft, an ADG III and TDG 3 category. The EMB-175 has a MGW of 20.5 feet, and similar with most regional jets, narrower than the Q400. TDG 3 requires a 50-foot wide taxiway. **Exhibit 3.3** and **Exhibit 3.4** illustrate the TDG 3 and 5 standards, with respect the existing and future critical aircraft.

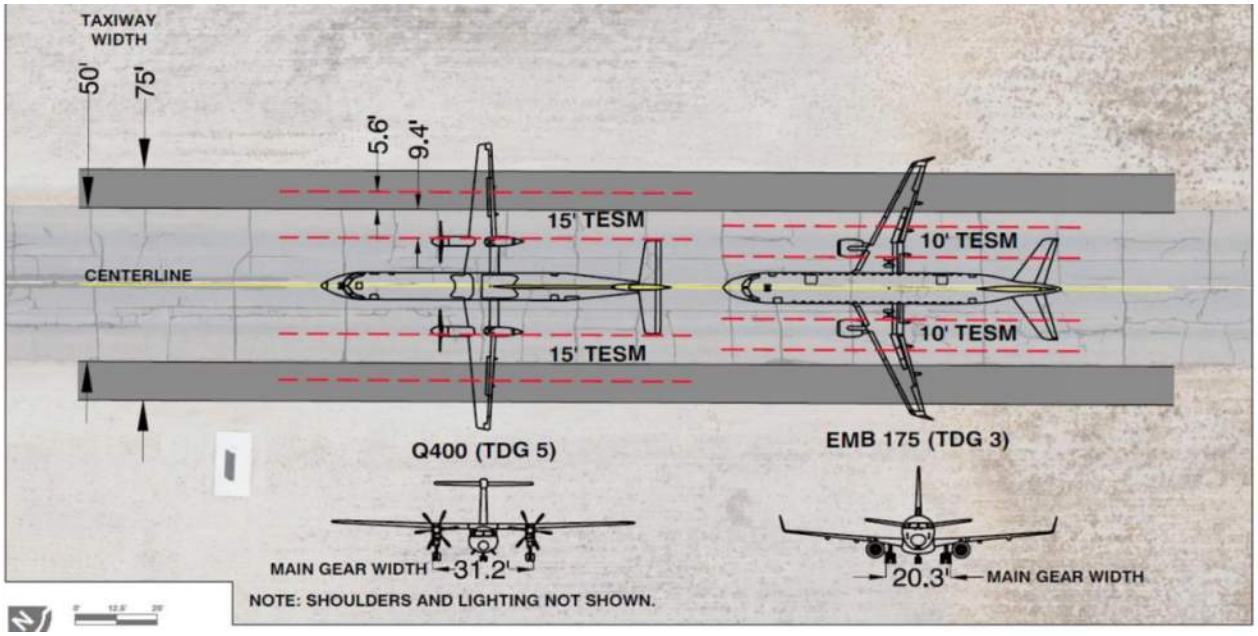
Recommendation: Alaska Airlines reports that the Q400 is expected to continue operations at Pangborn for the next 10 to 15 years, perhaps more if Alaska Airlines (Horizon Air) takes delivery of additional Q400 or orders the new Q400NextGen. For this reason, construction of the east side parallel Taxiway 'A' should be to ADG III and TDG 5 design standards. This results in a total taxiway width of 75' + 30' stabilized shoulders. The recommended east side taxiway strength is 150,000 pounds (dual wheel gear).

Exhibit 3-3: FAA Taxiway Design Group Classification (Q400 and EMB-175)



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

Exhibit 3-4: Taxiway Width Standards



Source: Mead & Hunt Figure

East Side Taxiway System – Runway Separation

The existing parallel taxiway-to-runway centerline separation varies from 527.5 to 540 feet. Per FAA design standards for ADG III aircraft, the minimum allowable separation is 400 feet (does not require adjustment for airfield elevation). The 1,000-foot section of existing Taxiway 'A' north of the airline apron would remain at the 527.5' separation in order to clear the ILS glideslope critical area, with an 'S' curve to transition between the 527.5 and 400-foot separation.

Recommendation: upon future pavement reconstruct project, construct and relocate the future east side parallel Taxiway 'A' to 400 feet separation from the Runway 12-30 centerline (ADG III and TDG 5 design standards). The existing Taxiway 'A-5' exit taxiway would require reconfiguration for north access to the airline apron and south access to the general aviation apron. See factors below:

Taxiway Facility Advantages (Shift Taxiway-to-Runway Centerline from 540' to 400'):

- Convert taxiway into additional apron expansion (±265,000 SF)
- Airline apron expansion potential (±30,000 SF)
- General aviation apron expansion (±200,000 SF)
- US Forest Service apron expansion potential (±35,000 SF)
- Use existing Taxiway 'A' during the Taxiway 'A' relocation project construction. Potentially use Taxiway 'A' as temporary general aviation runway surface during Runway 12-30 reconstruction, length unable to support airline operations. Taxiway-to-taxiway separation 12' too close to be used as dual parallel taxiway/taxilane. Segment of north Taxiway 'A' to remain at 527.5' due to ILS glideslope. Taxiway 'A' sections potentially used as a future temporary or permanent Airport vehicle roadway.
- Convert taxiway into aircraft hangar ramp
- Convert taxiway segments into Airport vehicle access
- Improves taxiway-to-runway elevation differential

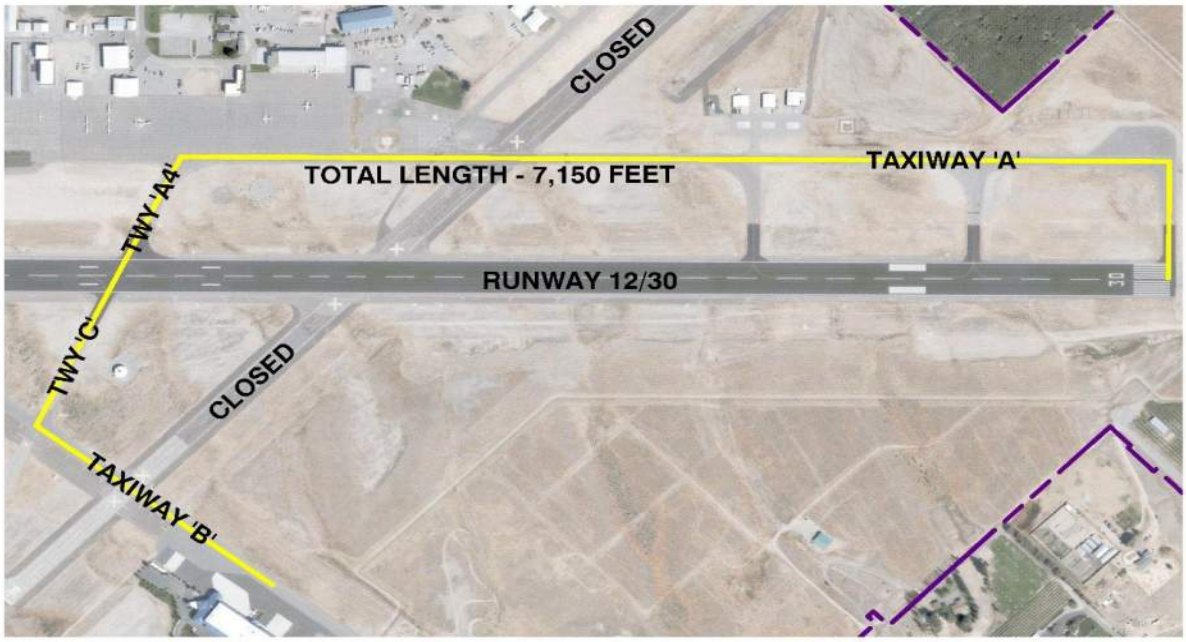
Taxiway Facility Disadvantages (Shift Taxiway-to-Runway Centerline from 540' to 400'):

- Recent northside Taxiway 'A' re-constructed @ 527.5' Runway 12-30 separation
- Relocation of signage; extensive relocation required with taxiway at current location
- Potential re-profile of exit connectors
- Costs (earthwork and equipment relocation)

WESTSIDE PARALLEL TAXIWAY SYSTEM IMPROVEMENTS AND PHASING

As shown in **Exhibit 3.5**, the absence of a west side parallel taxiway system can result in 7,000-foot taxiway route in order to get to-and-from the west side terminal and requires a runway crossing (shown based on the existing taxiway system). Since Runway 12 was extended, Taxiway 'B' is no longer an entrance taxiway to reach the Runway 12 end, which forces a runway crossing on an angled taxiway. As a precision runway, a new west-side full-parallel taxiway system is proposed. The west-side taxiway system must align and geometrically inter-connect with the planned east-side parallel taxiway system improvements. Per FAA AIP Handbook guidance, a partial-parallel taxiway system is justified at about 5,000 to 10,000 operations, and a full-parallel taxiway system at 10,000 to 20,000 operations.

Exhibit 3-5: Taxiway Routing To and From Westside Terminal Area



Source: Mead & Hunt Figure

Table 3.5 summarizes the recommended east and west side taxiway system improvements per taxiway segment, as applicable to FAA taxiway design standards.

Table 3-5: Future Taxiway Systems and Facilities

TAXIWAY SYSTEM - 2035 FUTURE CONDITION				
Taxiway Segment	**TWY 'A'**	**TWY 'A-1'**	**TWY 'A-2'**	**TWY 'A-3' (A-2)**
Type	East Parallel	Entrance	**REMOVE**	Exit
Dimension (Length x Width)	**6,935' x 75'**	**400' x 75'**	"	**400' x 75'**
Runway and Taxiway Design	RDC C-III | TDG 5	RDC C-III | TDG 5	"	RDC C-III | TDG 5
Shoulder Width and Type	30' Stabilized	**30' Stabilized**	"	**30' Stabilized**
Edge Lighting	MITL	MITL	"	MITL
Pavement Strength (Gear Type)	**±150,000# (DWG)**	**±150,000# (DWG)**	"	**±150,000# (DWG)**
Taxiway Segment	**TWY 'A-4'**	**TWY 'A-4' -NEW**	**TWY 'A-5'**	**TWY 'A-6'**
Type	REMOVE FUTURE	**Exit/Connector**	Exit	Entrance
Dimension (Length x Width)	"	**400' x 75'**	400' x 75'	400' x 75'
Runway and Taxiway Design	"	**RDC C-III | TDG 5**	RDC C-III | TDG 5	RDC C-III | TDG 5
Paved Shoulder Width	"	**Stabilized 30'**	Stabilized 30'	Stabilized 30'
Edge Lighting	"	**MITL**	MITL	MITL
Pavement Strength (Gear Type)	"	**±150,000# (DWG)**	**±150,000# (DWG)**	**±150,000# (DWG)**
Taxiway Segment	**TWY 'B' - NEW**	**TWY 'B-1' - NEW**	**TWY 'B-2' - NEW**	**TWY 'B-3' - NEW**
Type	**West Parallel**	**Entrance (South)**	**Exit**	**Exit**
Dimension (Length x Width)	**6,935' x 50'**	**400' x 50'**	**400' x 50'**	**400' x 50'**
Runway and Taxiway Design	**RDC C-II | TDG 3**	**RDC C-II | TDG 3**	**RDC C-II | TDG 3**	**RDC C-II | TDG 3**
Paved Shoulder Width	**Stabilized 20' (Rec)**	**Stabilized 20' (Rec)**	**Stabilized 20' (Rec)**	**Stabilized 20' (Rec)**
Edge Lighting	**MITL**	**MITL**	**MITL**	**MITL**
Pavement Strength (Gear Type)	**±100,000# (DWG)**	**±100,000# (DWG)**	**±100,000# (DWG)**	**±100,000# (DWG)**
Taxiway Segment	**TWY 'B-4' - NEW**	**TWY 'B-5' - NEW**	**TWY 'C' (TWY 'B')**	**TWY 'C'**
Type	**Exit**	**Entrance**	Hangar Access	**REMOVE FUTURE**
Dimension (Length x Width)	**400' x 50'**	**400' x 50'**	2,750' x 50'	"
Runway and Taxiway Design	**RDC C-II | TDG 3**	**RDC C-II | TDG 3**	RDC C-II | TDG 3	"
Paved Shoulder Width	**Stabilized 20' (Rec)**	**Stabilized 20' (Rec)**	**Stabilized 20' (Rec)**	"
Edge Lighting	**MITL**	**MITL**	MITL	"
Pavement Strength (Gear Type)	**±100,000# (DWG)**	**±100,000# (DWG)**	±100,000# (DWG)	"
Taxiway Segment	**TWY 'D' - NEW**	**TWY 'F'**	**TWY 'E' - NEW**	
Type	**Connector**	Hangar Access	**Hangar Access**	
Dimension (Length x Width)	**450' x 50'**	1,680' x 35'	**1,650' x 35'**	
Runway and Taxiway Design	**RDC C-II | TDG 3**	RDC B-II | TDG 2	**RDC B-II | TDG 2**	
Paved Shoulder Width	**Stabilized 20' (Rec)**	---	**---**	
Edge Lighting	**MITL**	Reflectors	**Reflectors**	
Pavement Strength (Gear Type)	**±100,000# (DWG)**	±30,000# (SWG)	**±30,000# (SWG)**	

RDC = Runway Design Code | TDG = Taxiway Design Group
( ) Denotes Former Taxiway Designation
Blue Text: Denotes a Facility Recommendation Change Based on Existing Conditions.
Source: Mead & Hunt Recommendations

4. NAVIGATIONAL AIDS / AIR TRAFFIC SYSTEMS

NAVIGATIONAL AIDS - VOR STATION

The Very High Omni-Range (EAT VOR/DME) navigational aid station located west of the Runway 12-30 midfield is owned and operated by the FAA, serving as a 'Low Altitude VOR Station'. The FAA VOR siting criteria establishes a 1,000-foot radius buffer around the station, which precludes structures which could interfere with the VOR electronic signals. See **Exhibit 3.6.** The FAA siting criteria typically stipulates 500 feet separation from the runway centerline and 250 feet from a taxiway centerline, while not penetrating Part 77 imaginary surfaces. Close-in siting is based on the fresnel zone requirements. In addition, the EAT VOR has unusable ranges of operation for certain altitudes due to surrounding valley terrain.

The FAA is removing select VOR stations from service as part of efforts to utilize the satellite-based Global Positioning System (GPS) procedures. The remaining limited VOR network is called the 'VOR Minimum Operating Network' to provide a basic conventional navigation service for operators to use if satellite-based Global Positioning System (GPS) becomes unavailable. The EAT VOR station is not on FAA Minimum Operating Network list, however, VOR stations are becoming increasingly susceptible to aging equipment, and are increasingly cost-prohibitive to maintain and operate.

Recommendation: the EAT VOR station and associated 1,000-foot buffer is anticipated to remain operational throughout 2030 (10-year planning period). Removal, relocation, or replacement of the EAT VOR is not anticipated unless advised by FAA. In the event the VOR is decommissioned by the FAA, it would open significant access and development potential within the southwest side of the airfield. It is recommended that the Airport coordinate with FAA regarding the future disposition of the EAT VOR station.

AIR TRAFFIC CONTROL SERVICES

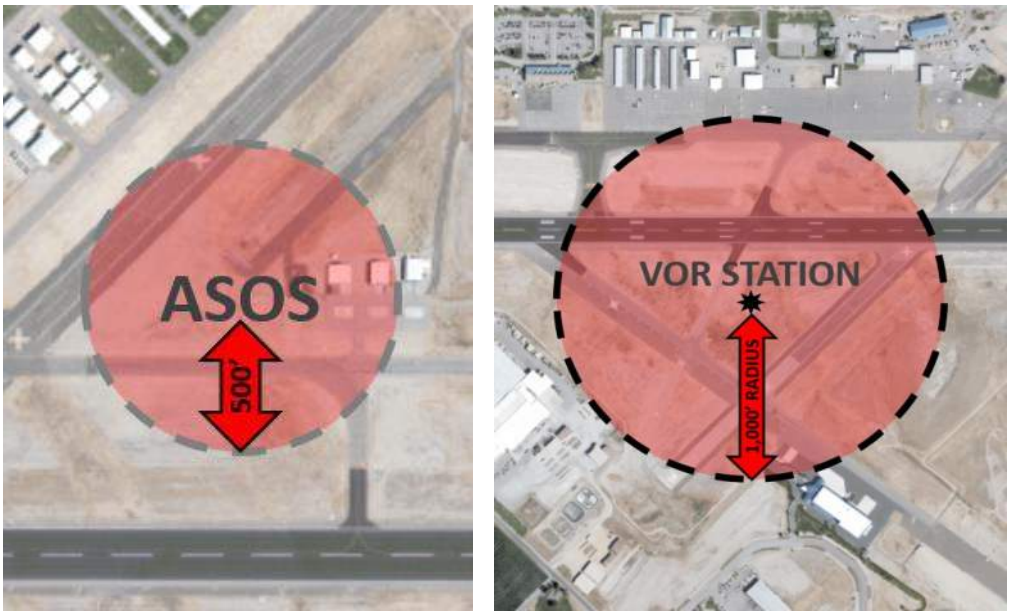
The Airport is pursing air traffic control service capabilities, including new automated technologies which offer 'remote' aircraft traffic and advisory services. Traditional air traffic control towers are operated and maintained per FAA benefit-cost formulas, within a shrinking federal contract tower program. As a lower-cost alternative, the emerging Remote Virtual Tower (RVT) program provides modernized 24-hour air traffic control services at much lower costs than the traditional ATCT facility and staffing requirements. The RVT, which could potentially co-link multiple airports, offers the ability for non-towered airports to establish visual and instrument air traffic services, which would minimize flight delay/cancellations due to inclement weather and increase air service and capacity through additional level of safety. The RVT facility and equipment items depend on site configuration requirements, which includes a camera mast(s), light gun equipment, meteorological sensors, and secured network data links (audio, radio and video servers) to provide controller situational awareness similar to traditional ATCT facilities. Radar equipment may also be integrated into a RVT depending on availability. As an emerging FAA pilot program technology, the RVT site installation, configuration and costs are not yet standardized, but would likely resemble FAA ATC Tower siting criteria.

AUTOMATED WEATHER SYSTEM – ASOS STATION

The Automated Surface Observing Systems (ASOS) station, located east of Runway 12-30, provides critical weather occurrences for executing flights during instrument flight conditions. See **Exhibit 3.6.** The current ASOS condition and proximity to potential site development is expected to encroach the existing ASOS site (500' buffer), which would necessitate relocation.

Recommendation: Relocate the ASOS, potentially co-located with the Instrument Landing System (ILS) glideslope equipment.

Exhibit 3-6: Existing VOR and ASOS Station Sand Buffers



Source: Mead & Hunt Figure

5. AIRLINE TERMINAL AND LANDSIDE FACILITIES

AIRLINE FACILITIES

This section evaluates the airline passenger facilities with respect to forecast airline service levels, passenger forecast demands, airline operating requirements, space allocation, and level-of-service considerations.

AIRLINE OPERATIONAL PEAKING

Airline facilities are largely determined by operational peaking characteristics. **Table 3.6** provides airline peaking information based on the master plan forecasts pertaining to activity levels, flight schedules, and aircraft types. This information quantifies the airline flight and passenger levels necessary to determine the timing of future airline facility needs based on arriving and departing passengers during the peak-month, peak-day and peak-hour passenger demand levels.

Table 3-6: Airline Facility Peaking

Airline Activity Component	Existing	2020 Demand	2025 Demand	2030 Demand	2035 Demand	Existing to 2035 Change
Aircraft						
Aircraft	Q400	Q400	Q400	Q400/NG	Reg. Jet	--
Average Aircraft Seat Size - Aggregate	76	76	76	85	90	**14.0**
Load Factor - Aggregate	79.8%	80.0%	80.5%	81.5%	82.5%	**2.7%**
Passengers						
Total Passengers	**121,500**	**137,100**	**153,000**	**169,400**	**183,200**	**61,700**
Peak-Month Passengers - Enplaned	5,814	6,717	7,682	8,721	9,663	3,849
Peak-Month Passengers - Enplaned %	9.4%	9.6%	9.8%	10.1%	10.3%	0
Peak-Month Passengers - Deplaned	5,439	6,144	6,858	7,591	8,213	2,774
Peak-Month Passengers - Deplaned %	9.2%	9.2%	9.2%	9.2%	9.2%	0
Daily - Total Passengers - Average Day	333	376	419	464	502	169
Daily - Total Passengers - Peak Day	370	423	478	537	588	218
Total Peak-Hour Passengers	191	221	253	287	318	127
Peak-Hour Enplaned Passengers (PHEP)	96	110	126	143	159	63
Peak-Hour Enplaned Passengers (PHDP)	96	110	126	143	159	63
Enplaned Per Departure (E/D) - Average Day	60	61	61	62	63	4
Enplaned Per Departure (E/D) - ADPM	67	70	73	76	78	12
Aircraft Operations/Flights						
Total Annual Airline Operations	**2,080**	**2,320**	**2,550**	**2,780**	**2,960**	**880**
Daily - Flights - 'Peak Month':	3.2	3.7	4.1	4.6	5.0	2
Daily - Flights - 'Average Day':	2.8	3.2	3.5	3.8	4.1	1

Source: Mead & Hunt Facility Analysis

AIRLINE TERMINAL BUILDING CONSTRAINTS

The airline passenger terminal building is 18,750 square feet. The building is in good structural and mechanical condition, and functions adequately with respect to current scheduled airline turboprop service and passenger peaking levels. However, the building experiences operational constraints due size and space allocation. **Exhibit 3.7** depicts the current building space allocations. **Exhibit 3.8** depicts current building level of service deficiencies. For comparative purposes, a review of passenger terminal building sizes at other similar-sized regional airports in the Pacific Northwest indicates the average building size totals 24,000 square feet with 10,500 square feet (45 percent) dedicated to airline and passenger processing operations. The Pangborn Memorial Airport terminal building totals 18,750 square feet with 8,500 square feet dedicated to airline and passenger processing.

AIRLINE TERMINAL BUILDING FACILITY NEEDS

Table 3.7 provides an analysis of the airline peaking data, used to analyze future building functional areas and space allocation based on airline and passenger demand. The basis of this analysis is with respect to FAA standards and industry best practices for assessing terminal building needs for serving a regional airline market. This analysis indicates that the existing terminal building is approximately 6,800 square feet deficient, in terms of providing standard space allocation to provide an acceptable airline and TSA passenger level of service. The extent of building improvements would likely respond to the type of airline service improvements, as considered based on four (4) airline service scenarios evaluated as part of the airline passenger forecasts. Each airline scenario would include various combinations of building improvements. The forecast airline terminal building improvement scenarios include:

Scenario A: Meet 20-year forecast passenger growth (Two-Gate System with Turboprop Aircraft)
Scenario B: Second West-Coast Destination/Airline (Two-Gate System with Turboprop/Jet Aircraft)
Scenario C: Second West-Coast Destination/Airline (Two-Gate System with 76 to 90-Seat Jet Aircraft)
Scenario D: Additional Low-Cost Charter (Two-Gate System with 90 to 150-Seat Jet Aircraft)

Future building improvements would likely be triggered based on the following airline service events:

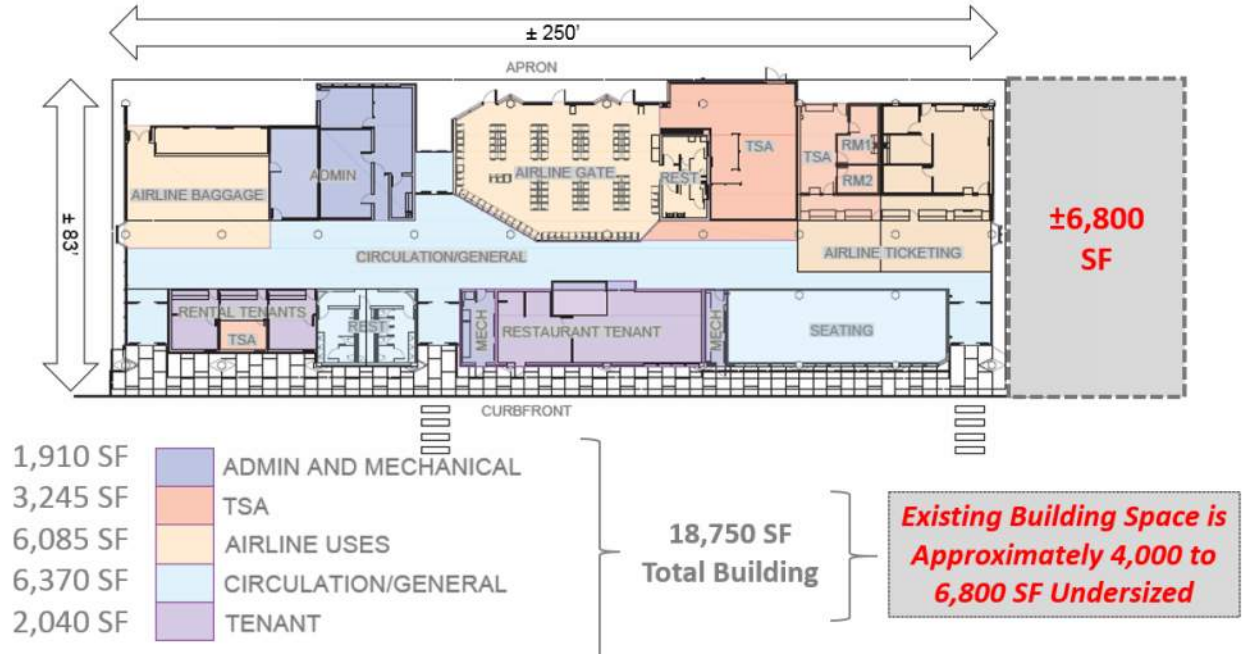
- Install improved deplaned passenger building security access (flip-flow)
- Larger aircraft and seating capacity (regional or narrowbody jet transports)
- Second airline operator (two-gate airline system or overlapping departure flights)
- Second or new destination (two-gate airline system or overlapping departure flights)
- Larger functional building space (airline, TSA, tenant, office, conference room)
- TSA passenger and baggage equipment requirements
- Building compliance improvements (ADA, fire systems)

Table 3-7: Airline Terminal Building Space Allocation by Major Functional Area

Facility Program Component	Existing Building		
	Existing Building Space	Level of Service Space Facility Need (LOS)	Difference (-Deficit)
Main Departures Hall	8,200	5,464	2,736
TSA Checked Baggage Inspection	775	875	-100
Baggage Handling	0	1,490	-1,490
Concessions	1,380	1,984	-604
Security Screening Checkpoint (SSCP)	1,505	1,990	-485
Passenger Waiting Area	2,935	2,320	615
Main Arrivals Hall	2,045	4,275	-2,230
Administration	1,515	2,010	-495
Facilities Maintenance	395	725	-330
Circulation and Mechanical Factor	18,750	21,133	-2,383
Total Area	**18,750**	**25,570**	**-6,820**

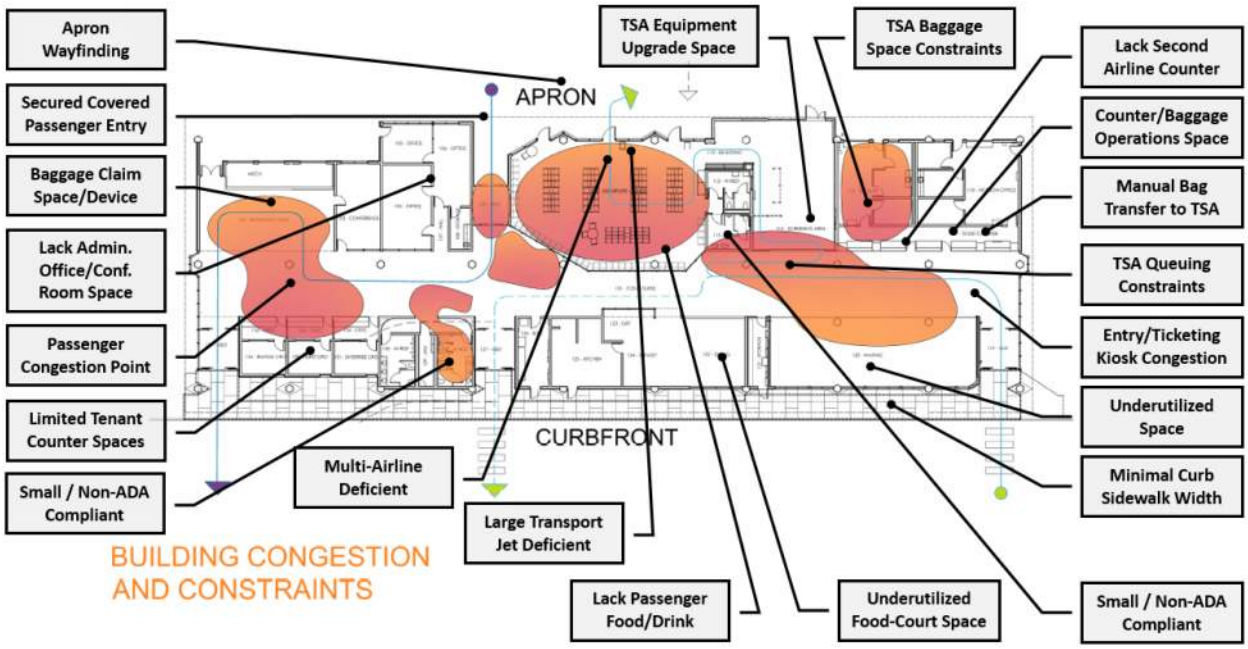
Source: Mead & Hunt Facility Analysis

Exhibit 3-7: Existing Terminal Building Space Allocation



Source: Mead & Hunt Figure

Exhibit 3-8: Existing Terminal Building Constraints



Source: Mead & Hunt Figure

AIRLINE AIRCRAFT APRON

Existing Conditions

As shown by **Exhibit 3.9**, the airline apron totals 95,500 square feet, of which 87,500 square feet is committed to aircraft maneuvering, 55,000 square feet is usable beyond the Taxiway 'A' object free area, and 8,000 square feet is used for passenger processing and ground service equipment. The apron is marked with two regional turboprop aircraft parking positions. The apron is adequate to accommodate a single regional turboprop Bombardier Q400 but is constrained for simultaneous aircraft parking and passenger loading. The usable apron area is constrained by the terminal building to the east, and Taxiway 'A' to the west.

Table 3.8 provides airline apron facility size and space allocation based on the forecast passenger demand forecast scenarios. This information quantifies airline apron area requirements based on airline space requirements for aircraft types, parking logistics, and support service equipment (GSE) space.

Table 3-8: Airline Apron Space Requirements

Airline Apron	Existing	2020 Demand	2025 Demand	2030 Demand	2035 Demand	Existing to 2035 Change
Apron - Total Area	**95,000**	**108,952**	**143,291**	**143,291**	**150,145**	**55,145**
Apron - Aircraft Maneuvering	87,000	98,952	131,291	131,291	138,145	**51,145**
Apron - Aircraft Parking Usable	55,000	62,556	83,000	83,000	87,333	**32,333**
Small Turboprop (Saab 340)	6,400	--	--	--	--	--
Medium Turboprop (Q400)	14,950	14,950	14,950	14,950	--	--
Regional Jets (50 to 90 Seats)	13,200	13,200	--	--	--	--
Regional Jet (90 to 110 Seats)	16,900	--	--	--	16,900	--
Narrowbody Jet (110 to 130 Seats)	22,400	--	22,400	22,400	--	--
Narrowbody Jet (130 to 150 Seats)	22,400	--	--	--	22,400	--
Apron - GSE / Support Area	8,000	10,000	12,000	12,000	12,000	**4,000**

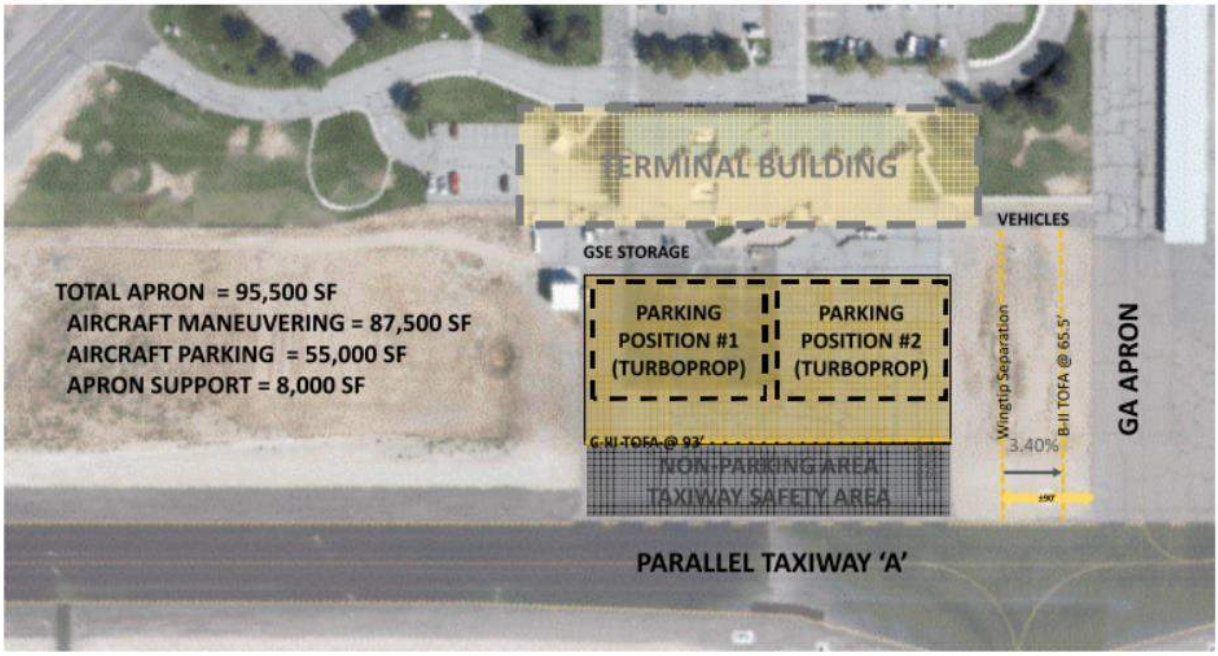
Source: Mead & Hunt Facility Analysis

Exhibit 3.10 depicts an approximate apron parking area required for various aircraft types considered as part of the airline scenarios (A, B, C and D). The aircraft were applied in various combinations as part of evaluating apron expansion options, including parking area, parking orientation, and wingtip maneuvering. Jet transport aircraft have a more demanding parking footprint than the turboprop aircraft, including a wider turning radius, larger wingtip maneuvering factors, and larger engine jet blast contours or power-out operations.

Exhibit 3.11 lists airline apron expansion factors. The apron, similar to the passenger terminal building, would likely involve expansion per the four airline service scenarios (A, B, C, and D) evaluated as part of the airline passenger forecasts. Apron improvements would be likely be triggered based on the following airline conditions or scenarios:

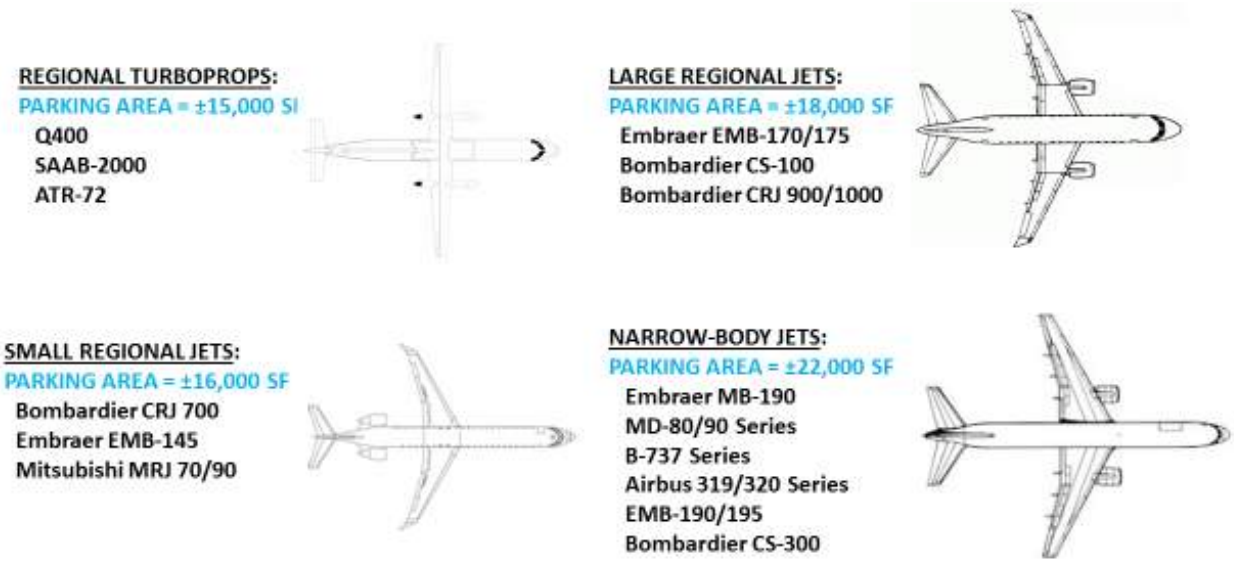
- Simultaneous aircraft parking (position, orientation, maneuvering, wingtip clearance)
- Jet aircraft parking (position, orientation, maneuvering, wingtip clearance, jet blast)
- Dedicated overnight parking (scheduled or aircraft maintenance) and/or aircraft deicing position

Exhibit 3-9: Airline Apron Existing Conditions



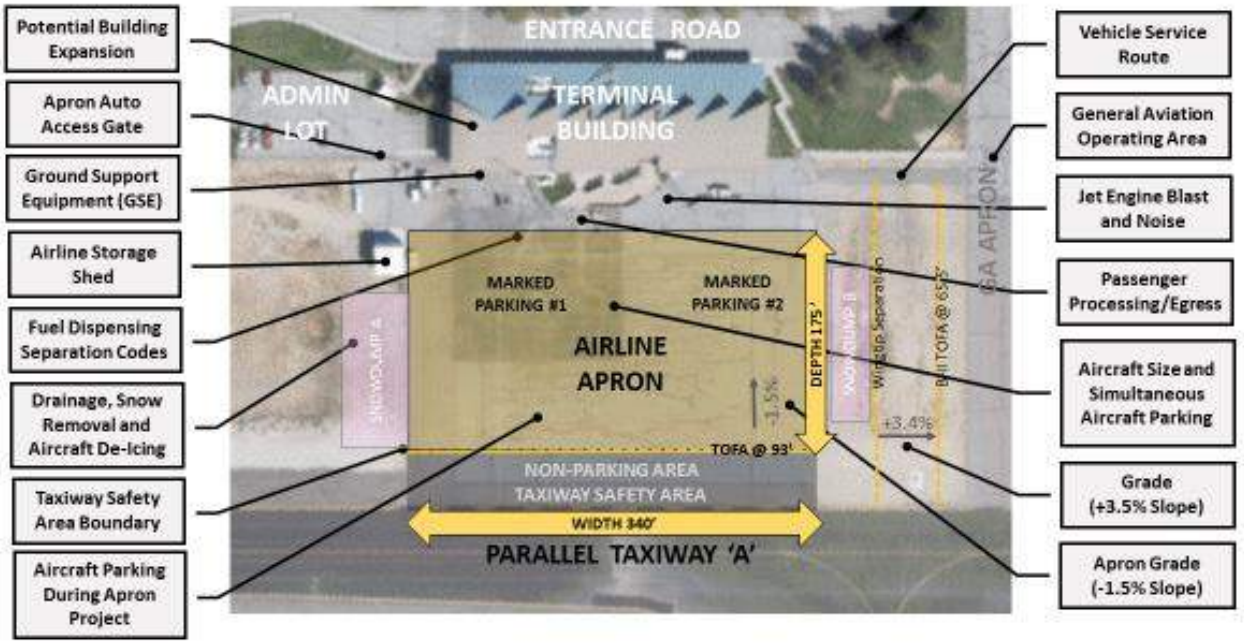
Source: Mead & Hunt Figure

Exhibit 3-10: Airline Apron Parking Areas – Aircraft Types



Source: Mead & Hunt Figure

Exhibit 3-11: Airline Apron Expansion Factors



Source: Mead & Hunt Figure

Table 3.9 identifies the apron facility requirements for short and long-term aircraft parking options to accommodate the forecast airline scenarios, including various combinations of aircraft types and parking configurations.

Table 3-9: Airline Apron Parking Area Requirements

Airline Apron	Existing	2020 Demand	2025 Demand	2030 Demand	2035 Demand	Existing to 2035 Change
Apron - Total Area	**95,000**	**108,952**	**143,291**	**143,291**	**150,145**	**55,145**
Apron - Aircraft Maneuvering	87,000	98,952	131,291	131,291	138,145	**51,145**
Apron - Aircraft Parking Usable	55,000	62,556	83,000	83,000	87,333	**32,333**
Small Turboprop (Saab 340)	6,400	--	--	--	--	--
Medium Turboprop (Q400)	14,950	14,950	14,950	14,950	--	--
Regional Jets (50 to 90 Seats)	13,200	13,200	--	--	--	--
Regional Jet (90 to 110 Seats)	16,900	--	--	--	16,900	--
Narrowbody Jet (110 to 130 Seats)	22,400	--	22,400	22,400	--	--
Narrowbody Jet (130 to 150 Seats)	22,400	--	--	--	22,400	--
Apron - GSE / Support Area	8,000	10,000	12,000	12,000	12,000	**4,000**

Source: Mead & Hunt Facility Analysis

Apron Deicing - Airline Aircraft

Deicing runoff and collection strategies and options were analyzed for the airline apron. At present, spent aircraft deicing fluids (ADF) are not contained, captured, or treated. This analysis provides a general planning-level analysis to identify strategies and options associated with airline deicing activities, as part of planning or future airline apron pavement improvements and expansion considerations. Future deicing facilities are intended to satisfy federal, state, and local regulations, with consideration of meeting increasingly more stringent requirements in the future. Deicing runoff management systems consist of collection, storage, and disposal components that work in combination. Three conceptual deicing strategies were developed:

- **Option 1: Sanitary/Wastewater Treatment Plant Processing:** Under this option, collected deicing runoff would be released into the regional sanitary/wastewater sewer line, based on an agreement with the Douglas County Sewer District, for treatment at the municipal waste water treatment plant.
- **Option 2**: **Collect Deicing Fluids for Off-Site Transport and Processing:** This option involves off-site hauling and disposal of collected runoff. The underground storage tank would be configured with a transfer station for filling tanker trucks. The transfer station would need to be located for ease of truck access. Optimally, the tank and transfer station configuration should be designed with minimum piping distances.
- **Option 3**: **Collect Deicing Fluids for On-Site Land Application:** This option involves disposing of the collected deicing runoff at an on-site or near-by land application treatment facility designed and constructed specifically for this purpose.

These options include the same conceptual gravity-fed collection and storage approach, with the differences being in the method for disposal of that material. In each case, the apron trench drains capture and conveys stormwater, which may contain aircraft/vehicle petroleum oils and fuel products, and spent aircraft deicing fluid. The stormwater drain would connect to an oil/water separator to isolate the oils from the stormwater, then a deicing diversion valve will isolate the deicing runoff from non-deicing stormwater. It is important to note that the oil/water separator only removes petroleum products from the stormwater and does not separate deicing fluids from the flow.

The deicing diversion valve would be manually actuated from a control panel on the apron. The diversion valve will route deicing runoff to a dedicated collection basin or tank. For commercial service airports with limited deicing operations, preference is given to simple approaches that rely on passive collection of deicing runoff, gravity flow and manual operation of any structural features that may be required. Based on discussions with the Douglas County Sewer District, there are cost concerns and logistics associated with Option 1 and Option 2.

Recommendation: The preferred deicing option is to collect fluids using on-site applications, including a collection basin.

Deicing - General Aviation Aircraft

Aircraft deicing for general aviation aircraft has historically been applied using hand-held spray pump containers, typically performed along the apron area fronting the Fixed Base Operator building.

Recommendation: It is recommended a dedicated general aviation deicing location 'pad' be developed along the north side of the general aviation apron, as a common location for all general aviation. This site is in accessible by the airline deicing equipment (via a paved access route) and could be designed to collect, then gravity flow into the airline deicing area for proper treatment and disposal.

AIRLINE VEHICLE PARKING AND CIRCULATION

Table 3.10 shows the existing and future auto parking facility requirements. Auto parking for the airline terminal building currently has 379 spaces, covering 148,400 square feet. Based on forecast enplanement levels, by 2035 an additional 186 spaces will require 86,000 square feet of new parking area. The short-term lot experiences 25 to 60 percent average-day capacity throughout the year. The long-term lot experience 60 to 90 percent capacity during the average peak-month period and 80 to 100 percent during peak-passenger season. **Exhibit 3.12** illustrated the existing airline auto parking lot configuration and access points.

Average Daily Airline Vehicle Traffic Levels (2017):

255 = Total Daily Airline-Related Vehicles
135 = Using Public Auto Parking Lot (Short and Long Term)
120 = Using Non-Public Parking Space or Terminal Building Curbfront Parking Lane

180 = Average Daily Long-Term Lot Occupancy
2.5 = Average Long-Term Parking Days Per Vehicle
35 = Average Daily Short-Term Lot Occupancy
36 = Average Daily Outbound Rental Cars
30 = Average Daily Employee and Administrative Parking Spaces

Auto Parking – TSA Emergency Setback

Under heightened security measures, the TSA has the authority to impose a 300-foot perimeter restricted area which would prevent auto parking. The 300-foot boundary impacts nearly 250 existing auto parking spaces, or 65 percent of the space capacity. A remote lot or parking garage offers an offsetting option in the event the 300-TSA setback is imposed in the future.

Exhibit 3-12: Airline Auto Parking Lot Designations

Source: Mead & Hunt Figure

Table 3-10: Airline Auto Parking Facility Requirements

Lot and Parking Function	Existing	2020 Demand	2025 Demand	2030 Demand	2035 Demand	Existing to 2035 Change
Daily Enplaned Passengers - Peak Month	**191**	**221**	**253**	**287**	**318**	**127**
PARKING SPACES (NO OVERFLOW)	**379**	**340**	**383**	**428**	**470**	**91**
PARKING SPACES (PLUS OVERFLOW)	**--**	**407**	**458**	**513**	**565**	**158**
Short-Term (Includes 8 Accessible)*	45	38	42	47	51	6
Long-Term	235	209	239	271	300	65
Rental Car	69	62	68	74	79	10
Employee/Tenant	30	32	34	37	39	9
Overflow/Special Event	0	66	75	84	95	95
PARKING AREA - SF (NO OVERFLOW)	**148,400**	**170,200**	**191,500**	**214,200**	**234,800**	**86,400**
PARKING AREA - ACRES (NO OVERFLOW)	**3.4**	**3.9**	**4.4**	**4.9**	**5.4**	**2.0**
PARKING AREA - SF (PLUS OVERFLOW)	**148,400**	**201,600**	**226,900**	**254,000**	**279,600**	**131,200**
PARKING AREA - ACRES (PLUS OVERFLOW)	**3.4**	**4.6**	**5.2**	**5.8**	**6.4**	**3.0**
Short-Term (Includes 9 Accessible)*	24,000	25,400	28,600	31,900	34,800	10,800
Long-Term	86,400	98,700	112,900	128,100	142,000	55,600
Rental Car	25,500	30,900	33,800	36,800	39,300	13,800
Employee / Tenant	12,500	15,200	16,200	17,400	18,700	6,200
Overflow / Special Event	0	31,400	35,400	39,800	44,800	44,800

Note*: Existing Condition = 8 ADA Accessible handicap parking spaces (301 to 400 total parking spaces).
Note*: Future Condition = 9 ADA Accessible handicap parking spaces (401 to 500 total parking spaces).
Source: Mead & Hunt Facility Analysis

6. GENERAL AVIATION (GA) TERMINAL AND LANDSIDE FACILITIES

General aviation is a substantial part of the Airport's total activity. The general aviation terminal area includes facilities to support pilots/passengers and aircraft, largely accommodated by the Fixed Base Operator (FBO) line services. Although most of the general aviation terminal flightline is occupied by existing structures, the terminal area is capable of expansion, redevelopment, and repurposing, in addition to future property acquisition. It is expected that expanded and new general aviation facilities will largely be required for business and commercial general aviation operators. The Airport's operational peaking characteristics are used to determine the facility requirements and space allocation to meet forecast aircraft demands for based aircraft operators, itinerant users, on-airport commercial tenants and other Airport operational requirements.

PLANNED BUILDING AND STRUCTURE REMOVAL

As shown in **Exhibit 3.13**, select buildings have been identified by the Airport for potential removal, relocation, replacement due to condition and redevelopment opportunities. These thirteen (13) buildings are a consideration in the terminal and landside redevelopment options.

Exhibit 3-13: Future Building Disposition (Removal, Replacement)

Source: Mead & Hunt Figure

FIXED BASE OPERATORS (FBO) FACILITIES – BUILDING AND HANGAR

Existing Conditions

The existing FBO facility is owned and operated by the Airport. It is anticipated that the airport will continue to operate the FBO. The attached hangar does not meet current demand for aircraft size and tail height clearance and is limited to use by smaller aircraft. The FBO is located adjacent to the general aviation ramp, west of the snow removal building. The building condition is deteriorating due to age and wear.

