North Hangar Area (On Airport and Through the Fence) – Source: Century West Engineering

Chapter 4
Facility Goals and Requirements

Introduction

Facility goals and requirements were developed based on the data presented in the earlier draft Airport Master Plan chapters and the information obtained from project stakeholders during Planning Advisory Committee (PAC) Meetings #1 and #2, Open House #1, and other PAC work sessions. The FAA-approved aviation activity forecasts, presented in Revised (November 2023) Working Paper No. 1 (Chapter 3), were used to identify the current and future Design Aircraft and their corresponding runway design codes (RDC), and to quantify demand-driven facility needs such as aircraft parking, hangar space and airport capacity. All airfield facility requirements definitions used in this chapter are based on Federal Aviation Administration (FAA) airport design and airspace planning standards.

The facility goals and requirements evaluation process is designed to identify the adequacy of existing airport facilities to meet future demand. The evaluation uses established planning criteria to define future facility needs for the Aurora State Airport (Airport) through the current 20-year planning period. This evaluation is performed within the framework of the Regional Setting, Airside, Landside, and Airport Administration elements for the Airport. The next step in the airport master planning process will be to translate the broadly defined facility needs into specific facility improvement options capable of addressing the projected facility requirements.

The proposed goals and requirements were developed in coordination with Oregon Department of Aviation (ODAV) staff for presentation to the PAC, other project stakeholders, and the general public for review and comment during PAC Meetings, Open Houses, and on the project website. These represent the goals, objectives, and facility improvements required to satisfy future aviation demand, while also addressing broader issues affecting the Aurora State Airport.

- FACILITY GOAL. Represents the goals, policies, and objectives developed in response to the issues/opportunities identified during the planning process.
- FACILITY REQUIREMENT. Represents the facility needs and/or improvements required to satisfy identified capacity/demand requirements, FAA standards, and applicable state laws.

Design Aircraft and Airport Design Standards Discussion

The existing and future design aircraft are determined based on the current and projected level of activity described in Chapter 3 – Aviation Activity Forecasts. The design aircraft establishes existing and future airport planning and design standards that will guide future planning, design, and improvement of the Airport.

DESIGN AIRCRAFT AND FAA REFERENCE CODE

The design aircraft designation is intended to represent the most demanding aircraft using the Airport on a regular basis when establishing the AAC/ADG for airfield planning and design purposes. FAA defines “regular” use as 500 annual operations. Operations by larger or more demanding aircraft may be accommodated based on facility capabilities or limitations. Example aircraft are presented in **Figure 4-1**.

As discussed in Chapter 3 – Aviation Activity Forecasts, the existing and future design aircraft identified for the Airport is a medium-sized business jet included in Aircraft Approach Category C/Airplane Design Group II (AAC/ADG C-II). The Canadair 600 (CL60), per the FAA Aircraft Characteristics Database, is representative of the segment of business jet activity associated with AAC/ADG C-II.

FIGURE 4-1: SAMPLE OF TYPICAL AIRCRAFT AND DESIGN AIRCRAFT AT THE AURORA STATE AIRPORT

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

Beech Baron 55
Beech Bonanza
Cessna 182
Piper Archer

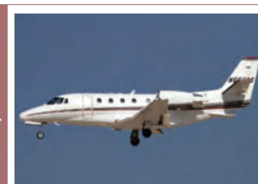
B-I (small)
12,500 lbs. or less

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

AAC/ADG - B-II
Greater than 12,500 lbs.



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

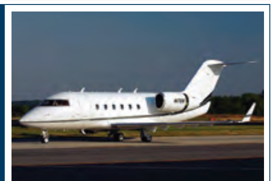
A-III, B-III
Greater than 12,500 lbs.

DHC Dash 7, Dash 8
Bombardier Q-200/300
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/G350
Canadair 600
Canadair Regional Jet
Lockheed JetStar

C-III, D-III

Bombardier Global 5000
Gulfstream 650
Boeing 737 Series /BBJ
MD-80, DC-9

Source: Century West Engineering

RUNWAY DESIGN CODE

The Runway Design Code (RDC) defines the design standards used for runway construction. The RDC is comprised of the two inputs related to (current/future) design aircraft, combined with approach visibility minimums for the runway:

- Aircraft Approach Category (AAC) – based on the approach speed of the aircraft;
- Airplane Design Group (ADG) – based on the wingspan and tail height of the aircraft; and
- The lowest approach visibility minimums established for the runway:
  - » Approach visibility minimums are determined by FAA for each runway based on the category of approach (visual, non-precision instrument, or precision instrument) and the most capable existing or future approach procedure.
  - » Lower visibility minimums generally correspond to instrument approaches that allow aircraft to descend to lower altitudes before requiring visual contact to be established with the runway environment prior to landing.
  - » RDC visibility minimums for each runway end are expressed in Runway Visual Range (RVR). Ground-based RVR transmitters project horizontal beams of light near the runway to measure forward visibility levels. The RVR values (measured in feet) correspond to visibility measurements commonly expressed in fractions of statute miles (e.g., 1-mile, 3/4-mile, etc.). The RVR for a runway reflects the most capable approach type or procedure for either runway end.

The existing RDC for Runway 17/35 is based on the current approach parameters (e.g., approach type and visibility minimums). As noted earlier, no change is anticipated in the aircraft-specific components of the RDC (AAC/ADG C-II). However, the approach visibility component may change within AAC/ADG C-II. Potential outcomes include maintaining or changing the existing approach visibility minimums. However, it is noted that changes to the visibility component of the RDC can trigger changes in dimensions for other airfield design standards, particularly runway protection zone (RPZ) dimensions.

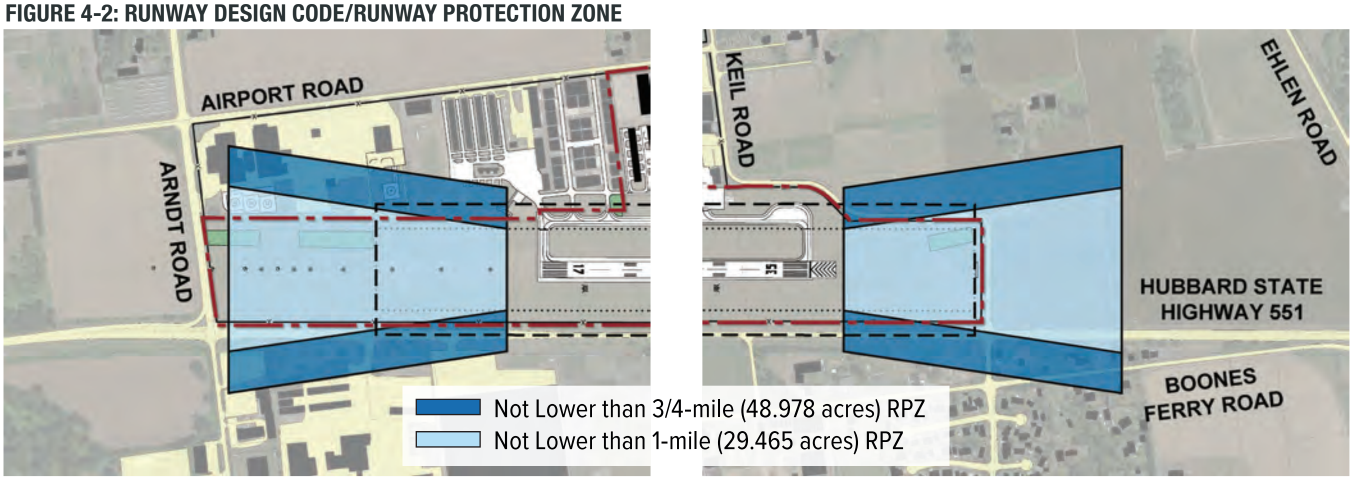
The **existing RDC for Runway 17/35 is C-II-4000** (lower than 1-mile, but not lower than 3/4-mile).

Potential RDC outcomes for both the existing and future runway lengths include:

1. Maintain existing RDC.
2. Change (downgrade) instrument approach visibility minimums to “not lower than 1-mile” **(RDC: C-II-5000)**.

A final recommendation for the future Runway 17/35 RDC will be based on the evaluation of airside (runway-taxiway system) alternatives conducted in Chapter 5 – Development Alternatives and in the RPZ Assessment. **Figure 4-2** illustrates existing RPZ dimensions related to the potential RDC options noted above.

FIGURE 4-2: RUNWAY DESIGN CODE/RUNWAY PROTECTION ZONE



Source: Century West Engineering

APPROACH AND DEPARTURE REFERENCE CODE

The Approach and Departure Reference Codes (APRC and DPRC) are not design standards, but rather an operational tool intended to aid Air Traffic Control (ATC) and airport staff to determine the capabilities of the airfield based on existing runway to parallel taxiway separation. Specifically, the APRC and DPRC identify the most demanding aircraft by Aircraft Approach Category (AAC), and Airplane Design Group (ADG) that may operate (approach or depart) on a runway in specific conditions without generating ATC operational controls.

The APRC is a three-component code that describes the most demanding aircraft by AAC and ADG that may operate concurrently with other aircraft on the airfield in certain visibility conditions without generating ATC operational controls. Since the APRC considers both AAC and ADG, it is possible for an airport to have two APRCs, where one represents the most demanding aircraft by AAC (paired with a lower ADG), and the other represents the most demanding aircraft by ADG (paired with a lower AAC).

The DPRC is similar to the APRC but is a two-component code (AAC and ADG) and does not consider a visibility component. The DPRC describes the type of aircraft that can depart a runway while any other aircraft is on the parallel taxiway. Much like ARPC, a runway may have two DPRCs to account for both AAC and ADG.

Table L-1 in *FAA Advisory Circular (AC) 150/5300-13B* lists the APRC based on runway to parallel taxiway separation and visibility minimum. The separation distance at the Aurora State Airport is 300 feet and the visibility minimums are not lower than 3/4 mile. This combination identifies APRCs of B/III/4000 and D/II/4000.

Table L-2 in the same AC lists the DPRC based only on runway to parallel taxiway separation. Referencing the Aurora State Airport's 300-foot separation identifies DPRCs of B/III and D/II.

The APRCs and DPRCs identified above indicate that the following aircraft may land, or depart on the runway, and taxi on the parallel taxiway at Aurora without operational restrictions:

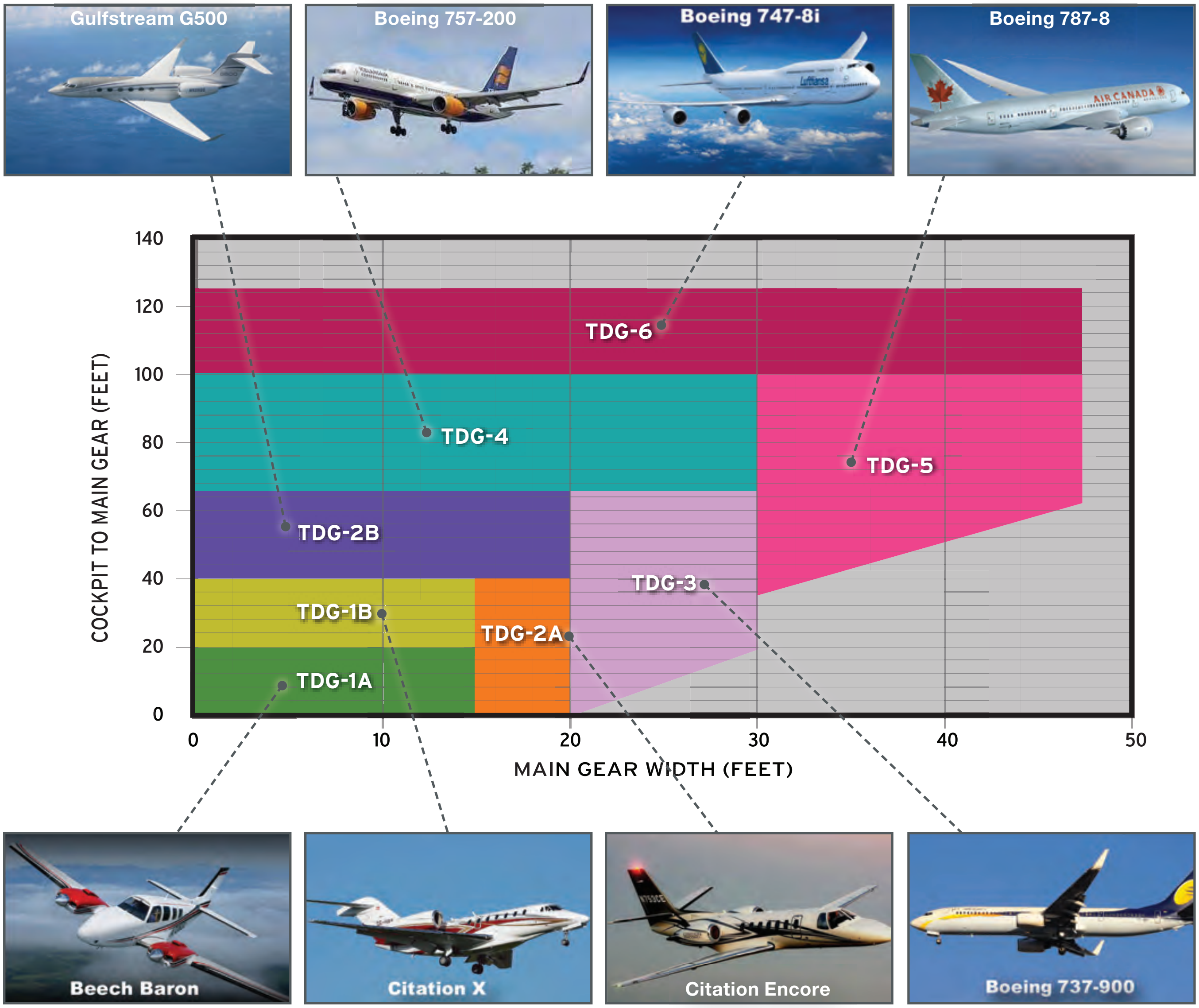
- Within Approach Categories A and B, Airplane Design Groups I(S), I, II, & III.
- Within Approach Categories C and D, Airplane Design Groups I and II.

