Chapter 5 – Airport Facility Requirements

Note: The airside facility requirements evaluations addressed design standards based on the actual current and historic airport activity for Runway 7/25, 11/29, and the airfield's major taxiway system. This evaluation was consistent with the City of Pendleton's desire to maintain existing airfield capabilities whenever feasible. The evaluation of historically-applied ARC C–III standards for Runway 7/25 presented in this chapter reflects this approach. The status of FAA funding eligibility for Runway 11/29 was undetermined when the facility requirements analysis was completed.

FAA review and comment regarding the recommended airport design standards and eligibility of Runway 11/29 occurred after the master plan analyses were completed, during review of the draft final airport master plan. The FAA review produced several changes to the applicable design standards that are reflected on the final ALP drawings presented in Chapter 8. The applicable FAA design standard dimensions are provided on Sheet 2 (Airport Data Sheet) of the ALP drawing set. It is noted that the City may opt to maintain existing facility capabilities and the issue of design standard compliance will focus primarily on FAA funding eligibility. The ultimate FAA eligibility decisions are typically made during the design phase of individual projects.

Introduction

The evaluation of airport facility requirements uses the results of the inventory and forecasts contained in Chapters Two and Three, as well as established planning criteria, to determine the future facility needs for the airport through the current twenty-year planning period. **Airside** facilities include runways, taxiways, navigational aids and lighting systems. **Landside** facilities include hangars, terminal and fixed base operator (FBO) facilities, aircraft parking apron(s), and aircraft fueling. Support items such as surface access, automobile parking, security, and utilities are also examined. All airfield items are evaluated based on established Federal Aviation Administration (FAA) standards.

The facility requirements evaluation is used to identify the adequacy or inadequacy of existing airport facilities and identify what new facilities may be needed during the planning period based on forecast demand. Potential options and preliminary costs for providing these facilities will be evaluated in the Airport Development Alternatives (Chapter Seven), to determine the most cost effective and efficient means for meeting projected facility needs.

Eastern Oregon Regional Airport – Functional Role

Eastern Oregon Regional Airport performs several functional roles that extend beyond general aviation and commercial aviation. The historical use of the airport by large military and civilian aircraft is reflected in the size and capabilities of its existing airfield facilities. In addition to the airport's history of accommodating military aircraft, the facility is uniquely capable of supporting regional emergency response operations requiring large aircraft.

The City of Pendleton's priority is to preserve the current level of functional capability for the airport, to the greatest extent feasible. As the owner of a regional airport, the City recognizes that its facilities are unique and not easily duplicated among eastern Oregon airports. While the significance of this may have a limited effect on general aviation activity, it is critically important when considering the airport's broader role as a key element in the state, regional, and national transportation infrastructure.

With this in mind, the City of Pendleton would like to maintain the "existing" design standards reflected on the 2002 Airport Layout Plan (ALP) for the primary runway, major taxiways, and areas on the main apron used by transport category aircraft. Recent projects completed on Runway 7/25 and several major taxiway sections provide many years of service before rehabilitation. Employing a "maintenance only" mode for these facilities is consistent with the City's goal of preserving the overall function of the airport and the FAA's long established and ongoing facility investment. Based on forecast activity, no expansion beyond current capabilities is required or recommended for these facilities.

It is noted that the precision instrument approach capabilities for Runway 7/25 require the same dimensions for several protected areas such as the width of the runway object free area and primary surface, and runway protection zones, regardless airport reference code (ARC).

Maintaining the existing ADG III design standards for Runway 07/25 and the associated facilities provides a reasonable approach that will allow the airport to maintain adequate safety margins for all activity.

Military Activity

Current military activity at Eastern Oregon Regional Airport is primarily related to the Oregon Army National Guard (OANG) facility, which coordinates training operations across multiple military branches. Military air traffic includes locally-based large helicopters and unmanned aircraft systems (UAS), and

transient helicopters and transport category fixed-wing aircraft. The large fixed-wing aircraft include the Lockheed C130 Hercules (ARC: C-IV) and the recent addition of Boeing C-17 Globemaster aircraft (ARC: B-IV). The majority of this aircraft activity is generated from Joint Base Lewis-McChord, south of Tacoma, Washington, and the Idaho Army National Guard from its base in Boise, Idaho in support of paratrooper training with the OANG in Pendleton.

As noted in the updated aviation activity forecasts, annual military fixed wing (airplane design group IV) operations are forecast to increase from approximately 160 to 260 operations by 2035. Although the forecast level of ADG IV activity does not meet the FAA's definition of "substantial use" (500 annual transient operations), it clearly illustrates established use by large aircraft that is important to consider in future airfield planning.

Emergency Response

Cascadia subduction zone seismic events have been identified as Oregon's greatest natural threat-one that could result in potentially catastrophic damage and long-lasting disruption of normal activities. As the research and understanding of the potential risks associated with a Cascadia event is becoming more detailed, it is evident that the effects could be severe and widespread. Recovery from events of this scale may be measured in decades, not months or years.

A recent study[1] analyzing potential impacts from a high magnitude earthquake noted that slight to moderate damage to infrastructure is expected. The potential for changes in underlying soils suggests that key transportation facilities including airports, may be at risk. Among the characteristics of this type of seismic event is soil liquefaction, which occurs when soil becomes dangerously unstable as water is moved through grains of soil under pressure during the shaking of the earthquake. Liquefaction can result in ground settlements. Oregon's largest airport, Portland International Airport is vulnerable to soil liquefaction and flooding due to its low elevation and direct exposure to the Columbia River. A key element of response planning is developing a system of assets that can be used to maintain critical transportation links when damaged facilities are out of service.

The **Oregon Resilience Plan – Reducing Risk and Improving Recovery for the Next Cascadia Earthquake Tsunami,**[2] completed in 2013, provides analysis of key challenges, including the potential impact on Oregon's infrastructure and outlines a basic strategy for post disaster response coordination. The overall expectation is that critical infrastructure components in coastal and western areas of the

[1] Cascadia Subduction Zone Earthquakes: A Magnitude 9.0 Earthquake Scenario (2013 Update), Cascadia Region Earthquake Workgroup (CREW), Federal Emergency Management Administration (FEMA), and National Earthquake Hazard Reduction Program (NEHRP)

[2] The Oregon Resilience Plan – Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami. Oregon Seismic Safety Policy Advisory Commission (OSSPAC) February 2013.

affected states will suffer complete loss or significant damage during a major event. The ability to respond will require coordinated use of assets outside the areas of damage. The report notes that eastern Oregon will play an important role in a response strategy:

"The Eastern zone where light damage would allow rapid restoration of services and functions, and where communities would become critical hubs for the movement of response recovery and restoration personnel and materials for the rest of the state."

Eastern Oregon Regional Airport has the longest fully instrumented runways in northern Oregon, east of Portland International Airport. The airport is uniquely capable of accommodating large military and commercial transport aircraft used in emergency response and relief operations.

The analysis of eastern Oregon airports contained in the 2013 report was limited to Redmond Municipal Airport, which is identified as primary FEMA facility. Although the direct flight distance between Pendleton and Portland is 57 miles greater than the distance between Redmond and Portland, the facilities available and the established military capabilities at Eastern Oregon Regional Airport, combined with direct access to the interstate highway system, suggests that it could perform a valuable role in a major response effort.

The report included several recommendations for short-term and long-term goals that will create an effective response strategy:

- Complete and updated inventory of assets, which could be used during emergencies;
- Complete a statewide evaluation, assessment, and gap analysis, including 97 public use airports in Oregon and the soil liquefaction vulnerability of Portland International Airport;
- Refine and gain consensus for the strategy (for an incremental program for achieving resilience in western Oregon)

It is anticipated that the detailed analysis of existing assets, including Eastern Oregon Regional Airport, will be reflected in updated emergency plans moving forward.

Despite the dire nature of a potential Cascadia event, it is important to note that emergency planners are not currently engaged in a program of building system redundancy or response capabilities where they do not currently exist. The potential scale of the problem is too great to provide a response equal to the need. The strategic preservation of regional system redundancy provides additional rationale to support maintaining the existing dimensions and operational capabilities of Eastern Oregon Regional Airport.

