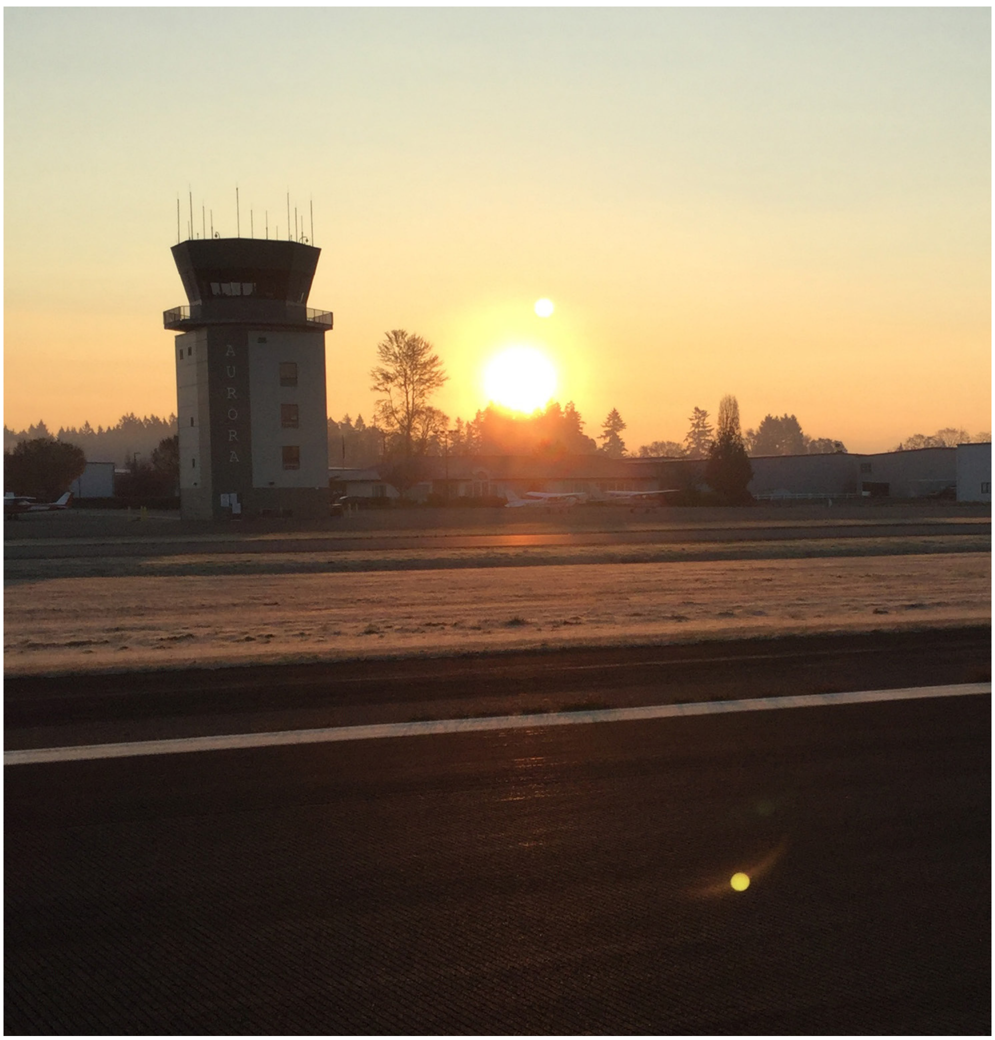
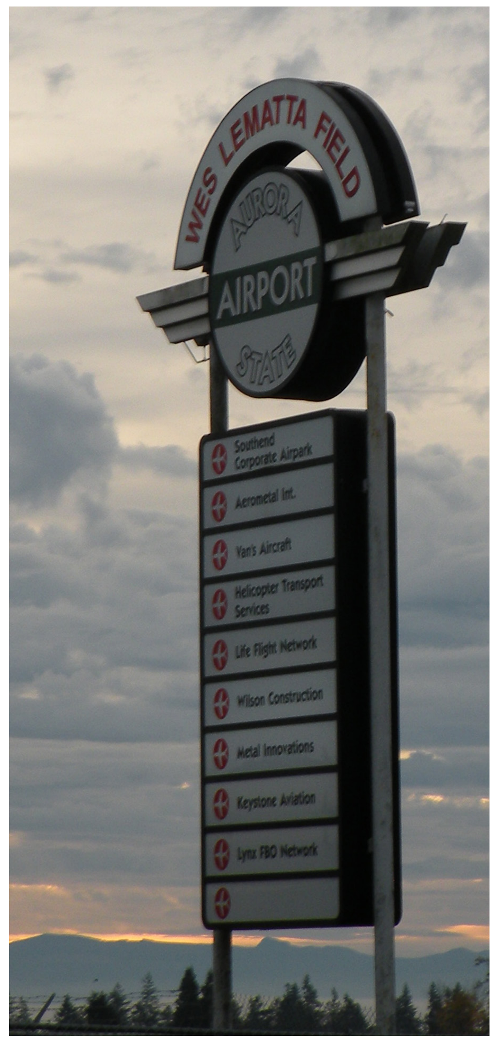
OREGON DEPARTMENT OF AVIATION

AURORA STATE AIRPORT
DRAFT AIRPORT MASTER PLAN

Aurora, OR
August 2023 (Updated)

Working Paper No. 1





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Runway 17 Looking South – Source: Century West Engineering

Chapter 1
Introduction

The Oregon Department of Aviation (ODAV) is preparing an Airport Master Plan (AMP) for Aurora State Airport (Airport) in cooperation with the Federal Aviation Administration (FAA) to define the Airport's needs for the next 20 years. The Airport Master Plan will provide specific guidance to maintain a safe and efficient airport that is economically, environmentally, and socially sustainable.

A glossary of common aviation terminology and list of acronyms is provided in **Appendix 1**.

Project Purpose and Need

The purpose of the Airport Master Plan is to define the current, short-term, and long-term needs of the Airport through a comprehensive evaluation of facilities, conditions, and FAA airport planning and design standards. The study will also address elements of local planning (land use, transportation, environmental, economic development, etc.) that have the potential of affecting the planning, development, and operation of the Airport. The FAA requires airports to maintain current planning as conditions change. This Airport Master Plan will address changing local conditions, current FAA standards, and trends within the aviation industry.

Project Funding

Funding for the Airport Master Plan is being provided through an FAA Airport Improvement Program (AIP) grant (AIP grant 3-41-004-022; $994,764). The AIP is a dedicated fund administered by FAA with the specific purpose of maintaining and improving the nation's public-use airports. The AIP is funded exclusively through fees paid by users of general aviation and commercial aviation. This project received 100% funding from the FAA, which includes COVID recovery funds. No local match was required.

100% FAA Funded Project

Total: $994,764

Goals of the Airport Master Plan

The primary goal of the master plan is to provide the framework and vision needed to define future facility needs at Aurora State Airport. The FAA sets out goals and objectives each master plan should meet to ensure future development will cost-effectively satisfy aviation demand and consider potential environmental and socioeconomic impacts.

Goal 1: Define the vision for the Airport to effectively serve airport users and the region. Assess known issues including air traffic control, runway length, ability to accommodate development, auto parking, fencing, and land use to develop a realistic, sustainable plan to improve the Airport.

Goal 2: Document existing activity, condition of airfield facilities, and policies that impact airport operations and development opportunities.

Goal 3: Forecast future activity based on accepted methodology.

Goal 4: Evaluate facilities and conformance with applicable local, state, and FAA standards.

Goal 5: Identify facility improvements to address design conformance issues and accommodate demand.

Goal 6: Identify potential environmental and land use requirements that may impact development.

Goal 7: Explore alternatives to address facility needs. Work collaboratively with all stakeholders to develop workable solutions to address needs.

Goal 8: Develop an Airport Layout Plan to graphically depict proposed improvements consistent with FAA standards as a road map to future development. Prepare a supporting Capital Improvement Plan to summarize costs and priorities.

Goal 9: Provide recommendations to improve land use and zoning oversight of the Airport to remove barriers to appropriate growth at the Airport.

Goal 10: Summarize the vision and plan for the Airport in the Airport Master Plan report.

Source: FAA with Century West airport-specific content.

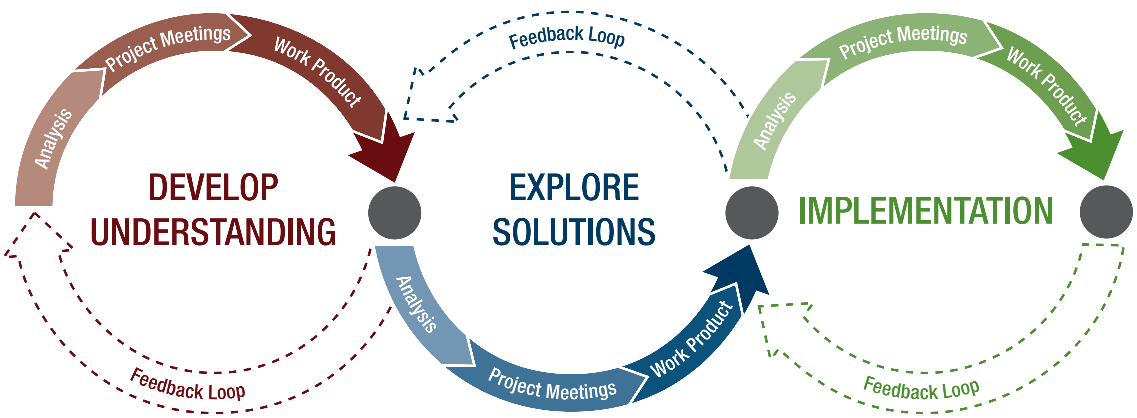
THE FAA ROLE IN THE AIRPORT MASTER PLAN

FAA *Advisory Circular (AC) 150/5070-6B Airport Master Plans* defines the specific requirements and evaluation methods established by FAA for the study. The guidance in this AC covers planning requirements for all airports, regardless of size, complexity, or role. However, each master plan study must focus on the specific needs of the airport for which a plan is being prepared.

The recommendations contained in an airport master plan represent the views, policies and development plans of the airport sponsor and do not necessarily represent the views of the FAA. Acceptance of the master plan by the FAA does not constitute a commitment on the part of the United States to participate in any development depicted in the plan, nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public law. The FAA reviews all elements of the master plan to ensure that sound planning techniques have been applied. However, the FAA only approves the Aviation Activity Forecasts and Airport Layout Plan.

Planning Process

The three-phase planning process is designed to provide multiple feedback loops intended to maintain the flow of information and ideas among the community and project stakeholders and ultimately maximize public involvement.



Framework of the Airport Master Plan

The framework of the Airport Master Plan provides a clear structure to inform and steer future planning decisions and serve as a tool to guide a process that allows the plan to take shape through flexibility, iteration, and adaptation. The framework is based upon an airport-urban interface model intended to analyze the regional setting of the Airport, its landside elements and airside elements, as well as the management and administration functions associated with the Airport. The framework provides guidance while being flexible enough to adapt to changing conditions to maximize opportunities to develop understanding, explore solutions, and implement the preferred development alternatives for the Airport and adjacent urban and rural environments.

	Regional Setting	Airside Elements	Landside Elements	Airport Administration
Develop Understanding **Explore Solutions** **Implementation**	Location & Vicinity Socio-Economic Data Airport Role Airport History Area Airports Context Airport Operations Applicable Planning Studies Environmental Data Local Surface Transportation Land Use/Zoning	Area Airspace Approach Procedures FAA ATCT Runway/Helipad Taxiways/Taxilanes Aprons/Tiedowns Pavement Condition FAA Design Standards Support Facilities	General Aviation (GA) Terminal Areas Through-the-fence (TTF) Agreements Hangars Airport Surface Roads Vehicle Parking Airport Fencing Utilities	Airport Ownership & Management Airport Financials Airport Rates and Charges Local Codes and Regulations Oregon Aviation Laws FAA Compliance Overview

Project Schedule

The Aurora State Airport Master Plan schedule is expected to occur over 18 months, Phase 1 – Develop Understanding will take approximately five months; Phase 2 – Explore Solutions will take approximately eight months; and Phase 3 – Implementation will take approximately five months including three months for FAA approvals, which can take from three to six months after delivery of the final draft narrative reports and drawings.

The project schedule was updated February 2023. The original schedule (18 months) has been updated to reflect the extended review time for Working Paper No. 1.

Develop Understanding

Late 2021 – Early 2023

- Chapter 1 - Introduction
- Chapter 2 - Existing Conditions
- Chapter 3 - Aviation Activity Forecasts
  * FAA Forecast Review & Approval Point

Mid 2022 – End 2022

- AGIS Survey

Explore Solutions

Mid 2023 – End 2023

- Chapter 4 - Facility Goals and Requirements
- Chapter 5 - Airport Development Alternatives
  * To include Modification of Standards Analysis

Implementation

Early 2024

- Chapter 6 - Airport Layout Plan
- Chapter 7 - Strategies & Actions Capital Improvement Plan, and Financial Plan

Mid 2024

- Finalize Master Plan

Public Involvement Process

A comprehensive and engaging public involvement process is a key element to a successful Airport Master Plan. Therefore, numerous opportunities for public input are built into the process. ODAV is completing the Aurora Airport Master Plan in accordance with the Department of Land Conservation and Development's (DLCD) State Agency Coordination (SAC) Program. Accordingly, ODAV established a Planning Advisory Committee (PAC) that includes members from all affected Federal, State, Local Special Districts, and Interested Parties. The PAC will meet nine times throughout the 18-month Aurora State AMP project timeline. All PAC meetings are open to the public.

Planning Advisory Committee Meetings

The PAC was assembled to provide input and allow for public dissemination of data. Airport tenants, pilots, local & regional economic development interests, neighbors of the airport, and staff/representatives of ODAV serve as members of the PAC. In addition to the membership composition noted above, representatives from the FAA Seattle Airports District Office (ADO) serve as ex officio members of the PAC.

TABLE 1-1: PLANNING ADVISORY COMMITTEE MEMBERS

Organization	Name	Alternate
1000 Friends of Oregon	Roger Kaye	
AABC/TLM Holdings	Ted Millar	
Atlantic Aviation (formerly Lynx Aviation)	Trent Brownlee	
Aurora Air Traffic Control	Raul Suarez	
Aurora Airport Improvement Association	Bruce Bennett	
Aurora Butteville Barlow Community Planning Organization	Ken Ivey	
Aurora CTE, Inc	Bill Graupp	
Charbonneau Country Club	Steven P. Switzer	
City of Aurora	Brian Asher	
City of Canby	Scott Archer	
City of Wilsonville	Dr. Joann Linville	Chris Neamtzu
Clackamas County	Commissioner Tootie Smith	
Columbia Helicopters	Rob Roedts	Bob Buchanan
Confederated Tribes of Siltez Indians	Robert Kentta	
Confederated Tribes of the Grand Ronde Community of Oregon	Cheryl Pouley	
Confederated Tribes of Warm Springs Reservation of Oregon	Christian Nauer	
Deer Creek Estates HOA	Matt Williams	
Friends of French Prairie	Ben Williams	Wayne Richards
Helicopter Transport Service	Robert Fournier	
Life Flight Network	Ben Clayton	
Marion County	Commissioner Danielle Bethell	
Marion County Planning Department	Austin Barnes	Brandon Reich
Oregon Dept of Aviation	Tony Beach	
Oregon Dept of Aviation Board	Cathryn Stephens	
Oregon Dept of Land Conservation and Development	Matt Crall	Nicole Mardell
Oregon Dept of Transportation	Naomi Zwerdling	
Oregon Farm Bureau	Mary Anne Cooper	
Oregon Office of Emergency Management	Sarah Puls	
Positive Aurora Airport Management	Tony Helbling	
Regional Solutions	Jody Christensen	
Vans Aircraft	Rian Johnson	Greg Hughes
Willamette Aviation	David Waggoner	
Wilsonville Chamber of Commerce	Patrick Donaldson	Kevin O'Malley

Air Traffic Control Tower from Hubbard Highway – Source: Century West Engineering

Chapter 2

Existing Conditions Analysis

The existing conditions analysis documents the existing airfield assets and conditions that affect the operation and development of Oregon Department of Aviation (ODAV)-owned facilities with emphasis on the Airport's regional setting, and its airside, landside, and administrative functions. The existing conditions analysis utilizes site visits, FAA and Sponsor documentation and records, and other publicly available information to support the effort. The findings documented in this chapter will be referenced to support subsequent studies and recommendations throughout the master planning process. A survey of airport stakeholders is being conducted to acquire additional information to help guide the planning process. This information will be summarized and added to the Airport Master Plan documentation.

Regional Setting

The Regional Setting section is comprised primarily of features that provide the "big-picture" context of the Airport within its local community and region. This section describes the location and vicinity of the Aurora State Airport and provides a range of information related to the operation and function of the Airport: socio-economic data, airport history, airport role, area airports context, airport activity data, environmental data, local surface transportation systems, land use on and around the Airport, and other relevant data.

LOCATION AND VICINITY

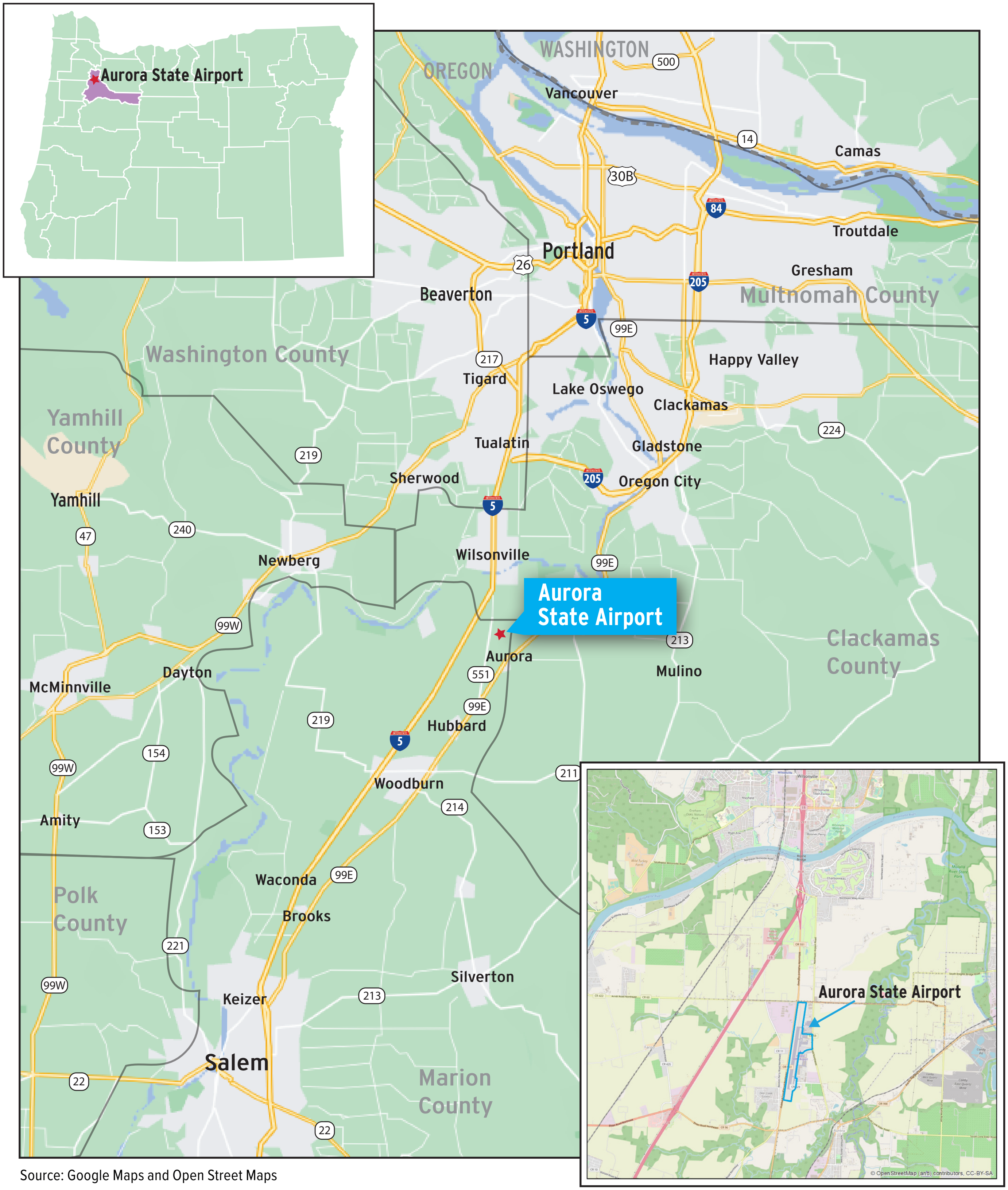
The community of Aurora, Oregon is located in the Willamette Valley in Marion County. Aurora is located about three miles east of the U.S. Interstate 5 (I-5) corridor, 23 miles south of Portland. Aurora is located within 15 miles of three other adjacent counties (Washington, Yamhill, and Multnomah).

Aurora State Airport is located approximately one mile northwest of the City of Aurora, in Northwest Marion County. The north end of the Airport is located immediately adjacent to the Clackamas County western boundary (at Arndt Road).

Marion County has a land area of approximately 1,193 square miles. The county extends east from the Willamette Valley into the Cascade Range, including Mount Jefferson. Incorporated cities include Salem, Keizer, Woodburn, Silverton, and Aurora. Salem is the county seat.

Clackamas County has a land area of approximately 1,883 square miles. The county extends east from the Willamette Valley into the Cascade Range, including Mount Hood. Incorporated cities include Barlow, Canby, Gladstone, Happy Valley, Lake Oswego, Milwaukie, Oregon City, West Linn, and Wilsonville. Oregon City is the county seat.

FIGURE 2-1: LOCATION AND VICINITY MAP



Source: Google Maps and Open Street Maps

COMMUNITY SOCIO-ECONOMIC DATA

Data from the Population Research Center (PRC) at Portland State University was reviewed to gauge recent changes in population within the Airport's service area. PRC data confirms that the areas within 30 to 60 minutes of Aurora State Airport have experienced steady growth over the past 10 years, often outpacing statewide growth rates. Sustained population growth within an airport's service area is often a general indication of broader economic conditions required increase airport activity. Historical PRC population estimates and average annual growth rates (AAGR) for these areas are presented in **Table 2-1**.

TABLE 2-1: HISTORIC POPULATION ESTIMATES

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Oregon	3,883,735	3,919,020	3,962,710	4,013,845	4,076,350	4,141,100	4,195,300	4,236,400	4,243,791	4,266,560
AAGR:	-	0.91%	1.11%	1.29%	1.56%	1.59%	1.31%	0.98%	0.17%	0.54%
Marion County	320,495	322,880	326,150	329,770	333,950	339,200	344,035	347,760	349,120	347,182
AAGR:	-	0.74%	1.01%	1.11%	1.27%	1.57%	1.43%	1.08%	0.39%	-0.56%
Clackamas County	381,680	386,080	391,525	397,385	404,980	413,000	419,425	423,420	426,515	425,316
AAGR:	-	1.15%	1.41%	1.50%	1.91%	1.98%	1.56%	0.95%	0.73%	-0.28%
Portland	601,510	592,120	587,865	613,355	627,395	639,100	648,740	657,100	664,675	658,773
AAGR:	-	-1.56%	-0.72%	4.34%	2.29%	1.87%	1.51%	1.29%	1.15%	-0.89%
Salem	156,455	157,770	159,265	160,690	162,060	163,480	165,265	167,400	168,970	177,694
AAGR:	-	0.84%	0.95%	0.89%	0.85%	0.88%	1.09%	1.29%	0.94%	5.16%
Wilsonville	20,515	21,550	21,980	22,870	23,740	24,v315	25,250	25,635	25,915	27,186
AAGR:	-	5.05%	2.00%	4.05%	3.80%	2.42%	3.85%	1.52%	1.09%	4.90%
Aurora	930	935	950	950	970	980	985	985	985	1,133
AAGR:	-	0.54%	1.60%	0.00%	2.11%	1.03%	0.51%	0.00%	0.00%	15.03%

Source: PSU Population Research Center (PRC), 2021

A review of economic data also indicates broad growth in the region over the last decade. According to Woods & Poole Economics[1] data, the gross regional products (GRP) of Marion and Clackamas counties have both experienced steady growth over the last 10 years (average annual growth of 4.28% and 3.59%, respectively).

It should be noted that the economic effects of the COVID-19 pandemic are evident in the 2020 data when GRP for both counties decreased -3.77% (Marion) and -3.19% (Clackamas). These declines are attributed to state and local restrictions put in place to slow the spread of the virus, and the corresponding economic contraction. However, data for 2021 highlights economic recovery fueled in part by federal stimulus and steps toward economic recovery.

A summary of Marion and Clackamas County GRPs over the past decade is presented in **Table 2-2**.

TABLE 2-2: HISTORIC GROSS REGIONAL PRODUCT (2012 DOLLARS)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Marion County (millions)	$11,546	$11,865	$12,287	$13,311	$14,0921	$14,6971	$15,532	$16,132	$15,523	$16,761
Percent Change	-	2.76%	3.56%	8.33%	5.87%	4.29%	5.68%	3.86%	-3.77%	7.97%
										AAGR 4.28%
Clackamas County (millions)	$15,497	$15,520	$15,505	$16,734	$17,606	$18,569	$19,613	$20,237	$19,592	$21,172
Percent Change	-	0.15%	-0.10%	7.93%	5.21%	5.47%	5.62%	3.19%	-3.19%	8.07%
										AAGR 3.59%

Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2021. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of Century West Engineering, Inc.

1 2021 State Profile - Woods & Poole Economics, Inc. Copyright 2021

AIRPORT HISTORY

Aurora State Airport was built by the United States Army Air Forces in 1943 and was known as the Aurora Flight Strip. From the time of construction until 1953 it was managed by the United States Bureau of Public Roads, when it was transferred to the State of Oregon's Highway Division. In 1973, the Highway Division transferred ownership to the State Aeronautics Division, which would later become ODAV. ODAV remains the owner and operator of Aurora State Airport today.

Although the general configuration of the single-runway airfield has remained largely unchanged, several notable airport facility improvements have been made during the nearly 50 years of State of Oregon ownership:

- **1976** – runway reconstructed and parallel taxiway constructed;
- **1979 and 1986** – property acquisition (22 acres, 10 acres) increased ODAV-owned property to the current 140 acres;
- **1995** – runway length increased to 5,003 feet;
- **2004** – runway reconstructed;
- **2009** – parallel taxiway shifted east, to its current location; and
- **2015** – Air Traffic Control Tower (ATCT) constructed.

During this period, aeronautical use facilities such as aircraft hangars were developed both on ODAV property and on privately-owned land parcels adjacent to the east side of the Airport. These off-airport properties have agreements with ODAV (referred to as "through-the-fence", or "TTF" agreements) to access the Aurora State Airport at designated points. Development of two privately-owned heliports adjacent to the east side of Airport has also occurred. However, these facilities do not have TTF access agreements and their operations are fully independent of the Aurora State Airport.

Several planning studies have been completed through the Airport's history, including FAA-funded master plans in 1976, 1988, and 2012. A Constrained Operations – Runway Justification Study was completed in 2019 to review the recommended runway improvements defined in the 2012 Airport Master Plan Update. A list of recent FAA AIP funded projects is presented below in **Table 2-3**.

TABLE 2-3: PROJECT HISTORY

Fiscal Year	Federal Grant Sequence Number	Project Description	Federal Grants/Funds	State of Oregon Grants/Funds
2005	11	Rehabilitate Runway - 17/35	$1,100,000	$0
2007	12	Construct Taxiway, Install Miscellaneous NAVAIDS, Install Taxiway Lighting	$1,959,856	$0
2007	13	Construct Taxiway, Install Miscellaneous NAVAIDS, Install Taxiway Lighting	$2,293,993	$0
2009	14	Remove Obstructions	$100,000	$0
2009	15	Conduct Miscellaneous Study (Airport Master Plan Update)	$534,431	$0
2010	16	Continued Study - Airport Master Plan Update	$64,600	$0
2013	17	Rehabilitate Apron, Rehabilitate Taxiway	$139,393	$0
2015	18	Construct Taxiway, Rehabilitate Apron, Rehabilitate Taxiway, Rehabilitate Taxiway	$1,289,561	$0
2015	—	2015 IGA/Proj Number 26906 Aurora Air Traffic Control Tower	$2,695,000	$141,852
2016	19	Rehabilitate Taxiway	$639,502	$0
2017	20	Conduct Environmental Study (Phase 1)	$189,635	$0
2017	–	SOAR-2017-ODA-S-00016, Constrained Operations Study	$0	$70,000
2017	–	SOAR-2017-SO PROJ 3, Ramp Light Repairs	$0	$13,000
2020	–	SOAR-2020-ODA-S-00002, Taxiway Repair, Obstruction Easement Survey, Obstruction Removal	$0	$ 330,000
2021	21	Environmental Assessment for Obstruction Removal (Phase 2)	$ 140,294	$0
2021	22	Airport Master Plan Study and AGIS Survey	$994,764	$0

Source: FAA AIP Grant Look Up Tool (Accessed 12/10/2021) and ODAV provided state grant information.

AIRPORT ROLE

The role of an airport may vary within the context of the National, State, or Local perspective. Understanding the existing roles of the Airport is vital to establish the long-term vision and development of the facility.

National Role

The federal airport system, referred to as the National Plan of Integrated Airport Systems (NPIAS), includes 3,304 public-use airports in all 50 states.[2] Fifty-seven of Oregon's 97 public-use airports are included in the NPIAS. Like federal highways, NPIAS airports represent a critical element of the national transportation system.

NPIAS reports are submitted every two years to Congress in accordance with title 49 United States Code (U.S.C.), section 47103. As required by the statute, the Federal Aviation Administration (FAA) *"...shall maintain the plan for developing public-use airports in the United States." The statute also requires that: "The plan shall include the kind and estimated cost of eligible airport development the Secretary of Transportation considers necessary to provide a safe, efficient, and integrated system of public-use airports adequate to anticipate and meet the needs of civil aeronautics, to meet the national defense requirements of the Secretary of Defense, and to meet identified needs of the United States Postal Service."*

NPIAS airports are grouped into two major categories: primary (commercial service) and non-primary (general aviation and limited passenger service). The majority of NPIAS airports are non-primary general aviation airports. Within the broad definition of general aviation airports, four functional categories are defined: National, Regional, Local, and Basic.

Aurora State Airport is designated a **"National" Nonprimary General Aviation** airport. The role of National airports in the NPIAS is defined as follows:

> *"National airports (84) are located in metropolitan areas near major business centers and support flying throughout the nation and the world. National airports are currently located within 31 states. They account for 13 percent of total flying at the studied general aviation airports and 35 percent of all flights that filed flight plans at the airports in the four new categories. These 84 airports support operations by the most sophisticated aircraft in the general aviation fleet. Many flights are by jet aircraft, including corporate and fractional ownership operations and air taxi services. These airports also provide pilots with an alternative to busy primary commercial service airports. There are no heliports or seaplane bases in this category.*
>
> *Criteria Used to Define the New National Category (all numbers are annualized):*
>
> *1. 5,000+ instrument operations, 11+ based jets, 20+ international flights, or 500+ interstate departures; or*
>
> *2. 10,000+ enplanements and at least one charter enplanement by a large certificated air carrier; or*
>
> *3. 500+ million pounds of landed cargo weight."*

Available data indicate that Aurora State Airport has consistently met or exceeded the FAA's "11+ based jet" and "5,000+ instrument operations" criteria established for National airports since the early 2000s. Aurora State Airport, and nearby Portland-Hillsboro Airport (19 miles northwest) are the only FAA-designated National Airports located in Oregon.

NPIAS airports are deemed significant to the air transportation in the United States, and thus are eligible for federal funding though the Airports Improvement Program (AIP), which currently covers 90% of eligible costs of planning and development projects.

State Role

The Oregon Department of Aviation has developed and periodically updates the Oregon Aviation Plan (OAP) to provide guidance on preserving the State's system of airports. The OAP presents a framework for improving the system to enhance support of local communities and regional economic development. The current OAP (OAP v6.0), completed in 2019, classified Aurora State Airport as **Category II – Urban General Aviation Airport**. The definition for Category II airports is:

2 2021-2025 NPIAS Report, Federal Aviation Administration (9/30/2020)

> *"These airports support all general aviation aircraft and accommodates corporate aviation activity, including piston and turbine engine aircraft, business jets, helicopters, gliders, and other general aviation activity. The most demanding user requirements are business-related. These airports service a large/multi-state geographic region or experience high levels of general aviation activity. The minimum runway length objective for Category II airports is 5,000 feet."*

The most demanding user requirements for Category II airports are typically related to business class aircraft since the airports do not support commercial airline service. Category II airports serve large/multi-state geographic regions and generally experience higher levels of general aviation activity.

The distribution of Category II airports throughout Oregon is a reflection of the state's physical geography, population centers, and the underlying market conditions required to support the full range of general aviation activity common to this type of airport. As documented in OAP v6.0, Oregon has a total 11 Category II airports, which includes one public-use heliport (Portland Downtown Heliport). More than half (6 of 11) of Oregon's Category II airports are located within 30 nautical miles of Aurora State Airport. The concentration of Category II airports in the Portland Metro area is consistent with the region's overall population and economic characteristics. Four of Oregon's Category II airports currently have an air traffic control tower (ATCT); three of these, including Aurora State Airport, are located in the Portland Metro area.

OAP-defined characteristics for Category II airports correspond to the business jet aircraft segment of general aviation. These airports accommodate a wide range of locally-based and transient aircraft that are designed to operate in all-weather conditions. These aircraft require increased facility capabilities for runways, taxiways, instrument approaches/departures, and airfield lighting systems.

Local Role

Aurora State Airport serves the local community in several ways. Based on data reviewed in late 2021, the Airport is currently home to 281 aircraft stored both on ODAV-owned property, and on adjacent privately-owned property with authorized airport access. A review of 2016-2021 Aurora ATCT operations data shows mostly consistent year-over-year increases during the six-year period, ranging from roughly 48,000 to 70,000 annual operations. Additional aircraft flight activity occurs outside the ATCT hours of operation between 0700 and 2000 local time (7:00 am to 8:00 pm in standard time terms). Detailed breakdowns of airport activity are provided later in this chapter and in Chapter 3 – Aviation Activity Forecasts.

The (2019) OAP v6.0[3] states that Aurora State Airport supported 2,672 direct, indirect, and induced jobs, contributing over $125 million in payroll benefits to the local economy (2014 data). The Airport accommodates several businesses including two Fixed Base Operators (FBOs), three flight schools, several aircraft manufacturing and service providers, and a restaurant. OAP v6.0 estimates a total of nearly $510 million in sales revenue/output is generated from airport businesses annually. Two examples of the numerous businesses based at Aurora State Airport include the Life Flight Network administrative office, which supports life-saving medevac services across the Pacific Northwest Region, and Vans Aircraft, a leading kit aircraft manufacturer.