TAXIWAY DESIGN GROUP

Taxiway design group (TDG), see **Figure 4-3**, is based on the physical dimensions of the aircraft landing gear, including distance from the cockpit to the main gear (CMG) and main gear width (MGW). These dimensions affect an aircraft's ability to safely maneuver on airport taxiways and dictate pavement fillet design. Although the TDG dimensional standards are presented for taxiways, they are also commonly used for taxilane design. Taxiways and taxilanes may be designed/constructed to different TDGs based on the expected use by specific types of aircraft. For example, the major taxiways at an airport should be designed for consistency with the design aircraft. Individual taxiways/taxilanes that are intended to accommodate only small aircraft would be designed based on the size of aircraft and the corresponding TDG.

The major taxiways at the Aurora State Airport are designed to accommodate ADG II aircraft, which are best represented by TDG-2A and -2B standards. **The use of TDG-2A and -2B standards accommodates the current and future Design Aircraft (CL60) and a diverse mix of other B/C/D-II aircraft that fall within the TDG-1B, -2A, and -2B criteria.** Taxilanes providing access to hangar areas and aprons will serve a variety of aircraft, primarily included in TDG-1A, -1B, -2A, and 2B. The TDG classification for these areas will be based on aircraft for which they are intended and determined in the alternatives evaluation process.

FIGURE 4-3: TAXIWAY DESIGN GROUPS



Source: Century West Engineering

FAA DESIGN STANDARDS

FAA AC 150/5300-13B Airport Design serves as the primary reference in establishing the geometry of airfield facilities. A comparison of existing condition dimensions and optional future design standards for the runway-taxiway system are summarized in **Table 4-1**. It is noted that all listed design standards are based on AAC/ADG C-II, which corresponds to the existing and future design aircraft. Optional standards based on different approach visibility minimums may affect specific design standards within AAC/ADG C-II.

FAA DESIGN STANDARDS

Specific design standards and conditions applicable to the Aurora State Airport facilities are presented in the following sections of this chapter within the sidebar "FAA Design Standards" text boxes. For additional information reference the appropriate sections within FAA AC 150/5300-13B.

TABLE 4-1: FAA DESIGN STANDARDS SUMMARY

		Existing Conditions/Standards		Optional Standards	
FAA Standard		Existing Dimensions	Existing Standard AAC/ADG C-II (not lower than 3/4 statute mile)	AAC/ADG C-II (Visual and not lower than 1 statute mile)	AAC/ADG C-II (Lower than 3/4 statute mile)
Runway Width		100'	100'	100'	100'
Runway Centerline to Parallel Taxiway Centerline Separation		300'	300'	300'	400'
RSA*	Width	500'	500'	500'	500'
	Length beyond runway end	1,000'	1,000'	1,000'	1,000'
	Length prior to threshold	600'	600'	600'	600'
OFA*	Width	685'*	800'	800'	800'
	Length beyond runway end	1,000'*	1,000'	1,000'	1,000'
OFZ	Width	400'	400'	400'	400'
	Length beyond runway end	200'	200'	200'	200'
Precision OFZ	Width	N/A	N/A	N/A	800'
	Length	N/A	N/A	N/A	200'
RPZ*	Inner Width	1,000'	1,000'	500'	1,000'
	Outer Width	1,510'	1,510'	1,010'	1,750'
	Length	1,700'	1,700'	1,700'	2,500'
	Acres	48.978	48.978	29.465	78.914
Runway Blast Pad**	Width	100' (RWY35)	120'	120'	120'
	Length	150' (RWY 35)	150'	150'	150'
Runway Shoulder Width		10'	10'	10'	10'
Taxiway Width		35'	35'	35'	35'
Taxiway Safety Area Width		79'	79'	79'	79'
Taxiway Object Free Area Width		124'	124'	124'	124'

Source: FAA Advisory Circular 150/5300-13B and Century West Engineering documented existing conditions

*Existing Non-Standard Conditions Identified through the Facility Requirements evaluation:

- OFA: Hubbard Highway is partially located within Runway 17/35 OFA, approximately 373 feet west of runway centerline at its nearest point.
- OFA: Keil Road is partially located within Runway 17/35 OFA, approximately 312 feet east of runway centerline at its nearest point.
- RPZs: Existing RPZs extend beyond airport property and include surface roads or other built items.
- RSA: Drain field in RSA to be evaluated for conformance with FAA standards.
- RSA: Drainage ditch along Taxiway A is within the RSA, options for mitigation will be shown in CH 5 - Development Alternatives.
- RSA: The ASOS is within the RSA, options for relocation will be evaluated in CH 5 - Development Alternatives.
- RSA: The segmented circle and windcone are within the RSA, options for relocation will be evaluated in CH 5 - Development Alternatives.

**Blast Pad: There is no blast pad on Runway 17 end. Blast pads are not required, but are generally recommended for runways with jet traffic

Demand/Capacity Analysis

Annual service volume (ASV) is a measure of estimated airport capacity and delay used for long-range planning. ASV, as defined in *FAA AC 150/5060-5, Airport Capacity and Delay*, provides a reasonable estimate of an airport's operational capacity.

For long-term planning purposes, the FAA estimates ASV capacity for a single runway with no air carrier traffic is approximately 230,000 operations. Hourly capacity is estimated to be 98 operations per hour during visual flight rules (VFR) conditions and 59 operations/hour during instrument flight rules (IFR) conditions.

- 2021 Capacity: 76,028 Annual Operations / 230,000 ASV = 33% (demand/capacity ratio)
- 2041 Capacity: 90,230 Annual Operations / 230,000 ASV = 39% (demand/capacity ratio)

Operations in 2021 accounted for 33% of the ASV. Figure 2-2 in *AC 150/5060-5* indicates average delay per aircraft with this ratio is approximately 0.1 to 0.2 minutes. This results in a total annual aircraft delay ranging between 7,603 to 15,206 minutes. Based on forecast operations, the 2041 operational activity will account for 39% of ASV. Average delay per aircraft will remain in the range between 0.1 to 0.3 minutes. This results in a total annual aircraft delay ranging between 9,023 to 27,069 minutes.

Based on the above analysis, the average delay per aircraft at the Aurora State Airport is expected to remain below one minute through the planning period and no capacity enhancements to reduce delay times are anticipated during the planning period.

Regional Setting Goals and Requirements

The proposed facility goals and requirements for the regional setting of the Aurora State Airport are developed to address the issues and opportunities that fit within the regional context of the Airport. The regional setting is focused on the impacts and relationships that the Airport may have within the social, economic, and environmental context of the region, counties, and associated municipalities. The regional setting elements considered include location and vicinity, socioeconomic factors, airport history, system role, airport operations, applicable planning studies, environmental data, local surface transportation, and land use/zoning. Understanding the national, state, and local role of the Aurora State Airport provides important context about the facility and its users.

The Aurora State Airport is located in proximity to multiple local jurisdictions, each of whom have a public interest in protecting public-use airports and adjacent lands consistent with Oregon state law. The Airport, which was constructed in 1943, is an established public-use transportation facility closely resembling urban type densities (impervious pavement surfaces and building footprint coverage) in a rural environment. The pressure of rapid change and growth on and near the Airport due to a quickly growing metropolitan area has made planning and improvement of aviation related facilities an important topic for airport users and businesses, neighbors, and municipalities within the region.

The following goals reflect ODAV's current and future management objectives for the Aurora State Airport, consistent with its role as an established public-use air transportation facility:

- FACILITY GOAL. Support efforts by aviation-related businesses and neighboring jurisdictions to ensure the continued economic benefits of the Airport, including job creation and support of the local and regional tax base.
- FACILITY GOAL. Maintain effective, ongoing public outreach to promote public awareness and perception of the Aurora State Airport.
- FACILITY GOAL. Work with federal (FAA), state, and private partners to support the funding of facility improvements to satisfy aviation demand.
- FACILITY GOAL. Maintain and improve facilities as necessary, consistent with the national, state, and local roles defined for the Airport and public demand.
- FACILITY GOAL. Continue to monitor aircraft operations and based aircraft counts to provide FAA justification for funding future facility improvements.

Land use, transportation, and environmental issues are inextricably linked together. Understanding and addressing these interrelated issues within the context of the Airport and its local and regional setting is a critical step to developing an implementable planning document. Several of these key issues are discussed in more detail below.

Many of the regional surface transportation issues raised throughout the planning process, including traffic congestion on nearby rural roads, state highways, and interstate highways, are relevant planning topics for the greater community to consider. The traffic congestion and related concerns discussed during PAC meetings equally affect airport users, airport businesses, and non-aviation-related neighbors. However, the typical regional surface transportation concerns identified during the planning process are outside of ODAV jurisdiction and outside of the scope of work for this federally-funded airport master plan.

These important surface transportation issues are the responsibility of Marion County, Clackamas County, representative metropolitan districts, and the Oregon Department of Transportation (ODOT). The regulation of adjacent off-airport aviation related private property falls under the sole jurisdiction of Marion County. Developments are subject to local transportation and planning requirements for which ODAV has no statutory control. Based on the jurisdictional requirements prescribed by Marion County, any planned development that occurs on ODAV property that has the potential to increase vehicle traffic demand is subject to project-specific traffic analysis and/or planning study as a condition of approval. These types of evaluations are typically performed at the project design and permitting stage associated with local development review and approval, and are outside the scope of an airport master plan.

- FACILITY REQUIREMENT. As required under applicable regulations, coordinate with state and local land use and transportation agencies to define any necessary surface transportation infrastructure improvements driven by proposed improvement projects on ODAV property.

The analysis of environmental factors for federally funded projects is defined by the Council on Environmental Quality (CEQ) and implemented in the National Environmental Policy Act (NEPA). The regulations require agencies like the FAA to integrate the NEPA process with other planning projects as early as possible. As part of this Airport Master Plan, an environmental screening (**Appendix 2**) was conducted during the existing conditions analysis to begin the process of incorporating potential environmental factors. The environmental screening analysis and airport master planning process is not intended to be part of the formal NEPA process. It is intended to serve as the basis for future projects' purpose and need in environmental evaluation and the alternatives that the FAA will carry forward into the NEPA process (*AC 150/5070-6B* - Appendix D).

During the airport master planning process, PAC members and public stakeholders expressed concerns about noise from helicopters operating on privately owned parcels adjacent to the Airport and fixed-wing traffic operating from ODAV property. PAC members and public stakeholders also shared concerns about air quality (sulfur and lead emissions from jet and piston aircraft), water quality/availability, groundwater runoff, and other factors that fit within the NEPA categories described in Chapter 2 – Existing Conditions Analysis. The environmental concerns raised by PAC members and public stakeholders are being documented and will be provided on the project webpage and included as **Appendix 9** in the airport master plan for future consideration by the FAA during the completion of any environmental assessment required by NEPA.

- FACILITY REQUIREMENT. As required under applicable regulations, coordinate with local, state, and federal agencies to conduct appropriate environmental study and permitting for future development projects that occur on ODAV property.

- FACILITY GOAL. Coordinate with users of the Aurora State Airport, Air Traffic Control Tower staff, and adjacent helicopter operators (Columbia Helicopters and HTS) in the continual improvement of the voluntary “Fly Friendly Program” for the Airport that identifies noise-sensitive areas and considers changes in common visual flight paths to mitigate noise exposure around the Airport. This effort should also be coordinated with the FAA Seattle Airports District Office (ADO), local land use jurisdictions, and airport neighbors.

All proposed airport improvements are subject to Marion County review based on applicable zoning requirements.

Per OAR 660-13-0030 (2)[1], “A city or county with planning authority for one or more airports, or areas within safety zones or compatibility zones described in this division, shall adopt comprehensive plan and land use regulations for airports consistent with the requirements of this division and ORS 836.600 through 836.630.”

At the conclusion of the Airport Master Plan, Marion County, Clackamas County, City of Aurora, City of Barlow, and City of Wilsonville will all require a comprehensive plan update to remain compliant with state land use laws. Each of these jurisdictions are located within the boundaries of the Part 77 airspace defined for Runway 17/35 at the Airport. Marion County, which is the jurisdiction responsible for land use development on, and surrounding the Airport, has acknowledged this requirement in comprehensive plan Policy #2 of the “Air, Rail, Water, Energy and Pipeline Transportation Policies.”[2]

- FACILITY REQUIREMENT. Support adoption of the airport master plan into local planning documents as required by OAR 660-13-0030, which implements ORS 836.600 through 836.630 and Statewide Planning Goal 12 (Transportation) by applicable jurisdictions.