Facility Requirements Evaluation

This chapter evaluates facility requirements from two perspectives: (1) conformance of existing facilities to Federal Aviation Administration airport design and airspace planning standards; and (2) new demand-based facility needs that reflect the updated aviation activity forecasts presented in Chapter Three.

The evaluation of demand-driven items will reflect in gross numbers, new facility needs such as runway length requirements, hangar spaces, and aircraft parking positions based on forecast demand and the needs of the design aircraft. Items such as lighting and navigational aids are evaluated based on the type of airport activity, airport classification, and capabilities.

Conformance Review

The evaluation of conformance to FAA airport design standards, depicted as "existing" on the current FAA-approved Airport Layout Plan (ALP), is updated to reflect the current analysis of the design aircraft and the associated planning assumptions described later in this chapter. Airspace planning criteria depicted as "ultimate" on the current FAA-approved ALP is reviewed for consistency with recommended approach capabilities, consistent with FAR Part 77, which is also described later in the chapter.

The updated inventory of existing facilities presented in Chapter Two, is used to evaluate conformance with FAA standards. **Figures 5-1** and **5-2** depict the location of the non-conforming items for the airport design standards described in this chapter. Detailed definitions of the standards and their application at the airport are provided later in the chapter. The reader is encouraged to consult the Glossary of Aviation Terms provided to clarify technical information.

Several airfield-built items, including wind cones and the electronic transmitters for the instrument landing system (ILS) are located within the runway safety area (RSA) and/or object free area (OFA) for Runway 7/25. These items were installed by, or at the direction of FAA in past years with locations determined to be "fixed-by-function." However, a review of current FAA airport design standards (AC 150/5300-13A, Para. 605, NAVAIDs as obstacles, Table 6-1) indicates that wind cones, glide slopes, and localizers do not meet the fixed-by function criteria for installation in either the RSA or OFA.

AC 150/5300-13A provides addition guidance (Note 3 in Table 6-1) on glideslope installations: "*Allowing a GS within ROFA due to a physical constraint should be evaluated on a case-by-case basis.*" It is unknown whether the FAA siting of the Runway 25 glideslope was determined through physical site constraints. However, it is noted that the installation of the Runway 25 glide slope transmitter (located approximately 350 feet north of runway centerline) reflects standard historical practice, if not the actual or modified FAA standards currently in place. A review five ILS runways in the region with similar characteristics to Runway 7/25, finds that all of the glideslope transmitters are located within the runway OFA (units installed 350 to 390

feet from runway centerline). It appears that the current FAA design standards and past FAA design/installation practices differ, which may prompt relocation of the Runway 25 glideslope outside of runway OFA, if deemed necessary by FAA through a case-by-case basis review.

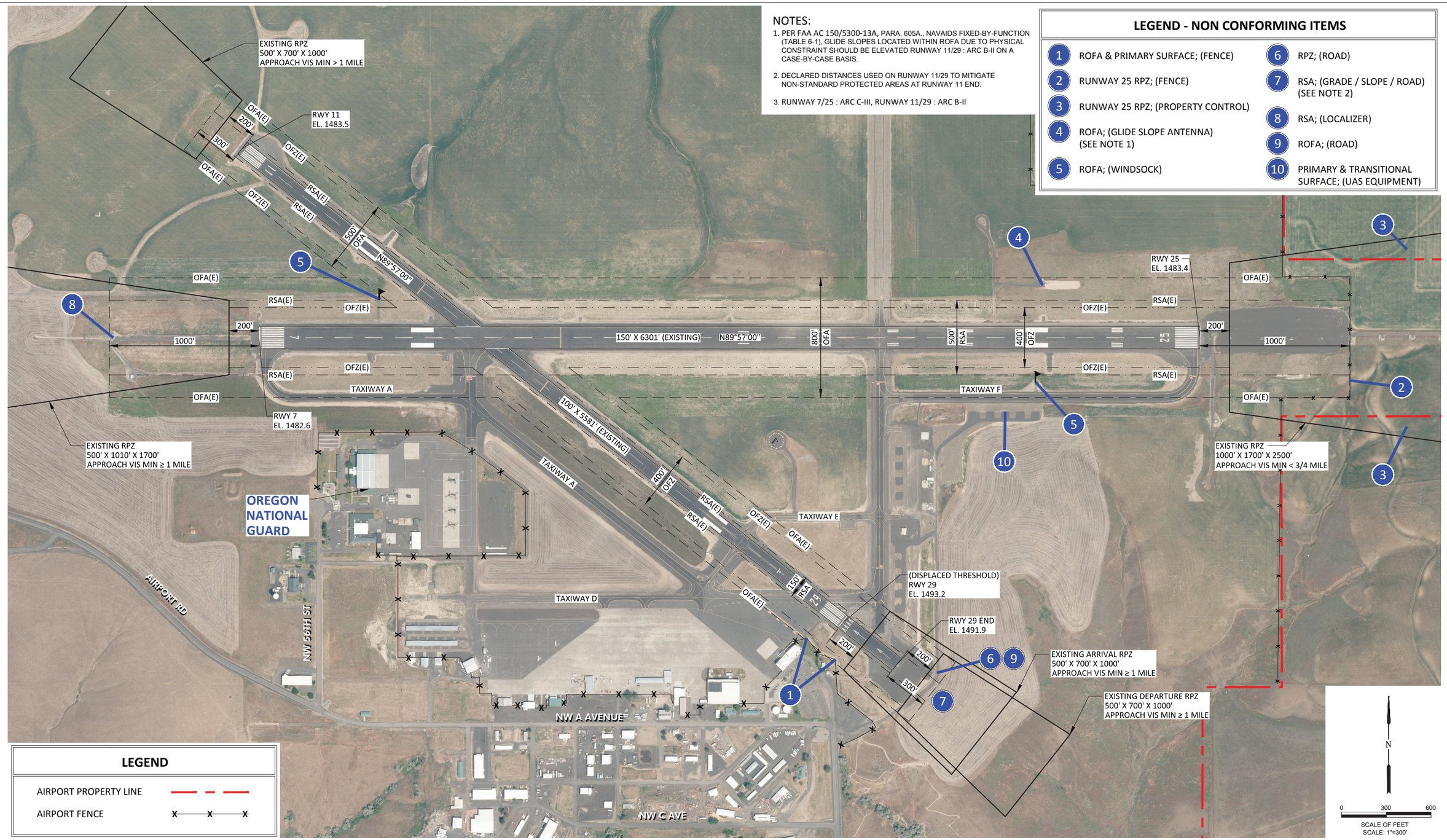
Within the landside areas of the airfield, the most common non-conforming item identified is the object free area (OFA) dimension or aircraft wingtip clearances (measured from taxilane centerline to an adjacent hangar or fence) for several hangar taxilanes. The hangar taxilanes are designed to accommodate small aircraft (ADG I), which has a standard OFA width of 79 feet and a centerline to fixed/moveable object clearance of 39.5 feet (1/2 the OFA width). Although the clearances vary, most aircraft movements occur without incident. However, as facilities are updated or replaced (aircraft parking or hangars), new facilities should be designed to conform to appropriate design standards.