The FBO terminal building usually establishes the 'core' within the general aviation terminal area flight line, and a central base of operations or command-center for outsourcing general aviation functions. From an aesthetics standpoint, the building leaves an impression as the first and last place visited by airport travelers. The FBO building is typically a stand-alone building structure, but sometimes attached to a large common hangar, depending on the lines FBO lines of service. Therefore, identifying a building location and integrating features into a single structure balances aeronautical tenant demands, FBO service provisions, operational/staffing logistics, and various cost-revenue factors. Based on an assessment of general aviation peak-hour passenger demand levels and comparison with representative buildings at similar-sized airports, the FBO terminal building would range between 3,500 and 4,500 square feet.

Proposed FBO Building Features:

- Lobby (foyer, seating-waiting, television viewing area)
- Line Service / Operations-Communications Node
- Retail Counter Area
- Management Office - 1
- Flight Planning, Briefing, Weather/Communications
- Office #1 and Office #2
- Concessions (Vending, Kitchenette, Minor Seating)
- Restroom (Woman)
- Restroom (Men)
- Meeting / Conference Room

.

FBO Building - Site Development Factors and Considerations:

- Recommended FBO Building is 3,500 to 4,500 square feet
  - Refurbish existing FBO building (±2,200 SF)
  - Construct new FBO building
- Aircraft fuel tank storage location, visibility, dispensing logistics
- Aircraft fuel truck parking location and visibility, dispensing logistics
- Aircraft parking designations (piston, turbine, helicopter)
- Contiguous apron area
- Adjacent auto parking, gate access, security
- Airside and landside visibility
- FBO staffing requirements
- Disposition of surrounding structures/buildings/hangars
  - Remove SRE maintenance and workshop building(s)
  - Potentially repurpose existing SRE building – to proposed AOB building
  - Remove or repurpose existing ARFF building – to proposed AOB building
  - Remove living quarters – to proposed AOB building
  - Consolidate/expand fuel storage tanks and dispensing

FBO Hangar - Site Development Factors and Considerations:

- Proposed FBO hangar size = ±8,000 to 12,000 square feet
- Hangar door height to accommodate medium size business jet (±18' door clearance)
- FBO hangar and building expected to be in close proximity or perhaps co-located

GENERAL AVIATION HANGARS

Table 3.11 shows the future general aviation hangar facility requirements, based on forecast projections. Future hangar development is planned for:

1) new based aircraft owners of approximately 27 additional aircraft,
2) present tenant hangar expansion,
3) expansion to larger hangars,
4) replacement of obsolete or removed hangars, and
5) unexpected 20-year private or public-owned hangar waiting list demands.

All future based aircraft are anticipated to be stored in hangars, developed as applicable to the airport minimum standards and building codes requirements. **Exhibit 3.14** illustrates typical hangar parameters based on aircraft and user characteristics.

GENERAL AVIATION APRON

Table 3.12 shows the future general aviation hangar facility requirements.

Existing Conditions: The general aviation apron totals 300,000 square feet with 48 marked aircraft parking positions. The apron becomes congested during the summer peak season, due to based tie-downs, FBO transient, air cargo, US Forest Service, and fueling activities. The public-use apron should be designed to accommodate 40 percent of the peak/design day itinerant aircraft, plus based aircraft and tenant space requirements for fixed-wing and rotorcraft aircraft.

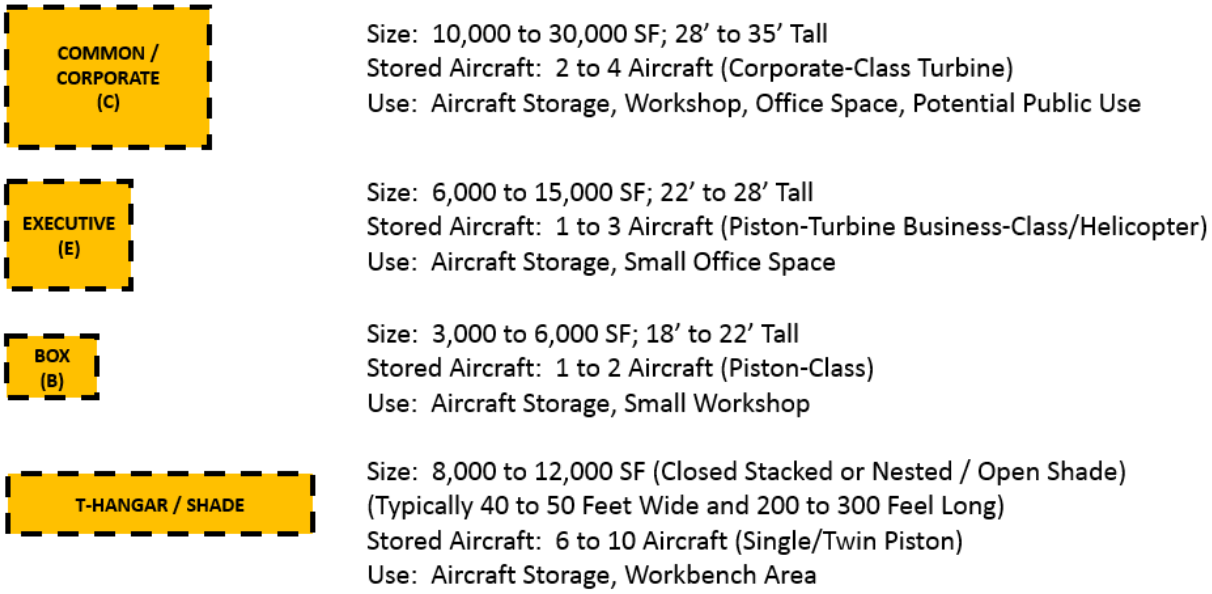
FAA airport planning criteria recommends 360 square yards (3,240 square feet) per itinerant aircraft space, and approximately 300 square yards (2,700 square feet) per based aircraft. The future main general aviation apron areas should be designed to Taxiway Design Group (TDG) 2 standards, with a pavement strength up to 30,000 pounds for piston/turboprop aircraft; 50,000 pounds for helicopters, and 60,000 to 90,000 pounds dual wheel gear for large-cabin business jets. **Exhibit 3.15** graphically shows aircraft parking requirements by representative aircraft types.

Table 3-11: General Aviation Hangar Demand

GA Hangar Facilities	Existing	2020	2025	2030	2035	Existing to 2035 Change
TOTAL AIRCRAFT	**107**	**114**	**118**	**126**	**134**	**27**
TOTAL BASED AIRCRAFT (FAA COUNT)	**96**	**103**	**107**	**115**	**123**	**27**
TOTAL HANGARED AIRCRAFT	**99**	**107**	**110**	**118**	**126**	**27**
Single-Piston	82	88	90	96	100	18
Twin-Piston	5	5	5	5	6	1
Turboprop (Single and Twin)	2	3	4	6	7	5
Small-Cabin Business Jets	4	4	5	5	7	3
Large-Cabin Business Jets	0	0	0	0	0	0
Ultra-Large Cabin Business Jets	0	0	0	0	0	0
Rotorcraft	3	3	3	3	3	0
Other Aircraft	3	3	3	3	3	0
HANGAR DEMAND - AIRCRAFT (SF)	**160,370**	**172,200**	**184,810**	**199,827**	**224,572**	**64,202**
Single-Piston	102,500	110,000	112,500	120,000	125,000	22,500
Twin-Piston	8,000	8,197	8,006	8,141	8,863	863
Turboprop (Single and Twin)	7,200	10,889	14,400	21,600	25,200	18,000
Small-Cabin Business Jets	28,900	29,078	36,125	36,125	50,575	21,675
Large-Cabin Business Jets	0	0	0	0	0	0
Ultra-Large Cabin Business Jets	0	0	0	0	0	0
Rotorcraft	10,800	11,066	10,809	10,991	11,964	1,164
Other Aircraft	2,970	2,970	2,970	2,970	2,970	0
HANGAR DEMAND - TYPE (SF)	**204,570**	**223,400**	**241,010**	**256,027**	**290,772**	**86,202**
T-Hangars	51,062	54,525	55,564	59,000	61,575	10,513
Executive	62,409	66,642	67,912	72,111	75,258	12,849
Common	46,900	51,033	61,334	68,716	87,739	40,839
FBO/SASO	8,000	15,000	20,000	20,000	30,000	22,000
Executive Jet	36,200	36,200	36,200	36,200	36,200	0
Total - Hangar Development Area (SF)	**441,825**	**474,564**	**513,038**	**555,933**	**632,108**	**190,283**
Total - Hangar Development Area (Acres)	**10**	**11**	**12**	**13**	**15**	4.4
HANGAR DEMAND - NUMBER (UNITS)	**39**	**42**	**45**	**49**	**55**	**15**
T-Hangars	6	6	7	7	7	1
Executive	22	23	24	25	26	4
Common	9	10	12	13	17	8
FBO/SASO	1	1	2	2	3	2
Executive Jet	1	1	1	1	1	0

Note: "Other" aircraft not counted as FAA official based aircraft, but still may necessitate hangar storage.
Source: Mead & Hunt Facility Analysis

Exhibit 3-14: General Aviation Hangar Types and Characteristics



Note: This information is intended to reflect a range of common industry hangar sizes and uses.
Source: Mead & Hunt Facility Database

Table 3-12: General Aviation Aircraft Operational Peaking – Apron Demand

General Aviaton Activity Component	Existing	2020	2025	2030	2035	Existing to 2035 Change
GA Aircraft						
Total Aircraft	107	114	118	126	134	**27**
Total Based (Counted)	96	103	107	115	123	**27**
GA Aircraft Operations						
Total Operations	35,134	36,700	38,100	39,900	41,800	**6,666**
Local	24,750	25,600	26,400	27,400	28,600	**3,850**
Itinerant	15,414	16,480	17,470	18,560	19,510	**4,096**
GA Peak Operations						
Peak Month Operations (Includes Touch & Go)	11,222	11,688	12,125	12,648	13,223	**2,000**
Peak Day Operations (Includes Touch & Go)	368	384	398	415	434	**65**
Peak Hour Operations (Includes Touch & Go)	65	68	70	73	76	**11**
GA Pilot and Passengers						
Total Annual Passengers (Local & Itinerant)	26,138	24,460	25,664	27,032	31,775	**5,637**
Total Peak-Day Passengers	29.5	30.9	32.2	33.7	35.2	**6**
Total Peak-Day Passengers (No Flight Training)	16.0	16.9	17.7	18.5	19.4	**3**

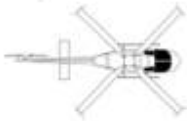
Note: GA passenger counts are estimates based on aircraft types, seating capacity, and load factor.
Source: Mead & Hunt Facility Analysis

Exhibit 3-15: General Aviation Aircraft Parking Area – Aircraft Type

Type: Business Jet
Parking Area: ±6,000 SF (60' x 100')
Aircraft Weight: 16,000 to 90,000 Pounds
Pilot/Passengers: 5 to 12

Type: Single/Twin-Piston
Parking Area: ±2,500 SF (40' x 60')
Aircraft Weight: 3,000 to 8,000 Pounds
Pilot/Passengers: 2 to 5

Type: Single/Twin Turboprop
Parking Area: ±4,500 SF (50' x 90')
Weight: 12,000 to 22,000 Pounds
Pilot/Passengers: 3 to 8



Type: Helicopter:
Parking Area: ±3,600 SF (60' x 60')
Aircraft Weight: 2,000 to 15,000 Pounds
Pilot/Passengers: 2 to 6

Note: This information is intended to reflect a range of common industry aircraft sizes.
Source: FAA Aircraft Performance Database - Excel File

General Aviation/FBO – Auto Parking

The existing FBO public auto parking lot has 56 spaces comprising 20,000 square feet. Based on the forecasts, the facility requirements for parking indicate a need for up to 75 spaces, which would include parking for pilots, patrons, tenants/employees, limited flight training, delivery vehicles, and community/civic parking.

7. AVIATION TENANTS AND SUPPORT FACILITIES

AIR CARGO FACILITIES (AIRCRAFT PARKING AND SORT BUILDING)

FedEx and UPS do not anticipate a substantial change to future air cargo services or logistics, or events that would necessitate significant improvements to on-airport facilities. Fed Ex cargo sorting occurs in a leased on-airport building, and as demand increases they can expand into the next building bay. UPS does not have on-airport facilities. As stated in the forecast chapter, air cargo volumes and flight logistics are not projected to experience significant growth or changes or result in a significant change to airport facility or infrastructure needs.

Recommendation: existing air cargo facilities are sufficient for future cargo aircraft and cargo sort needs.

UNITED STATES FOREST SERVICE (USFS)

The USDA Forest Service (USFS) currently operates a Central Washington Interagency Communications Center (CWICC) located on-Airport. From the CWICC, the USFS oversees aerial firefighting, rescue/rappelling activities, and conducts multiple-agency fire dispatch services. The USFS currently leases approximately 3.5 acres used for their rappel base. The USFS conducts between 1,000 and 7,500 annual operations, depending on the severity of the fire season. The peak fire season typically occurs between mid-June and September.

Pangborn USFS Future Airport facility needs:

- Additional office building space (supports USFS aircraft dispatch)
- Additional auto parking space (supports USFS aircraft crews)
- One addition Type 1 helicopter pad (total of 4 pads) (supports USFS helicopter operations)
- Additional lease space for training exercises (supports aircraft and crew activities)
- Dedicated fuel truck parking area

Expansion of the USFS ramp is constrained by adjacent apron areas, hangars, and taxiway systems. In addition, being immediately adjacent to general aviation and light commercial cargo operations does present operational challenges, as large helicopters hover-taxiing can damage nearby parked aircraft. With the planned Taxiway 'A' relocation, additional USFS apron space could be expanded for additional helicopter parking and maneuvering. Expansion of the current site may involve modifications to USFS leased areas.

Future USFS Airport Facility Needs:

The USDA Forest Service has considered the Pangborn Memorial Airport for providing expanded USFS firefighting based assets and mission capabilities, including a regional consolidation of USFS facilities and services. If necessary to support expanded or additional USFS mission requirements, the preferred site would be on the west side of the airfield along the south end of Taxiway 'B'.

AIRPORT OPERATIONS BUILDING (AOB)

The Airport Operations Building (AOB) is a single structure for consolidating Airport Rescue and Fire Fighting (ARFF) and Snow Removal Equipment (SRE) facilities and staff. The ARFF and SRE share many common functions, including staff, emergency response, storage, and vehicle maintenance. The proposed AOB building is estimated to be approximately 25,000 square feet.

Existing conditions and factors:

- Inadequate ARFF building size, door width, vehicle pull-through capabilities
- Inadequate SRE building size, parking configuration, door placement/width, vehicle pull-through
- SRE functions are in multiple buildings, unconsolidated storage and workshop areas
- SRE equipment stored outside
- Building modifications costs

CONSOLIDATED RENTAL CAR MAINTENANCE FACILITY

The Airport is pursing a dedicated area to consolidate rental car facilities. This area would have public access. The proposed facilities are planned to include:

- Multi-bay wash rack
- Gas refueling
- Adjacent auto parking

AIRCRAFT FUEL STORAGE AND DELIVERY

Typically, as operations increase, fuel storage requirements can be expected to increase proportionately. National and local trends indicate that the size of the general aviation aircraft fleet is slightly increasing, as more aircraft are used for business purposes and less for pleasure and leisure purposes. Therefore, it is expected that the ratio of gallons sold per operation will increase as well, and an estimate of future fuel storage needs can be calculated as a two-week supply during the peak month of operations. Storage tanks are now typically built above ground to ease maintenance and mitigate soil and ground water contamination. Accessibility and adequate parking with built in storm water drainage and spill containment is required for large fuel delivery trucks during offloading.

Existing conditions and factors:

- 100LL fuel underground tanks are aging, and necessitate replacement/relocation
- Insufficient Jet-A tank capacity during peak summer season
- Frequency of Jet-A truck delivery loads during peak summer season
- Jet-A tank capacity requires airline reserves
- Future airline demand (larger aircraft and/or second airline)
- Aircraft fuel storage and dispensing by other on-Airport tenants
- Jet-A dispensed using truck(s)
- 100LL dispensed using self fuel and potential truck(s)

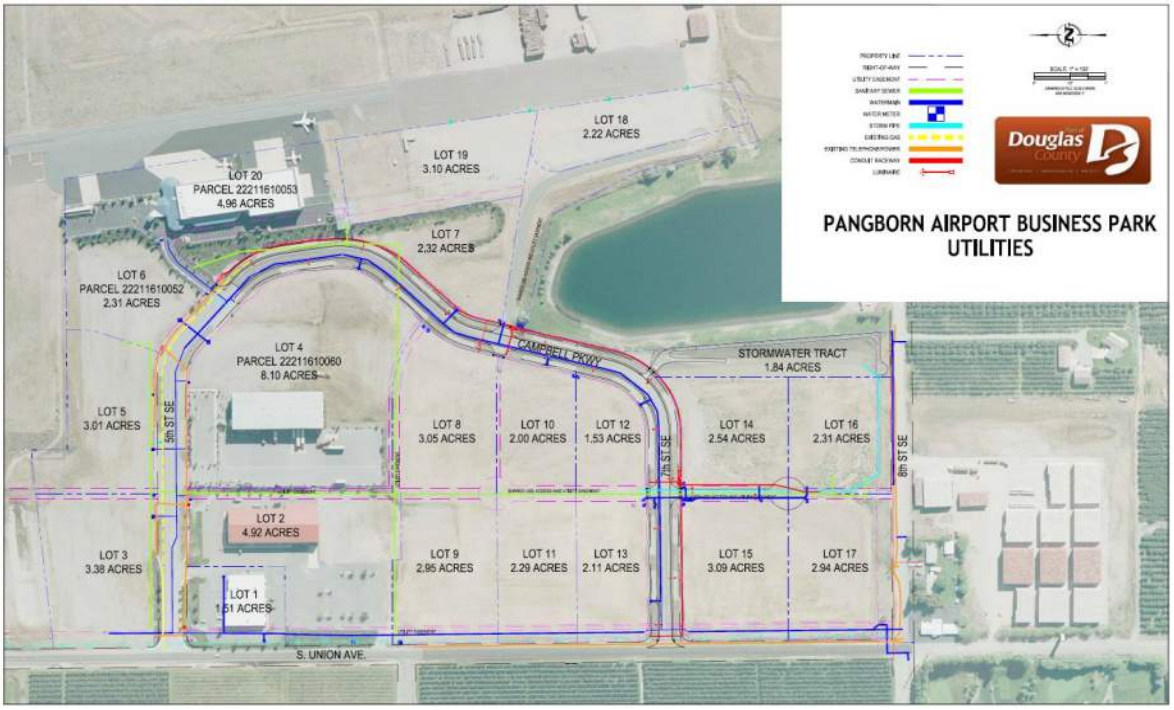
EXECUTIVE FLIGHT FACILITIES (BUILDING / HANGAR)

The Executive Flight facility, located within the Pangborn Airport Business Park on the west side of the airfield, has been used for aviation and non-aviation business tenant support. The facility provides hangar space for the larger based turboprop and business jet aircraft. In addition, the building is occasionally used for hosting special events. Prospective owners and tenants have assessed the building for various aviation purposes, including aircraft maintenance, flight training, and a variety of commercial interests. It is possible the building would be used by multiple operators. In addition, the building has been evaluated by the Airport for possible use to support airport operations (SRE, ARFF) and administrative functions. The building represents a significant opportunity for commercial purposes, particularly with the 2016 Runway 12 extension, including a substantial amount of aviation activity, including large transport-type aircraft.

PANGBORN AIRPORT BUSINESS PARK (PABP)

As shown in **Exhibit 3.16**, the Pangborn Airport Business Park (PABP), located in the southwest quadrant of the airfield, is progressing towards higher occupancy, largely from computer technology companies. Lots 18 and 19 remain available for potential aviation tenants needing airfield access. Lots 5 and 6 will not likely be developed for airfield access due to grades. Aviation developments for Lot 18 and 19, and north of Lot 5 and 6 may necessitate vehicle access along existing right of way routes. It is recommended the non-aviation lots (#1 to #17) be released from Airport aeronautical use and maintenance obligations. The Port of Douglas County has expressed interest in further developing airport business park opportunities, including large single-purpose institutional developments.

Exhibit 3-16: Pangborn Airport Business Park



Source: Port of Douglas County, 2017.

UNMANNED AIRCRAFT SYSTEMS (UAS-DRONES)

UAV aircraft are rapidly becoming a more mainstream aircraft platform supporting various civilian and military flight applications. The US Forest Service is actively investigating ways to use UAS in their firefighting missions, and large retail companies are pursuing UAS for product deliveries. While future UAS aircraft may not require or advocate airfield facilities, there may be UAS applications which could involve on-airport land or facility use, such as a regional domicile or port center for UAS delivery networks, maintenance, and training. As the UAS industry and regulations evolve, including airspace compatibility, some aspects of UAS activity could be realized at the Airport, particularly with the US Forest Service presence. However, due to the uncertainty of future UAS industry and commercial applications, no UAS-specific facilities have been planned for the Airport.

8. AIRPORT LAND USE AND PROPERTY INTERESTS

AIRPORT LAND USE

The following are recommendations to update Airport land uses to reflect Master Plan facility requirements.

- On-Airport Land Uses (Aeronautical and Non-Aeronautical)
  - Aeronautical Operating Areas (AO) – Aeronautical Area
  - Air Carrier Terminal Area (TA) – Aeronautical Area
  - General Aviation/Cargo/Aircraft Storage (GA) – Aeronautical Area
- Non-Aeronautical Uses (NAU) – Non Aeronautical Area
- Runway dimensions

- Runway Protection Zones (RPZ)
- Building Restriction Line (BRL)
- Noting Instrument procedures and minimums
- Revise to reflect changes in Airport property interests

Update Airport Overlay District (AP-O): 18.65 to Reflect Recommended Master Plan:

- Update Safety Zones
  - Runway dimensions
  - Zone dimensions
- Update Imaginary Airport Airspace Surfaces
  - Runway dimensions
  - Application to instrument procedures and minimums
- Revise Ordinance language per Local and State requirements

AIRPORT PROPERTY ACQUISITION

The Airport property consists of 698 acres. Based on the project and site development recommendations, the Airport should consider acquiring the following property. These properties have been identified for future Airport land interests, as necessary to satisfy FAA standards, accommodate future aviation site development, and provide revenue opportunities. Airport land acquisition must be conducted in accordance with FAA guidance.

AIRPORT PROPERTY ACQUISITION - PARCELS

1) Runway 12 Runway Protection Zone (RPZ) - North of Grant Road (Existing RPZ)
2) East Parking Overflow - East of Airline Terminal/Roundabout
3) East Hangar - North of Airport Way
4) East Hangar - North Road ROW Connection - Vanwell Street/Airport Way
5) East Hangar - Future GA Development
6) East Hangar - South Road ROW Connection - Vanwell Street
7) East Hangar - Future Development
8) East Hangar - Future Development
9) Runway 12-30 BRL - Southeast
10) Runway 30 RPZ - East of Vanwell Street
11) Runway 30 RPZ - South of 10th Street
12) Runway 30 RPZ - North of 10th Street
13) Runway 12 Runway Protection Zone (RPZ) - North of Grant Road (Future RPZ)

AIRPORT PROPERTY RELEASE - PARCELS

The Airport currently owns and controls property no longer needed for aeronautical purposes and, if released, these properties are subject to FAA release requirements. A "release" is a formal FAA written authorization discharging and relinquishing an airport's contractual obligations, whether from a particular FAA assurance or federal obligation, aeronautical property, land use condition, or the disposal of property.

Various conditions and circumstances affect the manner and degree of release, which must be coordinated with the FAA. Although not committed to release, the Airport Layout Plan (ALP) and Exhibit 'A' Property Map must reflect the land areas and airport facilities attendant to the release action.

The following property sites and conditions are recommended for potential release under FAA guidelines.

1) West of Runway 12 RPZ / Grant Road Loop: Release from Aeronautical Use
2) West of Runway 12 RPZ / Grant Road Loop: Release from Aeronautical Use
3) West of Union Street: Surplus, Release of Real Airport Property
   (Lots F-3, F-14, F-29, F-28, F-27, F-26, F-25, F-30, F-31, F-32, F-33, F-34 A/B)
4) North of Runway 12 RPZ / Grant Road Loop: Release from Aeronautical Use, Surplus
5) West of Union Street / North of PABP: Release of Real Airport Property, Surplus
6) Pangborn Airport Business Park (Non-Airside Lots) Release from Aeronautical Use
7) South Development Area - North of 8th Street: Release from Aeronautical Use
8) East of Runway 30 BRL: Release from Aeronautical Use
9) West of Runway 30 BRL: Release from Aeronautical Use

SUMMARY OF FACILITY REQUIREMENTS

The following chapter 'Airport Alternatives' identifies the site location and layout options for accommodating the facility requirement recommendations documented in this chapter.

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CHAPTER 4
Airport Alternatives Analysis

CHAPTER 4 - AIRPORT ALTERNATIVES ANALYSIS

CHAPTER OVERVIEW

This chapter documents the recommended airport facility alternatives to satisfy the 20-year aviation forecast demand for the Pangborn Memorial Airport (EAT or "the Airport"). The alternatives document where and how facilities are planned.

The alternatives systematically evaluate options to provide the technical basis for arriving at a preferred development concept. The preferred alternative, as selected by the Airport, is carried-forward into the Capital Improvement Plan (CIP) and depicted on the Airport Layout Plan (ALP) drawings.

AIRPORT STRATEGIC VISION FOR ACCOMMODATING ALTERNATIVES

The Airport envisions alternatives to support strategic development. The Airport seeks to increase commercial airline passenger service and reliability, air cargo services, support expansion of US Forest Service missions, and provide services and site development areas for general aviation users and tenants.

To meet this vision, it is necessary for the Airport to provide infrastructure capable of accommodating transport jet aircraft and building and parking space to accommodate user and tenant demands. The Airport also strives to bring new technologies to improve instrument procedures and establish innovative remote air traffic control services. Positioned within an emerging commerce area, the Airport has identified several parcels of land for future development for both aeronautical and non-aeronautical uses.

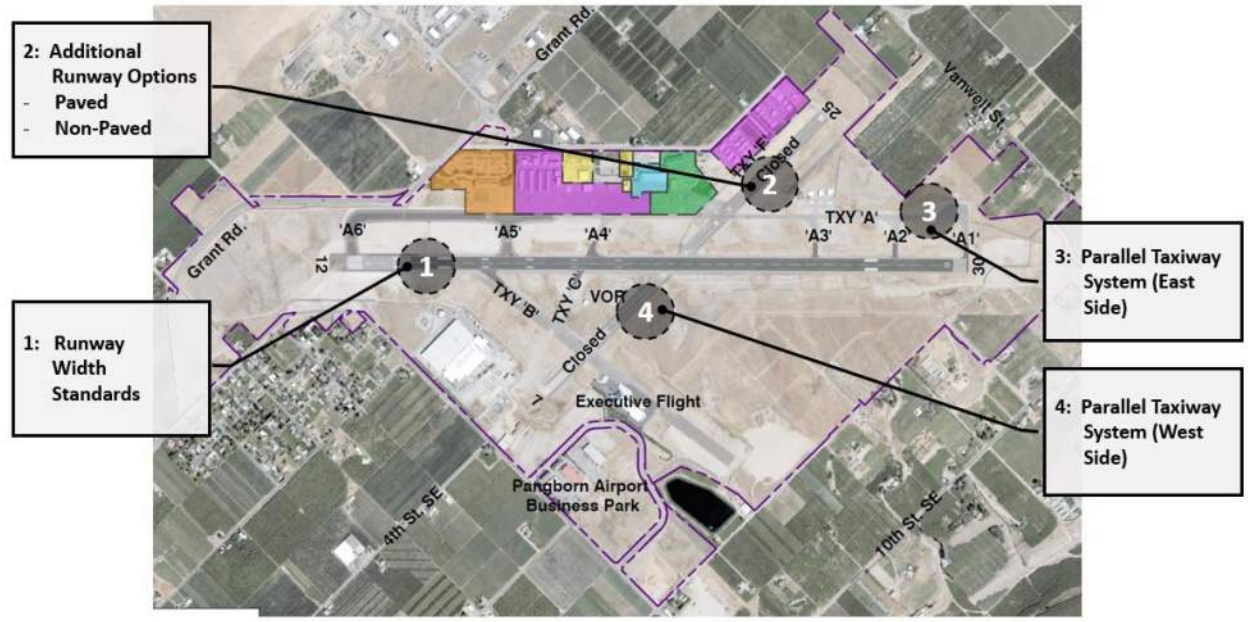
ASSESSED ALTERNATIVES

The alternatives process is iterative, identifying site development locations and then detailed layout options to accommodate facility requirements in accordance with the Airport's vision and FAA design standards. The alternative concepts are evaluated on technical merits, with respect to operational performance, environmental, constructability, and cost factors. Exhibit 4.1 displays the airfield alternative locations and Exhibit 4.2 displays the landside alternatives under consideration.

The alternative components outlined in this chapter are arranged as follows:

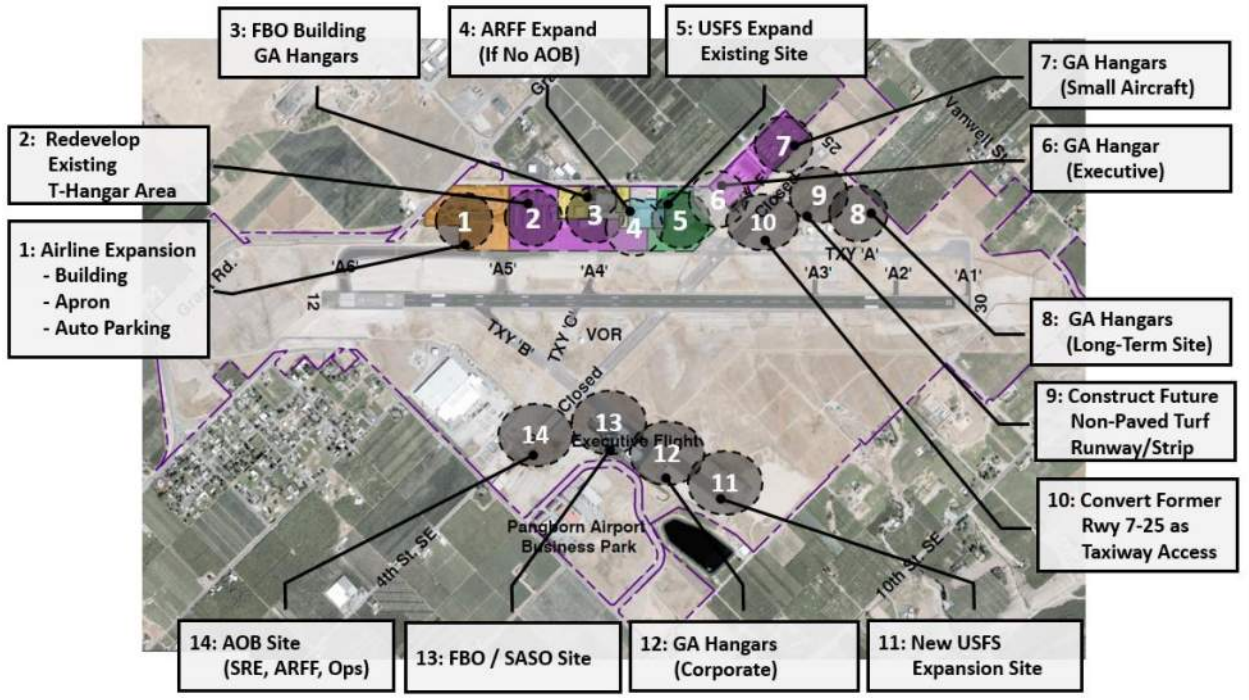
1) Airfield: Runway Dimensional Standards
2) Airfield: Additional Runway
3) Airfield: Taxiway Systems
4) Landside: Airport Terminal and Landslide Facilities
5) Landside: General Aviation and Fixed Base Operator (FBO)
6) Landside: Aviation Tenants and Airport Support Facilities

Exhibit 4-1: Airfield – Site Alternative Locations



Source: Mead & Hunt Figure

Exhibit 4-2: Landside – Site Alternative Locations



Source: Mead & Hunt Figure

1. AIRFIELD – RUNWAY DIMENSION STANDARDS

RUNWAY 12-30 WIDTH

The Runway 12-30 width is 150-feet, in which the FAA standard for Runway Design Code (RDC) C-III is 100 feet wide for aircraft less than 150,000 pounds and 150 feet wide for aircraft greater than 150,000 pounds. The following are alternative factors for evaluating runway width:

- Previous Airport runway infrastructure projects support a 150-foot wide runway per RDC C-III and TDG 5 standards, including the 2016 Runway 12 extension, 2006 Runway 30 extension and instrument landing system (ILS) installation, and the 1998 Runway 12-30 pavement reconstruction. Runway 12-30 facilities are installed to support a 150-foot width; including pavement geometry, paved shoulders, lighting systems, signage, and markings.
- The existing runway pavement strength is estimated at 192,000 pounds dual wheel gear (DWG), which is capable of accommodating airline transport aircraft over 150,000 pounds maximum takeoff weight (MTOW).
- The demand forecasts project operations by air carrier regional and narrowbody transport jet aircraft greater than 150,000 pounds; including charter and low-cost airline operators (Allegiant and Sun Country Airlines).
- The Airport is actively pursuing additional airline service to new west coast destinations. This service is expected to be operated using transport regional jets.
- The 150-feet width accommodates airline operating requirements:
  - Alaska/Horizon requires 150' width if braking action is less than fair and 10+knot crosswind
  - Regional jet transports typically require 125' wide – per industry/corporate standards
  - Narrowbody transports typically require 150' wide – per industry/corporate standards

  The Horizon Winter Operations (Station Operations) Appendices dated October 2017 specifies runway clearing and plowing criteria, which requires if the cleared runway is less than 150-feet the braking action must be report as fair or better when the crosswind is more than 10-knots. The Bombardier Q400 is expected to serve the Airport through 2025, and likely beyond.
- 150-feet accommodates large-cabin business jets; as typically required to satisfy regulatory, flight department, and insurance operating standards and insurance requirements.
- The Airport has become a one-runway facility. The 150-feet provides a safety margin for:
  - Precision instrument runway and low minimums (future lower ILS minimums planned)
  - Strong or gusty crosswinds during dry, wet/slippery, winter runway conditions
  - 'Wet and slippery' and 'contaminated' runway conditions (snow, ice, slush, snow)
- 150-feet provides flexibility to accommodate irregular and emergency operations (IROPS):
  - Cascadia Fault Airlift Site (Department of Emergency Management / WA Air National Guard)
  - Boeing aircraft practice approaches (typically B-737 aircraft models)
  - On-demand charters (A-318/319/320, MD-80, B-737, CS-100 aircraft models)
  - US Forest Service – alternate transport aircraft landing site for Moses Lake, Washington.
- All commercial airports in the State of Washington have a precedence for a primary runway width not less than 150-feet wide; including Bellingham-BLI, Pasco-PSC, Pullman/Moscow-PUW, Seattle-Tacoma International-SEA, Spokane-GEG, Walla Walla-ALW, and Yakima-YKM.

Preferred Alternative: The Runway 12-30 width contributes in maintaining Airport operational reliability, in which reliability is a key focus of the master plan. The Airport is pursuing multiple projects to further enhance commercial service reliability; including lower approach minimums, approach lighting system installation, ASOS relocation, passenger terminal building improvements, and airline apron expansion. Therefore, it is recommended Runway 12-30 facilities be planned to meet FAA ARC C-III standards for aircraft weighing greater than 150,000 pounds, in order not to limit future transport aircraft operators or commercial service opportunities.

In accordance with FAA planning guidance, a future determination can be made regarding Runway 12-30 design and constructability based on FAA C-III standards with regards to:

1) the future planning critical aircraft,
2) transport aircraft regular use and similar characteristics,
3) aircraft operator regulatory requirements – such as Horizon Airline wintertime criteria,
4) engineering and design factors,
5) construction feasibility and costs,
6) operational and revenue impacts to users, and
7) funding eligibility and participation.

2. AIRFIELD – ADDITIONAL RUNWAY

The former east-west Runway 7-25 (4,460' x 75') was deactivated due to failing pavement condition, as reported by the WSDOT Pavement Condition Index (PCI). The former grass landing strip was deactivated due to inadequate FAA safety area and separation standards. Although a crosswind runway is not required per FAA wind coverage standards or Airport activity levels, additional runway options were evaluated for future consideration. Any runway improvements must meet FAA standards, however as an ineligible FAA funding project, the Airport would assume total cost. **Exhibit 4.3** summarizes the additional runway design considerations, and **Exhibit 4.4** outlines the cost and funding considerations. The alternatives assessed the feasibility of a paved and non-paved (turf) runway option.

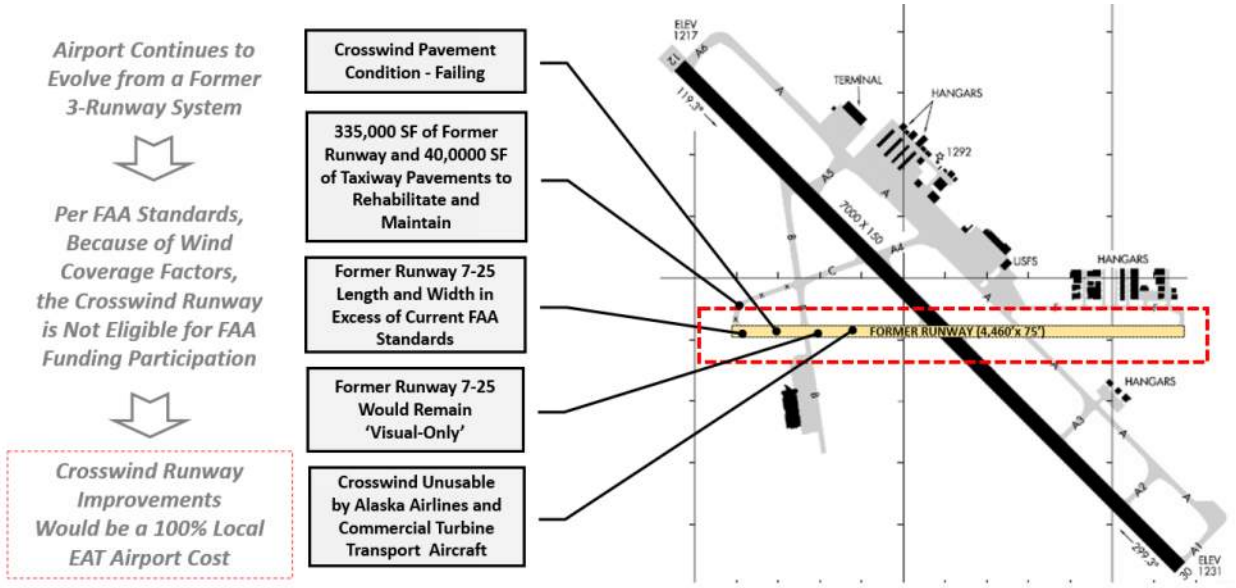
The additional was evaluated based on:

1) wind conditions,
2) users and aircraft types,
3) operational utilization,
4) compliance with design standards,
5) land compatibility,
6) constructability, and
7) cost and funding factors.

RUNWAY DESIGN STANDARDS AND CONSIDERATIONS:

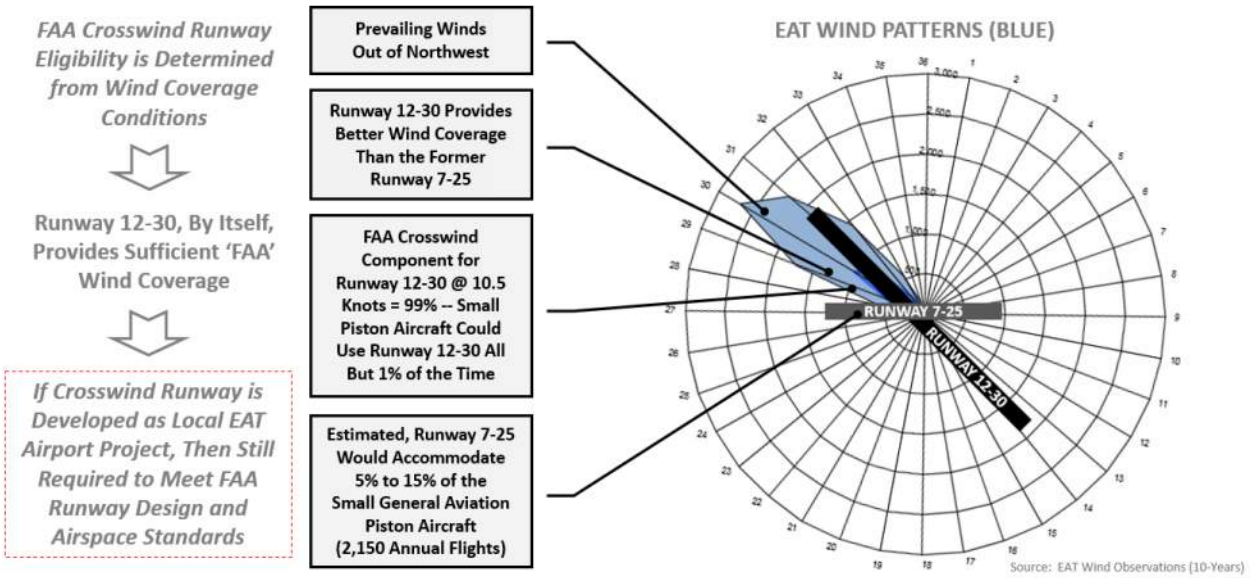
With respect to wind conditions, the aircraft category most affected are the light and very-light sport/experimental aircraft (particularly taildraggers), and glider-sailplanes. Per FAA standards, the additional runway would be designed to accommodate small piston aircraft in the FAA A-I small category aircraft weighing less than 12,500 pounds. The additional runway would be a visual runway, not requiring edge lights, paved shoulders, blast pads, or a parallel taxiway system.

Exhibit 4-3: Additional Runway Wind Characteristics



Source: Mead & Hunt Figure

Exhibit 4-4: Additional Runway Design and Funding Factors



Source: Mead & Hunt Figure

PAVED RUNWAY ALTERNATIVE:

The minimum length to accommodate small piston aircraft per FAA guidance is between 2,500 and 3,400 feet and a 60-foot width (aircraft per FAA Runway Design Group A-I small category (less than 50-knot approach speed) weighing less than 12,500 pounds). As a visual runway serving small piston aircraft, edge lighting, paved shoulders, blast pads, and a parallel taxiway system are not required.

During winter, the runway would likely be closed. Various paved runway options were considered but involved design factors which would require an FAA design waiver or modification to standards.

Recommendation: The paved additional runway option was dismissed from consideration due to design, utilization, and cost factors.

NON-PAVED TURF STRIP ALTERNATIVE (LIGHT SPORT AIRCRAFT/GLIDERS):

Turf strips are non-paved runways often used for low-traffic volumes by aircraft with light wheel loading and low approach/takeoff speeds (typically less than 50 knots). The turf would be intended to serve light sport utility aircraft and glider landing operations; as glider towed takeoffs would continue on Runway 12-30. The recommended turf dimension is 1,000 x 75, for accommodating representative light sport utility aircraft and glider-sailplane performance (FAA recommended width is 60 feet wide, although the glider association indicated a preference for 75 feet wide). Turf alignment options, including alternate grass landing areas (AGLA), were evaluated on the east-side of the airfield.

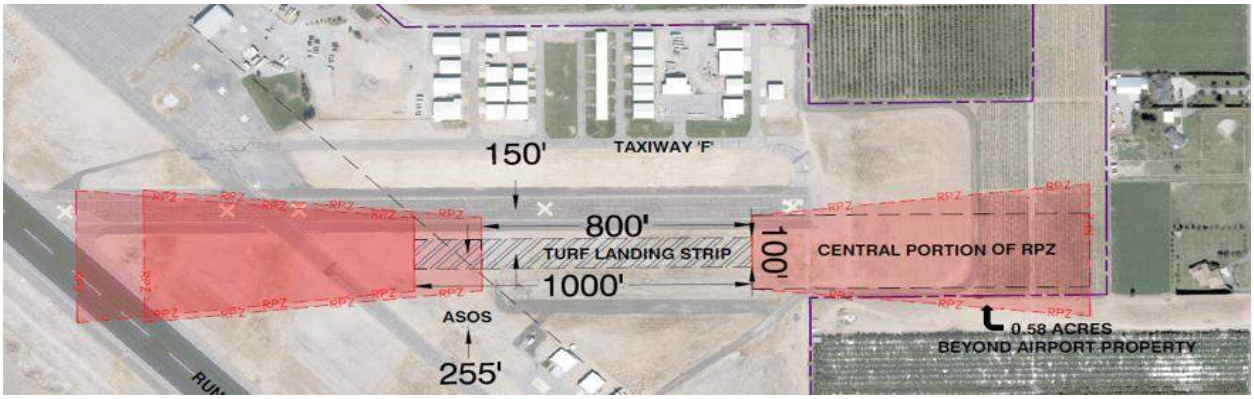
Light Sport Aircraft (LSA):

Defined per FAA Order 8130.2H as an aircraft, other than a helicopter or powered-lift, having a maximum gross takeoff not greater than 1,320 pounds. LSA includes the Piper J-2/3, Aeronca Champ, Luscombe 8 Series, Taylorcraft BC Series, and Ercoupe.

As shown in **Exhibit 4.5**, the preferred turf strip option is parallel and south of the former paved additional runway. This orientation allows for an approximate 800 to 1,000-foot length, with a proposed graded paved or unpaved taxiway/taxilane connection with the sailplane ramp.

Recommendation: develop a non-paved (turf) strip to accommodate light sport utility aircraft and glider landing operations

Exhibit 4-5: Recommended Turf Sport Utility Aircraft / Glider Landing Strip



Note: turf feasibility subject to FAA determination for existing and planned facilities based on safety areas, taxiway access, obstacle clearance, imaginary Part 77 airspace surfaces, ASOS weather station proximity, land compatibility; in addition to other possible operating, compliance, and regulatory factors.
Source: Mead & Hunt Figure

3. AIRFIELD - TAXIWAY SYSTEMS

The Airport continues to reconfigure their former three-runway system where some existing taxiway segments are circuitous or do not meet FAA taxiway design standards. This section identifies improvements to the taxiway system for more efficiency in support of east and west airfield developments. **Exhibit 4.6** identifies the location of taxiway system alternatives under consideration, which are recognized as east side and west side improvements.

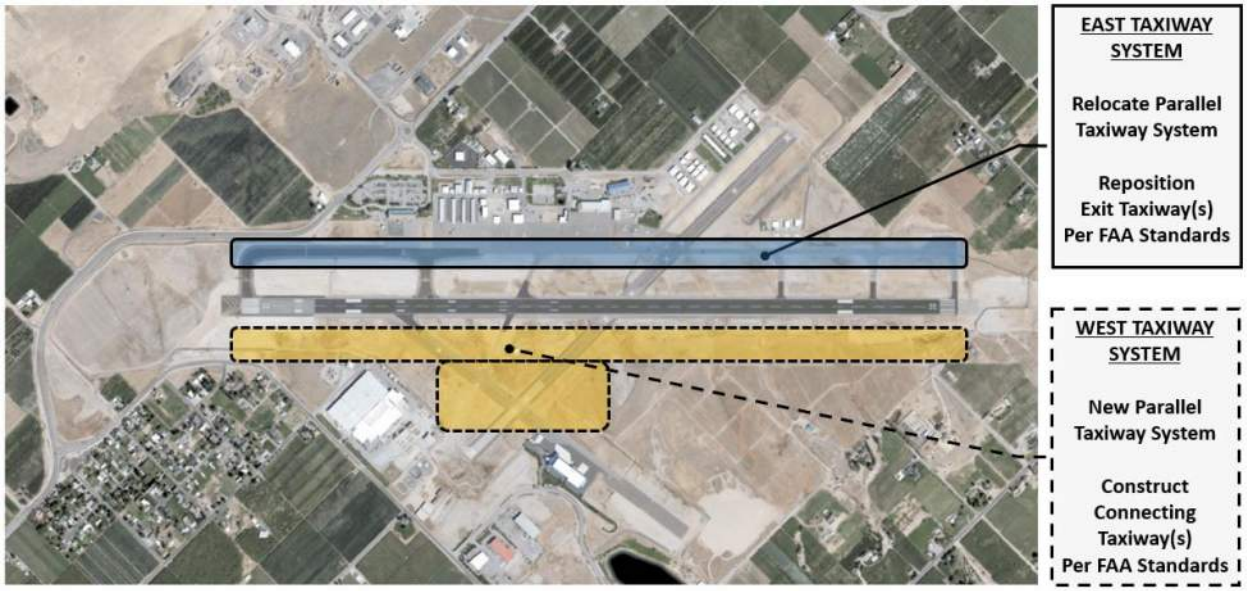
EAST SIDE PARALLEL TAXIWAY SYSTEM

East Side Taxiway System – Runway Separation

The existing parallel taxiway-to-runway centerline separation ranges from 527.5 to 540 feet. Per FAA design standards for ADG III, the minimum allowable separation is 400 feet. In addition, the existing taxiway elevation is higher than the runway elevation, which is addressed as part of an existing FAA Modification to Standards.