AREA AIRPORT CONTEXTUAL ANALYSIS

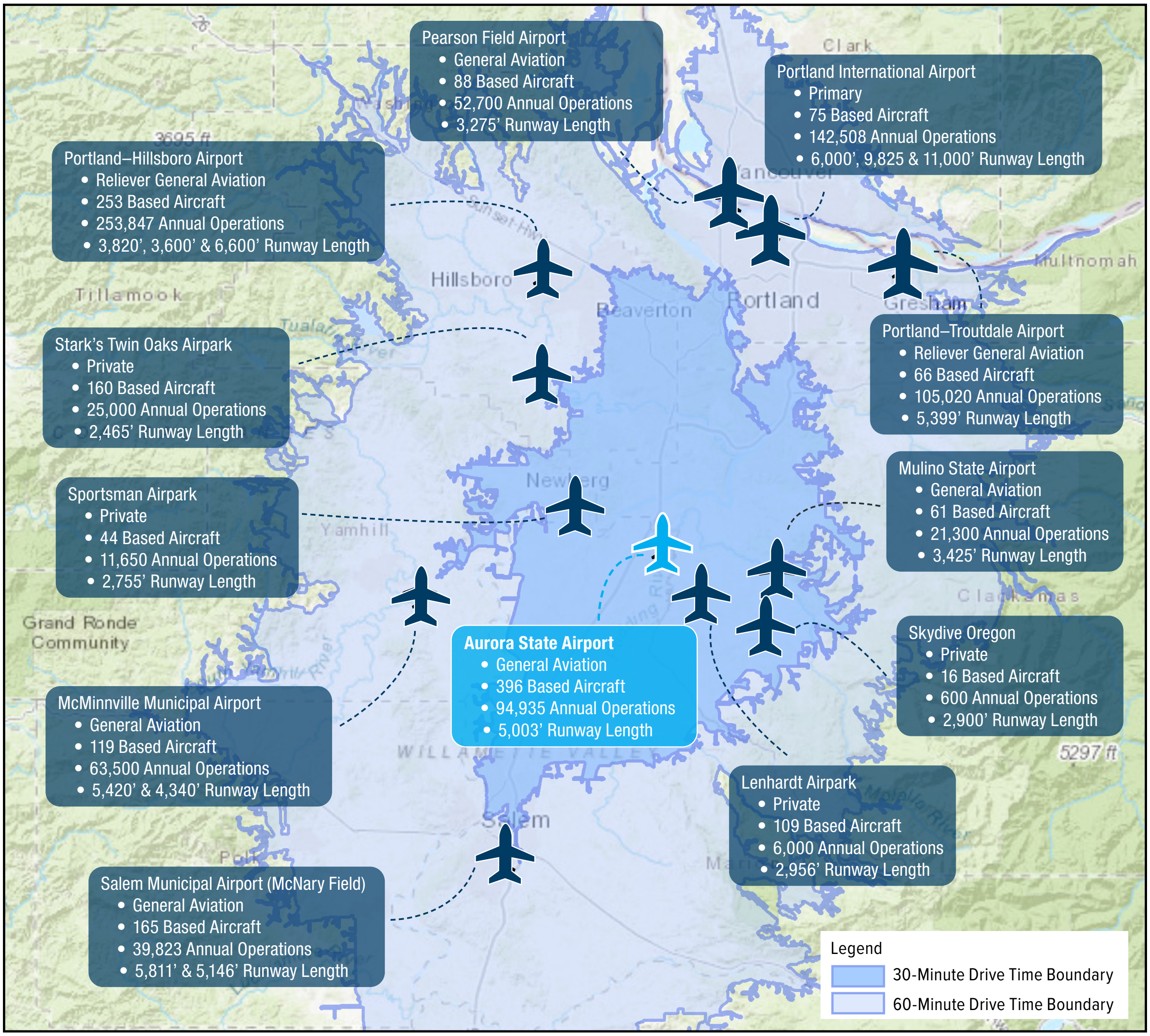
Contextual analysis of the airport service area examines the impact that the airport has on its immediate geographic area. For general aviation airports, the majority of aviation activity can be directly linked to their service area boundaries defined by 30- and 60-minute driving times surrounding the Airport. The airports and aviation activity within a defined service area may directly affect activity at any individual airport in the service area. This ranges from locally-based aircraft to transient aircraft where operators choose airports based in part on proximity to their place of business or travel destination.

Figure 2-2 (and **Table 2-4** at the end of this section) provide an overview of the public-use airports located in the service area for Aurora State Airport. These airports include both publicly-owned and privately-owned facilities. The most recent FAA Airport Master Record Form (5010) data available is presented for these airports to provide common reporting of activity. It is noted that the FAA 5010 data listed for Aurora State Airport is obsolete, but will be revised to reflect the 2021 baseline data developed in the Airport Master Plan. Current based aircraft and aircraft operations data for Aurora State Airport are provided later in this chapter and will be used to develop the aviation activity forecasts (Chapter 3).

3 OAP v6.0 Chapter 8: Economic Impact

As noted in the state airport classification system, an airport's functional role is determined primarily by facility capabilities and factors such as the size of the population it serves. The airports in the local area accommodate a wide range of general aviation activity. Aurora State Airport, Portland-Hillsboro Airport, and Portland International Airport accommodate the majority of business aviation activity in the Portland Metro area, while the smaller airports accommodate predominately smaller aircraft. Portland International Airport (PDX) is the primary commercial service airport serving the local area and region. PDX also accommodates a limited amount of general aviation activity. With the exception of PDX, the other public-use airports located within the service area for Aurora State Airport do not accommodate scheduled airline service.

FIGURE 2-2: AREA AIRPORTS



Source: AirportIQ 5010, Esri, USGS, NOAA

Portland International Airport

Portland International Airport (PDX) is located in northeast Portland, in Multnomah County on the south bank of the Columbia River. The Airport is owned and operated by the Port of Portland and is the largest commercial service airport in Oregon. It has three lighted runways with instrument approach capabilities and full range of aircraft services. The Airport is primarily focused on commercial airline service, but also supports a limited amount of general aviation (GA) activity, 75 GA based aircraft and 10,391 annual GA operations, according to the most recent 5010 data. The Port of Portland also owns Hillsboro and Troutdale Airports, which serve as GA reliever airports to Portland International.

Portland – Hillsboro Airport

Portland-Hillsboro Airport, owned by the Port of Portland, is located in Hillsboro, 10 miles west of Portland. The Airport is a designated reliever GA airport for PDX and serves the Portland Metro Area. The Airport has three lighted runways with instrument approach capabilities, an ATCT, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, aircraft rental, and air taxi (charter) services. Current FAA 5010 data lists 253 based aircraft and 253,847 annual operations.

Portland – Troutdale Airport

Portland-Troutdale Airport, also owned by Port of Portland, is in Troutdale in northern Multnomah County between Interstate 84 (I-84) and the Columbia River. The Airport is a designated GA reliever airport for Portland International. The Airport has a single lighted runway, instrument approach capabilities, an ATCT, and weather reporting. Available services include aviation fuel, hangars and parking, parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 66 based aircraft and 105,020 annual operations.

Pearson Field Airport

Pearson Field Airport is owned by the City of Vancouver and located on the south side of the city in Clark County, Washington. The Airport is located north of the Columbia River and State Highway 14, approximately two miles northwest of Portland International Airport. The Airport has a single lighted runway with instrument approach capabilities, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 88 based aircraft and 52,700 annual operations.

McMinnville Municipal Airport

McMinnville Municipal Airport is in the City of McMinnville in Yamhill County, on the southeast side of the city. The Airport is owned and operated by the City of McMinnville. The Airport has two runways (one lighted), instrument approach capabilities, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 199 based aircraft and 63,500 annual operations.

Salem Municipal Airport (McNary Field)

Salem McNary Field is owned and operated by the City of Salem and located within the city limits two miles southeast of downtown. The Airport previously had scheduled commercial airline service, but the service ended in 2011 and current activity is limited to GA and military operations (Oregon Army National Guard). McNary Field is also the home of the ODAV offices. It has two lighted runways and a helipad, instrument approach capabilities, an ATCT, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data list 165 based aircraft and 39,823 annual operations.

Mulino State Airport

Mulino State Airport is ODAV-owned and operated, and is located in the Hamlet of Mulino, along State Highway 213, approximately five miles north of the City of Molalla. The Airport has a single lighted runway with visual approach capabilities. Available services include aviation fuel, hangars and parking, and aircraft repair and maintenance. Current FAA 5010 data lists 61 based aircraft and 21,300 annual operations.

Stark's Twin Oaks Airpark

Stark's Twin Oaks Airpark is a privately-owned, public-use airport located south of Hillsboro, approximately 13 miles northwest of Aurora State Airport. The Airport has a single lighted runway with visual approach capabilities. Available services include aviation fuel, aircraft parking, hangars and parking, flight training, and aircraft rental. Current FAA 5010 data lists 160 based aircraft and 25,000 annual operations.

Lenhardt Airpark

Lenhardt Airpark is a privately-owned, public-use airport located east of Hubbard, approximately three and a half miles south of Aurora State Airport. The Airport has a paved lighted runway and a parallel grass strip on the west side of the runway, both with visual approach capabilities. Available services include aviation fuel, hangars and parking, aircraft maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 109 based aircraft and 6,000 annual operations.

Sportsman Airpark

Sportsman Airpark is a privately-owned, public-use airport located within the city limits of Newberg, approximately eight miles northwest of Aurora State Airport. The Airport has a single lighted runway with visual approach capabilities. Available services include aviation fuel, hangars and parking, aircraft maintenance, flight training, and aircraft rental. The airpark also serves as a launching point for hot air balloon operations. Current FAA 5010 data lists 44 based aircraft and 11,650 annual operations.

Skydive Oregon

Skydive Oregon Airport is a privately-owned, private use airport located on the west side of Molalla, approximately eight miles southeast of Aurora State Airport. The Airport has a single lighted runway with visual approach capabilities. Skydive Oregon Airport facilitates skydiving operations and instruction services offered by a resident provider also called Skydive Oregon. While the airport has fuel and hangars on site, these services support the skydiving operations and are not available to the public. Current FAA 5010 data lists 16 based aircraft and 600 annual operations.

A summary of the most recent FAA 5010 data for theses airports is presented in **Table 2-4**. As note earlier, the 5010 data is provided for general reference only as a broad indication of activity. Relevant data to be updated in the aviation activity forecasts (Chapter 3).

TABLE 2-4: FAA 5010 DATA

	Aurora State	Lenhardt	Sportsman	Mulino State	Skydive Oregon	Stark's Twin Oaks	McMinnville	Hillsboro	Salem	Portland Int.	Pearson Field	Troutdale	Total
Air Carrier	0	0	0	0	0	0	0	0	0	113,737	0	0	113,737
Air Taxi	7,909	0	100	0	0	0	0	9,561	3,776	16,168	100	4,000	41,614
GA Local	32,177	1,250	3,875	13,000	400	7,000	22,000	160,261	12,043	3,517	18,375	70,000	343,898
GA Itinerant	54,569	4,750	7,675	8,300	200	18,000	40,000	83,381	20,330	6,874	34,125	29,520	307,724
Military	280	0	0	0	0	0	1,500	644	3,674	2,212	100	1,500	9,910
TOTAL OPERATIONS	**94,935**	**6000**	**11,650**	**21,300**	**600**	**25,000**	**63,500**	**253,847**	**39,823**	**142,508**	**52,700**	**105,020**	**816,883**
TOTAL BASED AIRCRAFT	**396**	**109**	**44**	**61**	**16**	**160**	**119**	**253**	**165**	**75**	**88**	**66**	**1,552**
Single Engine	287	108	31	59	15	159	94	163	141	16	83	56	1212
Multi Engine	26	1	2	2	1	1	7	26	10	39	4	3	122
Jet	34	0	0	0	0	0	3	41	6	19	0	0	103
Helicopters	49	0	11	0	0	0	15	23	8	1	1	7	115
Glider	3	0	0	2	0	0	4	5	2	0	1	0	17
Military	0	0	0	0	0	0	0	0	19	21	0	0	40
Ultra-Light	1	4	0	0	4	1	0	0	0	0	0	0	10
OPBA[1]	239	55	265	349	38	568	521	1001	219	354	598	1569	447

Source: AirportIQ 5010 Airport Master Records and Reports (AirportIQ5010.com, Accessed 12/6/2021)
1. OPBA ratio includes general aviation and air taxi operations only. This is a ratio of total aircraft takeoffs and landings divided by the number of aircraft based at the airport.

AIRPORT OPERATIONS SUMMARY

Aurora State Airport accommodates a wide variety of aeronautical activity, including small single- and multi-engine aircraft, business class turbine aircraft (business jets and turboprops), helicopters, and gliders.

Based Aircraft

In late 2021, the ODAV State Airport Manager reviewed the based aircraft count for Aurora State Airport in the FAA based aircraft registry database. The count was previously updated in 2018 (349 based aircraft). The review was completed in consultation with the FAA Seattle Airports District Office in December 2021, and resulted in a new validated count of 281 based aircraft. The reduction in the Airport's based aircraft total reflects a more precise verification of aircraft and removal of previously-counted aircraft (helicopters) located at two private heliports adjacent to the Airport. Please see Chapter 3 - Aviation Activity Forecasts, for a full description of the current based aircraft count.

Aurora State Airport is unique compared to many other airports in that the majority of its based aircraft are stored off airport property, on privately-owned land parcels. These aircraft are referred to as "through-the-fence" (TTF) users. The private land owners are responsible for securing access to Airport property through formal TTF agreements with the airport owner (ODAV). The aircraft stored on these parcels access the Airport seamlessly at designated TTF points. The TTF access points at Aurora State Airport do not have gates and aircraft move freely between the Airport and the adjacent private property.

TABLE 2-5: BASED AIRCRAFT AND FLEET MIX

BA Type	On-Airport	TTF	Total
Single Engine	45	175	220
Multi Engine	1	14	15
Jet	3	33	36
Helicopter	1	9	10
Total	**50**	**231**	**281**

Source: National Based Aircraft Inventory – January 2022

Flight operations for the TTF aircraft rely on the Airport's runway-taxiway system, lighting, and navigational aids to access area airspace in the same manner as on-airport based aircraft. As noted above, the current based aircraft count does not include helicopters located at two privately owned heliports located adjacent to the Airport. A summary of all based aircraft by type and storage location is presented in **Table 2-5**.

Aircraft Operations

The ATCT at Aurora State Airport has been in service daily since October 2015. Controllers in the ATCT log aircraft contacts in the airport airspace, including arriving and departing aircraft, as well as aircraft transiting the airspace (without originating or terminating at the Airport). The resulting counts are available to the public through FAA's Operations Network (OPSNET) Traffic Counts datasets. To serve as a base for the Aurora State Airport operations estimate, the OPSNET Airport Traffic Counts dataset was downloaded for the period of 2016 through 2021, representing the six full years that the ATCT has been in service.

The Airport Traffic Counts dataset includes departure and arrival counts for itinerant aircraft (in both visual and instrument flight rules conditions)[4], local GA, and local military aircraft. The OPSNET Airport Traffic Counts for 2016-2021 are summarized in **Table 2-6**. These counts are unadjusted and provide the basis for a more detailed evaluation of aircraft operations at Aurora State Airport.

TABLE 2-6: OPSNET AIRPORT TRAFFIC COUNTS

Calendar Year	Itinerant Total	Local Total	Total Operations
2016	33,195	15,182	48,377
2017	34,641	23,511	58,152
2018	36,629	26,374	63,003
2019	34,252	28,598	62,850
2020	31,777	34,172	65,949
2021	35,566	34,176	69,742
Total:	206,060	162,013	368,073

Source: FAA OPSNET – January 2022

4 Visual Flight Rules (VFR) apply to aircraft operating with minimum visibility and cloud clearance requirements to maintain safe flight operations in visual meteorological conditions. Instrument Flight Rules (IFR) apply to aircraft operated under instrument flight plans, capable of meeting aircraft equipment and pilot requirements to operate exclusively with electronic guidance from ground or satellite navigational aids.

Aurora ATCT is in service daily between 0700 and 2000 local time. It should also be noted that in 2021 the ATCT was out of service outside of the normal schedule for portions of seven days. On February 13th, 2021 the ATCT opened 18 minutes late due to winter storm conditions, and due to a staffing shortage ATCT went to reduced hours (0800 to 1745 local time) Oct 29th - 31st, and Nov 3rd, 6th, and 10th. Total down time was 19 hours and 48 minutes, accounting for less than 0.5% of the scheduled service time scheduled for the year. These closures and their impact on the aggregated Airport Traffic Counts are not significant.

For airport master planning purposes, the evaluation of aircraft activity will be limited to aircraft physically operating on the Airport's runway-taxiway system. Since the remote facility operations do not require any physical contact with the Airport's runway-taxiway system, the flight activity (and based aircraft) will be removed from datasets.

During data collection annual operations estimates were requested from two off-airport private heliport operators. Each operator estimated between 200 and 300 annual operations were generated at their individual facilities, yielding a total of approximately 600 annual operations. However, in later discussions, the ATCT manager estimated the off-airport helicopter activity to be closer to 3% of total ATCT-logged itinerant operations for the Airport (approximately 1,200 operations in 2021).

The planning team determined that the higher ATCT estimate should be used to ensure that all off-airport helicopter operations were identified and removed from the Airport's operations totals. A reduction of 3% was applied to itinerant operations as reported by the OPSNET Airport Operations Report to account for the helicopter flight activity associated with the two adjacent heliports.

After-Hour Operations Estimates

Outside of the scheduled service times, the Aurora ATCT is not staffed and aircraft operations at Aurora State Airport are not counted. After-hours operations are known to exist (see below) and they need to be estimated, and added to the Airport Traffic Counts to develop an accurate baseline operations total.

The *2019 Constrained Operations Runway Justification Study* for Aurora State Airport addressed after-hours operations hours by assuming that 95% of all airport operations occur during ATCT service hours, and inversely 5% occur outside of those hours. This is a standard method that has been employed at other airports in similar situations, and the resultant baseline counts were approved by FAA for use in the study's forecasts. However, the availability of additional flight data supports a more precise approach.

Instrument Aircraft Flight Activity

FAA Traffic Flow Management System (TFMS) records were obtained through a Freedom of Information Act (FOIA) request. These records provide Instrument Flight Rules (IFR) flight plan arrivals and departures for all airports nationwide and include information on each aircraft, departure and arrival airports, and departure and arrival dates and times, among other data. Nearly 10 years of Aurora State Airport records were available for analysis—January 1, 2012 through August 16, 2021. Consultants have requested the remaining 2021 data through the FOIA process and will incorporate the data when available to complete the 2021 counts.

Flight records where Aurora State Airport was listed as either the departing or arrival airport were queried from the TFMS dataset, resulting in 79,885 IFR operations over the 10-year period. This time period predates the period that ATCT began service. However, arrival and departure times of IFR operations are likely minimally dependent on the presence of an ATCT, and the additional data increased the sample size provides a higher level of confidence in the resultant ratios. Although the TFMS data is based on actual flight plans that are not affected by the operating hours of the ATCT, the data distributions provide a reliable record of after-hours activity at the Airport.

Each of the TFMS operations was classified as occurring either during or outside of ATCT service hours based on arrival or departure timestamps. The timestamps are provided in the 24-hour format used in Coordinated Universal Time (UTC), which does not reflect local time change due to daylight savings time. This was then accounted for in the queries based on departure and arrival dates included in each record.

The queries showed that 86.1% (68,778) of IFR operations during the period occurred during the scheduled ATCT service time, and 13.9% (11,107) occurred outside of the scheduled service hours. To simplify calculations, the splits for IFR operations were rounded (86/14) for in-service and out-of-service operations ratios.

A breakdown of annual TFMS operations data based on the on- and off-hours schedule of the ATCT is presented in **Table 2-7**. The "ATCT open/closed" periods listed in the table are intended to provide time of day consistency when comparing TFMS data, and does not reflect actual period of ATCT operation, which began in late 2015.

TABLE 2-7: TFMS OPERATIONS DATA (ORGANIZED BY ATCT HOURS)

	ATCT Open Ops	ATCT Closed Ops	Total Ops	% Closed
2012*	6,110	703	6,813	10.32%
2013*	6,417	645	7,062	9.13%
2014*	6,450	1,014	7,464	13.59%
2015*	6,838	1,242	8,080	15.37%
2016	7,882	1,436	9,318	15.41%
2017	7,771	1,406	9,177	15.32%
2018	8,265	1,476	9,741	15.15%
2019	7,676	1,238	8,914	13.89%
2020	6,649	1,071	7,720	13.87%
2021	4,720	876	5,596	15.65%
Total	**68,778**	**11,107**	**79,885**	**13.90%**

Source: Century West Engineering developed using FAA TFMS Data
* Data prior to October 2015 ATCT opening

As the ratio was derived using only IFR flight plan data, it is valid for estimating only IFR operations, but does not capture activity conducted outside of IFR flight plans. This would include aircraft operating visually, with or without visual flight rules (VFR) flight plans. While the OPSNET Traffic Counts provide hard counts of VFR traffic during ATCT service hours, off-hours traffic is not represented in the OPSNET or other available datasets. However, as previously mentioned, other studies have employed a general 5% (of total operations) estimate to approximate all traffic outside of ATCT service hours. Inversely, 95% of VFR operations were assumed to occur during ATCT service hours. It is reasonable to apply that same method to account for after-hours VFR activity at Aurora State Airport. While not as precise as the above IFR method, it is the best option available evaluating available data.

The above discussed ratios were applied to OPSNET Airport Traffic Counts (ATCT in-service) to approximate IFR and VFR operations occurring when the ATCT was closed. A summary of IFR and VFR operations by ATCT status, as well as the resulting total annual operations estimates are presented in **Table 2-8**.

TABLE 2-8: ANNUAL OPERATIONS (ATCT ADJUSTED)

	2016	2017	2018	2019	2020	2021
ATCT Open (86%) - IFR	9,880	10,018	10,522	7,515	6,576	7,596
ATCT Closed (14%) - IFR	1,608	1,631	1,713	1,223	1,071	1,237
Total IFR	**11,488**	**11,649**	**12,235**	**8,738**	**7,647**	**8,833**
ATCT Open (95%)- VFR	37,501	47,095	51,381	54,306	58,418	63,835
ATCT Closed (5%) - VFR	1,974	2,479	2,704	2,858	3,075	3,360
Total VFR	**39,475**	**49,574**	**54,085**	**57,164**	**61,493**	**67,195**
ATCT Open - Total	47,381	57,113	61,903	61,821	64,994	71,431
ATCT Closed - Total	3,582	4,110	4,417	4,081	4,146	4,597
Total Ops	**50,963**	**61,223**	**66,320**	**65,902**	**69,140**	**76,028**
% ATCT Closed Ops	7.56%	7.20%	7.14%	6.60%	6.38%	6.44%

Source: Century West Engineering developed using FAA TFMS Data

The adjusted operations estimates align well with the previous approved forecast developed in the 2019 *Constrained Operations Runway Justification Study*. Using a 5% after-hours estimate across the board, that study approximated 66,153 operations for the 2018 base year. Using the updated methodology, the adjusted 2018 operations count is 67,478, an increase of 0.25%. Considering the heavier weight that was placed on IFR operations occurring outside of ATCT service hours, coupled with the removal of the erroneous itinerant helicopter operations, the slight increase is reasonable.

Operations Fleet Mix

To better understand the operational demand that the Airport's fleet composition has on the facility, an operations mix analysis was completed. The OPSNET Airport Traffic Counts attribute the airport operations to individual itinerant and local aircraft classifications. These classifications include:

- Itinerant
  - » Air Taxi
  - » General Aviation
  - » Military
- Local
  - » Civil (General Aviation)
  - » Military

The percentage of operations that each classification composes of the annual totals was calculated for each year that the ATCT has been in service to create ratios for each classification for each year. The ratios for each classification were assumed to apply to all operations regardless of ATCT status. The resultant ratios were applied to the historical operations estimates described above. The results of the exercise are summarized in **Table 2-9**.

TABLE 2-9: ANNUAL OPERATIONS FLEET MIX (HISTORICAL)

	2016	2017	2018	2019	2020	2021
Itinerant						
Air Taxi	2,194	2,319	2,121	1,670	1,129	2,006
General Aviation	32,174	33,502	35,665	33,638	31,621	36,390
Military	265	199	277	107	38	79
Subtotal	**34,633**	**36,020**	**38,063**	**35,415**	**32,788**	**38,475**
Local						
General Aviation	16,191	25,075	28,011	30,453	36,333	37,488
Military	139	129	245	34	19	65
Subtotal	**16,330**	**25,204**	**28,256**	**30,487**	**36,352**	**37,553**
Total	**50,963**	**61,223**	**66,320**	**65,902**	**69,140**	**76,028**

Source: Century West Engineering developed using FAA OPSNET Data

The OPSNET Airport Traffic Count data only differentiate local and itinerant traffic for GA aircraft. Understanding the demand placed on the Airport by different sizes and types of aircraft is also important. A review of FAA Traffic Flow Management System Counts (TFMSC) data illustrates an evolving fleet mix at the Airport over the previous 10-year period. TFMSC data captures instrument flight plan filings, which provides a reliable indication of activity trends for this segment of airport activity.

The FAA categorizes aircraft activity by Aircraft Approach Category – AAC (approach speed during landing) and Airplane Design Group - ADG (wingspan and tail height). **Table 2-10** provides examples of aircraft representative of AAC/ADG types ranging from small single-engine piston aircraft (A-I small) to large transport category jets (D-IV). In general, larger, and faster aircraft require larger operating surfaces and protected areas. **Table 2-11** provides a summary of operations by select aircraft at Aurora State Airport organized by AAC/ADG. The current and future AAC/ADG for Aurora State Airport will be determined following FAA approval of the aviation activity forecasts, which includes approval of the current and future design aircraft. The design aircraft represents the most demanding aircraft type that generates at least 500 annual operations.

TABLE 2-10: AIRCRAFT APPROACH CATEGORY (AAC) AND AIRPLANE DESIGN GROUP (ADG)

Aircraft Approach Category	Aircraft Approach Speed knots	Airplane Design Group	Aircraft Wingspan
A	less than or equal to 91	I	less than or equal to 49’
B	92 to 121	II	50’ to 79’
C	122 to 141	III	80’ to 118’
D	142 to 166	IV	119’ to 171’

A-I (small) 12,500 lbs. or less

Beech Baron 55
Beech Bonanza
Cessna 182
Piper Archer

B-I (small) 12,500 lbs. or less

Beech Baron 58
Beech King Air C90
Cessna 402
Cessna 421

A-II, B-II (small) 12,500 lbs. or less

Super King Air 200
Pilatus PC-12
DCH Twin Otter
Cessna Caravan

B-II Greater than 12,500 lbs.

Super King Air 300, 350
Beech 1900
Cessna Citation
Falcon 20, 50

A-III, B-III Greater than 12,500 lbs.

DHC Dash 7, Dash 8
Q-200, Q-300
DC-3
Convair 580

C-I, D-I

Lear 25, 35, 55, 60
Israeli Westwind
HS 125-700

C-II, D-II

Gulfstream II, III, IV
Canadair 600
Canadair Regional Jet
Lockheed JetStar

C-III, D-III

Boeing Business Jet
Gulfstream 650
B 737-300 Series
MD-80, DC-9

C-IV, D-IV

B - 757
B - 767
DC - 8-70
DC - 10

Source: Century West Engineering

TABLE 2-11: TFMSC IFR DATA - SELECT JET AIRCRAFT WITH MAXIMUM CERTIFICATED TAKEOFF WEIGHT OF MORE THAN 12,500 POUNDS

TFMSC IFR Data - Select Jet Aircraft with Maximum Certificated Takeoff Weight of More than 12,500 Pounds												
	AAC/ADG	Aircraft Designator	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
BAE HS 125*	B-I	HS25	2	0	0	0	0	0	0	0	0	0
Beechjet 400/400A/400XP	B-I	BE40	32	64	46	34	26	14	4	6	22	38
Beechjet Premier/Raytheon 390 Premier	B-I	PRM1	68	100	88	76	66	4	16	12	4	4
Cessna 500 Citation I	B-I	C500	0	4	6	0	20	20	2	0	0	0
Cessna 501 Citation I Special	B-I	C501	78	66	46	14	16	12	30	16	8	20
Cessna Citation CJ-2	B-I	C25A	44	68	176	82	74	188	232	148	100	182
Dassault Falcon 10	B-I	FA10	64	74	70	90	16	0	10	0	0	0
Sabreliner 40/60	B-I	SBR1	2	4	0	2	2	0	0	0	2	0
Cessna 550 Citation Bravo*	B-II	C55B	0	0	0	0	0	0	6	0	0	16
Cessna 550 Citation II/Bravo	B-II	C550	210	134	162	224	260	158	212	174	138	162
Cessna 551 Citation II/Special	B-II	C551	6	4	6	14	56	26	12	0	4	0
Cessna 560 Citation V Encore/Ultra	B-II	C560	362	496	460	580	688	772	706	618	546	622
Cessna 560 XL Citation Excel/XLS	B-II	C56X	102	118	132	258	316	396	430	392	340	278
Cessna 650 Citation III/IV	B-II	C650	90	90	118	144	118	114	98	68	66	42
Cessna 680 Citation - Latitude	B-II	C68A	0	0	0	0	0	4	10	30	30	40
Cessna 680 Citation Sovereign	B-II	C680	64	52	68	72	64	90	138	150	138	250
Cessna 750 Citation X	B-II	C750	60	74	90	94	90	94	104	92	84	38
Cessna Citation CJ-3	B-II	C25B	46	36	26	100	86	106	90	302	182	66
Cessna Citation CJ-4	B-II	C25C	6	12	2	4	10	72	60	622	618	730
Dassault Falcon 20	B-II	FA20	90	84	28	14	98	74	76	68	66	82
Dassault Falcon 2000/EX	B-II	F2TH	2	14	6	4	6	4	34	130	108	346
Dassault Falcon 50/EX	B-II	FA50	10	18	96	220	310	316	276	284	216	302
Dassault Falcon 900/B/C/EX	B-II	F900	180	144	48	8	54	80	68	100	26	16
Embraer EMB545/Legacy 450	B-II	E545	0	0	0	0	2	2	0	0	4	2
Embraer Phenom 300	B-II	E55P	14	102	96	92	86	122	56	80	256	430
Hawker Horizon	B-II	HA4T	2	2	2	0	0	0	0	2	2	6
Dassault Falcon F7X	B-III	FA7X	0	0	0	0	0	0	4	4	2	0
Hawker 600	C-I	H25A	0	0	2	0	0	0	0	0	0	0
Hawker 800/800XP	C-I	H25B	224	210	310	118	42	28	34	20	8	32
IAI Westwind 1124	C-I	WW24	10	8	4	2	10	2	2	4	0	0
Learjet 28*	C-I	LJ28	0	0	0	2	0	0	0	0	0	0
Learjet 31	C-I	LJ31	4	2	0	0	6	54	92	110	32	22
Learjet 40	C-I	LJ40	10	0	8	0	4	0	2	0	2	6
Learjet 45/XR	C-I	LJ45	110	148	180	236	240	208	110	136	122	204
Learjet 55	C-I	LJ55	0	2	0	0	2	0	4	2	0	0
Learjet 60	C-I	LJ60	2	4	10	82	36	14	30	14	6	10
Bombardier Challenger 300	C-II	CL30	32	90	64	72	78	104	88	78	62	54
Bombardier Challenger 350	C-II	CL35	0	0	0	4	2	0	22	54	80	104
Bombardier Challenger 600/601/604	C-II	CL60	126	122	36	12	64	80	58	52	90	68
Cessna 700 Citation - Longitude*	C-II	C700	0	0	0	0	0	0	0	0	0	18
Embraer ERJ 135/140/Legacy	C-II	E135	0	4	6	0	2	2	0	0	0	0
Embraer Legacy 500*	C-II	E550	0	0	0	0	0	2	0	0	0	4
Gulfstream 150	C-II	G150	2	0	0	2	2	6	80	22	4	2

Continued on next page

TABLE 2-11: TFMSC IFR DATA - SELECT JET AIRCRAFT WITH MAXIMUM CERTIFICATED TAKEOFF WEIGHT OF MORE THAN 12,500 POUNDS

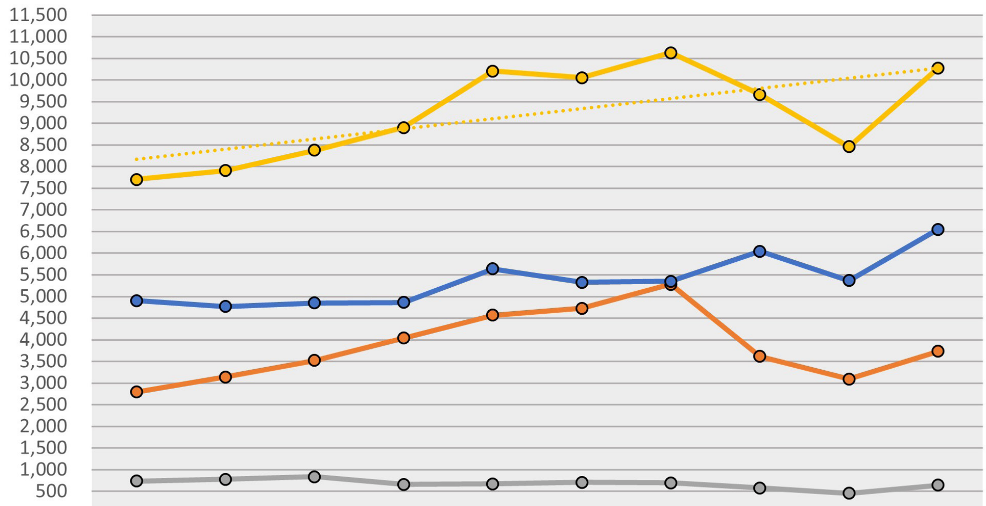
TFMSC IFR Data - Select Jet Aircraft with Maximum Certificated Takeoff Weight of More than 12,500 Pounds	AAC/ADG	Aircraft Designator	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gulfstream 280	C-II	G280	0	0	6	2	0	0	0	2	0	2
Gulfstream II/G200	C-II	GLF2	2	0	0	0	0	0	0	0	0	0
Gulfstream III/G300	C-II	GLF3	0	0	2	2	2	0	0	0	0	2
IAI Astra 1125	C-II	ASTR	178	152	164	114	160	162	96	14	0	4
IAI Galaxy 1126	C-II	GALX	8	10	16	0	2	4	0	4	2	2
Learjet 70	C-II	LJ70	0	0	0	0	0	0	2	0	2	0
Learjet 75	C-II	LJ75	0	0	0	0	4	10	12	0	2	4
Bombardier Global 5000	C-III	GL5T	0	0	0	0	0	0	0	2	0	0
Bombardier Global Express	C-III	GLEX	18	10	4	8	0	14	50	52	10	0
Learjet 35	D-I	LJ35	2	8	16	0	4	6	8	4	0	12
Gulfstream IV/G400	D-II	GLF4	4	0	4	0	2	6	2	8	26	84
Gulfstream V/G500	D-III	GLF5	6	10	4	2	0	4	2	0	4	6
Gulfstream VI/G600	D-III	GLF6	0	0	0	0	6	4	2	0	0	0
Total			**2272**	**2540**	**2608**	**2784**	**3132**	**3378**	**3370**	**3876**	**3414**	**4312**
B-I			290	380	432	298	220	238	294	182	136	244
B-II			1244	1380	1340	1828	2244	2430	2376	3112	2824	3428
B-III			0	0	0	0	0	0	4	4	2	0
C-I			360	374	514	440	340	306	274	286	170	274
C-II			348	378	294	208	316	370	358	226	242	264
C-III			18	10	4	8	0	14	50	54	10	0
D-I			2	8	16	0	4	6	8	4	0	12
D-II			4	0	4	0	2	6	2	8	26	84
D-III			6	10	4	2	6	8	4	0	4	6
Operations by AAC C and D Jets			**738**	**780**	**836**	**658**	**668**	**710**	**696**	**578**	**452**	**640**
Operations by ADG II and III Jets			**1910**	**2158**	**2078**	**2344**	**2788**	**3066**	**3088**	**3586**	**3244**	**4026**

Note: Operations by militarty, turboprop, and piston aircraft are not represented in the the counts above
* AAC/ADG data was not provided in TFMSC. Classifications were assigned according to FAA Aircraft Characteristics Database

As shown in **Figure 2-3**, while total TFMSC activity is trending upward, instrument-related operations by aircraft smaller than AAC/ADG B-I have declined significantly over the past three years, causing a decrease in total TFMSC operations over the same period. However, during this period, operations by AAC/ADG B-I and larger aircraft have remained steady or increased. These data indicate that instrument activity at the Airport is evolving toward a more diverse mix of larger aircraft including multi-engine piston, turboprops, and jets, while the volume of single-engine piston aircraft activity has declined.

This observation is further supported by fuel flowage data presented in **Table 2-12** below. Over the six years of available data, and accounting for decreased activity in 2020 due to the impacts of COVID-19, aviation gasoline (AVGAS) flowage has shown a decreasing trend while jet fuel flowage has increased.