NOTES:

1. PER FAA AC 150/5300-13A, PARA. 605A., NAVAIDS FIXED-BY-FUNCTION (TABLE 6-1), GLIDE SLOPES LOCATED WITHIN ROFA DUE TO PHYSICAL CONSTRAINT SHOULD BE ELEVATED RUNWAY 11/29 : ARC B-II ON A CASE-BY-CASE BASIS.
2. DECLARED DISTANCES USED ON RUNWAY 11/29 TO MITIGATE NON-STANDARD PROTECTED AREAS AT RUNWAY 11 END.
3. RUNWAY 7/25 : ARC C-III, RUNWAY 11/29 : ARC B-II

LEGEND - NON CONFORMING ITEMS

1	ROFA & PRIMARY SURFACE; (FENCE)	6	RPZ; (ROAD)
2	RUNWAY 25 RPZ; (FENCE)	7	RSA; (GRADE / SLOPE / ROAD) (SEE NOTE 2)
3	RUNWAY 25 RPZ; (PROPERTY CONTROL)	8	RSA; (LOCALIZER)
4	ROFA; (GLIDE SLOPE ANTENNA) (SEE NOTE 1)	9	ROFA; (ROAD)
5	ROFA; (WINDSOCK)	10	PRIMARY & TRANSITIONAL SURFACE; (UAS EQUIPMENT)



LEGEND

AIRPORT PROPERTY LINE	
AIRPORT FENCE	

CONFORMANCE TO FAA STANDARDS
FIGURE 5.1

EASTERN OREGON REGIONAL AIRPORT
AIRPORT MASTER PLAN

CENTURY WEST ENGINEERING

CONFORMANCE TO FAA STANDARDS
FIGURE 5.2

EASTERN OREGON REGIONAL AIRPORT
AIRPORT MASTER PLAN

CENTURY WEST ENGINEERING

2002 Airport Master Plan Overview

The 2002 Eastern Oregon Regional Airport Master Plan[3] provided recommendations for airport facility improvements for a planning period that extended to 2020. As noted in the Inventory Chapter, several improvement projects have been conducted since the last master plan was completed in 2002, consistent with the planning guidance depicted on the 2002 Airport Layout Plan. The projects included in the 2002-2020 capital improvement program (CIP) for the master plan are summarized in **Table 5-1.** Projects that have been completed are noted in the table. The previously recommended improvements that have not been implemented, will be reevaluated, modified, or eliminated based on the updated assessment of facility needs, current FAA guidelines, and the elements of the Airport Master Plan preferred development alternative.

3 Eastern Oregon Regional Airport Master Plan Update (October 2002). David Evans and Associates

TABLE 5-1: SUMMARY OF 2002 MASTER PLAN RECOMMENDED PROJECTS AND CURRENT STATUS

COMPLETED (YES/NO)	PROJECTS
	Short-Term (2002-2005)
Yes	Rehab Taxiway A/D
No	Rehab Air Carrier Apron
Yes*	Runway 16/34 Rehab – South of Runway 7/25 at 60-foot width, repaint markings (**runway converted to taxiway in 2014*)
No*	Runway 16/34 Rehab – North of Runway 7/25 (**runway converted to taxiway in 2014*)
No	T-Hangar Taxilane
Yes	Reconstruct Runway 7/25 including 20-foot paved shoulders
Yes	Pavement Rehabilitation: Misc. fog seal, localized preventative and stop gap pavement maintenance and repair (several rounds completed)
Yes	Runway 25 holding bay, 2-inch overlay
Yes	Runway 7/25 high intensity runway lighting (HIRL) replacement
No	Agricultural spraying operations pads (2 pads)
No	Environmental Assessment - Runway 11/29 Shift
Yes	Taxiway B, 3-inch overlay (south of Runway 7/25 and north of Nation Guard)
	Intermediate-Term (2006-2010)
No	Secondary access road
No	Runway 11/29 shift 2,000 feet NW construction
Yes	Passenger terminal building improvements
No	Phase I GA development (including drainage and utilities for entire area)
No	Phase I GA development (two 10-unit T-hangars, two conventional hangars)
No	Phase I air cargo improvements
No	Airport traffic control tower improvements
No	Master plan update
No	Fuel farm
No	Improvements for deicing
No	New FBO in GA development area
	Long-Term (2011-2015)
No	Phase II GA development (one 10-unit T-hangar, 2 conventional hangars)
No	Agricultural spraying operations pads (3 pads)
Yes	ARFF/SRE expansion
No	Phase II air cargo improvements

Several additional projects have been completed that were not anticipated in the last master plan update including the closure of Runway 16/34 and conversion to Taxiway G, and the construction of pads for unmanned aircraft systems (UAS) east of Taxiway G and south of Taxiway F.

Design Aircraft

The 2002 Airport Layout Plan (ALP) lists a Boeing 737 (Airport Reference Code (ARC) C-III) as the "existing" and "ultimate" critical (design) aircraft for Runway 07/25. However, it is noted that the airport master plan's aviation activity forecasts did not identify any B737 operations, instead presenting a "CRJ" (Bombardier/Canadair Regional Jet) as the design aircraft through the 20-year planning period. During this period, Horizon Air served Pendleton with de Havilland/Bombardier Dash 8-300 turboprop aircraft (ARC A-III) and was in the process of adding CRJs to their fleet. The forecast rationale was based on the anticipated fleet for Horizon Air and "other airlines that could start serving the Pendleton market." The CRJ models in service in 2002 included the CRJ 100, 200, and 700 models, all of which are ARC C-II aircraft. The composite of the CRJ's "Category C" approach speed and the Dash 8's "Airplane Design Group III" wingspan resulted in an ARC C-III designation for Runway 7/25.

For Runway 11/29, the 2002 ALP lists a Beechcraft King Air (ARC B-II) as the "existing" critical aircraft and a Bombardier Dash 8 Q400 (ARC C-III) as the "ultimate" critical aircraft.

Updated Assessment

The commercial air service assumptions in the 2002 airport master plan used to define critical/design aircraft are no longer valid. Based on FAA-defined activity-driven criteria, the "existing" design aircraft for both runways is a single-engine turboprop, operated by commercial passenger and cargo express carriers, included in Aircraft Approach Category A and Airplane Design Group II (ARC A-II). The "future" design aircraft is a multi-engine turboprop, such as a 34-seat Saab 340, which is consistent with the preferred commercial passenger forecast. This aircraft is included in Aircraft Approach Category B and Airplane Design Group II (ARC B-II).

However, as noted earlier, it is recommended that the "existing" design standards for Runway 7/25 and 11/29 depicted on the 2002 ALP be maintained for the current twenty-year planning period:

- Runway 7/25: ARC C-III
- Runway 11/29: ARC B-II

This recommendation reflects the current facility configurations in place, preserves current operational capabilities, and accommodates the wide range of aircraft types expected to operate at Eastern Oregon Regional Airport over the next twenty years and beyond.

The aviation activity forecast for 2035 includes nearly 260 ADG IV operations, in addition to a variety of ADG II and III business jet operations. The combined total of ADG IV operations and all other Approach Category C & D operations is projected to increase from 218 to 446 by the end of the twenty-year planning period. Although the projected activity remains below the FAA's "substantial use" standard of 500 annual itinerant operations, the anticipated growth reflects a trend toward increased large and high-performance aircraft activity. Preserving the existing physical characteristics of key airfield components will allow the airport to continue accommodate this unique mix of air traffic.

It is noted that Runway 7/25 was rehabilitated in 2005 with a 3-inch overlay based on ARC C-III design standards. This project is expected to provide a service life that extends well into the current twenty-year planning period. Several sections of major taxiways (50 feet wide) have also been rehabilitated or reconstructed since the last master plan was completed. The FAA recently informed airport management about a project to relocate the instrument landing system (ILS) localizer transmitter/antenna for Runway 7/25 outside of the ARC C-III runway safety area and object free area. The FAA's decision to relocate the ground based navigational aid is consistent with preserving current runway capabilities and design standards.

Airport Planning & Design Standards Note:

The following FAA standards are recommended for use in evaluating the runway-taxiway system at Eastern Oregon Regional Airport:

Maintain "Existing" Design Standards (as depicted on 2002 FAA-Approved ALP) for current and future use.