- FACILITY REQUIREMENT. Support local updates or development of overlay zoning designations, as required in OAR 660- 013-0050 and OAR 660-013-0070, consistent with planned facility improvements upon selection of a preferred alternative:
  - Marion County – update overlay zones (Marion County Code, Chapter 16.21) for airspace protection;
  - Clackamas County – update overlay zones (Clackamas County Zoning and Development Ordinance (ZDO), Chapter 713) for airspace protection;
  - City of Wilsonville – develop overlay zone ordinance for airspace protection; and
  - City of Barlow – develop overlay zone ordinance for airspace protection.

1 A city or county with planning authority for one or more airports, or areas within safety zones or compatibility zones described in this division, shall adopt comprehensive plan and land use regulations for airports consistent with the requirements of this division and ORS 836.600 through 836.630. Local comprehensive plan and land use regulation requirements shall be coordinated with acknowledged transportation system plans for the city, county, and Metropolitan Planning Organization (MPO) required by OAR 660, division 12. Local comprehensive plan and land use regulation requirements shall be consistent with adopted elements of the state ASP and shall be coordinated with affected state and federal agencies, local governments, airport sponsors, and special districts. If a state ASP has not yet been adopted, the city or county shall coordinate the preparation of the local comprehensive plan and land use regulation requirements with ODA. Local comprehensive plan and land use regulation requirements shall encourage and support the continued operation and vitality of airports consistent with the requirements of ORS 836.600 through 836.630.

2 The County should review and take appropriate actions to adopt State master plans for public airports in Marion County.

The *2003 Oregon Airport Land Use Compatibility Guidebook (LUGB)* presents the means and requirements for local governments to comply with airport land-use requirements established in OAR 660-013. The document is primarily intended as a guide to assist community review of airport-related planning issues. Chapter 6 of the LUGB outlines techniques for establishing compatible land uses at and around airports. One of the techniques discussed is the creation of separate zoning districts for airports. Establishing an airport development zone "creates a more distinct area of influence for the airport; gives the airport better opportunity to expand for airport-related dependent and compatible uses; and avoids possible unintended uses that often accompany an overlay zone."[3]

As previously discussed in Chapter 2 – Existing Conditions Analysis, Marion County is the jurisdiction responsible for the zoning and land use approvals at the Airport. The existing zoning designation for the Airport is 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 semipublic uses and to ensure their compatibility with adjacent uses." Airports are permitted in the P zone with a Conditional Use approval. According to the LUGB and general planning practice, the lack of an "airport specific" zone and the added Conditional Use requirement associated with the actual zone may unduly burden new development of aviation related facilities. Although development of airport-specific zoning represents "best practice" in land-use planning, it is important to note that Marion County consistently recognizes the suitability and appropriateness of aviation-related developments within the P zone applied to the Airport.

- FACILITY GOAL. Request Marion County to evaluate options for revising their zoning code to include airport-specific zoning for public use airports, to support a future rezone of the Airport. The proposed addition of airport-specific zoning more closely aligns with the guidance provided in the LUGB.
- FACILITY GOAL. Request Marion County to rezone the Airport to the applicable airport-specific zone, once adopted.

Airside Elements Goals and Requirements

The airside facilities goals and requirements section includes a discussion of the area airspace, instrument flight procedures, runways, taxiways/taxilanes, aprons/tiedowns/aircraft parking, and airside support facilities.

AREA AIRSPACE AND INSTRUMENT FLIGHT PROCEDURES

The Class D airspace surrounding the Aurora State Airport (see **Figure 2-12**, Chapter 2) is regulated by the FAA and is in effect during the hours when the Air Traffic Control Tower (ATCT) is in operation. See Chapter 2 - Existing Conditions Analysis for a description of local airspace categories and features.

Since the Class D controlled airspace for the Airport was created when the ATCT began operation in late 2015, aircraft flight paths have evolved with formal direction provided by air traffic controllers (e.g., traffic pattern entry/departure, traffic avoidance instructions, etc.). As noted previously, the control of aircraft in flight in Class D airspace is at the direction of the ATCT and is outside the regulatory authority of ODAV. The standard operating characteristics of fixed-wing aircraft and helicopters vary based on the capabilities and needs of the specific aircraft.

Aircraft flight paths and the associated noise exposure are important issues regulated by FAA. The noise evaluations that will be conducted in the Airport Master Plan are defined by the FAA-approved project scope of work and cannot be modified without FAA approval.

3 LUGB (Page 6-2)- Airport Development Zone - This type of zoning is applied to areas around an airport identified for airport related and dependent uses. It often replaces industrial, public facility or other designations currently given to the airport site and immediate vicinity. The Airport Development Zone is a base zoning district that identifies outright and conditionally permitted uses on airport property. The zone should include areas used or needed for airport operations, areas needed for anticipated facility growth, airport-related industry and commercial operations and airport-related industrial, commercial or recreational activities. According to OAR 660-013-0160, local governments must update their zoning and land use regulations to conform to this division at periodic review.

Airspace issues addressed in the planning process are defined by FAA and involve specific design components intended to protect aircraft in flight from hazards (built items, obstacles, or terrain). These include both **14 Code of Federal Regulations (CFR) Part 77** airspace surfaces established for specific landing areas (runways, etc.) and **FAA Terminal Instrument Procedures (TERPS)** surfaces that define the unobstructed airspace corridors required to permit aircraft to operate without visual reference to outside surroundings. These arrival and departure paths have both vertical and lateral clearance requirements to known obstacles such as terrain or other items. See descriptions of these airspace surfaces in Chapter 2 – Existing Conditions Analysis.

These airspace surfaces are defined by approach type (visual, non-precision instrument, precision instrument) and the minimum approach visibility required for the most capable instrument approach procedure (IAP). The design aircraft parameters represented in the AAC/ADG are also reflected in some airspace planning criteria.

The existing Part 77 surfaces for Runway 17/35 are defined by the most demanding approach criteria currently in place. This is currently the 7/8-mile approach visibility minimum requirement established by FAA for the published Runway 17 and 35 RNAV/GPS IAPs, and the requirement established by FAA Notice to Air Missions (NOTAM) for the Runway 17 Localizer IAP.

Prior to the planning process, published IAP minimum visibilities for existing IAPs were as low as 3/4-mile. This visibility threshold was the result of a change implemented by the FAA Flight Procedures Team that was not requested by ODAV or recommended in previous planning for the runway. Early in the airport master planning process, several airspace issues related to this change were identified. These centered primarily on the significantly larger object free surfaces surrounding the runway that would be required to comply with Part 77 obstacle clearance standards. The expanded airspace would impact both on- and off-airport structures, roads, and other built items that were impractical to address. Based on this technical assessment, ODAV requested that FAA Flight Procedures Team (responsible FAA office) raise the approach visibility minimums to 7/8-mile to align the procedures with airspace planning established for the runway. This request was approved by FAA and is currently reflected in published FAA flight procedures or NOTAM.

In addition to addressing potential obstacle clearance conflicts, the ODAV request to raise the approach visibility minimums was supported by analysis of local weather conditions. Ten years of historical visibility data recorded by the Automated Surface Observing System (ASOS) located on the airfield were analyzed to gauge the occurrence of visibility conditions (increments) below 1-mile. The analysis indicated that visibility conditions less than 1-mile account for 2.74% of total observations. However, visibility conditions between 3/4-mile and 1-mile account for 0.49% of total observations.

TABLE 4-2: AURORA STATE AIRPORT ASOS RECORDED VISIBILITY OBSERVATIONS

	Observations	%
Greater than or equal to 3-mile vis.	589,823	94.54%
Greater than or equal to 1-mile but less than 3-mile vis.	16,945	2.72%
Less than 1-mile vis.	17,111	2.74%
3/4-mile vis.	3060	0.49%
Less than 3/4-mile	14,051	2.25%
Total observations	623,879	100.00%

Source: Aurora State Airport ASOS, 10 years of recorded data

The data in **Table 4-2** demonstrate the small incremental benefit provided by an instrument approach with 3/4-mile visibility minimums at the Aurora State Airport, compared to the next higher increment, in terms of airport accessibility. Existing site characteristics make accommodating 3/4-mile or lower approach visibility minimums impractical.

RUNWAY

Facility goals and requirements for Runway 17/35 were evaluated relative to runway orientation, length, width, pavement strength, and FAA design standards.

RUNWAY ORIENTATION AND CROSSWIND COVERAGE

Runway orientation is a function of wind speed and direction combined with the ability of aircraft to operate under given conditions. FAA has defined the maximum allowable direct crosswind for ADG II aircraft as 13 knots. A direct crosswind is when the wind direction is 90 degrees offset from the direction of flight. Lower and higher crosswind components (10.5 and 16 knots) are defined for smaller and larger general aviation (GA) aircraft. Most aircraft can tolerate higher crosswind speeds when the intersecting angle is reduced.

TABLE 4-3: WIND ANALYSIS

		10.5 knots	13 knots	16 knots
Runway 17	IFR	79.85%	79.98%	80.03%
	VFR	70.80%	70.94%	71.01%
	All-Weather	72.45%	72.59%	72.65%
Runway 35	IFR	71.58%	71.60%	71.61%
	VFR	58.04%	58.16%	58.20%
	All-Weather	60.81%	60.92%	60.95%
Combined Runway 17/35	IFR	99.77%	99.92%	99.99%
	VFR	99.62%	99.89%	99.99%
	All-Weather	99.65%	99.89%	99.99%

Source: FAA ADIP

The FAA recommends that primary runways accommodate at least 95% of local crosswind conditions. When this level of coverage is not provided, the FAA recommends consideration of a crosswind runway. An updated analysis of 10 years of onsite wind conditions was conducted to assess wind coverage provided by Runway 17/35. The ASOS-collected wind data indicates that Runway 17/35 accommodates more than 99% of all-weather wind conditions for large and small GA aircraft. Due to prevailing winds, Runway 17 is most often the preferred runway. The results of the analysis are summarized in **Table 4-3**.

- FACILITY REQUIREMENT. It is recommended that the current runway alignment be maintained throughout the planning period.

RUNWAY LENGTH

The planning methodology used to define a runway length capable of satisfying existing and future demand at the Aurora State Airport is established by the FAA: *AC 150-5325-4B, Runway Length Requirements for Airport Design.* As noted in Chapter 2 – Existing Conditions Analysis, the current length of Runway 17/35 is 5,003 feet.

Demonstrating that defined runway lengths are justified is directly related to the FAA-approved forecast of aviation demand coupled with a detailed evaluation of aircraft operations, including aircraft that may be constrained by the current runway length. A constrained operation typically means that an aircraft operator must reduce payload/useful load (passengers, fuel, etc.) based on the runway length available. This is most common in warmer months when higher temperatures increase aircraft takeoff and landing distances, but it can also occur at moderate temperatures for some aircraft.

Using FAA planning methodologies, the evaluation of runway length requirements begins with the operational requirements of the design aircraft, or family of aircraft, expected to use the runway. Several airfield-specific conditions that affect aircraft performance are then verified including airport elevation, runway gradient, and the assumed operating temperature (average daily maximum temperature of the hottest month of the year). These inputs are applied to runway length curves presented in *AC 150-5325-4B* for the applicable segment of the GA aircraft fleet.

The FAA recommends a planning evaluation based on the "family of aircraft" approach for runways used by large airplanes (maximum takeoff weights between 12,500 pounds and 60,000 pounds) to capture the most common aircraft within a particular category. This grouping of aircraft is further characterized by determining the "useful load factor" at which they operate, based on the haul lengths and service needs of those aircraft.

This methodology is consistent with FAA planning criteria that correlates the needs of the existing and future design aircraft to approval of the Airport Layout Plan drawing and project eligibility for FAA funding. The specific design criteria applied to a runway does not preclude use by larger aircraft. Use by heavier aircraft may also be permitted with approval by airport management.

Aircraft Performance Curves (Runway Length Requirements)

For GA runways that accommodate large airplanes, the FAA recommends use of performance curves for runway length planning. The curves were developed by FAA based on approved airplane flight manuals, and they are intended to represent the needs of the fleet, rather than a single aircraft or type. This approach provides a more effective indication of the requirements of overall aircraft rather than relying on the requirements for an individual aircraft.

The design aircraft, or family of aircraft, defined in the FAA-approved Aviation Activity Forecasts, is matched to the applicable runway length curves that are defined based on the factors described below.

AC 150-5325-4B (Figure 3-2 and 3-3) provides two runway length curves for both the 75% and 100% segment of the fleet to reflect different useful loads for this category of aircraft. As noted earlier, useful load represents the payload (passengers, fuel, etc.) carried by the aircraft. The AC provides 60% and 90% useful load factors for both fleet percentages. For general reference, when an aircraft is at its maximum gross weight, it has reached its maximum useful load; however, that may not include full fuel tanks or a full passenger load depending on the aircraft's certificated design limits.