FIGURE 2-3: TFMSC IFR OPERATIONS DATA



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	7,700	7,908	8,376	8,902	10,208	10,050	10,630	9664	8460	10280
Smaller than B-I Aircraft	2,796	3,138	3,524	4,040	4,568	4,726	5,278	3,618	3,092	3,732
B-I and Larger Aircraft	4,904	4,770	4,852	4,862	5,640	5,324	5,352	6,046	5,368	6,548
Total C and D Aircraft	738	780	836	658	668	710	696	578	452	640

Source: Century West Engineering developed using FAA TFMSC Data

TABLE 2-12: AURORA STATE AIRPORT FUEL FLOWAGE

	2016	2017	2018	2019	2020	2021	Total
Jet Fuel gallons	933,527	896,058	1,050,306	929,453	893,989	1,055,344	3,769,806
AVGAS gallons	107,900	134,397	150,515	117,445	79,196	92,808	481,553

Source: Oregon Department of Aviation

APPLICABLE PLANNING STUDIES/DOCUMENTS

This section summarizes existing planning documents, federal advisory documents and background information directly related to the Aurora State Airport and the Aurora State Airport Master Plan. The documents in this section were utilized by Century West Engineering and the ODAV to support the production of the Aurora State Airport Master Plan. The documents included in this section represent the most comprehensive information related to the Aurora State Airport Master Plan that were available to the ODAV at the time of publication.

FAA Advisory Circulars

The FAA publishes a series of documents known as Advisory Circulars (AC) aimed at providing guidance to airports, airport users, and consultants for compliance with Code of Federal Regulations (CFR) pertaining to a variety of operational, engineering, and planning issues. While not an exhaustive list, the following ACs are commonly referenced during the airport master planning process. Additional ACs may be introduced and referenced as the plan develops.

- *AC 150/5070-6B, Airport Master Plans* – Provides guidance for the preparation of airport master plans that range in size and function from small general aviation to large commercial service facilities
- *AC 150/5300-13B, Airport Design* – Contains the Federal Aviation Administration's (FAA) standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other facilities at civil airports
- *AC 150/5060-5, Airport Capacity and Delay* – Explains how to compute airport capacity and aircraft delay for airport planning and design
- *AC 150/5325-4B, Runway Length Requirements for Airport Design* – Provides guidelines for airport designers and planners to determine recommended runway lengths for new runways or extensions to existing runways

Marion County Comprehensive Plan

The Marion County Comprehensive Plan[5] (Adopted: May 13, 1981 by Ord No. 601; subsequent periodic updates through 2021) was developed for the purpose of providing a guide to development and conservation of Marion County's land resources. It is a long-range policy and land use guide that provides the basis for decisions on the physical, social, and economic development of Marion County. The Marion County Comprehensive Plan incorporates elements and policies of other Marion County planning documents through a formal process.

The following policies were identified in the Goals and Policies section of the Marion County Comprehensive Plan to address airports in the County[6]:

- *"Airports and airstrips shall be located in areas that are safe for air operations and should be compatible with surrounding uses."*
- *"The County should review and take appropriate actions to adopt State master plans for public airports in Marion County."*
- *"The County will adopt appropriate provisions (including plans, ordinances and intergovernmental agreements) to protect the public airports from incompatible structures and uses. These provisions will be consistent with Federal Aviation Administration guidelines."*
- *"The County will discourage noise-sensitive uses from locating in close proximity to public airports."*

Marion County Rural Transportation System Plan

Marion County completed the *Rural Transportation System Plan* (RTSP) in 2005 with the intent of "providing framework for developing an efficient, well-balanced, and cost-effective transportation system for the next 20 years".[7] The RTSP addresses rural transportation facilities managed by Marion County outside of Urban Growth Boundaries (UGB). Transportation planning topics for areas within UGBs are addressed in individual city transportation system plans (E.g. City of Aurora Transportation System Plan). The RTSP has been formally adopted into the Marion County Comprehensive Plan.

5 Marion County Comprehensive Plan (May 1981, Ord No. 601); Revised: July 1994 by Ord 979, October 1998 by Ord 1091, May 2000 by Ord 1130, July 2000 by Ord 1118, August 2000 by Ord 1131, January 2001 by Ord 1132 and Ord 1139, December 2002 by Ord 1166, February 2008 by Ord 1260 and Ord 1261, September 2010 by Ord 1308, and June 2021 by Ord 1435

6 Marion County Comprehensive Plan, pg. 58

7 Marion County RTSP Page 2-1

The RTSP lists Aurora State Airport among the County's 25 airports and heliports (as of 2005), and references the projects outlined in the 1999 Aurora State Master Plan, most of which have been completed since the plan was developed. The RTSP states that the County intended to adopt the 2005 update to the Aurora State Airport Master Plan after review to ensure compatibility with County land use and zoning requirements.[8]

Marion County is in the early stages of planning for an update to the RTSP as it approaches the end of its 20-year planning period. In 2012-2013, an update was started, but never formally adopted and ultimately not considered as an update to the plan. The County has applied for state grant funding to begin the necessary update to the RTSP.

City of Aurora Transportation System Plan

The City of Aurora developed its 2009 Transportation System Plan *(*TSP) to establish the City's goals, policies, and strategies to improve the transportation system within its UGB. The primary objective of the TSP is to "…enhance the general mobility throughout the City and offer guidance on multi-modal transportation decisions over the coming decades".[9]

While Aurora State Airport is not located within the Aurora UGB, its proximity to the city and its impact on residents warranted its inclusion in the plan. The following excerpt from the plan lays out the recommendations concerning the Airport.

> *"…For planning purposes, the City needs to continue to work with the Aurora State Airport and ODAV to help maintain and improve roadway access to and from the airport, as well as understand and address the effects of increased traffic flow on Airport and Ehlen Roads caused by airport growth. The increased growth will likely impact operations at intersections under the jurisdiction of the City, County, and ODOT. Mitigation for these impacts may be required in the future to ensure safety and efficient traffic operations."*[10]

Oregon Aviation Plan

In 2019, ODAV completed an update to the *Oregon Aviation Plan* (OAP v6.0) for the state airport system which includes 95 airports, one heliport, and one seaplane base. The study area was statewide and considered both commercial service and general aviation airports.

Each airport's level generally reflects the type of aircraft and customers the airport serves as well as the characteristics of the airport's service area. In the OAP update, Aurora State Airport is classified as Category II – Urban General Aviation Airport.

As a Category II airport, the OAP has identified certain facilities and services that should ideally be in place. These objectives are considered the "minimums" to which the airport should be developed. At this time Aurora State Airport meets all of the listed requirements with the exception of a precision instrument approach.

As part of the OAP update, annual economic impacts for 97 statewide airports were also estimated. General aviation operations at Aurora State Airport accounted for an estimated 2,672 direct, indirect, and induced jobs, which contribute over $125 million in payroll. Airport businesses are estimated to generate nearly $510 million in sales revenue/output annually.[11]

Oregon Resilience Plan

The Oregon Resilience Plan was completed in 2013, and provides analysis of key challenges, including the potential impact on Oregon's infrastructure and outlines a basic strategy for post disaster response coordination following a significant Cascadia seismic event. The overall expectation is that critical infrastructure components in coastal and western areas of the affected states will suffer complete loss or significant damage during a major event. The ability to respond will require coordinated use of assets outside the areas of damage. The plan identifies 29 airports throughout the state arranged into a three-tier system to indicate the priorities for making future investments:

- Tier 1 (T1) is comprised of the essential airports that will allow access to major population centers and areas considered vital for both rescue operations and economic restoration;
- Tier 2 (T2) is a larger network of airports that provide access to most rural areas and will be needed to restore major commercial operations; and

8 Marion County RTSP, pg. 2-7
9 Aurora Transportation System Plan, pg. 1-1
10 City of Aurora Transportation System Plan, pg. 3-21
11 OAP v6.0, Chapter 8, Tables 8-3, 8-4, 8-5

- Tier 3 (T3) airports will provide economic and commercial restoration to the entire region after a Cascadia subduction zone event.

Aurora State Airport is classified as a T3 airport. As a T3 airport the plan sets goals for reaching recovery milestones after an event. For Aurora, those goals are:

- To restore a Minimal level of recovery within 1-3 days: Restore essential services primarily for use of first responders, repair crews, and vehicles transporting critical supplies;
- To restore a Functional level of recovery within 1-3 months: Although service is not yet restored to full capacity, it is sufficient to get the economy moving again—e.g. some truck/freight traffic can be accommodated. There may be fewer lanes in use, some weight restrictions, and lower speed limits; and
- To restore an Operational level of recovery within 6-12 months: Restoration is up to 90% of capacity: A full level of service has been restored and is sufficient to allow people to commute to school and to work.

The study also modeled the potential impacts of a Cascadia magnitude 9.0 earthquake on the region using models from the United States Geological Survey (USGS) to simulate strong shaking that is likely to occur in such an event. The resulting simulated shaking map was then used to estimate the amount of ground failure due to liquefaction and landsliding that would occur. Liquefaction susceptibility values were assigned and then categorized into Low, Moderate, and High susceptibility categories. The results of the model scenario are publicly available via the Oregon Department of Geology and Mineral Industries (DOGAMI) Oregon HazVu: Statewide Geohazards Viewer website (https://gis.dogami.oregon.gov/maps/hazvu/). The HazVu viewer shows that the southern half of the airfield is classified as a Moderate hazard area and the north half is classified as a High hazard area.

2012 Aurora State Airport Master Plan Update

The validity of the AMPU was recently questioned as part of a petition for review made to the Oregon Land Use Board of Appeals ("LUBA"). In that land use action, the petitioners sought review of a 2019 Oregon Aviation Board Decision made pursuant to OAR 138-103-0055 in which the Board found that the AMPU was compatible with the Marion County Comprehensive Plan. Petitioners also filed in state Circuit Court as a precautionary measure in the event LUBA dismissed the matter for lack of jurisdiction. LUBA concluded that it lacked jurisdiction to hear this matter, but was overturned on appeal on that issue by the Court of Appeals. In December of 2021, the Oregon Supreme Court declined to review the Court of Appeal's decision and the matter was remanded back to LUBA. As directed by the Court of Appeals, LUBA ordered ODAV and the Board to submit a copy of the master plan documents that were before the Board in a 2011 adoption hearing. ODAV and the Board are unable to locate a copy of this document, and, based on an incomplete record, LUBA remanded the Board's 2019 Findings that the Board complied with OAR 138-103-0055 when it adopted the AMPU. LUBA further ordered that it was unable to resolve any of the other issues presented by the parties, including whether the Board lawfully adopted the AMPU. When completed, the 2021 Airport Master Plan will supersede the previous planning studies completed for Aurora State Airport.

Because of the missing master plan documents, the Board may be unable to demonstrate in a legal proceeding that the AMPU was lawfully adopted. However, there has been no decision by a court or the Board that the AMPU was not lawfully adopted and the time in which that decision may be challenged has passed under state law. Moreover, the studies and information conducted to support the AMPU were funded and required by FAA and did not require adoption under state law to be valid for FAA purposes. The circuit court cases remain pending but are expected be dismissed or otherwise resolved consistent with LUBA's order of remand.

2019 Constrained Operations Runway Justification Study

In 2019, the ODAV completed a study to update the aviation activity forecasts and review the runway length requirements at Aurora State Airport to consider if the eligibility threshold for a runway extension had been met. A constrained operations airport user survey was distributed as part of this study. The survey identified 645 constrained annual operations from a variety of aircraft and aircraft operators. Additional analysis of TFMSC data and the airport user surveys indicated more than 500 annual operations by aircraft to/from destinations beyond 1,000 nautical miles of Aurora State Airport. The study concluded that a runway length of 7,888 feet was justified by FAA methodologies (AC 150/5325-4B). However, consultants recommended a future runway length of 6,002 feet as it was identified in the 2012 Airport Master Plan and depicted on the ALP. While the justification for additional runway length was never formally accepted by FAA, the Aviation Activity Forecasts developed in the study received FAA approval in a letter dated September 26, 2019.

ENVIRONMENTAL DATA

Aurora has a warm-summer Mediterranean climate as classified by the Köppen climate classification system. The climate is characterized by cool, rainy winters, and warm, dry summers. The fall, winter, and spring seasons often have overcast, wet, and changing conditions, while the summers are warm and dry.

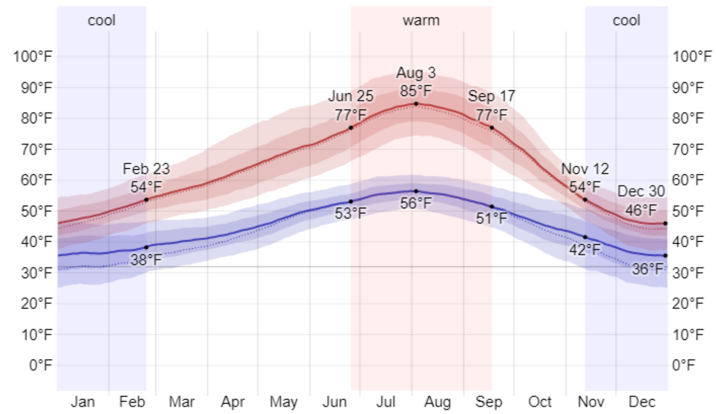
Average daily temperatures in Aurora range from a low of 40 degrees in December to a high of 68 degrees in July and August. The maximum average high temperature of the hottest month is 83 degrees in August, and the minimum average low temperature of the coldest month is 36 degrees in January and December. Annual temperature data are presented in **Figure 2-4**.

Precipitation at the Airport varies significantly throughout the year, as shown in **Figure 2-5**. The wet season lasts approximately seven months from mid-October to early-May. Inversely the dry season last approximately five months from early-May to mid-October. The airport receives an average of 52.3 inches of rainfall annually. The wettest month is December with an average of 8.7 inches; the driest month is July with an average of 0.5 inches of precipitation.

Sky conditions at the Airport, shown in **Figure 2-6**, vary significantly by season and are consistent with precipitation distributions. In general, the Airport experiences more instrument meteorological conditions (IMC) during the wetter months. The wetter, cloudy season generally begins in October and runs into early summer. The summer months are predominately partly cloudy, mostly clear, or clear—conditions that correspond to visual meteorological conditions (VMC).

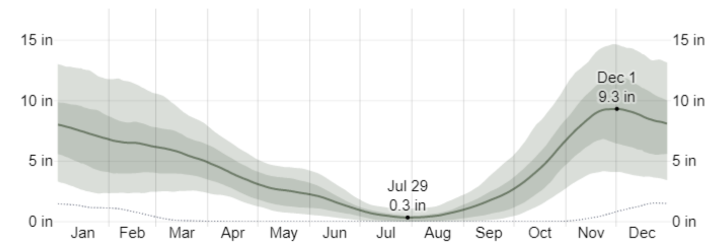
Wind data for the Airport indicates that prevailing wind directions vary by season. Spring and summer are characterized by north and west winds, while the fall and winter months observe winds from the south and east. See **Figure 2-7**. The FAA wind analysis computer program (Airport Data and Information Portal - Windrose Generator) confirms that the existing orientation of Runway 17/35 satisfies the FAA's minimum threshold of 95% crosswind coverage for all categories of aircraft.

FIGURE 2-4: ANNUAL TEMPERATURES



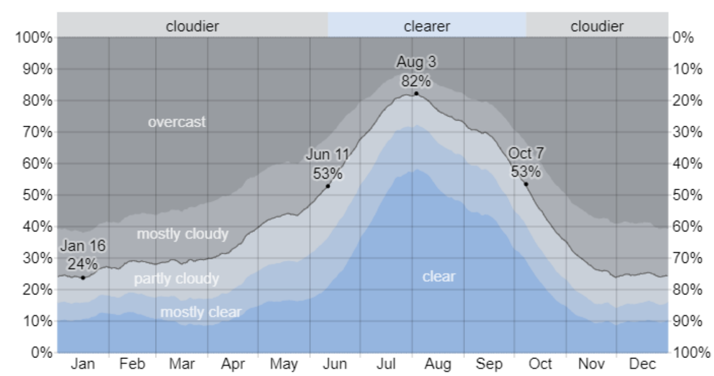
Source: www.weatherspark.com

FIGURE 2-5: ANNUAL RAINFALL



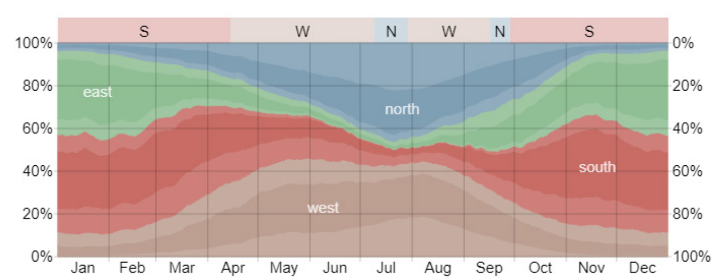
Source: www.weatherspark.com

FIGURE 2-6: ANNUAL CLOUD COVER



Source: www.weatherspark.com

FIGURE 2-7: ANNUAL WIND DATA



Source: www.weatherspark.com

ENVIRONMENTAL SCREENING/NEPA CATEGORIES

An environmental screening/desktop review of previous environmental work was included as part of the Airport Master Plan to provide a summary of the FAA prescribed environmental impact categories. Building off previous environmental work completed for the Airport, the desktop review referenced materials and site assessments completed for the Draft Environmental Assessment (EA) for Obstruction Removal.[12] The supporting field investigations for the EA include a biological assessment, water resources report, cultural resources, and air quality report. The documents included in the EA are currently under review by FAA and have been incorporated by reference into the environmental screening report provided in **Appendix 2**.

Typical environmental impact categories include:

- Air Quality;
- Biological Resources (including fish, wildlife, and plants);
- Federally-listed Endangered and Threatened ("T&E") Species;
- Climate;
- Coastal Resources;
- Department of Transportation Act, Section 4(f);
- Farmlands;
- Hazardous Materials, Solid Waste, and Pollution Prevention;
- Historical, Architectural, Archeological, and Cultural Resources;
- Land Use;
- Natural Resources and Energy Supply;
- Noise and Compatible Land Use
- Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks
- Visual Effects; and
- Water Resources (including wetlands, floodplains, surface waters, water quality, stormwater, groundwater, and wild and scenic rivers).

Several of the impact categories above (land use, climate, socioeconomic, etc.) are analyzed separately throughout Chapter 3 – Existing Conditions Analysis. Per the scope of work, not all impact categories identified above were included for analysis. A summary of significant findings is provided below.

Air Quality

The Aurora State Airport property falls within a census block where all air quality-related environmental hazard indexes are between the 24th and 73rd percentile nationwide. The Airport property scores within the 51st percentile for diesel particulate matter, the 73rd percentile for PM2.5 levels, the 24th percentile for ozone summer seasonal average of daily maximum eight-hour concentrations in the air, the 51st percentile for cancer risk from the inhalation of air toxics, and the 69th percentile nationwide for other respiratory hazards exposure.

Biological Resources

A review of available data yielded no records of species observed on the Airport listed by state, or federally as endangered or threatened, nor were any species listed as candidates for listing reported. However, the Molalla River (three miles northeast of the Airport), the Pudding River (0.85 mile east of the Airport), and Mill Creek (0.75 mile southeast of the Airport) are designated as habitat for Chinook salmon (federally threatened; state classified sensitive critical), Pacific lamprey (federal species of concern; state classified sensitive vulnerable), and steelhead (federally threatened; state classified sensitive vulnerable) based on records of historic sightings.

There are no designated critical habitats on the Airport property. However, sub-watersheds surrounding the Airport are considered Essential Fish Habitat (EFH) for Chinook and coho salmon. Federal agencies are required to consult with the National Oceanic and Atmospheric Administration (NOAA) Fisheries regarding any action authorized, funded, or undertaken that may adversely affect EFH. Stormwater runoff from the Airport property flows into the Chinook and steelhead critical habitat areas as well as the Chinook and coho EFH areas.

12 Aurora State Airport Master Plan Update Environmental Overview, December 2021, Environmental Science Associates

Hazardous Materials, Solid Waste and Pollution Prevention

An EPA hazardous waste treatment, storage, and disposal facility (TSDF) was reported at Columbia Helicopters Inc., adjacent to the Airport's northeast property boundary. This TSDF is recorded as addressing the handling and prevention of releases of hazardous materials into the environment from wastes generated on site at the property, as well as wastes received from off-site facilities. In addition to this TSDF, Columbia Helicopters Inc. also holds a National Pollutant Discharge Elimination System (NPDES) permit for water discharges and is identified by the EPA Cleanups in My Community Map as having been a Resource Conservation and Recovery Act (RCRA) corrective action site. Aurora State Airport also holds an NPDES permit (also referred to in Oregon as a 1200-Z Stormwater Discharge General Permit), as do 12 other properties within 12 miles of the Airport.

There is one aboveground storage tank fueling facility and one recently decommissioned fueling facility with underground storage tanks located on ODAV-owned property that are planned to be removed. There are also other privately-owned facilities surrounding the Airport property that have their own fueling facilities.

Natural Resources and Energy Supply

A Water Control District has been formed at the Airport to provide water for fire protection for properties at the Airport. Two wells are located on Airport property, in addition to a pumphouse and underground water storage tanks that provide water to fire hydrants across the Airport property.

Water testing has revealed the presence of arsenic above the maximum contamination level set by the EPA in wells located on and surrounding the Airport property. Mitigation measures in the form of pump and filtration systems were recommended to be implemented to provide adequate flow and water quality.

Water Resources

Wetlands

Several non-jurisdictional wetlands have been identified on Airport property. These wetlands were products of man-made drainage swales that are located in historic uplands with non-hydric soils. According to Oregon Department of State Lands Rule 141-085-0515 Removal-Fill Jurisdiction by Type of Water, these swales with wetland hydrology, vegetation, and soils are not considered waters of the state because they are artificially created for the purposes of stormwater detention and/or treatment.

Floodplains

The Airport property lies in a FEMA Zone X, which is considered an area of minimal flood hazard. The Airport is located outside of the 500-year floodplain. The closest 100-year floodplain is located approximately 0.55 miles east of the Airport and is associated with the Pudding River.

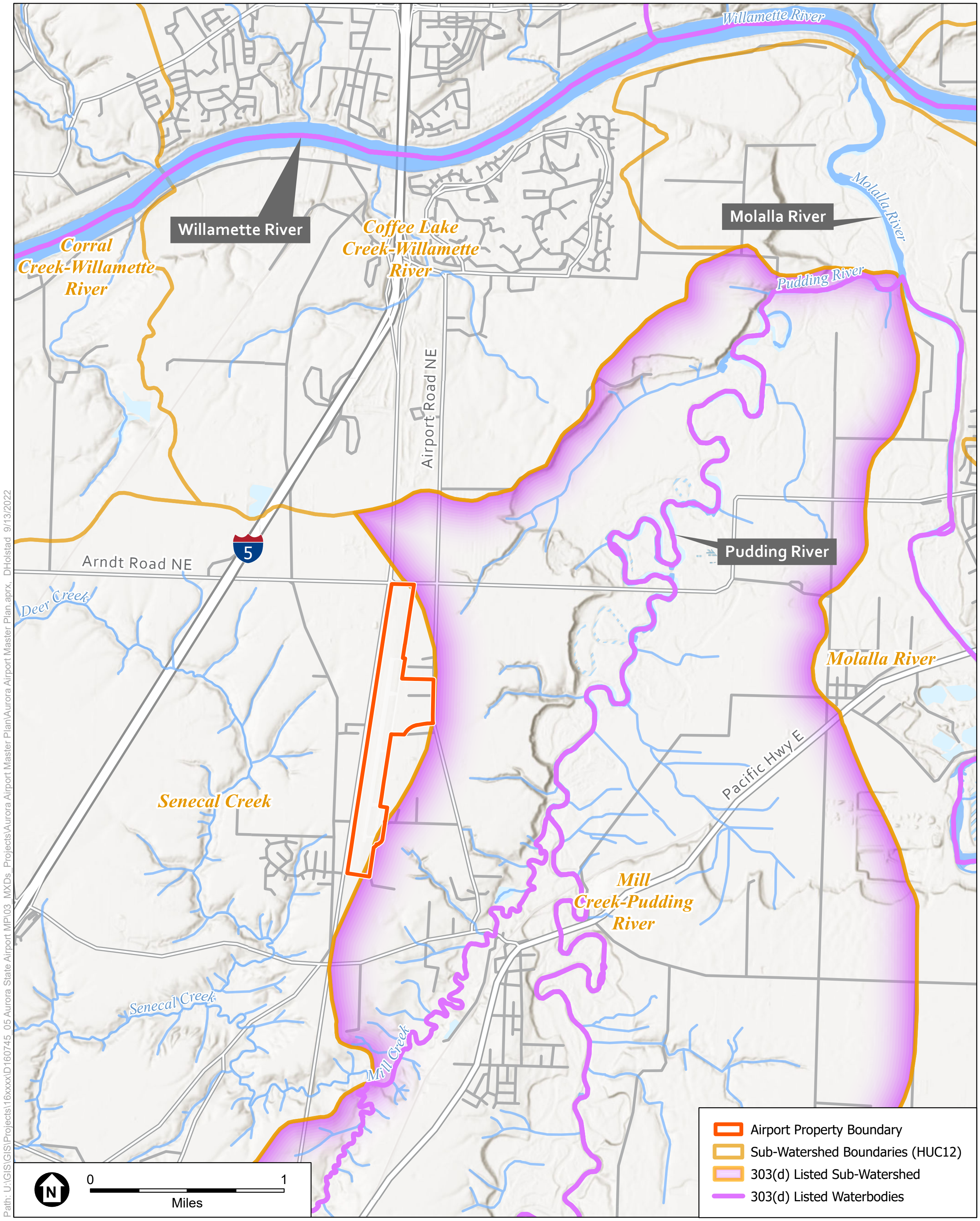
Water Quality

Many of the surface waters in the vicinity of the Aurora State Airport property are contaminated and listed on the DEQ 303(d) list. Contaminated surface waters in the vicinity of the Airport are depicted in **Figure 2-8** and listed below:

- A segment of the Pudding River east of the Airport is on the 303(d) list of impaired waterways for guthion, water temperatures, and dieldrin. It is impaired for fish and aquatic life, fishing, and public and private domestic water supplies.
- The entire Mill Creek-Pudding River sub-watershed (1st–4th order streams) is listed on the 303(d) list for benthic macroinvertebrates bioassessments and inorganic arsenic. It is considered impaired habitat for fish and aquatic life, fishing, public and private domestic water supplies, and recreational contact with the water.
- A segment of the Molalla River that intersects the Pudding River east of the Airport is not a 303(d)-listed waterway but is listed by the EPA's "How's My Waterway" tool as impaired for fishing due to flow regime modification.
- The segment of the Willamette River that the Molalla River flows into north of the Airport is also a 303(d)-listed waterway. It is listed for the following factors: noxious aquatic plants, aldrin, benthic macroinvertebrates bioassessments, temperatures, 4,4'-DDE, 4,4'DDT, dieldrin, and PCBs. It is considered impaired for aesthetic quality, boating, fish and aquatic life, fishing, and public and private domestic water supply.

Compromised waters in the vicinity of the Airport property include critical habitat for federally threatened Upper Willamette River Chinook and steelhead populations. These waters also flow downstream to additional critical habitat areas for other species of federally listed fish species in the Columbia River.

FIGURE 2-8: CONTAMINATED SURFACE WATERS IN VICINITY OF AURORA STATE AIRPORT



SOURCES - Basemap: ESRI; 303(d): DEQ, 2022.

D201600745.05

Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

Local and regional socioeconomic data are presented previously in this chapter. Title VI of the US Civil Rights Act of 1964, as amended, EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and Order DOT 5610.2, Environmental Justice require that no minority or low-income person shall be disproportionately adversely impacted by any project receiving federal funds. For transportation projects, this means that no particular minority or low-income person may be disproportionately isolated, displaced, or otherwise subjected to adverse effects. Potential impacts are assessed in terms of property acquisitions or relocations, changes in access to employment areas, and other changes in low-income and minority communities/neighborhoods. To determine whether an environmental justice population is present, Federal agencies must refer to U.S. Census data to establish the demographic and socio-economic baseline.

According to the Department of Transportation Order 1050.1F and Executive Order 13045, the FAA is directed to identify and assess environmental health risks and safety risks that the agency has reason to believe could disproportionately affect children. Environmental health risks and safety risks include risks to health or to safety that are attributable to products or substances that a child is likely to come into contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to. The closest schools to the airport are: North Marion Primary, Intermediate, Middle and Senior High School (2.0 miles southeast).

The FAA has not established significance thresholds for socioeconomics, environmental justice, or children's environmental health and safety risks.

Farmlands

The Farmland Protection Policy Act (FPPA) was passed under the Agriculture and Food Act of 1981 to minimize the impact that federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. According to the FPPA, farmland is classified as either "prime farmland, unique farmland, or farmland of statewide or local importance." There are no farmlands located on ODAV-owned Airport property. Some of the private lands located adjacent to the Airport are zoned Exclusive Farm Use (EFU), as well as Residential, and Commercial, and publicly owned rights of way.

Natural Resources and Energy Supply

The Airport uses fuel to power aircraft, natural gas for heating, and electricity to power buildings and runway and taxiway lighting. Electricity is provided to the Airport by Portland General Electric. Airport water is well water and sewer service are septic systems. Natural gas is provided by NW Natural Gas.

Historical, Architectural, Archeological, and Cultural Resources

The archaeology survey identified no high-probability areas and no archaeological resources within the study area consisting of ODAV-owned property on the Airport. Four historic resources have been previously identified within the study area: Runway 17-35, a drainage ditch, and two wind cones. The historic resources were recommended to be not eligible for listing in the National Register of Historic Places (NRHP) in 2019.

The report recommended that individual projects proposed in association with the Master Plan should include a compliance-level cultural resource investigation. This includes documenting historic resources within the study area on one or more Section 106 Documentation Forms and determining their eligibility for listing in the NRHP in consultation with the Federal Aviation Administration and the Oregon State Historic Preservation Office (SHPO). Consultation with SHPO regarding the potential for a historic district at Aurora State Airport should be resumed. The most recent Cultural Resource Review and Archaeology Survey completed as part of the Airport Master Plan is included in **Appendix 3**.

LOCAL SURFACE TRANSPORTATION

The Airport is located between Interstate 5 and State Highway 99E. Interstate 5, which is an essential north-south commerce link for the western United States, runs west of the Airport providing access to the Portland metro area. Access to the Airport is also provided by Highway 551 (Canby-Hubbard Highway) from the north and south, Arndt Road from the east and west, and Airport Road from Aurora. Keil Road is located south of the Airport and provides additional airport business access from Highway 551 and Airport Road. State Highway 99E, accessible to the Airport via Ehlen Road off of Highway 551 and Airport Road, provides access to the nearby communities of Canby, and Oregon City.

AREA LAND USE/ZONING

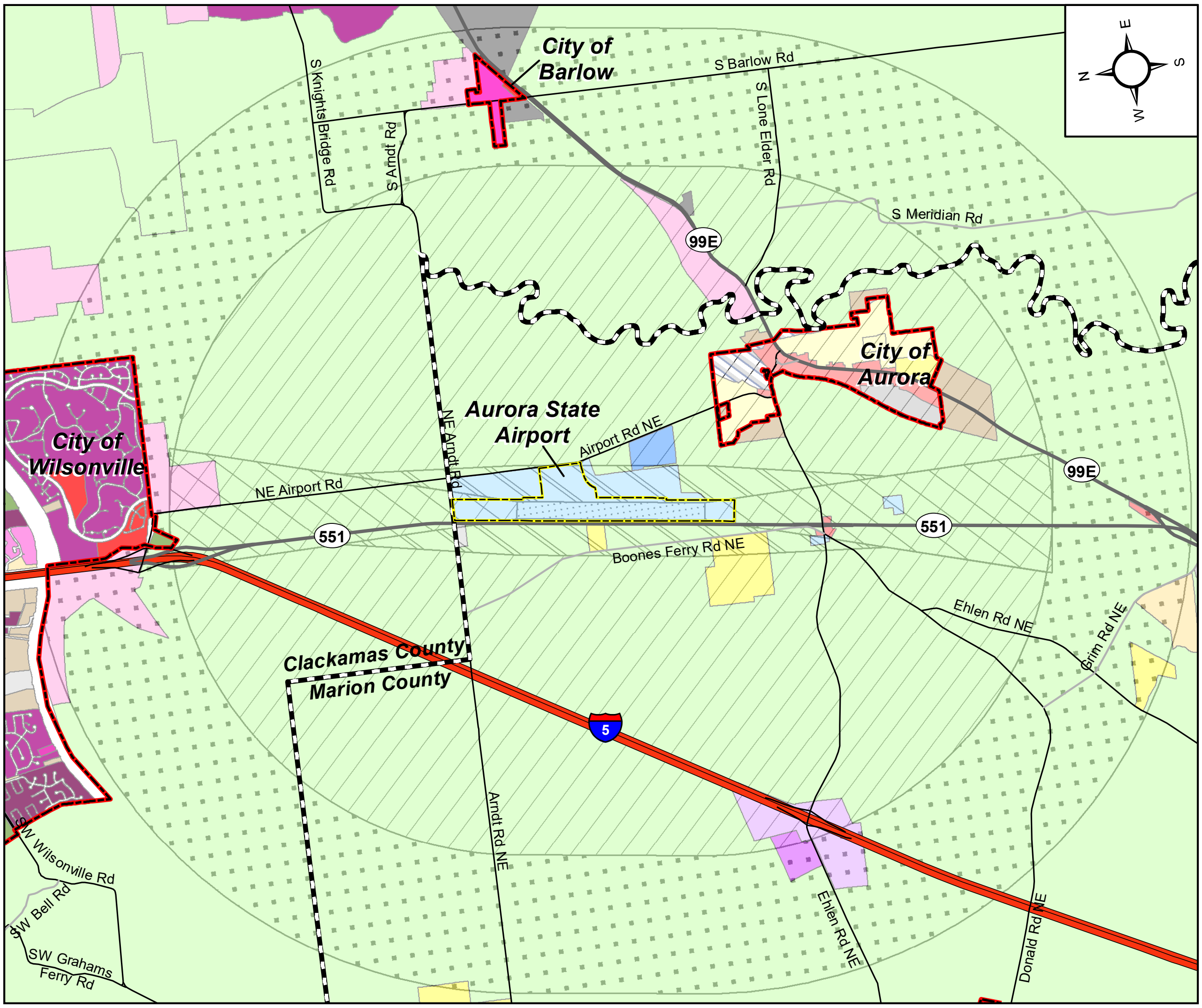
As depicted in **Figure 2-9**, the Airport is located outside of the Aurora UGB. Land use actions related to the airport property and its immediate surroundings are under the exclusive jurisdiction of Marion County. The applicable zoning ordinance articles associated with the Airport are summarized below and provided in full in **Appendix 4**.

The Airport's FAR Part 77 airspace extends over areas of Marion and Clackamas County, and the City of Aurora. Each of these jurisdictions is responsible for protecting the areas of airport airspace that fall within their boundaries, and each employs overlay zoning districts as a mechanism to do so. The overlay districts are discussed in more detail below.

Existing Airport Base Zone

The existing airport property is zoned as **Public (P)** as defined in Marion County Code 17.171. The intent of the P zone is "to provide regulations governing the development of lands appropriate for specific public and semi-public uses and to ensure their compatibility with adjacent uses." Airports are regulated by Chapter 17.171, Section 030 - Conditional Uses, which states that "Airport and airport related commercial and industrial uses" are authorized under the procedure provided for conditional uses and are permitted in the P zone.

FIGURE 2-9: AREA SURFACE TRANSPORTATION AND ZONING MAP



Marion County Zoning[1]	Clackamas County and City of Wilsonville Zoning[2]	City of Aurora Zoning[3]	FAR Part 77 Overlay[4]
AR, C, EFU, I, ID, ID-LU, P, P-LU, RS, UT-20	CN, EFU, FUD, IC, MFR1, PF, RI, RRFU, SFR10, SFR2, SFR3, SFR5, SFR7	C, FH, I, R1, R2	Primary Surface, Appproach Surface, Transitional Surface, Horizontal Surface, Conical Surface

Note: The Cities of Wilsonville and Barlow have not adopted overlay zoning districts to protect FAR Part 77 airspace surfaces. The conical surface over these jurisdictions has been excluded.

Compiled by Century West Engineering from the following data sources:

1 Marion County GIS Open Data (https://marioncounty.maps.arcgis.com)
2 Metro RLIS Discovery (https://rlisdiscovery.oregonmetro.gov)
3 City of Aurora Planning (https://www.ci.aurora.or.us/planning/page/zoning-maps)

Airport Vicinity Zoning/Land Use

The Airport is generally surrounded by Marion County **Exclusive Farm Use (EFU**) districts, and a few parcels of **Acreage Residential (AR)** and **Industrial (I)** located in the immediate vicinity of the property.