Recommendation: Relocate the future east side parallel Taxiway 'A' to 400 feet separation from the Runway 12-30 centerline (ADG III and TDG 5 design standards). The 1,000-foot section of existing Taxiway 'A' north of the airline apron would remain at the 527.5' separation to clear the ILS glideslope critical area, with an 'S' curve to transition between the 527.5 and 400-foot separation. The existing exit/connector taxiways would require reconfiguration for access to the airline and general aviation aprons. The parallel taxiway relocation would improve the runway-to-taxiway elevation differential. Exhibit 4.7 generally depicts the proposed east side parallel taxiway system relocation.

Exhibit 4-6: Taxiway System Alternative Locations



Source: Mead & Hunt Figure

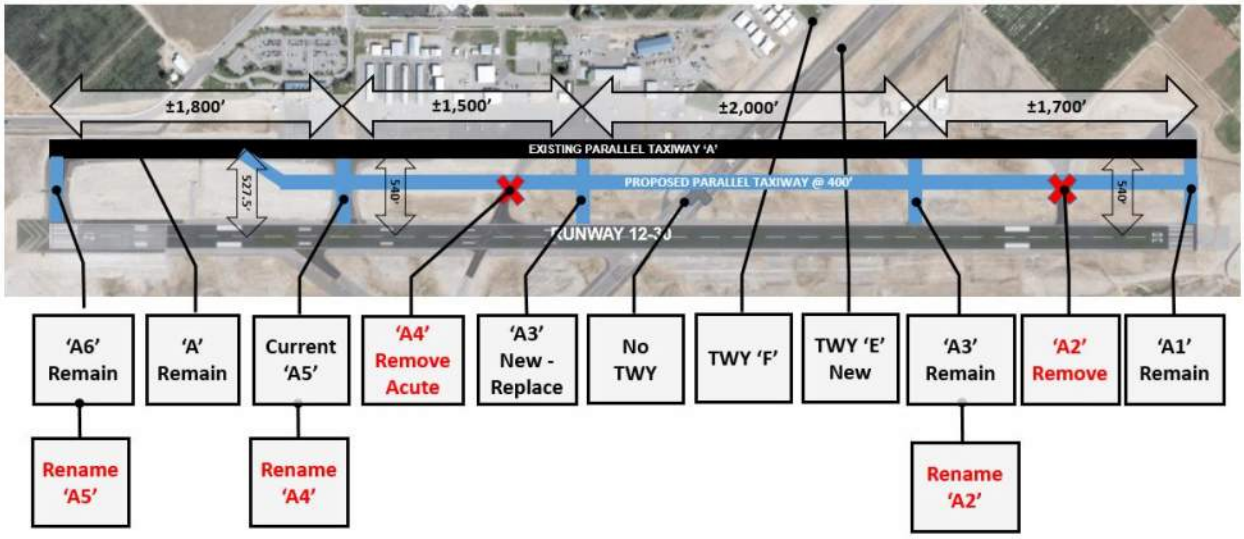
Exhibit 4-7: East Side Parallel Taxiway Relocation

Source: Mead & Hunt Figure

East Side Taxiway System – Taxiway 'A' Exit Connectors

Taxiways exit connectors should be located at the typical exit points based on aircraft category to minimize runway occupancy time. The FAA provides guidance on the location of exit taxiway distance intervals, based on the types of aircraft and percent of landing runway turnoff capability. **Exhibit 4.8** illustrates the planned taxiway exit connector projects, including taxiway interval distances and proposed taxiway re-naming.

Exhibit 4-8: East Side Taxiway Exit Connectors



Source: Mead & Hunt Figure

East-Side Taxiway System – North By-Pass/Run-Up

The north Taxiway 'A' does not have a holding bay to allow aircraft to by-pass while waiting on Taxiway A-6. This results in general aviation aircraft often performing engine run-ups on the north end of the general aviation apron, which is reported by pilots to be a concern with surrounding parked aircraft. In addition, commercial and medical flights frequently hold along Taxiway A-6, awaiting flight clearance. The runway also serves flight training.

Recommendation: construct a holding bay along the Taxiway A-6 internal turn radius, to provide for aircraft by-pass and continued access to the Runway 12 end. The proposed holding bay would be designed for the Q400. Feasibility and final design, marking, and lighting to de determined per engineering design considerations and FAA ILS determination.

East-Side Taxiway System - Recommendations

#1: Relocate Taxiway 'A' to minimum 400' runway-to-taxiway centerline separation

- Upgrade Taxiway 'A' system to TDG 5 standards (75' wide with 30' shoulders).
- Upgrade Taxiway 'A' system to Runway 12-30 pavement strength (150,000 pounds DWG)
- Taxiway A-1: upgrade to TDG 5 standards
- Taxiway A-3: upgrade to TDG 5 standards
- Reconnect south Taxiway 'A' by-pass
- Taxiway A-2: Remove (former Runway 30 entrance taxiway)
- Remove Taxiway 'A-4' (Not 90°)
- Construct new Taxiway 'A3' (90° Exit)
- Construct new islands for general aviation apron access
- Construct new entrance to air carrier apron
- Construct new entrance to US Forest Service apron
- Reconfigure existing Taxiway 'A-5'
- Construct new east side Taxiway to common hangar ramp

#2: Construct new north side run-up/by-pass

#3: Construct new Taxiway 'E' along former Runway 7-25

WEST-SIDE PARALLEL TAXIWAY SYSTEM IMPROVEMENTS AND PHASING

The conversion of former runway systems on the west-side of the airfield has resulted in taxiway layout and geometry challenges. As tenant activities and services expand on the west-side, a more suitable taxiway system will be required. The taxiway system will improve runway crossings, minimize runway occupancy times, and increase pilot visibility and situational awareness. The west-side taxiway system must align and geometrically inter-connect with the planned east-side parallel taxiway system improvements. **Exhibit 4.9** generally depicts the proposed west side parallel taxiway system, addition to the east-side parallel taxiway system relocation to 400-feet runway to taxiway centerline separation.

West Parallel Taxiway Factors and Considerations:

- Taxiway system to meet TDG 3 standards (50’ wide with recommended 20’ stabilized shoulders)
- Taxiway to be constructed in phases – Runway 30 end is predominate use
- Resolve FAA non-compliant acute runway-taxiway intersection(s)
- Runway 7-25 closure and taxiway access patterns (operations transferred to Runway 12-30)
- Avoids Runway 12-30 occupancy and aircraft back-taxi
- Future Executive Flight operator anticipated to be a commercial operator (SASO); inclusive of large aircraft (ARC C-II to D-III, TDG 2 to 3), corporate or charter services, flight training
- Further supports proposed west side commercial-type developments.
- Taxiway ‘B’ is 2,000 linear feet to Executive Flight, could result in aircraft nose-to-nose
- Taxiway pavement strength to future west side critical/demand aircraft
- Provides a more favorable paved route for Airport vehicles and equipment
- Reconfigure connectors to 90° exits
- Remove taxiway intersection nodes
- Utilize portion of closed Runway 7-25 as future taxiway connector
- Runway by-pass planned for north and south taxiway entrance ends
- VOR Station must be decommissioned to allow for ‘full’ parallel taxiway system
- Taxiway Object Free Area (TOFA) encroached CMI property

The following are the recommended West Side phased taxiway system improvements:

#1: Reconstruct Taxiway ‘B’ connector (90° exit)

#2: Deactivate/remove Taxiway ‘C’ (acute intersection)

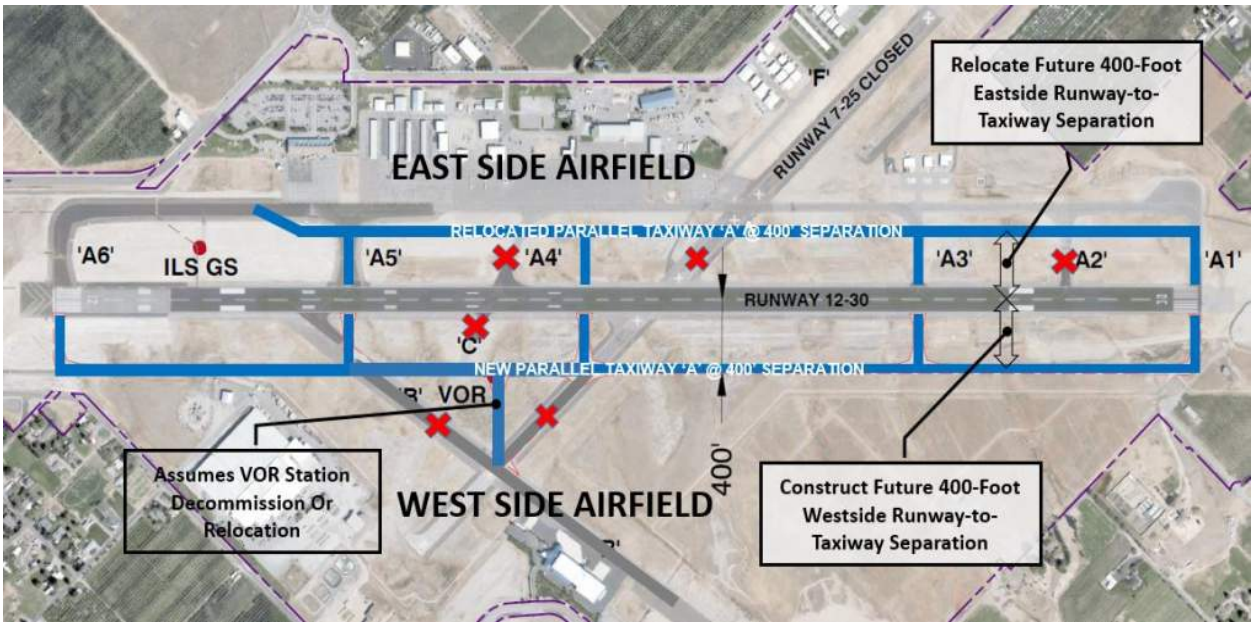
#3: Rehabilitate former Runway 7-25 as a taxiway connector

#4: Construct south portion of the parallel taxiway and exit connectors to Runway 30 end

#5: Construct north portion of the parallel taxiway and exit connectors to Runway 12 end

#6: Construct central portion of the parallel taxiway and reconfigure exit connectors (VOR Decommission)

Exhibit 4-9: Proposed West-side Taxiway System (Including Planned East-side Taxiway)



Source: Mead & Hunt Figure

4. LANDSIDE - AIRPORT TERMINAL AND LANDSIDE FACILITIES

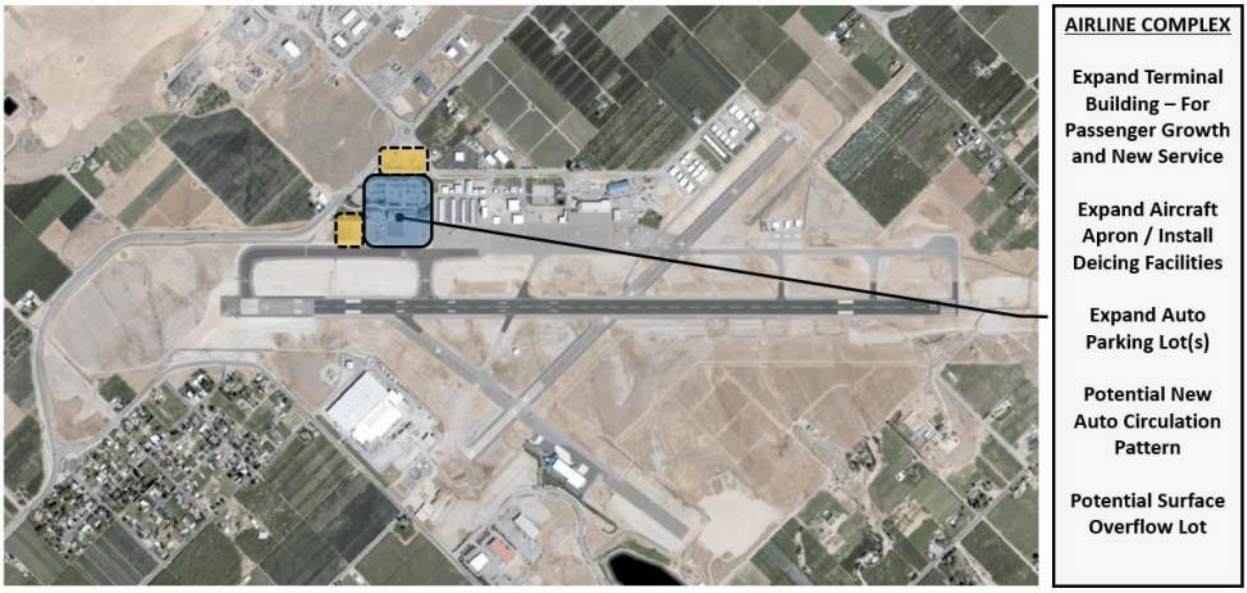
AIRLINE FACILITIES

This section evaluates the airline passenger terminal building with respect to anticipated airline service, passenger forecast demands, existing building space allocation, and level-of-service deficiencies. **Exhibit 4.10** identifies the location of airline system alternatives under consideration.

New Airline Complex (Building + Apron + Auto): The existing airline complex occupies 9 acres (building, apron and auto parking), with 13 acres available. The future airline facility requirement space allocation footprint is 12-plus acres, indicating potential space constraints with the existing airline site. The existing airline location is physically constrained, with Grant Road to the north, roadway systems to the east, airfield to the west, and general aviation to the south. As a result, airline sites elsewhere on the airfield were reviewed for potential airline re-development.

This assessment served two purposes, to document expansion constraints with the existing airline site, and to determine whether a new site offers better site advantages and long-term expansion potential. A total of six (6) sites were identified and compared. As an existing site, the current airline location offers overwhelming advantages. Although the existing site is physically constrained, the Airport elected to continue airline facility improvements at the current airline site.

Exhibit 4-10: Airline Passenger Complex Alternative Location



Source: Mead & Hunt Figure

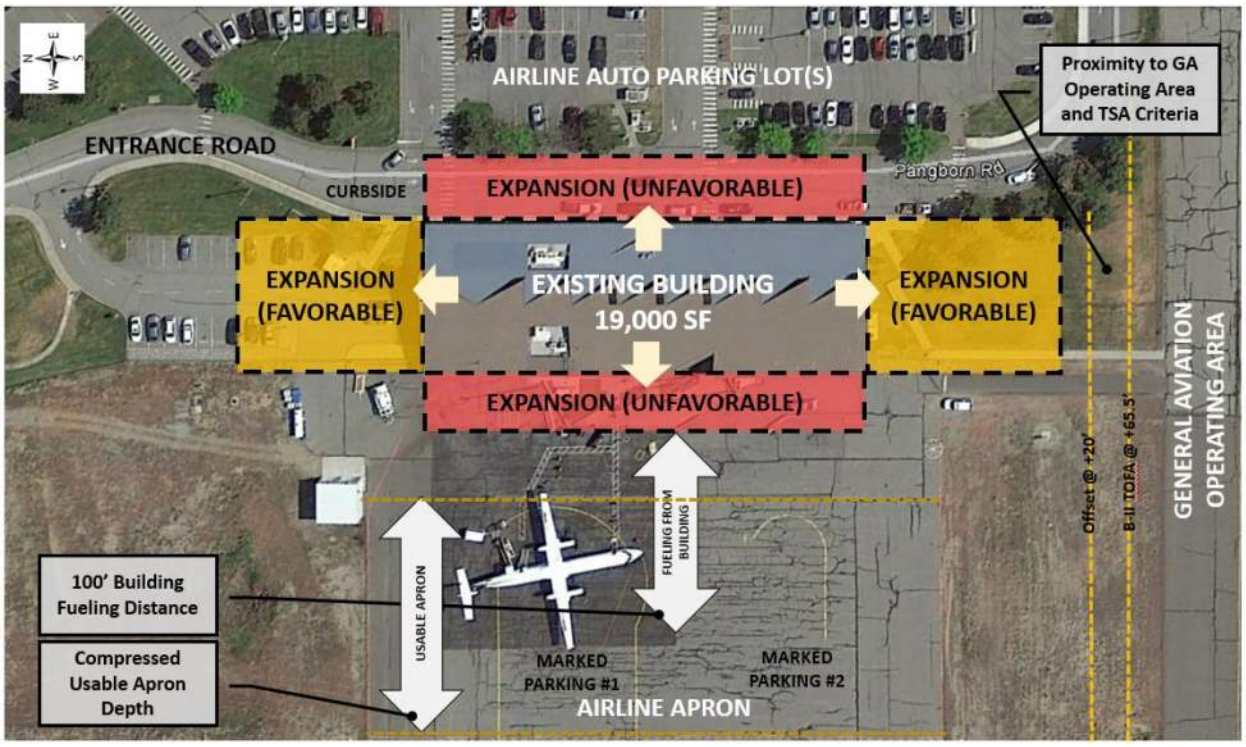
Passenger Terminal Building Comparison: For reference purposes, a review of passenger terminal building sizes at other similar-sized regional airports in the Pacific Northwest indicates the average building size totals 24,000 square feet with 10,500 square feet (45 percent) dedicated to airline and passenger processing operations. The Pangborn Memorial Airport terminal building totals 18,750 square feet with 8,500 square feet dedicated to airline and passenger processing.

External Building Site Development Factors and Considerations:

As illustrated by **Exhibit 4.11,** the following are external building factors which influence the building options and expansion capabilities:

- Building expansion direction – impacts to apron, vehicles, parking
  - Expansion to the north and south ends of the building is preferred
  - Expansion to the east impacts curb front, auto circulation and vehicle parking
  - Expansion to the west impacts the constrained airline aircraft apron
- Structural considerations based on existing building architecture
- Expansion functionality connecting with existing building space
- Impacts to usable airline apron area (aircraft parking/orientation, setbacks, jet blast)
- Aircraft fuel distance from building
- Grade and terrain factors
- Ground support equipment staging areas
- Impacts to building utilities
- Proximity to general aviation apron
- Potential for future jet loading bridge (long-term consideration)

Exhibit 4-11: Terminal Building Exterior Expansion Capabilities



Source: Mead & Hunt Figure

Terminal Building – Airline Service Scenarios:

The extent of building improvements would likely respond to the type of airline service improvements, as considered based on four (4) airline service scenarios evaluated as part of the airline passenger forecasts. Each airline scenario would include various combinations of building improvements.

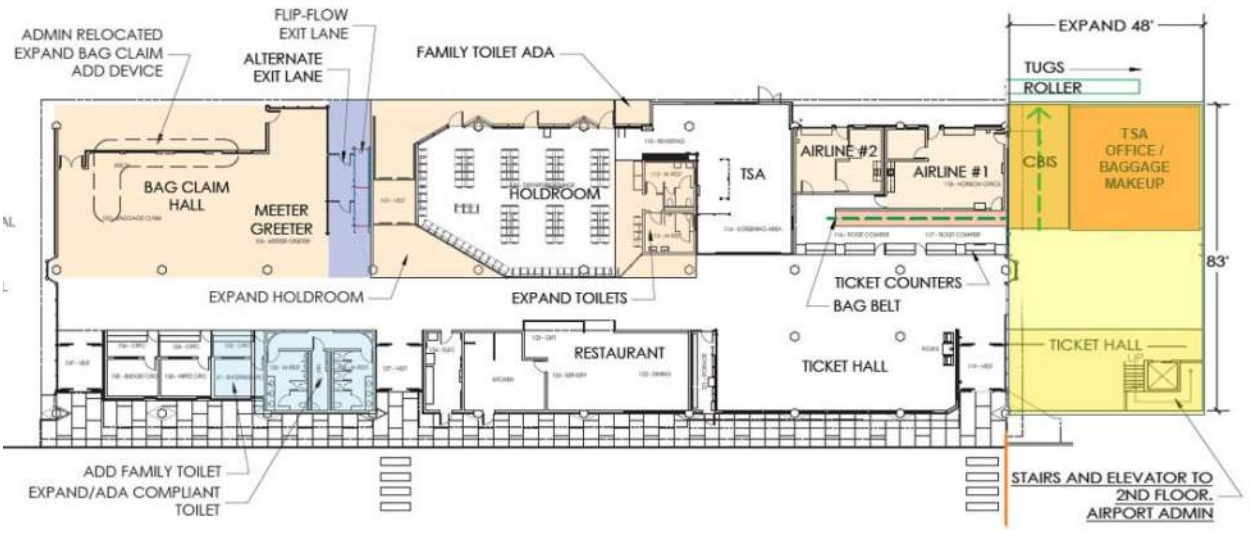
Airline Terminal Building Improvement Scenarios:

Scenario A: Meet 20-year forecast passenger growth (Two-Gate System with Turboprop Aircraft)
Scenario B: Second West-Coast Destination/Airline (Two-Gate System with Turboprop/Jet Aircraft)
Scenario C: Second West-Coast Destination/Airline (Two-Gate System with 76 to 90-Seat Jet Aircraft)
Scenario D: Additional Low-Cost Charter (Two-Gate System with 90 to 150-Seat Jet Aircraft)

Airport Preferred Building Scenario:

Various building expansion concepts were considered in order to accommodate the airline scenarios (A, B, C and D), and to resolve various combinations of building deficiencies and level of service factors. The preferred building concept centers on expanding and re-configuring the building per Scenario C (Two-Airline Gate System with 76 to 90-Seat Jets). As shown by **Exhibit 4.12**, the proposed total building size is 26,000 square feet, with the primary expansion to the north end (parking lot), and expansion exterior walls under the existing roofline towards the west (apron).

Exhibit 4-12: Preferred Terminal Building Expansion Option



Source: Mead & Hunt Figure

Airport Preferred Building Improvements:

- Passenger Departure Lounge (Ground Loading)
  - Expand Seating for Two-Gate System (±120 Seats = 2,050 SF)
  - Expand Secured Passenger-Access Restrooms (ADA)
- Airline Operating Area
  - New Second Airline Operating Area (Ticket Counter, Baggage, Operations Office)
  - Expand Baggage Make-Up (Hand or Conveyor System)
  - Expand Covered Baggage Tug Pick-Up Area
  - Expand Baggage Claim Area / Install Automated Baggage Collection Device
- Transportation Security Administration (TSA) Area
  - Expand/New TSA Baggage Screening Expansion (Building Addition)
  - New TSA Office Area (Building Addition)
- Other Building Areas
  - Expand Meet/Greet Area
  - Install Secured Passenger Automated Exit Lane Entry
  - Expand Public-Access Restrooms (ADA)
  - Relocate Airport Administration Office (Second Floor: ±4,200 SF)
  - New Airport Conference Room (Second Floor: ±800 SF)
  - New Airport Storage Area (Second Floor: ±600 SF)

Airline Facilities: The existing airline operating area (ticket counter, baggage, office) is adequate for a single airline. However, there is insufficient space to accommodate a second regional airline, without displacing TSA baggage screening.

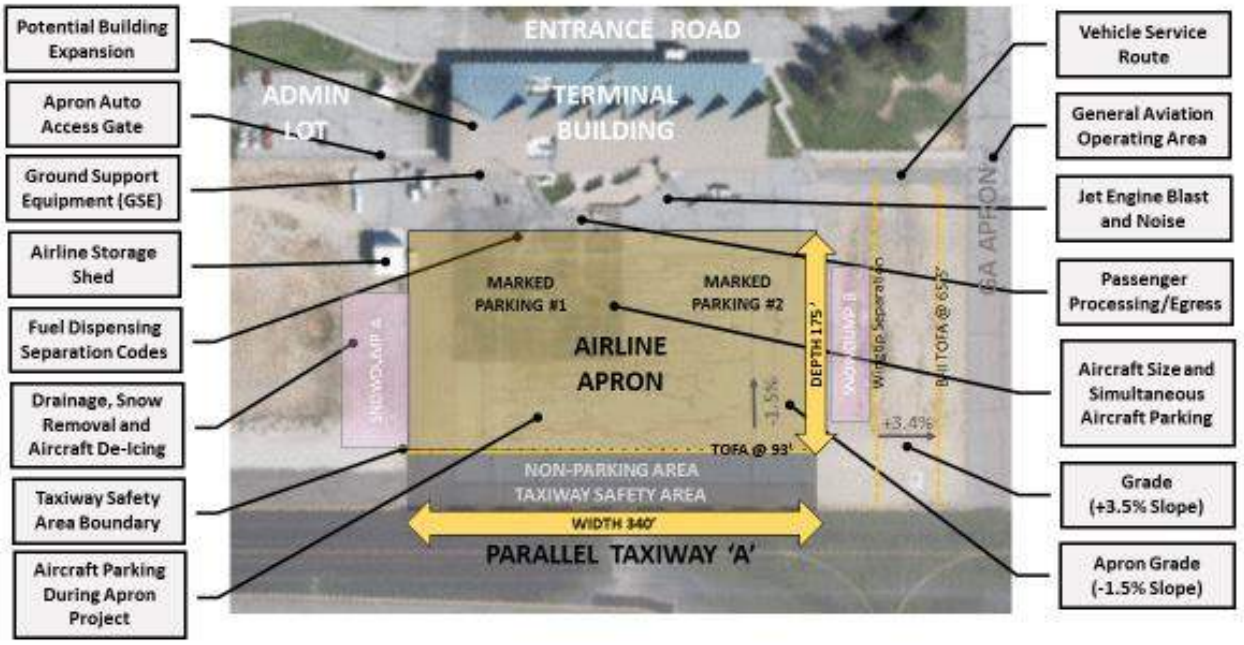
TSA Facilities: It is expected the TSA would install a 200-bag per hour explosives detection system (EDS) machine, possibly an L3 DX-80 into which TSA would manually insert and retrieve the bags. Alarmed bags will be held by the machine so the officer can see what caused the alarm and retrieve the bag for ETD screening. The standard TSA passenger screening area, with updated passenger screening occupies about 1,400 to 1,600 square feet.

Airline Building Recommendation: Renovate and expand building components to meet airline service demand scenarios (multi-airline, larger aircraft type/size, flight schedules, destinations) and to resolve passenger level of service deficiencies, along with building compliances.

AIRLINE APRON

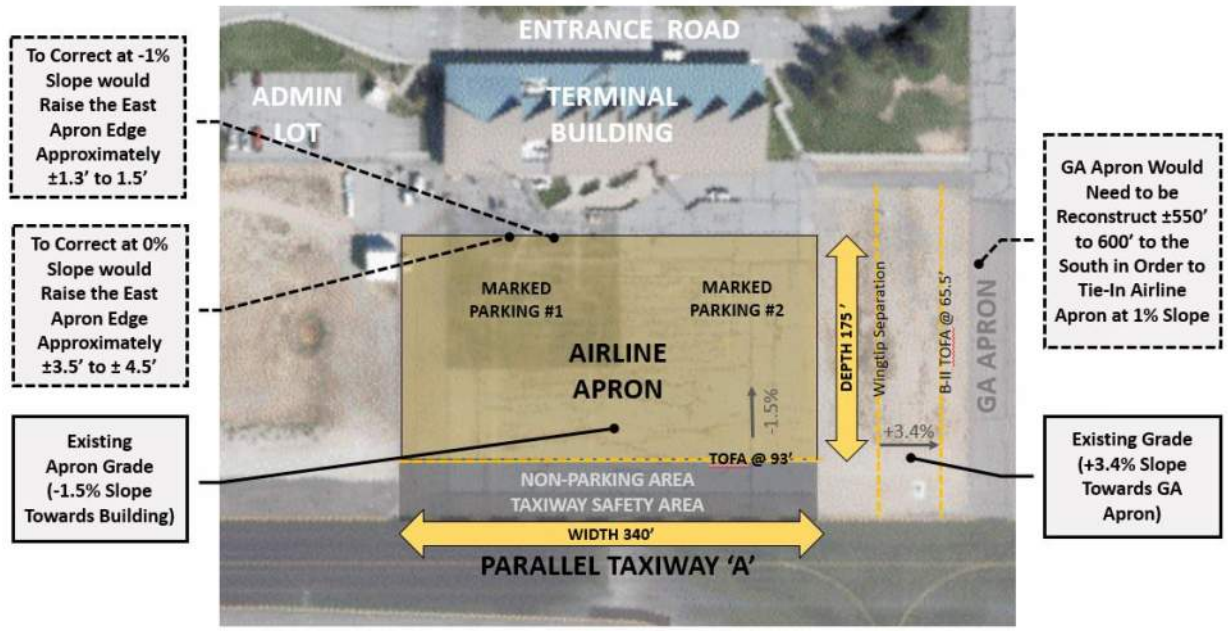
As shown by **Exhibit 4.13**, the air carrier apron totals 95,500 square feet, of which 87,500 square feet is committed to aircraft maneuvering, 55,000 square feet is usable beyond the Taxiway 'A' object free area, and 8,000 square feet is used for passenger processing and ground service equipment. The apron is marked with two regional turboprop aircraft parking positions. The apron is adequate to accommodate a single regional turboprop Bombardier Q400 but is constrained for simultaneous aircraft parking and passenger loading. The usable apron area is constrained by the terminal building to the east, and Taxiway 'A' to the west. **Exhibit 4.14** identifies the existing apron grade issues, considered in the apron alternatives.

Exhibit 4-13: Airline Apron Expansion Factors



Source: Mead & Hunt Figure

Exhibit 4-14: Airline Apron Grade / Slope Factors

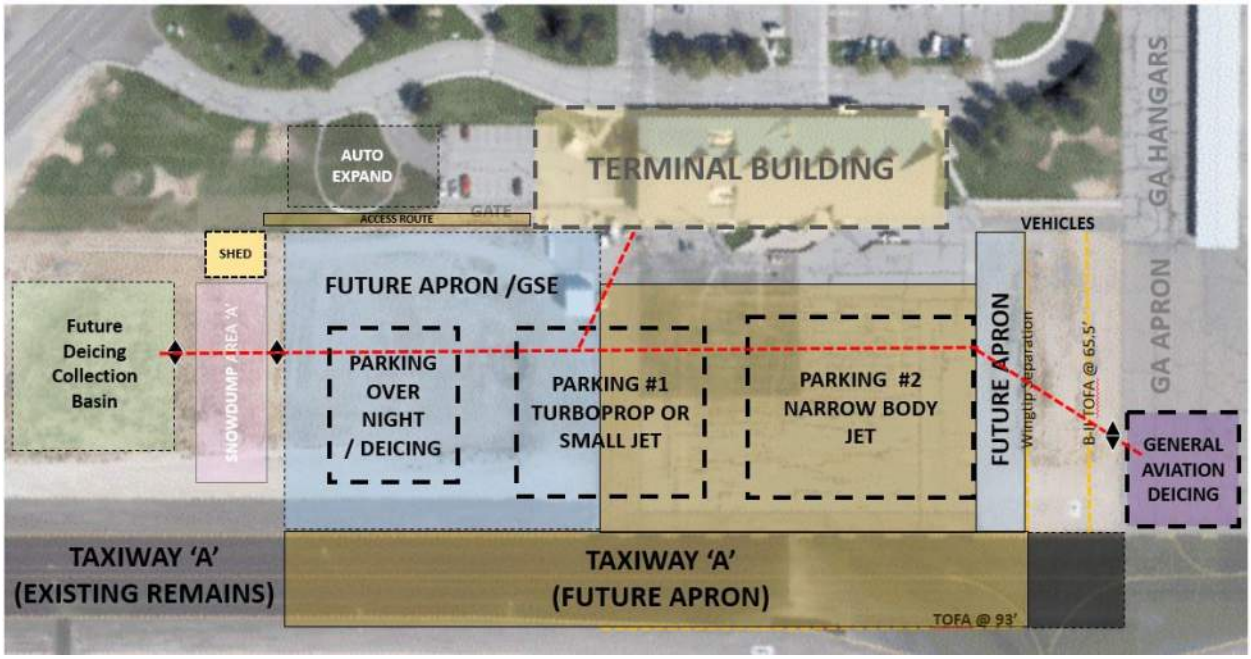


Source: Mead & Hunt Figure

Exhibit 4.15 shows the recommended apron expansion layout, including aircraft deicing. The following are airline apron site factors which influence the expansion options:

- Planned terminal building expansion (north end extension)
- Implement aircraft deicing recovery and collection system
- Negative sloping grade (-1.5%±)
  (raise airline apron 1.3' to 1.6' to correct to FAA standard of not greater than 1.0% slope)
- Positive slope between airline and general aviation aprons (+3.4%)
  (requires 550' of general aviation apron reconstruction to tie airline apron at 1.0% slope)
- Maintain physical separation with the general aviation apron, parking area, hangar access
- Proximity to vehicle gates and administrative auto parking lot
- Taxiway 'A' Object Free Area (TOFA)
- Secured Identification Display Area (SIDA)
- Snow removal and dump site(s) – north and south of apron edge
- Ground service equipment parking and airline storage shed
- Passenger baggage pick-up and marked building walkway entrance
- Aircraft power-out or tug operations (larger jet aircraft)
- Fuel truck and Airport vehicle service route
- Aircraft dry well drainage basin north of apron
- Future apron pavement reconstruction phasing – potential impacts to airline service
- Planned Taxiway 'A' provides expanded usable apron; requires apron entrance reconfiguration

Exhibit 4-15: Airline Apron Expansion and Aircraft Deicing Concept

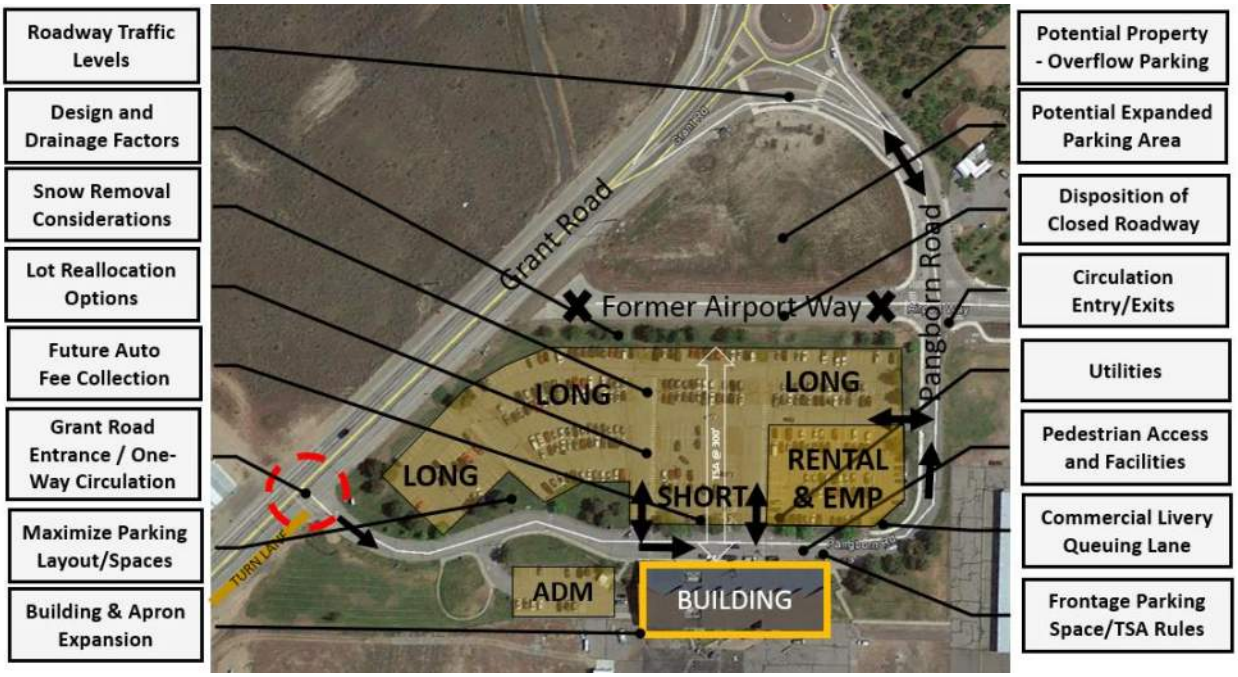


Source: Mead & Hunt Figure

AIRLINE VEHICLE PARKING AND CIRCULATION

The auto lot experiences capacity constraints during average to peak month periods. Based on forecast enplanement levels, by 2035 an additional 186 spaces will require 86,000 square feet of new parking area. **Exhibit 4.16** displays the auto parking lot site considerations and expansion factors.

Exhibit 4-16: Auto Parking Site Expansion Factors



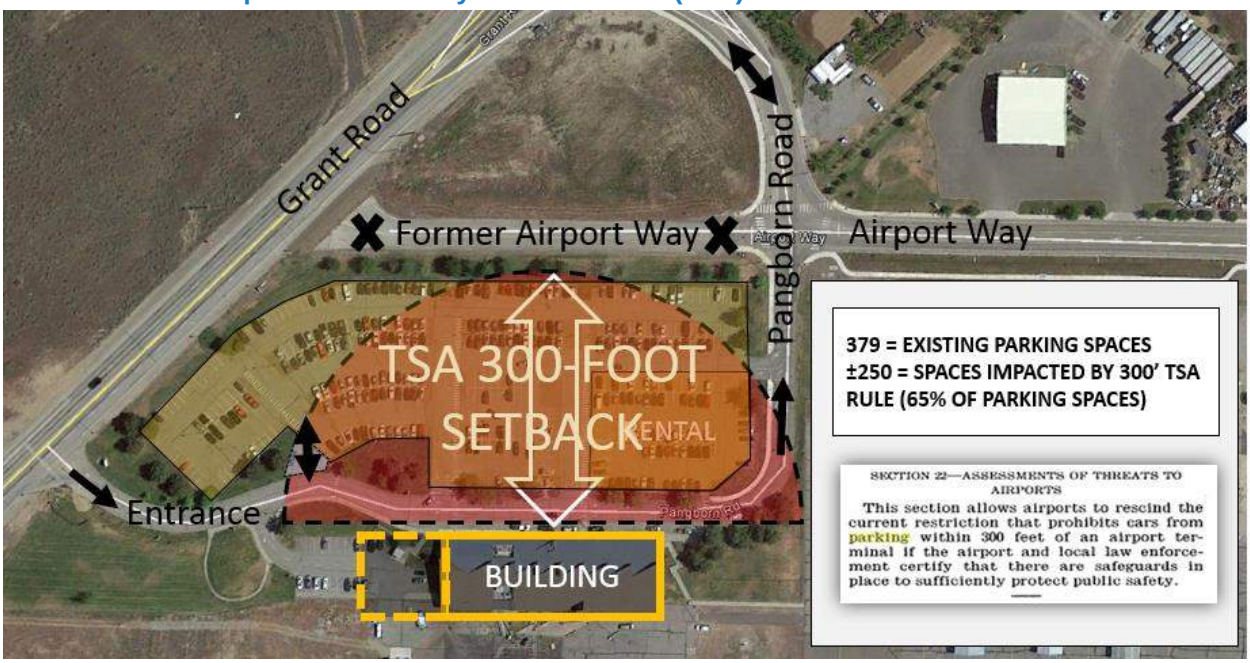
Source: Mead & Hunt Figure

The following lists the auto parking lot expansion triggers and site improvements.

- Airline passenger growth
  - Impacts from possible closure of the Grant Road entrance (north side access)
  - Requires new vehicle circulation route
  - Requires reconfiguration of parking lots
- Requires new entrance and exits points
- Potential TSA parking restrictions (300' terminal building buffer)

Exhibit 4.17 illustrates the potential TSA parking buffer. Under heightened security measures, the TSA has the authority to impose a 300-foot perimeter restricted area which would prevent auto parking. The 300-foot boundary impacts nearly 250 existing auto parking spaces, or 65 percent of the space capacity. Options to provide offsetting parking includes a remote surface lot and construction of a parking garage. However, even as long-term auto expansion option, the remote lot is not owned by the Airport, is distant from the terminal building (800 linear feet) and requires pedestrian crossing of Pangborn Drive, while the multi-level parking garage structure is cost prohibitive.

Exhibit 4-17: Transportation Security Administration (TSA) 300-foot Setback



Source: Mead & Hunt Figure

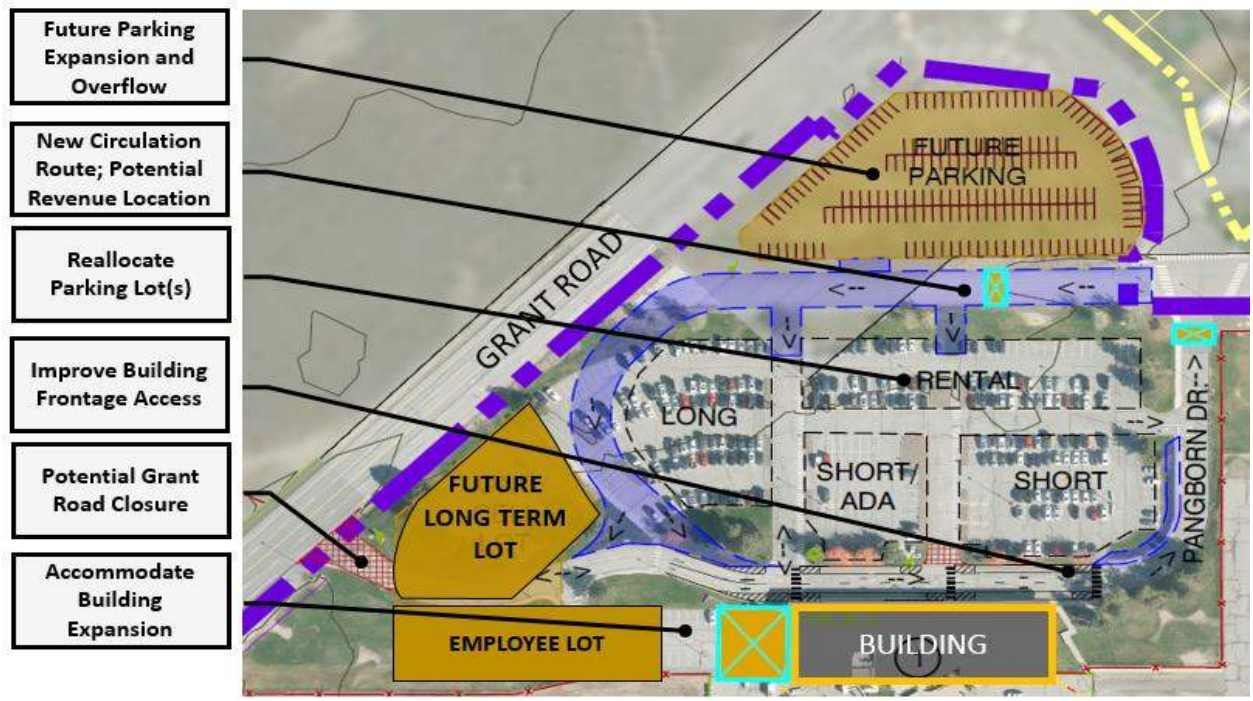
Exhibit 4.18 shows the preferred auto parking lot layout and circulation, taking into account:

- Dedicated commercial livery queuing lane (taxi, shuttle)
- Improved curb front parking arrangement, marking plan, and wayfinding
- Improved pedestrian walkways and lot access
- Reconfigure dedicated parking lots to re-allocate and maximize space utility
  - Short-term parking
  - Long-term parking

- Rental car
- Employee
- Airport Administrative/Visitor
- Handicap (Approximately 8 to 10 spaces per ADA codes)
- Potential layout for future parking lot ticket and payment collection system

- Airline terminal building expansion (north side expansion)

Exhibit 4-18: Airline Auto Lot Expansion and Circulation Concept



Source: Mead & Hunt Figure

5. LANDSIDE - GENERAL AVIATION AND FIXED BASE OPERATOR (FBO)

Exhibit 4.19 identifies the location of the Fixed Base Operator (FBO) alternatives under consideration. The key general aviation facility alternative components involve:

- FBO building/offices – currently combined (rehabilitate or future new)
- FBO hangar – currently combined (rehabilitate or future new)
- 100LL fuel tank replacement/relocation
- Future FBO or executive hangar site development
- Reserve areas for future general aviation activities
- Dedicated apron parking areas

Exhibit 4-19: Fixed Base Operator (FBO) Site Alternatives

Source: Mead & Hunt Figure

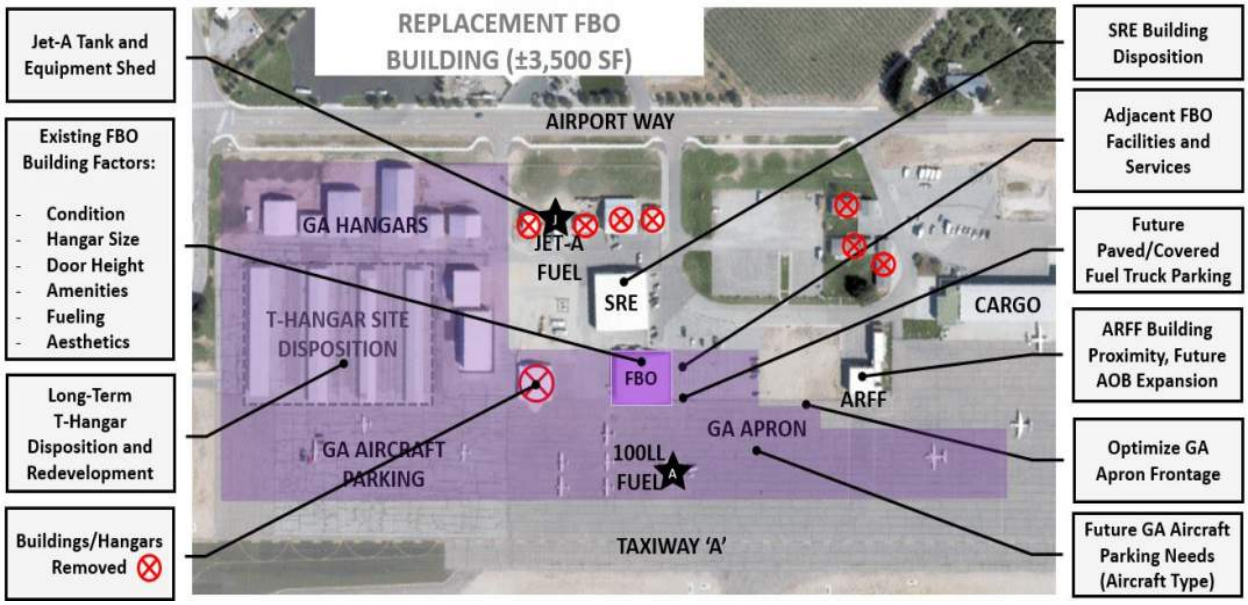
Exhibit 4.20 displays the general aviation site considerations and expansion factors under consideration. The Airport's operational peaking characteristics are used to determine the facility requirements and space allocation to meet forecast aircraft demands for based aircraft operators, itinerant users, on-airport commercial tenants and other Airport operational requirements.

Exhibit 4.21 shows the preferred FBO layout, which takes into account the following factors:

- Refurbish/modernize existing FBO building/office
- Proposed new FBO hangar (±8,000 to 12,000 square feet with ±18' door clearance)
- FBO hangar and building expected to be in close proximity or perhaps co-located
- Reconfigure FBO auto parking and vehicle circulation
- Dedicated fuel storage and truck parking location (100LL and Jet-A)
- Extend regional utilities

The FBO existing lot will need to be reconfigured or spaces relocated upon expansion of the GA/FBO Flightline hangar area. For the based aircraft owners, no dedicated auto parking is recommended, as pilots commonly park at their individual hangar via control-gated auto access.