Runway 07/25 (Existing/Future) – *Airport Reference Code (ARC) C-III. Runway design standards for aircraft approach category C & D runways with* ***lower than 3/4-statute mile*** *approach visibility minimums.*

- *Existing and Future Runway Protection Zone (RPZ) for Runway 25 based on* ***lower than 3/4-mile approach visibility minimums****. Existing RPZ for Runway 07 based on* ***not lower than 1-mile approach visibility****.*
- *Future RPZ for Runway 07 based on approach visibility standard* ***not lower than 3/4-mile****.*
- *FAR Part 77 airspace planning criteria based on "other than utility runways" with precision instrument approach (Rwy 25) and non-precision instrument approach (Rwy 07) with visibility minimums as low as 3/4-statute mile.*

Runway 11/29 (Existing/Future) – *Airport Reference Code (ARC) B-II. Runway design standards for aircraft approach category A & B runways with* ***not lower than 1-statute mile*** *approach visibility minimums.*

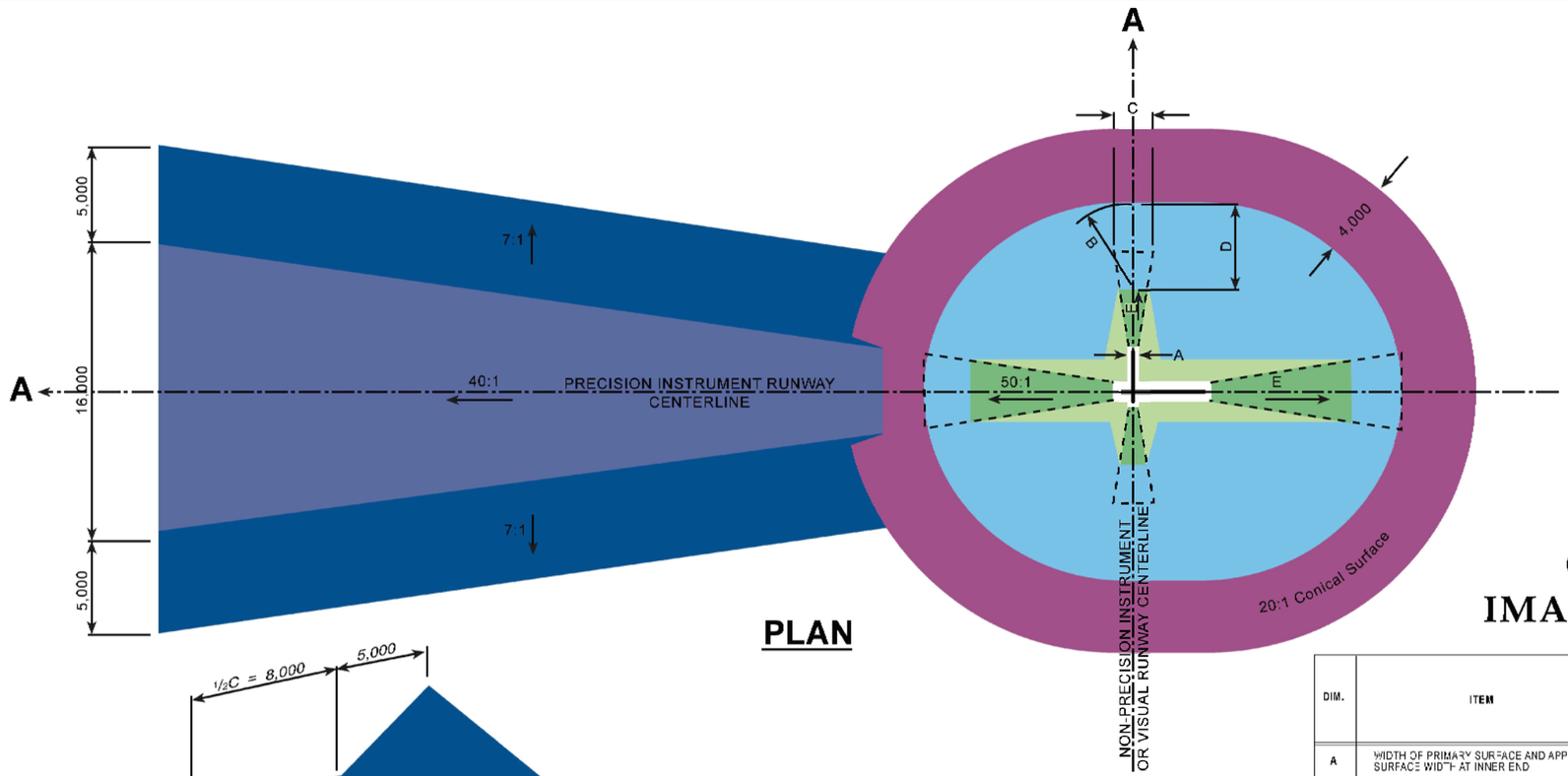
- *Existing and Future Runway Protection Zone (RPZ) for both runway ends based on* ***not lower than 1-mile approach visibility****.*
- *FAR Part 77 airspace planning criteria based on "other than utility runways" with non-precision instrument approaches, with visibility minimums greater than 3/4-statute mile.*

All references to the "standards" are based on these assumptions, unless otherwise noted (Per FAA Advisory Circular 150/5300-13A and FAR Part 77.25)

FAR Part 77 Surfaces

Airspace planning for U.S. airports is defined by Federal Aviation Regulations (FAR) Part 77.25 – Objects Affecting Navigable Airspace. FAR Part 77 defines airport imaginary surfaces, which are established to protect the airspace immediately surrounding a runway. The airspace and ground areas surrounding a runway should be free of obstructions (i.e., structures, parked aircraft, trees, etc.) to the greatest extent possible to provide a safe operating environment for aircraft. FAA Order 8260.3B - United States Standard for Terminal Instrument Procedures (TERPS) defines protected airspace surfaces associated with instrument approaches and departures.

The physical characteristics of the imaginary surfaces are determined by runway category and the approach capabilities of each runway end. Consistent with FAA planning standards, the FAR Part 77 Airspace Plan shall depict the "ultimate" airspace for the recommended runway configuration depicted on the accompanying Airport Layout Plan (ALP). **Figures 5-3 and 5-4** on the following pages illustrate plan and isometric views of generic Part 77 surfaces.



PLAN

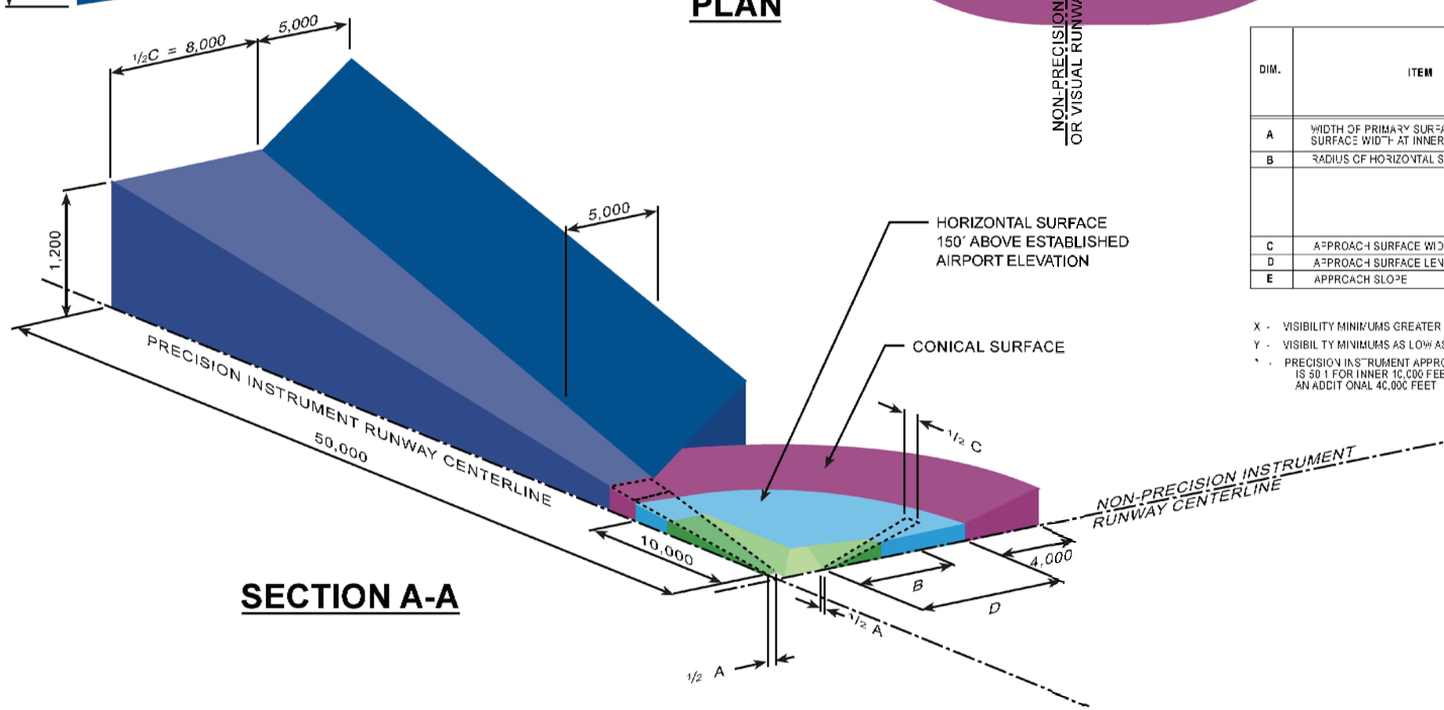
SURFACE SLOPE KEY

- HORIZONTAL SURFACE
- 20:1
- 7:1
- 7:1
- VARIES (SEE "E" VALUE IN TABLE BELOW)
- 40:1 (PRECISION INSTRUMENT RUNWAY ONLY)