The intent of the EFU zone (Marion County Code 17.136) is to provide and preserve the continued practice of commercial agriculture. It is intended to be applied in areas composed of tracts that are predominantly high-value farm soils. EFU zone generally prohibits the construction, use, or design of buildings and structures except for facilities used in agricultural or forestry operations, replacing or restoring a lawfully established dwellings, supporting exploration of geothermal or mineral resources, or supporting agri-tourism destinations and events. EFU zone also permits the construction of public roads, establishment or enhancement of wetlands, and the operation of composting facilities.

The AR zone (Marion County Code 17.128) facilitates the division and development of property suitable for development of acreage homesites. Allowed uses include single-family dwellings, agricultural development, planned developments, public parks and recreation facilities, religious organization use (less than 20,000 square feet in area), or replacement of an existing lawfully established dwelling.

The I zone (Marion County Code 17.165) is intended to provide for the location of needed industrial uses which are not dependent upon urban services. The I zone encourages orderly and compatible development of industrial uses, including agricultural related industry, on rural lands. Permitted uses include agricultural services and forestry; contracting and service facilities; the processing and manufacture of various commercial products; coal and wood fuel dealers; fire stations, utility facilities, and dwellings intended for facility caretakers.

The closest City of Aurora zoning district to the airport is an area of **Low Density Residential (R-1)** located approximately one-third of a mile southeast of the property.

The LDR zone (Aurora Municipal Code 16.10) is intended to provide a minimum standard for residential uses in areas of low population density. The municipal code allows LDR zoned areas to be used for single-family dwellings, public support facilities, childcare facilities, residential home care, public parks and recreation areas, two-family dwellings, city-owned structures, accessory buildings including accessory dwelling units (ADU), and some agricultural buildings.

Marion County, Clackamas County, and the City of Aurora have adopted airport overlay zoning districts intended to enhance the protection of airport airspace, and compatible land use planning. The City of Wilsonville has not adopted an overlay zoning district.

The airport overlay zones based on FAR Part 77 imaginary surfaces, applicable within each jurisdictional boundary, are included in the following codes:

- Marion County Code (Chapter 17.177)
- Clackamas County Code (Chapter 713)
- City of Aurora Municipal Code (Chapter 16.24)

The language contained in the zoning codes addresses permitted and conditional uses within each of the designated overlay zones to address land use compatibilities and height restrictions intended to protect aircraft operating in the airspace, as well as persons and property on the ground. **Figure 2-9**, presented earlier, depicts the overlay zones based on Part 77 imaginary surfaces established for Aurora State Airport.

The Oregon Department of Aviation Land Use Compatibility Guidebook recommends guidance for determining land use compatibility with overlaying FAR Part 77 surfaces. The guidance suggests that areas of residential land use should not be located under primary, approach, or transitional surfaces. At Aurora State Airport, two areas of residential property are located beneath the west transitional surface and another area of residential use is located south of the Willamette River near the end of the Runway 17 approach surface. Additionally, while the above discussed Public zone lists airports as a conditional use for the zone, the Land Use Compatibility Guidebook recommends establishing an airport-specific zone for airport properties.

Airside Elements

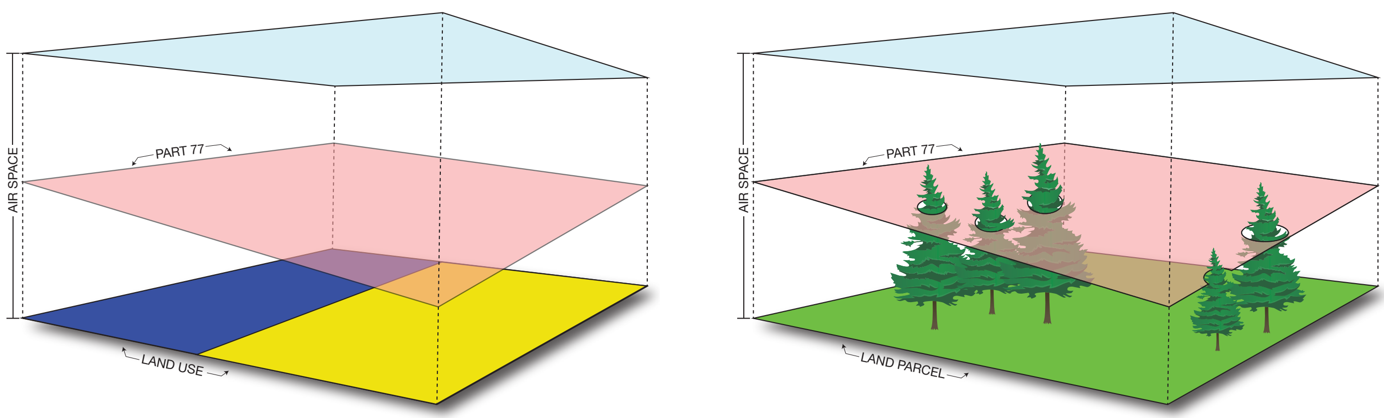
The Airside Elements (depicted in the existing conditions **Figure 2-13**) section is comprised of the facilities that facilitate the movement and operation of aircraft on the ground and in the air around Aurora State Airport. This section of the existing conditions analysis includes a discussion of the area airspace, instrument flight procedures, runways, taxiways/taxilanes, aprons/tiedowns/aircraft parking, airfield pavement condition, and airside support facilities.

AIRSPACE – PART 77, TERPS, AND RUNWAY END SITING SURFACES

In addition to the airspace classifications and operating environment with which pilots are more familiar with there are a variety of rules, regulations, design standards, and policies associated with the protection of airspace, evaluation of proposed objects on and near airports, and their effects on navigable airspace. Airport Cooperative Research Program (ACRP) Report 38 - *Understanding Airspace, Objects, and Their Effects on Airports* provides a comprehensive description of the regulations, standards, evaluation criteria, and processes designed to protect the airspace environments surrounding airports and is summarized below for additional context of airspace evaluation and design to serve Aurora State Airport.

14 CFR, Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace

Part 77 defines airspace surfaces and obstruction standards for civil airports and establishes the central regulation governing airspace protection, with cross-references to many other criteria documents. It sets forth the requirements for notifying the FAA of proposed construction; defines obstruction criteria; and describes aeronautical studies required to assess hazard status. The Part 77 surfaces associated with Aurora State Airport have been codified by the local jurisdictions through airport overlay zones discussed above. **Figure 2-10** depicts the existing Part 77 airspace defined for Runway 17/35 at Aurora State Airport. The graphics below illustrate the relationship between an invisible airspace surface (these surfaces are also referred to as “imaginary” surfaces) defined in Part 77 and the underlying land use and objects.



Source: Century West Engineering

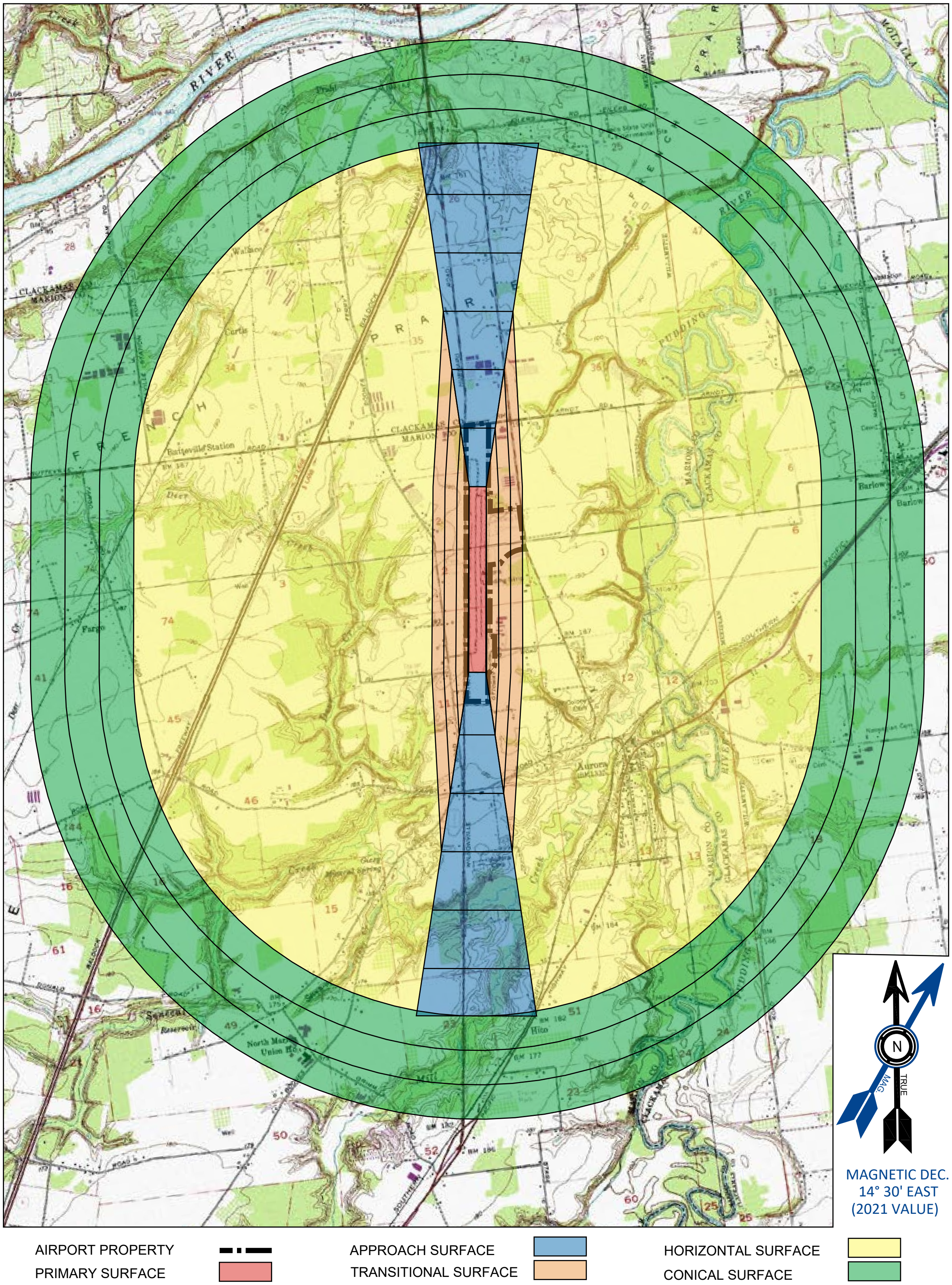
FAA Order 8260.3E – United States Standard for Terminal Instrument Procedures (TERPS)

This FAA Order, along with several derivative orders in the 8260 series and other related orders, define criteria that FAA flight procedure designers utilize when designing instrument flight procedures. Airspace protection requirements for instrument flight procedures are similar to those defined in Part 77, although they also define protected airspace requirements for instrument approach and departure routes connecting the terminal and enroute airspace. Obstruction mitigation (obstacles to protected airspace) defined in FAA aeronautical studies may be required for TERPS surfaces, in addition Part 77 surfaces.

FAA AC 150/5300-13B– Airport Design

This Advisory Circular (AC) is the principal document utilized by the FAA, airport sponsors, and consultants when planning and designing new airports or improvements to existing airports. Design criteria for addressing obstacle clearances for runway ends are defined in the AC’s discussion of Runway End Siting Surfaces.

FIGURE 2-10: PART 77 AIRSPACE



For Aurora State Airport, the approach surfaces for the runway extend 10,000 feet beyond each runway (beginning 200 beyond the runway end).

Source: Century West Engineering

AIRSPACE CLASSIFICATIONS (Figure 2-11)

Airspace within the United States is classified by the FAA as "controlled" or "uncontrolled" with altitudes extending from the surface upward to 60,000 feet above mean sea level (MSL). Controlled airspace classifications include Class A, B, C, D, and E. Class G airspace is uncontrolled. Aircraft operating within controlled airspace are subject to varying levels of positive air traffic control that are unique to each airspace classification. Requirements to operate within controlled airspace vary, with the most stringent requirements associated with very large commercial airports in high traffic areas. Uncontrolled airspace is typically found in remote areas or is limited to a 700 or 1,200-foot above ground level (AGL) layer above the surface and below controlled airspace.

LOCAL AREA AIRSPACE STRUCTURE (Figure 2-12)

The Seattle Sectional Aeronautical Chart depicts nearby airports, notable obstructions, and special airspace designations in the vicinity of Aurora State Airport. Low-altitude instrument airways are also depicted for general reference because pilots use them for both visual and instrument flight planning. The blue airways are identified as "Victor" or Area Navigation ("T routes") airways.

Additional definition of the low altitude airways is provided on FAA IFR Enroute Low Altitude – U.S. Chart L-1.[13] The chart is used exclusively for instrument flight planning and provides additional detail for pilots. As is common in busy air traffic areas, Aurora State Airport is surrounded by low altitude instrument airways in all directions. However, the minimum flight altitudes assigned to the nearby airway segments are well above the traffic pattern altitude (1,200 feet above mean sea level; 1,000 feet above ground level) for the Airport, which avoids operational conflicts between local and enroute air traffic. The proximity of several instrument airways, combined with VFR activity generated by nearby airports causes overflights from aircraft not departing or arriving at Aurora State Airport.

The nearest low altitude enroute airways to Aurora State Airport pass along the west and south sides of the Airport. These airways connect to ground-based electronic navigational aids (very high frequency (VHF) transmitters) located in Newberg, Bend, Eugene, and Battleground, Washington.

The airspace designation surrounding Aurora State Airport is dependent on the operational status of the ATCT. When the ATCT is operating, the surrounding airspace is Class D from the surface up to 2,500 feet AGL and extends outward in a four-mile radius. Aircraft operating in Class D airspace are required to establish contact with the ATCT before entering Class D airspace. When the ATCT is not operating, Class E airspace is in effect, extending from the surface upward and pilots are responsible for monitoring the assigned Common Traffic Advisory Frequency (CTAF).

Special Use Airspace

Special Use Airspace (SUA) is airspace where activities are confined due to their nature or where limitations are placed on aircraft operations that are not part of those activities. SUAs also include warning areas, military operations areas (MOA), alert areas, controlled firing areas (CFA), and national security areas (NSA).

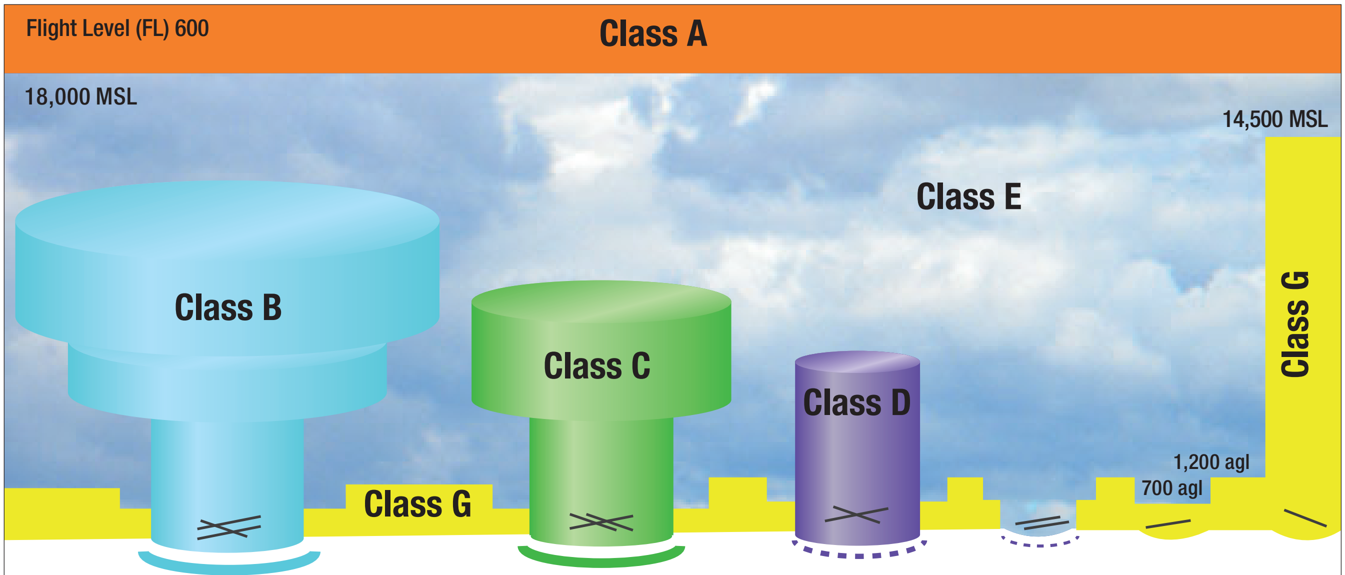
There are no SUAs in the immediate area of Aurora State Airport, with the closest example being the EEL C and EEL D MOAs located on the Oregon and Washington Coast.

Controlled and Uncontrolled Airspace

As mentioned previously, Aurora State Airport operates in controlled Class D airspace during the hours of ATCT operations. During these times pilots contact Aurora ATCT upon arrivals and departures. Outside of the hours of ATCT operations, the Airport operates as Class E airspace, at which times pilots use the CTAF for communications with ground facilities and other aircraft operating in the vicinity of the Airport.

13 United States Government Flight Information Publication

FIGURE 2-11: AIRSPACE CLASSIFICATIONS



COMMUNICATION REQUIREMENTS AND WEATHER MINIMUMS

	Class A	Class B	Class C	Class D	Class E	Class G
Airspace Class Definition	Generally airspace above 18,000 feet MSL up to and including FL 600.	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports	Generally controlled airspace that is not Class A, Class B, Class C, or Class D	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E
Minimum Pilot Qualifications	Instrument Rating	Student*	Student*	Student*	Student*	Student*
Entry Requirements	IFR: ATC Clearance VFR: Operations Prohibited	ATC Clearance	IFR: ATC Clearance VFR: Two-Way Communication w/ ATC	IFR: ATC Clearance VFR: Two-Way Communication w/ ATC	IFR: ATC Clearance VFR: None	None
VFR Visibility Below 10,000 MSL**	N/A	3 Statute Miles	3 Statute Miles	3 Statute Miles	3 Statute Miles	Day: 1 Statute Mile Night: 3 Statute Miles
VFR Cloud Clearance Below 10,000 MSL***	N/A	Clear of Clouds	500 Below 1,000 Above 2,000 Horizontal	500 Below 1,000 Above 2,000 Horizontal	500 Below 1,000 Above 2,000 Horizontal	500 Below 1,000 Above 2,000 Horizontal***
VFR Visibility 10,000 MSL and Above**	N/A	3 Statute Miles	3 Statute Miles	3 Statute Miles	5 Statute Miles	5 Statute Miles
VFR Cloud Clearance 10,000 MSL and Above	N/A	Clear of Clouds	500 Below 1,000 Above 2,000 Horizontal	500 Below 1,000 Above 2,000 Horizontal	1,000 Below 1,000 Above 1 Statute Mile Horizontal	1,000 Below 1,000 Above 1 Statute Mile Horizontal

* Prior to operating within Class B, C, or D airspace (or Class E airspace with an operating control tower), student, sport, and recreational pilots must meet the applicable FAR Part 61 training and endorsement requirements. Solo student, sport, and recreational pilot operations are prohibited at those airports listed in FAR Part 91, appendix D, section 4.

** Student pilot operations require at least 3 statute miles visibility during the day and 5 statute miles visibility at night.

*** Class G VFR cloud clearance at 1,200 agl and below (day); clear of clouds.

Source: Century West Engineering

FIGURE 2-12: AREA AIRSPACE – SEATTLE SECTIONAL CHART

LEGEND			
	Airports with other than hard-surface runways		Compass Rose (VOR/DME or VORTAC)
	Airports with hard-surfaced runways 1,500 ft. to 8,069 ft.		Enroute Airways
	Airports with hard-surfaced runways greater than 8,069 ft. or some multiple runways less than 8069 ft.		Class D Airspace (surface)
			Class E Airspace with floor 700' above surface
	VOR/ VORTAC		National Wilderness Area

Source: SkyVector.com

INSTRUMENT FLIGHT PROCEDURES

Instrument approach and departure procedures are developed by the FAA using electronic navigational aids and satellite navigation (SATNAV) to guide aircraft through a series of prescribed maneuvers in and out of an airport's terminal airspace. The procedures are designed to enable continued airport operation during instrument meteorological conditions (IMC), but are also used during visual conditions, particularly in conjunction with an instrument flight plan. The capabilities of each instrument approach are defined by the technical performance of the procedure platform (ground based navigational aids or satellite navigational aids) and the presence of nearby obstructions, which may affect the cloud ceiling and visibility minimums for the approach, and the routing for both the approach and missed approach procedure segments. The aircraft approach speed and corresponding descent rate may also affect approach minimums for different types of aircraft.

Aurora State Airport currently has three instrument approaches, two global positioning system (GPS) approaches to Runways 17 and 35, and a single localizer (LOC) approach to Runway 17. LOC RWY 17 approach presents separate minimums for approaching aircraft that are equipped to obtain a fix on FIDOV intersection. The GPS approaches provide vertical guidance to approaching aircraft. All published approach procedures provide electronic course guidance to either runway end and are authorized for category A-D aircraft (varying aircraft approach speeds) with approach minimums for both straight-in and circling procedures. Approach minimums are for each procedure are summarized in **Table 2-13** and the approach plates are provided in **Appendix 5**.

There are three departure procedures published for the Airport. GLARA TWO instructs aircraft departing from Runway 17 to climb to 1,000 feet then make a climbing left turn direct to GLARA, crossing at 4,000 feet, and aircraft departing Runway 35 to climb to 700 feet then make a climbing right turn to GLARA, also crossing at 4000 feet. GNNET TWO instructs aircraft departing from Runway 17 to climb to 1,000 feet then make a climbing right turn direct to GNNET, crossing at 5,000 feet, and aircraft departing Runway 35 to climb to 700 feet then make a climbing left turn to GLARA, crossing at 5,000 feet. NEWBERG TWO directs aircraft departing from Runway 17 to climb to 1000 feet then make a climbing right turn direct to the URG VOR/ DME and aircraft departing Runway 35 to climb to 700 feet then make a climbing left turn to URG VOR/DME, then traffic from either runway should continue climb in URG VOR/DME holding pattern to cross the waypoint at or above 4,000 feet before proceeding on course. Copies of the departure procedure plates are available in **Appendix 5**.

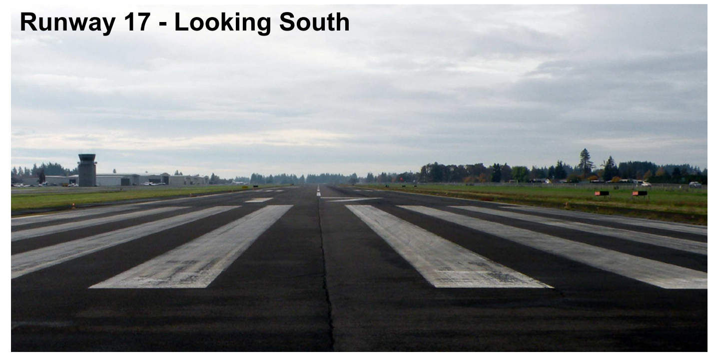
TABLE 2-13: INSTRUMENT APPROACH PROCEDURES – AURORA STATE AIRPORT

	MINIMUM ALTITUDE (MSL)	MINIMUM VISIBILITY (SM)	AIRCRAFT CATEGORY
RNAV (GPS) RWY 17			
LPV DA	511	7/8	A,B,C,D
LNAV/VNAV MDA	661	1 1/4	A,B,C,D
LNAV MDA	660	1	A,B
	660	1 1/8	C,D
Circling	700	1	A,B
	700	1 1/2	C
	940	2 1/4	D
RNAV (GPS) RWY 35			
LPV DA	453	7/8	A,B,C,D
LNAV/VNAV MDA	515	1	A,B,C,D
LNAV MDA	620	1	A,B
	620	1 1/4	C,D
Circling	700	1	A,B
	700	1 1/2	C
	940	2 1/4	D
LOC RWY 17			
S-17	1000	3/4*	A
	1000	1	B
	1000	2	C,D
Circling	1000	1	A
	1000	1 1/4	B
	1000	2 1/2	C,D
LOC RWY 17 (FIDOV FIX)			
S-17	580	3/4*	A,B
	580	1	C,D
Circling	700	1	A,B
	700	1 1/2	C
	940	2 1/4	D

Source: Federal Aviation Administration
* Visibility minimums increased to 7/8-mile via NOTAM 1/5229

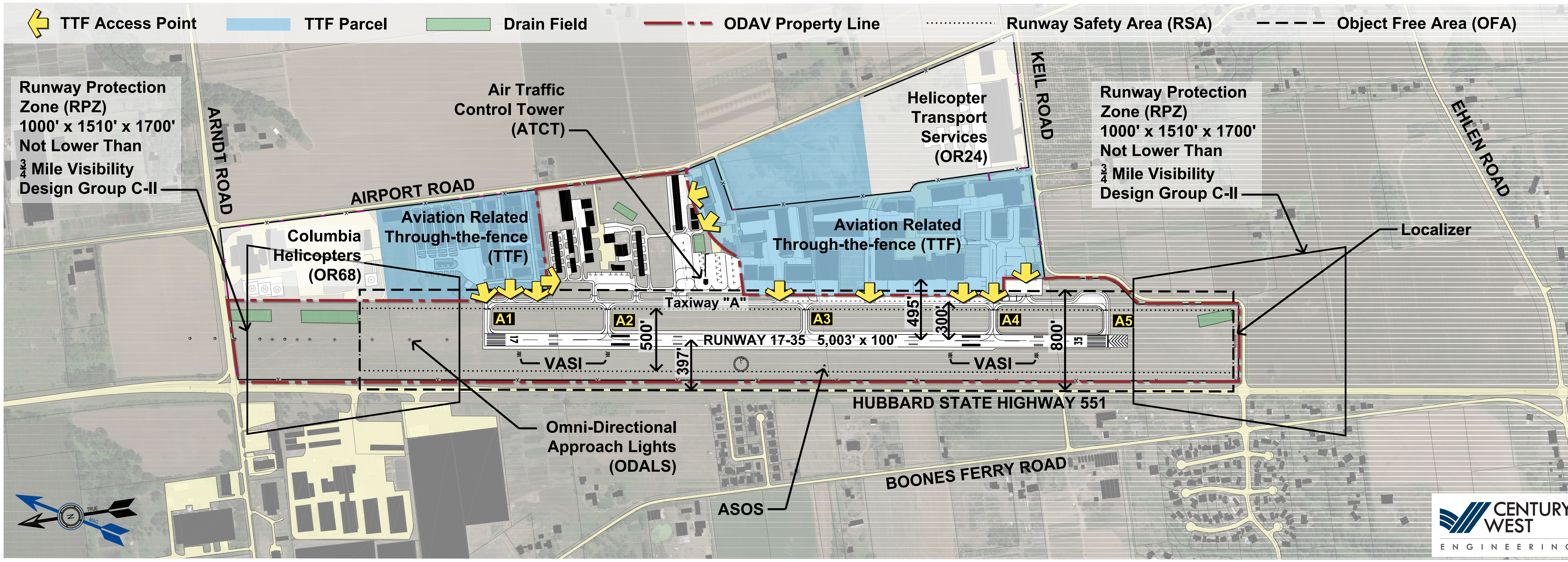
FIGURE 2-13
EXISTING CONDITIONS


Taxiway "A"


Runway 17 - Looking South


Air Traffic Control Tower (ATCT)


Atlantic Aviation Fuel Tanks - Leased ODAV Property




Hangars on ODAV Property


Hubbard Highway at Arndt Road


Piper Road at Hubbard Highway


Runway Distance Markers and VASI

RUNWAY

Runway 17/35 is 5,003 feet[14] long and 100 feet wide and is oriented in a north-south direction (187°/007° true bearing). Both runway ends employ left-hand traffic patterns with a traffic pattern altitude of 1,200 feet MSL. The runway is lighted and has a full-length parallel taxiway. The runway slopes downward from the 17 end (elevation 199.7 feet MSL) to the 35 end (elevation 196.3 feet MSL) resulting in an effective runway gradient of 0.06%.

The current runway pavement is comprised of two main sections. The largest being the 4,100-foot northern portion which was originally constructed in 1943. The southern 900 feet of the runway was constructed as an extension in 1993. The most recent runway paving work was a 2- to 3-inch asphalt overlay for the entire runway length, completed in 2005. The runway surface is grooved asphalt with a published single-wheel gear strength rating of 30,000 pounds and a dual-wheel gear strength rating of 45,000 pounds.

The runway has precision markings on each end to accommodate vertical guidance associated with the LPV[15] minimums. Precision markings include threshold bars, edge and centerline striping, aiming point markings, and touchdown zone markings, and runway designation markings. The markings were observed in good condition during a recent field visit to the facility. All markings are consistent with FAA standards.

Runway 35 Looking North – Source: Century West Engineering

TAXIWAYS AND TAXILANES

Runway 17/35 has a full length, 35-foot wide parallel taxiway (Taxiway A) that is offset 300 feet east of the runway (centerline to centerline). Taxiway A has five 90-degree connector taxiways accessing the runway (A1 – A5). The numbered taxiway connectors begin at the Runway 17 end (A1) and end at the Runway 35 end (A5). There are also 10 taxilane connections on Taxiway A that provide access to apron and hangar areas for three defined GA landside areas at the Airport. These include:

- Northern TTF Area;
- ODAV Terminal Area near the center of the airfield; and
- Southern TTF Area.

Additional taxilanes are located in and around hangar areas. Taxiway A and connector taxiways are equipped with blue medium intensity edge lights and yellow markings. Taxiway pavement conditions range from "Good" to "Poor" according to the ODAV's 2018 Pavement Evaluation Program (PEP) report (**Appendix 6**). Pavement condition is discussed in more detail in the Pavement Condition section below.

APRONS AND TIEDOWNS

Within the ODAV-owned property, there is a total of 316,434 square feet of apron space available, primarily on two apron areas. The largest terminal apron area is located at the center of the property east of Taxiway A, adjacent to the ATCT and measures 143,546 square feet. A smaller aircraft parking apron is located near the northern end of ODAV landside property at Taxiway A and Taxiway A2. This apron space is used primarily by Aurora Flight Training. The remaining apron area is on the south end of the airport adjacent to Atlantic Aviation.

14 Runway lengths are rounded to the nearest foot, the 2022 AGIS survey measured the runway length as 5,003.3 feet.

15 LPV = "Localizer Performance with Vertical guidance." Satellite-based instrument approach procedure

The ODAV-owned airport property has a total of 34 tiedown locations. Of the 34 tiedowns, 27 are located near the ATCT, including two configured as pull-through parking intended for large business aircraft. The remaining 25 tiedowns on the main apron are configured for small aircraft. The smaller north apron has seven tiedown locations for small aircraft. Neighboring tenants with airport TTF agreements also provide additional apron space and aircraft parking on their privately-owned land parcels.


Taxiway A Looking South – Source: Century West Engineering


Apron Looking East – Source: Century West Engineering

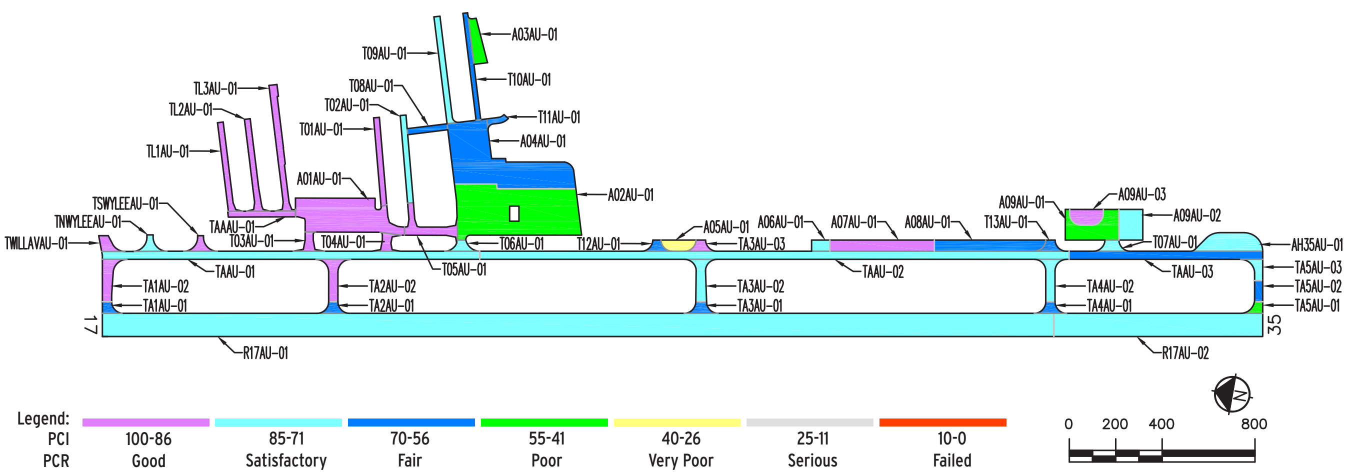
AIRFIELD PAVEMENT CONDITION

The ODAV Pavement Evaluation Program (PEP) systematically evaluates surface conditions, and identifies maintenance, repair, and rehabilitation projects needed to sustain functional pavements at Oregon public use airports. The PEP provides a thorough "snapshot in time" evaluation of surface conditions and provides projections of future surface condition for all eligible pavements in terms of pavement condition index (PCI). The PCI rating scale of 0 to 100 (failed to good) is used to assess pavement condition. For NPIAS airports like Aurora State Airport that receive federal funding, the PEP report is a critical tool for prioritizing airfield pavement needs and meeting FAA grant assurances.

PCI evaluations were performed as part of the PEP at Aurora State Airport in July 2018. The PEP was performed using the PCI methodology developed by the U.S. Army Corps of Engineers and outlined in the current edition of ASTM D-5340, Standard Test Method for Airport Condition Index Surveys. The 2018 PEP report for the Aurora State Airport is included in **Appendix 6**. The PEP assessments for Aurora State Airport are limited to ODAV-owned aeronautical pavements and do not include privately-owned (TTF) pavements located off airport property.

The PEP results (**Figure 2-14**) show that the runway pavement surface was in "satisfactory" condition with a weighted average PCI of 81 at that time. The primary distresses present on the runway were low- to medium-severity longitudinal cracking, low-severity weathering, and isolated low-severity alligator cracking. The longitudinal cracking was located primarily at paving joints created during the 2005 overlay project and sealed most recently in August of 2020. The alligator cracking was located primarily in areas aligning with the gear paths for typical business jet aircraft using the airport.

FIGURE 2-14: PAVEMENT CONDITIONS (2018 INSPECTION)



Source: 2018 ODAV Pavement Evaluation/Maintenance Management Program

Most of the taxiway pavements were rated “Satisfactory” or “Good.” Notable exceptions being the south 900 feet of Taxiway A and west fillets of connector taxiways A1 – A4, which received ratings of “Fair,” and the west fillet of connector taxiway A5 that was rated as “Poor.” The Taxilanes accessing hangar areas were rated as “Good” to “Fair.”

The apron pavements conditions were more varied. The west half of the main apron was rated as “Poor”, the east half was rated as “Fair,” and the north parking apron received a rating of “Good.” Most of the remaining apron pavements were rated as “Fair” or better. However, there was a single small area of apron located north of A3 between two access taxilanes rated “Very Poor.”

The 2018 PEP report recommended a variety of treatments to address the findings of the inspection, ranging from crack and slurry sealing to asphalt overlays and pavement reconstruction. The recommended treatment projects will be completed according to priority and funding availability, and ultimately included in the airport master plan’s capital improvement program (CIP).

In August of 2019, the ODAV commissioned GRI to conducted a Runway 17/35 pavement evaluation (included in **Appendix 6**) to determine the existing Pavement Classification Number (PCN). PCN is an International Civil Aviation Organization (ICAO) standard used to indicate the strength of a runway, taxiway or apron. That assessment included review of ODAV historical pavement records, falling weight deflectometer testing, pavement cores, and related analysis. The guidance provided in FAA Advisory Circular 150/5335-5C, Standardized Method of Reporting Airport Pavement Strength – PCN, was used to calculate the final PCN.