Exhibit 4-20: FBO / General Aviation Site Factors



Source: Mead & Hunt Figure

Exhibit 4-21: Preferred FBO / General Aviation Site Layout

Source: Mead & Hunt Figure

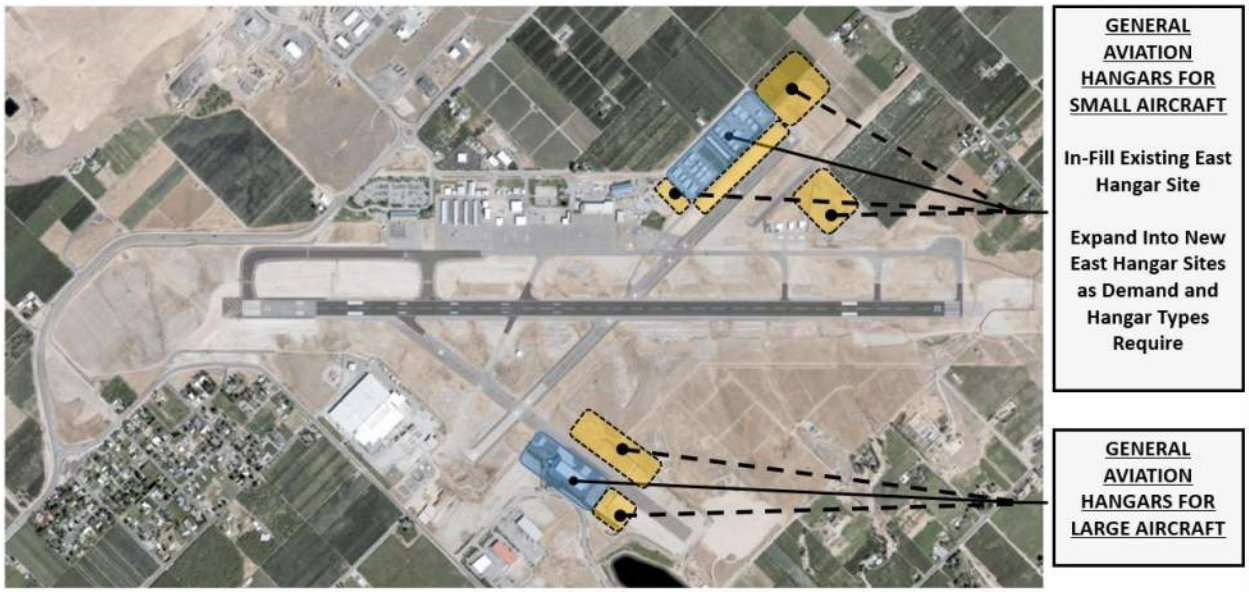
GENERAL AVIATION (GA) HANGARS

Exhibit 4.22 identifies the location of the aircraft hangar alternatives under consideration. The 20-year future hangar development is planned for: 1) ±27 forecast new based aircraft, 2) expanded/new tenant hangars, 3) hangars for small turboprop aircraft, 4) replacement for obsolete or removed hangars, and 5) reserved areas for unanticipated hangar demand.

The following are general aviation hangar development characteristics.

- New hangar construction is often a condition of favorable ground lease or payment schedules.
- The majority of new based aircraft will be single and twin-piston aircraft, often stored in T-hangars, in which 6 to 10-unit buildings are the most economical. However, hangars are trending towards individual buildings, including special-purpose units with attached workshop or finished space. Larger box and executive hangars often occupy multiple aircraft and can often involve business and commercial purposes.
- Ideally, hangars should be constructed in a linear and modular manner, along an established building or paved flight line. Hangar locations should be centralized and preferably grouped by similar size, type, function, and aircraft category (piston, turboprops, jets, rotor). This promotes more efficient access, visibility, and minimizes costs associated with maintenance, and for the extension of infrastructure, secured access, drainage, auto parking, and utilities. Hangar orientation should consider prevailing weather (snow) and wind conditions, and provide adequate drainage with minimal slope differential, especially in front of hangar doors.
- Hangar areas should be developed to not less than FAA Airplane Design Group II aircraft standards, in order to promote adequate building separation, ramp and maneuvering space, and sequential expansion flexibility for various hangar sizes. Hangars must be constructed beyond the runway and taxiway safety areas, navigational critical areas, remain beyond visibility line-of-sights, and not encroach imaginary airspace surfaces.

Exhibit 4-22: General Aviation Hangar Site Alternative Locations



Source: Mead & Hunt Figure

Recommended General Aviation Hangar Site Developments

Exhibit 4.23 illustrates the recommended general aviation hangar layout, described below by functional area:

East GA Hangar Area: This area, located along the former Runway 7-25, accommodates piston and other aircraft; including the gliders. Hangars in this area would likely include T-hangars, open-shade hangars, small individual box hangars, and small to medium executive hangars. This area offers the following hangar expansion potential:

- In-fill hangars (4 to 6 units = ±18 additional aircraft)
- Replacement for the Airport T-hangars A, B, C, D (4 units = ±32 additional aircraft)
  T-hangar buildings configured to also allow conversion as small box hangar units
- New 'green field' hangar expansion sites (A, B, C); as needed for unconstrained forecast demand

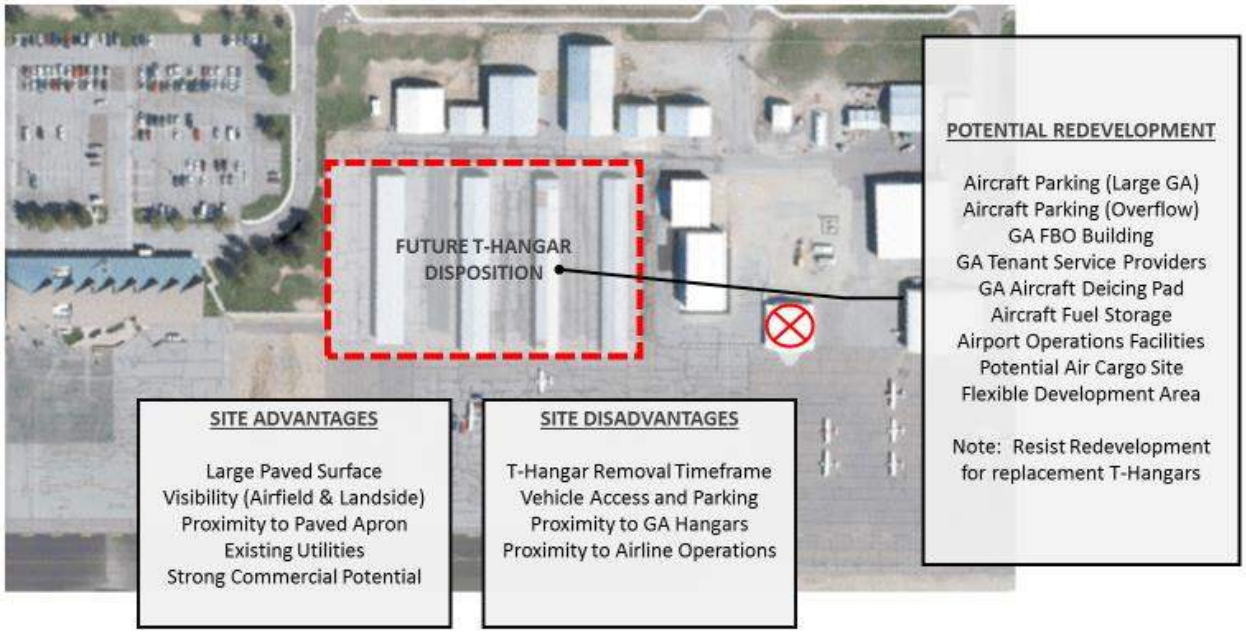
The former Runway 7-25 pavement is planned to be developed as a future hangar taxiway route, to serve existing and proposed hangars areas. The proposed new hangar areas (A, B, C) would involve various site improvements; including earthwork, paved aircraft ramp, vehicle and parking improvements, and potential land acquisition. The site south of the former Runway 7-25 is suitable for larger hangars and has the potential to connect directly with Taxiway 'B'.

Exhibit 4-23: East General Aviation Hangar Area Development

Source: Mead & Hunt Figure

North GA Hangar Area (Repurpose Options): As shown in **Exhibit 4.24**, when determined obsolete and removed, the existing T-hangar area (four units A, B, C, D occupies 2.2 acres) offers various opportunities for redevelopment, where the east and west perimeter will remain general aviation. The four new T-hangars provide 31 hangar units. Replacement hangars should be in place prior to displacing tenants. The flightline is occupied and offers limited availability for future hangar development. Future hangars in this area should serve more than an individual or private interest. Hangar rehabilitation should be considered as part of accommodating additional hangar demand. The T-hangars south of the airline terminal are aging and require increasing maintenance.

Exhibit 4-24: Northside T-Hangar Redevelopment Area Options



Source: Mead & Hunt Figure

West-Side Hangar Area: As shown in **Exhibit 4.25**, this area should be reserved or dedicated for corporate and commercial operators who may need a larger ground area to accommodate building, ramp, and ancillary facilities. This area, located along a paved taxiway, offers land use flexibility for large-tract site development, and reasonable extension of infrastructure, vehicle access/parking, and utilities.

Exhibit 4-25: West Hangar Development Area Option

Source: Mead & Hunt Figure

GENERAL AVIATION APRON

The future general aviation apron space requirement is 325,000 square feet. **Exhibit 4.26** depicts the recommended apron aircraft parking designations based on the recommended FBO development concept.

The following are current general aviation apron site factors:

- Taxiway 'A' taxiway object free area (TOFA) parking setback
- Limited flightline with apron frontage
- Based tie-down parking demand
- US Forest Service parking demand (seasonal)
- ARFF secured vehicle drive area
- Special Airport events (airshows)
- Aircraft run-up area
- Aircraft de-icing area

The following are general aviation apron site development considerations:

- Proximity to aircraft fuel tank and dispensing / fuel truck parking
- Planned relocation of Taxiway 'A'
- Proximity to future FBO facilities and pilot, aircraft fuel, aircraft line services
- Future disposition of surrounding buildings, hangars, structures (SRE/ARFF)
- Future flight training demands
- Vehicle/gate access
- Taxiway connections
- Designate segregated aircraft parking areas:
    - Based tie-down (6 to 10 positions)
    - FBO transient piston aircraft (20 to 25 positions)
    - FBO turboprop aircraft (6 to 8 positions)
    - FBO business jet aircraft (2 to 4 positions)
    - FBO helicopter (1 to 2 large, and 4 to 6 small positions)
    - Air cargo (1 position for FedEx and 1 position for UPS)
    - US Forest Service (Approximately 2 to 4 positions)

Exhibit 4-26: FBO / General Aviation Apron Recommended Site Layout

Source: Mead & Hunt Figure

6. LANDSIDE - AVIATION TENANTS AND AIRPORT SUPPORT FACILITIES

Exhibit 4.27 identifies the location of the aircraft hangar alternatives under consideration.

Exhibit 4-27: Airport Operations (ARFF / SRE) Sites

Source: Mead & Hunt Figure

AIRPORT OPERATIONS BUILDING (AOB)

The Airport Operations Building (AOB) is a single structure for consolidating Airport Rescue and Fire Fighting (ARFF) and Snow Removal Equipment (SRE) facilities and staff. The ARFF and SRE share many common functions, including staff, emergency response, storage, and vehicle maintenance. **Exhibit 4.28** is a concept rendering of a AOB, in which the proposed AOB building is estimated to be approximately 25,000 square feet.

The following are AOB siting factors and considerations, considered for a potential AOB site on the east side and west side of the airfield:

- Airport ARFF response times – per FAA Part 139 certification requirements
- Douglas County firefighting service location, equipment, and personnel requirements
- Access to public streets
- Access to Airport perimeter routes
- Airside and landside access times and visibility
- Co-located living quarters
- Site development costs

Exhibit 4-28: AOB Building Concept Rendering

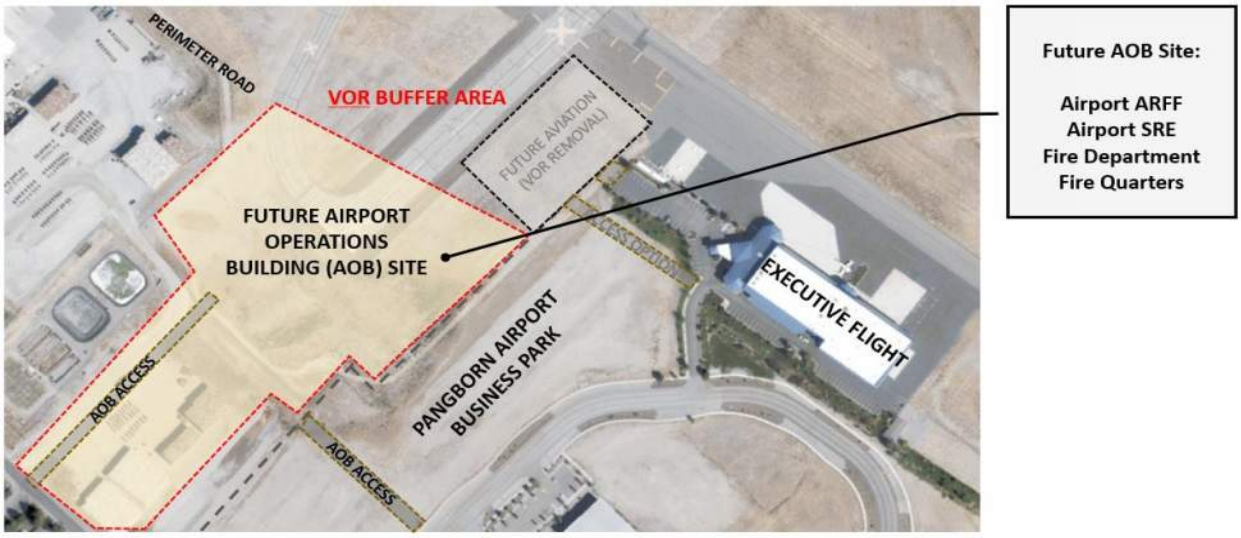
Source: Airport OAB Study Exhibit

Exhibit 4.29 displays the recommended AOB site, located on the west side of the airfield, beyond the end of the former Runway 7-25.

AOB East Side Airfield Site: The eastside AOB site location options include the space north of the existing ARFF building, and the current US Forest Service site if relocated to another part of the airfield in the future.

AOB West Side Airfield Site: The westside AOB site location option includes the west end of the former Runway 7-25, beyond the VOR buffer. This site has direct access to South Union Street, and to the Pangborn Airport Business Park. The site also has existing pavement for access and outdoor vehicle storage. This is the preferred site of the Douglas County Fire Department.

Exhibit 4-29: Recommended AOB West Side Alternative Location



Source: Mead & Hunt Figure

CONSOLIDATED RENTAL CAR MAINTENANCE FACILITY

The Airport is pursing a dedicated area to consolidate rental car facilities. The proposed rental car functions include a multi-bay wash rack, gas refueling, and adjacent parking.

Recommendation: the preferred rental car facility site is located west of Airport Way, within the area occupied by the SRE workshop/maintenance buildings (to be removed), Jet-A fuel tank (to be relocated), and rental car wash rack building. This area would have open-to-the-public access. Exhibit 4.30 displays the recommended consolidated car maintenance facility, located on the east side of the airfield, west of the FBO and SRE building.

Exhibit 4-30: Recommended Rental Car Facility Location

Source: Mead & Hunt Figure

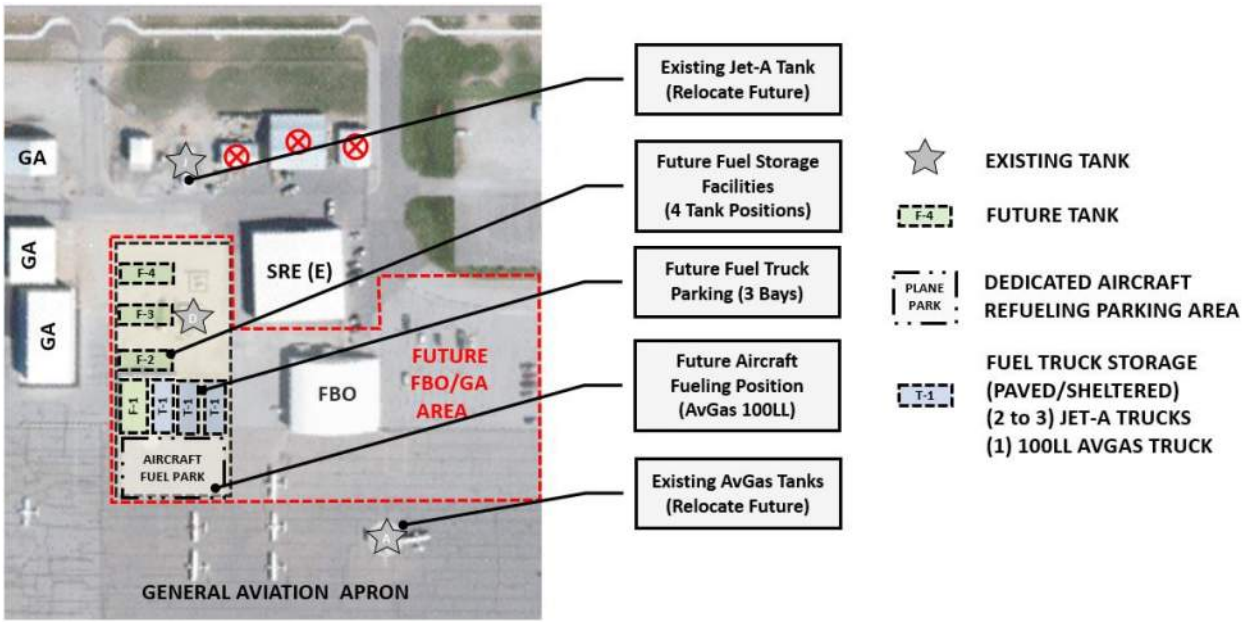
AIRCRAFT FUEL STORAGE AND DELIVERY FACILITIES

Exhibit 4.31 shows the recommended future aircraft fuel storage and dispensing facilities, located north of the FBO hangar/building. The following are fuel alternative considerations:

- Secured fencing
- Fire code setbacks - distances based on tank size
- Provide spill containment
- Optimize self-fueling access and parking
- Fuel truck parking and maneuvering
- Consolidate fuel tank storage

The location minimizes the need for fuel delivery trucks to drive through hangars and aircraft parking. It also allows greater flexibility for locating the loading pad, with sufficient space for low-profile berm-style spill containment. The fuel tank site has expandable capacity for four (4) 12,000-gallon tanks (fire code limit). The 100LL dispensing method would be self-fueled on the aircraft parking pad, improving potential spill containment. Jet A would be delivered to aircraft by truck, with vehicle parking co-located with the bulk storage tanks to optimize facility for spill containment and clean up. All tanks would be above ground to facilitate inspection and maintenance access.

Exhibit 4-31: Recommended Fuel Storage Facility



Source: Mead & Hunt Figure

AIRPORT PERIMETER VEHICLE ROUTE

As a FAA Part 139 certificated facility, an airfield perimeter roadway system is recommended for providing secured access to various airfield locations by authorized airport vehicles and machinery. This road system is intended to improve emergency response, and to reduce airport service vehicles operating on aircraft movement areas, which provides multi-use safety and reduces the potential for incursion.

AIRPORT FENCING AND VEHICLE GATES

Fencing and gate systems are used to enclose the Airport perimeter in order to restrict inadvertent access by people and wildlife to aircraft operating areas. Airport perimeter fencing should conform to Federal Aviation Administration (FAA) and Transportation Security Administration (TSA) certification standards, per recommendations from the 2005 EAT Wildlife Hazard Management Plan (WHMP – updated annually). Fence and gate positions should be strategically positioned to satisfy public entry, fire rescue, and other local requirements. For commercial airports, the FAA typically recommends 10 to 12-foot chain-link fence and 3-strand barbed-wire outriggers, and a 4-foot skirt of buried chain-link material to prevent burrowing and washouts. The airfield perimeter is entirely enclosed with perimeter fencing. The following airfield and terminal areas are recommended for new and upgraded fencing:

Fencing Improvements:

- Install fencing skirt along south airfield fencing
- Heighten fence along south portion of airfield

Vehicle Gate Improvements:

- Reposition airline apron vehicle gates per building, apron and auto parking improvements
- Construct, mark future Airport secured vehicle route traversing terminal apron

AIRPORT UTILITIES

The follow are recommended utility improvements:

- Extend Regional Sewer to FBO Flightline (Regional Line Stops at Passenger Terminal Building)
- Extend regional utilities to developments east of Pangborn Airport Business Park

ROADWAY IMPROVEMENTS

The following roadway improvements are planned, programmed, or recommended in the Airport vicinity:

On-Airport:

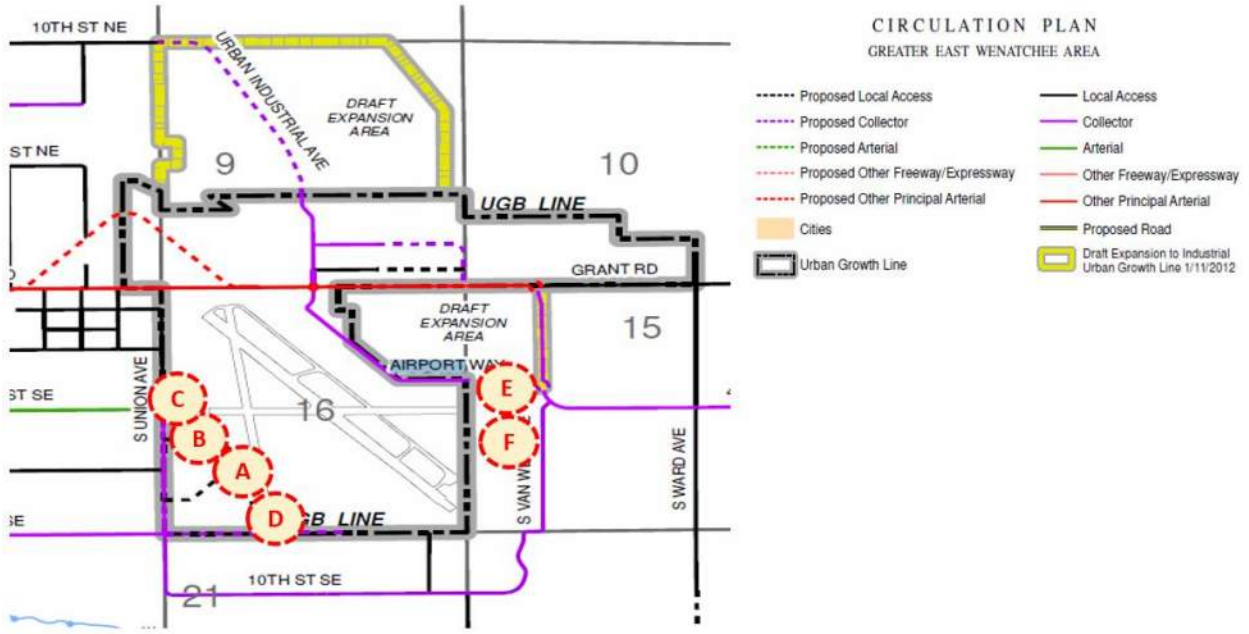
A. Improve connection between Campbell Parkway and Airport Business Park (Lots 18 and 19)
B. New access with 5th Street SE (PABP Lots 3 and 5) for recommended AOB site
C. New access with South Union Avenue for recommended AOB site
D. Improve connection between 8th Street SE and Airport Business Park (Lots 18 and 19)

Off-Airport:

E. Airport Way connection to Vanwell Avenue – north side access
(proposed to connect to future Vanwell roundabout)
F. Airport connection to Vanwell Avenue – south side access
(proposed to connect directly to Vanwell south of proposed roundabout)

Exhibit 4.32 depicts the roadway improvements. Douglas County has programmed the realignment of Vanwell Avenue south of the Runway 30 Airport property, to connect Ward Street with 10th Street SE, via 12th Street SE. The future disposition of the existing Vanwell Avenue route has not been identified. Further planning and design coordination would be required with Douglas County and affected property owners.

Exhibit 4-32: Roadway Improvement Alternatives (On and Off Airport)



Source: Mead & Hunt Figure

PREFERRED ALTERNATIVES

The alternative concepts presented in this chapter were reviewed by the Planning Advisory Committee (PAC), with the preferred concept recommended to the Airport Staff, for final Airport Sponsor approval. Airport stakeholders and the general public were provided an opportunity to the review and to provide input on the alternatives concepts. The preferred alternatives have been combined into a single airport planning concept to carry forward into the Capital Improvement Plan (CIP) and as depicted on the Airport Layout Plan (ALP) drawings.

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CHAPTER 5
Airport Implementation

CHAPTER 5 - AIRPORT IMPLEMENTATION

CHAPTER OVERVIEW

Chapter 5 identifies the recommended Airport Master Plan facilities and alternatives identified for a 20-year planning horizon at the Pangborn Memorial Airport ("Airport" or "EAT"). The Airport Capital Improvement Plan (Airport CIP) is a strategic year-by-year project development schedule for the continued maintenance, upgrade, and expansion of Airport capital facilities and equipment. The Master Plan CIP is developed in accordance with federal and state aviation grant programs and structured with respect to Airport's financial capabilities.

5.1 APPROACH

PROJECT PHASING

The Master Plan CIP projects are envisioned by the Airport to facilitate an orderly sequence of improvements. Projects are prioritized to address:

- Airport safety, efficiency, and standards
- Facility conditions and deficiencies
- Upgrade and expansion to meet user demand and level of service
- Air service initiatives

Project Costs

Project costs have been developed for each Airport CIP designated project. Costs are planning-level estimates derived from non-engineering quantity and unit-cost opinions and reflect 2017-dollar amounts. While not adjusted for inflation, each project includes contingency expenses to account for typical administrative, design, and construction fees; which is normally 10 to 15 percent of the total project cost.

FUNDING PARTICIPATION AND COMMITMENT

The Airport CIP identifies funding participation for each project, to estimate the federal, state, and local Airport funding share throughout the phased 20-year planning period. The percent of funding participation is consistent with federal and state grant-in-aid programming and procedural requirements. The focus is to identify the local Airport share necessary to undertake both FAA-eligible and non-eligible project improvements.

It should be noted that the Airport CIP is a planning recommendation and does not obligate local Airport funds nor does it represent a commitment of federal or state funding participation. In addition, Airport projects may require further federal and state programming coordination in order to satisfy project justification and environmental clearances, prior to receiving funding commitments or implementing project developments.

AIRPORT FUNDS

The Airport's financial records were reviewed to ascertain the availability of Airport funds, investments, and cash-carryovers to finance Airport Master Plan projects. The financial assessment is intended to provide a realistic timeline for securing Airport funding, in conjunction with the Airport's budget process and to coincide with federal and state CIP programming procedures. It is recognized that implementation of all recommended Master Plan projects is beyond the Airport's current financial capabilities, as longer-term projects would be implemented when demand warrants and upon available funds.

5.2 AIRPORT MASTER PLAN CAPITAL IMPROVEMENT PLANS

The Airport Master Plan CIP includes project recommendations and preferred site development alternatives envisioned by the Airport; as documented on the Airport Layout Plan (ALP). This includes projects to: 1) satisfy projected forecast and user demands, 2) facility and equipment upgrades to attain a higher level of service, and 3) protecting the Airport land use and property interests to the fullest planning extent possible. This Airport Master Plan CIP is predominately a capital-facilities plan and is not intended to capture all of the Airport's routine operating and preventative maintenance projects.

The following describes the capital plans used to plan, program, and fund the Airport Master Plan projects:

FAA Airport Capital Improvement Plan – ACIP (2019 to 2023): The FAA Airport Capital Improvement Plan (ACIP) is the programming mechanism FAA uses to identify, prioritize, and assign federal airport funds. The FAA ACIP is submitted annually for federally-eligible projects. The FAA evaluates each CIP project for eligibility, justification, cost reasonableness, priority rating, phasing, participation, and funding availability. The FAA ACIP includes five (5) projects totaling $12.6 million (see **Attachment A** for detailed project listing).

Master Plan 10-Year Development Program (2019 to 2028): The 10-year Master Plan CIP captures the projects being considered for local Airport programming, budgeting, and funding purposes. The 10-year Master Plan CIP is inclusive of the FAA ACIP, and also includes FAA non-eligible projects and other non-capital projects. The 10-year Master Plan CIP includes 48 projects totaling $67.6 million (see **Attachment B** for detailed project listing).

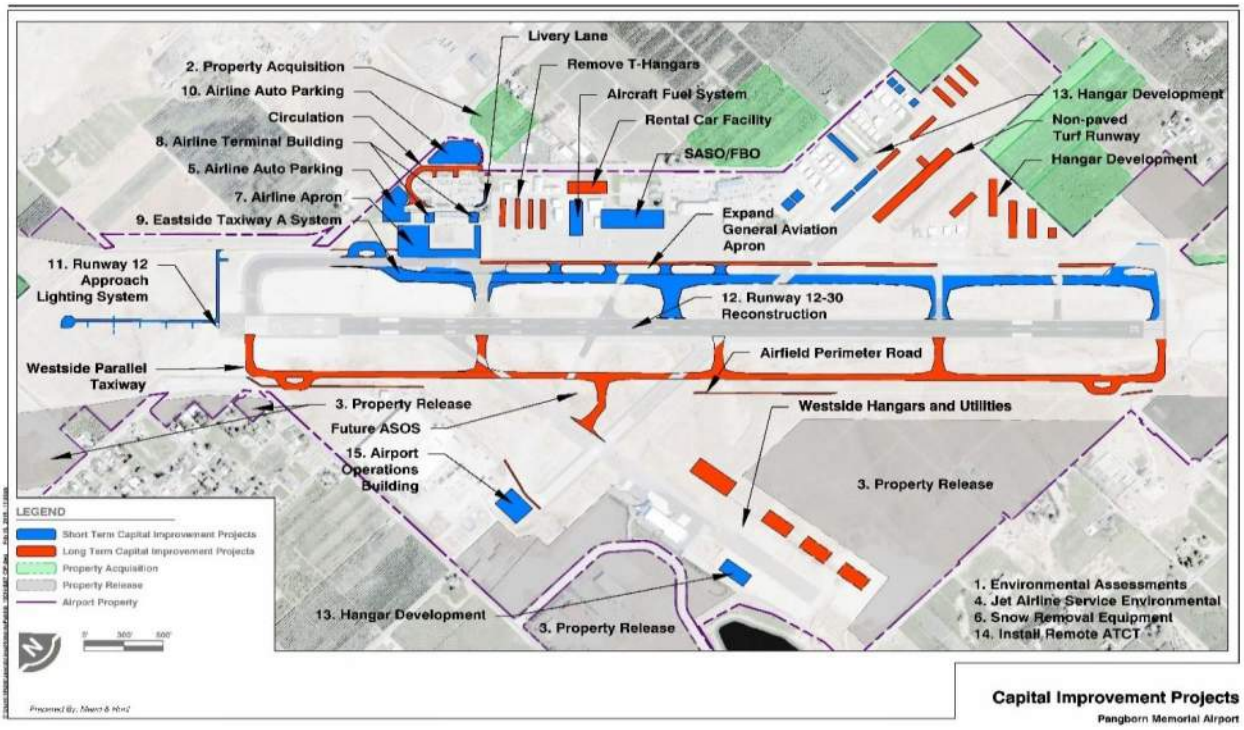
Master Plan Priority Priorities: The 10-year Master Plan CIP contains priority projects; subject to obtaining environmental clearance prior to construction or implementation. These higher-priority projects are the focus of Airport's short-term capital resources, as necessary to provide maintenance and facilities to meet forecast demand and position the Airport in providing essential infrastructure and level of service. **Exhibit 5.1** shows the general location of the priority projects. **Table 5.1** identifies the projects by implementation year and estimated total costs. The Master Plan Priority Projects include fifteen (15) projects totaling $52.7 million.

Table 5-1: Master Plan Priority Projects

Priority Project #	Priority Project - Description	Project Year	Project Cost Estimate	Project Year Cost Estimate
1	Environmental Assessment (5-Year Master Plan Projects)	2019	$440,000	$440,000
2	East Auto Parking Overflow (Property Acquisition)	2020	$800,000	$2,380,000
3	Non-Aeronautical Site Development Area(s)	2020	$250,000	
4	Jet Airline Service - Environmental	2020	$35,000	
5	Airline Auto Parking - Expand Lots and Reconfigure Access Connections	2020	$295,000	
6	SRE Equipment	2020	$1,000,000	
7	Airline Apron (Rehabilitate Pavement, Grade, Install Deicing System, Expand)	2021	$4,200,000	$4,200,000
8	Airline Terminal Building - Reconfigure/Expand	2022	$8,950,000	$8,950,000
9	Reconstruct Eastside Parallel Taxiway 'A' System at 400'	2022	$7,000,000	
	Runway 12 Edge Grading (Safety Areas and Airspace Surface)	2022	$150,000	
10	Airline Auto Parking - Expand Long-Term Lot / Reconfigure Access	2022	$3,750,000	
11	Runway 12 Property - RPZ & Approach Lights	2023	$515,000	$515,000
12	Runway 12-30 Reconstruction	2024	$14,400,000	$14,400,000
13	Executive Hangar/Building Site Development	2024	$75,000	
14	Install Remote Air Traffic Control System (Unspecified Site Installation)	2024	$1,000,000	
15	Construct New Airport Operations Building (AOB) and Vehicle Access	2025	$9,880,000	$9,880,000
1-15	**Total Project Costs**	**2019-2025**	**$52,740,000**	

Note: Project costs reflect FAA ACIP reflects FAA AIP Letter dated February 1, 2018.
Note: Cost estimates are for planning purposes; totals subject to rounding.
Note: Project design and construction may occur in separate years.
Source: Mead & Hunt CIP Analysis

Exhibit 5-1: Master Plan Priority Project Location



Source: Mead & Hunt Figure

AIRPORT CAPITAL IMPROVEMENT PLAN – AIRPORT LOCAL COST/SHARE

Grant projects are often related to enhancing airport safety, standards, capacity, security, and environmental compliance, and while typically not subject to repayment, are allowable for most airfield and terminal infrastructure improvements. For FAA-eligible projects, the Airport provides the 'local match share' of the grant amount, normally ranging between five and ten percent of the total project cost. Commercial airports typically fund the local Airport cost with accumulated operating capital surpluses, Passenger Facility Charges (PFC), and governmental transfers. For FAA non-eligible projects, the Airport typically assumes the entire project cost, which can become a significant portion of Airport's budget. Therefore, non-eligible projects are strategically scheduled in order to optimize the ability of the Airport to match FAA-eligible projects.

5.3 ENVIRONMENTAL EFFECTS (SHORT-TERM PROJECTS: 2020 TO 2025)

REGULATORY BACKGROUND

The proposed capital improvements identified during master plan development are illustrated on the Airport Layout Plan (ALP) for the Airport. The projects shown on the ALP are presented in two categories:

- Short-term projects: projects anticipated to be initiated within six years of ALP approval (2025); and
- Long-term projects: those projects initiated in 2026 and later.

ALP approval is considered a Federal action, and the Federal Aviation Administration (FAA) must provide conditional approval for each proposed facility that is shown on the ALP. The illustration of a proposed project on an ALP does not indicate that a project will be built, but that it may be constructed based on Airport needs and demands. The facilities identified on the ALP will be constructed only after the FAA provides unconditional approval. To receive unconditional approval, the FAA will conduct an aeronautical analysis to ensure that the project meets aeronautical requirements, and an environmental analysis must be conducted pursuant to the National Environmental Policy Act of 1969 (NEPA) and other applicable federal, state, and local environmental laws and regulations. Environmental compliance must occur prior to FAA's unconditional approval and federal funding (if requested). Additional environmental processing under Washington's State Environmental Policy Act (SEPA) must also occur.

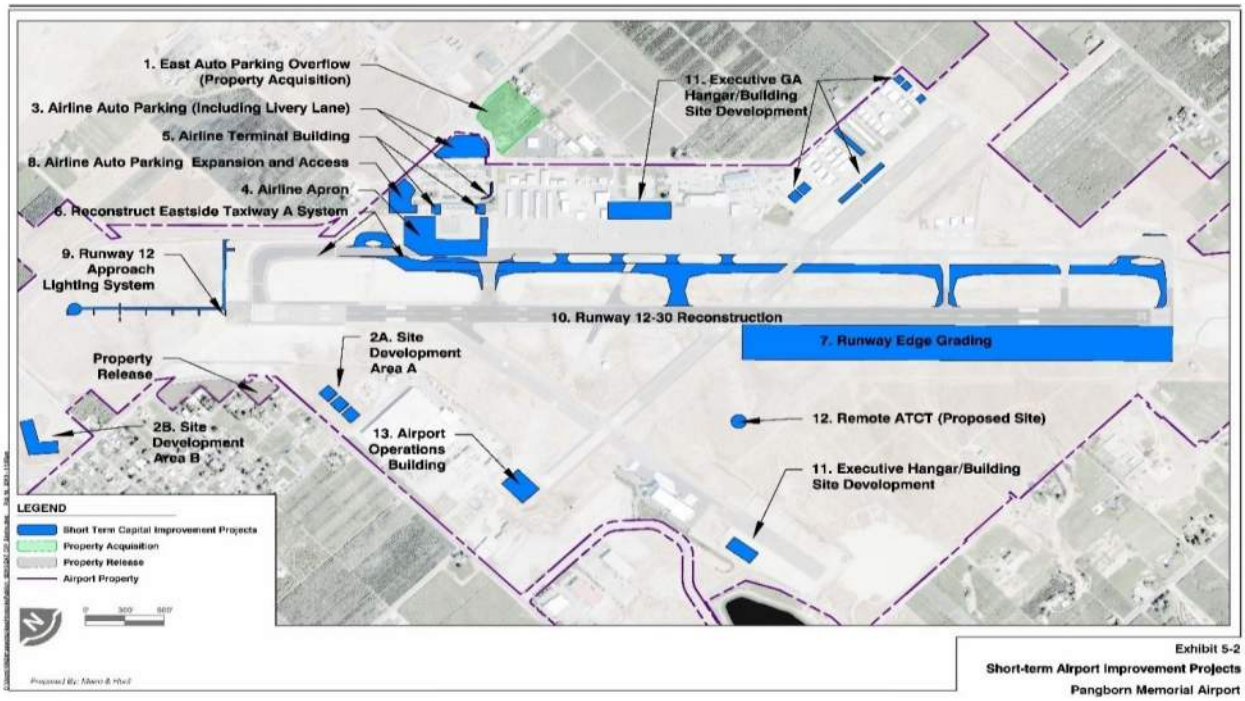
This Environmental Considerations section provides a preliminary screening of environmental resources located on or near EAT that have the potential to be affected by the development of short-term capital improvement projects. The environmental resources and conditions presented in this Environmental Considerations discussion were identified through a review of available published documents and agency databases. Note that this analysis does not preclude the need for individual NEPA evaluation for each capital improvement project, as required for FAA project approval.

PROJECTS CONSIDERED FOR PRELIMINARY ENVIRONMENTAL REVIEW

The short-term projects (2020 to 2025) that were identified in the preferred alternative are included in this preliminary environmental review. These projects were identified in the FAA Airport Capital Improvement Plan letter dated February 1, 2018, and the Airport Budget Plan spreadsheet obtained in August 2018. The recommended short-term projects have been coordinated with the Airport staff regarding implementation priority and implementation year. The projects will be addressed in the forthcoming Environmental

Assessment that will be undertaken subsequent to the Master Plan in accordance with the National Environmental Policy Act (NEPA). These recommended short-term projects are identified in **Exhibit 5.2** and **Table 5.2, Short-term Airport Improvement Projects.**

Exhibit 5-2: Short-term Airport Improvement Projects – Environmental Review



Source: Mead & Hunt Figure

Table 5-2: Short-term Airport Improvement Projects – Environmental Review

EA Project #	Project Description	Year
1	East Auto Parking Overflow (Property Acquisition)	2020
2	Non-Aeronautical Site Development Area(s)	2020
"	Site Development Area A: South Union Ave/North of CMI Building	"
"	Site Development Area B: North of Grant Road	"
3	Jet Airline Service - Environmental	2020
4	Airline Auto Parking - Expand Lots and Reconfigure Access Connections	2020
5	SRE Equipment	2020
6	Airline Apron (Rehabilitate Pavement, Grade, Install Deicing System, Expand)	2021
7	Airline Terminal Building - Reconfigure/Expand	2022
8	Reconstruct Eastside Parallel Taxiway 'A' System at 400'	2022
9	Runway 12 Edge Grading (Safety Areas and Airspace Surface)	2022
10	Airline Auto Parking - Expand Long-Term Lot / Reconfigure Access	2022
11	Runway 12 Property - RPZ & Approach Lights	2023
12	Runway 12-30 Reconstruction	2024
13	Executive Hangar/Building Site Development	2024
14	Install Remote Air Traffic Control System (Unspecified Site Installation)	2024
15	Construct New Airport Operations Building (AOB) and Vehicle Access	2025

Source: Airport Staff and FAA Coordination, December, 2018.

PRELIMINARY ENVIRONMENTAL REVIEW

The Environmental Considerations involve environmental resources/issue areas included in FAA Order 1050.1F, Environmental Impacts - Policies and Procedures[1]:

- Air Quality
- Biological Resources (Threatened and Endangered Species)
- Climate
- Coastal Resources
- Department of Transportation Act, Section 4(f)
- Farmlands
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Noise Compatible Land Use
- Socioeconomics; Environmental Justice; Children's Environmental Health and Safety Risks
- Visual Effects (Light Emissions / Visual Resources)
- Water Resources (Wetlands, Floodplains, Surface Waters, Groundwater, and Rivers)
- Coastal Resources (Not Applicable)
- Department of Transportation Section 4(f) Resources (Not Applicable)
- Floodplains (Not Applicable)
- Wild and Scenic Rivers (Not Applicable)

The sections below provide a high-level environmental evaluation of potential effects that could result from implementation of the Airport's short-term capital improvement projects.

AIR QUALITY

The Environmental Protection Agency (EPA) and Washington State Department of Ecology (WSDOE) designate the State of Washington as in attainment for each criteria pollutant under the National Ambient Air Quality Standards (NAAQS). Specifically, air quality in Douglas County, which is managed by the Washington Department of Ecology's Central Region, is in attainment for all criteria pollutants.[2] An attainment area is one in which air pollution levels do not exceed the established NAAQS.

[1] Note that two sections included in FAA Order 1050.1f are not included in the bulleted list: Irreversible and Irretrievable Commitment of Resources and Cumulative Impacts. While the preliminary environmental review does not include these categories, subsequent NEPA analyses for each capital improvement project will be required to conduct these evaluations.

[2] State of Washington, Department of Ecology. Criteria Air Pollutants, 2018. Available at: https://ecology.wa.gov/Air-Climate/Air-quality/Air-quality-targets/Air-quality-standards

Potential Effects

Construction activities associated with capital improvement projects have the potential to produce temporary increases in emissions. Additionally, several projects, such as development of non-aeronautical uses, reconfiguration of the airline terminal building, and construction of an airport operations building, have the potential to produce permanent increases emissions during facility operation (i.e., electricity usage, heating, cooling).

FAA Order 1050.1F requires Airport sponsors to evaluate potential air quality effects of project-related construction and operation. An assessment of air quality effects will be required during subsequent NEPA evaluation in order to obtain unconditional FAA approval or Federal funding.

BIOLOGICAL RESOURCES

The Endangered Species Act (ESA) requires federal agencies to examine if proposed projects may have an adverse impact on federally listed endangered or threatened species. The agency must ensure that the project is not likely to jeopardize the continued existence of a federally listed species or significantly alter or destroy key habitat for these species. Environmental laws including the Endangered Species Act, Marine Mammal Protection Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the Magnuson-Stevens Fishery Conservation and Management Act serve as guidance for the protection of biotic resources.

The shrub-steppe habitat located near the Pangborn Memorial Airport could potentially support seven species of concern: the Burrowing Owl (a state and federal species of concern), the Golden Eagle (state), Oregon Vesper Sparrow (state and federal), Merriam's shrew (state), the Sagebrush lizard (state and federal), Pallid Townsend's big-eared bat (state and federal), and the Washington ground squirrel (a state species of concern and Federal candidate species).

The lack of trees, forest, or surface water around the Airport makes most of the area unsuitable habitat for the listed species. There are no streams or fish within the project area, and no federal or state critical habitat has been designated within the airport vicinity.

Potential Effects

Native vegetation near the Airport has been severely disturbed over the past century from agricultural practices and airport operations and is of low value to most species. However, because there are threatened and endangered species that could potentially inhabit the area, the airport should conduct an evaluation to determine if the proposed near-term projects could result in potential adverse effects to listed species or their habitats. Should there be a No Effect finding, consultation with local and federal agencies is not required. If it is determined that protected species or their habitats could be affected by the airport's capital projects, consultation with the US Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife, and Washington State Department of Natural Resources will be required to identify appropriate avoidance, minimization, and mitigation measures. If the USFWS determines that the action is not likely to adversely affect listed species (e.g., the effects are beneficial, insignificant, or discountable), the USFWS will provide concurrence in writing and no further consultation is required. If the Federal agency determines that the action is likely to adversely affect listed species, then the airport must request initiation of formal consultation.

CLIMATE

The Council on Environmental Quality (CEQ) has indicated that global climate change should be considered in NEPA analyses. Increased concentrations of greenhouse gases (GHGs) in the atmosphere can affect the global climate. GHGs are defined as including carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). CEQ specifically asks agencies to consider:

- The potential effects of a proposed action on climate change as indicated by its GHG emissions; and
- The implications of climate change for the environmental effects of a proposed project.

Potential Effects

As previously discussed, under NEPA regulations, an air quality analysis will be performed to identify any potential temporary (construction) and/or permanent (operational) air quality effects that could occur as a result of the proposed short-term capital improvement projects. In conjunction with air quality analysis, a separate and distinct evaluation will be included to assess the proposed projects' potential to produce GHGs that could affect global climate. The evaluation will focus on the potential incremental change in CO2 emissions that would result from the construction and operation of proposed projects, and the potential effects of the proposed action on climate change.

FARMLANDS

The Farmland Protection Policy Act (FPPA) regulates federal actions with the potential to convert important farmland to nonagricultural uses. Project sponsors must consider potential direct and indirect impacts to farmlands. Direct impacts to farmland typically involve the conversion of farmland to non-agricultural use. As defined in FPPA, "farmland" includes prime farmland, unique farmland, and land of statewide or local importance. The NRCS online web soil survey system was used to identify Airport soil types:

- Pogue fine sandy loam (3% to 8% slopes), which are classified as "Prime farmland if irrigated;"
- Torriorthents (very steep), which are classified as "Not prime farmland;"
- Peshastin fine sandy loam, compacted substratum (3% to 8% slopes), which are classified as "Prime farmland if irrigated;" and
- Pogue loam (8% to 15% slopes), which are classified as "Farmland of unique importance."

According to the NRCS, most soils on airport property comprise Pogue fine sandy loam with 3 to 8 percent slopes, which is classified as "Prime farmland if irrigated." However, while the soil types indicate that there is prime farmland on Airport property, there is no land on airport property that is in cultivation. Further, the FPPA states that farmland does not include land already in or committed to urban development. Therefore, soils that are already located on Airport property, and have been dedicated to Airport uses, are not covered under the FPPA.

Potential Effects

Direct impacts to farmlands typically involve the conversion of farmlands to non-agricultural use. Indirect impacts include limiting or negating access to farmable land.

Although most soils within airport boundaries are classified as "Prime Farmland if Irrigated," no cultivation occurs on the airport. Further, land included within airport property is considered to be dedicated to Airport uses, and therefore is not covered under FPPA. Therefore, projects constructed within airport boundaries would not require the conversion of farmland to non-agricultural use or limit access to farmable land. However, the East Auto Parking Overflow Lot will require the acquisition of land outside of airport property. Pursuant to NEPA, to determine whether an impact would occur, the amount of farmland that would be removed from cultivation would need to be evaluated using Form AD-1006, "Farmland Conversion Impact Rating." Coordination with the NRCS would be required to determine the applicability or exemption of the proposed projects with regard to the FPPA.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, or disposal. These laws may extend to past and future landowners of properties containing these materials. Disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality and the organisms using these resources.

The WSDOE Integrated Site Information System (ISIS) Web Reporting database and the WSDOE Facility Site Identification System database were reviewed to identify records of potential hazardous waste sites located within the vicinity of Pangborn Memorial Airport and proposed project areas. These inquiries included state cleanup sites, federal superfund sites, hazardous waste generators, solid waste facilities, underground storage tanks (USTs), dairies, and necessary regulatory enforcement measures. The WSDOE Facility Site Identification system identified 12 records for known sites or permits issued in association with past or existing hazardous materials. Note that these sites can include such sites as fuel storage or excavation areas, and some of the sites have closed or undergone mitigation/remediation. No National Priority List (NPL) or "Superfund" sites were identified in Douglas County.

Potential Effects

Proposed short-term projects that use, transport, store or dispose of hazardous waste are required to follow strict monitoring procedures set forth by WSDOE to prevent the unregulated release of contaminants. Potential hazardous material generated during demolition and construction (i.e., pavement debris, petroleum products, fuel used by construction equipment) will be disposed of in accordance with Federal and State Standards, and the City will develop a Spill Prevention Control and Countermeasures Plan (SPCC) that can be used during project development.

Some of the projects, such as the reconfigured airline terminal building, new executive hangars, and new airport operations building, have the potential to generate new waste streams during facility operation. The Greater Wenatchee Regional Landfill and Recycling Center is located 2.5 miles east of the Airport. The sponsor must consider whether nearby solid waste facilities have the capacity to accept project-related construction and demolition debris and waste generated during project construction and operation.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Historical, architectural, archaeological, and cultural resources encompass a range of sites, properties, and physical resources associated with human activities, society, and cultural institutions. Section 106 of the National Historic Preservation Act (NHPA) stipulates that project sponsors requiring the use of federal funds or approvals must consider how their proposed projects could affect historic properties and resources.

A cultural resource report completed in 2011 inventoried 12 buildings on airport property and determined that none were eligible for inclusion to the National Register of Historic Places (NRHP). Additionally, the report determined that there were no known Native American Cultural sites on Airport. Due to the passage of time and change in conditions, this determination is no longer valid. Therefore, the NEPA analysis performed in support of short-term capital improvement projects will require an updated evaluation of cultural resources.