CIVIL AIRPORT IMAGINARY SURFACES

DIM.	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY X	LARGER THAN UTILITY Y	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY X	LARGER THAN UTILITY Y	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	15,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

X - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
Y - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



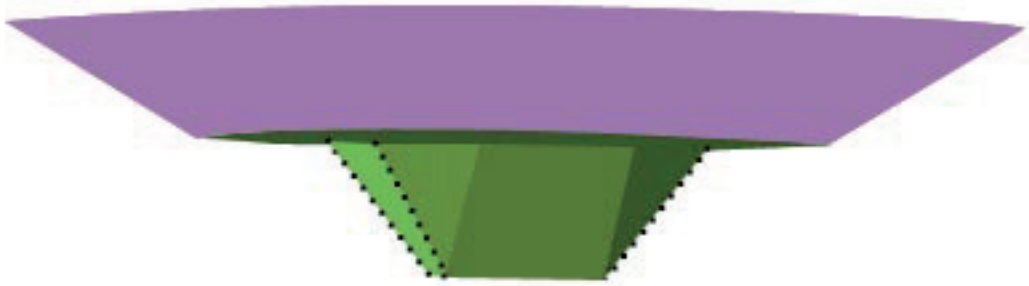
SECTION A-A

FAR PART 77
FIGURE 5.3

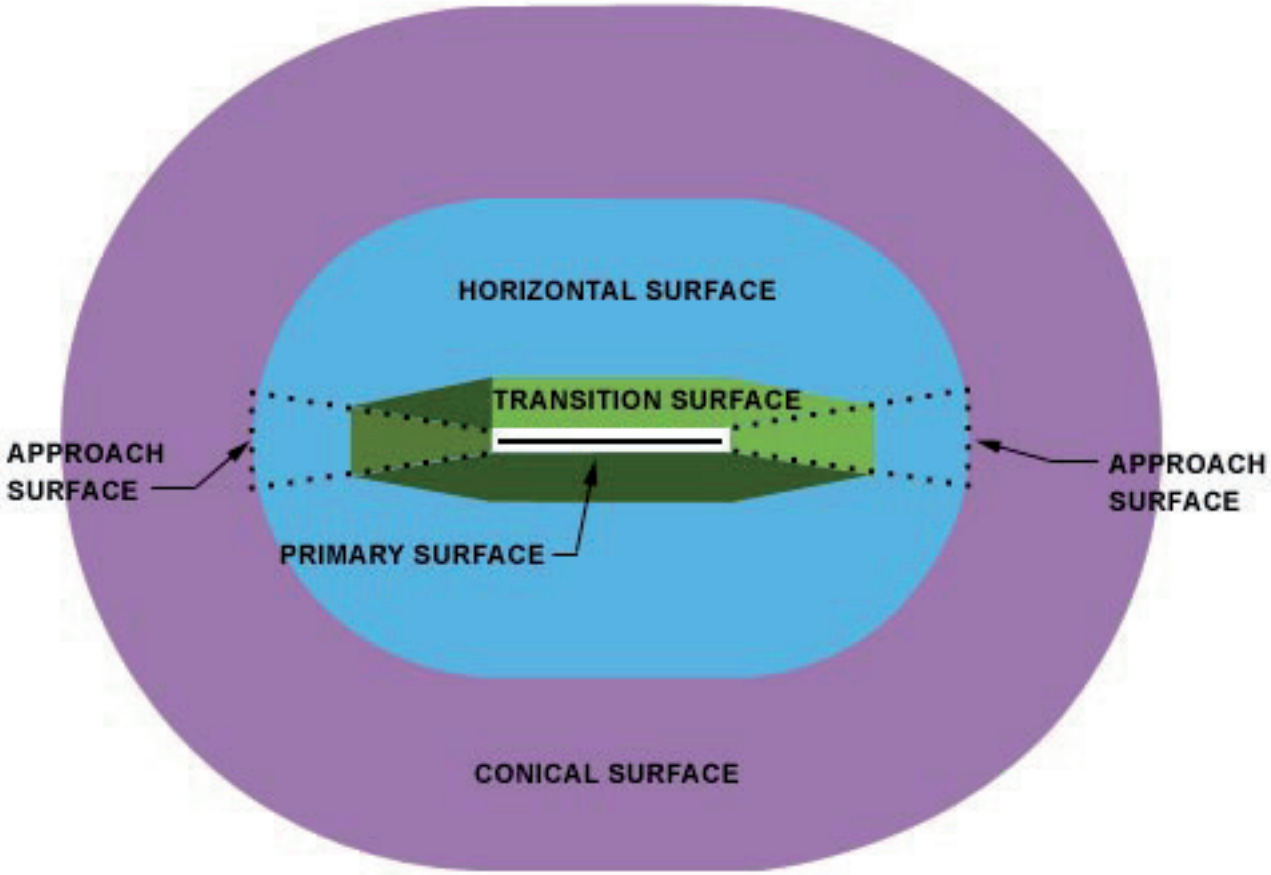
EASTERN OREGON REGIONAL AIRPORT
AIRPORT MASTER PLAN

CENTURY WEST ENGINEERING

HEIGHT HAZARD AIRSPACE SURFACES



PROTECTED AIRSPACE



OVERHEAD VIEW

FAR PART 77
FIGURE 5.4

EASTERN OREGON REGIONAL AIRPORT
AIRPORT MASTER PLAN

CENTURY WEST ENGINEERING

The 2002 Airspace Plan depicts airspace surfaces based on an "other than utility" runway designations, consistent with use by aircraft weighing more than 12,500 pounds. **Table 5-2** summarizes the airspace surface dimensions for Eastern Oregon Regional Airport depicted on the 2002 plan. Based on the updated inventory conducted for the airport master plan, two notable changes to the airport's protected airspace have occurred that are not reflected on the 2002 Airspace Plan:

- **Runway 16/34 is depicted as an active runway.** The runway was closed in 2014 and converted to Taxiway G.
- **The Runway 11 approach is depicted as visual with a 5,000-foot 20:1 approach surface.** Runway 11 currently supports a straight-in non-precision instrument (NPI) approach. Runway 11/29 has NPI markings at both runway ends, consistent with current approach capabilities. The current approach surface designation for Runway 11 is non-precision instrument, which corresponds to a 10,000-foot length and a 34:1 approach slope.

These items are noted in **Table 5-2**, and will be incorporated into the update airspace plan.

No obstructions are noted on the 2002 Airspace Plan for any defined FAR Part 77 airspace surfaces at Eastern Oregon Regional Airport. As noted in the conformance review, obstructions were identified in the Part 77 Surfaces. An AGIS survey is being conducted as part of the master plan update. Survey data, including runway elevations, and locations and elevations for terrain, trees, and built items, will be added to the updated airspace plan and discussed in Chapter 8, Airport Layout Plan.

It is also noted that Runway 7/25 and 11/29 are depicted with future extensions, consistent with the 2002 ALP drawing. The recommendations for future runway configurations are re-examined later in the facility requirements chapter and will be reflected in the evaluation of airport development alternatives.