The results of the evaluation suggested that based on calculated PCN, individual operations of up to 102,000 pounds for single-wheel and 143,000 pounds for dual-wheel could theoretically be accommodated. The evaluation hypothesized that a higher than expected PCN number for these isolated operations may have resulted from additional structural capacity added by the 2005 overlay. Conversely, the study also identified low-severity top-down alligator cracking and delamination of the top layer of pavement within the gear paths that would limit the ability of larger aircraft to use the runway. This type of cracking and delamination results from shear stresses at the pavement surface from aircraft wheel loading during landing and hard braking. These shear stresses are greater when larger aircraft with larger tire contact patches are in use, potentially resulting in catastrophic runway pavement damage if operations of larger aircraft were allowed.

Century West Engineering produced an additional memorandum for ODAV in September of 2020 that summarized the findings of the GRI pavement evaluation. The memorandum, entitled “Runway Pavement Considerations for Overweight Landings” (included in **Appendix 6**), also provided recommendations on evaluation of future requests by operators of aircraft exceeding the published Runway 17/35 weight limitations. The memorandum recommended that cumulative operations and their effects on pavement structural life be considered when operations exceeding weight limitations are requested. Since PCN is a measure only of whether individual operations may cause pavement failure, analysis that includes changes in overall fleet mix should be conducted for any reoccurring overweight operations. Also, the memorandum discussed pavement surface distresses and overlay delamination that were noted (and discussed above) that should be carefully considered as an indicator of increased chance of catastrophic pavement failure in the affected areas due to overweight landings and takeoffs. More frequent pavement inspections in areas of concern were also recommended. Finally, the memorandum provided recommendations on response planning should a pavement failure occur.

In May of 2021, GRI completed one additional evaluation for the ODAV that examined the remaining structural life of the Runway 17/35 pavement (included in **Appendix 6**). This evaluation calculated the remaining structural pavement life under a variety of fleet mix scenarios including the existing fleet mix and with the addition of varying numbers of overweight aircraft operations. The assessment concluded that repeated stresses put on the Runway by overweight aircraft would likely result in further damage, a shortened structural life of the pavement, and increased the likelihood of a catastrophic pavement failure. GRI also recommended a rehabilitation of the existing Runway pavement within the next 10 years due to the distresses noted previously.

FAA DESIGN STANDARDS

The FAA defines several recommended standards for airport design in *AC 150/5300-13B, Airport Design*. Some of the most critical standards are those related to the design of runways and taxiways and will be described in more detail in subsequent chapters of this planning study. At this stage of the planning process, it is relevant to summarize existing non-standard conditions previously identified by the FAA for consideration throughout the planning process.

Runway Safety Area (RSA) – The RSA is a defined surface surrounding the runway that is prepared or suitable for reducing the risk of damage to airplanes in the event of an airplane undershoot, overshoot, or an excursion from the runway.

Object Free Area (OFA) –The OFA is an area on the ground centered on the runway, taxiway, or taxilane centerline that is provided to enhance the safety of aircraft operations. No above ground objects are allowed except for those that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

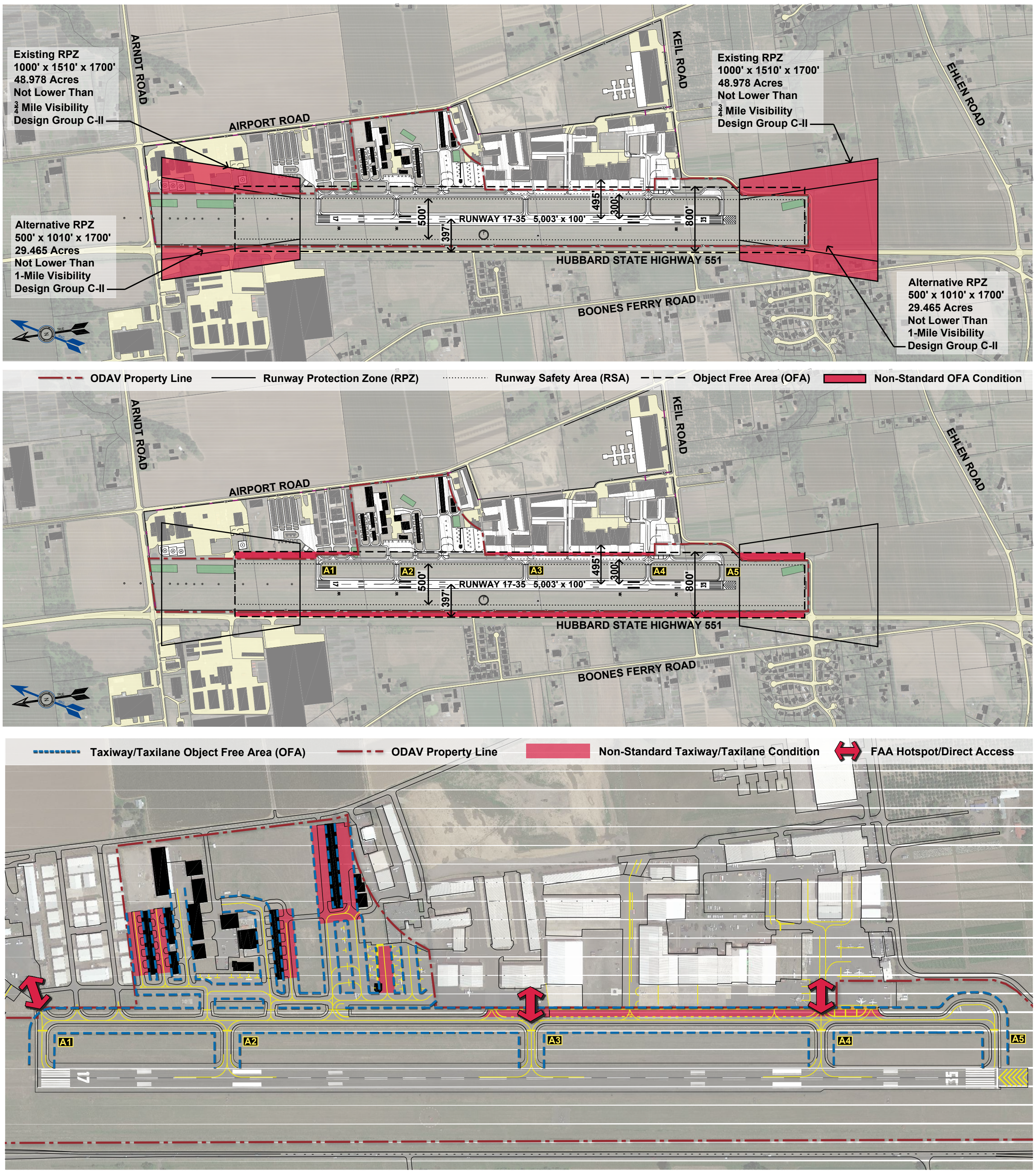
Obstacle Free Zone (OFZ) – The OFZ is a volume of airspace that is required to be clear of obstacles (including holding aircraft), except for frangible items required for the navigation of aircraft. It is centered along the runway and extended runway centerline.

Runway Protection Zone (RPZ) – The Runway Protection Zone (RPZ) is a trapezoidal area off each runway end intended to enhance the protection of people and property on the ground. The dimensions of an RPZ are a function of the critical aircraft and approach visibility minimums. The FAA recommends that RPZs be clear of all residences and places of public assembly (churches, schools, hospitals, etc.) and that airports own the land within the RPZs.

At Aurora State Airport, there are several known existing non-standard conditions to be analyzed in detail in the Facility Goals and Requirements and Development Alternatives Chapters. The following non-standard conditions are depicted in **Figure 2-15**:

- RPZs are encroached by various public roadways and contain properties that are not directly controlled by the Airport. “Interim Guidance on Land Uses Within Runway Protection Zone (2012)” generally identifies a public roadway as an incompatible land use within the RPZ. It also states that it is preferred that all property within RPZs be held by the airport in fee simple so the Airport sponsor can completely control the land use within.
- The runway OFA along its entire length is obstructed by Hubbard State Highway 551.
- There are several taxiway/taxilane design standard issues that should also be addressed at the Airport. The FAA recommends that taxiways/taxilanes not lead directly from an apron to the runway without requiring a turn. There are two direct runway access points on the Airport at Taxiways A3 and A4.
- The intersection of Taxiway A at A4 has been designated as a hotspot by the FAA. A hot spot is defined as a location on an airport movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

FIGURE 2-15: NON-STANDARD CONDITIONS



Source: Century West Engineering

AIRPORT SUPPORT SERVICES

Support facilities generally include airside support facilities such as airfield lighting, signage, weather reporting equipment, ground-based navigational aids (NAVAIDS), and fueling facilities.

Air Traffic Control Tower

Aurora State Airport has an FAA Contract Air Traffic Control Tower (ATCT) on the main apron. Contract towers are ATCTs that are staffed by employees of private companies rather than by FAA employees. The ATCT was constructed in 2015 and began operations in October of that year. The tower is in operation daily between 0700 and 2000 local time (7:00 am to 8:00 pm in standard time terms).

Taxiway Light and Air Traffic Control Tower

Runway/Taxiway Lighting

Airfield edge lighting is classified as low, medium, or high intensity systems. Aurora State Airport's runway has a medium intensity runway lighting (MIRL) which are white in color. The parallel taxiway and connector taxiways have medium intensity taxiway lighting (MITL) which are blue in color. Both systems are pilot-activated by keying the microphone from their aircraft. Apron edges are marked by blue edge reflectors.

Willamette Aviation Fuel Tanks

Airfield Lighting

The Airport accommodates day and night operations in visual and instrument meteorological conditions. The runway is equipped with lighting systems that meet the standards for the current instrument approach requirements and runway use.

Exterior building and pole-mounted overhead lighting is installed at various locations around the airfield in some parking lots and on airport buildings.

The airfield lighting was observed to be in good working condition and fully operational during recent site visits.


Medium Intensity Runway Lighting (MIRL)

Source: Century West Engineering

Airfield Signage

The runway-taxiway system has lighted mandatory instruction signs (red background with white text) marking the aircraft holding positions at each of the taxiway connections with the runway [17-35, 17, 35, etc.]; the signs also include taxiway direction/designations [A1, A2, etc.] with yellow background and black numbers/letters. The signs are located to coincide with the painted aircraft hold lines on each taxiway that connects to the runway.

Weather Reporting

Source: Century West Engineering

Aurora State Airport has an Automated Surface Observation System (ASOS) that provides 24-hour weather information. The ASOS sensor array is located west of the runway, near midfield. The system reports the following readings:

- Sky conditions such as cloud height and cloud coverage up to 12,000 feet;
- Surface visibility up to at least 10 statute miles;
- Basic present weather information such as the type and intensity for rain, snow, and freezing rain;
- Obstructions to vision like fog, haze, and/or dust;
- Sea-level pressure and altimeter settings;
- Air and dew point temperatures;
- Wind direction, speed and character (gusts, squalls);
- Precipitation accumulation; and
- Selected significant remarks including variable cloud height, variable visibility, precipitation beginning/ending times, rapid pressure changes, pressure change tendency, wind shift, peak wind.

When the ATCT is operating, weather reports are broadcast via the Automated Terminal Information System (ATIS). ATIS reports weather conditions and other information relevant to the airport hourly at 55 minutes past the hour on frequency 118.525 MHz. When the ATCT is not in service, the system reverts to the default ASOS information broadcast on the same frequency. The ASOS weather information is also available by telephone (503) 678-3011.

NAVAIDs

Navigational Aids (NAVAIDS) provide navigational assistance to approaching aircraft. They are classified as either Visual or Electronic. Visual NAVAIDs provide visual cues to pilots, usually through lights. Electronic NAVAIDs aid the pilot on approach by interacting with electronic instruments onboard the aircraft.

Visual NAVAIDs

Aurora State Airport has four types of visual NAVAIDs:

Visual Approach Slope Indicators (VASI). Two-box VASIs are located at both runway ends. VASIs give pilots visual cues regarding their angle of final approach by displaying different colored lights based on where they are in relation to the published glide slope angle. The Runway 17 VASI has a 3.5-degree glide path; the Runway 35 VASI has a 3.0-degree glide path. VASIs allow a limited range of adjustment above the standard 3.0-degree glide path angle to increase clearance over close-in obstructions to the runway approach.

Runway End Indicator Lights (REIL). Runway 17 is equipped with a REIL. REILs mark runway ends with sequenced strobe lights positioned on each corner of the runway end. REILS increase a pilot's ability to identify the runway end in darkness or poor visibility conditions.

Omnidirectional Approach Lighting System (ODALS). Runway 17 is equipped with an ODALS. ODALSs are normally associated with runways with published instrument approach procedures. They consist of a series of lights extending out from the runway end flashing in sequence guiding the aircraft to the runway end.

Airport Rotating Beacon (APBN). APBNs are used to indicate the location of an airport to pilots in darkness or during reduced visibility. For land airports, the APBN provides sequenced white and green flashing lights that rotate 360-degrees to allow pilots to identify the airport from all directions, from several miles. The beacon operates on a dusk-dawn photocell automatic switch and reportedly functions normally.

Electronic NAVAIDs

Localizer (LOC) with Distance Measuring Equipment (DME). The LOC and DME work in conjunction to provide lateral course guidance and distance information to aircraft on approach to Runway 17.

Newberg (URG) Very High Frequency Omnidirectional Range with DME (VOR/DME). The NAVAID is located 10.8 miles northwest of the Airport and supports nearby enroute navigational routes and instrument procedures to several airports in the area. Nine separate instrument airways converge in the area surrounding Aurora State Airport. Air traffic on these airways includes aircraft from throughout the instrument enroute system, including aircraft operating at airports throughout the region and aircraft that are simply transiting the area enroute to more distant airports.

FBO and Flight Training Services

There are two businesses offering fixed base operator (FBO) services at the Airport. Atlantic Aviation (formerly Lynx FBO) provides fueling and oxygen services, aircraft parking, hangar rentals, aircraft maintenance, and avionics sales and service. Willamette Aviation Services provides aircraft fuel, aircraft parking, hangar leasing and sales, and aircraft rental and maintenance services. Flight training service are offered by Willamette Aviation Services and Aurora Flight Training (formerly Aurora Aviation), which is a non-FBO business.

Fuel Services

On airport fuel sales are provided by Atlantic Aviation, which has an above-ground 12,000-gallon aviation gasoline (AVGAS/100LL) tank and an above-ground 20,000-gallon Jet A tank located on leased ODAV property immediately southwest of the Atlantic Aviation building. Atlantic Aviation operates two mobile fuel trucks to ferry fuels from their tanks to aircraft parked on the apron. Additional off-airport fuel storage and service is available on surrounding private properties with TTF agreements. There are no known underground fuel storage tanks on airport property.

Emergency Services

Marion County Sheriff Department provides emergency service and response to the Aurora State Airport. A single dedicated deputy is assigned to the Aurora community, which includes the Airport. The Aurora Fire District provides fire suppression, rescue, emergency medical response, and hazardous material response. The nearest district fire station is in the City of Aurora, less than two miles from the Airport. The Aurora Airport Water Control District was formed in 2002 and installed a 247,800-gallon fire suppression system to assist the Aurora Fire District in protecting the Airport in the event of fire.

Landside Facilities

The landside elements section includes the landside facilities (depicted in **Figure 2-13**) designed to support airport operations, including aircraft storage and maintenance. This section of the existing conditions analysis includes a discussion of General Aviation (GA) Terminal Areas and "through-the-fence" (TTF) areas, hangars/ airport buildings, airport surface roads, vehicle parking, airport fencing, and utilities.

GENERAL AVIATION (GA) TERMINAL AREAS AND "THROUGH-THE-FENCE" (TTF) AGREEMENTS

As depicted in **Figure 2-16**, there are three discernible GA areas with landside aviation facilities at the Airport. All of the existing landside facilities are located on the east side of the runway:

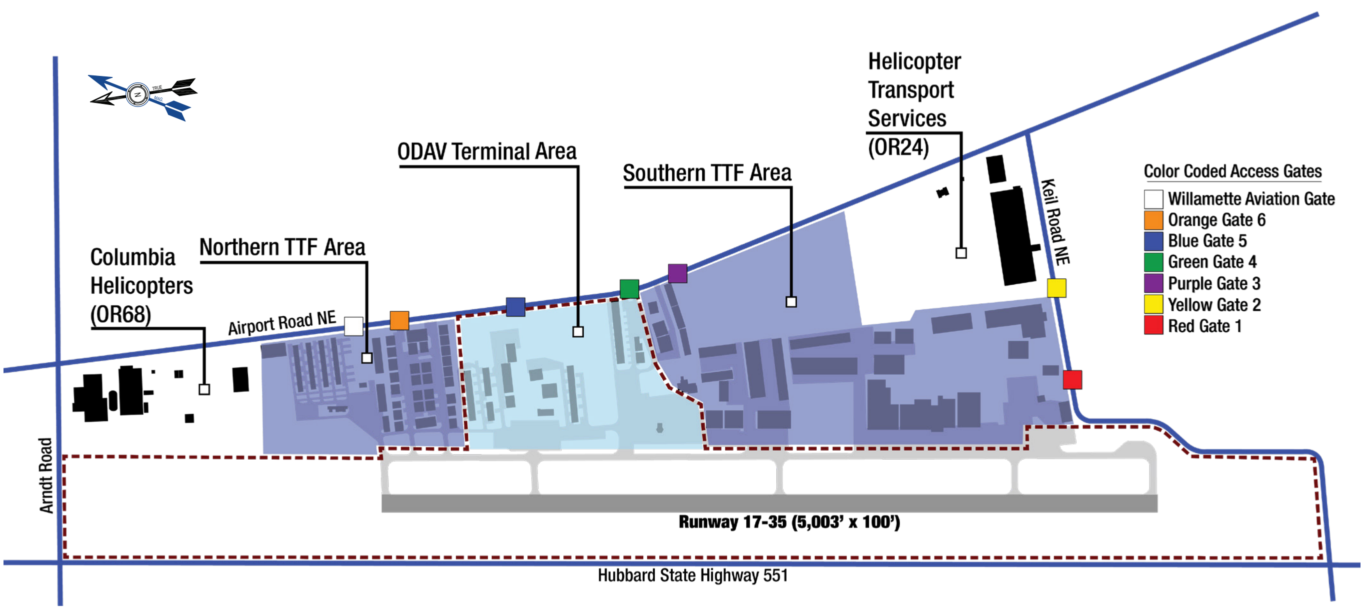
- **Terminal Area** – ODAV-owned property near the center of the airfield
- **North TTF Area** – privately-owned aeronautical use areas with ODAV-approved TTF access agreements
- **South TTF Area** – privately-owned aeronautical use areas with ODAV-approved TTF access agreements

The focus of the Airport Master Plan are the public facilities located on ODAV property and the eleven designated TTF access points on the airport property line. As noted earlier, the nearby Columbia Helicopters and Helicopter Transport Services (HTS) facilities are privately-owned helipads that are fully independent from Aurora State Airport operations and facilities. These facilities will not be included in the airport master plan evaluations.

Therefore, from a landside development standpoint, attention will be given to the facilities within the ODAV Terminal Area. In certain instances, appurtenant facilities in the North and South TTF Areas may be included to provide necessary context.

The ODAV Terminal Area is comprised of numerous hangars for storing general aviation aircraft, airport businesses like Aurora Flight Training, Aurora Aviation; an apron for itinerant traffic, and the FAA Air Traffic Control Tower (ATCT). The specific airfield facilities within this area of the Airport have been discussed within the relevant sections of this existing conditions analysis.

FIGURE 2-16: AURORA STATE AIRPORT GA TERMINAL AND TTF AREAS



Source: Developed by Century West Engineering

HANGARS/AIRPORT BUILDINGS

Buildings located on the Airport property and those located on adjacent TTF properties are summarized by ownership and general usage in **Table 2-14** below.

Table 2-14 summarizes the existing buildings, ownership, and general usage.

TABLE 2-14: HANGARS/AIRPORT BUILDINGS

	T-Hangar Buildings	T-Hangar Buildings SF	Conventional / Multiple-Aircraft	Conventional / Multiple-Aircraft SF	Other (business, office, etc)	Other (business, office, etc) SF	Total	Total SF
Northern TTF Area	5	47,300	33	163,100	1	1,500	35	211,900
ODAV Terminal Area	5	64,400	10	73,300	3	6,000	17	143,700
Southern TTF Area	-	-	28	623,000	2	14,500	30	637,500
Total	**10**	**111,700**	**71**	**859,400**	**6**	**22,000**	**82**	**993,100**

Source: Century West Engineering - Aerial photo based analysis

The 2019 *Constrained Operations Runway Justification Study* included a hangar/building analysis to identify new construction:

> *"Since 2012, most of the new hangar construction at the Airport has occurred in the South TTF Area. Approximately 30,650 SF of T-hangars were removed to accommodate construction of new larger conventional and corporate aircraft storage hangars. Overall, in the South TTF Area, including the HTS building, new construction amounted to approximately 223,000 SF of new aviation commercial and corporate aircraft storage space. Further expansion in the South TTF Area is ongoing.*
>
> *Within the ODAV Terminal Area no hangars had been removed since 2012 and new construction included one hangar at approximately 6,200 SF. There is approximately 8.1 acres of developable land within the ODAV Terminal Area. In the north end Columbia Helicopters area, new construction included approximately 3,500 SF of new storage buildings that appear to have been constructed to replace steel shipping/storage containers. No changes were identified in the Wiley or Willamette areas within the North TTF Area."*

AIRPORT SURFACE ROADS

There are multiple access points to the Airport that coincide with a colored gate system to clearly delineate Airport access and assist in emergency response and advertisement (see **Figure 2-16**). Stenbock Way NE access is located at the Purple Gate at Airport Road NE and is considered to be the major entry point to ODAV property due to the access provided to the ATCT. However, the Purple Gate entry on Stenbock Way NE provides access directly on to privately-owned land on the South TTF Area and provides access to numerous private hangars and buildings like the Columbia Aviation Association meeting facility.

Access to the ODAV Terminal Area is also provided at the unnamed access roads identified by the Green and Blue Gates on Airport Road, slightly north of the Purple Gate. The access road at the Blue Gate is the only public access point that is located entirely on public land. The road is approximately 700 feet long and provides vehicle access to Aurora Flight Training, a large vehicle parking lot, and most of the hangars located on public property.

VEHICLE PARKING

On the public land within the ODAV Terminal Area, several joint use parking lots are available near the public tiedown area, air traffic control tower, adjacent hangars, and airport related businesses. The parking areas on state-owned land provides parking for approximately 60 vehicles. The majority of the vehicle parking positions are located adjacent to Aurora Flight Training and is accessible from the Blue Gate. Several more parking positions located next to the ATCT are typically reserved for FAA ATCT and ODAV maintenance staff.

On the adjacent privately held land, airport businesses offer parking for employees and customers based on Marion County zoning and development standards. Individual hangar tenants typically park adjacent to or in their hangars while flying; some parking lots are available for their use, as well.

AIRPORT FENCING

Approximately four miles of fencing and access gates surround the entire Airport, inclusive of the public and private properties. The perimeter fencing was constructed in 1999 with a combination of private funds (for abutting private land areas) and FAA funds (for publicly owned airport land). All access points are gated, although not all are automated. The gates that are not automated are locked and are used to provide controlled access for maintenance. These gates are not intended for regular public use.

The Airport gate signage and color system (Red, White, Purple, Blue, Orange, Green, and Yellow) was installed at access points along Keil Road and Airport Road. The design, construction, and installation of the access gates was funded with private money. ODAV operates and maintains the Blue and Purple gates which provide access to public-use areas of the Airport. The remaining colored gates depicted in **Figure 2-16** serve private properties with access agreements and are operated and maintained by private operators.

UTILITIES

The developed areas of Aurora State Airport have water, sewer, storm water drainage, natural gas, and electric. The following text describes the major utilities serving the Airport.

Water

Water at the Airport is provided from a system of wells. In the early 2000s, with the assistance of Marion County, the Aurora Airport Water Control District was created to address major fire and life safety needs for privately-owned land adjacent to ODAV property at the Airport. The system included an underground tank system, a pump house, underground water pipes, fire hydrants, and numerous connections for fire sprinkler systems.

Sewer

Sanitary sewer is provided by individual and shared drain field/septic tank systems. There are six individual drain fields located on ODAV owned property, with three more proposed for the south end of the runway safety area (RSA) near the existing one used by the South End Airpark. The drain fields are shared for both aviation related uses on both private and publicly owned land.

Stormwater

The Airport's stormwater system is made up of a network of edge drain, culverts and surface drainage features which generally flow to the east, west, and south sides of the Airport. Most of the stormwater runoff originating on ODAV-owned property and airfield facilities like the runway, taxiway, and apron flows to the west side of the Airport.

Electric

Electric service is provided by Portland General Electric (PGE).

Gas

Natural gas service is provided NW Natural.

Airport Administration

The Airport Administration section provides a summary of Airport Ownership and Management, Airport Finance, Rates and Charges, and overview of FAA Grant Assurances and Compliance.

AIRPORT OWNERSHIP AND MANAGEMENT

Aurora State Airport is owned and operated by ODAV. ODAV manages Aurora State Airport among a group of 28 state-owned or operated airports from its office in Salem. The department has approximately 15 ½ full-time employees with one State Airports Manager, who is responsible for the day-to-day management of the airports. Airport management staff oversees grant administration, construction management, airport finance and leasing, as well as operations and maintenance of the Aurora State Airport. Airport tenants are responsible for managing their facilities and leased areas to meet the requirements defined in their leases.

AIRPORT FINANCE

ODAV operates Aurora State Airport within its group of state-owned airports as an enterprise fund. All revenue generated by the airports remains within the airport operating budget. This is a standard FAA requirement for all airports to prevent revenue diversion from airport operations to general services or non-airport operations.

The primary revenue generating sources for Aurora State Airport includes improved and unimproved ground lease rents, access fees from through-the-fence users, and fuel flowage fees. The primary expenditures for the Airport include airport legal fees, property taxes, maintenance and operation expenses, and personnel services. The Airport's capital improvement projects are typically funded through FAA grants with a local match that may be provided by ODAV grants. Based on a review of the airport's revenues and expenses for 2021, the airport's revenues exceed its expenses for normal operations and maintenance. A summary of the airports revenues and expenses are included in **Tables 2-15** and **2-16**.

TABLE 2-15: AIRPORT REVENUE/EXPENSE SUMMARY (2021)

AIRPORT REVENUE	
Leases, Tiedowns, Property Tax, Utilities	$83,203.15
Access Fees (Through-the-Fence)	$40,000.00
Fuel Flowage Fees	$92,114.00
TOTAL AIRPORT REVENUES	**$215,317.15**
AIRPORT EXPENSES	
Airport Personnel Services	$19,101.96
Transit Tax	$63.28
Utilities	$28,547.38
Maintenance & Inspections	$30,359.68
Supplies	$5,834.80
Legal Fees	$83,166.70
Reporting & Monitoring Charges	$14,050.00
Property Taxes	$33,009.73
TOTAL AIRPORT OPERATING EXPENSES	**$214,133.53**
NET OPERATING INCOME	**$1,183.62**

Source: ODAV Budget FY2021 Actuals

TABLE 2-16: AIRPORT RATES AND CHARGES DATA

RATES AND CHARGES	
FBO Tiedown Fees (Monthly)	$10.00
Non-Commercial Tiedown Fees (By Category) (Per Month)	
Category II	$20.00
Category III & IV	$17.50
Category V	$15.00
Access Fees (shall be the greater of the two (1) weight range or (2) minimum guarantee)	
(1) Weight Range (Per Month)	
Class 1 Aircraft (up to 5,000 lbs)	$15.00
Class 2 Aircraft (5,001 to 10,000 lbs)	$24.00
Class 3 Aircraft (10,001 to 20,000 lbs)	$44.00
Class 4 Aircraft (20,001 to 30,000 lbs)	$66.00
Class 5 Aircraft (30,001 to 40,000 lbs)	$88.00
Class 6 Aircraft (40,001 lbs and over)	$120.00
(2) Minimum Guarantee (Per Month)	
Category II	$275.00
Category III & IV	$175.00
Category V	$75.00
Fuel Flowage Fee (Per Gallon)	$0.08
Improved Ground Lease Rates (Sq/Ft) (Per Month)	$0.3256
Unimproved Ground Lease Rates (Sq/Ft) (Per Month)	$0.05

Source: ODAV State Airport Rates 2021

FAA COMPLIANCE OVERVIEW

A management program based on the FAA's "Planning for Compliance" guidance and the adoption of additional airport management "Best Practices" is recommended to address FAA compliance requirements and avoid noncompliance, which could have significant consequences.

Airport management "Best Practices" are developed to provide timely information and guidance related to good management practices and safe airport operations for airport managers and sponsors. The practices outlined herein are designed for use by ODAV for evaluating and improving their current and future operation and management program.

Airport sponsors must comply with various federal obligations through agreements and/or property conveyances, outlined in *FAA Order 5190.6B, Airport Compliance Manual*. The contractual federal obligations a sponsor accepts when receiving federal grant funds or transfer of federal property can be found in a variety of documents including:

- Grant agreements issued under the Federal Airport Act of 1946, the Airport and Airway Development Act of 1970, and Airport Improvement Act of 1982. Included in these agreements are the requirement for airport sponsors to comply with:
  - Grant Assurances;
  - Advisory Circulars;
  - Application commitments;
  - FAR procedures and submittals; and
  - Special conditions.
- Surplus airport property instruments of transfer;
- Deeds of conveyance;
- Commitments in environmental documents prepared in accordance with FAA requirements; and
- Separate written requirements between a sponsor and the FAA.

OREGON AVIATION LAWS

The Oregon Department of Aviation (ODAV) has created both the Oregon Administrative Rules (OAR) and Oregon Revised Statutes (ORS) to govern airports within the state.

Oregon Administrative Rules (OAR)

- OAR Chapter 660, Division 13 – Airport Planning
- OAR Chapter 660, Division 13 – Exhibits
- OAR Chapter 738 – ODAV
- Non-Commercial Leasing Policy
- Commercial Leasing Policy
- Category II Minimum Standards Policy
- Category IV Minimum Standards Policy
- Category V Minimum Standards Policy
- Insurance Requirements

Oregon Revised Statutes (ORS)

- ORS 197 – Land Use Planning I
- ORS 197A – Land Use Planning II
- ORS 319 – Aviation Fuel Tax
- ORS 835 – Aviation Administration
- ORS 836 – Airports and Landing Fields
- ORS 837 – Aircraft Operations
- ORS 838 – Airport Districts

Airport Compliance with Grant Assurances

As a recipient of both federal and state airport improvement grant funds, the airport sponsor is contractually bound to various sponsor obligations referred to as "Grant Assurances", developed by FAA and the State of Oregon. These obligations, presented in detail in federal and state statute and administrative codes, document the commitments made by the airport sponsor to fulfill the intent of the grantor (FAA or state) required when accepting federal and/or state funding for airport improvements. Failure to comply with the grant assurances may result in a finding of noncompliance and/or forfeiture of future funding. Grant assurances and their associated requirements are intended to protect the significant investment made by the FAA or State of Oregon to preserve and maintain public-use airports as valuable transportation assets.

FAA Grant Assurances

The FAA's Airport Compliance Program defines the interpretation, administration, and oversight of federal sponsor obligations contained in grant assurances. The Airport Compliance Manual defines policies and procedures for the Airport Compliance Program. Although it is not regulatory or controlling with regard to airport sponsor conduct, it establishes the policies and procedures for FAA personnel to follow in carrying out the FAA's responsibilities for ensuring compliance by the sponsor.

The *Airport Compliance Manual* states the FAA Airport Compliance Program is: "…designed to monitor and enforce obligations agreed to by airport sponsors in exchange for valuable benefits and rights granted by the United States in return for substantial direct grants of funds and for conveyances of federal property for airport purposes. The Airport Compliance Program is designed to protect the public interest in civil aviation. Grants and property conveyances are made in exchange for binding commitments (federal obligations) designed to ensure that the public interest in civil aviation will be served. The FAA bears the important responsibility of seeing that these commitments are met. This order addresses the types of commitments, how they apply to airports, and what FAA personnel are required to do to enforce them."

According to the FAA, cooperation between the FAA, state, and local agencies should result in an airport system with the following attributes:

- Airports should be safe and efficient, located at optimum sites, and be developed and maintained to appropriate standards;
- Airports should be operated efficiently both for aeronautical users and the government, relying primarily on user fees and placing minimal burden on the general revenues of the local, state, and federal governments;
- Airports should be flexible and expandable, able to meet increased demand and accommodate new aircraft types;
- Airports should be permanent, with assurance that they will remain open for aeronautical use over the long-term;
- Airports should be compatible with surrounding communities, maintaining a balance between the needs of aviation and the requirements of residents in neighboring areas;
- Airports should be developed in concert with improvements to the air traffic control system;
- The airport system should support national objectives for defense, emergency readiness, and postal delivery;
- The airport system should be extensive, providing as many people as possible with convenient access to air transportation, typically not more than 20 miles of travel to the nearest NPIAS airport; and
- The airport system should help air transportation contribute to a productive national economy and international competitiveness.

The airport sponsor should have a clear understanding of and comply with all assurances. The following sections describe the selected assurances in more detail.

Project Planning, Design, and Contracting

Sponsor Fund Availability (Assurance #3)

Once a grant is given to the airport sponsor, the sponsor commits to providing the funding to cover their portion of the total project cost. Currently this amount is 10% of the total eligible project cost, although it may be higher depending on the particular project components or makeup. Once the project has been completed, the receiving airport also commits to having adequate funds to maintain and operate the airport in the appropriate manner to protect the investment in accordance with the terms of the assurances attached to and made a part of the grant agreement. It is noted that this Airport Master Plan project is 100% FAA funded due to the availability of grants associated with COVID-19 pandemic recovery.

Consistency with Local Plans (Assurance #6)

All projects must be consistent with city and county comprehensive plans, transportation plans, zoning ordinances, development codes, and hazard mitigation plans. The airport sponsor should familiarize themselves with local planning documents before a project is considered to ensure that all projects follow local plans and ordinances.

Accounting System Audit and Record Keeping (Assurance #13)

All project accounts and records must be made available at any time. Records should include documentation of cost, how monies were actually spent, funds paid by other sources, and any other financial records associated with the project at hand. Any books, records, documents, or papers that pertain to the project should be available at all times for an audit or examination.

General Airport Assurances

Good title (Assurance #4)

The airport sponsor must have a Good Title to affected property when considering projects associated with land, building, or equipment. Good Title means the sponsor can show complete ownership of the property without any legal questions, or show it will soon be acquired.

Preserving Rights and Powers (Assurance #5)

No actions are allowed, which might take away any rights or powers from the sponsor, which are necessary for the sponsor to perform or fulfill any condition set forth by the assurance included as part of the grant agreement.

Airport Layout Plan (ALP) (Assurance #29)

The airport sponsor should maintain an up-to-date ALP, which should include current and future property boundaries, existing facilities/structures, locations of non-aviation areas, and existing and proposed improvements. FAA requires proposed improvements to be depicted on the ALP in order to be eligible for FAA funding. If changes are made to the airport without authorization from the FAA, the FAA may require the airport to change the alteration back to the original condition or jeopardize future grant funding.

Disposal of Land (Assurance #31)

Land purchased with the financial participation of an FAA Grant cannot be sold or disposed of by the airport sponsor at their sole discretion. Disposal of such lands are subject to FAA approval and a definitive process established by the FAA. If airport land is no longer considered necessary for airport purposes, and the sale is authorized by the FAA, the land must be sold at fair market value. Proceeds from the sale of the land must either be repaid to the FAA, or reinvested in another eligible airport improvement project.

Airport Operations and Land Use

Pavement Preventative Maintenance (Assurance #11)

Since January 1995, the FAA has mandated that it will only give a grant for airport pavement replacement or reconstruction projects if an effective airport pavement maintenance-management program is in place. The Oregon Department of Aviation prepares and updates pavement reports for the airport. These reports identify the maintenance of all pavements funded with federal financial assistance and provides a pavement condition index (PCI) rating (0 to 100) for various sections of aprons, runways, and taxiways; including, a score for overall airport pavements.

Operations and Maintenance (Assurance #19)
All federally funded airport facilities must operate at all times in a safe and serviceable manner and in accordance with the minimum standards as may be required or prescribed by applicable Federal, State, and Local agencies for maintenance and operations.