Percentage of Fleet

AC 150-5325-4B identifies *"Airplanes that Make Up 75 Percent of the Fleet" and "Remaining 25 Percent of Airplanes that Make Up 100 Percent of Fleet."* The AC provides guidance for selecting the appropriate grouping of aircraft fleet and the corresponding runway length curves that should be used for planning. The AC indicates that designers should use 75% of fleet curves when the aircraft under evaluation are not found in the 100% of fleet group. If a relatively few airplanes under evaluation are listed in the 100% of fleet aircraft group, then FAA recommends that the 100% fleet curves should be used.

Table 4-4 summarizes representative aircraft within these groups and identifies the listed aircraft currently using the Aurora State Airport.

TABLE 4-4: AC 150/5325-4A - 75% AND 100% OF FLEET AIRCRAFT

75% of Fleet	100% of Fleet
British Aerospace – Bae 125-700	British Aerospace – Bae Corporate 800, 1000
Beechcraft, Mitsubishi – Beech Jet - 400A, Premier I	Bombardier – Challenger 600, 601-3A/3ER, 604
Bombardier – Challenger 300	Cessna – S550 Citation S/II, 650 Citation III/IV, 750 Citation X
Cessna – Citation I, II, III, V, VII, CJ-2, Bravo, Excel, Encore, Sovereign	Dassault – Falcon 900C/900EX, 2000/2000EX
Dassault – Falcon 10, 20, 50	IAI – Astra 1125, Galaxy 1126
Israel Aircraft Industries – Jet Commander 1121, Westwind 1123/1124	Learjet – 45XR, 55/55B/55C, 60
Learjet – 20 series, 30 series, 40, 45	Raytheon Hawker – Horizon, 800/800 XP, 1000
Raytheon Hawker – Hawker 400, 600	Sabreliner – 65/75
Rockwell – Sabreliner 75A	

Source: FAA AC 150/5325-4B
Notes: 1. Red text indicates aircraft operating at the Aurora State Airport according to TFMSC data.

Table 4-5 summarizes 10 years of historical jet aircraft instrument flight plan filings for the Aurora State Airport. The filings provide a reliable indication of jet activity at the Airport, which has consistently included more than 500 annual operations for aircraft in the 100% of fleet grouping. Based on FAA criteria, use of the 100% of fleet runway length curves is appropriate for the Aurora State Airport.

TABLE 4-5: TFMSC IFR DATA - SELECT JET AIRCRAFT WITH MAXIMUM CERTIFICATED TAKEOFF WEIGHT OF MORE THAN 12,500 POUNDS

	Aircraft Designator	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Operations by Aircraft that make up 75% of the Fleet Group											
BAE HS 125	HS25	2	0	0	0	0	0	0	0	0	0
Beechjet 400/400A/400XP*	BE40	32	66	46	34	26	14	4	6	24	38
Beechjet Premier/Raytheon 390 Premier	PRM1	70	100	88	76	68	4	16	12	4	4
Bombardier Challenger 300	CL30	32	102	72	74	78	104	88	80	62	54
Bombardier Challenger 350	CL35	0	0	0	4	2	0	22	56	84	108
Cessna 500 Citation I	C500	0	4	8	0	20	20	2	0	0	0
Cessna 501 Citation I Special	C501	78	70	46	14	16	12	30	16	8	20
Cessna Citation CJ-2	C25A	44	68	178	82	74	188	234	154	100	184
Cessna Citation CJ-3	C25B	46	36	26	102	86	106	90	306	182	66
Cessna Citation CJ-4	C25C	6	12	2	4	10	72	60	636	678	790
Cessna 550 Citation II/Bravo	C550	212	134	164	226	262	158	212	174	138	162
Cessna 550 Citation Bravo	C55B	0	0	0	0	0	0	6	0	0	16
Cessna 551 Citation II/Special	C551	6	4	6	14	56	26	12	0	4	0
Cessna 560 Citation V Encore/Ultra	C560	366	498	466	590	694	774	708	632	546	626
Cessna 560 XL Citation Excel/XLS	C56X	106	118	132	260	318	400	438	396	340	286
Cessna 680 Citation - Latitude	C68A	0	0	0	0	0	4	10	30	30	40
Cessna 680 Citation Sovereign	C680	64	56	68	72	66	90	140	150	140	254
Cessna 700 Citation - Longitude	C700	0	0	0	0	0	0	0	0	0	18
Dassault Falcon 10	FA10	64	74	70	92	20	0	10	0	0	0
Dassault Falcon 20	FA20	94	86	28	14	98	74	76	68	66	82
Dassault Falcon 50/EX*	FA50	16	32	108	228	320	332	276	286	216	306
Embraer EMB545/Legacy 450	E545	0	0	0	0	2	2	0	0	4	2
Embraer ERJ 135/140/Legacy	E135	0	4	6	0	2	2	0	0	0	0
Embraer Legacy 500	E550	0	0	0	0	0	2	0	0	0	4
Embraer Phenom 300	E55P	14	106	98	96	88	130	56	80	256	434
Hawker 600	H25A	0	0	2	0	0	0	0	0	0	0
IAI Westwind 1124	WW24	10	8	4	2	10	2	2	4	0	0
Learjet 28	LJ28	0	0	0	2	0	0	0	0	0	0
Learjet 31	LJ31	4	2	0	0	6	54	92	110	32	22
Learjet 35	LJ35	2	8	18	0	4	6	8	4	0	12
Learjet 40	LJ40	10	0	8	0	4	0	2	0	2	6
Sabreliner 40/60	SBR1	2	4	0	2	2	0	0	0	2	0
Operations by Aircraft that make up 100% of the Fleet Group											
Bombardier Challenger 600/601/604	CL60	126	122	36	12	68	82	64	60	96	78
Cessna 650 Citation III/IV	C650	94	92	120	144	122	126	104	68	68	42
Cessna 750 Citation X	C750	60	76	92	94	102	100	108	92	84	38
Dassault Falcon 2000/EX	F2TH	2	14	6	4	6	4	40	134	124	366
Dassault Falcon 900C/EX	F900	180	148	48	10	56	82	70	110	32	24
Dassault Falcon F7X	FA7X	0	0	0	0	0	0	6	4	2	0
Gulfstream 150	G150	2	0	0	2	2	6	80	24	4	2
Gulfstream 280	G280	0	0	6	2	0	0	0	2	0	2
Hawker 700/800/800XP	H25B	224	212	316	118	42	28	34	22	8	32
Hawker Horizon	HA4T	2	2	2	0	0	0	0	2	2	6
IAI Astra 1125	ASTR	178	152	164	114	160	162	96	14	0	4
IAI Galaxy 1126	GALX	8	10	16	0	2	4	0	4	2	2
Learjet 45	LJ45	116	156	180	236	242	212	112	140	124	208
Learjet 55	LJ55	0	2	0	0	2	0	4	2	0	0
Learjet 60	LJ60	2	4	10	82	36	14	30	16	6	10
Operations by Aircraft with Maximum Takeoff Weight > 60,000 lbs											
Gulfstream II/G200	GLF2	2	0	0	0	0	0	0	0	0	0
Gulfstream III/G300	GLF3	0	0	2	2	2	0	0	0	0	2
Gulfstream IV/G400	GLF4	4	0	4	0	2	6	2	8	26	88
Gulfstream V/G500	GLF5	6	10	4	2	0	4	2	0	4	6
Gulfstream VI/G600	GLF6	0	0	0	0	6	4	2	0	0	0
Bombardier Global 5000	GL5T	0	0	0	0	0	0	0	2	0	0
Bombardier Global Express	GLEX	18	10	4	8	0	14	50	52	10	0
Total		2304	2602	2654	2818	3182	3424	3398	3956	3510	4444
Operations by 75% of the Fleet Group Aircraft		1280	1592	1644	1988	2332	2576	2594	3200	2918	3534
Operations by 100% of Fleet Group Aircraft**		1024	1010	1010	830	850	848	804	756	592	910

Source : FAA TFMSC Data; Notes: 1. **Total Operations by 100% of Fleet Group Aircraft includes Operations by Aircraft with Maximum Takeoff Weight > 60,000 lbs.

Aircraft Useful Load

Once the appropriate runway length curve set is identified based on percentage of aircraft fleet, an additional step is required to determine the appropriate useful load factor that applies to the aircraft operating at the Aurora State Airport. Useful load factors are based on the haul lengths and service needs of the design aircraft or a grouping of aircraft.

The FAA requires use of either 60% or 90% of useful load factors as described in Paragraph 303 of *AC 150-5325-4B*. Paragraph 303 explains that the *"75% of fleet at 60% useful load curve provides a runway length sufficient to satisfy the operational requirements of approximately 75% of the fleet at 60% useful load. This figure is to be used for those airplanes operating with no more than a 60% useful load factor."*

To justify a runway length based on the higher demand profile of 90% useful load curves, FAA requires documentation of 500 annual takeoffs and landings to/from airports beyond 1,000 nautical miles (NM) by aircraft in the 100% of fleet group. Traffic Flow Management System (TFMS) Flight plan data acquired from FAA through a Freedom of Information Act (FOIA) request was queried to identify operations by aircraft included in the 100% of fleet group originating at or departing from the Aurora State Airport. Operations between the identified city-pairs with distances of at least 1,000 NM were totaled. This exercise did not identify 500 annual operations by aircraft in the 100% of the fleet group traveling at least 1,000 miles. As a result, the 60% useful load curves should be used in determining runway length requirements.

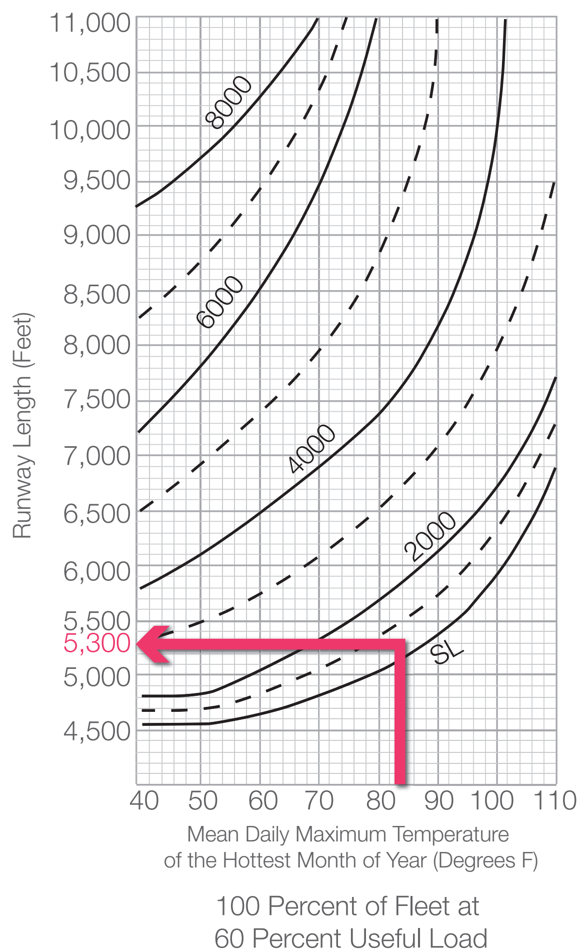
Runway Length Calculation

Figure 4-4 depicts the runway length curves for 100% of the fleet group with 60% useful loads identified in Figure 3-2 of *AC 150-5325-4B*. The Aurora State Airport is located at an elevation of 199.8 feet above mean sea level (MSL) and the mean maximum temperature (the average daily high temperature for the hottest month of the year) is 83°F.[4] Based on these inputs and the FAA runway length curves for 100% of fleet at 60% useful load, an unadjusted runway length of 5,300 feet is identified.

Further adjustment of the above length is required to account for effective runway gradient and wet and slippery conditions. It should be noted that these adjustments are not cumulative since the first adjusts for takeoffs and the latter adjusts for landings. After both adjustments have been independently applied, the larger resulting runway length is the standard methodology's recommended length.

Runway gradient is addressed by increasing the unadjusted runway length at a rate of 10 feet for each 1-foot of difference between runway high and low points. The runway has an elevation difference of 3.3 feet resulting in an adjusted runway length of 5,333 feet. For the 60% useful load fleet group, adjustments for wet and slippery conditions can increase the runway length either by 15% or up to a maximum of 5,500 feet, whichever is less. Applying a 15% adjustment to the runway length calculated above exceeds 5,500 feet. So, the recommended length is increased to 5,500 feet to satisfy the requirements for the wet/slippery conditions.

FIGURE 4-4: 100% OF FLEET AT 60% USEFUL LOAD CURVES



Source: FAA Advisory Circular 150/5325-4B

4 NOAA National Centers for Environmental Information, https://www.ncei.noaa.gov/access/us-climate-normals/

Summary of Comments on 4 UAO_Airport Facility Requirements_31424 FAA Review Copy - CWE Responses 20240411.pdf

Page: 4-15

Number: 1 Author: Mobile User Date: 4/11/2024 10:34:53 AM

When was this done? Was this prior to my activity with this project?

Author: Mark Steele Subject: Sticky Note Date: 4/11/2024 10:34:53 AM

The data were requested via FOIA in January 2022.

Based on local conditions, the standard methodology outlined above and in *AC 150-5325-4B*, and direction from FAA-SEA ADO, a runway length of 5,500 feet is required to accommodate 100% of large airplanes (60,000 pounds or less maximum gross takeoff weight) at 60% useful load for the current 20-year planning period.