TABLE 5-2: FAR PART 77 AIRSPACE SURFACES

	DEPICTED IN 2002 AIRSPACE PLAN	CURRENT RECOMMENDATIONS
RUNWAY 07/25 | Other than Utility | Precision		
Width of Primary Surface	1,000 feet	No Change
Approach Surface Length	Runway 07: 10,000 feet Runway 25: 50,000 feet	No Change
Approach Surface Slope	Runway 07: 34:1 Runway 25: 50:1 - Inner 10,000 feet Runway 25: 40:1- Outer 40,000 feet	No Change
Approach Surface Width at End	Runway 07: 3,500 feet Runway 25: 16,000 feet	No Change
RUNWAY 11/29 | Other than Utility | Non-Precision		
Width of Primary Surface	500 feet	No Change
Approach Surface Length	Runway 11: 5,000 feet Runway 29: 10,000 feet	**Runway 11: 10,000 feet** Runway 29: No Change
Approach Surface Slope	Runway 11: 20:1 Runway 29: 34:1	**Runway 11: 34:1** Runway 29: No Change
RUNWAY 16/34 | Utility | Visual		
Width of Primary Surface	500 feet	**Runway Closed**
Approach Surface Length	Runway 16: 5,000 feet Runway 34: 5,000 feet	**Runway Closed**
Approach Surface Slope	Runway 16: 20:1 Runway 34: 20:1	**Runway Closed**
AIRPORT (APPLICABLE TO ALL RUNWAYS)		
Transitional Surface	7:1 Slope to 150 feet above runway	
Horizontal Surface Elevation/Radius	150 feet above airport elevation/10,000 feet	
Conical Surface	20:1 for 4,000 feet	

Approach Surfaces

Runway approach surfaces extend outward and upward from each end of the primary surface, along the extended runway centerline. As noted earlier, the dimensions and slope of the approach surfaces are determined by the type of aircraft intended to use the runway and the most demanding approach planned for the runway.

Runway 11/29 has a 456-foot displaced threshold on Runway 29. This configuration does not alter the FAR Part 77 approach surface for Runway 29, which begins at the end of the primary surface, 200 feet beyond the end of useable runway. The 2002 Approach Plan & Profile drawing (sheet 7 of 13) depicts a 20:1 obstacle clearance approach (OCA) for Runway 29 that is located 200 feet from the displaced threshold. The standards for the Runway 29 OCA are evaluated later in the chapter.

Primary Surface

The primary surface is a rectangular plane that centered on the runway (at centerline elevation) and extends 200 feet beyond each runway end. The width of the primary surface depends on runway category, approach capability, and approach visibility minimums. The primary surface should be free of any penetrations, except items with locations fixed by function (i.e., PAPI, runway or taxiway edge lights, etc.). The primary surface end connects to the inner portion of the runway approach surface.

As noted in the preceding table, Runway 7/25 has a 1,000-foot wide primary surface that is consistent with the instrument landing system (ILS) precision instrument approach on Runway 25. A review of existing conditions identifies a portion of the UAS launch pads located south of Taxiway F located within the primary surface (less than 500 feet south of runway centerline). Aircraft and support equipment located on or adjacent to the pads create a penetration to the primary surface. Relocating (or modifying) the built items and operating areas outside the primary surface is recommended. Marking (high visibility markings) or lighting (red obstruction lights) the areas when occupied is recommended as an interim measure.

The primary surface for Runway 11/29 is 500 feet wide and extends 200 feet beyond each runway end (5, 981 feet overall). A review of existing conditions identifies a section of security fence near the east end of the terminal building located within the primary surface for Runway 11/29 (less than 250 feet from runway centerline). Adding obstruction lights or relocating the fence outside the primary surface recommended. The 2002 Airport Layout Plan recommended shifting Runway 11/29 several hundred feet northward. If this recommendation is maintained, the primary surface would also be shifted northward, which may eliminate the fence obstruction. An updated evaluation of runway configuration will be conducted in the alternative analysis.

Transitional Surface

The transitional surface is located along both sides of the primary surface and inner approach surface, represented by planes of airspace that rise perpendicular to the runway centerline at a slope of 7 to 1, until reaching an elevation 150 feet above the runway elevation, where it connects to the runway horizontal surface. The transitional surface should be free of obstructions (i.e., parked aircraft, structures, trees, etc.).

The UAS launch pads located in the Runway 7/25 primary surface and the fence located in the Runway 11/29 primary surface also penetrate the adjacent transitional surfaces. Relocating (or modifying) the built items and operating areas to avoid penetrating the 7:1 transitional surface is recommended. Marking (high visibility markings) or lighting (red obstruction lights) the items is recommended as an interim measure.

Horizontal Surface

The horizontal surface is a flat plane of airspace located 150 feet above runway elevation with its boundaries defined by the radii (10,000 feet for other than utility instrument runways) that extend from each runway end. The outer points of the radii for each runway are connected to form an oval, which is defined as the horizontal surface. The 2002 Airspace Plan depicts the horizontal surface elevation at 1,643 feet above mean sea level (MSL). No areas of terrain penetrations are identified on the 2002 airspace plan.

Conical Surface

The conical surface is an outer band of airspace, which surrounds and ties into the horizontal surface. The conical surface begins at the elevation of the horizontal surface and extends outward 4,000 feet at a slope of 20:1. The 2002 Airspace Plan depicts the top elevation of the conical surface as 1,843 feet MSL, 200 feet above the horizontal surface and 350 feet above the airport elevation. No areas of terrain penetrations are identified on the 2002 airspace plan.

Airport Design Standards

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13A, Airport Design, serves as the primary reference in planning airfield facilities. A comparison of existing and future design standards for each runway are summarized in **Table 5-3** and **Table 5-4**. The design standards for airplane design group (ADG) IV are also presented for comparison in **Table 5-3,** since the majority of military fixed aircraft operating at the airport are included in this category. A summary of Eastern Oregon Regional Airport current conformance with these standards is presented in **Table 5-5**.

As noted earlier, it is recommended that the "existing" ARC C-III is maintained for Runway 7/25 and ARC B-II is maintained for Runway 11/29 in the current twenty-year planning period. Detailed narrative descriptions of design standards are presented in the following sections of the chapter.

TABLE 5-3: RUNWAY 07/25 AIRPORT DESIGN STANDARDS SUMMARY (DIMENSIONS IN FEET)

FAA STANDARD	RUNWAY 07/25 EXISTING CONDITIONS[1]	ADG C-III 2 LOWER THAN ¾ MILE STANDARDS	ADG B-IV & C-IV 2 LOWER THAN ¾ MILE STANDARDS
Runway Length	6,301	5,540[5]	5,540[5]
Runway Width	150	150	Same as C-III
Runway Shoulder Width	25	25	Same as C-III
Runway Safety Area • Width • Beyond RWY End • Prior to Landing Threshold	 500 1000 600	 500 1000 600	Same as C-III
Runway Obstacle Free Zone • Width • Beyond RWY End • Prior to Landing Threshold	 400 200 200	 400 200 200	Same as C-III
Precision Obstacle Free Zone • Width • Beyond RWY End • Prior to Landing Threshold	 800 200 200	 800 200 200	Same as C-III
Object Free Area • Width • Beyond RWY End • Prior to Landing Threshold	 800 1000 600	 800 1000 600	Same as C-III
Runway Protection Zone Length	Runway 07: 1,000 [9] Runway 25: 2,500 [8]	Runway 07: 1,000 [9] Runway 25: 2,500 [8]	Same as C-III
Runway Protection Zone Inner Width	Runway 07: 500 [9] Runway 25: 1,000 [8]	Runway 07: 500 [9] Runway 25: 1,000 [8]	Same as C-III
Runway Protection Zone Outer Width	Runway 07: 700 [9] Runway 25: 1,700 [8]	Runway 07: 700 [9] Runway 25: 1,700 [8]	Same as C-III
Runway Centerline to: Parallel Taxiway/Taxilane CL Aircraft Parking Line (APL) Building Restriction Line (BRL)	 400 Not Depicted[3] 750[4]	 400 570[6] 745[7]	Same as C-III
Taxiway Width	50	50 (TDG 3&4)	75
Taxiway Shoulder Width	20	20 (TDG 3&4)	25
Taxiway Safety Area Width	118	118	171
Taxiway Object Free Area Width	186	186	259
Taxiway CL to Fixed/Movable Object	93	93	129.5
Taxilane OFA Width	162	162	225
Taxilane CL to Fixed/Movable Object	81	81	112.5

Notes:

1. Airfield dimensions as depicted on 2002 Airport Layout Plan (ALP).
2. Based on Precision Instrument Runway standards for Runway 07/25 (Per FAR Part 77). Runway Protection Zone dimensions based on approach visibility minimums less than ¾ mile (RWY 25) and 1-mile (Rwy 7), Per AC 150/5300-13A and as depicted on 2002 ALP.
3. 2002 ALP does not depict an Aircraft Parking Line; the closest aircraft parking area (UAS launch pads) is located approximately 500 feet from runway centerline.
4. The 2002 ALP depicts a 750-foot BRL for Runway 7/25, which is the setback required to accommodate a 35.7-foot structure (building roof elevation above runway elevation) without penetrating the 7:1 Transitional Surface. Setbacks for larger structures and structures constructed in areas with terrain elevated above runway elevation would depend on roof elevation and actual clearance of Transitional Surface slope.
5. Runway length required for large aircraft weighing more than 60,000 pounds, per FAA runway length software.
6. Distance required to accommodate a 10-foot aircraft tail height without penetrating the 7:1 Transitional Surface. This distance also clears the existing parallel taxiway OFA and the runway OFA. Setbacks for larger aircraft types (i.e., large business jets, etc.) would be based on tail height clearance of Transitional Surface slope.
7. Distance required to accommodate 35-foot structure without penetrating the 7:1 Transitional Surface and clearing parallel taxiway OFA.
8. RPZ dimensions for Runway 25, based on approach visibilities of less than ¾ -mile.
9. RPZ dimensions for Runway 07, based on approach visibilities of less than 1-mile.