Potential Effects

While past cultural assessments have determined that no eligible cultural resources are located within the vicinity of the Airport, environmental review for the capital projects will require an updated cultural resource evaluation and Section 106 consultation with the appropriate state and tribal agencies.

Additional studies to be conducted include:

- A survey and analysis will be undertaken to identify potential historical resources on or near the Airport. Potential resources, including structures that are currently 50 years old, or will become 50 years old during the planning horizon, must be evaluated to determine whether they are eligible for the NRHP inclusion. The FAA will be responsible for performing government-to-government Section 106 consultation with the State Historic Preservation Officer (SHPO).
- For those projects that include ground disturbance, a cultural and archaeological resources investigation will be undertaken to identify the presence and extent of potential culturally significant resources that could be affected. The FAA is responsible for performing government-to-government Section 106 consultation with SHPO.
- Outreach will be conducted with federally recognized Native American tribes to identify the presence of traditional cultural properties or Native American sacred sites that could be affected by proposed capital improvement projects. The FAA will be responsible for performing government-to-government consultation with the Tribal Historic Preservation Officer (THPO) or another designated tribal representative.

Before historic and cultural studies are undertaken, the FAA is responsible for defining an Area of Potential Effect (APE), which is “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. The APE must include all direct and reasonably foreseeable indirect effects associated with a proposed project. Identifying the APE is the first step in initiating consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA), and the APE serves as the basis for consultation with the State Historic Preservation Officer (SHPO) and for Government-to-Government consultation with federally recognized Native American Tribes.

LAND USE

The compatibility of existing and planned land uses in the airport vicinity is usually associated with the extent of the airport’s noise impacts. Local land use plans should be consistent with airport operations and likewise, airport operations should be consistent with a local land use plans to the extent possible.

The 700-acre Airport is located within an unincorporated area governed by the Douglas County Board of County Commissioners, 2 miles east of the East Wenatchee city limits and one mile east of the East Wenatchee Urban Growth Area (UGA) boundary. The Airport vicinity is composed mostly of large-parcel agricultural land uses, with residential subdivision to the northwest, sparse large-lot residential to the south, and commerce centers to the north and northeast.

Land to the east, south and west adjacent to the airport is zoned as Commercial Agricultural 10 and Commercial Agricultural 5 (west). Land to the north of airport is zoned Dryland Agricultural. No land is zoned for Planned Residential Development adjacent to the airport or within one mile north, east, or south of the airport. Douglas County established an Airport Overlay District (AP-O Zoning District) to protect the viability of the Airport as a significant resource to the community by encouraging compatible land uses, densities, and reducing hazards that may endanger the lives and property of the public and aviation users. The ordinance prescribes development standards and site planning requirements per boundary of the AP-O district.

Potential Effects

The airport property is designated by the County and the East Wenatchee UGA zoning codes for General Industrial (I-G) use. All proposed projects located within airport boundaries and the proposed East Auto Parking Overflow Area would be consistent with these zoning codes and the AP-O District. Should proposed short-term projects result in an increase in commuter access to and from the airport, potential indirect effects on adjacent land uses will require analysis. Proposed near--term projects will not affect aircraft operations.

NATURAL RESOURCES AND ENERGY SUPPLY

CEQ Regulations require that Federal agencies consider energy requirements, natural depletable resource requirements, and the conservation potential of alternatives and mitigation measures. While limited Federal guidance exists to guide evaluation of natural resource and energy impacts, the guidance encourages maximizing energy efficiency and minimizing natural resource consumption.

Energy requirements associated with short-term proposed capital improvements generally fall into two categories: 1) changed demand for stationary facilities (e.g. building heating or lighting) and 2) those that involve the movement of air and ground vehicles, altering fuel consumption.

Electric power is supplied by the Douglas County Public Utility District (PUD), which owns and operates the Wells Hydroelectric Project. Natural gas is provided by Cascade Natural Gas and water is provided by East Wenatchee Water District. The airport has one 20,000 gallon take for Jet-A fuel and two 10,000-gallon tanks for 100LL Avgas. Note that the FBO also stores and sells Jet-A fuel.

Potential Effects

During construction, proposed projects will require the use of natural resources such as water, gravel, and asphalt, none of which are in short supply. In addition, construction activities will require the use of gasoline or diesel fuel to power construction equipment, and such fuels are readily available.

Several of the projects, such as expansion of the airline terminal building and construction of an airport operations building, will result in increased consumption of energy and other natural resource during operation of the facilities. The NEPA analysis undertaken to evaluate the environmental effects of proposed short-term projects will need to consider potential changes in the use of energy and natural resources.

NOISE AND NOISE COMPATIBLE LAND USE

The FAA has adopted guidelines for evaluating the compatibility of various land uses with various noise levels resulting from aircraft (FAA Order 1050.1F). In accordance with FAA guidance, excessive aircraft noise exposure is considered to be exposure at or above 65 A-weighted decibels (dB) measured using the Day-Night Average Sound Level (DNL). The DNL metric represents the average sound level, in decibels, for the 24-hour period from midnight to midnight as weighted to reflect additional annoyance for sounds generated between 10 p.m. and 7 a.m. A significant noise impact would occur if analysis shows that a proposed action would cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to a No Action Alternative for the same timeframe. Existing and future noise contours show that most of the 65 DNL contour overlies airport property. Also included in the 65 DNL contour are industrial, agricultural and residential land uses off airport property.

Potential Effects

While most of the short-term capital improvement projects would not result in changes to aircraft noise levels, construction activities associated with development projects could result in temporary increases in noise levels.

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics.

The potential effects of proposed airport projects can extend to nearby neighborhoods and communities to cause direct or indirect socioeconomic impacts. The principal social impacts that should be considered during project analyses include those associated with relocation or other community disruption, transportation, planned development, and employment. In some cases, the effects of proposed projects can extend beyond current Airport boundaries to cause the relocation of residents or businesses, disrupt an established community, affect transportation patterns, or conflict with off-site development plans or land uses. Project implementation may also affect employment by creating temporary or permanent jobs associated with Airport development or by relocating jobs to another location.

Potential Effects

All proposed projects, with the exception of the East Auto Parking Overflow Lot, will occur within airport boundaries. As such, these projects will not result in the relocation of residents or businesses or conflict with off-site development land and land uses.

Project construction could potentially result in temporary effects to residents and businesses near the airport. Potential temporary construction effects could include noise, dust or light emissions from construction activities, or could be associated with changes to surface traffic. The proposed East Auto Parking Overflow lot and development of non-aeronautical uses (Areas A and B) have the potential to

influence surface traffic on roads adjacent to the airport. Proposed short-term projects will be evaluated in a subsequent NEPA evaluation to identify its potential to create temporary or permanent socioeconomic effects.

Children's Environmental Health and Safety Risks.

NEPA requires project sponsors and federal agencies to consider environmental health risks and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Children's Health and Safety Risks are generally risks that would be attributable to products or substances children are likely to encounter or ingest through air, food, drinking water, recreational waters, soil, or other projects that children might use or to which they might be exposed.

Potential Effects

There are no schools, churches, hospitals, or assisted living facilities present within 1-mile of the Airport. However, there are existing residential uses nearby. Subsequent environmental studies will be performed pursuant to NEPA regulations to identify potential project-related effects to air quality, noise, and other environmental resources, and the results of these analyses will be used to determine whether any project-related environmental impacts have the potential to cause direct and/or indirect effects to children.

Environmental Justice.

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

The Greater Wenatchee Valley, including the City of East Wenatchee, City of Wenatchee, Douglas County, and Chelan County, is the primary service area for Pangborn Memorial Airport. Statistics related to income and race for the four jurisdictions in the Greater Wenatchee Valley were found using the 2012-2016 American Community Surveys available from the U.S. Census Bureau. Income information is not available for the census block or census tract levels. Table 5-3 provides a comparison of the demographics within the Greater Wenatchee Valley.

Table 5-3: Demographics Within Greater Wenatchee Valley

Local Jurisdictions	Estimated Household Income		% of People Estimated Below Poverty Level	% Minority*
	Median	Mean		
City of East Wenatchee	$60,034	$77,193	13.5%	34.8%
Douglas County	$59,163	$69,575	13.4%	34.7%
City of Wenatchee	$45,606	$64,262	13.5%	37.4%
Chelan County	$51,845	$67,915	12.6%	31.2%

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates, Selected Economic Characteristics

***** Percent minority calculated using US Census data for Race: *White alone, not Hispanic or Latino, percent.*

Potential Effects

An environmental justice impact would occur if a minority or low-income population faced disproportionate adverse environmental effects from a federally funded or supported project. Census data for the City of

East Wenatchee and Douglas County do not indicate the presence of low-income populations. However, if potential environmental impacts are identified in association with proposed short-term projects, the County will perform further analysis at the census block level to determine whether project-related impacts have the potential disproportionately affect minority or low-income populations.

VISUAL EFFECTS (LIGHT EMISSIONS / VISUAL RESOURCES)

Light emissions include any light that originates from a light source into the surrounding environment. Airport light emissions include airfield and apron floodlighting, navigational aids, Airport structures and parking facilities, and roadway lighting. Lighting during construction activities could result in temporary light emissions. Visual effects refer to the extent to which a project would emit light that creates annoyance or interferes with other activities, contrasts with or detracts from visual resources, or affects the visual character of the existing environment.

Per NEPA regulations, proposed master plan projects will require evaluation of potential impacts on visual resources associated with new structures, roadways, and/or aviation facilities.

Potential Effects

New structures such as the new airport operations building, reconfigured terminal building or other above ground structures will require evaluation for potential impact on visual resources. The visual character of the airport, along with its proposed improvements, is anticipated to be compatible with current land use plans and zoning and is not expected to result in visual intrusion impacts to any historic properties.

Consultation with the local agencies including Douglas County and the City of East Wenatchee may be initiated confirm conclusions regarding light emissions or visual impacts.

WATER RESOURCES (WETLANDS, SURFACE WATERS, AND GROUNDWATER)

Wetlands. Wetlands are protected under the Clean Water Act, Section 404, which requires a project applicant to obtain a permit from the U.S. Army Corp of Engineers or authorized state for the discharge of dredged or fill material into waters of the United States. Executive Order 11990 directs Federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

Three freshwater ponds are located near the project airport: One pond is 0.12 mile to the north, and another is 0.37 mile to the north. Both are designated as palustrine unconsolidated bottom wetlands. The third is an irrigation reservoir located 720 feet south of the Executive Flight Building, but it is not a jurisdictional wetland.

Surface water. Surface water occurs above ground and include rivers, streams, ponds or lakes. The Columbia River, located approximately one mile south of the Airport, receives protection as a Water of the U.S. An intermittent stream is located on the east side of the eastern property boundary that terminates prior to reaching the Wenatchee Reclamation District's canal at an elevation of about 800 feet. The headwaters of another intermittent stream are located in a ravine in the southern portion of the airfield that terminates approximately 0.5 mile south of the southern property boundary. Several other small rills and channels begin in the southern portion of the airport and continue off Airport property. Two outfalls exist off the west side of the airfield, extending onto the neighboring CMI site, which is on the same parcel as the

airfield. Stormwater from outfalls in the southwest ravine system flows toward the Airport's southern property boundary.

A Stormwater Inventory Report prepared in conjunction with this Master Plan identifies existing stormwater management facilities at EAT including catch basins and manholes that channel stormwater to the ravine system in the south and toward South Union Avenue in the west, and numerous dry wells, French drains, and other infiltration devices in the terminal hangar, aircraft parking, and parking lot areas. The Stormwater Management Inventory Report identified recommended improvements to address increased runoff and water quality associated with proposed master plan development.

Groundwater. Groundwater is subsurface water that occupies the space between sand, clay and rock formations. Aquifers are the geologic layers that store or transmit groundwater to wells, springs and other water sources. The Safe Drinking Water Act and its implementing regulations (40 CFR parts 141-149) prohibit Federal agencies from funding actions that would contaminate an EPA-designated sole source aquifer or its recharge area. State and local agencies may also promulgate regulations to protect sole source aquifers and their recharge areas. The Eastbank Aquifer is located approximately 10 miles north of the City of Wenatchee in Douglas County. It is the primary source of drinking water for the area. Aquifers such as the Eastbank function as a natural filter and underground storage for water. The Eastbank Aquifer is continuously re-charged by the Columbia River. The City of Wenatchee's Regional System also includes two backup wells in Wenatchee and three backup wells in East Wenatchee.

Potential Effects

Proposed short-term capital improvement projects are unlikely to result in impacts to wetlands, as none are located at the airport. However, surface water and groundwater could potentially be affected by proposed projects.

All proposed short-term projects have the potential to create temporary stormwater management and water quality impacts during construction and permanent water quality impacts associated with the creation of additional impervious surfaces and stormwater runoff associated with new vehicle parking areas, additional apron areas, and new structures.

To prevent potential water quality impacts, grading plans and storm water design will be developed to follow FAA standards for airfield construction and the WSDOE Stormwater Management Manual for Eastern Washington. A National Pollutant Discharge Elimination System (NPDES) Construction Storm Water General Permit from WSDOE will be required for construction activities disturbing one acre or more. The Construction Storm Water General Permit requires the SWPPP be developed and that sediment, erosion, and pollution prevention control measures be implemented. Water quality impacts from construction would be minimized with the use of Best Management Practices (BMPs) identified in the Storm Water Management Manual for Eastern Washington.

ENVIRONMENTAL RESOURCES – NOT APPLICABLE (NA)

The four resources identified below are not present in the Airport vicinity. Therefore, these resources would not be affected by proposed Airport capital improvement projects:

Coastal Resources: The nearest coastline is more than 50 miles from the Airport. Therefore, no impacts to coastal resources would occur as a result of Airport capital improvement projects.

Department of Transportation Section 4(f) Resources: Section 4(f) resources include public parks, recreational areas, wildlife or waterfowl refuges, and historic sites. The nearest Section 4(f) property to the Airport is Kenroy Park, located approximately four miles west of Airport property. The nearest National Register of Historic Places site is the Rock Island Railroad Bridge located 2.6 miles southwest of the airfield. No wildlife or waterfowl refuges are located in the Airport vicinity.

No known Section 4(f) resources are present that could be affected by proposed short-term projects. However, should the results of a cultural survey and consultation identify the presence of a historic property that could be impacted, the potential impact would require consideration through a Section 4(f) evaluation.

Floodplains: FEMA Flood Insurance Rate Maps (FIRM) indicate that the Airport is not within the 100-year flood zone (Zone A). The Airport is located in flood zone B, which identifies areas between the limits of the 100-year flood and 500-year flood zone.

Wild and Scenic Rivers: According to a listing of Wild and Scenic Rivers compiled and managed by the USACE, the BLM, the National Park Service, the U.S. Forest Service, and the USFWS, there are no wild and scenic rivers located within the vicinity of the Airport. The nearest wild and scenic river segment is the Middle Fork of the Snoqualmie River, which is approximately 50 miles east of the Airport.

5.4 AIRPORT GRANT-IN-AID FUNDING PROGRAMS

The following section describes the traditional federal and state airport-in-aid funding programs administered by the FAA and WSDOT. **Table 5.4** lists the funding categories and typical participation available to the Airport as a FAA Non-Hub Primary funding classification. As a primary commercial service facility, most projects are FAA-eligible, and will be funded from federal grant-in-aid programs (FAA entitlement and discretionary), with the Airport matching participation typically at five to ten percent.

Table 5-4: Airport Funding Programs and Participation

Grant Program / Funding Category	Federal (FAA) Participation	State (WSDOT) Participation	Airport (EAT) Participation
FEDERAL FUNDING PROGRAMS (FEDERAL AVIATION ADMINISTRATION - FAA)			
FAA Passenger Entitlement	$1 Million Annually	-	-
FAA 'Pure' Discretionary	90%	5% (See Note)	5% to 10%
FAA State Apportionment	90%	5% (See Note)	5% to 10%
FAA Small Airport Fund	90%	5% (See Note)	5% to 10%
STATE OF WASHINGTON AIRORT FUNDING PROGRAMS (WSDOT)			
WSDOT Airport Aid Program (Pavement Projects)	-	95%	5%
WSDOT Airport Aid Grant Program (Safety Projects)	-	95%	5%
WSDOT Airport Aid Program (Security and Planning Projects)	-	95%	5%
WSDOT Airport Aid Program	100% Airport Low Interest Loan Through State of Washington		

Note: Funding programs and participation levels subject to FAA/WSDOT budget reauthorization.
Note: WSDOT funding participation and levels per WSDOT program and project discretion.
Source: Mead & Hunt CIP Analysis

FAA FUNDING PROGRAMS AND GUIDANCE

The federal government has funded civilian airport development since 1946. The FAA currently funds airport improvements through a dedicated Aviation Trust Fund, collected from user-generated fees and taxes (airline passenger tax, aircraft parts, and fuel). The Trust funds are reinvested at FAA-eligible airports through the Airport Improvement Program (AIP); the current FAA Airport Improvement Program is authorized under the *Airport and Airway Improvement Act of 1982*, administered in accordance with FAA Order 5100.38, "Airport Improvement Program Handbook". Although subject to congressional authorizations, the FAA AIP program and funding levels are not anticipated to change significantly throughout the 20-year Airport CIP period.

The FAA funding sources available to support airport capital improvements are:

FAA Entitlement: Commercial service airports enplaning more than 10,000 annual passengers are classified as primary and receive FAA entitlement funds. Per FAA formula, the Airport is allocated $1.0 million annually in passenger entitlement funds. These funds can be committed to AIP-eligible projects with FAA approval, and can be accumulated up to four years. Projects funded with entitlement grants typically receive 90 percent FAA participation and 10 percent Airport (local) participation.

FAA Discretionary: FAA discretionary dollars are the remaining funds not assigned to FAA entitlements or mandated by FAA set-asides. Typical projects funded with discretionary money are: airport capacity, safety and security, noise related or those identified as FAA national priority projects. Subject to FAA formula, discretionary balances and available funds are uncertain from year-to-year. Discretionary funds commonly provide grants for large capital projects (airfield pavement rehabilitation and land acquisition), and support 80 to 95 percent of the total eligible project cost. Discretionary funding levels are typically identified in the FAA ACIP three to five years in advance of the project, in which the Airport must commence the project within 6 months of the fiscal-year grant agreement.

FAA Apportionment: FAA apportionment funds are distributed amongst individual states based on an area/population formula and national funding considerations. The use of apportionments for funding individual airport project grants is at the discretion of the FAA, and varies based on funding formula and balances.

FAA PROJECT PRIORITIES

The demand for FAA AIP funds exceeds the availability; an FAA National Priority Rating system is used to calculate the apportionment and distribution of AIP grant funds for specific airport projects. This formula system, which is occasionally adjusted to reflect national priorities, takes into consideration the airport type and project role. The following are the FAA AIP funding categories and point system:

1) Safety/Security = 10 points
2) Statutory Emphasis Programs = 9 points
3) Planning = 8 points
4) Reconstruction = 8 points
5) Environment = 8 points
6) Capacity = 7 points
7) Standards = 6 points
8) Other = 4 points

Passenger Facility Charges (PFC): The Airport collects a $4.50 Passenger Facility Charge (PFC) per enplaned (boarding) passenger. The Airport's existing PFC authorization is approved by the FAA through July, 2019. The Airport collects $240,000 annually in PFC revenues, after accounting for airline administrative fees. Based on the 20-year passenger enplanement forecasts, the Airport would collect between $250,000 to $300,000 annually in PFC revenues at the current $4.50 passenger rate and accounting for airline fees. The PFC revenues must be used for specific, pre-approved capital projects. There are two types of projects eligible for PFC funding: (1) a project that meets FAA requirements and (2) the recovery of an airport sponsor share of prior AIP projects. Similar to other FAA funding programs, PFC funds are limited to FAA eligible projects, and can be used to match participation with FAA and WSDOT grants. The PFC is expected to continue throughout the 20-year development plan period and remain an important aspect of funding major airport capital projects.

STATE OF WASHINGTON (WSDOT) FUNDING PROGRAMS AND GUIDANCE

The Washington State Department of Transportation (WSDOT) administers an Airport Aid Grant Program for airports within the State of Washington. The program is funded by a per-gallon aviation fuel fee and aircraft registrations. Projects are required to be identified in the WSDOT Aviation's five-year Statewide Capital Improvement Program (SCIP), including projects not funded or eligible under the FAA. The program distributes funds to three major project categories: 1) pavement projects, 2) safety projects, and 3) maintenance, security and planning projects, in which projects must be accessible by the public and depicted on the Airport Layout Plan (ALP). The maximum WSDOT grant amount is $250,000 per project, in which WSDOT may fund up to 95 percent, with a minimum 5 percent local Airport participation. In addition, WSDOT may participate in matching the local share of FAA AIP projects, where WSDOT contributes up to half of the 10 percent match of the total FAA funded project.

5.5 AIRPORT FUNDING

The Airport is jointly owned by the Port of Chelan County and the Port of Douglas County. The Airport's assets total nearly $45 million. The Ports operate and manage the Airport under a Joint Operating Agreement (JOA) which stipulates the Port's fiscal agreement and financial contributions for the Airport. As combined for maintenance operations and capital budget, the Port of Chelan County contributes 70 percent and the Port of Douglas County 30 percent. As a federally-obligated public facility, Airport fiscal duties must be conducted in accordance with federal and state grant assurances, along with other local and state business practices.

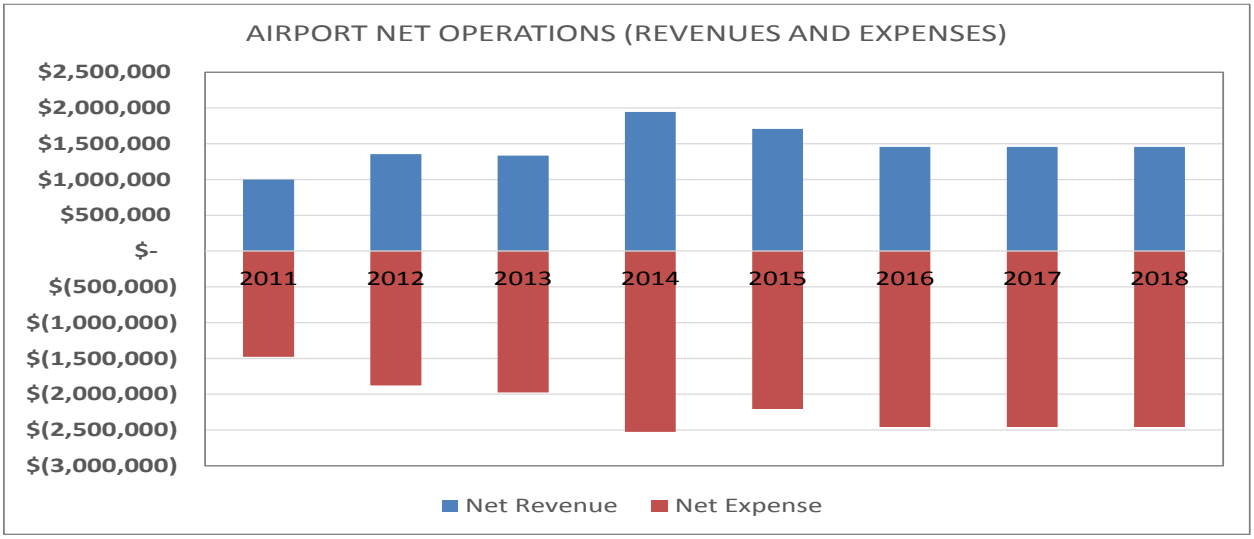
AIRPORT FINANCIAL POSITION

Airport financial statements and audit reports were reviewed to identify budget trends, income patterns, and major operating revenue and expense influences. **Exhibit 5.2** depicts the Airport operating revenue and expenses from fiscal year 2011 to 2018 (excluding grants and asset depreciation). From 2011 to 2018, annual Airport operating revenues averaged $1.5 million annually and total operating expenses averaged $2.1 million, with a net loss operating deficit averaging $630,000 per year.

The Airport maintains a minimum $20,000 in cash reserves. In recent years, the Airport has experienced a net deficit cash-flow carryover, for both operating and capital funds. Due to evolving Airport financial factors and Port contribution levels, no cash-flow or carryover amounts were projected for the Airport CIP. For the same reason, funding option scenarios have not been developed to model various demand or growth scenarios.

While the Airport's operating budget is relatively stable, financial cash-flow tends to vary from year-to-year. Airport financial situations can fluctuate, significantly, over short spans due to changes in tenants, user activity, compensations, unforeseen regulatory requirements, emergency repairs, and unanticipated maintenance/construction costs. These unexpected expenses could potentially postpone Airport CIP projects.

Exhibit 5-3: Airport Operating Revenue and Expenses Summary (2011 to 2018)



Source: Airport Financial Records

AIRPORT OPERATING REVENUE AND EXPENSE CENTERS

The Airport's operating revenues and expenses are relatively consistent. The financial resources regularly available for the Airport include revenue generated from aeronautical uses (tenant fees, fuel sales, terminal building rent, hangar/building rent) and non-aeronautical sources (industrial park, non-aviation rents and farming). Airport operating revenues are predominantly generated through rents, fuel services, and user fees, which in turn, are the principle sources of Airport funds used to finance project improvements.

Airport Operating Revenue Categories:

- Rent: Terminal Space-Concessions / Automobile Parking
- Rent: Land Leases
- Rent: Non-Aviation Land Leases
- Fuel Service
- Aircraft Landing Fees
- Aviation Fuel Flowage Fees
- Security Badge Income
- Miscellaneous Fees, Permits and Reimbursements

Airport Non-Operating Revenue Categories:

- Operating Grants
- Passenger Facility Income
- Advertising Income
- Port Bond Debt Issues
- Port Tax Levy Revenues
- Other Contributions and Investments

Approximately 38 percent of the Airport operating revenue is generated by airfield and terminal operations, 10 percent by non-aviation and industrial park/agricultural revenues, 16 percent by general aviation revenues and 36 percent by fuel revenues. Airport rents (aviation and non-aviation leases) account for nearly 50 percent of the Airport operating revenues. Airport operating expenses are predominately dedicated to salaries, benefits, taxes and fuel operations.

Airport rental revenues are anticipated to increase marginally over the 20-year planning period, most likely in proportion with Airport fee increases and land valuations, along with additional rental revenues from expanded or new on-Airport tenant developments. Property values and land absorption in the Airport vicinity are trending upwards. Therefore, the Airport's ground lease rates would also be expected to increase proportionally, as reflective of market conditions and economic rate-index adjustments.

AIRPORT DEBT

The Airport has long-term annual debt payments to the East Wenatchee Water District for a Utility Local Improvement District (ULID) and to Angeline B. Schall for the purchase of real estate. The ULID notes are scheduled to mature in August of 2020 and the note for the real estate purchase matures in November 2018.

AIRPORT RATE AND LEASE STRUCTURE

The Airport has a standard 'Ground Lease Agreement' in which rent is based on net, with the tenant solely responsible for all utility costs. The Airport's rates and charges guidelines extends through 2018, in which rates generally increases up to 3 percent annually.

Airport rates and charges are established per Airport resolution, assessed for the following Airport revenue categories:

- Landing Fees
- Aircraft Hangars
- Aircraft Tie-Downs
- Aeronautical Ground Leases
- Non-Aeronautical Ground Leases
- Vehicle Parking – Terminal
- Rental Income
  Note: Leasehold tax is 12.84%

It is incumbent on the Airport to provide reasonable and competitive rates and charges for achieving budget self-sufficiency. As part of this, the Airport would also need to assess land capitalization and business investment benefits for tenant facilities, services, or lease improvements; including prospective tenants. However, for Airport CIP purposes, reliance on short-term rate increases and land income to generate revenues to offset or substantially close-the-gap on net Airport operating income is not anticipated.

5.6 AIRPORT CIP REVENUE AND FUNDING SOURCES

As described below, the Airport explores alternate private investment and public funding sources. Although not reflected in the Airport CIP, other funding sources may be desirable for select projects in the absence of federal, state, and local funds. New sources of Airport revenues, fees, and dedicated charges may be available in the future as a means to generate additional Airport income.

AIRPORT FUTURE REVENUE SOURCES

The following are recommendations for future Airport revenue enhancements:

Airport Tenant Facilities: The Airport continually seeks tenants to utilize facilities. The Airport has few diversified structures available for immediate lease. In the future, tenants may become increasingly responsible for financing construction of new buildings and hangars. Pre-paid rent compensation is an option to incentivize new construction but foregoes Airport revenue income.

Airport Land Development: Based on the 20-year forecasted demand, Airport site development and land acquisition is planned in order to expand, develop, and re-develop tenant sites (hangars, buildings, etc.) for a mix of aviation enterprises and non-aeronautical businesses. As identified by the Airport CIP, new site developments may necessitate significant infrastructure and capital improvements; including grading, roadway, utilities, pavements, structures, and security features.

The timing of new site improvements is contingent and speculative, as construction hinges on offering suitable area, attractive facilities, competitive occupancy rates, and the ability to economically incentivize investments based on market conditions. Consequently, the largest gains in future Airport revenues would likely be attributed to future building/ground lease incomes.

Rental Car Facility Charges (CFC): The CRF is commonly assessed at commercial service airports per individual rental car user contract. Airport auto parking, rental car, and hangar facility developments would most likely benefit the most from new and innovative Airport funding.

PRIVATE FUNDING SOURCES

The following private money sources, typically used for revenue-generated projects, could be available to the Airport for funding smaller capital improvements:

- Intergovernmental transfers
- Special grant programs
- Private financing/tenant leasing arrangements
- Bank lending/borrowing (not a preferred Airport funding source)

Borrowing may occur, but ultimately it must be repaid with Airport operating earnings. It is important to recognize that private businesses are the principal Airport users, and per agreements, the key contributors of Airport revenue. As such, certain Airport projects and improvements identified in the Airport CIP could potentially be funded wholly or in-part with private partnerships, including:

- Aircraft hangars
- Tenant buildings
- On-Airport development
- Tenant auto parking improvements

PUBLIC FUNDING SOURCES

The following public money sources, typically used for capital and infrastructure projects, could be available to the Airport for funding larger capital improvements:

- Port Bonding
- Port Taxation

Although not contemplated as part of the Airport Master Plan, a restructuring of Airport governance or sponsorship in the future may provide expanded opportunities or new sources of public-entity funding. However, future reliance on taxpayer-based revenues is not anticipated as part of developing the Airport CIP.

Economic Development Funds/Grants

The use of economic development funding or tenant investments are common examples of third-party funding for non-eligible federal and state project costs. Economic development funds, although feasible for Airport landside projects, are somewhat difficult to predict as a reliable source of funding.

5.7 FUTURE PROJECT DEVELOPMENT AND CIP CONSIDERATIONS

Federally-obligated airports operate under increasingly complex project implementation and grant-in-aid funding procedural requirements. The competition for federal and state funds place an emphasis on the Airport Master Plan as a means to reasonably commit towards the project improvement schedule, in terms of project justification, costs, funding sources, and matching participation. It should be noted that the Airport Master Plan represents the development views of the Airport Sponsor and does not commit or obligate financial support to the recommended Airport projects, even if identified in the Airport CIP or depicted on the Airport Layout Plan (ALP) drawings.

FUNDING COORDINATION

Regular coordination with the FAA and WSDOT is important to facilitate project formulation and arrange funding in a timely manner. Projects also need to be scheduled and coordinated in a manner which does not unnecessarily burden or prevent Airport operations. All Airport projects should be re-assessed and updated annually, including necessary adjustments in project sequencing, multi-year phasing considerations, cost opinions, enabling requirements, and funding participation.

It is important to develop a well-planned and executable Airport CIP, as constant project changes are difficult for the FAA to make short-term program or funding adjustments. FAA programmed projects cannot be traded out for other projects. FAA grants are only issued on bids or negotiated fees. In addition, the FAA can only commit funds to a multiyear grant for years within the current program authorization. These are critical considerations, particularly if pursuing large FAA discretionary funding amounts. As part of the CIP development, the Airport should also coordinate with the FAA regarding environmental efforts, funding cost/benefit, and other project justification requirements. As part of this, the Airport must assure timely coordination and completion of applicable FAA pre-construction efforts, including environmental processing, Airport Layout Plan, and Exhibit 'A' Property Map.

AIRPORT CIP STRATEGY

The Airport Master Plan has comprehensively assessed Airport project needs throughout the 20-year planning period. It is recognized the project improvements are beyond the Airport's current financial capabilities. However, each project supports a justifiable recommendation as identified by the Airport Master Plan Advisory Committee (PAC) and Airport Sponsor.

Projects also must satisfy Federal Aviation Administration (FAA) standards. For this reason, each project recommendation has been included as part of the Master Plan Capital Improvement Plan (CIP) and depicted on the Airport Layout Plan (ALP) drawings. This provides the Airport reasonable flexibility in accommodating planned or other strategic improvements as demand warrants and the financial resources become available.

The following are advantages based on these considerations:

- Airport Master Plan projects must be depicted on the ALP in order to be considered for FAA funding. A project absent of being identified on the ALP would have to go through extenuating FAA procedures, and risk not being implemented or funded. The Airport cannot risk this circumstance, especially with scheduled commercial air cargo and airline passenger service.
- A full assessment of Airport project improvements and site development considerations ensures that the Airport is being developed in a strategic, sequential, and orderly manner. Thereby, planned projects can occur and be implemented without the Airport second-guessing the long-term implications, or wondering if projects would compete for the best-use of available space.
- There are often a number of procedural and pre-project requirements to implement even basic project improvements; including environmental, land use regulations, codes, and stakeholder support. Addressing these strategically allows the Airport to avoid the more arbitrary 'build on demand' arrangements. Also, a well envisioned Airport Master Plan offers a more appealing sense of opportunity and development.
- FAA programming and discretionary funds can change rapidly, the Airport should be prepared annually, including possible FAA reimbursable agreements. Airport CIP projects can often be scaled-back, combined, or accelerated as needed. Some FAA grants are reimbursable to the Airport.
- The Airport lobbies extensively to compete for limited FAA resources and funding. Projects identified in this Airport Master Plan are similar to projects being pursued aggressively and competitively by similar commercial service airports.

AIRPORT MASTER PLAN CIP SUMMARY

The following are critical factors for implementing the Airport CIP, and advancing project improvements to meet future Airport demands and level of service expectations:

- 'Priority Projects' to rectify essential airport infrastructure and services
- Continued improvements to reconfigure the airfield to a one-runway system, and to provide future east and west landside developments
- Airport to rely heavily on FAA funds (entitlement *and* discretionary)
- Substantial Airport investments for planned facility and building/hangar improvements
- Substantial Airport investment for recommended new site development(s)
- Airport may require additional public funding and/or new revenue sources in order to meet the FAA grant matching share and to fund local-only Airport project costs.
- The project recommendations and site developments planned beyond the 10-year Airport Master Plan CIP will likely require re-assessment prior to programming and funding implementation.

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CHAPTER 6
Airport Layout Plan Drawings

CHAPTER 6 - AIRPORT LAYOUT PLAN DRAWINGS

CHAPTER OVERVIEW

The Airport Layout Plan (ALP) serves as the record planning drawing for the Airport, graphically depicting existing conditions and the recommended 20-year Airport improvement projects envisioned by the Airport Sponsor.

Airport Layout Plan (ALP)

Refers to a set of planning drawings used to graphically depict current and future Airport facilities. The ALP depicts proposed developments as determined from the aviation activity forecasts, facility requirements, and alternatives analysis.

The ALP is a set of drawing sheets prepared in accordance with FAA Advisory Circular 150/5300-13A, Change 1, *Airport Design*, and the FAA Standard Operating Procedure (SOP 2.00) ALP Checklist. As a federally-obligated facility, an up-to-date ALP is required per FAA Grant Assurances in order to receive FAA development and funding approval. Per FAA Advisory Circular 150/5070-6B, *Airport Master Plans*, the ALP serves five purposes:

1) The ALP creates a blueprint for Airport development. The ALP provides a guideline by which the Airport Sponsor can ensure that development maintains airport design standards and safety requirements and is consistent with Airport and community land use plans.
2) The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.
3) The ALP enables the Airport Sponsor and the FAA to plan for Airport facility improvements. This permits the FAA to anticipate budgetary and procedural needs and allows the FAA to protect the airspace required for facility or approach procedure improvements.
4) The ALP provides as working tool for the Airport Staff.
5) The ALP is necessary to receive financial assistance under the Airport Improvement Program (AIP) and to impose and use Passenger Facility Charges (PFC).

It should be noted that the Airport Master Plan projects, as recommended, do not constitute a commitment or financially obligate the Airport Sponsor and FAA to participate in project developments as depicted on the ALP. In addition, the ALP is for planning purposes only, and not intended to provide engineering design accuracy.

AIRPORT ALP DRAWING CHRONOLOGY

The following are the Airport's most recent ALP updates and revisions:

- 2017 (12-2017): ALP Update prepared for Airport Master Plan Update
- 2017 (05-2017): ALP As-Built (Runway 12 Extension) drawing update - draft submitted for FAA Review
- 2017 (05-2017): Exhibit "A" As-Built drawing update - draft submitted for FAA Review
- 2012 (02-2012): ALP Update prepared for Airfield Improvement Needs Assessment Study (2009)
- 2004 (04-2004): ALP Update prepared for Airport Master Plan Update

ALP UPDATE DRAWING FEATURES

The following items have been updated on the ALP drawings per Airport Master Plan recommendations:

General

- Update ALP Drawing Sheets Per FAA AGIS and ALP Checklist Standards.
- New Aerial Base Mapping Imagery, Planimetrics, Topographic Contours, and Airspace Obstruction.

Airfield

- Planned Runway 12-30 precision lighting instrument improvements
- Relocation of Taxiway 'A' to 400 feet runway centerline separation
  - Remove existing taxiway connectors (Taxiway 'A2' and 'A4')
  - Construct new taxiway connectors (90 degrees)
  - New run-up bypass along Taxiway 'A6' run-up bypass
- Planned west side parallel taxiway system and run-up bypass areas
- Runway 7-25 Closure (Deactivated in 2016)
- Turf Glider Landing Strip Closure (Deactivated in 2015)
- Construct new turf landing strip for light sport aircraft and gliders
- ASOS relocation/replacement
- Decommission of VOR (FAA determination)
- Conversion of former Runway 7-25 into a taxiway system
- Airport perimeter service roadway improvements
- Install Remote Air Traffic Control System (equipment installation)
- Airfield Perimeter Fencing / Gate Improvements

Landside / Terminal Area

- Expansion of airline apron and deicing installation
- Expansion of general aircraft apron – to Taxiway 'A'
- Expansion of US Forest Service aircraft apron – to Taxiway 'A'

- Expansion of airline terminal building
- Expansion of airline auto parking lot and proposed new circulation route
- New FBO common hangar and FBO executive hangars – flightline
- Additional general aviation hangars – east side site
  - T-hangars/Shade hangars
  - Executive box hangars
- Reconfigure dedicated general aviation aircraft parking areas (mark pavement)
- Planned new Rental Car Facility
- Planned Building Removal / Relocations:
  - Airport T-Hangar Removal (Hangars A, B, C and D)
  - Relocate Airport Beacon for new Rental Car Facility
  - Remove ARFF Building – for new AOB Building
  - Remove hangar – for new/relocated fuel facility
  - Remove Fire District Quarters - Per new AOB
  - Relocate Jet-A fuel tank system
- Develop new consolidated fuel storage and dispensing location
- Construct new Airport Operations Building (AOB) and Sand Storage on west side
- Extend Taxiway 'B' – for future aviation/hangar development

Roadway Improvements

- Extend Airport Way connection to Vanwell Avenue (Public Route - North Access)
- New Hangar Area Connection to Vanwell Avenue (Limited Route - South Access)
- Improve Eastward Campbell Parkway Connection to PABP (Lots 18 and 19)
- Improve Northward 8th Street SE Airport Connection to PABP (Lots 18 and 19)
- New Roadway/driveway access with 5th Street SE (PABP Lots 3 and 5) (AOB)
- New Roadway/driveway access with South Union Avenue (AOB)
- 8th Street Improvements (South Union to PABP (Lots 18 and 19)
- 8th Street Improvements (PABP to End of Street)

Airport Property Interests

- Update Airport property interests to reflect Exhibit "A" Property Map (dated 05-2017)
- Update Airport property interests to reflect Airport Master Plan recommendations:
  - Airport property acquisition – Runway 12 Runway Protection Zone
  - Airport property acquisition – Runway 30 Runway Protection Zone
  - Airport property acquisition – Airline auto parking lot expansion
  - Airport property acquisition – Hangar expansion
- Airport property release(s) – relinquish from FAA aeronautical obligations

ALP DRAWINGS (ALP SHEET INDEX)

The ALP drawings are prepared electronically in colored drawing format using Autodesk Civil 3d (AutoCAD), for scaled sheet-size plotting and reduced copies for insertion into the Airport Master Plan narrative report. The FAA AGIS imagery data serves as the base map features for the ALP drawings (aerial, topography, linework).

The following drawing sheets comprise the ALP set:

1) Title Cover Sheet
2) Facility Layout Plan - Airport Aerial
3) Airport Data Tables
4) Airport Layout Plan Drawing - Existing/Future Conditions
5) Terminal Area Plan
6) Airspace Drawing (Part 77 Surface Plan – Full View)
7) Airspace Drawing (Part 77 Surface Plan – Extended View)
8) Approach Plan and Profile Sheet - Runway 12 (Existing/Future)
9) Approach Plan and Profile Sheet - Runway 30 (Existing/Future)
10) Approach Plan and Profile Sheet - Runway 8 & 26 (Future Turf)
11) Departure Surface Drawing - Runway 12 And 30
12) Runway Centerline Profile Drawing - Runway 12-30
13) Airport Land Use Plan
14) Airport Property Map

ALP Drawing Sheets Descriptions

The following is a description of each ALP drawing sheet:

Title and Approval Sheet: A sheet identifying the Airport name, grant numbers and an index of drawing sheets contained in the ALP set. This sheet also contains the Airport location and vicinity maps, a revision block, and a location to chronicle ALP reviewer and approval stamps/letter(s).

Airport Data Sheet: A sheet separately listing the technical ALP data requirements, table information and notes, allowing a less cluttered ALP drawing image. Major components of the sheet include:

- Basic Data Table | Runway Data Table | Supporting Tables
- Runway Declared Distance Depiction
- Modification to Airport Design Standards
- Wind Rose Data
- Mapping Sources
- General Notes and Notices

The ALP planning phases are noted as:

Existing: Airport conditions as of November, 2016.
Future: Airport conditions planned or recommended within the 20-year planning period
Ultimate: Airport projects or space allocation anticipated beyond the 20-year planning period.

Aerial-Existing Facilities Layout: This drawing shows the existing Airport facilities overlaid on the aerial photo. The drawing contains minimal text and dimensioning to provide an uncomplicated view of current infrastructure and equipment locations. This sheet is intended to be useful to the Airport and public-at-large by illustrating the location of major Airport facilities.

Airport Layout Plan (ALP) Drawing: A sheet consisting of a scaled, single-page drawing illustrating existing and future improvements planned throughout the 20-year Airport Master Plan development period, consistent with the future Airport Reference Code (ARC). The drawing set is a graphic illustration of the Airport's existing and planned developments, generally depicting future airfield and landside facilities, airspace surfaces, airport land uses and airport property interests.

Major drawing components include:

- Depiction of Existing and Future Airport Facilities
- Airfield, Landside Land Uses
- Navigational Aids
- Safety and Design Standard Dimensions
- Airport Property Interests
- General Notes and Notices

Terminal Area Plan Drawing: A scaled drawing depicting close-in features of the major terminal area(s) as consistent with the ALP drawing. This drawing depicts detailed reference to buildings, apron/ramp areas and auto access features, including geometric dimensional areas, safety setbacks and separation standards.

Key drawing components include:

- Terminal Building Footprint and Major Components
- Apron Configuration and Aircraft Parking Positions
- Aircraft Taxiways and Taxilanes
- Terminal Curbfront, Auto Parking Lot Area(s) / Access Roadways
- Aircraft Hangars (Existing, Future, Relocated)
- Fueling Facilities
- Fencing and Security Access Points
- Airport Storage/Maintenance Facilities
- Commercial-Related Terminal Area Space
- Reserved Terminal Area Space

Part 77 Airspace (Obstruction) Plan: Scaled drawing identifying the limits of recommended land use control for the height of objects surrounding the Airport. Airspace surfaces correspond with the ultimate runway dimensions and instrument approach capabilities, in which each of the Federal Aviation Regulations (FAR) Part 77, Subpart C imaginary surfaces (primary, horizontal, conical, approach and transitional) are depicted in plan and profile view. The approach surface is depicted in full-length view using 50-foot contour intervals. An obstruction data table provides structure disposition with respect to existing and future FAR Part 77 surfaces. In addition, the drawing includes tables referencing runway dimensions and elevations, data sources, general notes, an isometric cut-away view of airspace features, and a legend noting key drawing symbols. The drawing provides reference to applicable height and land use zoning ordinances of the Airport Sponsor and surrounding governmental entities.

Runway Inner-Approach Plan & Profiles: Scaled drawings depicting close-in plan and profile approach features beyond each runway end. These drawings identify obstruction and non-compatible land uses within the runway protection zone and airspace surfaces extending beyond runway centerline. Airspace surfaces are depicted for disposition of obstructions to navigable airspace. The limits of the drawings extend to a point where the FAR Part 77, Subpart C approach surface reaches 100’ in height above the runway end elevation. Obstructions are indexed in plan and profile view, with an obstruction table used to denote existing and future obstructions to FAR Part 77 surfaces. The recommended mitigation of obstructions is noted, to correspond with the Airport’s development plan. A general note section includes data sources and applicable references. A legend is used to note key drawing symbols.

The following are the runway instrument designations used:

- Runway 12 End – Existing Precision / Future Precision (RVR)
- Runway 30 End – Existing and Future Approach with Vertical Guidance (RNAV)
- Turf Strip – Future Visual

Runway Departure Surface Drawing: Depicts the applicable departure surfaces as defined in Appendix 2 of FAA AC 150/5300-13. The surfaces are shown for runway end(s) designated primarily for instrument departures. The one-engine inoperative (OEI) obstacle identification surface (OIS) should be shown for departure runway end(s) supporting air carrier operations.

Airport Land Use Plan: A scaled drawing for coordinating compatible land uses and land use controls around the Airport, providing recommendations for on and off Airport property uses through the 20-year planning period based on the proposed Airport developments and property interests. The drawing identifies aviation and non-aeronautical land uses within the Airport vicinity, as designated by local planning and zoning, and provides reference to height and land use zoning ordinances of the Airport Sponsor, and from those applicable to the surrounding governmental entities. The proposed Airport land uses are consistent with the Airport's requirements for aircraft operations, noise contours, and safety zones, including federal guidelines and state statues.

Airport Property Map: A scaled drawing depicting the property interests held or to be acquired in all lands to be developed or used in connection with the Airport, as consistent with the Airport Layout Drawing. The drawing documents past Airport land acquisition, including fee-simple and easement tracts. A drawing table lists an inventory of all Airport property parcels by number; including the grantor, grantee, purpose, type of ownership interest, acreage, recorded liber, federal/state grant project number, and date of acquisition. The

Airport Property Map was updated to reflect existing property boundary and ownership interests as provide by a property survey conducted in 2012.

FAA ALP CHECKLIST

The ALP drawings are developed using the FAA Standard Operating Procedure ALP Checklist (SOP 2.00 dated October 1, 2013). The FAA ALP Checklist establishes uniform procedures for ALP review, to ensure the ALP drawings are approved consistent with FAA procedural requirements, design standards, and airspace analysis. The FAA ALP Checklist, as signed by the Airport Sponsor, contains remarks and supporting attachments to document the design rationale used in developing the ALP drawing set.

Note: The ALP drawings have not been prepared as electronic (eALP) drawing.

Aeronautical Study

The FAA conducts and aeronautical study of the ALP, to determine the effects of proposed developments on air navigational facilities and on the safe and efficient use of navigable airspace. The Airport Sponsor must not make an alteration to the Airport unless the FAA ADO has determined that it will not adversely affect the safety, utility, and efficiency of the Airport. As a federally-obligated facility, the Airport Sponsor is not permit to change or alter Airport facilities which are not in conformity with the ALP.

ALP Approval

The Airport Sponsor and FAA are responsible for formally approving (sign and/or stamp) the ALP. FAA ALP approval indicates the existing Airport facilities and proposed developments conform to currently published FAA airport design standards, and are acceptable from the standpoint of Airport safety, utility, and efficiency. The FAA ALP approval letter typically documents applicable stipulations regarding the Airport Sponsor's ALP planning, environmental, and funding commitments.

Acceptance of the Airport Master Plan by the FAA does not constitute a commitment on the part of the FAA to participate in any development depicted by the ALP, nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public law.

ALP Update and Revision

The ALP is intended to establish the framework for a continuous Airport planning process. As stated in FAA Order 5100.38, *Airport Improvement Program (AIP) Handbook*, an ALP remains current for about a five-year period, unless there are major Airport changes made or planned.