- FACILITY REQUIREMENT. Consistent with FAA planning methodologies and direction from FAA-SEA ADO, a runway length of 5,500 feet at the Aurora State Airport defines the justified runway length for the planning and analyses to be performed in Chapter 5 – Development Alternatives.

RUNWAY WIDTH

Runway 17/35 is 100 feet wide with 10-foot-wide paved and gravel shoulders. The existing runway configuration meets the current and future FAA design standards defined for AAC/ADG C-II. Runway 35 has a paved blast pad (100 feet wide by 150 feet long). The Runway 17 end does not have a blast pad.

- FACILITY REQUIREMENT. The runway width and shoulders should be maintained at the existing width of 100 feet (with 10-foot shoulders). The blast pad adjacent to Runway 35 should be widened and adding a blast pad at the Runway 17 end is recommended based on current jet aircraft activity and common runway utilization.

FAA DESIGN STANDARDS

Runway Blast Pads

Existing/Future Standards: The AAC/ADG C-II standard for a blast pad is 120 feet wide and 150 feet long.

Condition: Runway 35 has a blast pad that is 100 feet wide and 150 feet long. Runway 17 does not have a blast pad. The Runway 35 blast pad should be widened to meet standards, while a new blast pad should be constructed for Runway 17.

RUNWAY PAVEMENT STRENGTH

The existing published weight bearing capacity for Runway 17/35 is 30,000 pounds for aircraft equipped with single wheel gear (SWG) and 45,000 pounds for dual wheel gear (DWG) aircraft. Runway pavement strength and weight rating has become an important issue due an increase in aircraft landing requests submitted to airport management for aircraft over 60,000 pounds. The existing and future design aircraft is categorized as AAC/ADG C-II. A review of the FAA Aircraft Characteristics Database (2023), identified a range of maximum takeoff weight (MTOW) for AAC/ADG C-II between 21,500 pounds and 75,000 pounds for the 26 aircraft listed, including the Challenger 600 (CL60) which has a MTOW of 36,200 pounds. All of the listed aircraft are equipped with dual wheel landing gear.

The current runway pavement section was constructed in 2005 and is reaching the end of its 20-year design life. Operations by aircraft that exceed the runway's published weight bearing capacity may be expected to cause premature pavement stress and reduce the remaining lifespan of the runway pavement. As indicated in earlier documentation of air traffic, operations by aircraft with 12,500- to 60,000-pound operating weights at the Aurora State Airport are significant in volume and growing (see **Table 4-5**). The Airport also has on occasion accommodated limited operations by aircraft greater than 60,000 pounds.

The forecast increase in demand by aircraft weighing 45,000 to 60,000 pounds may warrant strengthening the runway pavement section as part of the next runway reconstruction project. This would prolong the service life of the runway and would provide additional durability for the limited amount of activity that exceeds 60,000 pounds. There is minimal demand for SWG aircraft above 30,000 pounds. Additional fleet mix analysis will be required by FAA to justify a change in pavement section design. This work is outside the airport master plan scope of work and would be performed in a pre-design element of project formulation.

- FACILITY REQUIREMENT. Maintain current weight bearing capacity, and perform additional engineering and fleet mix analyses to determine the appropriate runway pavement strength consistent with future pavement rehabilitation needs.

Page: 4-16

Number: 1 Author: Timothy A House Subject: Comment on Text Date: 4/11/2024 10:34:53 AM
This is not referenced in the adjacent paragraphs. What does this mean?

> Author: Mark Steele Date: 4/11/2024 10:36:51 AM
> This is worded poorly. It should say "in coordination with FAA-SEA ADO". We'll update the text.

Number: 2 Author: Mobile User Date: 4/11/2024 10:34:53 AM
Not required. Is there a current erosion issue that would justify the addition of the blast pad?
See AC 150/5300-13B Chapter 3.7.4.2 Recommended Practices.

> Author: Mark Steele Date: 4/11/2024 12:51:55 PM
> It is correct that blast pads are not a requirement or a recommendation for ADG-II runways. However it is generally good practice to include blast pads on runways servicing jets to prevent erosion issues. We will change the requirement to a facility goal.

RUNWAY DESIGN STANDARDS

Runway 17/35 meets applicable FAA dimensional and clearance standards with two exceptions:

Runway Protection Zones (RPZ) – Portions of the existing RPZs extend off airport property and contain public roads. These issues are related to FAA land use compatibility guidelines.

Runway Object Free Area (OFA) – Portions of the existing OFA extend off airport property and contain public roads. Vehicles traveling on the roads penetrate the OFA. One helicopter parking position located south of the ATCT is located within OFA.

These items are discussed further in this chapter and in evaluations (RPZ Analysis and OFA Modification of Standards [MOS] Analysis) that will be completed as supporting elements for the Airport Master Plan's airside alternatives analyses.

A review of the applicable design standards is provided in the following section. Definitions of design standards and brief summaries of existing conditions are provided in the adjacent sidebars. As noted in **Table 4-1**, presented earlier in the chapter, the current AAC/ADG C-II design standards applied to the runway-taxiway system are consistent with runway approach visibility minimums "not lower than 3/4-mile." This standard corresponds to current instrument approach visibility minimums of 7/8-mile since the next incremental visibility threshold available is "not lower than 1-mile."

Runway Protection Zone

The FAA provides interim guidance regarding RPZs and incompatible land uses with a particular focus on roads located within RPZs. This guidance directs airport sponsors to evaluate any planned changes to existing RPZs that introduce or increase the presence of roads within the RPZ.[5] FAA *AC 150/5300-13B* (Appendix I, Section 3) also provides current FAA guidance on permissible land uses within the limits of RPZs.

FAA guidance recommends the evaluation of existing roads in RPZs during airport master planning to determine if feasible alternatives exist for realignment of a road outside RPZs or for changes to the RPZs themselves. The FAA Seattle ADO has indicated that the primary focus of their review under this guidance is related to proposed changes to RPZs, which may include change to a runway end/RPZ location, approach visibility minimums, or the built items located in an RPZ. Any proposed changes in the length or threshold configuration of a runway that changes the location of existing RPZs are subject to review by FAA headquarters in Washington D.C.

FAA DESIGN STANDARDS

RPZ

Existing Standard: AAC/ADG C-II/not lower than 3/4-mile RPZs (48.978 acres). RPZs should be owned by the Airport or under control by easement and should be clear of incompatible land uses such as roads and buildings.

Future Standard (Options): Maintain existing standard or apply AAC/ADG C-II/not lower than 1-mile RPZs (29.465 acres) if instrument approach visibility minimums are changed from 7/8-mile to 1-mile.

Condition: Both Runway 17 and 35 RPZs have areas that are outside of ODAV-owned land and contain multiple incompatible land uses. As part of this Airport Master Plan, an analysis of the existing and proposed RPZs will be evaluated as part of the development alternatives analysis to identify an agreeable solution to address the incompatibilities.

The FAA also encourages airport sponsors to control RPZs through fee simple ownership. In cases where ownership is not in place, easements are used to control activities within the RPZ. Both RPZs for Runway 17/35 have small areas that extend beyond ODAV-owned property. ODAV has secured Avigation (FAA term: Air + Navigation) easements for these sections of the existing RPZs.

5 FAA September 27, 2012, Interim Guidance on Land Uses Within a Runway Protection Zone

Page: 4-17

Number: 1 Author: Mobile User Date: 4/11/2024 10:34:53 AM
The interim guidance memo was replaced. AC-150/5190-4B issued on 9/16/2022 is the latest guideline for RPZ.

Author: Mark Steele Date: 4/11/2024 12:35:17 PM
We've updated the text to reflect the current guidance

Number: 2 Author: Mobile User Date: 4/11/2024 10:34:53 AM
This has been replaced.

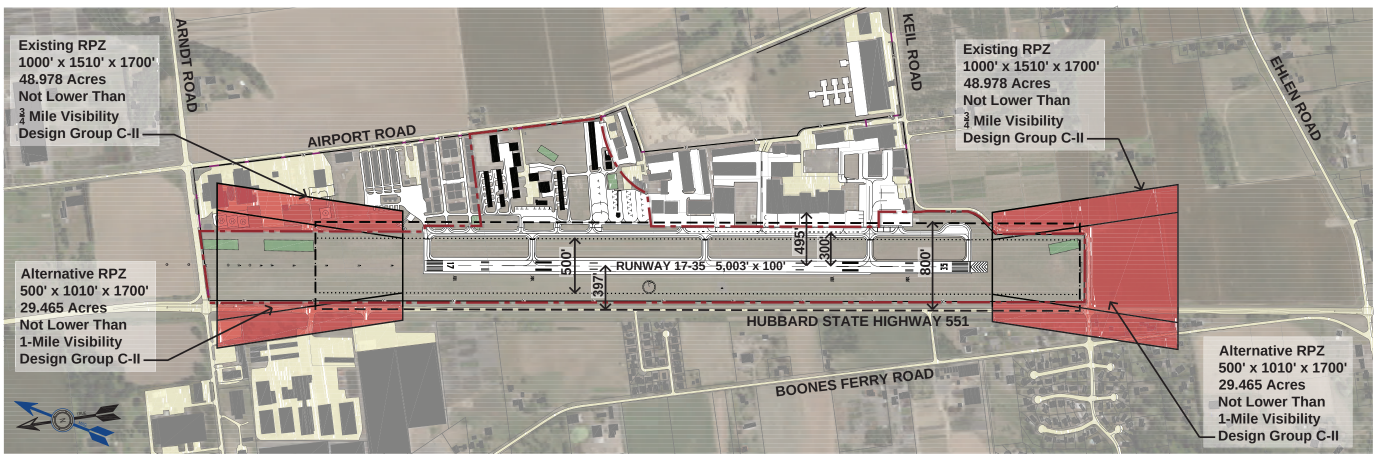
Author: Mark Steele Date: 4/11/2024 12:35:34 PM
We've updated the text to reflect the current guidance

The existing AAC/ADG C-II RPZ dimensions for Runway 17/35 are determined by the lowest published IAP visibility minimums of 7/8-mile. The corresponding RPZ dimensional standard is incrementally defined by FAA for runway approach visibility minimums "not lower than 3/4-mile" since the next available visibility increment is "not lower than 1-mile," which is not compatible with approaches having 7/8-mile visibility minimums.

For the purposes of this evaluation both the existing and an optional RPZ are displayed in **Figure 4-5**. The optional RPZ corresponds to dimensional standards defined for "approach visibility minimums not lower than 1-mile." As depicted in the figure, sections of both the existing (not lower than 3/4-mile) and optional (1-mile) RPZs for Runways 17 and 35 have identified land use incompatibilities. The size of future RPZs in relation to approach visibility requirements and land use compatibility will be assessed further in Chapter 5 – Development Alternatives Analysis.

- FACILITY REQUIREMENT. Based on the conformance issues identified, it is recommended that existing and future RPZ land use compatibility be evaluated further and coordinated with FAA through the alternatives analysis process.

FIGURE 4-5: RUNWAY 17/35 PROTECTIONS ZONES NON-STANDARD CONDITIONS



Source: Century West Engineering

Object Free Area (OFA)

The runway OFA is a flat surface that sits at the same elevation as the runway. The OFA should be clear of terrain and above ground objects except for those required for air navigation or aircraft ground maneuvering purposes. *FAA AC 150/5300-13B* defines both dimensional and obstruction clearance standards for runway OFAs.

The OFA for Runway 17/35 has been identified as a nonstandard condition due to fencing, public roads, privately owned helicopter landing pads and roads, windcone, ASOS, and other objects located outside of ODAV property control, as depicted in **Figure 4-6**. As part of this Airport Master Plan, an OFA MOS analysis will be completed as part of Chapter 5 – Development Alternatives Analysis.

FAA DESIGN STANDARDS

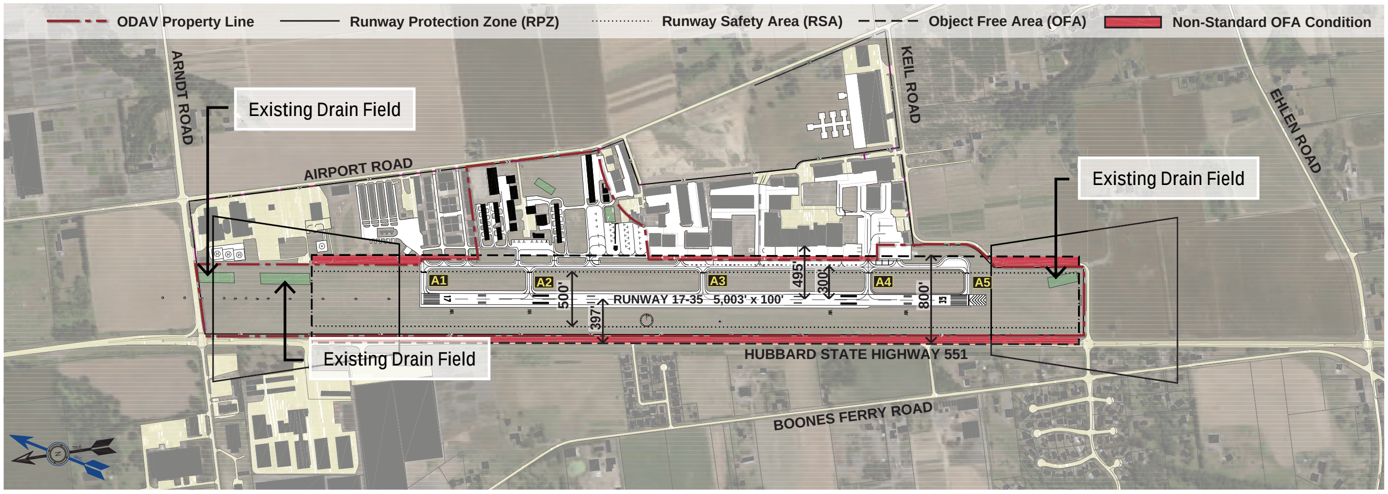
Runway OFA

Existing/Future Standards: AAC/ADG C-II/not lower than 3/4-mile standard is 800 feet wide (400 feet each side of runway centerline) and 1,000 feet beyond the runway ends. The OFA should be clear of above ground objects except for those required for air navigation or aircraft ground maneuvering purposes. Additional gradient standards apply.