TABLE 5-4: RUNWAY 11/29 AIRPORT DESIGN STANDARDS SUMMARY (DIMENSIONS IN FEET)

FAA STANDARD	RUNWAY 11/29 EXISTING CONDITIONS[1]	ADG B-II[2] NOT LOWER THAN 1-MILE EXISTING AND FUTURE STANDARDS
Runway Length	5,581	5,280[6]
Runway Width	100	75
Runway Shoulder Width	25	10
Runway Safety Area • Width • Beyond RWY End • Prior to Landing Threshold	 150 300 300	 150 300 300
Runway Obstacle Free Zone • Width • Beyond RWY End • Prior to Landing Threshold	 400 200 200	 400 200 200
Object Free Area • Width • Beyond RWY End • Prior to Landing Threshold	 500 300 300	 500 300 300
Runway Protection Zone Length	1,000	1,000
Runway Protection Zone Inner Width	500	500
Runway Protection Zone Outer Width	700	700
Runway Centerline to: Parallel Taxiway/Taxilane Centerline Aircraft Parking Line (APL) Building Restriction Line (BRL)	 400 Not Depicted[3] 350	 300 320/465.5[4] 355/465.5[5]
Taxiway Width	50	35
Taxiway Shoulder Width	10	10
Taxiway Safety Area Width	79	79
Taxiway Object Free Area Width	131	131
Taxiway CL to Fixed/Movable Object	65.5	65.5
Taxilane OFA Width	115	115
Taxilane CL to Fixed/Movable Object	57.5	57.5

Notes:

1. Airfield dimensions as depicted on 2002 Airport Layout Plan (ALP).
2. Based on Non-Precision Instrument Runway for Runway 11/29 (Per FAR Part 77). Runway Protection Zone dimensions based on approach visibility minimums not lower than 1-mile (Per AC 150/5300-13A) based on 2002 ALP.2002
3. ALP does not depict an Aircraft Parking Line; the closest aircraft parking area (UAS launch pads) is located approximately 500 feet from runway centerline.
4. Distance required to accommodate a 10-foot aircraft tail height without penetrating the 7:1 Transitional Surface/distance required to clear 400-foot parallel taxiway OFA. Setbacks for larger aircraft types (i.e., large business jets, etc.) would be based on tail height clearance of Transitional Surface slope.
5. Distance required to accommodate 15-foot structure (typical T-Hangar and small conventional hangar roof heights) without penetrating the 7:1 Transitional Surface/distance required to clear 400-foot parallel taxiway OFA.
6. Runway length required for future design aircraft (Saab 340 ME Turboprop), ISA +20 degrees C; MGTW, optimal flaps.

TABLE 5-5: EASTERN OREGON REGIONAL AIRPORT CURRENT CONFORMANCE WITH FAA DESIGN STANDARDS

ITEM	RUNWAY 07/25 AIRPLANE DESIGN GROUP III APPROACH VISIBILITY LOWER THAN ¾ MILE	RUNWAY 11/29 AIRPLANE DESIGN GROUP II APPROACH VISIBILITY NOT LOWER THAN 1-MILE
Runway Safety Area	No[1]	No[3]
Runway Object Free Area	No[2]	No[4]
Runway Obstacle Free Zone	Yes	Yes
Taxiway Safety Area	Yes	Yes
Taxiway Object Free Area	Yes	Yes
Taxilane Object Free Area	Yes	Yes
Building Restriction Lines	Yes	Yes
Aircraft Parking Lines	Yes	Yes
Runway Protection Zones	No[6]	No[5]
Runway - Parallel Taxiway Separation	Yes	Yes (*)
Runway Width	Yes	Yes (*)
Runway Length	Yes	Yes(*)
Taxiway Width	Yes	Yes(*)

Notes:

(*) Indicates facility dimension currently exceeds standard

1. AC 150/5300-13, Table 6-1 includes the permitted items with a "fixed-by-function designation" within the RSA. Runway 7/25 has one non-permitted item (Runway 25 localizer) within the RSA.
2. AC 150/5300-13, Table 6-1 includes the permitted items with a "fixed-by-function designation" within the OFA. Runway 7/25 has four non-permitted items (glide slope, localizer, and two windsocks) within the OFA.
3. Runway 11/29 does not meet RSA standards for grade, slope, and permitted items (road beyond Runway 29 end). Displaced threshold and declared distances are used to mitigate non-standard RSA at Runway 11 end.
4. A road and section of fence is located within the OFA for Runway 11/29.
5. A road is located within the departure RPZ for Runway 29.
6. A portion of the Runway 25 RPZ is not controlled by airport.

Runway Safety Area (RSA)

The FAA defines the runway safety area (RSA) as a prepared surface centered on, and surrounding a runway. *"The RSA enhances the safety of aircraft which undershoot, overrun, or veer off the runway, and it provides greater accessibility for fire-fighting and rescue equipment during such incidents."* The FAA notes that the RSA is intended to enhance the margin of safety for landing and departing aircraft and that RSA standards cannot be modified.

The FAA states that "*The RSA must be:*

(1) cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;
(2) drained by grading or storm sewers to prevent water accumulation;
(3) capable, under dry conditions, of supporting snow removal equipment, Aircraft Rescue and Fire Fighting (ARFF) equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and
(4) free of objects, except for objects that need to be located in the RSA because of their function. Objects higher than 3 inches above grade must be constructed, to the extent practical, on frangibly mounted structures of the lowest practical height with the frangible point no higher than 3 inches above grade. Other objects, such as manholes, should be constructed at grade and capable of supporting the loads noted above. In no case should their height exceed 3 inches above grade."

The recommended transverse grade for the RSA located along the sides of a runway ranges between 1½ to 5 percent from runway shoulder edges. The recommended longitudinal grade for the first 200 feet of RSA beyond the runway end is 0 to 3 percent. The remainder of the RSA must remain below the runway approach surface slope. The maximum negative grade is 5 percent. Limits on longitudinal grade changes are plus or minus 2 percent per 100 feet within the RSA.

A review of current FAA airport design standards (AC 150/5300-13A, Para. 605, NAVAIDs as obstacles, Table 6-1) indicates that the localizer transmitter/antenna array located in the RSA (west end) for Runway 7/25 does not meet the FAA's current fixed-by-function criteria for installation. This item is owned by FAA and was installed by FAA. FAA has notified airport management of plans to relocate the units outside the RSA.

The south end of Runway 11/29 is built on an embankment that drops significantly beyond the runway end. The south end of the RSA is limited by both the grade change (≈-41 feet) and a built item (gate-controlled access road) located approximately 250 feet beyond the end of the runway on its extended centerline. An "as-built" update of the 2002 ALP drawing identifies the elevation of the access road as 1,460 feet MSL, approximately 31 feet lower than the listed runway end elevation (1,491.4 feet). The Runway 29 threshold is displaced 456 feet and declared distances are published for Runway 11 and 29 operations, which effectively mitigates the non-standard RSA. The 2002 ALP drawing depicts a recommended relocation of the Runway 29 end, approximately 2,000 feet north of its current south end, in conjunction with a 2,000-foot extension at the north end. The change in runway configuration will be reexamined and evaluated in the alternative's analysis.