Compatible Land Use (Assurance #21)
Land uses around an airport should be planned and implemented in a manner that ensures surrounding development and activities are compatible with the airport. Aurora State Airport is located in unincorporated Marion County. The airport sponsor should work with the county and adjacent land use jurisdictions to ensure that zoning and land use controls are in place to protect the airport from incompatible land uses. Incompatible land uses around airports represents one of the greatest threats to the future viability of airports.

Day-To-Day Airport Management
Economic Non-Discrimination (Assurance #22)
Any reasonable aeronautical activity offering service to the public should be permitted to operate at the airport as long as the activity complies with airport established standards for that activity. Any contractor agreement made with the airport will have provisions making certain the person, firm, or corporation will not be discriminatory when it comes to services rendered including rates or prices charged to customers.

Exclusive Rights (Assurance #23)
No exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public. However, an exception may be made if the airport sponsor can prove that permitting a similar business would be unreasonably costly, impractical, or result in a safety concern, the sponsor may consider granting an exclusive right.

Leases And Finances
Fee and Rental Structure (Assurance #24)
An airport's fee and rental structure should be implemented with the goal of generating enough revenue from airport related fees and rents to become self-sufficient in funding the day-to-day operational needs. Airports should update their fees and rents on a regular basis to meet fair market value, often done through an appraisal or fee survey of nearby similar airports. Common fees charged by airports include fuel flowage fees, tiedown fees, landing fees, and hangar or ground lease rents.

Airport Revenue (Assurance #25)
Revenue generated by airport activities must be used to support the continued operation and maintenance of the airport. Use of airport revenue to support or subsidize non-aviation activities or to fund other departments who are not using the funds for airport specific purposes is not allowed and is considered revenue diversion. Revenue diversion is a significant compliance issue for FAA.

For additional information on FAA Grant Assurances, please visit: https://www.faa.gov/airports/aip/grant_assurances/#current-assurances

Taxiway A at A4 – Source: Century West Engineering

Chapter 3

Aviation Activity Forecasts

COVID-19 STATEMENT (JANUARY 2022)

The preliminary forecasts were prepared at the end of the second full year of the COVID-19 pandemic. The disruption of airport activity experienced throughout the U.S. airport system related to COVID-19 since 2020 is unprecedented and has led to significant changes in activity that are not consistent with recent historical trends. It is acknowledged that not all elements of general aviation activity have been affected equally. Some segments of personal air travel have demonstrated resilience, partly in response to the heavily impacted commercial airline industry.

Although the limits of the current industry-wide disruption have yet to be defined, it is believed that the underlying elements of demand within general aviation will remain largely intact until all public health constraints are fully addressed and economic conditions gradually return to normal.

Federal Aviation Administration (FAA) forecast approval will be based in reference to the data and methodologies used and the conclusions at the time the document was prepared. However, consideration must still be given to the significant impacts of COVID-19 on aviation activity. As a result, there is lower than normal confidence in future growth projections.

FAA approval of the forecast does not provide justification to begin airport development. Justification for future projects will be made based on activity levels at the time the project is requested for development, rather than this forecast approval. Further documentation of actual activity levels reaching the planning activity levels will be needed prior to FAA participation in funding for eligible projects.

February 2023 Note: The draft aviation activity forecasts were submitted electronically to the FAA Seattle Airports District Office (ADO) on May 20, 2022 for formal review as part of Working Paper 1. All public comments provided on Working Paper 1 obtained through the airport master plan Planning Advisory Committee (PAC) and the overall public involvement process for the airport master plan, were organized (with responses) and forwarded to FAA with the working paper to aid in their formal review. FAA review comments on Working Paper 1 were received on August 17, 2022. The FAA requested Consultant/Sponsor responses to FAA comments and questions, and to provide any revised draft content that was developed in response to the FAA review/response. Written responses to FAA were provided by the Consultant/Sponsor on September 30, 2022. Follow-up coordination with FAA staff continued, including a request to provide a "track changes" version of the document for final FAA review. A record of these communications will be included in the public participation section of the airport master plan. A final draft of the chapters contained in Working Paper 1 will include revisions made during the extended comment period.

Introduction and Overview

This chapter provides a summary of historical aviation activity and new aviation activity forecasts for the 2021-2041 Aurora State Airport (Airport) - Airport Master Plan. The most recent aviation activity forecasts approved by the Federal Aviation Administration (FAA) for Aurora State Airport were developed in the 2012 Airport Master Plan and the 2019 Constrained Operations Runway Justification Study.

The aviation activity forecasts have a base year of 2021 (calendar year), the last year of complete data available when the preliminary forecasts were prepared. The base year is maintained for consistency in all subsequent forecast revisions leading to the final FAA-Approved 2021-2041 forecast. The forecast covers a 20-year period with reporting intervals at every five years. Multiple forecasting methodologies are used in this analysis and the models that provide the most valid outlooks are presented for comparison.

Aviation activity forecasts help determine if existing airport facilities are sufficient or will need to be modified to handle future demand (aircraft operations and based aircraft). The FAA Seattle Airports District Office (ADO) reviews the preliminary forecasts for rationality and comparison to the FAA Terminal Area Forecast (TAF). FAA forecast approval is a critical step in the airport master planning process since the projected activity will determine applicable design standards and other planning criteria.

The chapter is organized around the following sections:

- Introduction/Overview, FAA Forecasting Process;
- Key Activity Elements;
- Historical Data, Historical Forecasts, and Airport Events;
- Based Aircraft Forecasts;
- Aircraft Operations Forecasts;
- Peak Activity Forecasts;
- Design Aircraft; and
- Forecast Summary.

The overall goal is to prepare forecasts that accurately reflect current conditions, relevant historical trends, and provide reasonable projections of future activity, which can be translated into specific airport facility needs anticipated during the next 20 years and beyond. Aurora State Airport is currently capable of accommodating a full range of general aviation (GA) activity in both Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). Aircraft use includes business class jets and turboprops, a wide variety of piston-engine aircraft, and helicopters.

The forecast methodologies presented in this chapter are consistent with the Airport's role as an urban general aviation airport and they do not anticipate a change in the Airport's functional role, such as the initiation of commercial passenger or cargo service.

The forecasts are unconstrained and assume the Oregon Department of Aviation (ODAV) will be able to make the facility improvements necessary to accommodate the anticipated demand, unless specifically noted. ODAV will consider if any unconstrained demand will not or cannot be reasonably met through the evaluation of airport development alternatives later in the airport master plan.

The historical development of landside facilities at Aurora State Airport, including aircraft hangars, has occurred both on and off ODAV-owned property. These facilities and the based aircraft they accommodate are identified as "inside the fence" or "through-the-fence (TTF)." All off-airport facilities/users with direct access to the runway-taxiway system have TTF access agreements with ODAV.

This Airport Master Plan will address needs for existing and future facilities that are, or would be under the direct ownership and management of ODAV. However, the activity generated by all aircraft that rely on TTF access to airfield facilities, are included in the Airport's based aircraft count and the aircraft operations data compiled by the air traffic control tower (ATCT). This activity will be included when evaluating runway-taxiway and related facility needs.

FEDERAL AIRPORT SYSTEM

As described in Chapter 2, Aurora State Airport is included in the federal airport system, referred to as the National Plan of Integrated Airport Systems (NPIAS). The NPIAS currently includes 3,304 public-use airports in all 50 states. Fifty-seven of Oregon's 97 public-use airports are included in the NPIAS.

Aurora State Airport is designated a **"National" Nonprimary General Aviation** airport. The role of National airports in the NPIAS is defined as follows:[1]

> *"National airports (84) are located in metropolitan areas near major business centers and support flying throughout the nation and the world. National airports are currently located within 31 states. They account for 13 percent of total flying at the studied general aviation airports and 35 percent of all flights that filed flight plans at the airports in the four new categories. These 84 airports support operations by the most sophisticated aircraft in the general aviation fleet. Many flights are by jet aircraft, including corporate and fractional ownership operations and air taxi services. These airports also provide pilots with an alternative to busy primary commercial service airports. There are no heliports or seaplane bases in this category.*
>
> *Criteria Used to Define the New National Category (all numbers are annualized):*
>
> *1) 5,000+ instrument operations, 11+ based jets, 20+ international flights, or 500+ interstate departures; or*
> *2) 10,000+ enplanements and at least one charter enplanement by a large certificated air carrier; or*
> *3) 500+ million pounds of landed cargo weight."*

Available data indicate that Aurora State Airport has consistently met or exceeded the FAA's "11+ based jet" and around 5,000+ instrument operations criterion established for National airports since the early 2000s.

Aurora State Airport, and nearby Portland-Hillsboro Airport (19 miles northwest) are the only FAA-designated National Airports located in Oregon.

STATE AIRPORT SYSTEM

As described in Chapter 2, Aurora State Airport is designated a **Category II – Urban General Aviation Airport** in the 2019 Oregon Aviation Plan (OAP v6.0). The definition for Category II airports is:

> *"These airports support all general aviation aircraft and accommodate corporate aviation activity, including piston and turbine engine aircraft, business jets, helicopters, gliders, and other general aviation activity. The most demanding user requirements are business-related. These airports service a large/multi-state geographic region or experience high levels of general aviation activity. The minimum runway length objective for Category II airports is 5,000 feet."*

1 2021-2025 NPIAS Report, Federal Aviation Administration (9/30/2020)

Oregon currently has a total of 11 Category II airports, which includes one public-use heliport (Portland Downtown Heliport). The distribution of Category II airports throughout Oregon is a reflection of the state's physical geography, population centers, and the underlying market conditions required to support the full range of GA activity common to this type of airport.

More than half (6 of 11) of Oregon's Category II airports are located within 30 nautical miles of Aurora State Airport. The concentration of Category II airports in the Portland Metro area is consistent with the region's overall population and economic characteristics.

FAA Forecasting Process

The FAA provides aviation activity forecasting guidance for airport master planning projects. *FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans*, outlines seven standard steps involved in the forecast process:

1. Identify Aviation Activity Measures: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
2. Previous Airport Forecasts: May include the FAA Terminal Area Forecast (TAF), state or regional system plans, and previous master plans.
3. Gather Data: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4. Select Forecast Methods: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
5. Apply Forecast Methods and Evaluate Results: Prepare the actual forecasts and evaluate for reasonableness.
6. Summarize and Document Results: Provide supporting text and tables as necessary.
7. Compare Forecast Results with FAA's TAF: Follow guidance in FAA Order 5090.5, Field Formulation of the National Plan of Integrated Airport Systems and Airport Capital Improvement Program. In part, the Order indicates that forecasts should not vary significantly from the TAF. When there is more than 10% variance in the 5-year term, or 15% in the 10-year term, documentation will be provided for careful consideration by the FAA. The aviation demand forecasts are then submitted to the FAA for their approval.

Key Activity Elements

As noted above, GA airport activity forecasting focuses on two key activity segments: based aircraft and aircraft operations (takeoffs & landings). Detailed breakdowns of these activity segments include:

- Aircraft fleet mix;
- Peak activity;
- Distribution of local and itinerant operations; and
- Determination of the design aircraft (also referred to as the critical aircraft).

The design aircraft represents the most demanding aircraft type or family of aircraft that uses an airport on a regular basis (a minimum of 500 annual takeoffs & landings per year). Per *AC 150/5000-17, Critical Aircraft and Regular Use Determination*, the design aircraft is used is used to establish a variety of FAA design categories, which then establish design standards for airfield facilities. FAA airport design standard groupings reflect the physical requirements of specific aircraft types and sizes. Design items, such as runway length evaluations, are determined by the requirements of current/future design aircraft. The activity forecasts also support the evaluation of several demand-based facility requirements including runway and taxiway capacity, aircraft parking, and hangar capacity.

Table 3-1 describes the data sources used in this chapter.

FAA Forecast Terminology

Aircraft Operation
A count of a takeoff, landing, or touch-and-go. Each time an aircraft touches the runway to takeoff or land, it counts as an operation.

Aircraft Approach Category (AAC)
Classification of an aircraft by approach speed, with A being the slowest and E being the fastest.

Airplane Design Group (ADG)
Classification of an aircraft by its size (wingspan and tail height) with I being the smallest and VI being the largest.

Airport Reference Code (ARC)
Used to determine facility size and setback requirements. The ARC is a composite of the AAC and ADG of the critical aircraft. ARC is no longer used in FAA Advisory Circulars. Instead AAC and ADG are identified independently. Though the term is no longer in use, previous studies described in this document may reference ARC.

Based Aircraft
Aircraft that are stored at the Airport,[1] either full-time or seasonally (more than half a calendar year).

Design Aircraft
The most demanding aircraft, or family of aircraft (in terms of size and/or speed) generating at least 500 annual operations at an airport. The design aircraft is used to establish the applicable AAC and ADG (for existing and forecast activity).

General Aviation (GA)
Aviation activities conducted by recreational, business, and charter users not operating as airlines under FAR Part 121, Part 135, or military regulations.

Air Taxi
Aviation activities conducted by on-demand or scheduled operators certified under FAR Part 135. The majority of air taxi activity is conducted with aircraft also operated by general aviation users.

Itinerant Operation
An operation that originates at one airport and terminates at a different airport. For example, an aircraft flying from the Airport to another airport.

Local Operation
An operation that originates and terminates at the same airport. For example, an aircraft takes off from the Airport, remains near the airport to practice flight maneuvers, and then lands at the Airport. Touch-and-go operations occur in the airport traffic pattern and they are categorized as local operations.

Touch-and-Go
A maneuver where an aircraft lands and takes off without leaving the runway. A touch-and-go is counted as two aircraft operations.

1 Includes aircraft located on ODAV-owned property and aircraft located on privately-owned property that have TTF access.
Source: Century West Engineering, FAA and industry terminology.

TABLE 3-1: FORECASTING DATA SOURCES

Source	Description
Air Traffic Control Tower (ATCT) Airport Operations Data	The FAA database provides aircraft operations counts for ATCT-equipped airports. For Aurora State Airport, ATCT reports became available in late 2015 when the ATCT opened. With an established 2021 base year for the new activity forecasts, a 6-year period (2016-2021) of full year ATCT data was used to provide a reliable historical indication of basic activity, adjusted to reflect specific conditions, to develop a 2021 baseline for new aircraft operations forecasts at the Airport. The FAA standard ATCT activity categories are not specific to aircraft types, but do break out local and itinerant operations. Itinerant operation counts are logged for air carrier, general aviation, air taxi, and military aircraft. Local operation counts are logged for civil and military aircraft. The Aurora ATCT manager also provided additional first-hand observations about the mix of air traffic, and common operational factors not captured in ATCT data for the Airport.

(Continued)
TABLE 3-1: FORECASTING DATA SOURCES

Source	Description
FAA National Based Aircraft Inventory Program	The FAA National Based Aircraft Inventory Program database assigns all eligible active civilian aircraft to individual airports, as reported and verified by airport owners. Aircraft reported by more than one airport are researched by airport management, with the final resolution approved by FAA. Inactive and other aircraft that do not meet FAA criteria may be listed, but they are not included in the airport's current "validated count." The FAA requires airport owners to update their counts periodically to reflect changes in activity. The accuracy of based aircraft counts at individual airports has improved significantly with more consistent airport verification and reporting. The current level of verification was not common in previous airport master plan data.
FAA Terminal Area Forecast (TAF)	The FAA TAF, published in May 2021, was used in this forecast evaluation. The TAF provides historical data and long-term projections for annual operations and based aircraft at all NPIAS airports, including Aurora State Airport. The forecasts are based on overall growth rates assigned by FAA and do not necessarily correspond to the previous airport master plan, or other existing forecasts. The airport master plan's recommended based aircraft and operations forecasts will be compared to the TAF as part of the FAA forecast review/approval process.
FAA National Aerospace Forecast	The 2021-2041 Aerospace Forecast was referenced in this forecast evaluation. The FAA Aerospace Forecast is a national-level forecast of civil aviation activity that helps guide local forecasts by serving as a point of comparison between local and national trends.
Traffic Flow Management System Counts (TFMSC)	The TFMSC includes data collected from FAA instrument flight rules (IFR) flight plan filings. This activity is categorized by aircraft type and it provides airport origin-destination and time of day information for all flights, including flights that occur when the Aurora State Airport control tower is closed. The advantage of the TFMSC data is its degree of detail and insights into the more demanding aircraft operating at the Airport, such as jets and turboprops, that regularly file IFR flight plans. TFMSC data is the most reliable indicator of business aviation activity at the Airport, which is critical in documenting activity required for design aircraft designation and the operations fleet mix.
Socioeconomic Data	Socioeconomic data is provided by data vendor Woods & Poole, Inc. (W&P). Population data are provided by the Portland State University - Population Research Center (PRC). The PRC produces the annual population estimates and long term forecasts for Oregon and its counties and cities, as well as the estimates by age and sex for the state and its counties. These estimates are used by the state and local governments, various organizations, and agencies for revenue sharing, funds allocation, and planning purposes. The 2020-2065 PRC population forecast is the primary resource for evaluating changes in local area population during the airport master plan 20-year planning horizon. The W&P datasets for Marion and Clackamas Counties were used for this analysis. The W&P data provides 124 data categories with historical records from 1970 to 2019 and forecasts through 2050. Data categories considered include population, employment, earnings and income, and gross regional product.
State Aviation System Plans	The Oregon Aviation Plan (OAP v6.0) is the current state aviation system plan for Oregon, adopted in 2019. OAP v6.0 includes facility data, activity forecasts, system-wide minimum standards and performance measures for Oregon's public-use airports.
Previous Airport Planning	The 2012 Aurora State Airport Master Plan Update provides is the most recent FAA-approved airport layout plan (ALP) drawing for the Airport. The 2019 Constrained Operations Runway Justification Study provided updated aviation activity forecasts and airside facility requirements assessments related to the critical aircraft. Both planning documents were prepared prior to the COVID-19 pandemic.
Fixed Base Operator (FBO)	Historical fuel flowage data provided to airport management by the airport tenants providing aircraft services was reviewed. This information was consulted when developing aircraft operations forecasts.

Source: Century West Engineering

National General Aviation Activity Trends

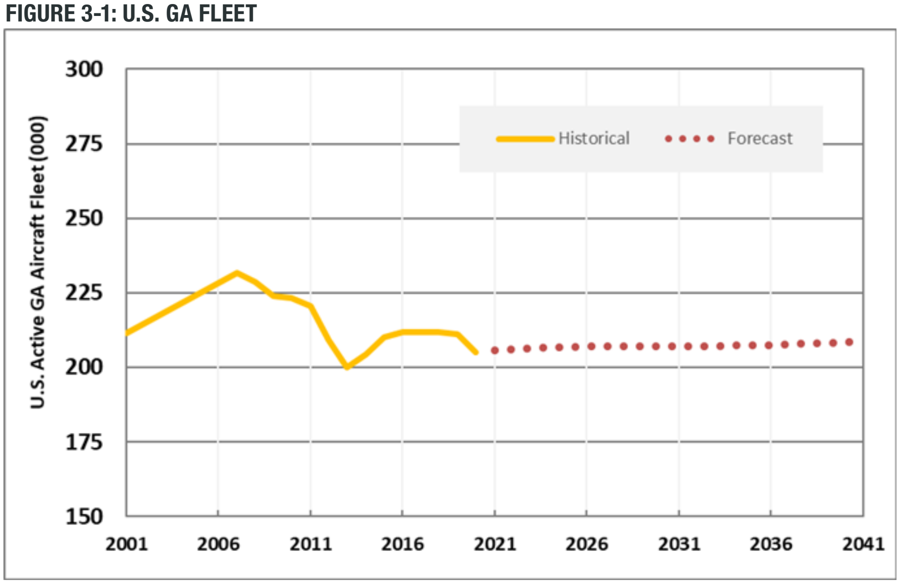
The first two decades of the 21st Century have presented numerous challenges for the GA industry. On a national level, most measures of GA activity declined sharply during the Great Recession, rebounded, then declined again at the outset of the COVID-19 pandemic.

Aircraft manufacturing, for example, hit a low point in 2010 after several years of growth, then rebounded and experienced relatively stable year-over-year growth through 2019. The COVID-19 pandemic abruptly slowed worldwide deliveries of GA aircraft in 2020, yielding a 12.9% (476 aircraft) decrease compared to 2019. In the same period, business jets declined by 10.3% (66 aircraft), turboprops by 13.0% (84 aircraft), and helicopters by 21.3% (151 aircraft), while piston-powered aircraft declined by less than 1% (3 aircraft). 2021 deliveries show signs of recovery with total civil aircraft deliveries up 13.4% (431 aircraft).

The FAA performs an annual assessment of U.S. civil aviation through its FAA Aerospace Forecast. The 20-year forecasts are updated annually by evaluating recent events and established trends affecting a wide range of commercial and GA segments. Broad economic conditions and current forecasts are examined in order to provide reasonable expectations for aviation within the broader U.S. and global economy. The FAA forecasts examine in detail several key aviation industry indicators including fuel prices, production and supply; aircraft manufacturing trends; aircraft ownership trends; fleet and pilot attrition; flight training trends; advances in fuel, engine, avionics, and airspace technology (ADS-B NextGen, etc.); and on-demand air travel. This array of factors is reflected in the FAA's overall assessment of future U.S. aviation activity. The 2021-2041 forecast factored in the impacts of the COVID-19 pandemic (through spring 2021) in both historical data and forecasts.

As depicted in **Figure 3-1**, the active U.S. GA fleet has fluctuated within a slight overall decline since 2001. This trend coincides with other GA industry trends including annual aviation fuel consumption, hours flown, IFR enroute air traffic, operations at towered airports, active pilots, etc. The most recent downward trend, attributed to the pandemic, reflects a sharp decline in 2019 and 2020 data. The FAA 2021-2041 forecast predicts that the active GA aircraft fleet will grow at an average annual rate of approximately 0.1% between 2020 and 2041 (forecast assumptions summarized below).

FIGURE 3-1: U.S. GA FLEET



Source: FAA Long Range Aerospace Forecasts (FY 2021-2041)

Although the FAA maintains a modestly favorable long-term outlook for general aviation, many of the activity segments associated with piston engine aircraft and aviation gasoline (AVGAS) consumption are not projected to return to "pre-Great Recession" levels within the 20-year forecast.

Key takeaways from the FAA 2021-2041 Aerospace Forecast Highlights are summarized below:

Positive Activity Indicators

- Turbine aircraft (turboprop, turbojet, helicopter) fleet and hours flown will grow;
- Sport and Experimental aircraft fleet and hours flown will grow;
- Piston Rotorcraft fleet and hours flown will grow;
- Jet fuel consumption will grow;
- The number of active Sport, Airline Transport, Rotorcraft only, and Instrument rated pilots will grow;
- GA Enroute IFR air traffic will grow; and
- GA Operations at towered airports will grow.

Negative Activity Indicators

- Fixed-wing Piston aircraft fleet and hours flown will decline;
- AVGAS consumption will decline; and
- The number of active private and commercial pilots will decline.

Neutral Activity Indicators

- Overall GA fleet net growth is nearly flat over the next 20 years.

The cited measures of national general aviation activity (positive, negative, neutral) are intended to reflect the broad expectations defined by FAA, which have varying relevancy to Aurora State Airport. For example, Van's Aircraft, a leading aircraft kit manufacturer located at the Airport, reports nearly 11,000 aircraft kits have been completed and flown, with thousands more kits currently under construction. It is apparent that this manufacturing activity has directly affected activity at Aurora State Airport. A significant, and growing percentage of the single-engine aircraft based at the Airport are kit aircraft, certified by FAA in the experimental category.

It is recognized that trends experienced at individual airports often deviate from system wide trends, and generally reflect localized factors. In its current forecast, the FAA expects general aviation to experience modest growth overall. The FAA's annual growth assumptions for individual general aviation activity segments are summarized in **Table 3-2**.

TABLE 3-2: FAA LONG RANGE FORECAST ASSUMPTIONS (U.S. GENERAL AVIATION)

ACTIVITY COMPONENT	FORECAST AVERAGE ANNUAL GROWTH RATE (2021-2041)
Aircraft in U.S. Fleet	
Single Engine Piston Aircraft in U.S. Fleet	-0.9%
Multi-Engine Piston Aircraft in U.S. Fleet	-0.4%
Turboprop Aircraft in U.S. Fleet	0.6%
Turbojet Aircraft in U.S. Fleet	2.3%
Experimental Aircraft in U.S. Fleet	1.4%
Sport Aircraft in U.S. Fleet	4.0%
Piston Helicopters in U.S. Fleet	0.9%
Turbine Helicopters in U.S. Fleet	1.6%
Active GA Fleet (# of Aircraft)	0.1%
Active Pilots in U.S.	
Sport Pilots	2.7%
Private Pilots	-0.4%
Commercial Pilots	-0.1%
Airline Transport Pilots	0.7%
Instrument Rated Pilots	0.4%
Student Pilots (Indicator of flight training activity)	-- (See note 1)
Active GA Pilots (All Ratings, Excluding Student Pilots)	0.2%
Hours Flown in U.S.	
Fixed Wing Piston Aircraft	-0.7%
Fixed Wing Turbine Aircraft	2.6%
Rotorcraft Piston Aircraft	1.9%
Rotorcraft Turbine Aircraft	2.1%
Experimental Aircraft	2.7%
Light Sport Aircraft	4.5%
Total GA Fleet Hours	1.0%
Fuel Consumption in U.S.	
AVGAS (Gallons consumed - GA only)	-0.3%
Jet Fuel (Gallons consumed – GA only)	2.4%

Source: FAA Long Range Aerospace Forecasts (FY 2021-2041)
1. Change in FAA certificate expiration; now excluded from forecast

Recent Events Summary

This following section briefly summarizes several events that contribute to the current airport activity levels and the development of new forecasts.

AVIATION FUEL VOLUMES

Operator-reported fuel delivery data for aviation gasoline (AVGAS) and jet fuel flowage fees reported to ODAV, were reviewed for the 2016-2021 period. As indicated in **Table 3-3**, annual volumes for both fuel grades have fluctuated over the six-year period, although the split between jet fuel and AVGAS volumes is relatively consistent. During this period AVGAS, fluctuated between 8 and 13% of total fueling volume at Aurora State Airport. It is unclear specifically what factors may have caused the fluctuations. However, competition for fuel sales from other airports and the effects of the COVID-19 pandemic shutdowns may have impacted sales. In any case, there is no evidence of a correlation between fuel sales and airport activity, and therefore the forecast will not consider this metric.

TABLE 3-3: FUEL FLOWAGE (GALLONS)

	2016	2017	2018	2019	2020	2021	Total
Jet Fuel	933,527	896,058	1,050,306	929,453	893,989	1,055,344	3,769,806
AVGAS	107,900	134,397	150,515	117,445	79,196	92,808	481,553

Source: Oregon Department of Aviation

FLIGHT TRAINING

Flight schools are not required by FAA to report annual aircraft operations by airport. Although the ATCT aircraft operations counts do not distinguish between flight training activity and other air traffic operating in the vicinity of the Airport, Aurora ATCT staff were consulted to approximate the portion of local operations that are associated with flight training. In addition to the two locally based flight schools (with about 20 fleet aircraft combined), the Aurora ATCT manager indicates that aircraft from Hillsboro, Troutdale, and Twin Oaks airports operate at the Airport daily.

The Aurora ATCT manager estimates that 40 to 45% of the total aircraft operations at Aurora State Airport are related to flight training, noting that "Aurora State is so dynamic in its day-to-day operations and highly dependent upon the weather. This percentage may be higher in the summer months." It was also confirmed by the ATCT manager that most local operations at the Airport are flight training, and virtually all of those are runway related movements (touch and go, stop and go landings, etc.). The activity mix is consistent with historical ATCT operations counts and is reflected in the 2021 baseline operations total.

To get an idea of the current and future flight training activity at Aurora State Airport, the four most active flight schools at the Airport were identified and contacted for information regarding their current operations and plans for future growth. The schools contacted included Aurora Flight Training and Willamette Flight School, which operate out of Aurora State Airport, Hillsboro Aero Academy operating out of Hillsboro Airport, and Twin Oaks Flight Training out of Twin Oaks Airpark.

Aurora Flight Training and Willamette Flight School operate regularly out of Aurora State Airport since that is where they are based. Hillsboro Aero Academy and Twin Oaks Flight School do limited pattern work at Aurora State Airport as needed when conditions allow. Both operators estimated that approximately 5% of their training activities occur at Aurora State Airport. None of the surveyed schools maintain records of aircraft operations that take place at Aurora State Airport or any other airport they visit.

All of the contacted flight schools stated that they saw a large spike in student pilot activity in 2020, primarily due to factors related to the COVID-19 pandemic. During that time, students had extra disposable income from federal stimulus payments and a surplus of free time due to various shutdowns. Many new students in 2020 took advantage of both and started flight training. The schools also reported that 2021 levels largely leveled off compared to 2020 activity.

When asked about future plans for growth, the schools all indicated that they have no set plans to expand their business over the near term as they have no way of knowing how demand for flight training will change post-COVID-19.

FIXED BASE OPERATORS (FBO)

Aurora State Airport currently has two full service fixed base operators (Atlantic Aviation and Willamette Aviation Services) offering fuel, aircraft hangar and parking space, and aircraft maintenance services for a full range of general aviation and business aviation users. The current level of service reflects the Airport's ability to support the local based aircraft fleet and attract transient aircraft, including business aviation users in a highly competitive market.

SUMMARY OF RECENT ACTIVITY FORECASTS

The two most recent aviation activity forecasting efforts specific to Aurora State Airport were prepared in the 2012 Airport Master Plan Update and the 2019 Constrained Operations Runway Justification study. The 2012 Airport Master Plan used a 2010 base year with forecasts extending to 2030. The 2019 runway study used a 2018 base year with forecasts extending to 2038. The 2019 forecast was designed to be a minor update of the Airport Master Plan forecast with updated evaluations focused on the design aircraft and its associated runway length requirements. The 2019 forecast was also the first forecast supported by actual air traffic control tower operations counts. Both forecasts were prepared in the pre-COVID era.

The limitations associated with the availability and accuracy of aircraft activity data at Aurora State Airport have been described extensively in this chapter. The historical use of aircraft operations estimates before the availability of air traffic control tower counts and changes in the Airport's based aircraft counting methodology contributed to significant variability in both historical data and forecasts. The inability to establish fully quantifiable connections or meaningful comparisons between previous and current forecasts is also part of the historical record of evaluations conducted for the Airport. Looking forward, acknowledging previous forecast limitations provides important context related to the challenges of creating updated aviation activity forecasts where significant data limitations exist.

2012 Aurora State Airport – Airport Master Plan Update

The preferred based aircraft forecast projected an increase from 354 to 464 aircraft over the 20-year planning period. This forecast translates into a 1.36% average annual growth rate and a net increase of 110 aircraft. The preferred aircraft operations forecast projected an increase from 90,909 to 124,386 annual operations over the 20-year planning period. This forecast translates into a 1.58% average annual growth rate for the forecast period. The forecast identified the existing and future design aircraft as high performance medium business jets (IAI Astra and Cessna Citation X), both of which have Airport Reference Code C-II (ARC C-II) designations.

The 2012 Airport Master Plan forecasts were developed before the addition of the ATCT at the Airport. As result, baseline and forecast annual aircraft operations were based on estimates. These data were later found to have inadvertently overestimated activity when compared to actual aircraft operations counts logged by the ATCT. As noted elsewhere in the master plan, any estimates of air traffic for the Airport that pre-date the ATCT are not considered reliable or relevant for comparison. Similar issues are found with based aircraft data related to previous counting methods.

2019 Aurora State Airport – Constrained Operations Runway Justification Study

The preferred based aircraft forecast projected an increase from 349 to 561 aircraft over the 20-year planning period. This forecast translates into a 2.4% average annual growth rate and a net increase of 212 aircraft. The preferred aircraft operations forecast projected an increase from 66,153 to 112,200 annual operations over the 20-year planning period. This forecast translates into a 2.68% average annual growth rate for the forecast period. The forecast identified the existing and future design aircraft as ARC C-II medium business jet.

FAA Terminal Area Forecast

The 2020-2045 Terminal Area Forecast (TAF) of based aircraft and aircraft operations for the Airport was described earlier in the chapter. The TAF based aircraft forecast projects an increase from 346 to 554 aircraft over the 26-year forecast period (2019-2045). This forecast translates into a 1.09% average annual growth rate and a net increase of 208 aircraft. The TAF aircraft operations forecast projects an increase from 61,127 to 69,063 annual operations over the 26-year period. This forecast translates into a 0.47% average annual growth rate for the forecast period. The recommended airport master plan forecasts will be compared to the current TAF as part of the FAA review and approval process. Significant deviations from the TAF must be adequately documented for FAA forecast approval.

Oregon Aviation Plan V6.0 Model

The current Oregon Aviation Plan (OAP v6.0) was adopted in 2019 and provides long term aviation activity forecasts for all general aviation airports in the state. The OAP v6.0 relied on FAA TAF data for the 2015 baseline and its forecast horizon was 2015-2035.

The OAP v6.0 preferred based aircraft forecast annual growth rate was 1.1%. For Aurora State Airport, this model translated into increase from 346 to 421 based aircraft over the 20-year forecast period (+75 aircraft). The preferred aircraft operations forecast annual growth rate was 0.9%. For Aurora State Airport, this model translated into increase from 94,935 to 113,231 annual operations over the 20-year forecast period.

CHANGES IN DATA SOURCES AND METHODOLOGY

Several improvements in data sources, verification and methodology have occurred since the previous master plan was completed in 2012. The changes provide a more accurate definition of airport activity than presented previously. These changes, described below and in Chapter 2, are incorporated into the 2021 airport activity data that is the baseline for new 20-year aviation activity forecasts.

The updated data provides a more accurate picture of current activity at Aurora State Airport, and therefore the ability to develop more reliable long-term aviation activity forecasts. However, it is important to recognize that the recent improvements in data accuracy reduces the ability to draw definitive conclusions when comparing to previously-reported estimates or forecasts. As a result, it is recommended that the new aviation activity forecasts be reviewed using consistent data sources and the assumptions defined in each forecast model, rather than a comparison to previous forecasts.

BASED AIRCRAFT COUNTING METHODOLOGY

The FAA's method of monitoring an airport's based aircraft fleet has improved in recent years. Airport owners are now required by FAA to regularly update their locally-based aircraft totals through verification and submittal of validated counts through the FAA National Based Aircraft Inventory Program (www.basedaircraft.com). The coordinated reporting eliminates duplicated (aircraft counted at more than one airport) and inactive aircraft. The regular reporting also allows more opportunities to review and validate aircraft. Inactive aircraft can be added to an airport's validated count when reactivated in the FAA's system.

In late 2021, the ODAV State Airport Manager reviewed the based aircraft count for Aurora State Airport, previously updated in 2018. The evaluation was completed in consultation with the FAA Seattle Airports District Office in December 2021, and resulted in a new validated count of 281 based aircraft. The previous count was 349 based aircraft 2018. The reduction in the Airport's based aircraft total reflects a more precise verification of aircraft and removal of previously-counted aircraft located at two private heliports adjacent to Aurora State Airport.

The 2022 validated based aircraft count included the following adjustments to the previous inventory:

- Added new aircraft not previously entered (or assigned to the Airport) in the database;
- Removed aircraft that could not be physically verified on site;
- Removed aircraft that were also reported by other airports and could not be verified on site for 6+ months per year;
- Removed aircraft without current FAA registrations or airworthiness certificates; and
- Removed aircraft (21 helicopters) located at the nearby Columbia Helicopters Heliport (FAA Identifier: OR68) and the HTS Aurora Heliport (FAA Identifier: OR24).

Based on FAA facility criteria, it was determined that the two private heliports operate independently from Aurora State Airport since their aircraft do not require access to the runway-taxiway facilities. Historically, these aircraft have been included in previous airport master plan forecasts and data sets. Based on current FAA guidance, the off-airport aircraft at OR68 and OR24 are not be reflected in baseline data or new airport master plan forecasts for Aurora State Airport. In addition to the adjustment in based aircraft numbers, the Airport's ATCT aircraft operation counts were adjusted to reflect the separation of on- and off-airport activity that share the designated Class D controlled airspace. Additional information on ATCT operations adjustments is provided later in this chapter.