Condition: The OFA for Runway 17/35 includes non-standard conditions such as fencing, public roads, and other objects off airport property that are located within the OFA. As part of this Airport Master Plan, an OFA MOS analysis will be completed as part of Chapter 5 – Development Alternatives Analysis.

- FACILITY REQUIREMENT. Based on the facility needs identified in Chapter 4, it is recommended that the existing and future OFA be evaluated further and coordinated with FAA in the scoped OFA MOS Analysis as part of Chapter 5 – Development Alternatives Analysis.

FIGURE 4-6: RUNWAY OBJECT FREE AREA NON-STANDARD CONDITIONS



Source: Century West Engineering

Runway Safety Area (RSA)

The RSA is a flat surface that sits at the same elevation as the runway and is intended to be clear of terrain and above ground objects. The RSA is intended to enhance the safety of aircraft that overshoot, overrun, or veer off the runway, as well as to provide access for Aircraft Rescue and Firefighting (ARFF) equipment during such incidents. *FAA AC 150/5300-13B* defines dimensional, gradient, surface condition, and obstruction clearance standards for the RSA.

The RSA for Runway 17/35 meets AAC/ADG C-II design standards with the exception of the drain field located in the southeast corner of the RSA, the drainage ditch along Taxiway A, the ASOS, and windcone on the west side of the runway. The compatibility of non-standard items and potential mitigation strategies will be evaluated in Chapter 5 – Development Alternatives Analysis.

- FACILITY REQUIREMENT. AAC/ADG C-II RSA standards must be met and maintained for the existing runway and applied to any future runway configuration options evaluated in the development alternatives analysis.

Obstacle Free Zone (OFZ)

The AAC/ADG C-II standard width for the Runway 17/35 OFZ is 400 feet based on operations by large aircraft. The OFZ extends 200 feet beyond the runway ends. FAA definition, the runway OFZ clearing standard *"precludes aircraft and other object penetrations, except for frangible NAVAIDs that need to be located in the OFZ because of their function."*

FAA DESIGN STANDARDS

RSA

Existing Standard: AAC/ADG C-II/not lower than 3/4-mile standard is 500 feet wide (250 feet each side of runway centerline) and 1,000 feet beyond runway ends. The RSA should be cleared and graded with no objects higher than 3 inches above grade, except for FAA-approved items that are frangible (breakaway mounts). Additional gradient and surface compaction standards apply.

Condition: There are several items within the RSA for Runway 17/35 including the drain field, drainage ditch, ASOS, and windcone that will be studied further within the development alternatives. Future runway planning will require that the FAA standards are maintained.

Runway OFZ

Existing/Future Standards: Runway OFZ standards are based on approach visibility minimums of the runway, and the size and approach speeds of the aircraft using the runway. The standard for runways used by large aircraft are 400 feet wide or 200 feet each side of runway centerline and 200 feet beyond runway ends.

Inner-Approach OFZ

Existing/Future Standards: For runway ends with an approach lighting system (ALS), such as Runway 17, an inner-approach OFZ is required. By FAA standard, the inner-approach OFZ begins 200 feet from the runway end (at the same elevation) and extends 200 feet beyond the last light unit in the ALS. Its width is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning.

Condition: Runway 17/35 meets the FAA dimensional and obstacle clearing standards for runway OFZ and the inner-approach OFZ (for Runway 17). Future runway planning will require that the FAA standards are maintained.

The OFA for Runway 17/35 and the inner-approach OFZ for Runway 17 meet AAC/ADG C-II design standards. In the event an ALS is proposed for Runway 35, the inner-approach OFZ standards would apply.

- FACILITY REQUIREMENT. AAC/ADG C-II OFZ standards must be maintained for the existing runway and applied to any future runway configuration options evaluated in Chapter 5 – Development Alternatives Analysis.

Runway Markings

The markings on Runway 17/35, as noted in Chapter 2 – Existing Conditions Analysis, are consistent with FAA standards for color (white), configuration, and approach type, and are in good condition. The Runway 17 and 35 end identifiers (numbers) are based on the magnetic heading of each runway end. Runway end numbers are periodically updated based on the ongoing change in magnetic variation. The runway's alignment relative to magnetic north will be evaluated to determine if a change in runway designation will be required in the current planning period.

- FACILITY REQUIREMENT. Runway markings should be maintained consistent with FAA standards. Periodic repainting should be incorporated into the ODAV Pavement Maintenance Program.

TAXIWAYS AND TAXILANES

The existing taxiway and taxilane systems on ODAV property were analyzed relative to the runway, apron, and aircraft parking requirements, hangars, and FAA design standards. Existing taxiway markings at the Airport are consistent with FAA standards for color (yellow) and configuration, and are generally in good condition.

The existing runway to parallel taxiway centerline separation for Taxiway A is 300 feet, which meets the current C-II standard.

It is noted that existing parallel taxiway separation would not meet the standard of 400 feet for C-II runways with lower than 3/4-mile visibility minimums. Due to other facility limitations associated with implementing "lower than 3/4-mile visibility minimums," it is unlikely that visibility minimums will be reduced.

Taxiway A, the run-up apron at the south end of the taxiway, and connector taxiways (A1-A5) generally meet standards with several notable exceptions, as depicted in **Figure 4-7**.

Two FAA-designated hot spots exist on the Aurora State Airport taxiway system. A hot spot is 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. The hot spots and other locations on the Taxiway A system that warrant further consideration are summarized below:

- Hot Spot #1 is located at Taxiway A and A1. Based on previous discussions with FAA, it is understood that this hot spot will be removed from the designation list if proper marking and signage is installed. Airport management reports that the signage and appropriate markings have been updated. Further discussion with FAA will be required to remove the designation from the FAA Hot Spots List database.
- Hot Spot #2 is located at Taxiway A and A4. This location is identified as a "direct access" taxiway and solutions to address this non-standard condition will be considered during the development alternatives analysis.

FAA DESIGN STANDARDS

Runway to Parallel Taxiway Separation
Existing/Future Standards: AAC/ADG C-II/not lower than 3/4-mile standard is 300 feet.

Condition: The parallel taxiway (Taxiway A) for Runway 17/35 has a centerline-to-centerline separation of 300 feet.

Parallel Taxiway to Taxilane Separation
Existing/Future Standards: The separation standard between a parallel taxiway and an adjacent parallel taxilane is based on ADG. The ADG II standard is 101.5 feet.

Condition: The centerline-to-centerline separation between Taxiway A and the north side hangar taxilanes is 105 feet and exceeds standards. Future development of any parallel taxiway/taxilanes will meet the standards of the ADG/TDG for which they are designed.

Taxiway Width
Standards: TDG 2A/2B standard taxiway width is 35 feet.

Condition: Taxiway A and the five connector taxiways (A1-A5) meet the FAA dimensional standard (width). Future taxiways will be required to meet the ADG/TDG standards for the intended aircraft use.

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Number: 1 Author: Timothy A House Subject: Comment on Text Date: 4/11/2024 10:34:53 AM

I am not sure that the signage and marking improvements has occurred. When were the improvements completed and specifically what were they. This type of discussion was not had at the latest RSAT.

Author: Mark Steele Date: 4/11/2024 12:54:20 PM

We've updated the text to reflect the current status of the markings and signs - Markings have been updated, signs will be updated in a future project.

Two interior runway connector taxiways (A3 and A4) provide a direct access path to the runway from adjacent apron parking areas. The aprons have a wide expanse of unbroken pavement fronting the east edge of Taxiway A, between Taxiway A3 and A4. These direct access conditions and the wide expanse of pavement are not consistent with current FAA taxiway design guidance. Changes in pavement configuration will be evaluated in the airside alternatives analysis. Options may include increasing the distinction between apron and taxiway pavements, limiting the number of aircraft access points along this section of Taxiway A, and modifying the direct paths in the A3 and A4 runway-taxiway-interface to improve pilot situational awareness and reduce the potential for inadvertent runway incursions.

FAA DESIGN STANDARDS

Taxiway Safety Area (TSA)

Standards: ADG II standard is 79 feet wide or 39.5 feet each side of the taxiway centerline for the entire length of the taxiway. Additional gradient standards apply.

Condition: The existing TSAs on the Airport meet FAA dimensional and grading standards. Future taxiway improvements will be required to meet the standards of the ADG for which they are designed.

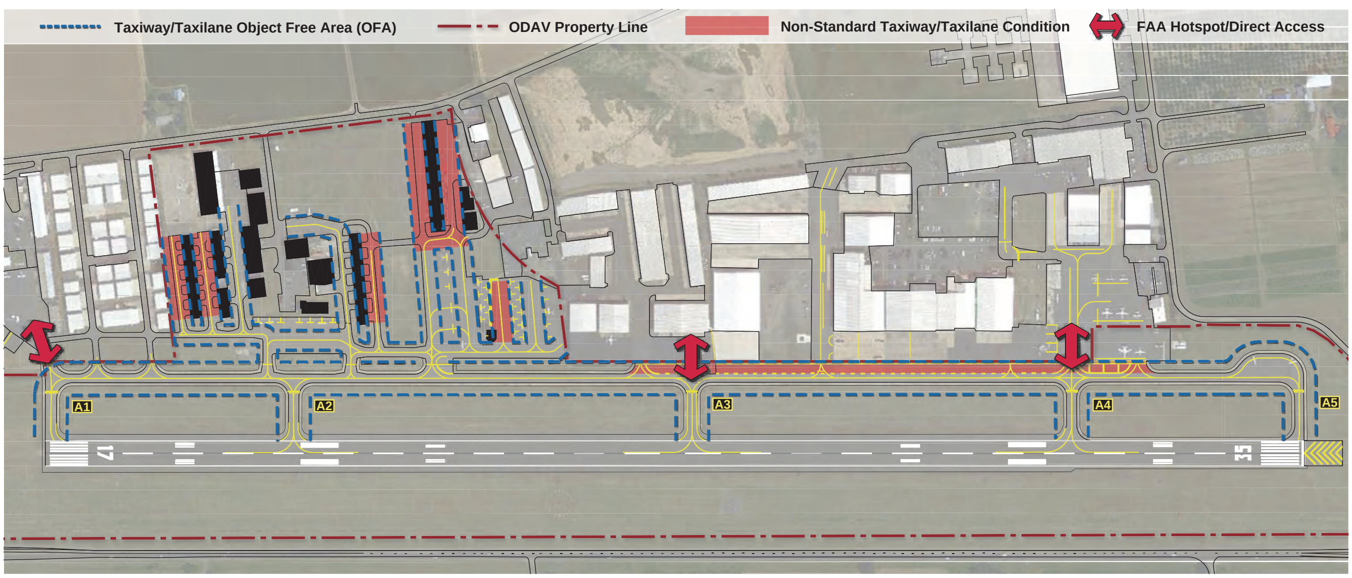
Taxiway Object Free Area (TOFA)

Standards: ADG II standard is 124 feet wide or 62 feet each side of taxiway centerline.

Condition: The TOFA for Taxiway A and Taxiways A1-A5 satisfy FAA dimensional and obstacle clearing standards for ADG II. Future taxiway improvements will be required to meet the standards of the ADG for which they are designed.

The north end of runway/taxiway system does not currently have a designated aircraft runup area. A review of options will be performed in the airside alternatives analysis near Taxiways A1 and A2. Options may include concepts for both ODAV property and private property that were explored in a recent environmental assessment. It is noted that options that were previously considered, which included acquisition of private property were met with resistance from existing airport users and were ultimately excluded from the scope of work in the environmental assessment. A potential site located on ODAV property near Taxiway A2, adjacent to the old fuel pumps, has been identified as a possible location to be considered during the development alternatives process.

FIGURE 4-7: TAXIWAY / TAXILANE NON-STANDARD CONDITIONS



Source: Century West Engineering

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Number: 1 Author: Timothy A House Subject: Comment on Text Date: 4/11/2024 10:34:53 AM

This geometry configuration is challenging. It does not meet the standards. There is direct access and the connector taxiway is supposed to have a radius where it turns to align with the threshold. Since this is private land our options are limited, but the geometry needs addressed.