THE ALP DRAWING SHEETS (DATED DECEMBER, 2017 – FAA DRAFT REVIEW) ARE INCLUDED AS A REPORT ATTACHMENT

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Attachments

AIRPORT LAYOUT PLAN

FOR THE

PANGBORN MEMORIAL AIRPORT

EAST WENATCHEE, WASHINGTON

October 2019

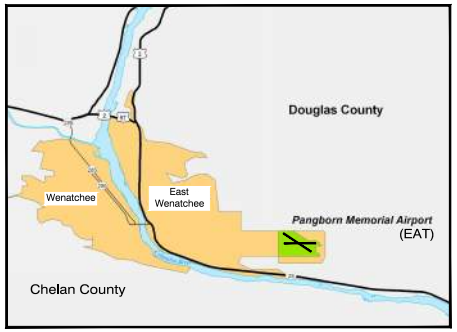
FAA DISCLAIMER

LOCATION MAP

AIRPORT LAYOUT PLAN DRAWING SHEET INDEX

ALP SHEET NUMBER	ALP DRAWING TITLE	REVISED DATE & INITIALS
1	TITLE COVER SHEET	
2	FACILITY LAYOUT PLAN - AIRPORT AERIAL	
3	AIRPORT DATA TABLES	
4	AIRPORT LAYOUT PLAN DRAWING - EXISTING/FUTURE CONDITIONS	
5	TERMINAL AREA PLAN	
6	FUTURE RUNWAY 12 PART 77 - PLAN & PROFILE	
7	EXISTING RUNWAY 12/30 - INNER PORTION	
8	FUTURE RUNWAY 12 - INNER PORTION	
9	FUTURE RUNWAY 30 - INNER PORTION	
10	FUTURE TWF RUNWAY 8/26 - INNER PORTION	
11	RUNWAY CENTERLINE 12/30 & 8/26 - PLAN & PROFILE	
12	PART 77 & OBSTRUCTION NORTH-WEST SHEET 1 OF 2	
13	PART 77 & OBSTRUCTION SOUTH-EAST SHEET 2 OF 2	
14	AIRPORT LAND USE PLAN	
15	AIRPORT PROPERTY MAP	

VICINITY MAP



GENERAL ALP NOTES:

- ALP prepared using design criteria from FAA Advisory Circular 150/5300-13A Change 1, *Airport Design*, FAA Standard Operating Procedures 2.00 and 3.00, and Part 77 of the Federal Aviation Regulations (FAR), *Safe, Efficient Use, and Preservation of the Navigable Airspace*.
- ALP drawings updated from 'as-built' ALP drawing set prepared by Stantec on April 25, 2017 for the Runway 12 extension project and land acquisition. ALP base mapping (planimetrics, topographic contours) reflects features obtained September, 2016. Digital ortho aerial imagery conducted by Stantec, September 13, 2016. Master Plan ALP AGIS mapping features supplemented by aerial mapping conducted by Geotera in November, 2016.
- All elevations and coordinates in NAD83 and NAVD88. Elevations are above mean sea level (MSL), unless noted. Source: ground survey conducted by third party surveyor in July 29, 2016, as reported in Airports Facility Directory and AVN Data Sheet. Future runway end coordinates estimated.
- Airport property boundary and parcel information from Exhibit 'A' Property Map dated 4-25-2017 and approved 11-17-2017 as prepared for AIP project 3-53-0084-035 runway extension land acquisition and AIP project 3-53-0084-036/37 as-built ALP. Original airport property boundary derived 2004 ALP Property Map dated April 12, 2004 prepared by Coffman & Associates.

ALP CHECKLIST CERTIFICATION FOR AIRSPACE REVIEW

FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
AP PROVAL BLOCK

FAA OFFICIAL
MANAGER
SEATTLE AIRPORTS DISTRICT OFFICE

SIGNATURE DATE:

APPROVAL LETTER DATE:

EXECUTIVE DIRECTOR
PORT OF CLEAN COUNTY — DATE

EXECUTIVE DIRECTOR
PORT OF DOUGLAS COUNTY — DATE

AIRPORT DIRECTOR
PANGBORN MEMORIAL AIRPORT — DATE

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

TITLE COVER SHEET

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 1 OF 15

The preparation of these documents was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of these documents by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

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EXISTING BUILDINGS/FACILITIES	
NUMBER	DESCRIPTION
1	AIRLINE TERMINAL BUILDING
2	T-HANGAR
3	BOX HANGAR
4	FUEL ISLAND - 100LL
5	FUEL TANK - JET A
6	RENTAL CAR WASH SHOP
7	AIRPORT SHOP & GARAGE
8	SNOW REMOVAL EQUIPMENT BUILDING
9	FIXED BASE OPERATOR
10	AIRPORT RESCUE AND FIRE FIGHTING
11	AIR CARGO BUILDING
12	U.S. FOREST SERVICE BUILDINGS
13	ELECTRICAL VAULT
14	WESTSIDE TENANT (NON-AVIATION)
15	EXECUTIVE FLIGHT - HANGAR AND OFFICE
16	NON-AVIATION BUILDING

EXISTING RUNWAY VIS / NAV AIDS	
NUMBER	DESCRIPTION
A1	RUNWAY 12 END IDENTIFIER LIGHTS (REILS)
A2	RUNWAY 12 GLIDE SLOPE
A3	RUNWAY 12 PAPI (4 LIGHT)
A4	AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)
A5	RUNWAY 30 PAPI (2 LIGHT)
A6	RUNWAY 30 REILS
A7	LOCALIZER
A8	VHF OMNI-DIRECTIONAL RANGE (VOR)/DME* and ADJACENT COMMUNICATIONS EQUIP.

*DME = DISTANCE MEASURING EQUIPMENT

SURVEY MONUMENTS	
NUMBER	STATION DESIGNATION
M1	EAT 'A' (PACS) - DQ 4301
M2	EAT 'B' (SACS) - DQ 4302
M3	EAT 'C' (SACS) - DQ 4303
Primary and secondary survey controls source: NGS database.	

GENERAL ALP NOTES:

- ALP prepared using design criteria from FAA Advisory Circular 150/5300-13A Change 1, *Airport Design*, FAA Standard Operating Procedures 2.00 and 3.00, and Part 77 of the Federal Aviation Regulations (FAR), *Safe, Efficient Use, and Preservation of the Navigable Airspace*.
- ALP drawings updated from 'as-built' ALP drawing set prepared by Stantec on April 25, 2017 for the Runway 12 extension project and land acquisition. ALP base mapping (planimetrics, topographic contours) reflects features obtained September, 2016. Digital ortho aerial imagery conducted by Stantec, September 13, 2016. Master Plan ALP AGIS mapping features supplemented by aerial mapping conducted by Geotera in November, 2016.
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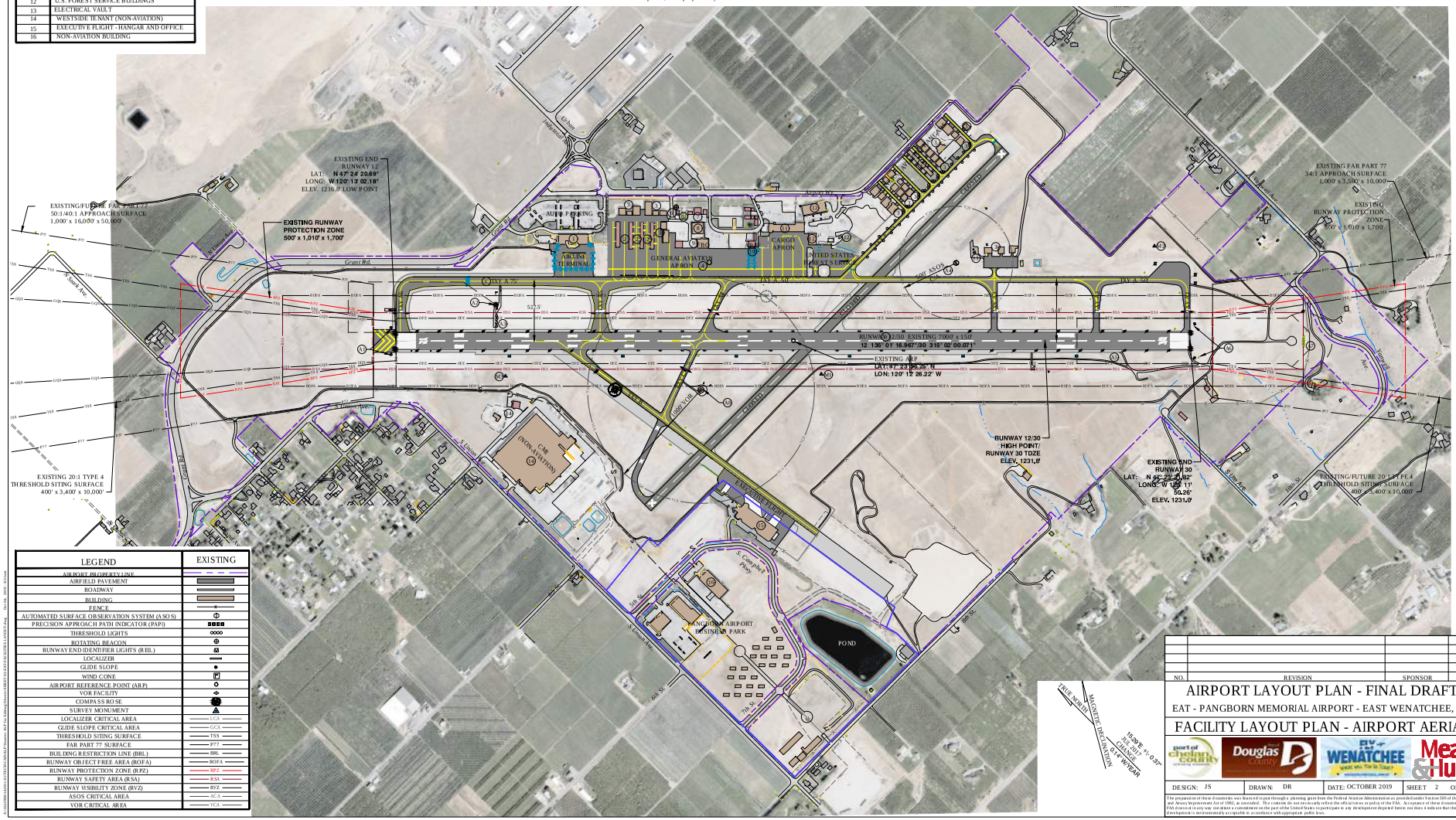
- Airport property boundary and parcel information from Exhibit 'A' Property Map dated 4-25-2017 and approved 11-17-2017 as prepared for ALP project 3-53-0084-035 runway extension land acquisition and AIP project 3-53-0084-036/37 as-built ALP. Original airport property boundary derived 2004 ALP Property Map dated April 12, 2004 prepared by Coffman & Associates.



LEGEND	EXISTING
AIRPORT PROPERTY LINE	
AIRFIELD PAVEMENT	
ROADWAY	
BUILDING	
FENCE	
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)	
PRECISION APPROACH PATH INDICATOR (PAPI)	
THRESHOLD LIGHTS	
ROTATING BEACON	
RUNWAY END IDENTIFIER LIGHTS (REIL)	
LOCALIZER	
GLIDE SLOPE	
WIND CONE	
AIRPORT REFERENCE POINT (ARP)	
VOR FACILITY	
COMPASS ROSE	
SURVEY MONUMENT	
LOCALIZER CRITICAL AREA	LCA
GLIDE SLOPE CRITICAL AREA	GCA
THRESHOLD SITING SURFACE	TSS
FAR PART 77 SURFACE	P77
BUILDING RESTRICTION LINE (BRL)	BRL
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ
RUNWAY SAFETY AREA (RSA)	RSA
RUNWAY VISIBILITY ZONE (RVZ)	RVZ
ASOS CRITICAL AREA	ACA
VOR CRITICAL AREA	VCA

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

FACILITY LAYOUT PLAN - AIRPORT AERIAL

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 2 OF 15

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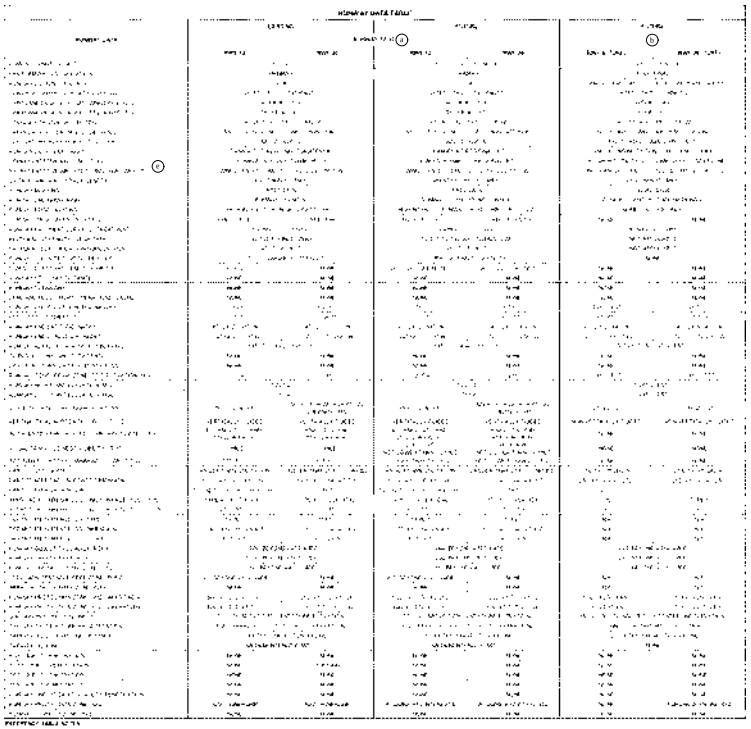

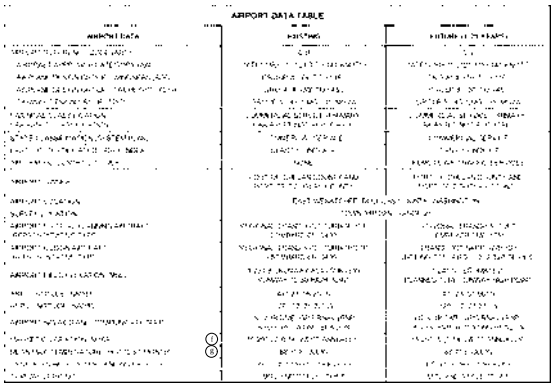

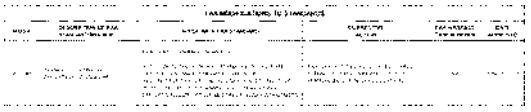

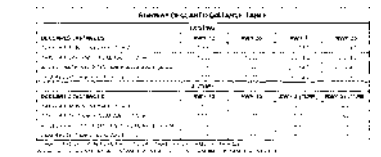

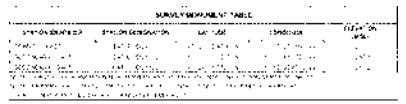

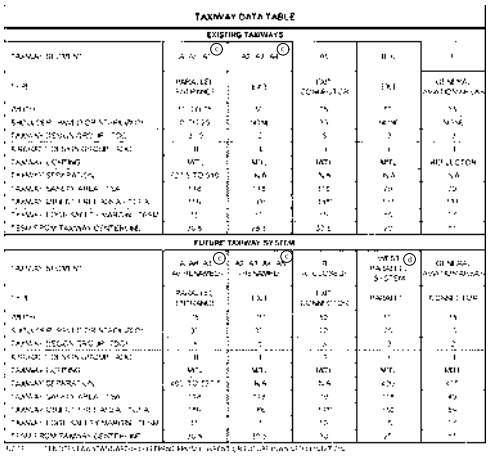

DATA SHEET NOTES:

- ALP prepared using design criteria from FAA Advisory Circular 150/5300-13A Change 1, *Airport Design*, FAA Standard Operating Procedures 2.00 and 3.00, and Part 77 of the Federal Aviation Regulations (FAR), *Safe, Efficient Use, and Preservation of the Navigable Airspace*.
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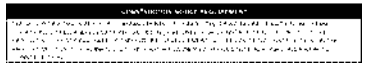
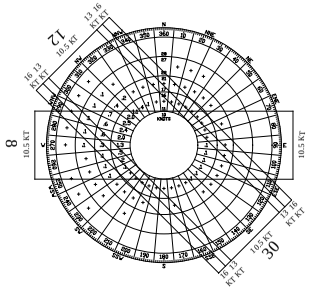
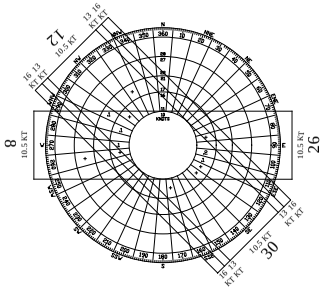
- (a) Existing Runway 12-30 width (150'), paved shoulders (25' wide) and blast pad dimension (200' x 200') reflects FAA design standards for RDC C-II aircraft with a MTOW greater than 150,000 pounds. The FAA standard runway width is 100 feet, the shoulder width is 20 feet, and the runway blast pad width is 140 feet. The airport is planning to accommodate aircraft with similar characteristics weighing greater than 150,000 pounds. Future FAA determination may be required to reflect applicable RDC C-III standards with greater than 150,000 pound MTOW.
- (b) The planned turf Runway 8-26 is not required to meet FAA crosswind standards, and is not FAA eligible. Runway 8-26 is designed to accommodate light sport utility aircraft and glider-sailplane landings with approach speeds less than 50-knots.
- (c) Taxiway 'A' (eastside) parallel taxiway system is designed for ADG III and TDG 5 standards and planned to be reconstructed at a 400-foot to 527.5-foot Runway 12/30 centerline separation; elevation adjustment does not apply. Taxiway A and connectors designed for Q-400 (TDG 5 aircraft). Q-400 aircraft continue to operate at the airport. Taxiway design group to be reconsidered at time of design. The portion of Taxiway A transitioning past the ILS glideslope is planned to remain at a 527.5-foot runway separation. Taxiway segments planned to be renamed following parallel Taxiway 'A' improvements.
- (d) The planned westside parallel taxiway system is designed for ADG II and TDG 3 standards. Development of the westside taxiway system and aviation related facilities encroaching the VOR buffer and adjacent communications equipment is contingent upon the future VOR/DME disposition (deactivated, relocated, relocated, replaced). The relocation of the VOR/DME station is not included in the FAA MON program. Any taxiways constructed in the VOR critical area will require OESG review.
- (e) Transition from the existing airport critical aircraft (Q400 turboprop: RDC C-II and TDG 5) to the future planned critical aircraft (DMB-175: RDC C-II and TDG 5) is dependent on airline operating factors.
- (f) Magnetic Declination source: National Geophysical Data Center, July 2017.
- (g) Mean maximum temperature from NOAA climatic website: http://cdiac.esd.ornl.gov/ndps/ushcn/statemax.html#1

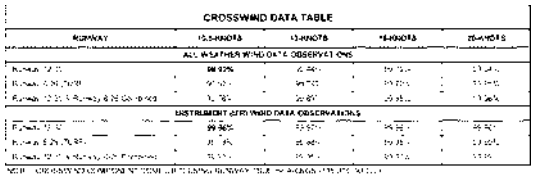




WIND ROSE
ALL WEATHER CONDITIONS



WIND ROSE
IFR CONDITIONS



SOURCE: All-weather and IFR (3 sm and 1,000' minimums) windrose and crosswind component data source: National Climatic Data Center, Station # 727825, Washington (Pangborn Memorial Airport AWOS: from 1997 to 2006).

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

AIRPORT DATA TABLES

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 3 OF 15

The preparation of these documents was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of these documents by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

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NUMBER	EXISTING BUILDINGS/FACILITIES DESCRIPTION
1	AIRLINE TERMINAL BUILDING
2	T-HANGAR
3	BOX HANGAR
4	FUEL ISLAND - 100LL (to be removed)
5	FUEL TANK - JET A
6	RENTAL CAR WASH SHOP
7	AIRPORT SHOP & GARAGE
8	SNOW REMOVAL EQUIPMENT BUILDING
9	FIXED BASE OPERATOR
10	AIRPORT RESCUE AND FIRE FIGHTING
11	AIR CARGO BUILDING
12	U.S. FOREST SERVICE BUILDINGS
13	ELECTRICAL VAULT
14	WESTSIDE TENANT (NON-AVIATION)
15	EXECUTIVE FLIGHT - HANGAR AND OFFICE
16	NON-AVIATION BUILDING
17	COMPASS ROSE (to be removed)

FACILITY NOTES:

Only major facilities shown on ALP for clarity. Comprehensive facility data with elevations are illustrated on TERMINAL AREA PLAN, SHEET 5.

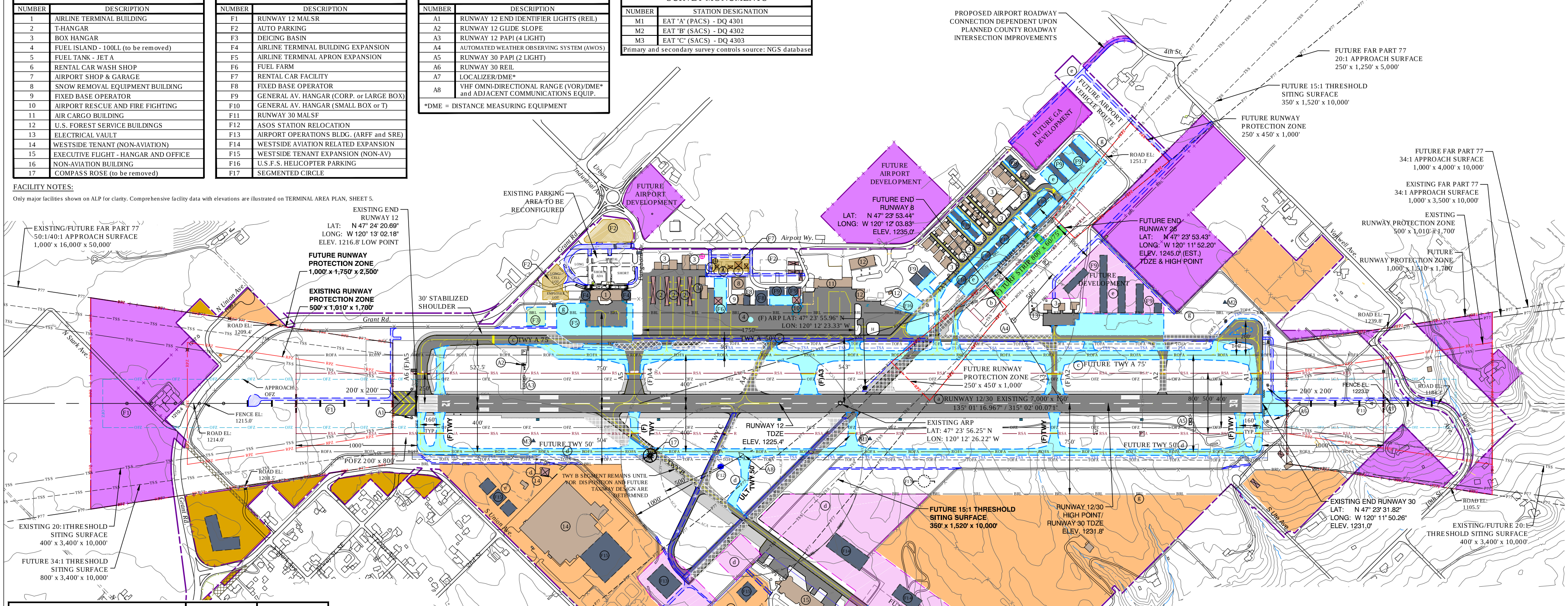
NUMBER	FUTURE FACILITIES DESCRIPTION
F1	RUNWAY 12 MALSR
F2	AUTO PARKING
F3	DEICING BASIN
F4	AIRLINE TERMINAL BUILDING EXPANSION
F5	AIRLINE TERMINAL APRON EXPANSION
F6	FUEL FARM
F7	RENTAL CAR FACILITY
F8	FIXED BASE OPERATOR
F9	GENERAL AV. HANGAR (CORP. or LARGE BOX)
F10	GENERAL AV. HANGAR (SMALL BOX or T)
F11	RUNWAY 30 MALSF
F12	ASOS STATION RELOCATION
F13	AIRPORT OPERATIONS BLDG. (ARFF and SRE)
F14	WESTSIDE AVIATION RELATED EXPANSION
F15	WESTSIDE TENANT EXPANSION (NON-AV)
F16	U.S.F.S. HELICOPTER PARKING
F17	SEGMENTED CIRCLE

NUMBER	EXISTING RUNWAY VIS / NAV AIDS DESCRIPTION
A1	RUNWAY 12 END IDENTIFIER LIGHTS (REIL)
A2	RUNWAY 12 GLIDE SLOPE
A3	RUNWAY 12 PAPI (4 LIGHT)
A4	AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)
A5	RUNWAY 30 PAPI (2 LIGHT)
A6	RUNWAY 30 REIL
A7	LOCALIZER/DME*
A8	VHF OMNI-DIRECTIONAL RANGE (VOR)/DME* and ADJACENT COMMUNICATIONS EQUIP.

*DME = DISTANCE MEASURING EQUIPMENT

NUMBER	SURVEY MONUMENTS STATION DESIGNATION
M1	EAT 'A' (PACS) - DQ 4301
M2	EAT 'B' (SACS) - DQ 4302
M3	EAT 'C' (SACS) - DQ 4303

Primary and secondary survey controls source: NGS database



PROPOSED AIRPORT ROADWAY CONNECTION DEPENDENT UPON PLANNED COUNTY ROADWAY INTERSECTION IMPROVEMENTS
FUTURE FAR PART 77 20:1 APPROACH SURFACE 250' x 1,250' x 5,000'
FUTURE 15:1 THRESHOLD SITING SURFACE 350' x 1,520' x 10,000'
FUTURE RUNWAY PROTECTION ZONE 250' x 450' x 1,000'
FUTURE FAR PART 77 34:1 APPROACH SURFACE 1,000' x 4,000' x 10,000'
EXISTING FAR PART 77 34:1 APPROACH SURFACE 1,000' x 3,500' x 10,000'
EXISTING RUNWAY PROTECTION ZONE 500' x 1,010' x 1,700'
FUTURE RUNWAY PROTECTION ZONE 1,000' x 1,510' x 1,700'
FUTURE AIRPORT VEHICLE ROUTE
FUTURE GA DEVELOPMENT
FUTURE AIRPORT DEVELOPMENT
FUTURE END RUNWAY 8 LAT: N 47° 23' 53.44" LONG: W 120° 12' 03.83" ELEV. 1235.0'
FUTURE END RUNWAY 26 LAT: N 47° 23' 53.43" LONG: W 120° 11' 52.20" ELEV. 1245.0' (EST.) TDZE & HIGH POINT
FUTURE DEVELOPMENT
EXISTING PARKING AREA TO BE RECONFIGURED
EXISTING END RUNWAY 12 LAT: N 47° 24' 20.69" LONG: W 120° 13' 02.18" ELEV. 1216.8' LOW POINT
FUTURE RUNWAY PROTECTION ZONE 1,000' x 1,750' x 2,500'
EXISTING RUNWAY PROTECTION ZONE 500' x 1,010' x 1,700'
30' STABILIZED SHOULDER
EXISTING/FUTURE FAR PART 77 50:1/40:1 APPROACH SURFACE 1,000' x 16,000' x 50,000'
(F) ARP LAT: 47° 23' 55.96" N LON: 120° 12' 23.33" W
FUTURE TWY A 75'
FUTURE RUNWAY PROTECTION ZONE 250' x 450' x 1,000'
RUNWAY 12/30 EXISTING 7,000' x 150' 135° 01' 16.967" / 315° 02' 00.071"
EXISTING ARP LAT: 47° 23' 56.25" N LON: 120° 12' 26.22" W
RUNWAY 12 TDZE ELEV. 1225.4'
FUTURE TWY 50'
POFZ 200' x 800'
TWY B SEGMENT REMAINS UNTIL VOR DISPOSITION AND FUTURE TAXIWAY DESIGN ARE DETERMINED
FUTURE 15:1 THRESHOLD SITING SURFACE 350' x 1,520' x 10,000'
RUNWAY 12/30 HIGH POINT/ RUNWAY 30 TDZE ELEV. 1231.8'
EXISTING END RUNWAY 30 LAT: N 47° 23' 31.82" LONG: W 120° 11' 50.26" ELEV. 1231.0'
EXISTING/FUTURE 20:1 THRESHOLD SITING SURFACE 400' x 3,400' x 10,000'
EXISTING 20:1THRESHOLD SITING SURFACE 400' x 3,400' x 10,000'
FUTURE 34:1 THRESHOLD SITING SURFACE 800' x 3,400' x 10,000'
FUTURE FAR PART 77 20:1 APPROACH SURFACE 250' x 1,250' x 5,000'
FUTURE AVIATION
FUTURE TXY 50'
PANGBORN AIRPORT BUSINESS PARK
POND

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
PROPERTY TO BE RELEASED (AIRPORT CONTROL)	N/A	
PROPERTY TO BE RELEASED (NON-AERONAUTICAL USE) (i)	N/A	
DEVELOPMENT AREA	N/A	
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVAL	N/A	
TURF RUNWAY	N/A	(b)
DEICING BASIN	N/A	
VACATED ROADWAY	N/A	
ROADWAY		(e)
AUTOMOBILE PARKING	N/A	
BUILDING		(e)
BUILDING TO BE REMOVED	N/A	
FENCE (f)		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
PRECISION APPROACH PATH INDICATOR (PAPI)		
THRESHOLD LIGHTS		
ROTATING BEACON		
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
LOCALIZER		N/A
GLIDE SLOPE		N/A
WIND CONE		
AIRPORT REFERENCE POINT (ARP)		
VOR FACILITY		N/A
COMPASS ROSE		N/A
SURVEY MONUMENT		N/A
SEGMENTED CIRCLE		N/A
TAXIWAY SAFETY AREA	TSA	TSA
OBSTACLE FREE ZONE	OFZ	OFZ
LOCALIZER CRITICAL AREA	LCA	N/A
GLIDE SLOPE CRITICAL AREA	GCA	N/A
THRESHOLD SITING SURFACE	TSS	TSS
FAR PART 77 SURFACE	P77	P77
BUILDING RESTRICTION LINE (BRL) (g)	BRL	N/A
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
RUNWAY VISIBILITY ZONE (RVZ)	RVZ	RVZ
ASOS CRITICAL AREA (g)	ACA	ACA
VOR CRITICAL AREA (g)	VCA	N/A

ALP NOTES:

- ALP prepared using design criteria from FAA Advisory Circular 150/5300-13A Change 1, *Airport Design*, FAA Standard Operating Procedures 2.00 and 3.00, and Part 77 of the Federal Aviation Regulations (FAR), *Safe, Efficient Use, and Preservation of the Navigable Airspace*.
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- Runway elevations and coordinates in NAD83 and NAVD88. Source: ground survey conducted by third party surveyor in July 29, 2016, as reported in Airports Facility Directory and AVN Data Sheet. Future runway end coordinates estimated.

(a) Existing Runway 12-30 width (150'), paved shoulders (25' wide) and blast pad dimension (200' x 200') reflects FAA design standards for RDC C-III aircraft with a MTOW greater than 150,000 pounds. The FAA standard runway width is 100 feet, the shoulder width is 20 feet, and the runway blast pad width is 140 feet. The airport is planning to accommodate aircraft with similar characteristics weighing greater than 150,000 pounds. Future FAA determination may be required to reflect applicable RDC C-III standards with greater than 150,000 pound MTOW.

(b) The planned turf Runway 8-26 is not required to meet FAA crosswind standards, and is not FAA eligible. Runway 8-26 is designed to accommodate light sport utility aircraft and glider-sailplane landings with approach speeds less than 50-knots.

(c) Taxiway 'A' (eastside) parallel taxiway system is designed for ADG III and TDG 5 standards and planned to be reconstructed at a 400-foot to 527.5-foot Runway 12/30 centerline separation; elevation adjustment does not apply. Taxiway A and connectors designed for Q-400 (TDG 5 aircraft). Q-400 aircraft continue to operate at the airport. Taxiway design group to be reconsidered at time of design. The portion of Taxiway A transitioning past the ILS glideslope is planned to remain at a 527.5-foot runway separation. Taxiway segments planned to be renamed following parallel Taxiway 'A' improvements.

(d) The planned westside parallel taxiway system is designed for ADG II and TDG 3 standards. Development of the westside taxiway system and aviation related facilities encroaching the VOR buffer and adjacent communications equipment is contingent upon the future VOR/DME disposition (deactivated, relocated, replaced). The relocation of the VOR/DME station is not included in the FAA MON program. Any taxiways constructed in the VOR critical area will require OESG review.

(e) Future airport buildings/hangars shown for conceptual layout purposes. Proposed roadways are shown for planning-level purposes, with final roadway alignment and right-of-way to be coordinated with the proper local and/or state authorities.

(f) Existing perimeter fence is 6' to 8' tall. Future fencing to meet FAA/TSA requirements, typically 8' to 10' tall for commercial airports.

(g) Airport restriction areas: building restriction line (BRL) for Runway 12-30 established to provide approximately 35-foot obstacle clearance based on Part 77 imaginary surfaces. BRL for the planned turf Runway 8-26 established to provide approximately 18-foot obstacle clearance based on Part 77. The VOR/DME station buffer radius is 1,000-feet. The AWOS-3 protection area limits development to 15-feet below the wind sensor elevation within a 500-foot radius, and 10-feet above the wind sensor elevation within a 500 to 1,000-foot radius. Structures must also conform to FAA NAVAID critical areas and line-of-sight criteria.

(h) Magnetic Declination source: National Geophysical Data Center, July 2017.

(i) The airport owns and controls property no longer planned for aeronautical purposes. The discharge or relinquishment of these properties/parcels, as subject to FAA release authorization, involves land being released from the airport's contractual obligations; including from a particular FAA assurance or federal obligation, aeronautical use, land use condition, and/or the future disposal (sale) of property.

MAGNETIC DECLINATION 15.20°E +/- 0.37° JUL 2017 CHANGE 0.14° W/YEAR (h)

TRUE NORTH

0 400 800 FEET

FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
APPROVAL BLOCK

FAA OFFICIAL
MANAGER
SEATTLE AIRPORTS DISTRICT OFFICE — SIGNATURE DATE

APPROVAL LETTER DATE

AIRPORT DIRECTOR
PANGBORN MEMORIAL AIRPORT — SIGNATURE DATE

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

AIRPORT LAYOUT PLAN DRAWING -EXISTING/FUTURE CONDITIONS

Port of Chelan County — Douglas County — Port of East Wenatchee / Wenatchee — Mead & Hunt

DESIGN: JS | DRAWN: DR | DATE: OCTOBER 2019 | SHEET 4 OF 15

The preparation of these documents was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of these documents by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

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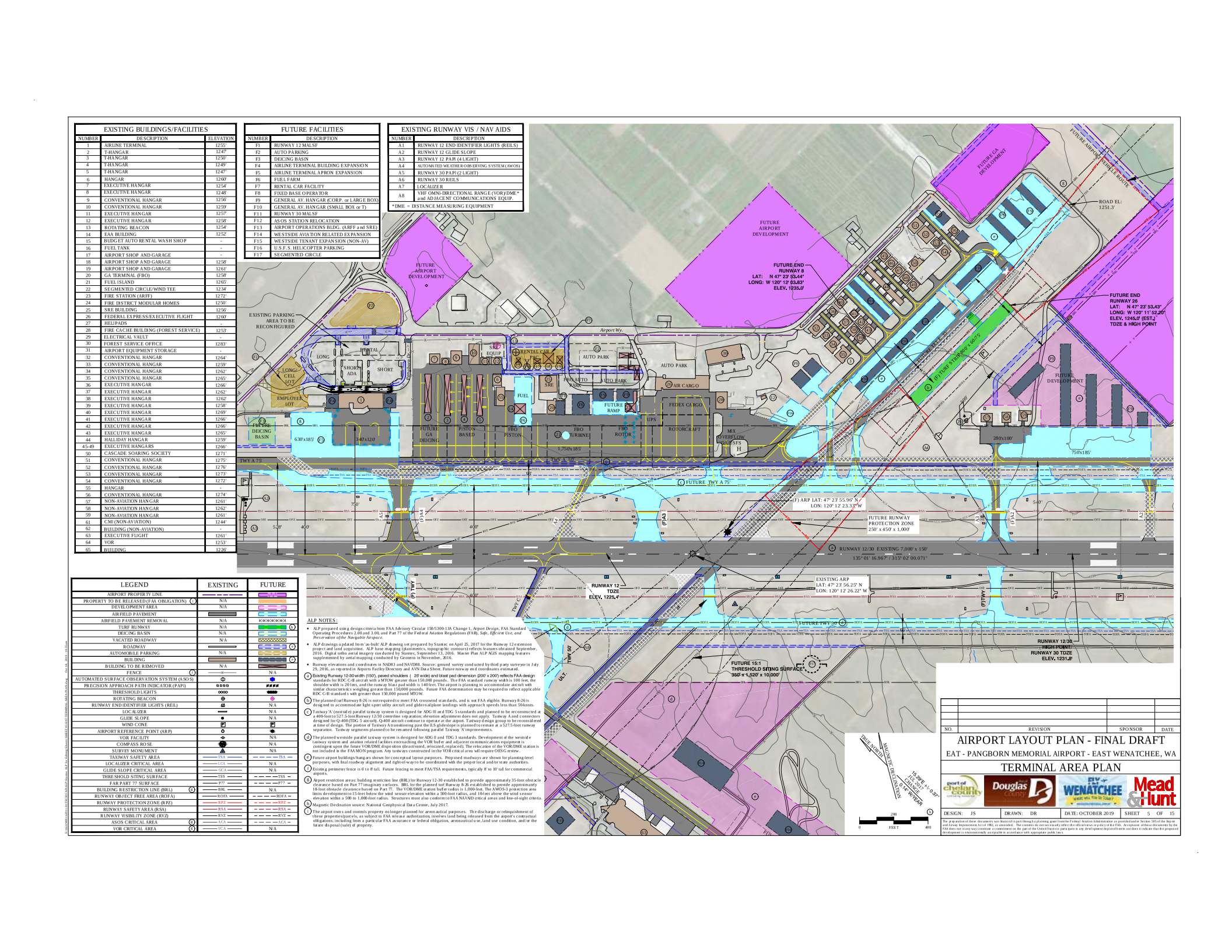

EXISTING BUILDINGS/FACILITIES		
NUMBER	DESCRIPTION	ELEVATION
1	AIRLINE TERMINAL	1255'
2	T-HANGAR	1247'
3	T-HANGAR	1250'
4	T-HANGAR	1249'
5	T-HANGAR	1247'
6	HANGAR	1260'
7	EXECUTIVE HANGAR	1254'
8	EXECUTIVE HANGAR	1248'
9	CONVENTIONAL HANGAR	1256'
10	CONVENTIONAL HANGAR	1259'
11	EXECUTIVE HANGAR	1257'
12	EXECUTIVE HANGAR	1258'
13	ROTATING BEACON	1254'
14	EAA BUILDING	1252'
15	BUDGET AUTO RENTAL WASH SHOP	-
16	FUEL TANK	-
17	AIRPORT SHOP AND GARAGE	-
18	AIRPORT SHOP AND GARAGE	1258'
19	AIRPORT SHOP AND GARAGE	1261'
20	GA TERMINAL (FBO)	1258'
21	FUEL ISLAND	1265'
22	SEGMENTED CIRCLE/WIND TEE	1234'
23	FIRE STATION (ARFF)	1272'
24	FIRE DISTRICT MODULAR HOMES	1250'
25	SRE BUILDING	1256'
26	FEDERAL EXPRESS/EXECUTIVE FLIGHT	1260'
27	HELIPADS	-
28	FIRE CACHE BUILDING (FOREST SERVICE)	1253'
29	ELECTRICAL VAULT	-
30	FOREST SERVICE OFFICE	1283'
31	AIRPORT EQUIPMENT STORAGE	-
32	CONVENTIONAL HANGAR	1264'
33	CONVENTIONAL HANGAR	1259'
34	CONVENTIONAL HANGAR	1262'
35	CONVENTIONAL HANGAR	1265'
36	EXECUTIVE HANGAR	1266'
37	EXECUTIVE HANGAR	1262'
38	EXECUTIVE HANGAR	1262'
39	EXECUTIVE HANGAR	1258'
40	EXECUTIVE HANGAR	1269'
41	EXECUTIVE HANGAR	1266'
42	EXECUTIVE HANGAR	1266'
43	EXECUTIVE HANGAR	1265'
44	HALLIDAY HANGAR	1259'
45-49	EXECUTIVE HANGARS	1266'
50	CASCADE SOARING SOCIETY	1271'
51	CONVENTIONAL HANGAR	1275'
52	CONVENTIONAL HANGAR	1276'
53	CONVENTIONAL HANGAR	1273'
54	CONVENTIONAL HANGAR	1272'
55	HANGAR	-
56	CONVENTIONAL HANGAR	1274'
57	NON-AVIATION HANGAR	1261'
58	NON-AVIATION HANGAR	1262'
59	NON-AVIATION HANGAR	1261'
61	CMI (NON-AVIATION)	1244'
62	BUILDING (NON-AVIATION)	-
63	EXECUTIVE FLIGHT	1261'
64	VOR	1253'
65	BUILDING	1226'

FUTURE FACILITIES	
NUMBER	DESCRIPTION
F1	RUNWAY 12 MALSF
F2	AUTO PARKING
F3	DEICING BASIN
F4	AIRLINE TERMINAL BUILDING EXPANSION
F5	AIRLINE TERMINAL APRON EXPANSION
F6	FUEL FARM
F7	RENTAL CAR FACILITY
F8	FIXED BASE OPERATOR
F9	GENERAL AV. HANGAR (CORP. or LARGE BOX)
F10	GENERAL AV. HANGAR (SMALL BOX or T)
F11	RUNWAY 30 MALSF
F12	ASOS STATION RELOCATION
F13	AIRPORT OPERATIONS BLDG. (ARFF and SRE)
F14	WESTSIDE AVIATION RELATED EXPANSION
F15	WESTSIDE TENANT EXPANSION (NON-AV)
F16	U.S.F.S. HELICOPTER PARKING
F17	SEGMENTED CIRCLE

EXISTING RUNWAY VIS / NAV AIDS	
NUMBER	DESCRIPTION
A1	RUNWAY 12 END IDENTIFIER LIGHTS (REILS)
A2	RUNWAY 12 GLIDE SLOPE
A3	RUNWAY 12 PAPI (4 LIGHT)
A4	AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)
A5	RUNWAY 30 PAPI (2 LIGHT)
A6	RUNWAY 30 REILS
A7	LOCALIZER
A8	VHF OMNI-DIRECTIONAL RANGE (VOR)/DME* and ADJACENT COMMUNICATIONS EQUIP.

*DME = DISTANCE MEASURING EQUIPMENT

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
PROPERTY TO BE RELEASED (FAA OBLIGATION) (i)	N/A	
DEVELOPMENT AREA	N/A	
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVAL	N/A	
TURF RUNWAY	N/A	(b)
DEICING BASIN	N/A	
VACATED ROADWAY	N/A	
ROADWAY		(e)
AUTOMOBILE PARKING	N/A	
BUILDING		(c)
BUILDING TO BE REMOVED	N/A	
FENCE (i)		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
PRECISION APPROACH PATH INDICATOR (PAPI)		
THRESHOLD LIGHTS		
ROTATING BEACON		
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
LOCALIZER		N/A
GLIDE SLOPE		N/A
WIND CONE		
AIRPORT REFERENCE POINT (ARP)		
VOR FACILITY		N/A
COMPASS ROSE		N/A
SURVEY MONUMENT		N/A
TAXIWAY SAFETY AREA	TSA	TSA
LOCALIZER CRITICAL AREA	LCA	N/A
GLIDE SLOPE CRITICAL AREA	GCA	N/A
THRESHOLD SITING SURFACE	TSS	TSS
FAR PART 77 SURFACE	P77	P77
BUILDING RESTRICTION LINE (BRL) (k)	BRL	N/A
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
RUNWAY VISIBILITY ZONE (RVZ)	RVZ	RVZ
ASOS CRITICAL AREA (k)	ACA	ACA
VOR CRITICAL AREA (k)	VCA	N/A

ALP NOTES:

- ALP prepared using design criteria from FAA Advisory Circular 150/5300-13A Change 1, *Airport Design*, FAA Standard Operating Procedures 2.00 and 3.00, and Part 77 of the Federal Aviation Regulations (FAR), *Safe, Efficient Use, and Preservation of the Navigable Airspace.*
- ALP drawings updated from 'as-built' ALP drawing set prepared by Stantec on April 25, 2017 for the Runway 12 extension project and land acquisition. ALP base mapping (planimetrics, topographic contours) reflects features obtained September, 2016. Digital ortho aerial imagery conducted by Stantec, September 13, 2016. Master Plan ALP AGIS mapping features supplemented by aerial imagery conducted by Quantum Spatial via Cessna in November, 2016.
- Runway elevations and coordinates in NAD83 and NAVD88. Source: ground survey conducted by third party surveyor in July 29, 2016, as reported in Airports Facility Directory and AVN Data Sheet. Future runway end coordinates estimated.

(a) Existing Runway 12-30 width (150'), paved shoulders (25' wide) and blast pad dimension (200' x 200') reflects FAA design standards for RDC C-II aircraft with a MTOW greater than 150,000 pounds. The FAA standard runway width is 100 feet, the shoulder width is 20 feet, and the runway blast pad width is 140 feet. The airport is planning to accommodate aircraft with similar characteristics weighing greater than 150,000 pounds. Future FAA determination may be required to reflect applicable RDC C-II standards with greater than 150,000 pound MTOW.

(b) The planned turf Runway 8-26 is not required to meet FAA crosswind standards, and is not FAA eligible. Runway 8-26 is designed to accommodate light sport utility aircraft and gliders/airplane landings with approach speeds less than 50 knots.

(c) Taxiway 'A' (outside) parallel taxiway system is designed for ADG III and TDG 5 standards and planned to be reconstructed at a 400-foot to 527.5-foot Runway 12/30 centerline separation; elevation adjustment does not apply. Taxiway A and connectors designed for Q-400 (TDG 5 aircraft). Q-400 aircraft continue to operate at the airport. Taxiway design group to be reconsidered at time of design. The portion of Taxiway A transitioning past the ILS glidelslope is planned to remain at a 527.5-foot runway separation. Taxiway segments planned to be renamed following parallel Taxiway 'A' improvements.

(d) The planned westside parallel taxiway system is designed for ADG II and TDG 3 standards. Development of the westside taxiway system and aviation related facilities encroaching the VOR buffer and adjacent communications equipment is contingent upon the future VOR/DME disposition (deactivated, relocated, replaced). The relocation of the VOR/DME station is not included in the FAA MON program. Any taxiways constructed in the VOR critical area will require OEIS G review.

(e) Future airport buildings/hangars shown for conceptual layout purposes. Proposed roadways are shown for planning-level purposes, with final roadway alignment and right-of-way to be coordinated with the proper local and/or state authorities.

(f) Existing perimeter fence is 6' to 8' tall. Future fencing to meet FAA/TSA requirements, typically 8' to 10' tall for commercial airports.

(g) Airport restriction areas: building restriction line (BRL) for Runway 12-30 established to provide approximately 35-foot obstacle clearance based on Part 77 imaginary surfaces. BRL for the planned turf Runway 8-26 established to provide approximately 18-foot obstacle clearance based on Part 77. The VOR/DME station buffer radius is 1,000-feet. The AWOS-3 protection area limits development to 15-feet below the wind sensor elevation within a 500-foot radius, and 10-feet above the wind sensor elevation within a 500 to 1,000-foot radius. Structures must also conform to FAA NAVAID critical areas and line-of-sight criteria.

(h) Magnetic Declination source: National Geophysical Data Center, July 2017.

(i) The airport owns and controls property no longer planned for aeronautical purposes. The discharge or relinquishment of these properties/parcels, as subject to FAA release authorization, involves land being released from the airport's contractual obligations; including from a particular FAA assurance or federal obligation, aeronautical use, land use condition, and/or the future disposal (sale) of property.