The current split between aircraft located on airport property and on adjacent privately-owned property with TTF access agreements was verified in the updated validated count. Both on-airport and TTF aircraft are included in the Airport's current and historical FAA validated counts since they all rely on the runway-taxiway system for their flight operations. It is noted that the FAA does not normally consider TTF aircraft as "based aircraft" at the airports they access and utilize. However, due to the fact that the TTF at Aurora State Airport do not have to cross a fence to enter the airfield and that the TTF facilities are seamlessly integrated with the Airport, the FAA has in this one instance, approved the TTF aircraft at Aurora State Airport has based aircraft. As noted earlier, helicopters located at the two private heliports adjacent to the Airport are not "TTF aircraft" and they are not included in current based aircraft counts for the Airport. This accounting is consistent with current FAA guidance, and it is a change from the previous FAA-accepted counting methodology used at the Airport. Prior to this airport master plan, these (non-TTF) helicopters were included in based aircraft counts for Aurora State Airport.

The new validated based aircraft count for the Airport was approved and accepted by FAA in January 2022. The FAA requires the January 2022 validated count (281) to serve as the common baseline for all based aircraft forecast models in the Airport Master Plan. Other existing FAA data sources reporting based aircraft (5010-1 Airport Record Form, Terminal Area Forecast, etc.) will be updated for consistency with the current validated count.

TABLE 3-4: BASED AIRCRAFT AND FLEET MIX

Aircraft Type	On-Airport	TTF	Total
Single Engine	45	175	220
Multi Engine	1	14	15
Jet	3	33	36
Helicopter	1	9	10
Total	**50**	**231**	**281**

Source: National Based Aircraft Inventory – January 2022

The January 2022 validated based aircraft count for Aurora State Airport is summarized in **Table 3-4**. The summary includes a breakdown of aircraft by types, consistent with FAA data reporting. Additional information on aircraft types and categories is provided on the following page. The FAA National Based Aircraft Inventory Program report (January 2022) for the Airport is provided in **Appendix 7**.

NATIONAL BASED AIRCRAFT INVENTORY HISTORY

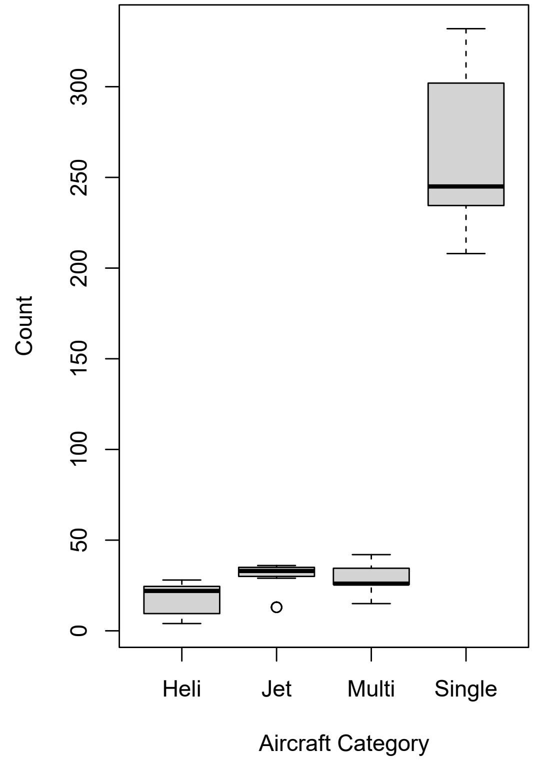
During its Spring 2023 review of the preliminary aviation activity forecasts presented in Working Paper No. 1, the FAA provided an 11-year summary (2013-2023) of Aurora State Airport based aircraft counts, as reported and validated in the National Based Aircraft Inventory Database, more commonly known as BasedAircraft.com. The historical summary of individual reports provided a complete timeline of data recorded in the FAA's internal system. Data detailing the on-airport versus TTF splits over the historical period are not available and are not included in the following summary.

The counts for each year are points in time, representing January 1st of each year. The 2021 base year count discussed above began in December of 2021 and was finalized on January 12th, 2022. The validated totals that came out of that count were assumed to reflect the end of year conditions at the airport and were applied to the 2021 calendar year. It should also be noted that BasedAircraft.com counts are constantly being updated as airports around the nation report changes to their fleets. If an aircraft is reported as based at more than one airport, that aircraft is removed from the validated count of both airports until additional evidence is provided to show at which facility the aircraft meets the criteria to be considered a based aircraft. Due to these factors, the totals reported for the forecast base year do not exactly match the results of the ODAV count that was finalized on January 12, 2021. However, the counts, with some adjustments to be described below, are the most complete and accurate record of based aircraft available and will serve as an excellent dataset from which to perform trend analysis, a process that will be described later in this chapter.

National Based Aircraft Inventory History Data Adjustments

Two adjustments were made to the raw data prior to developing trends. The first was to remove helicopters located at the two neighboring off-site facilities (OR68 and OR24). It was determined during the 2021 based aircraft count completed by ODAV at the end of that year, that there were 21 helicopters counted as Aurora State Airport-based aircraft prior to updating the count at the end of that year. Those 21 helicopters were removed from the BasedAircraft.com inventory for Aurora State Airport. The correction is reflected in the FAA-provided history in 2022 and 2023 counts (due to January 1 timing for each year). Both OR24 and OR68 have operated since at least 2013. Detailed helicopter counts for each facility are not available prior to 2021. Since there is no better information available, it is assumed that both OR24 and OR68 based similar numbers of aircraft annually over that period, and 21 helicopters were subtracted from the validated inventory for each year prior to 2022.

FIGURE 3-2: BASED AIRCRAFT BY CATEGORY



The second adjustment concerns jet aircraft. The number of jets reported at Aurora State Airport increased dramatically from 13 in 2013 and 2014 to 34 in 2015, a 162% increase. It was hypothesized that the sudden increase was related to the construction of the ATCT in 2015. While the ATCT was not operational until the third quarter of 2015, it's reasonable to expect that additional jets would begin arriving at the Airport in the months preceding in anticipation of the increased operational capability and improved safety that the tower would bring. Assuming that was the case, jet counts prior to 2015 may be identified as outliers and removed from the analysis, as they reflect a different operating environment that is not representative of the greater dataset.

To determine if there were any outliers in the dataset, an outlier analysis was performed across all aircraft classifications. The interquartile range (IRQ) was calculated for each classification. IQR is a measure of variability based on dividing a dataset into quartiles. Quartiles divide an ordered data set into four equal parts. The divisions between these parts are known as first, second, and third quartiles (Q1, Q2, and Q3). The distance between Q1 and Q3 is the IRQ. Data points that fall more than 1.5*IQR below Q1 or 1.5*IQR above Q3 are considered outliers and may be excluded from analysis, as they may be impacted by external factors unrelated to the rest of the dataset.

The results of this analysis are often summarized in a box plot. Box plots are a simple way to quickly summarize the distribution of a dataset and identify any outliers. In a box plot, the boxes represent the IQR, the T-bars, commonly called 'whiskers', represent Q1 – 1.5*IQR and Q3 + 1.5*IQR. Points that fall outside of these whiskers are outliers. A box plot developed for the Aurora State Airport based aircraft counts is shown in **Figure 3-2**.

The outlier analysis showed that the jet counts reported for 2013 and 2014 are statistical outliers compared to other years. It should be noted that a data point identified as an outlier should not simply be automatically removed based on this analysis alone. Investigators should also examine the greater context of the dataset and should only remove data if a reasonable explanation can be suggested. In this case, considering the context of the ATCT coming online at the same time, it is reasonable to conclude that the 2013 and 2014 jet counts reflect the conditions of a different operating environment. As such, the 2013 and 2014 jet counts were excluded from the dataset. The raw and adjusted BasedAircraft.com annual counts are summarized in **Table 3-5**.

TABLE 3-5: NATIONAL BASED AIRCRAFT INVENTORY VALIDATED COUNTS‡

	2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023	
	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj	Raw	Adj
Single Engine*	245	245	242	242	332	332	322	322	318	318	235	235	234	234	286	286	278	278	208	208	217	217
Multi Engine**	26	26	25	25	42	42	41	41	41	41	28	28	26	26	26	26	26	26	15	15	15	15
Jet	13	13	13	13	34	34	33	33	31	31	29	29	35	35	36	36	33	33	35	35	36	36
Helicopter	25	4	25	4	46	25	44	23	43	22	37	16	46	25	49	28	45	24	9	9	10	10
Total	309	288	305	284	454	433	440	419	433	412	329	308	341	320	397	376	382	361	267	267	278	278

Source: Century West Engineering developed FAA-provided National Based Aircraft Inventory Data
‡ The totals presented reflect the validated counts on January 1 of each year.
* Includes SETP, LSA, and SE Experimental Aircraft
** Includes METP

HISTORICAL OPERATIONS DATA CHALLENGES

Ideally, when developing operations forecasts a robust set of historical data are available from which to base or compare forecast models. Unfortunately, this is not the case at Aurora State Airport. This lack of a representative operational history creates challenges in developing accurate forecast models.

The Airport ATCT has been in operation and recording activity since October 2015, which results in six complete years of operations counts between the opening of the tower and the AMP base year (2021). Generally, at least 10 years of data are preferred to develop 20-year forecasts.

In addition to the short history of available data, several significant events appear to have skewed the data. First, the adjusted ATCT recorded counts show a 20% single-year increase in operations between 2016 and 2017 and an 8% increase between 2017 and 2018. These annual growth rates far surpass what would be expected for an airport like Aurora State Airport under normal conditions. It could be reasonably surmised that the sharp growth over the two-year period was related to the ATCT coming online, which contributed to increased demand for aircraft preferring to operate in the Airport's controlled airspace environment.

Second, the data show significant variability in 2020 and 2021 due to the impacts of the COVID-19 pandemic and the subsequent recovery. As discussed previously, local area flight schools reported a notable increase in flight training activity in 2020, which was partly attributed to an increase in existing and potential students' free time when normal workplace routines were disrupted. An increase in disposable income during this period related to a variety of stimulus payments is also believed to have contributed to increased flight training activity. At the same time, business air traffic activity decreased due to limited operations and shutdowns which resulted in a 6% decrease in itinerant GA traffic and a 32% decrease in air taxi activity. The inverse was observed in 2021 as businesses and employees returned to normal operations. During that time, flight training activity leveled off as noted by the interviewed flight schools, and business aircraft activity surged with itinerant GA activity increasing by 15% and air taxi activity increasing by nearly 78%

No matter the specific reason for these dramatic increases in operations at Aurora State Airport, it is evident that these three years – accounting for 50% of the available historical data – are not representative of the typical operating environment at Aurora State Airport and as such, the historical ATCT counts should not be used to develop trends from which to forecast future activity.

Single-Engine Piston (SEP) and Turboprop (SETP)

SEP aircraft have one piston-powered engine. SETP aircraft have one turbine powered engine used to drive the aircraft's propeller. Both types of aircraft are generally small and often used for flight training and recreational flying but may be used for municipal business trips. SETP aircraft are also commonly used by air ambulance (medevac) and air cargo service providers. Depending on weight and operator certification, these aircraft generally require only one pilot. Single-engine piston and turboprop aircraft are included in the "Single Engine" category on the FAA 5010-1 Airport Master Record Form and the FAA National Based Aircraft Inventory Program.

Multi-Engine Piston (MEP) and Turboprop (METP)

MEP/METP aircraft have two or more engines and are typically larger than SEP/SETP aircraft. Multiple engines make the aircraft more capable and require additional flight instruction beyond what is needed to operate an SEP/SETP aircraft. MEP aircraft are primarily used for personal travel, flight training, and business aviation. METP aircraft are used extensively in business aviation. Most MEP/METP aircraft may be operated with one pilot, but some larger aircraft may require two pilots. MEP/METP aircraft are included in the "Multi Engine" category on the FAA 5010-1 Airport Master Record Form and the FAA National Based Aircraft Inventory Program.

Jets

Jet aircraft have one or more turbofan/turbojet engines instead of a piston or turboprop engine. These aircraft range in size from small, four-passenger business jets to the largest airliners. They can generally fly faster and at higher altitudes than piston and turboprop aircraft, providing service capabilities (range, speed) comparable to commercial airliners. Some civilian jets are certified for single-pilot operation, although the majority of jet models require two pilots.

Helicopter

Helicopters have one or more rotors mounted above the cabin for lift and propulsion. Helicopters are commonly used for aerial firefighting, law enforcement, emergency response, medical evacuation (MEDEVAC), flight training, and aerial inspection (pipeline, forestry, aerial agriculture, etc.). Helicopters may be piston- or turbine-powered, and depending on the complexity of the model, can be operated by one pilot or two.

Other

Some aircraft that are included in the categories noted above may further categorized by FAA based on their design category or type certificate.

- Experimental aircraft refer to kit airplanes built by users or third parties other than the original manufacturer. Experimental aircraft share many characteristics with SEP aircraft; the key differentiator is how and where the aircraft is assembled. These aircraft are commonly included in the "Single Engine" category in FAA airport records (5010, Based Aircraft Inventory), rather than "Other."
- Sport aircraft (also referred to as Light Sport Aircraft, or LSA) are airplanes that have a specific weight and maximum speed in level flight. Sport aircraft require less training and a less strict medical certificate to pilot the aircraft. These aircraft are listed in the "Single Engine" category in FAA 5010 airport records.
- Gliders are unpowered aircraft that are towed into flight and use thermal uplift to sustain altitude. Powered gliders are equipped with engines and are capable of takeoff without the aid of tow plane. These aircraft are listed in the "Gliders" category in FAA 5010 airport records.
- Ultralight aircraft weigh less than 155 pounds and do not require the pilot operating the aircraft to have a private pilot's license or medical certificate. These aircraft are listed in the "Ultralights" category in FAA 5010 airport records.

Source: Century West Engineering, FAA and industry terminology.

ANNUAL AIRCRAFT OPERATIONS

The addition of an ATCT at Aurora State Airport in October 2015 provides actual counts of aircraft takeoffs and landings during the 13 hours (0700 to 2000 hours - local) of daily operation. Overall aircraft operations data presented in the last Airport Master Plan were estimated and supplemented with limited instrument flight plan data. The ability to accurately estimate aircraft operations is greatly improved with actual data accounting for the majority of flight activity.

As described in Chapter 2, the 2021 baseline aircraft operations total was developed using actual air traffic control tower counts, with two specific adjustments. First, an adjustment was made to account for aircraft activity occurring during non-ATCT operating hours (2000 to 0700). Based on methods described in Chapter 2, off-hours IFR activity was estimated to account for 14% of annual operations, and off-hours VFR activity was estimated to account for 5% of annual operations. Combined, total estimated off-hours operations accounted for 6.4% of 2021 activity.

A second adjustment was made to eliminate helicopter operations for the two adjacent private heliports. The movement of these aircraft in and out of the Airport's controlled airspace is captured in the operations counts for Aurora State Airport because the traffic is handled by the ATCT. However, separating the activity from Aurora State Airport runway operations is appropriate since the aircraft do not actually takeoff or land on the Airport. Based on standard FAA air traffic control procedures, ATCT operations counts do not distinguish between fixed-wing aircraft and helicopters.

As noted earlier, annual operations estimates were requested from both off-airport private heliport operators. Each operator estimated between 200 and 300 annual operations were generated at their individual facilities, yielding a total of approximately 600 annual operations. However, in later discussions, the ATCT manager estimated the off-airport helicopter activity to be closer to 3% of total ATCT-logged itinerant operations for the Airport (approximately 1,200 operations in 2021). The planning team determined that the higher ATCT estimate should be used to ensure that all off-airport helicopter operations were identified and removed from the Airport's operations totals. A reduction of 3% was applied to itinerant operations as reported by the OPSNET Airport Operations Report to account for the helicopter flight activity associated with the two adjacent heliports.

Detailed breakdowns of VFR and IFR operational splits were developed from these data, for use in forecasting future activity.

Table 3-6 summarizes adjusted annual (calendar year) aircraft operations for Aurora State Airport for the historical period (2016- 2021). For consistency in data, the adjustments described above were applied retroactively to the historical years coinciding with the operation of the air traffic control tower. The 2016-2021 period presented represents all full-calendar year data available from the opening of the tower (October 2015) the forecast base year (2021). Operations data prior to this period are based on estimates and are not considered reliable.

TABLE 3-6: AURORA STATE AIRPORT HISTORICAL ATCT OPERATIONS COUNTS (ADJUSTED CALENDAR YEAR DATA)

	Annual Aircraft Operations											
	2016		2017		2018		2019		2020		2021	
Itinerant	Raw	Adj*	Raw	Adj*	Raw	Adj*	Raw	Adj*	Raw	Adj*	Raw	Adj*
Air Taxi	2,040	2,194	2,163	2,319	1,980	2,121	1,567	1,670	1,061	1,129	1,885	2,006
General Aviation	30,909	32,174	32,291	33,502	34,390	35,665	32,583	33,638	30,680	31,621	35,308	36,390
Military	246	265	186	199	259	277	100	107	36	38	74	79
Subtotal	33,195	34,633	34,641	36,020	36,629	38,063	34,252	35,415	31,777	32,788	37,267	38,475
Local												
General Aviation	15,053	16,191	23,391	25,075	26,145	28,011	28,566	30,453	34,154	36,333	35,221	37,488
Military	129	139	120	129	229	245	32	34	18	19	61	65
Subtotal	15,182	16,330	23,511	25,204	26,374	28,256	28,598	30,487	34,172	36,352	35,282	37,553
Total	48,377	50,963	58,152	61,223	63,003	66,320	62,850	65,902	65,949	69,140	72,549	76,028

Source: Century West Engineering developed using FAA OPSNET (Airport Operations) Data

INSTRUMENT FLIGHT PLAN (TFMSC) DATA

A 10-year summary of instrument flight plan data at Aurora State Airport gleaned from FAA Traffic Flow Management System Counts (TFMSC) records is provided in **Table 3-7**. The FAA TFMSC provides detailed, aircraft-specific data for flight plan filings and aircraft movements. TFMSC data provides a reliable accounting of instrument flight plans filed to and from an airport and includes relevant aircraft-specific data such as type, ADG, and ARC. However, TFMSC data only includes operations that have an active instrument flight plan filed on arrival or departure to/from the facility. This caveat means that operations by aircraft that choose to cancel their flight plan prior to arrival and arrive VFR, or aircraft that depart the airport VFR and file a flight plan enroute are not included in the count. To account for those operations, FAA directs[2] planners to normalize the data by examining TFMSC-reported arrivals and departures, identify the higher of the arrival or departure count by aircraft type and multiply by two, effectively balancing arrivals and departures by aircraft type. This accounts for any operations performed under VFR and not included in the TFMSC data.

2 FAA AC-150/5000-17, Critical Aircraft and Regular Use Determination, Section 2.2

The 2012 Airport Master Plan update identified the current and future design aircraft to be a high-performance jet categorized as Aircraft Approach Category (AAC) C and Airplane Design Group (ADG) II. This finding was confirmed in the data review contained in the 2019 Constrained Operations Runway Justification Study. Further discussion of AAC and ADG and their roles in determining the critical aircraft for this airport master plan is presented in the Critical Aircraft section later in this chapter.

It should be noted that during the review of the TFMSC data, a small number of jet aircraft were found to not be assigned an AAC and ADG in the data and were instead included in the "Unknown" category. These aircraft were manually assigned AAC and ADG classifications based on data from the FAA Aircraft Characteristics Database and aircraft manufacturer provided data. Furthermore, operations by military aircraft were identified and excluded from the analysis.

TABLE 3-7: AURORA STATE AIRPORT INSTRUMENT FLIGHT OPERATIONS

TFMSC IFR Operations by AAC/ADG - Calendar Year Data											
AAC/ADG	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average Annual Operations
A-I	2,372	2,638	2,414	2,482	2,750	2,750	3,428	2,458	2,162	2,330	2,578
A-II	410	494	1,108	1,554	1,814	1,966	1,844	1,158	930	1,398	1,268
A-III	14	6	2	4	4	10	6	2	0	4	5
A-IV	0	0	0	0	0	0	0	0	0	0	0
B-I	1,498	1,368	1,422	1,194	1,198	1,126	1,134	1,190	1,024	1,154	1,231
B-II	2,222	2,232	2,214	2,620	3,270	3,110	3,152	3,798	3,448	4,182	3,025
B-III	0	0	0	2	0	2	4	8	2	0	2
B-IV	0	0	0	0	0	0	0	0	0	0	0
C-I	360	374	514	440	340	306	274	286	170	274	334
C-II	348	378	294	208	316	370	358	226	242	264	300
C-III	18	10	4	8	0	14	50	54	10	0	17
C-IV	0	0	0	0	0	0	0	0	0	0	0
C-V	0	0	0	0	0	0	0	0	0	0	0
D-I	2	8	16	0	4	6	8	4	0	12	6
D-II	4	0	4	0	2	6	2	8	26	84	14
D-III	6	10	4	2	6	8	4	0	4	6	5
D-IV	0	0	0	0	0	0	0	0	0	0	0
D-V	0	0	0	0	0	0	0	0	0	0	0
Unknown	446	390	380	388	504	376	366	472	442	572	434
Total	**7,700**	**7,908**	**8,376**	**8,902**	**10,208**	**10,050**	**10,630**	**9,664**	**8,460**	**10,280**	**9,218**
Operations by AAC C and D Aircraft	**738**	**780**	**836**	**658**	**668**	**710**	**696**	**578**	**452**	**640**	**676**
Operations by ADG II and Larger	**3,022**	**3,130**	**3,630**	**4,398**	**5,412**	**5,486**	**5,420**	**5,254**	**4,662**	**5,938**	**4,635**

Source: FAA TFMSC Report - 4/14/2022 (Aurora State Airport)

TERMINAL AREA FORECAST

The FAA Terminal Area Forecast (TAF) for Aurora State Airport, published May 2021, provides historical and forecast data for the period 1990-2045. Current and historical TAF based aircraft and operations data for the Airport share many of the data collection issues described earlier. Accordingly, the historical TAF activity data for Aurora State Airport are not considered accurate enough to draw reliable conclusions related to current activity data. Historical (2000-2020) TAF based aircraft and annual aircraft operations data are presented in **Figures 3-3 and 3-4**. The 2021 baseline activity levels for based aircraft and operations are depicted for reference.

FIGURE 3-3: HISTORICAL TAF – BASED AIRCRAFT

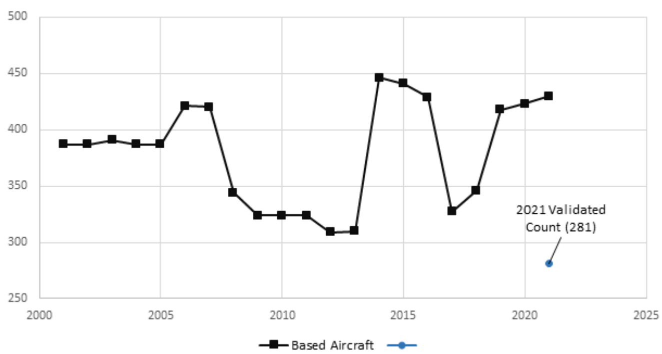
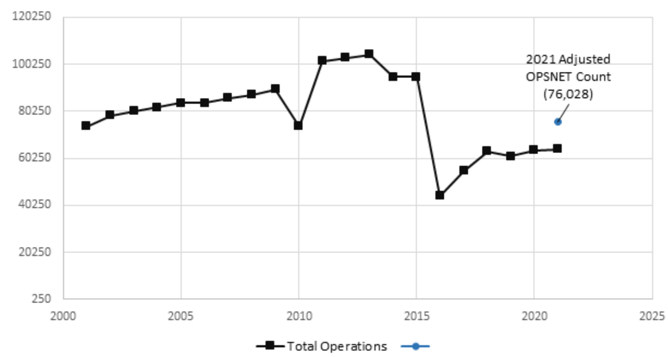


FIGURE 3-4: HISTORICAL TAF – ANNUAL AIRCRAFT OPERATIONS



Source: FAA TAF 2000-2045 (Aurora State Airport) www.taf.faa.gov

COMMUNITY PROFILE

Historical population and economic data for the region was presented in Chapter 2. Long term population and economic forecasts are summarized in **Tables 3-8 and 3-9**. These data are used by local government to project future demand for services, housing, and to effectively manage growth as required by the State of Oregon land use planning law. The forecast population and economic growth within the service area for Aurora State Airport is expected to contribute to increased aviation demand the master planning horizon.

Table 3-8 summarizes the 2021 Portland State University - Population Research Center (PRC) population forecast for the 2021-2041 period that corresponds to the Airport Master Plan. The PRC forecasts are prepared annually. The 2021 forecasts presented were prepared during the second year of the COVID-19 pandemic and account for pandemic-related impacts, as documented at the time. The county and statewide population forecasts for the local area generally project higher rates of annual growth over the next five years, followed by a slowing that accelerates near the end of the forecast horizon. The PRC forecast growth in Clackamas County and in Aurora exceed the projected statewide growth rate; the forecast growth in Marion County trails the forecast statewide growth rate. The City of Aurora urban growth boundary (UGB) population forecast projects annual growth averaging above 2% over the 20-year forecast.

TABLE 3-8: FORECAST POPULATION

	2021	2026	2031	2036	2041
Oregon	4,266,560	4,542,741	4,761,243	4,960,026	5,130,713
CAGR:	-	1.26%	0.94%	0.82%	0.68%
Marion County	347,182	373,010	387,806	399,722	409,506
CAGR:	-	1.45%	0.78%	0.61%	0.48%
Clackamas County	425,316	441,763	464,902	487,724	509,796
CAGR:	-	0.76%	1.03%	0.96%	0.89%
Aurora UGB	1,133	1,193	1,357	1,524	1,695
CAGR:	-	1.04%	2.61%	2.35%	2.15%

Source: PSU Population Research Center (PRC), 2021

Table 3-9 summarizes the current Woods & Poole Economics forecast gross regional product (GRP) for Marion and Clackamas County for the 2021-2041 period that corresponds to the Airport Master Plan. GRP measures the market value of all goods and services produced in the defined region. As indicated in the data, strong GRP growth is forecast over the long term, with a similar slowing near the end of the forecast horizon.

TABLE 3-9: FORECAST GROSS REGIONAL PRODUCT

	2021	2026	2031	2036	2041
Marion County (millions)	$16,761	$18,397	$20,107	$21,874	$23,688
Percent Change	-	9.76%	9.29%	8.79%	8.29%
					CAGR: 1.7%
Clackamas County (millions)	$21,172	$23,348	$25,652	$28,067	$30,590
Percent Change	-	10.28%	9.87%	9.42%	8.99%
					CAGR 1.9%

Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2021. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of Century West Engineering, Inc.

Current Aviation Activity

Current based aircraft and annual aircraft operations data for use in developing new aviation activity forecasts are presented in **Tables 3-10 and 3-11**. The 2021 baseline totals will be applied to all 2021-2041 airport master plan forecast models.

TABLE 3-10: BASELINE BASED AIRCRAFT (JANUARY 2022)

Aircraft Type	On-Airport	TTF	Total
Single Engine	45	175	220
Multi Engine	1	14	15
Jet	3	33	36
Helicopter	1	9	10
Total	**50**	**231**	**281**

Source: National Based Aircraft Inventory – January 2022

TABLE 3-11: BASELINE AIRCRAFT OPERATIONS (2021)

	2021
Itinerant	
Air Taxi	2,006
General Aviation	36,390
Military	79
Subtotal	**38,475**
Local	
General Aviation	37,488
Military	65
Subtotal	**37,553**
Total	**76,028**

Source: Century West Engineering developed using FAA OPSNET Data

2021-2041 Aviation Activity Forecasts

Several based aircraft forecast models were developed using a mix of FAA standard methodologies and other methods commonly used at GA airports with limited and/or unreliable operational activity data, such as is the case at Aurora State Airport to provide a range of projections for comparison. The models rely on a variety of data inputs to identify the most relevant projections. The resulting annual growth rates for all the forecasts are comparable to FAA-accepted growth rates for similar general aviation airports throughout the United States. A preliminary comparison of the models identified the most relevant models based on applicability with Aurora State Airport. Models determined to have less relevance or those that were redundant were discarded and were not included in the accompanying table or graph that identified the recommended forecast.

BASED AIRCRAFT

Seven preliminary based aircraft forecast models were developed during the initial forecasting exercise. Four of these models were discarded to identify the most appropriate projections for evaluation. Three based aircraft forecast models were presented in draft Working Paper No. 1, with annual average growth rates ranging from 0.2% to 1.7%.

During several rounds of coordinated review of Working Paper No. 1 with FAA, the Consultant revised the based aircraft forecast models to respond to specific FAA comments. The extended FAA review process resulted in three based aircraft models for final consideration. Two of the models (National Aerospace Forecast and FAA TAF Federal Contract Tower - Oregon) are maintained unchanged from the original preliminary forecasts and one new model was developed based on the Airport's historical validated based aircraft data reporting (2013 to 2023). One original model (Aurora Historical Hangar Development Trend) was discarded.

The final three preliminary based aircraft forecast models are presented in **Table 3-15** and depicted in **Figure 3-4**. Both can be found at the end of this section. The models reflect annual average growth rates ranging from -1.3% to 1.1%. The forecast models are applied to the 2021 based aircraft baseline (281) originally presented in draft Working Paper No. 1. Descriptions of the discarded forecast models are presented in **Appendix 8.**

National Based Aircraft Inventory Historical Trend Model – The historical validated National Based Aircraft Inventory counts discussed previously (see **Table 3-5**) were used to develop a bottom-up historical trend model for future based aircraft. Bottom-up models differ from top-down models as they begin by determining trends for the individual components of a fleet and forecast them independently to arrive at a sum-of-parts total for the entire fleet. Top-down forecast work in the opposite way, projecting the total fleet first and then dividing that total into the individual components. Generally, a bottom-up forecast provides a more granular view of the based aircraft forecast as it builds individually focused projections for each aircraft type based on how they have changed over time.

Best fit trend lines were calculated for each aircraft type as presented in the adjusted BasedAircraft.com dataset to identify individual historical growth rates for each class of aircraft. Those growth rates were projected forward through the planning period. The total based aircraft counts are the sum of the individual aircraft type estimates over time. This model results in an annual average growth rate of -1.3% The resulting projections of based aircraft are presented in **Table 3-12**.

This model provides a projection of future changes in the Airport's based aircraft fleet that is tied to historical airport-specific reporting. As noted earlier, the bottom-up methodology used in this model provides a reasonable projection that captures the unique trends (positive/negative) experienced at the Airport for each of the four main aircraft categories included in the FAA inventory (single engine, multi-engine, jet, helicopter). This method reflects relevant aircraft-specific trends within the larger data set, rather than applying a single composite rate to the overall based aircraft fleet.

TABLE 3-12: NATIONAL BASED AIRCRAFT INVENTORY HISTORICAL TREND MODEL

	CAGR	2021	2026	2031	2036	2041
Single Engine*	-2.0%	220	199	179	162	146
Multi Engine**	-6.1%	15	11	8	6	4
Jet	1.3%	36	38	41	43	46
Helicopter	3.2%	10	12	14	16	19
Total Based Aircraft	**-1.3%**	**281**	**260**	**242**	**227**	**215**

Source: Century West Engineering
* Includes SETP, LSA, and SE Experimental Aircraft
** Includes METP

Federal Contract Tower (Oregon) TAF Model – This model uses the 2020-2045 Terminal Area Forecast (TAF) Query Data for the group of Oregon airports with federal contract air traffic control towers. The evaluation of a group of operationally similar airports (GA Airports with Federal Contract ATCT facilities within the state of Oregon) provides a larger and more robust dataset, which in turn decreases variability within the data, from which to derive trends.

This model applies the Oregon Federal Contract Tower TAF forecast annual growth rates for total based aircraft to the Airport's baseline based aircraft count, and projected out for the 20-year planning period. The model is non-linear and year-over-year growth rates vary. The model assumes that the Airport's based aircraft fleet growth will be in line with state growth for airports with FAA contract air traffic control towers. The model results in an average annual growth rate of 1.1%. A breakdown of the individual aircraft types and the combined projected totals over the planning period are presented in **Table 3-13**.

This model provides a projection of future changes in the Airport's based aircraft fleet that is consistent with the trends defined by FAA for similar Oregon airports with contract air traffic control towers. Although the projection does not establish an historical statistical relationship between the Airport and the larger data set, this "grouping" method provides a reasonable projection for long term planning. The underlying assumption is that future activity within a group of similar airports that are located in a defined region will be similar, and that on the whole, this activity will be consistent with the FAA's broad expectations defined in its TAF.

TABLE 3-13: FEDERAL CONTRACT TOWER (OREGON) TAF MODEL

	CAGR	2021	2026	2031	2036	2041
Single Engine Piston	0.9%	216	229	240	250	259
Multi Engine Piston	0.0%	6	6	6	6	6
Turbo Prop	1.1%	13	14	15	15	16
Jet	2.3%	36	40	45	50	56
Helicopter	1.4%	10	11	11	12	13
Combined	1.1%	281	300	317	333	350

Source: Century West Engineering

National Aerospace Forecast (Weighted Airport Fleet Mix) Model – The use of an established FAA forecast provides a valid high-level indication of growth rates that is consistent with FAA national expectations for the GA aircraft fleet. More specifically, the adaptation of the FAA forecast recognized different growth expectations defined by FAA for specific aircraft types to tie the projections to the existing based aircraft fleet mix at the Airport.

This model applies the FAA's *National Aerospace Forecast FY 2021-2041* growth rates for each aircraft type to the Airport's existing fleet mix and projects out for the 20-year planning period. The linear projection assumes steady growth that does not change year-over-year during the 20-year forecast. The model accounts for growth differences between aircraft types by weighting rates with the Airport's fleet mix distribution. Aircraft types were summed to get total projected counts for each forecast year. The model assumes that the Airport's based aircraft fleet will grow in parallel to the national fleet. The model results in an average annual growth rate of 0.2%. A breakdown of the individual aircraft types and the combined projected totals over the planning period are presented in **Table 3-14.**

This model provides a reasonable projection of future changes in the Airport's based aircraft fleet that is consistent with the historical analysis and long-term trends defined by FAA for active general aviation and air taxi aircraft in the U.S. fleet. This method assumes that individual airport activity will not deviate significantly from the system-wide forecasts made by FAA that reflect a broad range of national economic and aviation industry factors.

TABLE 3-14: NATIONAL AEROSPACE FORECAST (WEIGHTED AIRPORT FLEET MIX) MODEL

	CAGR	2021	2026	2031	2036	2041
Single Engine Piston	-0.9%	171	163	156	149	142
Multi Engine Piston	-0.4%	6	6	6	6	6
Turbo Prop	0.6%	13	13	14	14	15
Jet	2.3%	36	40	45	50	56
Helicopter	1.4%	10	11	11	12	13
Experimental	1.4%	41	44	47	50	54
Light Sport	4.0%	4	5	6	7	9
Combined	0.2%	281	282	285	289	294

Source: Century West Engineering

RECOMMENDED BASED AIRCRAFT FORECAST

The recommended based aircraft forecast for Aurora State Airport is the **National Based Aircraft Inventory Historical Trend Model**. This model is based on a relatively long history (9 years for jets, 11 years for all other classes) of FAA validated aircraft counts for the Airport. The data were adjusted to account for observed irregularities using the best methods available. The forecast uses a bottom-up methodology, which is preferable when forecasting individual groups within a larger data set.