Author: Mark Steele Date: 4/11/2024 11:04:11 AM

Agreed that this is a challenging geometry to work with. We've added text concerning the direct access at A1 in the previous paragraph. Options for a runup area will be evaluated in the alternatives analysis. Both the direct access issues and runup area are included as facility requirements on the next page.

The taxilane object free area (TLOFA) standard for ADG II aircraft is 110 feet (55 feet each side of centerline). The ADG II standard is applied to much of the airfield on ODAV property. ADG I TLOFA standards—79 feet (39.5 feet each side of centerline)—are applied to several small aircraft areas. By FAA standard, the TLOFA should be free of items that could create a hazard for taxiing aircraft including parked aircraft, hangars, fences, other built items, and natural terrain. It is common for taxilanes serving aircraft parking aprons and hangar developments to be designed to meet the standards of a particular group of aircraft using the facilities.

The taxilanes in the apron area adjacent to the ATCT generally meet FAA TLOFA dimensional standards for ADG I and ADG II aircraft, where applicable. Future Improvement of taxilanes associated with apron and aircraft parking expansion will meet the standards of the ADG for which they are designed.

Several taxilanes located between hangar rows have non-standard TLOFA widths due to building separation and other obstructions like fencing on adjacent private property. The TLOFAs in these areas range from 69 to 79 feet. The areas where the TLOFA is narrower than required by standards are not typically considered to be deficient by airport users based on the aircraft using the facilities. *AC 150/5300-13B* provides guidance for calculating appropriate taxilane centerline to object separation distance based on the wingspan of the most demanding aircraft anticipated to use the taxilane.

The equations offered in the AC include:

- Taxiway centerline to object separation equals 0.7 times airplane wingspan plus 10 feet.
- Taxiway centerline to object separation equals 0.6 times airplane wingspan plus 10 feet.

Doubling the results of the above equations yields in a TLOFA width appropriate for that or smaller aircraft

For a typical single-engine fixed-wing aircraft or light-twin aircraft with a 41-foot wingspan, the FAA formula yields a recommended TLOFA of 69 feet wide. Options to provide standard TLOFA widths on ODAV-owned property will be considered in Chapter 5 – Development Alternatives Analysis. For long-term hangar redevelopment, the FAA may require standard TLOFAs, if physically feasible, as hangars are replaced at the end of their useful life.

- FACILITY REQUIREMENT. Coordinate completed mitigation on Hot Spot #1 with FAA to remove from the FAA's active list.

- FACILITY REQUIREMENT. Evaluate modifications to Hot Spot #2 to identify an acceptable solution/redesign for Taxiway A4 in Chapter 5 – Development Alternatives Analysis.

- FACILITY REQUIREMENT. Define measures required to correct the "direct access" taxilane at Taxiway A and A3 by identifying an acceptable solution/redesign in Chapter 5 – Development Alternatives Analysis.

- FACILITY REQUIREMENT. Evaluate north aircraft runup area options at the north end of Taxiway A in Chapter 5 – Development Alternatives Analysis.

- FACILITY REQUIREMENT. Evaluate TLOFA clearance options for taxilanes in Chapter 5 – Development Alternatives Analysis.

- FACILITY GOAL. Taxiway markings should be maintained consistent with FAA standards. Periodic repainting should be incorporated into the ODAV Pavement Maintenance program.

APRONS AND TIEDOWNS

Transient aircraft are typically stored on the Airport for short periods of time, typically less than a day. Based aircraft may be stored either in hangars or on apron tiedowns. However, national and local trends have shown it is the preference of aircraft owners to favor hangars when storing their aircraft at their base airport, rather than using outside parking on aprons. For the purposes of this study, it is assumed that based aircraft will be accommodated predominately by hangar storage and additional future demand for apron parking will be driven by transient aircraft. The anticipated demand for long-term tiedowns for based aircraft is expected to be small and can be incorporated into the transient demand.

Past planning studies have quantified transient tiedown demand using an FAA methodology that has since been removed from *AC 150/5300-13B*. An alternative method described in **Airport Cooperative Research Program (ACRP) Report 113** was used instead. The ACRP method applies the following formula to operations fleet mix forecast to estimate future demand for transient aircraft parking:

*(X/2 * T)/365 * P = Number of Transient Parking Positions*

Where:

X = number of operations

T = percent of operations that are transient (51% at the Aurora State Airport)

P = percent of transient aircraft that are parked on the apron at the same time (50% estimated)

The ACRP formula was applied to operations fleet mix forecast estimates in Table 3-18 in Chapter 3 to calculate the number of additional transient aircraft tiedown spaces needed over the 20-year planning period. Previous planning studies identified a standard ratio of 360 square yards (3,250 square feet) of apron per tiedown intended for a single-engine piston aircraft, such as the Cessna 182, to account for taxilanes and required spacing between aircraft. This area is 3.1 times the footprint area of the Cessna 182. To scale up to other types of aircraft and calculate the apron space needed, the same multiplier was applied to the corresponding footprint areas of the representative aircraft for each aircraft type. The anticipated transient aircraft parking positions and required apron space are summarized in **Table 4-6**.

TABLE 4-6: TRANSIENT AIRCRAFT TIEDOWN AND APRON REQUIREMENTS

	Single Engine Piston	Multi Engine Piston	Turbo-prop	Jet	Helicopter	Total
Additional Transient Aircraft Parking						
2026	1	(1)	1	1	1	3
2031	1	(1)	1	1	1	3
2041	(2)	(1)	2	3	1	3
Total	**0**	**(3)**	**4**	**5**	**3**	**9**
Additional Apron Area (sq. ft)						
2026	3,250	(5,200)	7,400	9,200	4,100	18,750
2031	3,250	(5,200)	7,400	9,200	4,100	18,750
2041	(6,500)	(5,200)	14,800	27,600	4,100	34,800
Total	**0**	**(15,600)**	**29,600**	**46,000**	**12,300**	**72,300**

Source: Century West Engineering

It should be noted that the operations fleet mix forecast projects a decrease in operations by multi-engine piston aircraft. This results in a decrease of three parking positions required to accommodate these aircraft. As this transition occurs, these tiedown locations should be repurposed to accommodate demand by other aircraft.

- FACILITY REQUIREMENT. An additional 72,300 square feet of apron is needed during the current planning period to accommodate projected demand. The need for an additional 9 aircraft parking positions is defined over the course of the planning period.

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Number: 1 Author: Timothy A House Subject: Comment on Text Date: 4/11/2024 10:34:53 AM

Appendix E? How does this ACRP method compare?

Author: Mark Steele Date: 4/11/2024 12:19:18 PM

Appendix E provides general guidelines for determining parking apron area needed. The ACRP method largely incorporates these guidelines. One notable difference is that the ACRP method bases demand on average daily operations while Appendix E recommends using operations at average peak period.

Number: 2 Author: Mobile User Date: 4/11/2024 10:34:53 AM

What is available to support these estimates?

Author: Mark Steele Date: 4/15/2024 12:20:00 PM

There is little hard data available that allows us to definitively quantify transient ops. However, your comment pointed out that the previous numbers were based on itinerant operations. We've reworked the analysis to separate transient from the itinerant ops. The adjusted OPSNET ATCT counts show 51% of annual ops are itinerant. We are assuming that 25% of those are transient and that split will remain steady over the planning period. 50% transient AC parked at one time is a planning level estimate used in lieu of quantifiable parking data. We will update the table and add text to explain in the paragraph below.

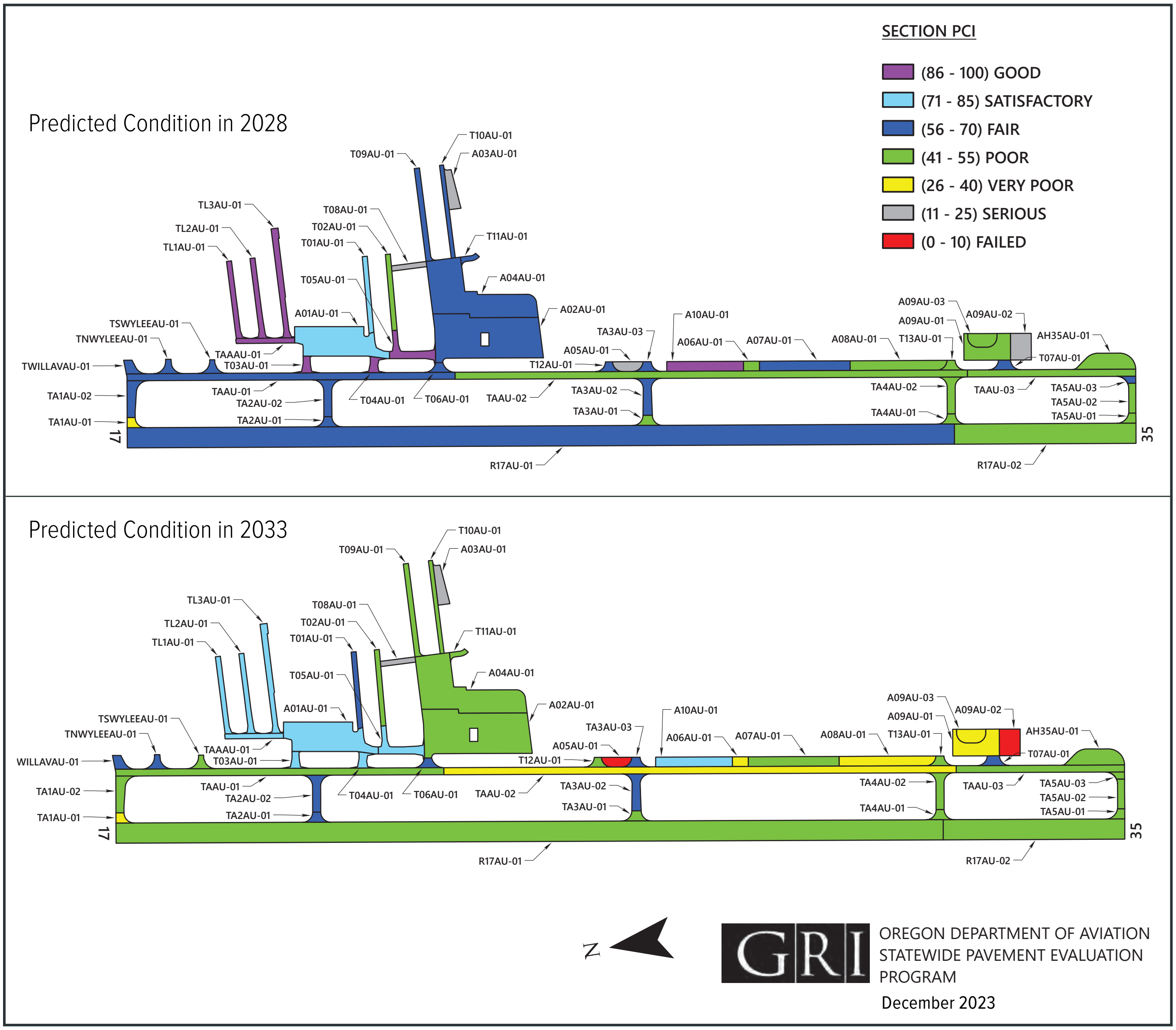
AIRFIELD PAVEMENT CONDITIONS

An updated Pavement Evaluation/Maintenance Management Program inspection (PEP), performed by ODAV contractors, was conducted in 2023 for all airfield pavements. A summary of pavement conditions provided in the 2023 pavement condition report states:

- Section Pavement Condition Index (PCI) at the Aurora State Airport range from a low of 18 (a PCI of "Serious") to a high of 94 (a PCI of "Good"). The area-weighted average PCI for all airport pavements is 62, corresponding to an overall PCI of "Fair."

A graphical depiction of predicted 2028 and 2033 (assuming no future pavement maintenance) is presented below in **Figure 4-8**. The area weighted average condition for existing airfield pavements is predicted to be "Fair" in 2028, and projected to be "Poor" in 2033 according to the PEP. Additional pavement analysis for Runway 17/35 completed by ODAV in 2023 confirmed that rehabilitation will be required in the current planning period as the runway reaches the end of its 20-year design life. Continued use by heavier aircraft is expected to accelerate pavement wear and may impact the timetable for rehabilitation. ODAV is currently considering a range of pavement management options to avoid premature pavement failure that would require costly emergency repairs or an extended unplanned closure of the runway.

FIGURE 4-8: PREDICTED PAVEMENT CONDITIONS



Source: Oregon Department of Aviation – 2023 Pavement Evaluation/Maintenance Management Program

- FACILITY REQUIREMENT. Perform ongoing airfield pavement maintenance in accordance with ODAV PEP recommendations to maximize the longevity of the airfield pavements during the current planning period and beyond.

- FACILITY REQUIREMENT. Rehabilitation of Runway 17/35 is anticipated in the near-term (0-5 years), based on its current condition, age, and use.

- FACILITY REQUIREMENT. Rehabilitation of the southern two-thirds of the existing Taxiway A pavement is anticipated during the 10- to 20-year phase of the planning period.

- FACILITY REQUIREMENT. Rehabilitation of the main apron pavement is anticipated during the 10- to 20-year phase of the planning period.