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

TERMINAL AREA PLAN

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 5 OF 15

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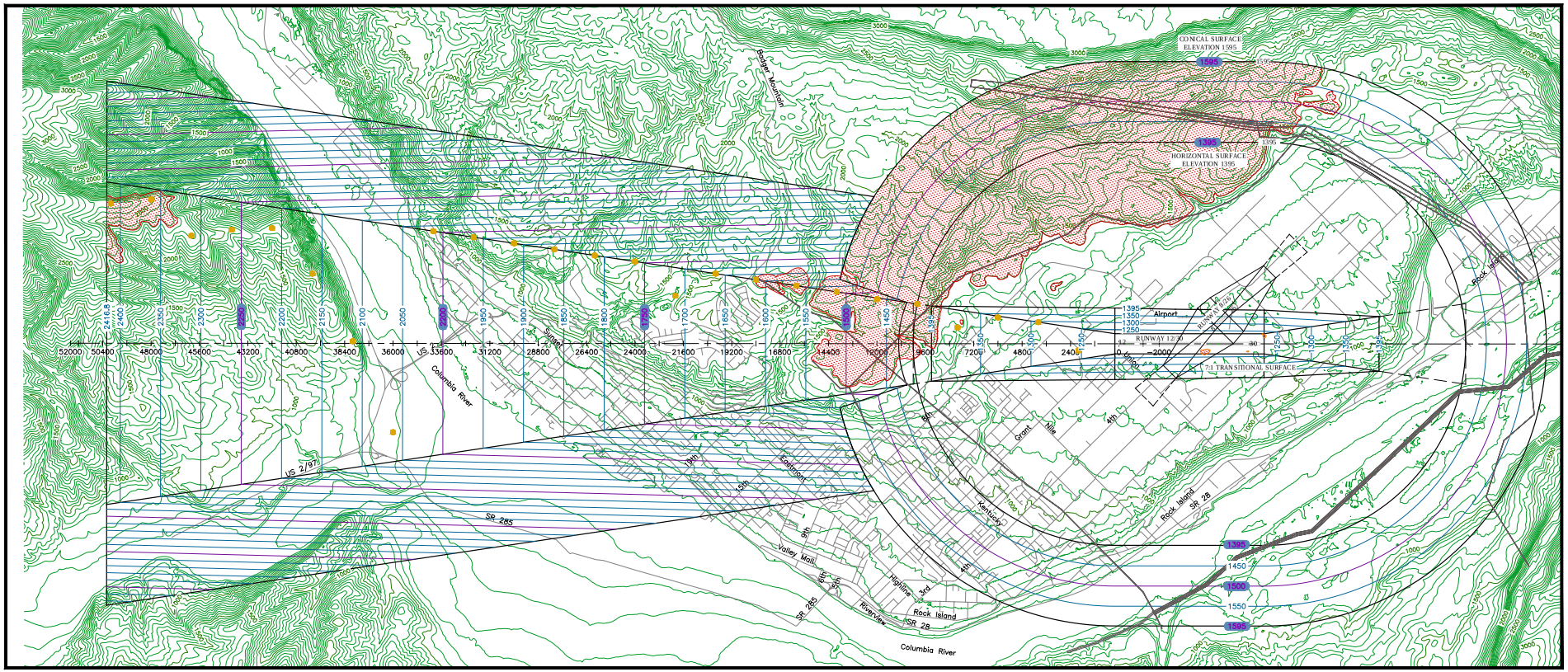

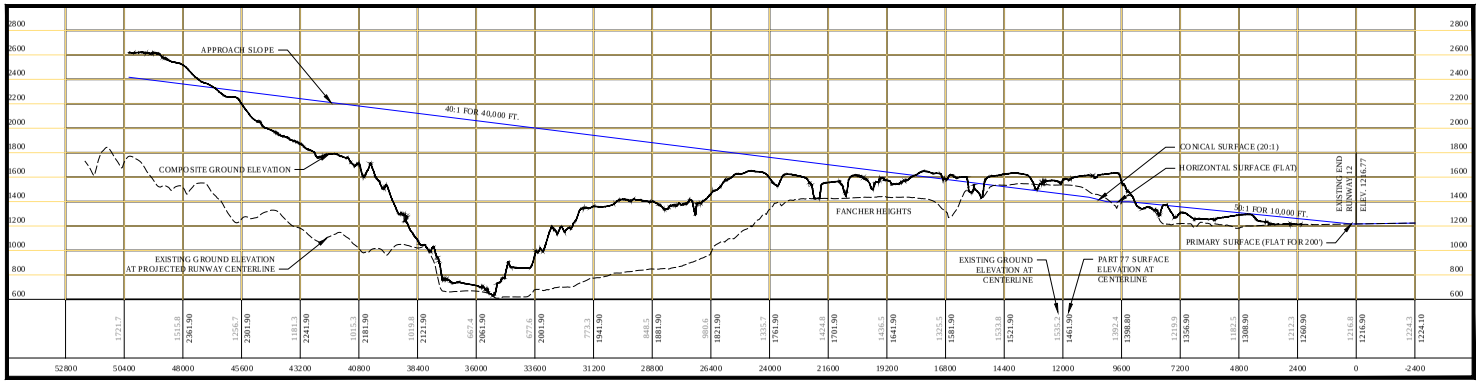

2000 — AIRSPACE ELEVATIONS (250' INCREMENTS)

1950 — AIRSPACE ELEVATIONS (50' INCREMENTS)

2000 — EXISTING CONTOURS

HIGHEST POINT ALONG APPROACH SURFACE FOR COMPOSITE PROFILE

TERRAIN OBSTRUCTION
SEE SHEETS 12 AND 13
FOR OBSTRUCTION TABLES

TRUE NORTH
MAGNETIC DECLINATION
15.39°E 0.37°
JULY 2017
ANNUAL CHANGE
0.1° W/YEAR

0 2400 4800 FEET

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

FUTURE RWY 12 PART 77 - PLAN & PROFILE

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 6 OF 15

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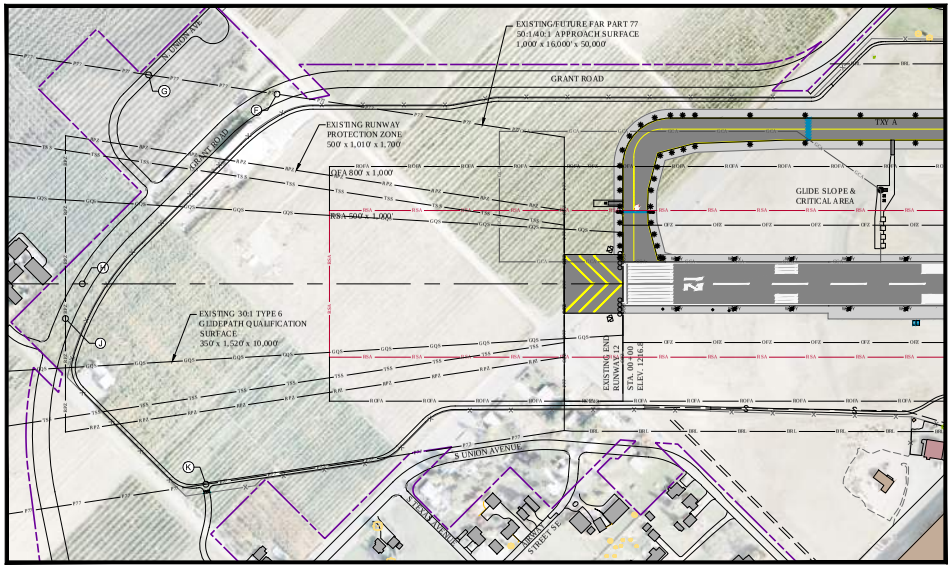
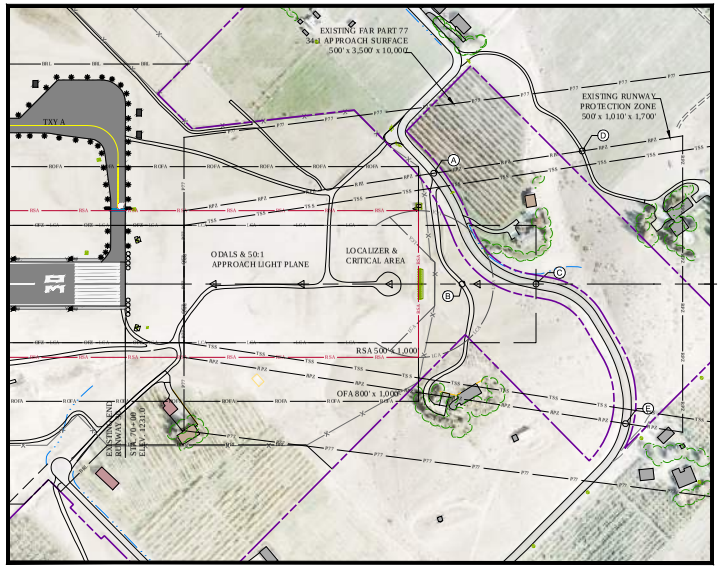
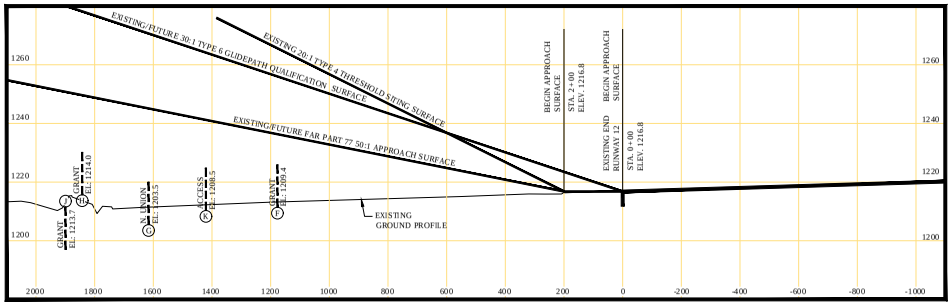


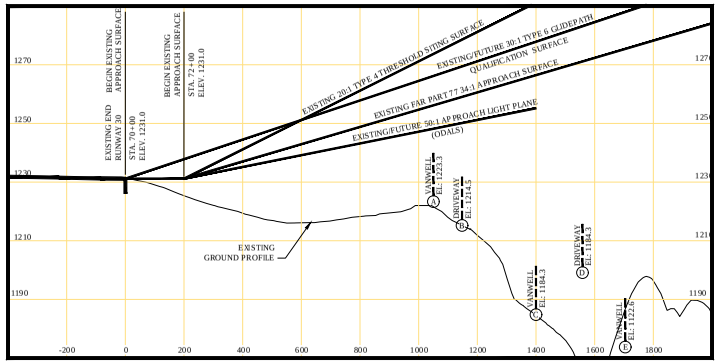
RUNWAY END 12 - PLAN



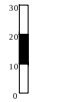
RUNWAY END 30 - PLAN



RUNWAY END 12 - PROFILE



RUNWAY END 30 - PROFILE



LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
DEVELOPMENT AREA	N/A	N/A
AIRFIELD PAVEMENT		N/A
ROADWAY		N/A
PARKING	N/A	N/A
BUILDING		N/A
FENCE		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
THRESHOLD LIGHTS		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
LOCALIZER CRITICAL AREA	LCA	N/A
GLIDE SLOPE CRITICAL AREA	GCA	N/A
DEPARTURE SURFACE	DEP	N/A
GLIDEPATH QUALIFICATION SURFACE	GQS	N/A
THRESHOLD SITING SURFACE	TSS	N/A
FAR PART 77 SURFACE	P77	N/A
BUILDING RESTRICTION LINE (BRL)	BRL	N/A
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	N/A
RUNWAY PROTECTION ZONE (RPZ)	RPZ	N/A
RUNWAY SAFETY AREA (RSA)	RSA	N/A
ASOS CRITICAL AREA	ACA	N/A
VOR CRITICAL AREA	VCA	N/A

NOTE: EXISTING APPENDIX 2 SURFACES IDENTIFIED IN PREVIOUS ALP ARE NO LONGER APPLICABLE, THESE ARE REPLACED BY TABLE 3-2 APPROACH/DEPARTURE SURFACES IN AC 150/5300-13A, CHANGE 1.

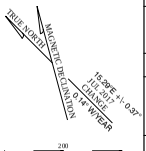
EXISTING APPROACH/DEPARTURE SURFACES

RUNWAY END	TYPE	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
12	4	400'x3,400'x10,000'	0'	20:1
30	4	400'x3,400'x10,000'	0'	20:1
8	1	120'x300'x500'/2,500'	0'	15:1
26	1	120'x300'x500'/2,500'	0'	15:1
12/30	7	1,000'x10,200'x6,466'	0'	40:1

EXISTING FAR PART 77 APPROACH SURFACES

RUNWAY END	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
12	1000'x16,000'x50,000'	200'	50:1/40:1*
30	**500'x3,500'x10,000'	200'	34:1

1. PRECISION APPROACH CONSISTS OF ADDITIONAL SURFACES, SEE PART 77 SHEET.
* SLOPE IS 50:1 FOR THE FIRST 10,000 FEET, AND 40:1 FOR THE ADDITIONAL 40,000 FEET.
** INNER DIMENSION OF 500' MODIFIED TO 1000' TO CORRELATE WITH PRIMARY SURFACE.



NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

EXISTING RUNWAY 12/30-INNER PORTION

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 7 OF 15

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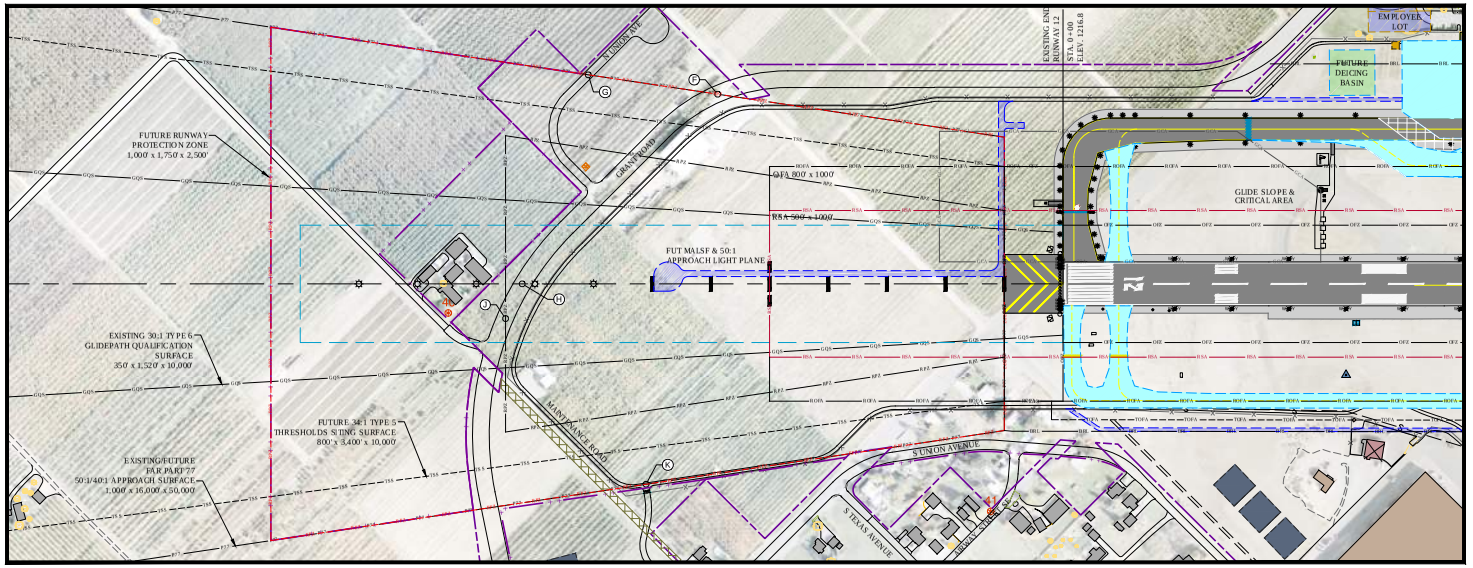
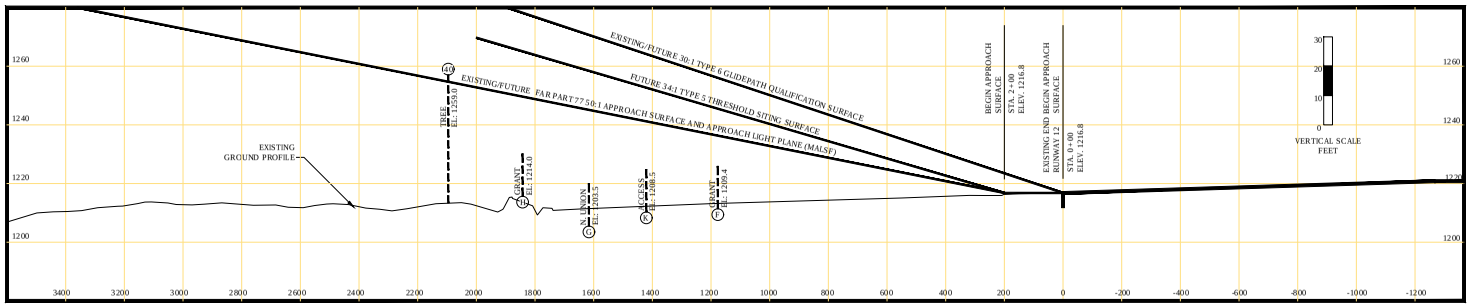


FUTURE RUNWAY END 12 - PLAN



FUTURE RUNWAY END 12 - PROFILE

FUTURE FAR PART 77 APPROACH SURFACES

RUNWAY END	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
12	1000'x16,000'x50,000'	200'	50:1/40:1*
30	1000'x4,000'x10,000'	200'	34:1
8	250'x1,250'x5,000'	0'	20:1
26	250'x1,250'x5,000'	0'	20:1

1. PRECISION APPROACH CONSISTS OF ADDITIONAL SURFACES, SEE PART 77 SHEET.
* SLOPE IS 50:1 FOR THE FIRST 10,000 FEET, AND 40:1 FOR THE ADDITONAL 40,000 FEET.

NOTE: FUTURE APPENDIX 2 SURFACES IDENTIFIED IN PREVIOUS ALP ARE NO LONGER APPLICABLE, THESE ARE REPLACED BY TABLE 3-2 APPROACH/DEPARTURE SURFACES IN AC 150/5300-13A, CHANGE 1.

FUTURE APPROACH/DEPARTURE SURFACES

RUNWAY END	TYPE	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
12	5	800'x 3,400'x10,000'	200'	34:1
30	4	400'x 3,400'x10,000'	200'	20:1
8	1	120'x 300'x500'/2,500'	0'	15:1
26	1	120'x 300'x500'/2,500'	0'	15:1
12/30	7	1,000'x10,200'x6,466'	0'	40:1

⚠ FAR PART 77 OBSTRUCTION TABLE

OBJECT DESCRIPTION	OBJECT ELEVATION	PROPOSED OBJECT DISPOSITION
40 TREE	1259 MSL	REMOVE
41 TREE	1278 MSL	REMOVE

1. REFER TO SHEET 13 FOR ADDITIONAL PART 77 OBSTRUCTION INFORMATION.

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVAL	N/A	
ROADWAY		
PARKING	N/A	
BUILDING		
BUILDING TO BE REMOVED	N/A	
FENCE		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
PRECISION APPROACH PATH INDICATOR (PAPI)		
THRESHOLD LIGHTS		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
MALSF/ODALS CRITICAL AREA		
LOCALIZER CRITICAL AREA	LCA	LCA
GLIDE SLOPE CRITICAL AREA	GCA	GCA
DEPARTURE SURFACE	DEP	DEP
GLIDE PATH QUALIFICATION SURFACE	GQS	GQS
THRESHOLD SITING SURFACE	TSS	TSS
FAR PART 77 SURFACE	P77	P77
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
ASOS CRITICAL AREA	ACA	ACA

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

FUTURE RUNWAY 12-INNER PORTION

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 8 OF 15

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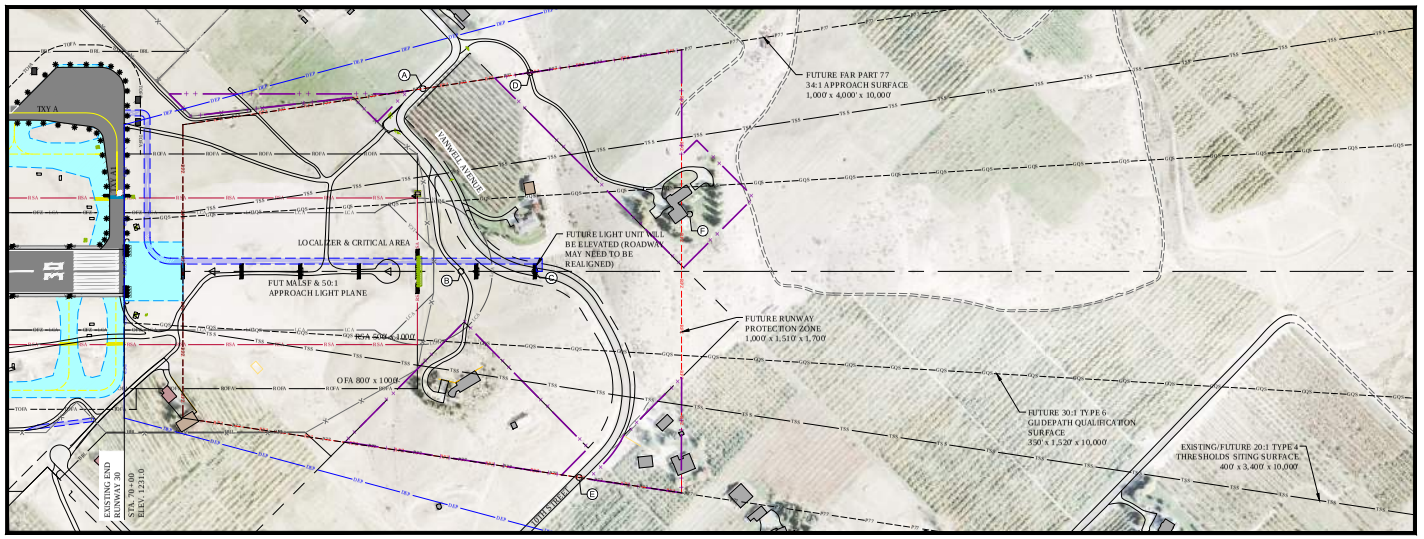
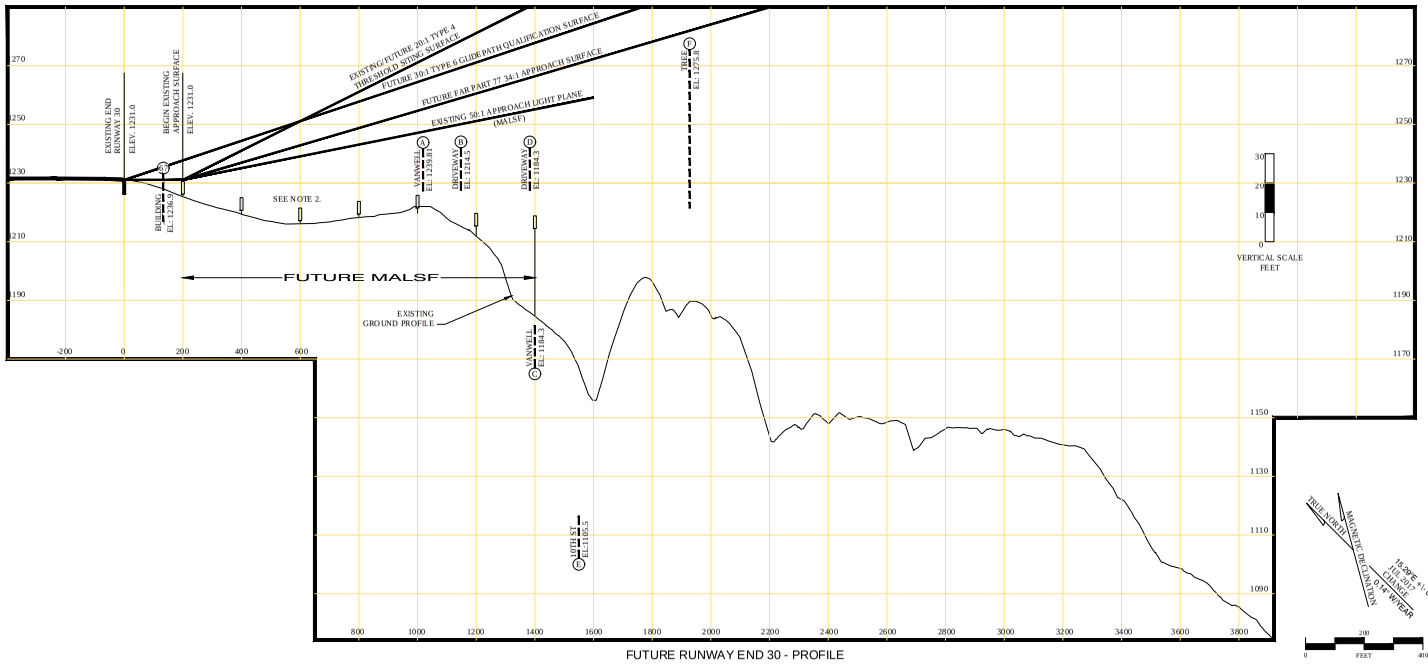


FUTURE RUNWAY END 30 - PLAN



FUTURE RUNWAY END 30 - PROFILE

FUTURE FAR PART 77 APPROACH SURFACES

RUNWAY END	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
12	1000'x16,000'x50,000'	200'	50:1/40:1*
30	1000'x4,000'x10,000'	200'	34:1
8	250'x1,250'x5,000'	0'	20:1
26	250'x1,250'x5,000'	0'	20:1

1. PRECISION APPROACH CONSISTS OF ADDITIONAL SURFACES, SEE PART 77 SHEET.
* SLOPE IS 50:1 FOR THE FIRST 10,000 FEET, AND 40:1 FOR THE ADDITIONAL 40,000 FEET.

NOTE: FUTURE APPENDIX 2 SURFACES IDENTIFIED IN PREVIOUS ALP ARE NO LONGER APPLICABLE, THESE ARE REPLACED BY TABLE 3-2 APPROACH/DEPARTURE SURFACES IN AC 150/5300-13A, CHANGE 1.

FUTURE APPROACH/DEPARTURE SURFACES

RUNWAY END	TYPE	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
12	5	800'x3,400'x10,000'	200'	34:1
30	4	400'x3,400'x10,000'	200'	20:1
8	1	120'x300'x500'/2500'	0'	15:1
26	1	120'x300'x500'/2500'	0'	15:1
12/30	7	1,000'x10,200'x6,466'	0'	40:1

PART 77 OBSTRUCTION TABLE

OBJECT	OBJECT DESCRIPTION	OBJECT ELEVATION	PROPOSED OBJECT DISPOSITION
67	BUILDING	1236.8 MSL	REMOVE
68	SIGN	1236.6 MSL	'NO ACTION'
69	GROUND	1234.1 MSL	EXCAVATE

1. REFER TO SHEET 12 AND 13 FOR ADDITIONAL PART 77 OBSTRUCTION INFORMATION.

2. THE FUTURE RUNWAY 30 MALSF IS SHOWN FOR GENERAL PLANNING PURPOSES. RSA GRADIENT REQUIREMENTS IN THIS AREA; THE FIRST 200 FEET OF THE RSA BEYOND THE RUNWAY ENDS, THE LONGITUDINAL GRADE IS 3.0% MAX. FOR REMAINDER OF RSA THE MAXIMUM ALLOWABLE POSITIVE LONGITUDINAL GRADE IS SUCH THAT NO PART OF THE RSA PENETRATES ANY APPLICABLE APPROACH SURFACE OR CLEARWAY PLANE. MAXIMUM ALLOWABLE NEGATIVE GRADE IS 5 %.

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRFIELD PAVEMENT		
ROADWAY		
PARKING	N/A	
BUILDING		N/A
BUILDING TO BE REMOVED	N/A	
FENCE		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
PRECISION APPROACH PATH INDICATOR (PAPI)		
THRESHOLD LIGHTS		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
LOCALIZER CRITICAL AREA	LCA	LCA
GLIDE SLOPE CRITICAL AREA	GCA	GCA
DEPARTURE SURFACE	DEP	DEP
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS
THRESHOLD SITING SURFACE	TSS	TSS
FAR PART 77 SURFACE	P77	P77
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
ASOS CRITICAL AREA	ACA	ACA
VOR CRITICAL AREA	VCA	VCA

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

FUTURE RUNWAY 30

TRUE NORTH
MAGNETIC DECLINATION 15.20°E +/- 0.37° (2019) CHANGING 0.14° W/YEAR

0 200 400 FEET

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 9 OF 15

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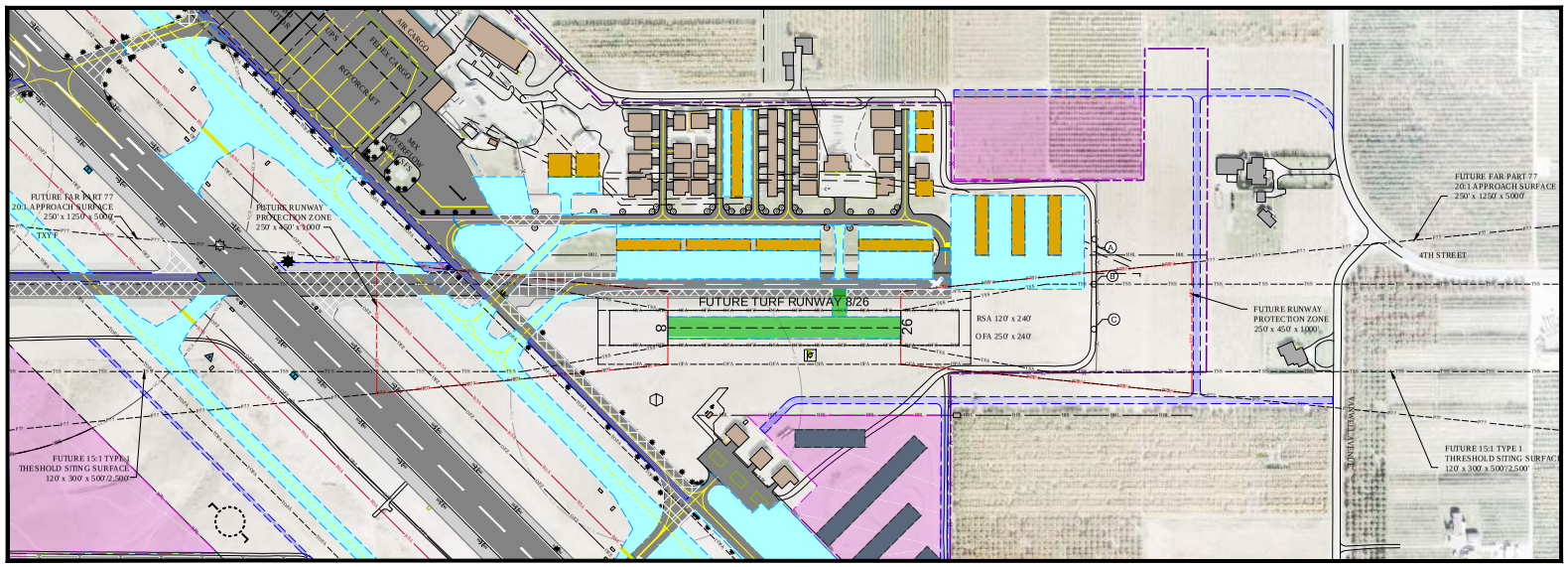
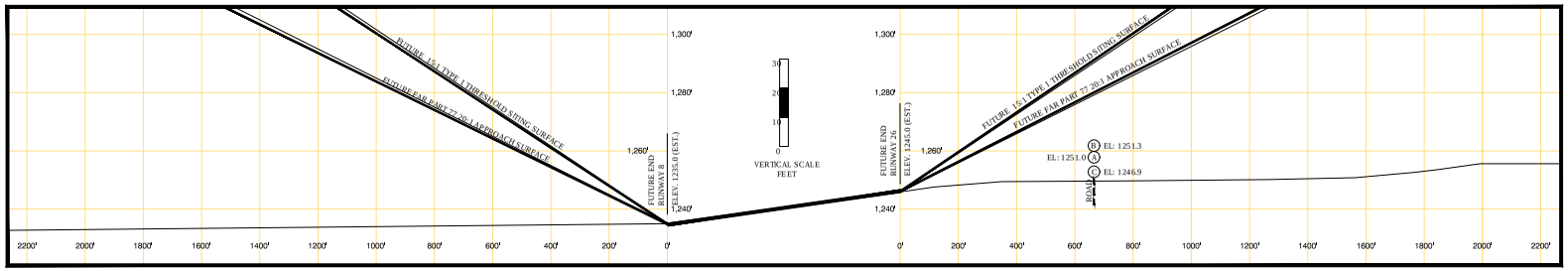


FUTURE RUNWAY END 8 - PLAN

FUTURE RUNWAY END 26 - PLAN



FUTURE RUNWAY END 8 - PROFILE

FUTURE RUNWAY END 26 - PROFILE

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRFIELD PAVEMENT		
ROADWAY		
PARKING	N/A	
BUILDING		
ULTIMATE BUILDING	N/A	
BUILDING TO BE REMOVED	N/A	
FENCE		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
PRECISION APPROACH PATH INDICATOR (PAPI)		
THRESHOLD LIGHTS		
RUNWAY END IDENTIFIER LIGHTS (REIL)		
LOCALIZER CRITICAL AREA	LCA	LCA
GLIDE SLOPE CRITICAL AREA	GCA	GCA
DEPARTURE SURFACE	DEP	DEP
GLIDEPATH QUALIFICATION SURFACE	GQS	GQS
THRESHOLD SITING SURFACE	TSS	TSS
FAR PART 77 SURFACE	77	77
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
ASOS CRITICAL AREA	ACA	ACA
VOR CRITICAL AREA	VCA	VCA

NOTES RE: FUTURE TURF RUNWAY

TURF RUNWAY TO BE CONSTRUCTED FOLLOWING THE RELOCATION OF TAXIWAY A.

TURF RUNWAY TO BE DESIGNED FOR AIRCRAFT WITH APPROACH SPEEDS OF LESS THAN 50 KNOTS.

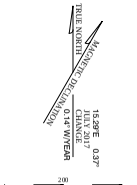
NOTE: APPENDIX 2 SURFACES IDENTIFIED IN PREVIOUS ALP ARE NO LONGER APPLICABLE, THESE ARE REPLACED BY TABLE 3-2 APPROACH/DEPARTURE SURFACES IN AC 150/5300-13A, CHANGE 1.

APPROACH/DEPARTURE SURFACES

RUNWAY END	TYPE	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
8	1	120'x300'x500'/2,500'	0'	15:1
26	1	120'x300'x500'/2,500'	0'	15:1

FUTURE FAR PART 77 APPROACH SURFACES

RUNWAY END	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
8	250'x1,250'x5,000'	0'	20:1
26	250'x1,250'x5,000'	0'	20:1



NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

FUTURE TURF RUNWAY 8/26

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 10 OF 15

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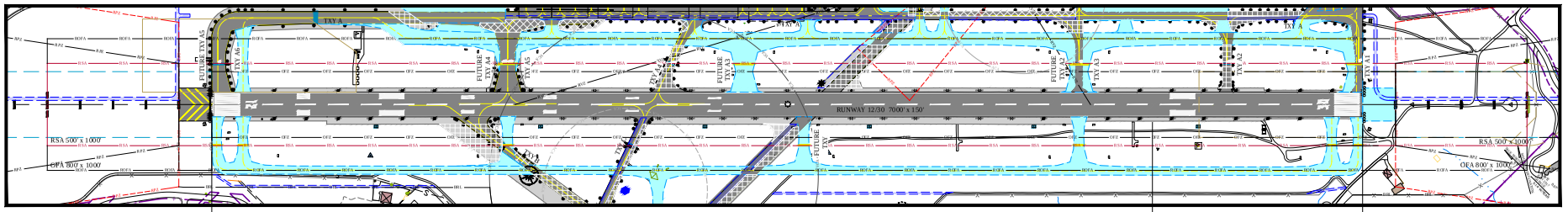
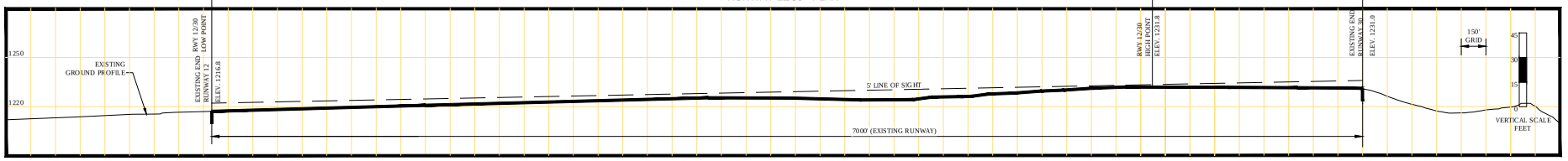
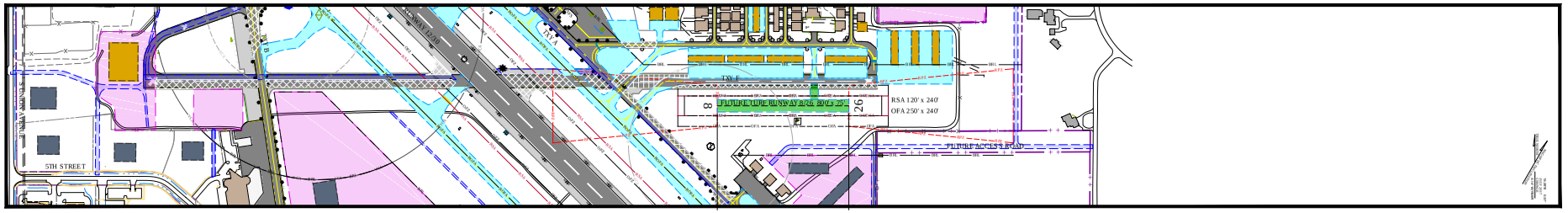


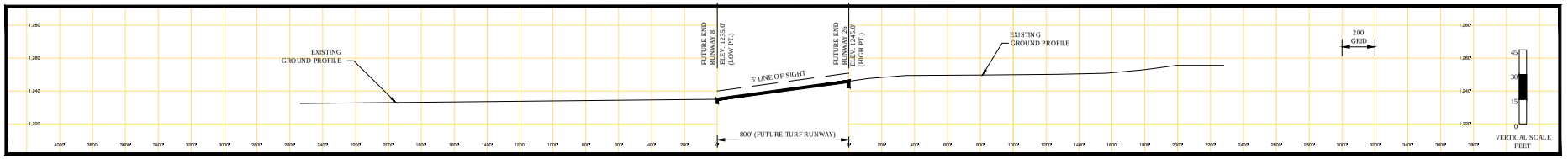
RUNWAY 12/30 - PLAN



RUNWAY12/30 - PROFILE



FUTURE TURF RUNWAY 8/26 - PLAN



FUTURE TURF RUNWAY 8/26 - PROFILE

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVAL	N/A	
ROADWAY		
PARKING	N/A	
BUILDING		
ULTIMATE BUILDING	N/A	
BUILDING TO BE REMOVED	N/A	
FENCE		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
PRECISION APPROACH PATH INDICATOR (PAPI)		
THRESHOLD LIGHTS		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

LEGEND	EXISTING	FUTURE
LOCALIZER CRITICAL AREA	LCA	LCA
DEPARTURE SURFACE	DEP	DEP
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
ASOS CRITICAL AREA	ACA	ACA
VOR CRITICAL AREA	VCA	VCA

NOTES:

THE PLANNED ADDITIONAL NON-PAVED TURF RUNWAY 8-26 IS NOT REQUIRED TO MEET FAA CROSSWIND STANDARDS, AND IS THEREFORE, NOT FAA ELIGIBLE. THE PLANNED RUNWAY 8-26 IS DESIGNED TO ACCOMMODATE LIGHT SPORT UTILITY AIRCRAFT AND GLIDER-SAILPLANE LANDINGS WITH APPROACH SPEEDS LESS THAN 50-KNOTS. THE RUNWAY CFR 77 APPROACH SURFACE AND RUNWAY PROTECTION ZONE PLANNED TO BEGIN AT THE RUNWAY END. RUNWAY REQUIRES FAA AIRSPACE DETERMINATION BASED ON EXISTING/FUTURE AIRPORT CONDITIONS WITH REGARDS TO AIRSPACE ANALYSIS AND AIRCRAFT TRAFFIC PATTERNS.

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

RUNWAY CENTERLINE 12/30 & 8/26 - PLAN & PROFILE

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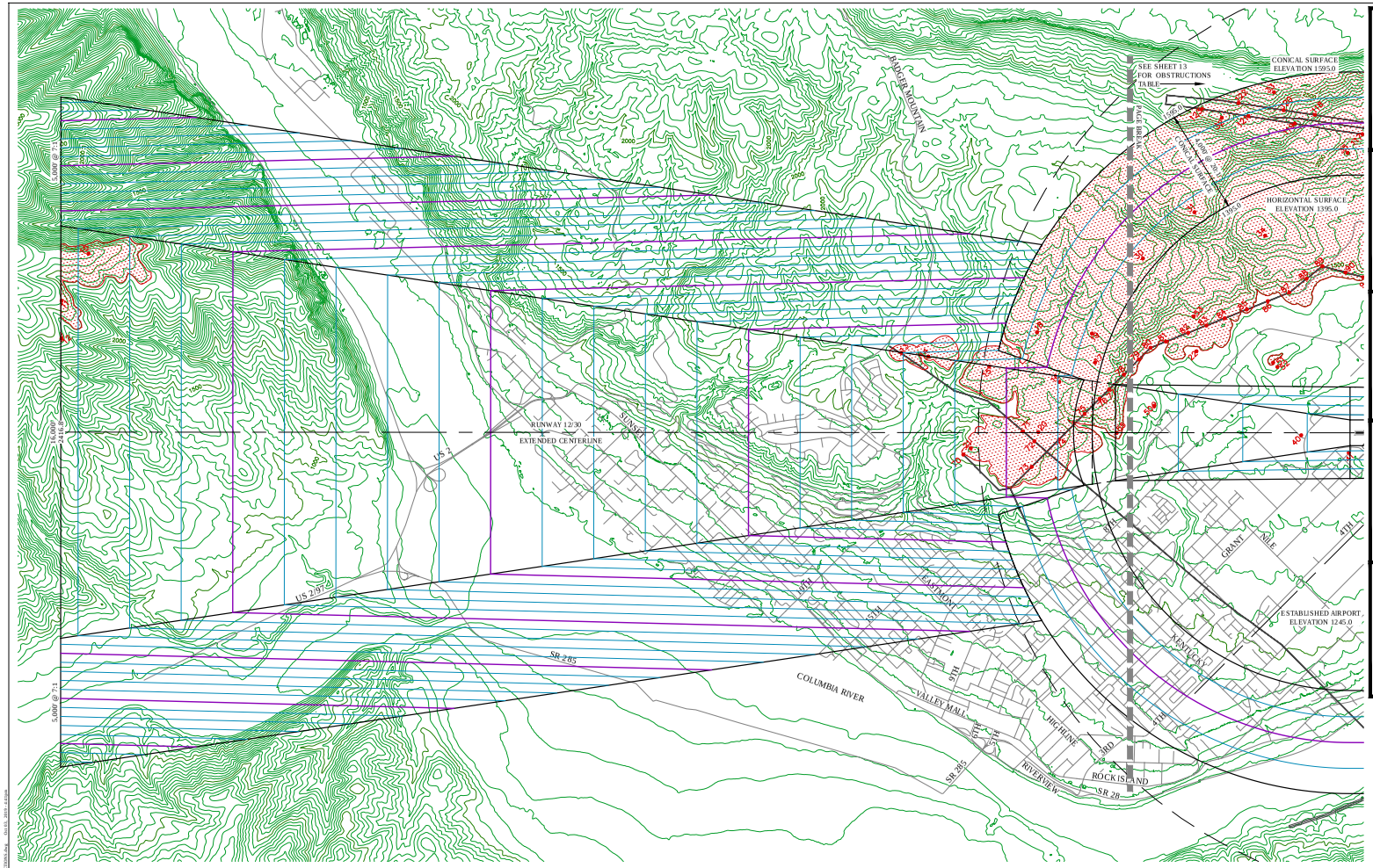

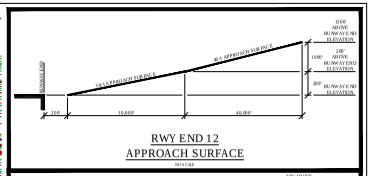

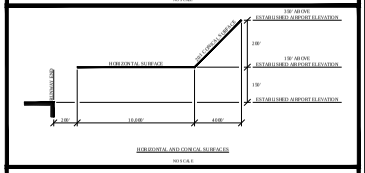

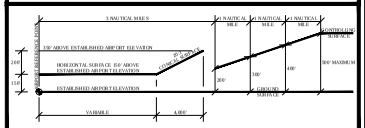

GENERAL NOTES

1. APPROACH SURFACE TO PAVED RUNWAY END BEGINS 200' BEYOND RUNWAY END.
2. ANY HEIGHT WITHIN A TERMINAL OBSTACLE CLEARANCE AREA, INCLUDING AN INITIAL APPROACH SEGMENT, A DEPARTURE AREA, AND A CIRCLING APPROACH AREA, WHICH WOULD RESULT IN THE VERTICAL DISTANCE BETWEEN ANY POINT ON THE OBJECT AND AN ESTABLISHED MINIMUM INSTRUMENT FLIGHT ALTITUDE WITHIN THAT AREA OR SEGMENT TO BE LESS THAN THE REQUIRED OBSTACLE CLEARANCE IS AN OBSTRUCTION TO AIR NAVIGATION.