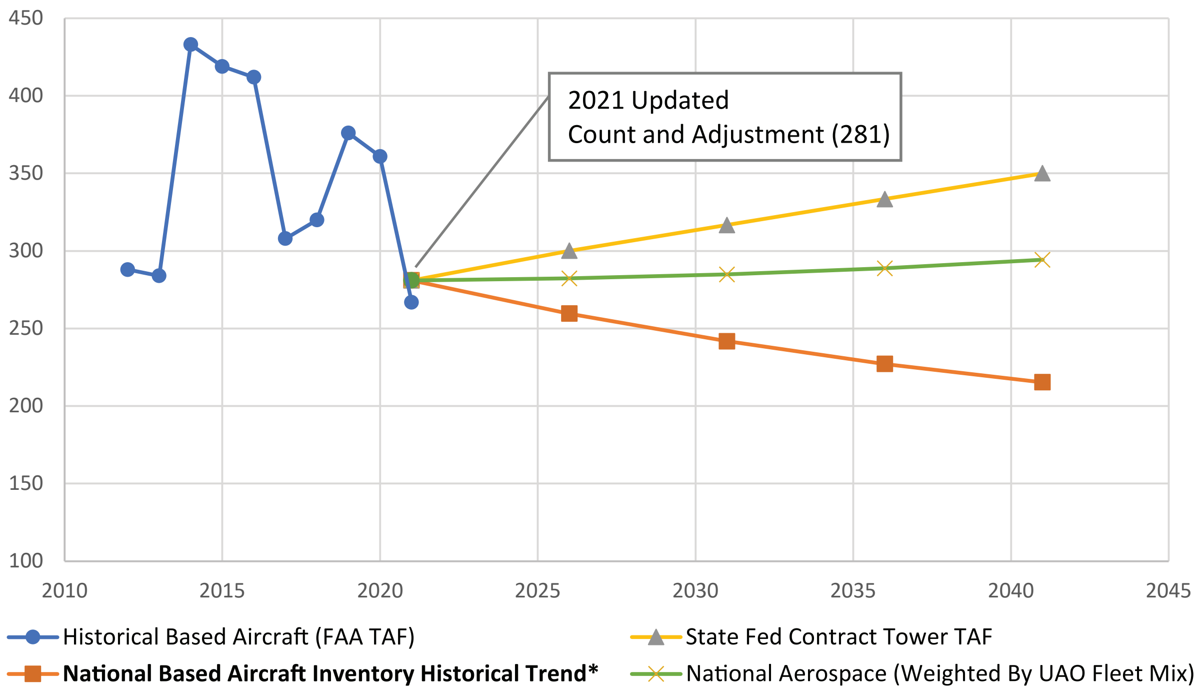
The recommended forecast has an overall growth rate of -1.3%, which results in a decline of 66 aircraft over the 20-year planning period. The decrease in total aircraft is driven primarily by a loss of single engine aircraft. Considering the Airport's constrained site, and limited available space for new hangar development – both on-airport and TTF – it is reasonable to expect that as more jets arrive at the Airport, the demand for higher priced, low density aircraft storage (hangars) to accommodate expensive jet aircraft will displace the lower-revenue producing, higher-density storage for small single engine piston aircraft. The based aircraft forecast models presented for consideration, including the recommended model, are summarized in **Table 3-15** and depicted in **Figure 3-5**.

TABLE 3-15: FORECASTS OF BASED AIRCRAFT

Based Aircraft Forecast Models	CAGR	2021	2026	2031	2036	2041
National Based Aircraft Inventory Historical Trend*	**-1.3%**	**281**	**260**	**242**	**227**	**215**
State Fed Contract Tower TAF	1.1%	281	300	317	333	350
National Aerospace (Weighted By UAO Fleet Mix)	0.2%	281	282	285	289	294

Source: Century West Engineering
*Recommended Based Aircraft Forecast

FIGURE 3-5: BASED AIRCRAFT FORECASTS



Source: Century West Engineering, FAA TAF, FAA National Aerospace Forecasts
Historical National Based Aircraft Inventory annual counts were reported for January 1 of each year. Those counts have been applied to the end of the previous year to match the timing of 2021 base year count.
*Recommended Forecast

Based Aircraft Fleet Mix

Understanding the current and projected composition (fleet mix) of the based aircraft fleet enables the Airport to understand the current and future facility needs of the local users. As the preferred forecast is a bottom-up historical trend model, individual aircraft types are projected across the planning period based on documented histories of the aircraft based at Aurora State Airport. It should be noted that historical based aircraft counts provided in the FAA's National Based Aircraft Inventory data are categorized as Single-Engine, Multi-Engine, Jet, and Helicopter. Single-engine turboprop, light sport, and experimental (fixed wing single-engine propeller). are included in the Single-Engine category, and multi-engine turboprop aircraft are included in the Multi-Engine category.

Table 3-16 summarizes the current and forecast fleet mix for the planning period. The based aircraft fleet mix at Aurora State Airport is expected to become slightly more diverse as it is anticipated that single-engine piston aircraft will be retired over time and/or replaced by jet aircraft as described previously. It is also reasonable to anticipate that a portion of the single-engine fleet is likely to be replaced by LSA or experimental kit aircraft, following national trends. The continued addition of locally based turbine-engine aircraft (turboprop, jet, helicopter, etc.) is also anticipated based on historic trends and the FAA's long term general aviation fleet forecast, which reflects the continued adoption of turbine engine technology.

TABLE 3-16: FORECAST BASED AIRCRAFT FLEET MIX

	CAGR	2021	2026	2031	2036	2041
Single Engine*	-2.0%	220	199	179	162	146
Multi Engine**	-6.1%	15	11	8	6	4
Jet	1.3%	36	38	41	43	46
Helicopter	3.2%	10	12	14	16	19
Total Based Aircraft	**-1.3%**	**281**	**260**	**242**	**227**	**215**

Source: Century West Engineering
* Includes SETP, LSA, and SE Experimental Aircraft
** Includes METP

AIRCRAFT OPERATIONS

Eleven preliminary aircraft operations forecast models were developed during the initial forecasting exercise. Six of these models were discarded to identify the most appropriate projections for evaluation. Five aircraft operations forecast modes were presented in draft Working Paper No. 1, with annual average growth rates ranging from 0.6% to 3.6%.

During several rounds of coordinated review of Working Paper No. 1 with FAA, the Consultant revised the aircraft operations forecast models to respond to specific FAA comments. The extended FAA review process resulted in four aircraft operations models for final consideration. Two of the models (National Aerospace Forecast and FAA TAF Federal Contract Tower - Oregon) are maintained unchanged from the original preliminary forecasts; two models (TFMSC and Marion County Population) were significantly revised; and one model (Aurora Historical ATCT Trend) was discarded.

The final four preliminary aircraft operations forecast models are presented in **Table 3-17** and depicted in **Figure 3-6**. The models reflect annual average growth rates ranging from 0.6% to 1.6%. The forecast models are applied to the 2021 aircraft operations baseline (76,028) originally presented in draft Working Paper No. 1. Descriptions of the discarded forecast models are presented in Appendix 8.

Hybrid TFMSC Itinerant/FAA National Aerospace Forecast GA Local Operations Model – An earlier iteration of this model began with a 20-year (2001-2021) trend of TFMSC instrument flight plan data for the Airport. It was intended to establish a projected growth rate for the period. This revised model assumed that future itinerant operations at the Airport will follow the 20-year trend defined for the Airport by available TFMSC data, and that growth in local operations at the Airport will be consistent with the FAA's 2022-2042 National Aerospace Forecast for airports with contract air traffic control towers. The use of the national forecast at Aurora State Airport is considered to provide a reasonable projection that is in line with broader FAA expectations for this type of general aviation activity. Itinerant and local splits were based on 2021 operations counts. Operational impacts experienced during the COVID-19 pandemic appear to dampen the overall trend. This early iteration yielded a reasonable correlation between the historical data to the derived trend line (R-squared = 0.72). The model resulted in an average annual growth rate of 2.4%.

Although the TFMSC 20-year trend is a good indicator of itinerant activity, local operations are not captured in the TFMSC data. Based on this consideration, it was determined the model should be augmented to account for local activity, which includes predominantly airport traffic pattern activity conducted in visual flight rules (VFR) conditions.

Normally at a towered airport such as Aurora State Airport, a trend analysis of historical ATCT local operations would provide a reasonable indication of future growth potential. However, two unique factors significantly limit the ability to generate reliable airport-specific trend analyses for this forecast:

1. Limited Data Range. The limited number of years of ATCT operations (2016-forward) provides a reliable indication of individual year historical activity but does not provide a sufficient span of time needed to define reliable trends to build future activity projections. This is highlighted within the overall ATCT data, where local operations have experienced several significant upward and downward fluctuations during this period.

2. COVID-19. The FAA recognizes that the COVID-19 pandemic and the ongoing post-COVID recovery have created significant forecast uncertainty throughout the U.S. civil aviation system that reduces the level of confidence normally associated with airport master plan forecasting. The impacts of COVID-19 on activity at Aurora State Airport are reflected in the ATCT historical operations counts noted above, and they contribute to annual data that fails to define a reliable trend that can be used to project future aircraft flight activity.

Since the ATCT opened, Aurora State Airport has experienced strong growth in local operations increasing at an annual rate of over 18% between 2016 and 2021. ATCT personnel interviewed as part of this study indicated that most of this growth can be attributed to flight training, specifically airport traffic pattern activity associated with flight training (touch and go operations, etc.). However, several factors were noted suggesting that recent growth is not sustainable at the current rate. ATCT personnel stated that they regularly deny access to the Class D (controlled) airspace to incoming aircraft due to congestion in the pattern and the need to accommodate other air traffic (e.g., inbound, outbound aircraft on instrument flight plans, etc.). This was further corroborated in interviews with flight school operators who stated that they have been denied access to the airspace by the ATCT due to congestion. Locally based flight schools also report that the ATCT will limit aircraft access to the traffic pattern (for touch and goes, etc.) for aircraft planning their flights from the Airport, when the area is congested.

To address the above-described issues, a new hybrid aircraft operations forecast model was developed that uses separate growth rates for itinerant and local operations. The individual rates are applied to the 2021 baseline local and itinerant operations totals to develop the 20-year forecast. The use of a hybrid model accounts for the distinction in local and itinerant operations commonly found at general aviation (GA) airports.

Itinerant operations are projected to increase at an average annual rate of 2.4% between 2021 and 2041. This growth rate reflects the long-term (2001-2021) historical trend defined for instrument flight plan-related operations at Aurora State Airport documented in the FAA TFMSC data.

Local operations are projected to increase at an average annual rate of 0.7% between 2021 and 2041. This growth rate is consistent with the FAA's 2022-2042 National Aerospace Forecast growth rate defined for General Aviation Local Operations at Airports with FAA and Contract Air Traffic Control Service. As noted above, the use of a national FAA forecast growth rate appears to be the best available method for projecting local aircraft operations at Aurora State Airport due to the strong fluctuations in local activity experienced at the Airport since the ATCT operation began, making localized trend analysis unreliable. The varied impacts in activity at Aurora State Airport that are generally attributed to the COVID-19 pandemic further underscore the inability to define reliable operations projections based on a limited range of data that experienced significant inconsistencies. This model results in an average annual growth rate of 1.6%.

This hybrid model combines airport-specific activity data and national trend data to reflect the distinctly different drivers of local and itinerant aircraft operations at the Airport. The trend analysis of TFMSC data provides a reasonable indication of future growth rates for itinerant activity at the Airport, including definition of the future critical aircraft. In contrast, the limited range of the Airport's available air traffic control tower (ATCT) operations data and the unprecedented fluctuations in activity that occurred during the period due to COVID-19, have the potential of significantly skewing any resulting projections. These limitations support the use of a broader measure of local flight activity contained in existing FAA national forecasts that can be combined with airport-specific (TFMSC) data that are not affected by ATCT data limitations.

Marion and Clackamas County Combined Population Growth Model – The use of regional socioeconomic conditions as an indicator of aviation activity at an airport is a generally accepted practice in instances where historical operations data are limited, such as at Aurora State Airport. The model assumes that total airport operations will track with the combined population of Marion and Clackamas Counties.

The Airport is located in Marion County, less than a mile from the Marion/Clackamas County boundary, and over 75% of the 30-minute drive time service area (see Figure 2-2) is in these counties. It is reasonable to assume that the combined population of Marion and Clackamas Counties may serve as a representative surrogate for operations at Aurora State Airport since population in the area indicates the number of persons served by the Airport, and therefore the potential customer base utilizing airport services including air taxi, flight training, and general GA services.

The model combines the Portland State University (PSU) Population Research Center (PRC) population forecasts for Marion and Clackamas Counties over the planning period. The compound average growth rate of the combined dataset was calculated and applied to the Airport's 2021 baseline aircraft operations total. The model results in an average annual growth rate of 0.9%.

This model provides a projection of future aircraft operations that effectively mirrors the forecast population growth for the two primary counties in the Airport's service area. Although limited airport operations data prevents more complex statistical analyses, in broad terms, the relationship between community growth and airport activity is generally consistent. The model assumes that changes in airport activity will be similar to the anticipated growth in the local area.

National Aerospace Forecast Operations (Airports with ATCT) – This model applies the *National Aerospace Forecast FY2021-2041* "Total Combined Aircraft Operations at Airports with FAA and Contract Traffic Control Service" forecast 2021-2041 growth rates for all aircraft categories to the Airport's baseline operation counts and projects out 20 years. This model assumes that airport operations will grow at a rate similar to forecast population growth within its primary service area. Resulting operations by aircraft type were summed to get total operations for each year in the forecast. Aircraft categories were combined into Local and Itinerant totals based on the splits from baseline. The model assumes that the Airport operations will mirror national trends. The model results in an average annual growth rate of 0.8%.

This model provides a reasonable projection of future changes in the Airport's annual aircraft operations that is consistent with the historical analysis and long-term trends defined by FAA for towered airports in the U.S. fleet. This method assumes that individual airport activity will not deviate significantly from the system-wide forecasts made by FAA that reflect a broad range of national economic and aviation industry factors.

Federal Contract Tower TAF State (Oregon) Model – This model applies the Oregon Federal Contract Tower TAF forecast annual growth rates for aircraft classifications to Aurora State Airport's baseline operations counts (using the same classifications) over the 20-year period. The model assumes that operations at the Airport will be consistent with FAA's Terminal Area Forecast (TAF) for Oregon airports with contract air traffic control towers. This model provides a more focused regional assessment within the TAF, compared to the TAF national model for contract tower airports, as these airport are the most operationally similar to Aurora State Airport in the state. The model is non-linear and year-over-year growth rates vary. The model assumes that the Airport's operations will mirror state trends. The model results in an average annual growth rate of 0.6%.

This model provides a projection of future changes in the Airport's annual aircraft operations that is consistent with the trends defined by FAA for similar Oregon airports with contract air traffic control towers. Similar to the contract tower model used for based aircraft forecasting, this projection does not establish an historical statistical relationship between the Airport and the larger data set, although it does provide a reasonable projection for long term planning. The underlying assumption is that future activity within a group of similar Oregon contract towered airports will be similar, and that on the whole, this activity will be consistent with the FAA's broad expectations defined in its TAF.

RECOMMENDED AIRCRAFT OPERATIONS FORECASTS SUMMARY

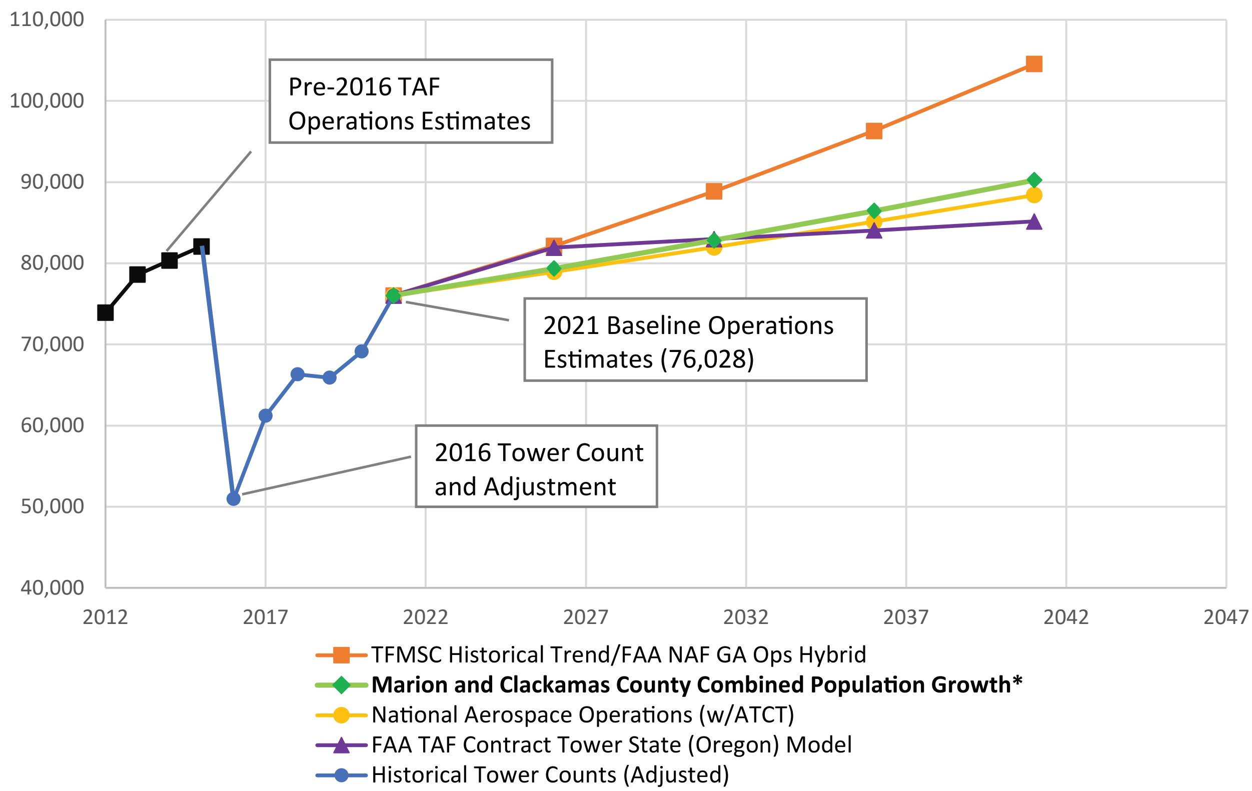
The Marion and Clackamas County Combined Population Growth Model is the recommended aircraft operations forecast for the 2021-2041 Aurora State Master Plan. In lieu of representative operational data specific to the Airport, population growth forecasts developed for the two counties most contributing to the Airport service area were selected to indicate future operational activity. The model assumes that operations will track with the local population as it reflects the number of people likely to use airport services. This model reflects the best data available considering the limitations of the available ATCT traffic counts. The model projects an average annual growth rate of 0.9% over the planning period. The aircraft operations forecast models are included in **Table 3-17** and depicted in **Figure 3-6**.

TABLE 3-17: OPERATIONS FORECAST

	CAGR	2021	2026	2031	2036	2041
TFMSC Historic Trend/FAA NAF GA Ops Hybrid	1.6%	76,028	82,123	88,855	96,298	104,537
Marion and Clackamas County Combined Population Growth*	**0.9%**	**76,028**	**79,354**	**82,825**	**86,449**	**90,230**
National Aerospace Operations (w/ ATCT)	0.8%	76,028	78,939	81,966	85,114	88,388
FAA TAF Contract Tower State (Oregon) Model	0.6%	76,028	81,924	82,972	84,046	85,151

Source: Century West Engineering developed using FAA TFMSC Data
* Denotes recommended forecast

FIGURE 3-6: OPERATIONS FORECAST MODELS



Source: Century West Engineering using FAA TAF, FAA OPSNET, and FAA National Aerospace Forecast Data
* Denotes recommended forecast

AIRCRAFT OPERATIONS FLEET MIX AND SPLITS

The distribution of total operational activity attributed to each of the five primary types of aircraft – single engine piston, multi-engine piston, turboprop, jet, and helicopter – is called the fleet mix. An understanding of the current and projected fleet mixes enables airports to plan for improvements to accommodate for growth or decline in activity by the specific aircraft type.

The fleet mix is derived from the current and projected operations totals established in the existing conditions analysis (base year counts) and the preferred forecast (projected estimates). ATCT operations counts do not distinguish between the individual aircraft types. So, fleet mix shares are estimated based on ancillary information, including TFMSC data, national trends, and input from knowledgeable sources such as ATCT controllers.

The base year fleet mix was estimated starting with the total operations in 2021. TFMSC data provides counts of aircraft arriving at or departing Aurora State Airport with a filed IFR flight plan and classifies those counts by aircraft type. The vast majority of jets and turboprop operations are executed with an IFR flight plan and are captured by the TFMSC data. As such, the TFMSC jet and turboprop operations totals were used as the respective fleet mix splits. Jet operations were further split by weight categories based on a review of the base year TFMSC data.

While some helicopters operate under IFR flight plans, that is not the case for all. So TFMSC helicopter counts are not representative of the activity on the airfield. Discussions with the ATCT manager indicated that helicopter operations (not including off-site operators) account for approximately 1% of the total operations. As this was the best information available, a 1% split of total operations was attributed to helicopter activity.

Having accounted for jets, turboprops, and helicopters, the remaining operations can be attributed to piston aircraft. However, there are no definitive data sources that differentiate between single engine and multi engine piston aircraft operations. So as a planning estimate, the remaining unclassified operations were split according to the ratio of single-engine piston to multi-engine piston aircraft based at Aurora State Airport (96.6% SEP/3.4% MEP).

To estimate future fleet mix, the base year mix developed above was projected through the planning period as follows. Turboprop and total jet operations were based on a 20-year TFMSC trend for each respective aircraft. Projected total jet operations were further split by weight categories as follows. Best fit trend lines were derived for operations by jets 12,500 lbs and less, and by jets greater than 60,000 lbs. The trend line for jets greater than 60,000 lbs excluded the 2021 count (92) as it was over twice the average of the annual totals for the previous 5 years and could be attributed to a single aircraft that began operating at the Airport over the previous year. As such, it was determined to be not representative of the overall historical trend and was removed. The derived trends were applied to the base counts for the two jet weight categories and projected over the planning period. All jet operations not accounted for by these projections were attributed to jets between 12,500 lbs and 60,000 lbs. Growth rates developed in the FAA National Aerospace Forecasts (General Aviation, Hours Flown) were applied to helicopters and multi-engine piston aircraft. All remaining operations not accounted for in each projected year were attributed to single-engine piston aircraft.

The aircraft operations fleet mix forecast is summarized in **Table 3-18**. Activity splits (local, itinerant, etc.) for forecast operations are summarized in **Table 3-19**.

TABLE 3-18: OPERATIONS FLEET MIX

Aircraft Type	CAGR	2021	2026	2031	2036	2041
Total Airport Operations	**0.9%**	**76,028**	**79,354**	**82,825**	**86,449**	**90,230**
Single Engine Piston*	-0.2%	65,319	66,066	66,096	65,124	62,762
Multi Engine Piston	-0.3%	2,299	2,265	2,231	2,198	2,165
Turbo Prop	6.8%	2,628	3,652	5,074	7,050	9,796
Jet	5.4%	5,022	6,533	8,497	11,053	14,378
12,500 lbs or Less	2.3%	842	943	1,057	1,184	1,327
Greater than 12,500 lbs and up to 60,000 lbs	6.2%	4,088	5,464	7,271	9,639	12,739
Greater than 60,000 lbs	6.3%	92	125	169	230	312
Helicopter	2.0%	760	839	927	1,023	1,130
Fleet Mix Percentages						
Single Engine*		85.9%	83.3%	79.8%	75.3%	69.6%
Multi Engine Piston		3.0%	2.9%	2.7%	2.5%	2.4%
Turbo Prop		3.5%	4.6%	6.1%	8.2%	10.9%
Jet		6.6%	8.2%	10.3%	12.8%	15.9%
12,500 lbs or Less		1.1%	1.2%	1.3%	1.4%	1.5%
Greater than 12,500 lbs and up to 60,000 lbs		5.4%	6.9%	8.8%	11.1%	14.1%
Greater than 60,000 lbs		0.1%	0.2%	0.2%	0.3%	0.3%
Helicopter		1.0%	1.1%	1.1%	1.2%	1.3%

Source: Century West Engineering
*Includes LSA/Experimental Aircraft

TABLE 3-19: RECOMMENDED OPERATIONS FORECAST

TFMSC Historic Trend/FAA NAF Hybrid	CAGR	2021	2026	2031	2036	2041
Itinerant						
Itinerant Air Taxi	2.5%	2,006	2,056	2,108	2,160	2,214
Itinerant GA	2.1%	36,390	37,154	37,934	38,731	39,544
Itinerant Military	0.0%	79	79	79	79	79
Itinerant Total	**0.4%**	**38,475**	**39,289**	**40,121**	**40,970**	**41,838**
Local						
Local GA	1.3%	37,488	40,000	42,639	45,413	48,328
Local Military	0.0%	65	65	65	65	65
Local Total	**1.3%**	**37,553**	**40,065**	**42,704**	**45,478**	**48,393**
Total Operations	**0.9%**	**76,028**	**79,354**	**82,825**	**86,449**	**90,230**

Source: Century West Engineering developed using FAA ATCT Data

Operational Peaks

Activity peaking is evaluated to identify potential capacity related issues that may need to be addressed through facility improvements or operational changes. The Peak Month represents the month of the year with the greatest number of aircraft operations (takeoffs and landings). The Peak Month for most general aviation airports occurs during the summer when weather conditions and daylight are optimal. This also coincides with the busiest time of year for flight training and recreational flying. A review of FAA OPSNET ATCT operations counts identified July as the Peak Month in 2021, which accounted for 11.4% of annual operations.

The Design Day is a calculated metric that is representative of an average day in the peak month, which is calculated by dividing the total peak month operations by 30.5. The peak activity period in the Design Day is the Design Hour. For planning purposes, the Design Hour operations are estimated to account for 20% of Design Day operations.

Also of interest is the Peak Day. The Peak Day represents the busiest day that the airport experiences in a year. The Peak Day may or may not fall within the Peak Month. A review of the OPSNET Peak Day report identified June 16 as the Peak Day in 2021.

The operational peaks for each forecast year are summarized in **Table 3-20**. This level of peaking is consistent with the mix of airport traffic and is expected to remain relatively unchanged during the planning period. These measures of activity are considered in the facility requirements analyses when calculating runway/taxiway capacity and transient aircraft parking requirements.

TABLE 3-20: PEAK OPERATIONS

	2021	2026	2031	2036	2041
Annual Operations	**76,028**	**79,354**	**82,825**	**86,449**	**90,230**
Peak Month Operations*†	8,699	9,080	9,477	9,891	10,324
Design Day Operations (Average Day in Peak Month)	285	298	311	324	338
Peak Day Operations*††	459	479	500	522	545
Design Hour Operations (Assumed 20% of Design Day)	57	60	62	65	68

Source: Century West Engineering
* Adjusted OPSNET Data
† 2021 Peak Month identified as July
†† 2021 Peak Day identified as June 16

Design Aircraft

The design aircraft (or critical aircraft) represents the most demanding aircraft, or family of aircraft with similar characteristics, using an airport on a regular basis and determines the appropriate AAC/ADG and airport design standards for airport development. It is widely understood that the most demanding aircraft operating at Aurora State Airport are Jets. FAA AC 150/5000-17, Critical Aircraft and Regular Use Determination states that counts of jet operations provided by TFMSC data, once normalized as described previously, are considered representative of the total operations of this aircraft type which nearly always operates on IFR flight plans.

As noted in Chapter 2 - Existing Conditions Analysis, TFMSC data shows that an existing critical aircraft with an AAC of C and an ADG of II (herein referred to as C-II) is justified based on the 500 annual operations requirement. While operations by C-II aircraft specifically do not reach the threshold, there are more than 500 annual operations by AAC C aircraft and ADG II aircraft which meets the requirement.

To determine the future critical aircraft, the 2021 TFMSC operations by all AAC C and D aircraft, and all ADG II and II aircraft were projected forward across the 20-year planning period based on 20-year historical trends derived from TFMSC data. According to these projections, operations by C-II aircraft will remain below the 500 operations threshold through the planning period. However, similarly to the existing critical aircraft, there are sufficient operations separately by AAC C and ADG II aircraft to justify a future critical aircraft with an AAC of C and ADG of II (C-II). Sufficient operations by AAC C or ADG III aircraft are not anticipated to occur in the 20-year term. **Table 3-21** summarizes projected operations by AAC and ADG.

TABLE 3-21: AAC/ADG 20-YEAR PROJECTION

	CAGR	2021	2026	2031	2036	2041
C-II	0.8%	264	275	286	298	310
AAC C	**2.3%**	**538**	**603**	**675**	**757**	**848**
AAC D	-9.4%	102	62	38	23	14
AAC C & D	1.5%	640	665	713	780	862
ADG II	9.9%	5,928	9,504	15,236	24,427	39,162
ADG III	7.6%	10	14	21	30	43
ADG II & III	9.9%	5,938	9,518	15,257	24,457	39,205

Source: Century West Engineering using FAA TFMSC data (2002-2021)

The existing and future design aircraft identified in the aviation activity forecasts corresponds to Aircraft Approach Category C and Airplane Design Group II.

- 2021 TFMSC data indicates that Aircraft Approach Category C and D operations exceeded the minimum of 500 annual operations required for Design Aircraft designation. While neither approach category alone reached the operations threshold, collectively they exceed the threshold and represent the most demanding family of high performance jet aircraft.
- Airplane Design Group II or larger aircraft operations also exceeded the 500 operations threshold required for Design Aircraft designation.
- AAC and ADG are independently justified through current activity levels, and the AAC/ADG C-II designation most accurately represents this segment of aircraft activity.
- Specific facility requirements, such as runway length requirements will be derived from the composite of Approach Category C and D jet aircraft reflected in FAA runway length planning tables.

Bombardier Challenger 601

Table 3-22 summarizes FAA technical criteria used to determine the applicable AAC/ADG for aircraft based on physical characteristics; representative aircraft are also depicted.

TABLE 3-22: REPRESENTATIVE DESIGN AIRCRAFT BY AAC AND ADG

Aircraft Approach Category	Aircraft Approach Speed knots	Airplane Design Group	Aircraft Wingspan
A	less than or equal to 91	I	less than or equal to 49'
B	92 to 121	II	50' to 79'
C	122 to 141	III	80' to 118'
D	142 to 166	IV	119' to 171'

A-I (small) 12,500 lbs. or less

Beech Baron 55
Beech Bonanza
Cessna 182
Piper Archer

B-I (small) 12,500 lbs. or less

Beech Baron 58
Beech King Air C90
Cessna 402
Cessna 421

A-II, B-II (small) 12,500 lbs. or less

Super King Air 200
Pilatus PC-12
DCH Twin Otter
Cessna Caravan

B-II Greater than 12,500 lbs.

Super King Air 300, 350
Beech 1900
Cessna Citation
Falcon 20, 50

A-III, B-III Greater than 12,500 lbs.

DHC Dash 7, Dash 8
Q-200, Q-300
DC-3
Convair 580

C-I, D-I

Lear 25, 35, 55, 60
Israeli Westwind
HS 125-700

C-II, D-II

Gulfstream II, III, IV
Canadair 600
Canadair Regional Jet
Lockheed JetStar

C-III, D-III

Boeing Business Jet
Gulfstream 650
B 737-300 Series
MD-80, DC-9

C-IV, D-IV

B - 757
B - 767
DC - 8-70
DC - 10

Source: Century West Engineering

Military Activity

Air traffic control tower counts for the Airport average 248 annual military operations since 2016, although the volume has decreased to less than 150 annual operations over the last two years. Occasional military use with helicopters or small fixed-wing aircraft in support of emergency response, search and rescue, and flight training activities would be consistent with activity (Oregon Army National Guard, etc.) experienced at other Oregon general aviation airports. Military flight activity at the Airport is projected to remain at current levels, with a static projection of 144 annual operations during the planning period. Forecast military activity is included in **Table 3-23**.

Air Taxi Activity

Air taxi activity includes for-hire charter flights, medevac flights, and some scheduled commercial air carriers operating under FAR Part 135. Air taxi activity at Aurora State Airport is forecast to increase at the same rate as itinerant general aviation operations. Forecast air taxi activity is included in **Table 3-23** (forecast summary).

Forecast Summary

A summary of the based aircraft and annual aircraft operations is presented in **Table 3-23**. These forecasts project slight to modest growth over the 20-year planning period that is consistent with FAA's long-term expectations for general aviation in the region. Based aircraft are forecast to decrease at an average annual rate of -1.3% between 2021 and 2041, reflecting a continued reduction in the number of small single-and multi-engine piston aircraft that is partially offset by growth in turbine fixed wing aircraft and helicopters. Aircraft operations are forecast to increase at an average annual rate of 0.9% between 2021 and 2041. The forecasts reflect the Airport's ability to attract and accommodate both locally based and transient aeronautical activity from a diverse group of users, including flight training, recreational aviation, personal travel, and business aviation.

TABLE 3-23: FORECAST SUMMARY

Activity	CAGR	2021	2026	2031	2036	2041
Based Aircraft						
Single Engine*	-2.0%	220	199	179	162	146
Multi Engine**	-6.1%	15	11	8	6	4
Jet	1.3%	36	38	41	43	46
Helicopter	3.2%	10	12	14	16	19
Total Based Aircraft	**-1.3%**	**281**	**260**	**242**	**227**	**215**
Aircraft Operations						
Itinerant						
Itinerant Air Taxi	2.5%	2,006	2,056	2,108	2,160	2,214
Itinerant GA	2.1%	36,390	37,154	37,934	38,731	39,544
Itinerant Military	0.0%	79	79	79	79	79
Itinerant Total	**0.4%**	**38,475**	**39,289**	**40,121**	**40,970**	**41,838**
Local						
Local GA	1.3%	37,488	40,000	42,639	45,413	48,328
Local Military	0.0%	65	65	65	65	65
Local Total	1.3%	37,553	40,065	42,704	45,478	48,393
Total Operations	**0.9%**	**76,028**	**79,354**	**82,825**	**86,449**	**90,230**
Aircraft Operations Fleet Mix						
Single Engine*	-0.2%	65,319	66,066	66,096	65,124	62,762
Multi Engine Piston	-0.3%	2,299	2,265	2,231	2,198	2,165
Turbo Prop	6.8%	2,628	3,652	5,074	7,050	9,796
All Jets	5.4%	5,022	6,533	8,497	11,053	14,378
Jets 12,500 lbs or Less	2.3%	842	943	1,057	1,184	1,327
Jets 12,501 lbs and up to 60,000 lbs	6.2%	4,088	5,464	7,271	9,639	12,739
Jets Greater than 60,000 lbs	6.3%	92	125	169	230	312
Helicopter	2.0%	760	839	927	1,023	1,130
Total Operations	0.9%	76,028	79,354	82,825	86,449	90,230
Operations By C-II (Critical Aircraft)	0.8%	264	275	286	298	310
Operations by AAC C & D	1.5%	640	665	713	780	862
Operations by ADG II & Larger	9.9%	5,938	9,518	15,257	24,457	39,205
Instrument Operations	2.7%	9,443	10,789	12,326	14,082	16,089

Source: Century West Engineering
*Includes Experimental/LSA

TERMINAL AREA FORECAST (TAF) COMPARISON

The recommended based aircraft and aircraft operations forecasts are compared to the current TAF as required for FAA review in **Table 3-24**.

TABLE 3-24: AIRPORT PLANNING AND TAF FORECAST COMPARISON

Activity	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2021	0	0	0.0%
Base yr. + 5yrs.	2026	0	0	0.0%
Base yr. + 10yrs.	2031	0	0	0.0%
Base yr. + 15yrs.	2036	0	0	0.0%
Commercial Operations				
Base yr.	2021	2,006	1,727	16.2%
Base yr. + 5yrs.	2026	2,056	1,845	11.4%
Base yr. + 10yrs.	2031	2,108	1,967	7.1%
Base yr. + 15yrs.	2036	2,160	2,097	3.0%
Total Operations				
Base yr.	2021	76,028	76,794	-1.0%
Base yr. + 5yrs.	2026	78,175	78,053	0.2%
Base yr. + 10yrs.	2031	80,387	79,109	1.6%
Base yr. + 15yrs.	2036	82,665	80,198	3.1%

Source: Century West Engineering
Note: TAF data is on a U.S. government fiscal year basis (October through September).

Next Steps

The draft aviation activity forecasts will be submitted to the FAA Seattle Airports District Office (ADO) for formal review following presentation and discussion of the chapter in Planning Advisory Committee (PAC) Meeting 2.

Upon FAA approval of the forecasts, the current and future design aircraft will be used in subsequent airport master plan technical evaluations and definition of airport design standards and airspace planning standards. These designations will include the appropriate design criteria, including Aircraft Approach Category (AAC), Airplane Design Group (ADG) and Taxiway Design Group (TDG) to be used in the 2021-2041 Airport Master Plan.

The approved aviation activity forecasts will be used to evaluate the aeronautical facility requirements for the Airport in the following chapter (Chapter 4 – Facility Requirements). The facility requirements evaluation will quantify current and future facility needs in general terms and volume.

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