AIRPORT SUPPORT SERVICES

Airport support services and facilities includes the typical airside supporting facilities such as airfield lighting, signage, weather reporting equipment, ground-based navigational aids (NAVAIDS), and fueling facilities.

Runway/Taxiway/Apron Lighting

The Runway 17/35 and taxiway lighting system consists of standard Medium Intensity Runway Lighting (MIRL) and Medium Intensity Taxiway Lighting (MITL). The apron edges and some taxilanes are marked with blue edge reflectors. The lighting system is in good condition. Typical airfield lighting systems have a useful life of 20 years, though some systems may operate beyond the estimated useful life. For planning purposes, replacement of all airfield lighting systems will be assumed during the current planning period of 20 years.

Current generation airfield lighting is moving exclusively toward light-emitting diode (LED) systems. FAA design guidance for airfield lighting is to provide consistency between incandescent or LED systems. As a result, upgrading any individual airfield lighting to system to LED will prioritize airfield-wide LED upgrades as funding is available. A similar issue may exist for any future runway or taxiway extensions where combining existing incandescent systems and new LED systems may not be compatible with FAA guidance.

- FACILITY REQUIREMENT. The existing MIRL system can be maintained through the end of its useful life. Replacement of the existing MIRL system with LED units is anticipated during the current planning period. Depending on overall project requirements and funding levels, MIRL replacement may also be considered as part of the anticipated runway pavement rehabilitation project to minimize operational downtime for the runway. The MIRL system should be updated as necessary to address any changes to the runway identified in the development alternatives analysis process.

- FACILITY REQUIREMENT. The existing MITL system can be maintained through the end of its useful life. Replacement of the existing MITL with LED units is anticipated during the current planning period. The MITL system should be updated as necessary to address any changes to the taxiway system identified in the development alternatives analysis process.

- FACILITY REQUIREMENT. Apron and taxilane edge reflectors should be maintained and periodically replaced as needed. Additional edge reflectors should be installed as necessary for new construction or reconfiguration identified in the development alternatives analysis process.

Airfield Signage

The runway-taxiway system has extensive internally illuminated lighted signage that conveys directional, location, and runway clearance information to pilots. Upon a recent site survey, all lighted signs appeared to be in good working condition.

- FACILITY REQUIREMENT. Existing airfield signage can be maintained through the end of its useful life. Replacement of existing signs with LED units is anticipated during the current planning period.

  ODAV has been working with the FAA Runway Safety Action Team (RSAT) to increase opportunities for safety on the airfield, including the installation of additional lighted signage.

Weather Reporting

The Aurora State Airport has an automated weather observing system (ASOS) owned and operated by the FAA that provides 24-hour weather information. The ASOS is located on west side of the Airport between Runway 17/35 and the Hubbard Highway. The ASOS is in good working condition, but will likely require replacement during the current planning period.

- FACILITY REQUIREMENT. It is recommended that ODAV continue coordinating maintenance of the ASOS with the National Weather Service (NWS). A Letter of Agreement (LOA) with NWS, FAA Tech Operations, and the ATCT provides for access to maintain the equipment. Continue to protect the defined ASOS critical area from encroachment to ensure reliable site readings.

NAVAIDS

NAVAIDS at the Aurora State Airport include both visual NAVAIDS and electronic NAVAIDS. Visual NAVAIDS include Visual Approach Slope Indicators (VASI) on both runway ends, the Omnidirectional Approach Lighting System (ODALS) on Runway 17, and the airport rotating beacon. All NAVAIDS on the field are reported to be in functional operating condition.

Several electronic NAVAIDS maintained by the FAA, both on site in the vicinity, serve operations at the Aurora State Airport. These include the Runway 17 Localizer (LOC) with Distance Measuring Equipment (DME) and the Newberg (URG) Very High Frequency Omnidirectional Range with DME (VOR/DME).

- FACILITY REQUIREMENT. The airport rotating beacon can be maintained through the end of its useful life. Replacement with an LED unit is anticipated during the current planning period. In the event of changes to the airfield, the rotating beacon may be relocated or reconfigured as necessary. Tree growth in the immediate vicinity of the rotating beacon should be controlled to maintain beacon visibility from the air in all directions.
- FACILITY REQUIREMENT. The Runway 17 ODALS can be maintained through the end of its useful life or upgraded based on current approach lighting system technologies. Replacement with an LED unit is anticipated during the current planning period. New FAA-funded ODALS installations are uncommon. Options for installation of a new generation approach lighting system should be addressed in the airside development alternatives analysis process, in addition to any system changes that may be related to changes in the runway.
- FACILITY REQUIREMENT. The VASI units can be maintained through the end of their useful life. Replacement with an LED Precision Approach Path Indicator (PAPI) system is anticipated during the current planning period, or in the event of changes to the runway.

Fixed-Base Operations/Flight Training Services/Fuel Services

Fixed-base operations (FBO), flight training, and fuel services are provided by several commercial operators. Some are located on private property with TTF access and others are located on ODAV property with leases.

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Number: 1 Author: Mobile User Date: 4/11/2024 10:34:53 AM

Is this what gets your approach below 1 mile? That may be an option, remove at end of useful life and not replace.

Author: Mark Steele Date: 4/11/2024 12:49:50 PM

The visibility minimums for the runway are not tied directly to the ODALS. LOC and GPS approaches are capable of achieving minimums below 1 mile independent of lighted approach aids. The replacement of the ODALS at end of useful life will be evaluated in the alteranatives analyisis.

Author: Mark Steele Subject: Sticky Note Date: 4/11/2024 2:04:18 PM

As recently as 5300-13A (Table 3-4 - Standards for Instrument Approach Precedures), FAA "Recommended" Approach Lights for 3/4 mile to < 1 mile and >= 1 mile visibility minimums for straight-in procedures, noting "ODALS, MALS, SSALS, and SALS are acceptable."

Number: 2 Author: Mobile User Date: 4/11/2024 10:34:53 AM

Are these FAA owned/maintained?

Author: Mark Steele Date: 4/15/2024 12:15:04 PM

The VASIs are FAA-owned. We've updated the text to clarify.

Landside Elements Goals and Requirements

The landside facilities goals and requirements section includes a discussion of the GA terminal areas, hangars and airport buildings, airport surface roads and vehicle access, vehicle parking, airport fencing, and utilities. The focus of the Airport Master Plan is on the facilities located on ODAV owned property.

GENERAL AVIATION TERMINAL AREAS

There is approximately 8 acres of land in the ODAV terminal area that are available for future hangars, aircraft storage, and other aviation related needs.

HANGARS/AIRPORT BUILDINGS

As previously discussed, hangars are generally preferred for storage of aircraft based at the Airport, while tiedowns are predominately used by transient aircraft. For this study, most demand for storage of aircraft based at the Aurora State Airport will be met through hangars.

The Aurora State Airport has a variety of hangar types. These hangars are privately managed and include T-hangars, conventional box hangars, and commercial hangars. Currently an estimated 971,100 square feet of hangar space is available to airport users. The occupancy status of all the privately owned and managed hangars is not available, but it is estimated that the existing hangars are operating at or near capacity.

Table 4-7 summarizes the criteria used to estimate hangar space demand over the planning period. The typical physical requirements for the different types of based aircraft type included in the aviation activity forecasts are used to approximate an appropriate hangar area for each type. The footprint of the representative aircraft is the product of the aircraft's wingspan (or rotor diameter) and length. A low, high, and average hangar area for each aircraft type is provided. The low hangar areas listed for single-engine, multi-engine, and turboprop are representative of the space provided by a T-hangar for each aircraft type. The high hangar areas listed are representative of the space provided by a conventional box hangar and includes additional space around the aircraft to further protect against damage. For this study, the average of the two were used to calculate storage space needed.

TABLE 4-7: HANGAR AREA CRITERIA

	Single Engine Piston	Multi Engine Piston	Turbo-prop	Jet	Helicopter
Example Aircraft	Cessna 182	Cessna 340	King Air 200	Cessna Citation III	Bell 206
Footprint (Wingspan x Length, sq. ft.)	1,044	1,651	2,384	2,969	1,322
Low Hangar Area per Aircraft (sq. ft.)	1,100	1,700	2,500	3,500	1,500
High Hangar Area per Aircraft (sq. ft.)	2,000	3,500	4,000	5,000	3,000
Average Hangar Area per Aircraft (sq. ft.)	1,550	2,600	3,250	4,250	2,250

Source: FAA Aircraft Characteristics Database, Century West Engineering

The above areas were applied to the five-year forecast increments by aircraft type from the based aircraft fleet mix forecast presented in Chapter 3. The FAA-approved aviation activity forecasts suggest a decline in single-engine piston, multi-engine piston, and turboprop aircraft over the 20-year planning period. As presented in **Table 4-8**, the resulting facility requirements analysis indicates decreased demand for T-hangars and smaller box hangars that house individual aircraft and an increase in demand for larger corporate style hangars that accommodate ADG I and II jet aircraft and multiple single-engine aircraft in a single building.

TABLE 4-8: HANGAR AREA REQUIREMENTS

	Single Engine	Multi Engine	Jet	Helicopter	Total
Additional Aircraft					
2026	(21)	(4)	2	2	(21)
2031	(20)	(3)	3	2	(18)
2041	(33)	(4)	5	5	(27)
Total	**(74)**	**(11)**	**10**	**9**	**(66)**
Additional Hangar Area (sq. ft.)					
2026	(32,550)	(10,400)	8,500	4,500	(29,950)
2031	(31,000)	(7,800)	12,750	4,500	(21,550)
2041	(51,150)	(10,400)	21,250	11,250	(29,050)
Total	**(114,700)**	**(28,600)**	**42,500**	**20,250**	**(80,550)**

Source: Century West Engineering

- FACILITY REQUIREMENT. The remaining undeveloped areas in the ODAV Terminal Development Area and any future infill development opportunities should be reserved to accommodate aeronautical uses.

AIRPORT SURFACE ROADS

The Airport's blue and purple gates provide landside access to ODAV property from the public right-of-way. There are limited internal vehicle roads and taxilanes located in ODAV's landside area. Several vehicular/pedestrian deviations (V/PD) have occurred on the Airport in recent years. ODAV has been working with the FAA Runway Safety Action Team (RSAT) to increase opportunities for safety on the airfield.

- FACILITY REQUIREMENT. Existing on-airport surface roads on ODAV property should be maintained and updated as required to serve future landside development identified in the development alternatives analysis.
- FACILITY GOAL. A drivers training program could be established to promote on-airport drivers safety.

VEHICLE PARKING

Within the ODAV Terminal Area vehicle parking is limited and should be considered when conceptualizing new hangar construction to prevent vehicles parking on taxilanes, aprons, or object free areas.

- FACILITY REQUIREMENT. Maintain the existing vehicle parking facilities and consider vehicle parking when conceptualizing new hangar construction to prevent vehicles parking on taxilanes, aprons, or object free areas.

AIRPORT FENCING

The entire airport facility is fenced with designated vehicle gates. The existing fencing and gates are in good condition.

- FACILITY REQUIREMENT. Maintain the existing perimeter fencing/access gates, and update as required by future improvements identified in the development alternatives analysis.

Airport Administration Goals and Requirements

Airport administration goals and requirements include recommendations and best practices for airport ownership, facility management, finance, airport user rates and charges, and compliance with FAA grant assurances.

Goals related to ODAV's management of the Aurora State Airport, consistent with its current and future operational requirements, are provided for each administrative category listed below.

AIRPORT OWNERSHIP AND MANAGEMENT

The Aurora State Airport is owned and operated by ODAV. ODAV manages the Aurora State Airport among a group of 28 state-owned or -operated airports with 15.5 full-time equivalent (FTE) employees based in Salem. As the airport owner (sponsor), ODAV is responsible for managing operations and coordinating with applicable local jurisdictions as well as state and federal agencies. Much of the day-to-day operations and maintenance for the Aurora State Airport are completed by full-time ODAV staff with additional staff resources (part-time or contracted), as needed. ODAV currently has six FTE employees assigned to the daily maintenance and operation of the Aurora State Airport.

AIRPORT FINANCE

Based on a review of the recent financial records presented in Chapter 2 – Existing Conditions Analysis, the Airport's revenues only slightly exceed expenses for normal operations and day-to-day maintenance. Based on the current level of operating revenues and expenses, ODAV is dependent on state and federal grants to fund major capital improvements and ongoing pavement maintenance projects.

An analysis of revenues generated at the Airport indicates that TTF access fees account for 18.5% of total airport operating revenue and fuel flowage fees (all aircraft) account for approximately 43% of airport revenues. It is worth noting that TTF-based aircraft account for 82% of the Airport's based aircraft total, but contribute a significantly lower percentage of total airport revenues. A review of current airport business planning may be considered to evaluate support of increased operations, maintenance, and capital costs required to satisfy future user demand.

FAA GRANT ASSURANCES AND COMPLIANCE OVERVIEW

Upon a review of local, state, and federal regulations, ODAV is understood to be in compliance with all requirements related to the Aurora State Airport. A detailed discussion of the applicable regulations is presented in Chapter 2 – Existing Conditions Analysis.

- FACILITY GOAL. Maintain current efforts to work with state and federal partners to ensure continued compliance with state and federal regulations.