LEGEND

- 2000 — AIRSPACE ELEVATION (250' INCREMENTS)
- 1950 — AIRSPACE ELEVATION (50' INCREMENTS)
- 2000 — EXISTING GROUND ELEVATIONS
- AIRSPACE TERRAIN OBSTRUCTION

PART 77 OBSTRUCTION TABLE

ID	OBJECT DESCRIPTION	OBJECT ELEVATION	OBSTRUCTED PART 77 SURFACE	SURFACE ELEVATION	OBJECT PENETRATION	PROPOSED OBJECT DISPOSITION
10	GROUND	2615.0	40:1 APPROACH	2390.0	225.0	"NO ACTION"
11	GROUND	2548.0	40:1 APPROACH	2419.0	129.0	"NO ACTION"
12	GROUND	2434.0	40:1 APPROACH	2419.0	15.0	"NO ACTION"
13	GROUND	1646.0	40:1 APPROACH	1602.0	44.0	"NO ACTION"
14	GROUND	1619.0	40:1 APPROACH	1579.0	40.0	"NO ACTION"
15	GROUND	1630.3	40:1 APPROACH	1516.8	113.5	"NO ACTION"
16	GROUND	1593.2	40:1 APPROACH	1449.0	144.3	"NO ACTION"
17	GROUND	1667.0	20:1 CONICAL	1412.4	254.6	"NO ACTION"
18	GROUND	1661.8	20:1 CONICAL	1536.3	125.5	"NO ACTION"
19	PRIMARY ROAD	1777.9	20:1 CONICAL	1435.0	342.8	"NO ACTION"
20	GROUND	1554.2	40:1 APPROACH	1534.7	19.5	"NO ACTION"
21	GROUND	1535.2	40:1 APPROACH	1469.2	66.0	"NO ACTION"
22	TREE	1407.1	HORIZONTAL	1398.8	8.3	"NO ACTION"

PART 77 OBSTRUCTION TABLE

ID	OBJECT DESCRIPTION	OBJECT ELEVATION	OBSTRUCTED PART 77 SURFACE	SURFACE ELEVATION	OBJECT PENETRATION	PROPOSED OBJECT DISPOSITION
70	POLE	1623.3	40:1 APPROACH	1541.8	81.5	"NO ACTION"
71	POLE	1596.1	40:1 APPROACH	1484.2	111.9	"NO ACTION"
72	POLE	1582.8	40:1 APPROACH	1472.9	109.9	"NO ACTION"
73	POLE	1596.2	40:1 APPROACH	1475.6	120.6	"NO ACTION"
74	POLE	1581.7	40:1 APPROACH	1449.3	132.5	"NO ACTION"
75	POLE	1581.1	20:1 CONICAL	1414.8	166.2	"NO ACTION"
76	POLE	1645.3	HORIZONTAL	1398.8	246.5	"NO ACTION"
77	POLE	1661.0	HORIZONTAL	1398.8	262.2	"NO ACTION"
78	POLE	1573.8	HORIZONTAL	1398.8	175.0	"NO ACTION"
79	POLE	1476.5	HORIZONTAL	1398.8	77.7	"NO ACTION"
80	POLE	1470.0	HORIZONTAL	1398.8	71.2	"NO ACTION"
81	POLE	1461.2	HORIZONTAL	1398.8	62.4	"NO ACTION"
82	POLE	1554.1	HORIZONTAL	1398.8	155.3	"NO ACTION"

PART 77 OBSTRUCTION TABLE

ID	OBJECT DESCRIPTION	OBJECT ELEVATION	OBSTRUCTED PART 77 SURFACE	SURFACE ELEVATION	OBJECT PENETRATION	PROPOSED OBJECT DISPOSITION
83	POLE	1496.4	HORIZONTAL	1398.8	97.6	"NO ACTION"
84	POLE	1513.6	HORIZONTAL	1398.8	114.8	"NO ACTION"
85	POLE	1492.1	HORIZONTAL	1398.8	93.3	"NO ACTION"
86	POLE	1428.0	HORIZONTAL	1398.8	29.2	"NO ACTION"
87	POLE	1523.7	HORIZONTAL	1398.8	124.9	"NO ACTION"
88	POLE	1568.9	HORIZONTAL	1398.8	170.1	"NO ACTION"
89	POLE	1582.4	HORIZONTAL	1398.8	183.6	"NO ACTION"
90	POLE	1541.4	HORIZONTAL	1398.8	142.6	"NO ACTION"
91	POLE	1473.3	HORIZONTAL	1398.8	74.5	"NO ACTION"
92	POLE	1475.8	HORIZONTAL	1398.8	77.0	"NO ACTION"
93	POLE	1504.4	HORIZONTAL	1398.8	105.6	"NO ACTION"
94	POLE	1528.5	HORIZONTAL	1398.8	129.7	"NO ACTION"
95	POLE	1535.3	HORIZONTAL	1398.8	136.5	"NO ACTION"

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

PART 77 & OBSTRUCTIONS NW - 1 OF 2

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 12 OF 15

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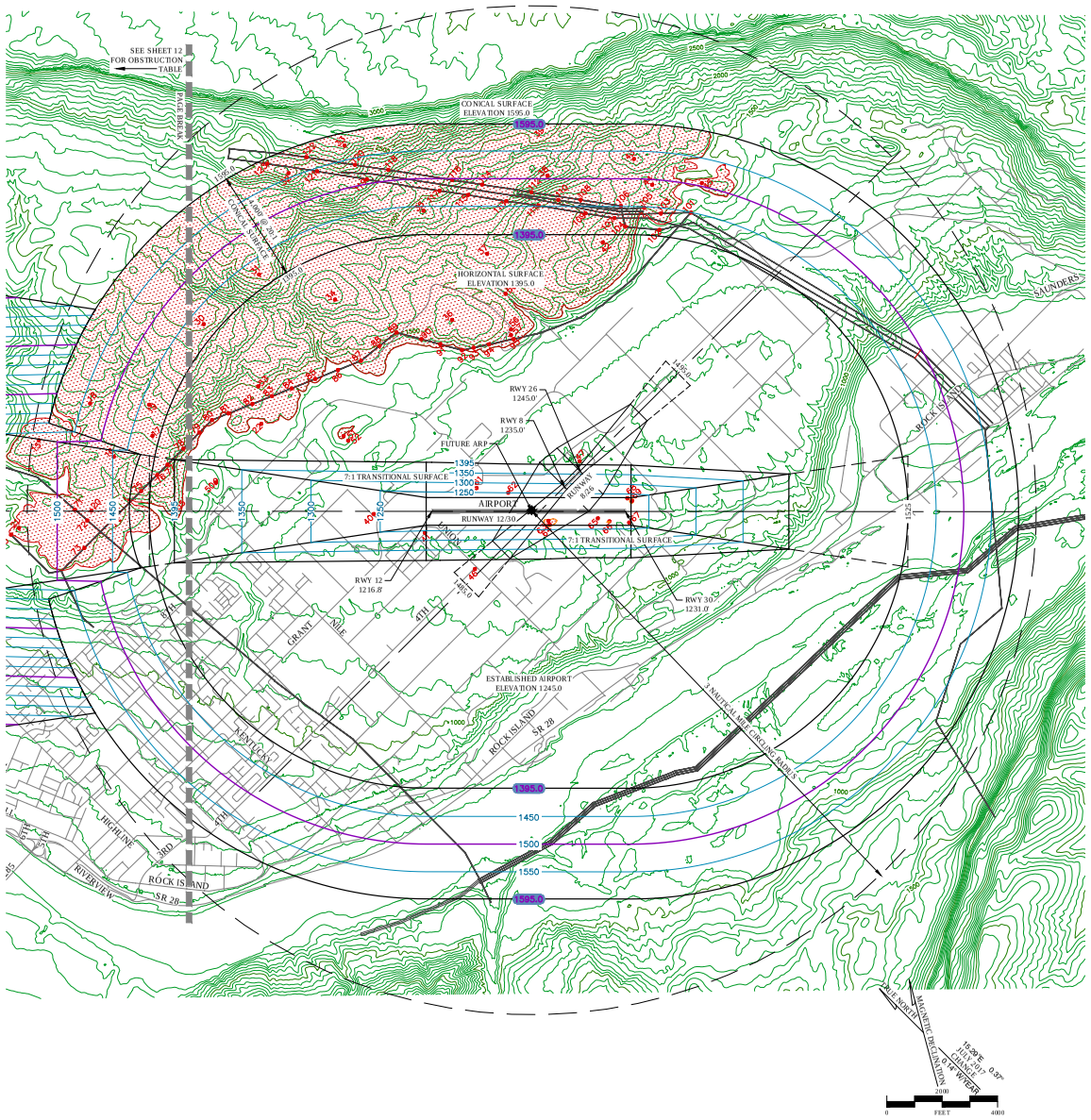

OBSTRUCTION NOTES

1. MANY PROPOSED OBJECT DISPOSITIONS ON PREVIOUS ALP WERE AS SIGNED WITH DISPOSITION 'REQUEST AERONAUTICAL STUDY'. AERONAUTICAL STUDY WAS PERFORMED AND ADDITIONAL OBSTRUCTIONS WERE IDENTIFIED IN THE PROCESS. PROCEDURES WERE DEVELOPED BY FAA ATO BASED ON AERONAUTICAL SURVEY. IF FURTHER PROPOSED OBJECT DISPOSITIONS ARE REQUIRED FOR PART 77 SURFACES, THESE ARE BEYOND THE SCOPE OF AN ASBUILT ALP AND WILL NEED TO BE ADDRESSED BY CURRENT PLANNING EFFORTS AT EAT.
2. 'NO ACTION' PROPOSED OBJECT DISPOSITIONS ARE THE SAME ITEMS DEFINED IN PREVIOUS APPROVED ALP. THE LOCATIONS OF THESE ITEMS HAVE BEEN UPDATED BASED ON AERONAUTICAL SURVEY, AND ADDITIONAL PENETRATIONS IN 'NO ACTION' AREAS ARE ALSO IDENTIFIED.
3. THE OBJECT ELEVATIONS FOR PRIMARY ROADS ARE IDENTIFIED 15' ABOVE ROAD PER REQUIREMENTS.
4. CURRENT MODIFICATION TO AIRPORT DESIGN STANDARDS (MOS) #1 APPROVED BY FAA ON JUNE 5, 2015 ADDRESSES CROSS SLOPE RUNWAY AND TAXIWAY PRIMARY SURFACE PENETRATIONS. THESE PENETRATIONS ARE NOT SHOWN ON THIS ASBUILT ALP. AS IDENTIFIED IN MOS #1, 'FOLLOWING THE RUNWAY EXTENSION PROJECT AND PRIOR TO ANY MAJOR REHABILITATION OR RECONSTRUCTION OF THE RUNWAY, THE SPONSOR WILL PERFORM FURTHER PLANNING AND ENGINEERING EFFORTS IN SUPPORT OF MEETING RUNWAY STANDARDS.'

DATA SOURCE AND ANALYSIS

OBSTRUCTION DATA SHOWN HEREIN WAS OBTAINED FROM FAA AIRPORTS GIS PROJECT EAT-150945 , HAVING BEEN VERIFIED BY THE NATIONAL GEODETIC SURVEY ON 5/1/2015. CRITICAL OBSTACLE DATA WAS SURVEYED IN ACCORDANCE WITH FAA AC 150/5300-18B SPECIFICATIONS FOR VERTICALLY GUIDED AIRPORT AIRSPACE ANALYSIS. THE PART77 COMPOSITE AIRSPACE MODEL WAS CREATED BY STANTEC USING AUTODESK CIVIL 3D 2014 SOFTWARE. THE RESULTING PART77 TIN SURFACE MODEL WAS CONVERTED TO ESRI DTM FORMAT AND PENETRATIONS WERE CALCULATED USING ESRI ARCGIS V10.2.2 SOFTWARE AND STANTEC DEVELOPED GEOPROCESSING TOOLS. TERRAIN OBSTRUCTION BOUNDARIES WERE ESTABLISHED USING COMPOSITE SURFACE COMPARISONS IN CIVIL 3D. IN AREAS CONTAINING A GROUP OF SIMILAR ITEMS OR GROUND PENATRATIONS, THE HIGHEST PENETRATED ITEM IN THAT AREA WAS SELECTED AS AN OBSTACLE.

GENERAL NOTES

1. APPROACH SURFACE TO PAVED RUNWAY END BEGINS 200' BEYOND RUNWAY END.
2. ANY HEIGHT WITHIN A TERMINAL OBSTACLE CLEARANCE AREA, INCLUDING AN INITIAL APPROACH SEGMENT, A DEPARTURE AREA, AND A CIRCLING APPROACH AREA, WHICH WOULD RESULT IN THE VERTICAL DISTANCE BETWEEN ANY POINT ON THE OBJECT AND AN ESTABLISHED MINIMUM INSTRUMENT FLIGHT ALTITUDE WITHIN THAT AREA OR SEGMENT TO BE LESS THAN THE REQUIRED OBSTACLE CLEARANCE IS AN OBSTRUCTION TO AIR NAVIGATION.

LEGEND

- 2000 — AIRSPACE ELEVATION (250' INCREMENTS)
- 1950 — AIRSPACE ELEVATION (50' INCREMENTS)
- 2000 — EXISTING GROUND ELEVATIONS
- AIRSPACE OBSTRUCTION

PART 77 OBSTRUCTION TABLE

ID	OBJECT DESCRIPTION	OBJECT ELEVATION	OBSTRUCTED PART 77 SURFACE	SURFACE ELEVATION	OBJECT PENETRATION	PROPOSED OBJECT DISPOSITION
30	FENCE	2017.8	20:1 CONICAL	1423.9	593.9	"NO ACTION"
31	GROUND	2028.2	20:1 CONICAL	1422.4	605.8	"NO ACTION"
32	GROUND	2554.8	20:1 CONICAL	1558.4	996.4	"NO ACTION"
33	GROUND	2728.2	20:1 CONICAL	1575.7	1 152.5	"NO ACTION"
34	GROUND	1830.3	HORIZONTAL	1398.8	431.5	"NO ACTION"
35	GROUND	1956.7	HORIZONTAL	1441.9	514.8	"NO ACTION"
36	GROUND	1598.5	HORIZONTAL	1398.8	199.7	"NO ACTION"
37	GROUND	1686.5	HORIZONTAL	1398.8	287.7	"NO ACTION"
38	GROUND	1926.0	HORIZONTAL	1505.4	420.7	"NO ACTION"
39	GROUND	2127.2	HORIZONTAL	1594.4	532.8	"NO ACTION"
40	TREE	1259.0	50:1 APPROACH	1254.8	4.2	REMOVE
41	TREE	1278.3	7:1 TRANSITIONAL	1256.2	22.1	REMOVE
42	GROUND	1629.7	HORIZONTAL	1398.8	280.9	"NO ACTION"
43	GROUND	1768.0	20:1 CONICAL	1535.6	232.4	"NO ACTION"
44	GROUND	1640.0	20:1 CONICAL	1490.1	149.8	"NO ACTION"
45	GROUND	1530.9	20:1 CONICAL	1505.6	25.3	"NO ACTION"
46	TREE	1255.0	34:1 APPROACH	1240.0	15.1	RW 7-25 CLOSED
47	BUSH	1251.5	PRIMARY	1248.8	2.7	RW 7-25 CLOSED
50	GROUND	1376.0	50:1 APPROACH	1369.0	7.0	EXCAVATE
51	POLE	1444.4	HORIZONTAL	1398.8	45.6	"NO ACTION"
52	POLE	1402.4	HORIZONTAL	1398.8	3.6	"NO ACTION"
53	BUILDING	1538.0	HORIZONTAL	1398.8	139.2	"NO ACTION"
55	GROUND	1449.5	50:1 APPROACH	1397.9	51.5	"NO ACTION"
56	PRIMARY ROAD	1474.5	HORIZONTAL	1398.8	75.7	"NO ACTION"
57	WATER TOWER	1497.1	HORIZONTAL	1398.8	98.3	"NO ACTION"
58	PRIMARY ROAD	1448.4	HORIZONTAL	1398.8	49.6	"NO ACTION"
61	POLE	1277.1	7:1 TRANSITIONAL	1270.5	6.6	OBSTACLE LIGHT
62	SIGN	1264.1	7:1 TRANSITIONAL	1250.4	13.7	OBSTACLE LIGHT
63	GROUND	1234.0	PRIMARY	1225.3	8.7	EXCAVATE
64	BUSH	1234.6	PRIMARY	1225.3	9.3	REMOVE
65	LIGHTED WINDSOCK	1249.4	PRIMARY	1231.6	17.8	RELOCATE
66	GROUND	1232.9	PRIMARY	1231.4	1.5	EXCAVATE
67	BUILDING	1236.8	PRIMARY	1231.1	5.7	REMOVE
68	SIGN	1236.6	PRIMARY	1231.1	5.5	"NO ACTION"
69	GROUND	1234.1	PRIMARY	1231.1	3.0	EXCAVATE

ID	OBJECT DESCRIPTION	OBJECT ELEVATION	OBSTRUCTED PART 77 SURFACE	SURFACE ELEVATION	OBJECT PENETRATION	PROPOSED OBJECT DISPOSITION
101	POWER PYLON	1490.1	HORIZONTAL	1449.4	40.7	"NO ACTION"
102	POLE	1432.3	HORIZONTAL	1410.0	22.2	"NO ACTION"
103	POWER PYLON	1572.8	HORIZONTAL	1439.9	132.9	"NO ACTION"
104	POWER PYLON	1701.6	HORIZONTAL	1413.2	288.4	"NO ACTION"
105	POWER PYLON	1559.3	HORIZONTAL	1447.7	111.6	"NO ACTION"
106	POWER PYLON	1721.9	HORIZONTAL	1450.7	271.2	"NO ACTION"
107	POWER PYLON	1719.6	HORIZONTAL	1428.7	290.8	"NO ACTION"
108	POWER PYLON	1625.8	HORIZONTAL	1461.7	164.1	"NO ACTION"
109	POWER PYLON	1601.5	HORIZONTAL	1437.4	164.2	"NO ACTION"
110	POWER PYLON	1710.9	HORIZONTAL	1435.1	275.9	"NO ACTION"
111	POWER PYLON	1632.9	HORIZONTAL	1451.3	181.6	"NO ACTION"
112	POWER PYLON	1897.6	HORIZONTAL	1475.4	422.2	"NO ACTION"
113	POWER PYLON	1843.9	HORIZONTAL	1459.2	384.7	"NO ACTION"
114	POWER PYLON	1900.8	HORIZONTAL	1489.1	411.7	"NO ACTION"
115	POWER PYLON	1913.0	HORIZONTAL	1470.4	442.6	"NO ACTION"
116	POWER PYLON	2109.9	HORIZONTAL	1497.6	612.3	"NO ACTION"
117	POWER PYLON	2100.2	HORIZONTAL	1478.1	622.0	"NO ACTION"
118	POWER PYLON	2334.3	HORIZONTAL	1519.4	815.0	"NO ACTION"
119	POWER PYLON	2470.4	HORIZONTAL	1508.2	962.2	"NO ACTION"
120	POWER PYLON	2598.8	HORIZONTAL	1537.8	1060.9	"NO ACTION"
121	POWER PYLON	2524.2	HORIZONTAL	1544.0	980.2	"NO ACTION"
122	POWER PYLON	2691.9	HORIZONTAL	1574.0	1117.9	"NO ACTION"
123	POWER PYLON	2642.1	HORIZONTAL	1589.3	1052.7	"NO ACTION"

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

PART 77 & OBSTRUCTIONS SE - 2 OF 2

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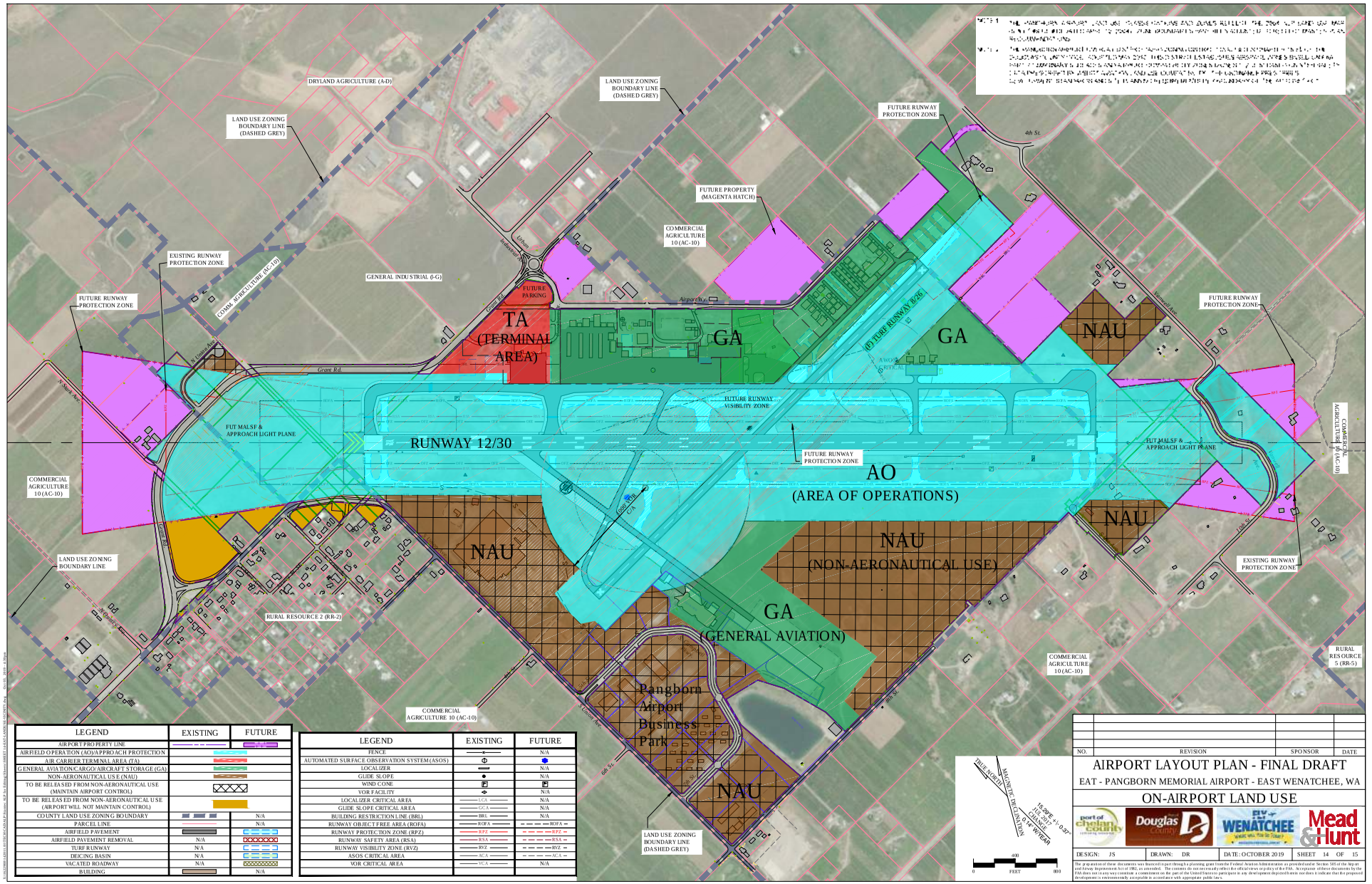

LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRFIELD OPERATION (AO)/APPROACH PROTECTION		
AIR CARRIER TERMINAL AREA (TA)		
GENERAL AVIATION/CARGO/AIRCRAFT STORAGE (GA)		
NON-AERONAUTICAL USE (NAU)		
TO BE RELEASED FROM NON-AERONAUTICAL USE (MAINTAIN AIRPORT CONTROL)		
TO BE RELEASED FROM NON-AERONAUTICAL USE (AIRPORT WILL NOT MAINTAIN CONTROL)		
COUNTY LAND USE ZONING BOUNDARY		N/A
PARCEL LINE		N/A
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT REMOVAL	N/A	
TURF RUNWAY	N/A	
DEICING BASIN	N/A	
VACATED ROADWAY	N/A	
BUILDING		N/A

LEGEND	EXISTING	FUTURE
FENCE		N/A
AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)		
LOCALIZER		N/A
GLIDE SLOPE		N/A
WIND CONE		
VOR FACILITY		N/A
LOCALIZER CRITICAL AREA	LCA	N/A
GLIDE SLOPE CRITICAL AREA	GCA	N/A
BUILDING RESTRICTION LINE (BRL)	BRL	N/A
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	RSA	RSA
RUNWAY VISIBILITY ZONE (RVZ)	RVZ	RVZ
ASOS CRITICAL AREA	ACA	ACA
VOR CRITICAL AREA	VCA	N/A

NO.	REVISION	SPONSOR	DATE

AIRPORT LAYOUT PLAN - FINAL DRAFT

EAT - PANGBORN MEMORIAL AIRPORT - EAST WENATCHEE, WA

ON-AIRPORT LAND USE

DESIGN: JS	DRAWN: DR	DATE: OCTOBER 2019	SHEET 14 OF 15

The preparation of these documents was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of these documents by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public law.

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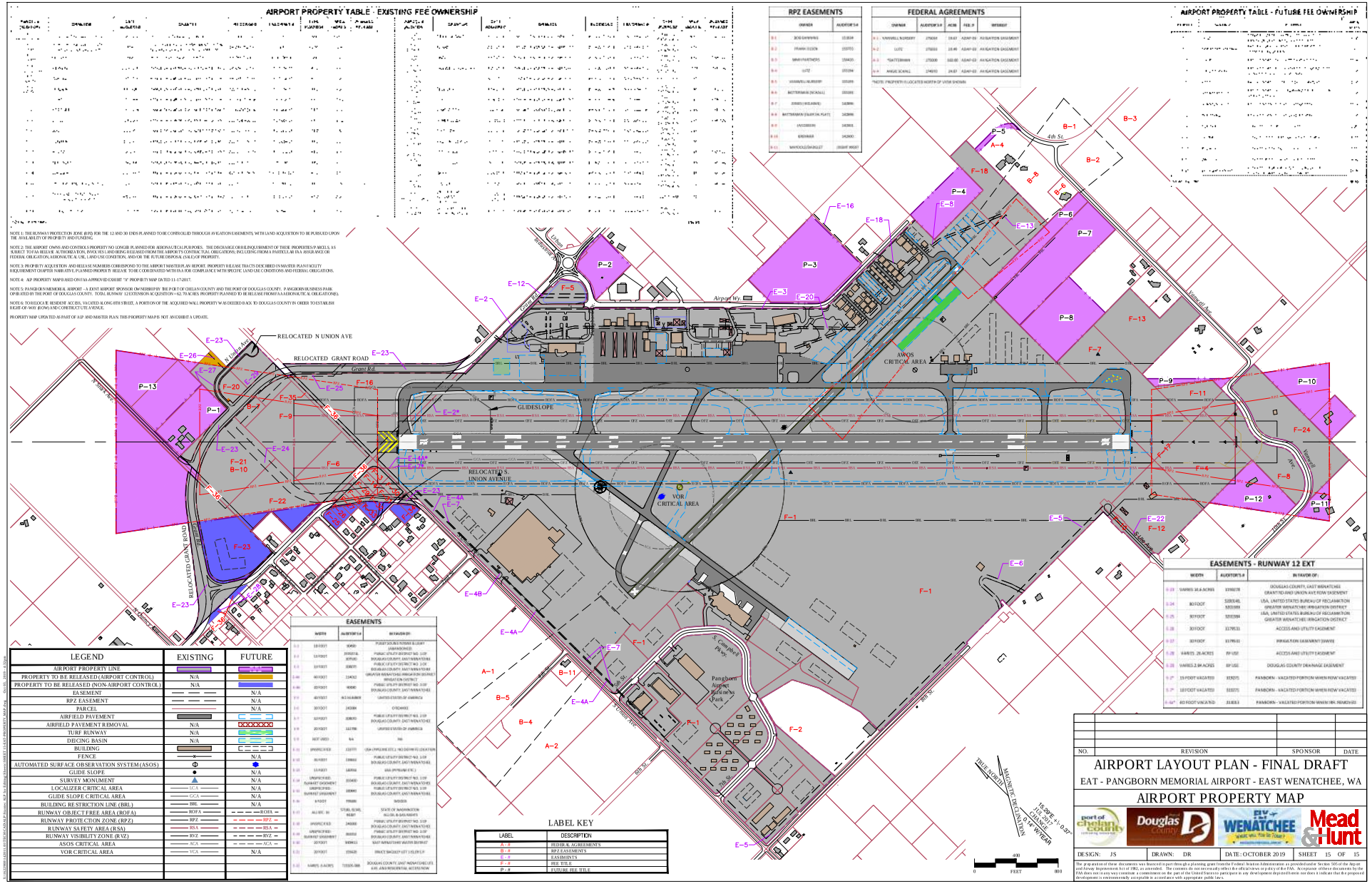

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FLY WENATCHEE

WHERE WILL YOU GO TODAY?

PANGBORN MEMORIAL AIRPORT

Appendices

GLOSSARY OF TERMS

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This glossary includes definitions of terms and acronyms used in the Plan. It is intended to serve as a reference for other Plan elements. Terms are defined and described in the chapters in which they appear.

A

AAC	Aircraft Approach Code: *An FAA classification based on how fast an aircraft approaches the runway on landing. Used to determine airfield design characteristics.*
AC	Advisory Circular: *FAA standards and guidelines on a variety of airport characteristics.* Also Asphalt Concrete (in Pavement Condition Index): *A composite material commonly used to surface roads, parking lots, and airports. It consists of mineral aggregate bound together with asphalt, laid in layers, and compacted.*
ACRP	Airport Cooperative Research Program: *An industry-driven, applied research program that develops near-term, practical solutions to problems faced by airport operators. ACRP is managed by the Transportation Research Board (TRB) of the National Academies and sponsored by the Federal Aviation Administration (FAA). The research is conducted by contractors who are selected on the basis of competitive proposals.* (Transportation Research Board, 2014)
ADG	Aircraft Design Group: *An FAA classification based on the wingspan and tail height of aircraft. Used to determine airfield design characteristics.*
ADO	FAA Airports District Office: *The local ADO is located in Renton, WA. Staff in the ADO oversee airport planning, permitting, and design projects, manage capital improvement programs, and allocate federal funding.*
AIP	FAA Airport Improvement Program: *The AIP provides grants to public agencies — and, in some cases, to private owners and entities -- for the planning and development of public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS). Airports receive regular funding each year called "entitlement" and may compete against other airports nationwide for additional "discretionary" funding.* (Federal Aviation Administration, 2014)
Agg. Base	Aggregate Base (in Pavement Condition Index): *is used as a base course in roadways and is typically made of a recipe of mixing different sizes of crushed rock together forming the Aggregate which has certain desirable properties.*
ALS	Approach Lighting System: *A series of lights before the runway end that guide aircraft landing in the dark and during periods of low visibility.*
ALP	Airport Layout Plan: *A set of drawings that provides a graphic representation of the long-term development plan for an airport. The primary drawing in this set is the Airport Layout Plan. Other drawings may also be included, depending on the size and complexity of the individual airport*
ARC	Airport Reference Code: *A combination of the AAC and ADG. These two elements combined set the design standards, setbacks, and dimensions of safety critical airport facilities, such as pavement to pavement separation, pavement width, safety areas, object free areas, and runway protection zones.*

ARFF	Airport Rescue and Firefighting: *A special category of firefighting that involves the response, hazard mitigation, evacuation and possible rescue of passengers and crew of an aircraft involved in an airport ground emergency.*
ASOS	Automated Surface Observation System: *The ASOS provides general reports which include: temperature, dew point, sky condition, visibility, cloud heights, current weather, precipitation accumulations, icing conditions and sea level pressure.*
ATCT	Airport Traffic Control Tower: *A manned observation tower in charge of managing ground traffic and air traffic in an airport's airspace. The ATCT staff help maintain safe separation between aircraft in the air, and aircraft and vehicles on the ground.*
ATIS	Automatic Terminal Information Service: *(ATIS) broadcasts continuous prerecorded aeronautical information to pilots 24 hours per day. An ATIS broadcasts important airport operational information which includes date and time of the observation, weather, active runway, available approaches and current notices to airman.*
AVGAS	Aviation Gasoline (also referred to at 100LL): *Leaded gasoline used in piston powered aircraft.*
Avigation Easement	*An **easement** is the right a property owner grants to another for a specific use of their property. This right is acquired through purchase or condemnation. An **avigation easement** is the right a public or private agency acquires to use the airspace above a specific height for the flight of aircraft and control development of obstacles or hazards.*

B

Based Aircraft	*Based Aircraft are aircraft that hangar or tie-down at an airport. These aircraft indicate that they are based at an airport on their registration form, and the owners typically live or work in the area.*
BRL	*Building Restriction Line: A line on the Airport Layout Plan, defined by FAA Part 77 height restrictions and Object Free Areas (OFA), beyond which a structure may not project. The line is usually parallel to taxiways or runways.*
BTS	Bureau of Transportation Statistics: *The statistical arm of the U.S. Department of Transportation. The BTS's mission is to create, manage, and share transportation statistical knowledge with public and private transportation communities and the Nation.* (U.S. Department of Transportation, 2014)

C

CAGR	Compound Annual Growth Rates: *The average, annual rate of growth (or loss) over a period of multiple years.*
CFR	Code of Federal Regulations: *The CFR annual edition is the codification of the general and permanent rules published in the Federal Register by the departments and agencies of the Federal Government.* (U.S. Government Printing Office, 2014)
CIP	Capital Improvement Plan: *An airport's list of planned capital expenditures over the next five years, on file with the state and the FAA. The CIP is used by federal and state agencies to plan and allocate funding, and used by airport sponsors to plan the local share of capital expenditures.*

CTAF — Common Traffic Advisory Frequency: *CTAF is a radio frequency used by pilots to communicate with each other at non-towered airports, or when the tower is closed at night. The CTAF may also be used to coordinate arrivals and departures and control airfield lighting systems.*

Critical Aircraft — *A critical aircraft is the most demanding aircraft, or family of aircraft, to use an airport. Facility design standards and dimensions are set to accommodate the critical aircraft. For projects requiring FAA-funding, the critical aircraft must have scheduled operations of any number per year, or over 500 non-scheduled operations per year.*

D

dB — Decibel: *A decibel is a measure of the amplitude or strength of a sound wave. The strength, or loudness, of a sound wave is measured using decibels on a logarithmic scale. The range of audibility of a human ear is 0 dB (threshold of hearing) to 125 dB (pain begins). The use of a logarithmic scale often confuses people because it does not directly correspond to the perception of relative loudness. A common misconception is that if two noise events occur at the same time, the result will be twice as loud. In reality, the event will double the sound energy, but only result in a 3 dB increase in magnitude. For a sound event to be twice as loud as another, it must be 10 dB higher.*

dBA — Weighted Decibel: *Scientific studies have shown that people do not interpret sound the same way a microphone does. For example, humans are bias and sensitive to tones within a certain frequency range. The A-weighted decibel scale was developed to correlate sound tones with the sensitivity of the human ear. The A-weighted decibel is a "frequency dependent" rating scale which emphasizes the sound components within the frequency range where most speech occurs.*

DHS — Department of Homeland Security: *The mission of DHS is to secure the nation from threats. The agency has 240,000 employees in jobs that range from aviation and border security to emergency response, from cybersecurity analyst to chemical facility inspector.* (U.S. Department of Homeland Security, 2014)

DNL — Day/Night Average Sound Level: *The standard metric used to measure noise from aircraft is the Day-Night Noise Level, which measures the cumulative noise levels of all aircraft operations. DNL includes penalties for night operations (10pm-7am), when ambient noise levels tend to be lower and aircraft noise may be viewed as more disruptive.*

E

EA — Environmental Assessment: *An EA is a concise document that takes a hard look at expected environmental effects of a proposed action. EA's are required for projects that receive federal funding, pursuant to the National Environmental Policy Act and other applicable regulations. Should significant environmental impact be expected as part of a purposed action, then an environmental impact statement may be warranted.* (Federal Aviation Administration, 2006)

EIS — Environmental Impact Statement: *If the EA indicates the proposed action's impacts would meet or exceed a significance threshold(s) for the affected resource(s), or that mitigation would not reduce the significant impact(s) below the applicable threshold(s), FAA must prepare an EIS. An EIS provides additional, detailed evaluations of the proposed action and its alternatives, including the No Action alternative.* (Federal Aviation Administration, 2006)

ESA — Endangered Species Act: *The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the U.S. Fish and Wildlife Service and the Commerce Department's National Marine Fisheries Service.*

Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened. For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments. (U.S. Fish and Wildlife Service, 2013)

ETMSC — Enhanced Traffic Management System Counts: *Provides information on traffic counts by airport or by city pair for various data groupings such as aircraft type or by hour of the day. Data are created when pilots file flight plans and/or when flights are detected by the National Airspace System*

EPA — Environmental Protection Agency: *The purpose of the EPA is to ensure that Americans are protected from significant risks to health and the environment; that national efforts to reduce environmental risk are based on the best available scientific information; and that federal laws protecting health and the environment are enforced; that environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy.* (U.S. Environmental Protection Agency, 2014)

F

FAA — Federal Aviation Administration: *The FAA's continuing mission is to provide the safest, most efficient aerospace system in the world.* (Federal Aviation Administration, 2010) *The FAA are the regulatory authority on airports, airspace, aircraft, and pilots in the U.S. FAA policy is created in Washington D.C., and administered by local regional and district offices. The regional and district offices for EAT are located in Renton, Washington.*

FAR Part 77 — Federal Aviation Regulation Part 77: *Establishes standards and notification requirements for objects affecting navigable airspace.*

FBO — Fixed Base Operator: *FBOs are airport businesses that provide a variety of general aviation services including aircraft parking, fuel, maintenance, charter and aircraft rental, pilot lounge, flight instruction and sales.*

FEMA — Federal Emergency Management Agency: *FEMA coordinates the federal government's role in preparing for, preventing, mitigating the effects of, responding to, and recovering from all domestic disasters, whether natural or man-made, including acts of terror.* (Federal Emergency Management Agency, 2014)

FONSI — Finding of No Significant Impact: *A federal agencies record of decision on an environmental assessment declaring that the p*roposed action poses no significant impact on natural and human resources included in the National Environmental Policy Act.

FPO — FAA Flight Procedures Office: *The FPO is responsible for establishing instrument procedure (departure, en route, arrival, approach) design and obstacle clearance standards, criteria, and policy for the existing National Airspace System flight procedure structure and to accommodate emerging technologies and flight operation capabilities. The FPO develops and establishes criteria for terminal instrument procedures for issuance in the current edition of United States Standard for Terminal Instrument Procedures and related 8260-series orders.* (Federal Aviation Administration, 2014)

FSDO — FAA Flight Standards District Office: *The FSDO is the regulatory agency in charge of low-flying aircraft, accident reporting, air carrier certification and operations, aircraft maintenance, aircraft operational issues, aircraft permits, airmen certification (licensing) for pilots, mechanics, repairmen, dispatchers, and parachute riggers, certification and modification issues, enforcement of airmen & aircraft regulations.* (Federal Aviation Administration, 2013)

G

GA — General Aviation: *General aviation refers to aircraft activity that is not scheduled for commercial purposes (e.g. airlines and cargo carriers), or conducted by the military. GA operations include charter and on-demand air transport, flight instruction, recreational flying, pipeline inspection, and emergency response.*

GIS — Geographic Information System: *A computer system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.*

H

HAZMAT — Hazardous Materials: *materials that pose a risk to human health and safety, and the environment. Transport, storage, and disposal of these materials are regulated by state and federal environmental and transportation agencies.*

HUD — U.S. Department of Housing and Urban Development: *HUD is the federal agency responsible for affordable housing, federal grants for housing, residential disaster recovery services, and energy efficient housing. HUD and FAA guidelines are used to assess impact on residential properties near airports.*

I

ICAO — International Civil Aviation Organization: *ICAO is a United Nations specialized agency that works with Member States and global aviation organizations to develop international Standards and Recommended Practices (SARPs) which States reference when developing their legally-enforceable national civil aviation regulations.* (International Civil Aviation Organization, 2014)

IFR — Instrument Flight Rules: *IFR governs flight procedures when there is cloud ceiling less than 1,000 feet and/or visibility less than 3 miles. These rules require pilots to be specially licensed to navigate using instruments and air traffic control instruction, without visual reference.*

ILS — Instrument Landing System: *A precision runway approach aid based on two radio beams which together provide pilots with both vertical and horizontal guidance during an approach to land.*

Instrument Procedures	*A series of predetermine maneuvers consisting of navigational waypoints, headings, and minimum altitudes, intended to guide aircraft between the terminal (airport area) phase of flight and the enroute phase of flight.*

J

JET A	*Jet A is gasoline used in turbine engine powered aircraft. These include jets and propeller aircraft with turbine engines. Jet A is kerosene, refined to meet aviation specifications.*

K

L

LAHSO	Land and Hold Short Operations: *is an air traffic control procedure for aircraft landing and holding short of an intersecting runway or point on a runway, to balance airport capacity and system efficiency with safety.*

M

Monte Carlo Simulation	*This is a form of statistical analysis that determines probabilities of outcomes using multi-variable regression. An equation which includes the variables and a predefined range within which they will occur, is run multiple times (thousands or more) for estimates of the probabilities of specific outcomes. Monte Carlo simulations are useful in determining, high, medium, and low forecasts.*
Magnetic Bearing	*This determines the numbering scheme of runways. Runways are measured based on their orientation to the magnetic north pole (not the true North Pole, located at 90 degrees north latitude). Magnetic bearing is used because it influences how compasses work.*
MIRL	Medium Intensity Runway Lights*: MIRLs are located along the edge of the runway, and are used by pilots at night and in low visibility to land and take-off from the runway.*
MTOW	Maximum Takeoff Weight: *The maximum takeoff weight, or maximum gross takeoff weight (MGTOW) of an aircraft is the maximum weight at which the pilot is allowed to attempt to take off, due to structural or other limits.*

N

NAAQS	National Ambient Air Quality Standards: *The Clean Air Act requires the Environmental Protection Agency to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.* (U.S. Environmental Protection Agency, 2011)
NAVAID	Navigational Aid: *an electronic or visual guidance system that allows pilots to maintain situational and locational awareness during periods of low visibility. NAVAIDs include airfield lights and radio beacons that convey positional information to pilots.*

NEPA	National Environmental Policy Act: *The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet NEPA requirements federal agencies prepare a detailed statement known as an Environmental Assessments and Environmental Impact Statements (EIS). EPA reviews and comments on EISs prepared by other federal agencies, maintains a national filing system for all EISs, and assures that its own actions comply with NEPA.* (U.S Environmental Protection Agency, 2014)
Non-Directional Beacon	*A NAVAID that broadcasts its location in all directions. These NAVAIDs are typically coupled with automatic direction finders, which convey their relative direction to aircraft.*
Non-Precision Instrument	*NAVAIDs and instrument procedures enabling only lateral guidance of aircraft, compared to precision instrument which provides lateral and vertical guidance. During periods of visibility below 3 statute miles and when the cloud ceiling is below 1,000 feet above ground level, aircraft, airports, and pilots must be equipped and trained to fly non-precision instrument procedures, otherwise the airport must close until visibility improves.*
NOTAM	Notice to Airmen: *Federally issued notice pertaining to deviations from standard operating procedures in the national airspace system. NOTAMs typically pertain to airspace and runway closures, and special events such as air shows. Pilots are responsible for reviewing applicable NOTAMs in the airspace and airports within which they operate.*
NPIAS	National Plan of Integrated Airport Systems: *The NPIAS identifies nearly 3,400 existing and proposed airports that are significant to national air transportation and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). It also includes estimates of the amount of AIP money needed to fund infrastructure development projects that will bring these airports up to current design standards and add capacity to congested airports. The FAA is required to provide Congress with a 5-year estimate of AIP eligible development every two years. The NPIAS contains all commercial service airports, all reliever airports, and selected general aviation airports.* (Federal Aviation Administration, 2014)
NTSB	National Transportations Safety Board: *The NTSB is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States.*
NRI	Natural Resource Inventory: *A statistical survey of land use and natural resource conditions and trends on U.S. non-Federal lands, maintained by the US Department of Agriculture.*

O

OE/AAA	FAA Obstacle Evaluation / Airport Airspace Analysis: *OE/AAA evaluates cases related to airspace in the U.S. Structures built within 20,000 feet of public airports or exceeding 200 feet above ground level must go through OE/AAA review. OE/AAA issues a determination on whether the proposed construction is or is not a hazard to air navigation.*
OFA	Object Free Area: *The OFA is centered about the runway or taxiway centerline. The OFA clearing standard requires clearing the OFA of above-ground objects protruding above the nearest point of the safety area, except those fixed by function. Buildings and parked aircraft are not permitted in the OFA* (Federal Aviation Administration, 2012).

OFZ	Obstacle Free Zone: *The OFZ clearing standard precludes aircraft and other object penetrations, except for frangible NAVAIDs that need to be located in the OFZ because of their function. Its shape is dependent on the approach minimums for the runway end and the aircraft on approach, and thus, the OFZ for a particular operation may not be the same shape as that used for design purposes.* (Federal Aviation Administration, 2012)
Operation	*An operation is either an aircraft takeoff or a landing. Operational count is data showing how many times aircraft have taken off, landed, or performed a touch-and-go at an airport. One visit to an airport counts as two operations (landing and takeoff).*

P

PABP	Pangborn Airport Business Park: *Within Pangborn Memorial Airport, the Port of Douglas County has developed the 70-acre Pangborn Airport Business Park, located at South Union Street and Eighth Street Southeast in East Wenatchee.*
PAC	Planning Advisory Committee: *A panel made up of stakeholders with interests in the East County Study Area (see ECSA) that meets at Master Plan milestones to provide feedback and direction to the Port of Portland on key Plan elements.*
PAPI	Precision Approach Path Indicator: *A series of lights that indicate to a pilot whether they are on, above, or below the prescribed glide path to a runway end. These devices have either two or four lights that alternate between white and red to indicate the pilot's position.*
PCI	Pavement Condition Index: *A numerical index used in transportation civil engineering between 0 and 100 which is used to indicate the general condition of a pavement.*
Precision Instrument	*NAVAIDs and instrument procedures enabling both lateral and vertical guidance of aircraft. During periods of visibility below 1/2 a statute mile and when the cloud ceiling is below 200 feet above ground level, aircraft, airports, and pilots must be equipped and trained to fly precision instrument procedures, otherwise the airport must close until visibility improves.*

Q

R

RCW	Revised Code of Washington: *The codified body of statutory law governing the U.S. state of Washington, as enacted by the Washington Legislative Assembly, and occasionally by citizen initiative.*
RDC	Runway Design Code: *A combination of the AAC and ADG. These two elements combined set the design standards, setbacks, and dimensions, pavement width, safety areas, object free areas, and runway protection zones for a single runway.* (Federal Aviation Administration, 2012)
Regression Analysis	*Using projected change of one variable to forecast the change of another. Regression analysis typically identifies correlation between two variables historically, indicating whether these variables change in a similar fashion to each other, or inversely. Correlation and regression do not determine causation.*

RNAV — Area Navigation: *Is a method of instrument flight rules (IFR) navigation that allows an aircraft to choose any course within a network of navigation beacons, rather than navigate directly to and from the beacons. This can conserve flight distance, reduce congestion, and allow flights into airports without beacons.*

RSA — Runway Safety Area: *The RSA is a safety area that is centered longitudinally on the runway. It must be clear of all objects, graded, drained, and capable of supporting snow removal equipment, firefighting equipment, and the passage of aircraft without damage to the aircraft.* (Federal Aviation Administration, 2012)

ROFA — Runway Object Free Area: *This is an object free area centered on the runway. See the definition of OFA.*

RPZ — Runway Protection Zone: *The RPZ is a trapezoidal feature, and its function is to enhance the protection of people and property on the ground by keeping the area clear of incompatible land uses. These land uses generally include noise sensitive land uses, land uses that are characterized by high concentrations of people; and fuel and hazardous material storage.*

RVR — Runway Visual Range: *RVR is the distance over which a pilot of an aircraft on the centerline of the runway can see the runway surface markings delineating the runway or identifying its center line. RVR is normally expressed in feet or meters.*

S

SASO — Specialized Aviation Service Operator*: A single-service provider or special Fixed Based Operator performing less than full services.*

SRE — Snow Removal Equipment: *Specialized equipment operated on airports for the specific task of removing snow and ice from runways, taxiways, and apron areas on the airport.*

T

TAF — Terminal Area Forecast: *The TAF is the annual FAA forecast of passengers, aircraft operations, and based aircraft for the National airspace system. This is a top down forecast, starting from the FAA national aerospace forecast and being distributed to the different airports. It is used as a basis for comparison for Master Plan generated forecasts.*

TDG — Taxiway Design Group: *The TDG is based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance which describes the relationship between critical aircraft's physical characteristics and the design of taxiway and taxilane elements.*

TDZL — Touchdown Zone Lighting: *TDZL is comprised of rows of white light bars (with three in each row) at intervals on either side of the centerline for 3,000 ft.*

Tiedown — *Tiedowns are located on aircraft parking aprons and used to secure parked aircraft so that they do not move in high winds.*

TODA — Takeoff Distance Available: *The takeoff run available plus the length of any remaining runway or clearway beyond the far end of the takeoff run available.*

TOFA — Taxiway Object Free Area: *This is an object free area centered on the taxiway. See the definition of OFA.*

TSA — Taxiway Safety Area: *The TSA is a safety area that is centered longitudinally on the taxiway. It must be clear of all objects, graded, drained, and capable of supporting snow removal equipment, firefighting equipment, and the passage of aircraft without damage to the aircraft.* (Federal Aviation Administration, 2012).

U

UAS — Unmanned Aircraft System: *The UAS is the combination of a pilotless vehicle and pilot that flies the vehicle remotely. This acronym is often used interchangeably with unmanned aerial vehicle; however, UAS refers to the vehicle and the pilot.*

UAV — Unmanned Aerial Vehicle: *A UAV is a pilotless vehicle. This acronym is often used interchangeably with unmanned aerial system; however, UAV refers to the vehicle itself, and not the pilot.*

UGB — Urban Growth Boundary: *A regional boundary, set by the local jurisdiction by mandating that the area inside the boundary be used for higher density urban development and the area outside be used for lower density development, with the hope of controlling urban sprawl.*

USACE — U.S. Army Corps of Engineers: *The USACE has regulatory over navigable waterways in the U.S. They manage river hydrology, flood prevention, and emergency response.*

USC — United States Code: *The United States Code is a consolidation and codification by subject matter of the general and permanent laws of the United States. It is prepared by the Office of the Law Revision Counsel of the United States House of Representatives.* (United States House of Representatives, 2014)

USFS — United States Forest Service: *An agency of the U.S. Department of Agriculture that administers the nation's national forests and national grasslands.*

USFWS — U.S. Fish and Wildlife Service: *USFWS is tasked with enforcing federal wildlife laws, protecting endangered birds and species, managing bird migrations and fisheries, restoring wetlands, and collecting excise taxes on fishing and hunting.* (U.S. Fish and Wildlife Service, 2014)

V

VFR — Visual Flight Rules: *Under visual flight rules, pilots must be able to maintain separation from aircraft and objects visually, without the use of navigational aids. When weather reduces visibility below three statue miles then pilots may not operate under visual flight rules, and must instead use instrument flight rules.*

VOR — Very High Frequency (VHF) Omnidirectional Range: *VOR NAVAIDS convey positon and course (relative to the VOR) information to aircraft in flight. These NAVAIDs are used to establish airways across the U.S.*

W

WAAS — Wide Area Augmentation System: *WAAS is a ground-based global positioning system (GPS) signal augmentation service. WAAS antennas boost strength and reliability of satellite GPS signals, enabling aircraft to use GPS to fly instrument approach procedures.*

WSDOT	Washington State Department of Transportation: *WSDOT is a Washington governmental agency that constructs, maintains, and regulates the use of the state's transportation infrastructure, including state owned airports. WSDOT-Aviation participates in funding airport projects throughout the state.*
Weight Bearing Capacity	*The amount of weight a piece of pavement is capable of bearing under normal circumstances, without resulting in excessive wear. Aircraft that weigh more than a pavements weight bearing capacity may still use the pavement; however, frequent use by such aircraft will cause premature wear of the pavement, requiring earlier replacement.*
WHA	Wildlife Hazard Assessment: *Wildlife Hazard Assessments (WHA) help identify and minimize risks of aircraft-wildlife collisions and in turn save lives. FAA regulations require that a qualified airport biologist with professional training specifically in airport wildlife hazard management conduct the WHA*.
WHMP	Wildlife Hazard Management Plan: *WHMP establishes guidelines at an airport to minimize aircraft exposure to potentially hazardous wildlife while assuring compliance with wildlife conservation laws and regulations.*

X

Y

Z

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FLY WENATCHEE

WHERE WILL YOU GO TODAY?

PANGBORN MEMORIAL AIRPORT

Mead&Hunt