A summary of the RSA requirements and noted non-conforming items for Runway 07/25 and 11/29 are presented below:

Runway Safety Area (RSA) Existing & Future Standards	
Runway 07/25 **ARC C-III** **Lower than 3/4-mile**	**Runway 11/29** **ARC B-II** **Not Lower than 1-mile**
500 feet wide and extends 1,000 feet beyond each departure end of runway, and 600 feet prior to landing.	150 feet wide and extends 300 feet prior and beyond each runway end Runway 29 threshold is displaced by 456 feet and published declared distances are used for both runway ends to mitigate a non-standard RSA at south end of runway, and built items located within the RSA footprint
Non-Conforming Items	
• Localizer antenna is located in the RSA (west end, approximately 975 feet beyond Runway 7 threshold)	• RSA at Runway 29 end does not meet dimensional, gradient, slope, and compaction standards (mitigated, as described above) • A road is located in the RSA beyond the south end of Runway 11/29 (mitigated, as described above)

Runway Object Free Area (ROFA)

Runway object free areas (ROFA) are two-dimensional surfaces "*centered about the runway centerline*" intended to be clear of ground objects that protrude above the runway safety area edge elevation. Obstructions within the ROFA may interfere with aircraft flight in the immediate vicinity of the runway. The FAA clearing standard is:

"*The ROFA clearing standard requires clearing the ROFA of above-ground objects protruding above the nearest point of the RSA…Except where precluded by other clearing standards, it is acceptable for objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes to protrude above the nearest point of the RSA, and to taxi and hold aircraft in the ROFA. To the extent practicable, objects in the ROFA should meet the same frangibility requirements as the RSA. Objects non-essential for air navigation or aircraft ground maneuvering purposes must not be placed in the ROFA. This includes parked airplanes and agricultural operations.*"

A review of current FAA airport design standards (AC 150/5300-13A, Para. 605, NAVAIDs as obstacles, Table 6-1) indicates that several airfield-built items, including two wind cones and the electronic localizer and glide slope transmitters/antenna for the instrument landing system (ILS) located within the ROFA for Runway 7/25, and do not meet the FAA's current fixed-by function criteria for installation. The FAA-

owned localizer is planned for relocation (outside the ROFA). The wind cones were installed at the direction of FAA in past years with locations determined to be "fixed-by-function." It appears that the wind cones do not meet current FAA standards and may need to be relocated, if FAA is unable to waive the standard. As noted earlier, the FAA provides addition flexibility on glideslope installations within runway ROFAs, which may be permitted on a case-by-case basis. It appears that the current FAA design standards and past FAA design/installation practices differ, which may prompt relocation of the Runway 25 glideslope outside of the ROFA, if deemed necessary by FAA through its review.

The ROFA for Runway 11/29 has similar limitations to the RSA described earlier, in terms of the footprint defined by the ADG II dimensional standards. However, since the ROFA represents an unobstructed plane that "*requires clearing…of above-ground objects protruding above the nearest point of the RSA*", vehicles traveling on the road (31 feet below runway end elevation) within the ROFA, do not protrude above the elevation defined by RSA. The Runway 29 displaced threshold and the use of declared distances on Runway 11/29 effectively mitigate the items located in the ROFA footprint. Gradient standards are limited to positive transverse grade changes. In contrast to the RSA, there are no standards for negative grade changes and there is no surface compaction standard for the ROFA.

A summary of the ROFA dimensional standards and noted non-conforming items for Runway 07/25 and 11/29 are presented below:

Runway Object Free Area (ROFA) Existing & Future Standards	
Runway 07/25 ARC C-III Lower than 3/4-mile	**Runway 11/29 ARC B-II Not Lower than 1-mile**
800 feet wide and extends 1,000 feet beyond each departure end of runway and 600 feet prior to landing	500 feet wide and extends 300 feet prior and beyond each runway end Runway 29 threshold is displaced by 456 feet and published declared distances are used for both runway ends to mitigate a non-standard ROFA at south end of runway, and built items located within the OFA footprint
Non-Conforming Items	
• Runway 25 glideslope • Runway 25 localizer • Two lighted windsocks	• A section of security fence (between the terminal building and the approach end Runway 29) is located in the ROFA • Access road (beyond Runway 29 end) is located in the ROFA footprint, but is below grade (public access is controlled by gate)

Obstacle Free Zone (OFZ)

Obstacle free zones (OFZ) are planes of airspace extending upward above the runway elevation. The OFZs are intended to mitigate close-in obstructions that may create hazards for aircraft. The FAA defines the following clearing standard for the OFZ:

"*The OFZ clearing standard precludes aircraft and other object penetrations, except for frangible NAVAIDs* [navigational aids] *that need to be located in the OFZ because of their function.*"

The FAA defines four types of OFZs for runways, depending on their type and configuration:

RUNWAY OBSTACLE FREE ZONE (ROFZ)

"*The ROFZ is a defined volume of airspace centered above the runway centerline, above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The ROFZ extends 200 feet beyond each end of the runway.*"

The ROFZ width dimension for runways accommodating large aircraft is 400 feet, which applies to Runway 7/25 and 11/29.

Three additional OFZs are defined for Runway 25, based on its current precision instrument approach capabilities:

INNER-TRANSITIONAL OFZ

"*The inner-transitional OFZ is a defined volume of airspace along the sides of the ROFZ and inner-approach OFZ. It applies only to runways with lower than ¾-statute mile approach visibility minimums. Runway to taxiway separation may need to be increased, but may not be decreased, based on this requirement.*

(1) Small runway standards - omitted (this item does not apply to either runway at Eastern Oregon Regional Airport)

(2) For operations on runways by large aircraft, separate inner-transitional OFZ criteria apply for Category (CAT) I and CAT-II/III runways.[4]

(a) For CAT-I runways, the inner transitional OFZ begins at the edges of the ROFZ and inner-approach OFZ, then rises vertically for a height "H", and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet above the established airport elevation." [5]

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[4] Runway Categories (I, II, III) refer the level of precision available, with Category I being the most typical for general aviation and smaller commercial runways; Categories II and III are more sophisticated and require special aircraft equipment and/or crew training.

[5] (1) In U.S. customary units, $H_{feet} = 61 - 0.094\ (S_{feet}) - 0.003\ (E_{feet})$. S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level.

INNER-APPROACH OFZ

"The inner-approach OFZ is a defined volume of airspace centered on the approach area. It applies only to runways with an ALS [approach lighting system]. *The inner-approach OFZ begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the ALS. Its width is the same as the ROFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning."*

PRECISION OBSTACLE FREE ZONE (POFZ)

"The POFZ is defined as a volume of airspace above an area beginning at the threshold at the threshold elevation, and centered on the extended runway centerline (200 feet long by 800 feet wide)."

"(1) The surface is in effect only when all of the following operational conditions are met:

- *(a) The approach includes vertical guidance.*
- *(b) The reported ceiling is below 250 feet or visibility is less than 3/4 statute mile (or Runway Visual Range [RVR] is below 4,000 feet)* [6]
- *(c) An aircraft on final approach is within two (2) miles of the runway threshold.*

(2) When the POFZ is in effect, a wing of an aircraft holding on a taxiway waiting for runway clearance may penetrate the POFZ; however, neither the fuselage nor the tail may penetrate the POFZ. Vehicles up to 10 feet in height necessary for maintenance are also permitted in the POFZ."

(3) The POFZ is applicable to all runway thresholds, including displaced thresholds."

A summary of the OFZ dimensional standards for current/future approach capabilities and noted non-conforming items for Runway 07/25 and 11/29 are presented below:

[6] RVR: Runway Visual Range. A measurement (in feet) of visibility along the runway with transmissometer installed on the side of a runway.

Obstacle Free Zone (OFZ) Existing & Future Standards	
Runway 07/25 **ARC C-III** **Lower than 3/4-mile**	**Runway 11/29** **ARC B-II** **Not Lower than 1-mile**
ROFZ – 400 feet wide and 200 feet beyond runway ends. **Runway 25** Inner Approach OFZ: 400 feet wide, extending 200 feet beyond last approach light fixture at a slope of 50:1 Inner Transitional OFZ: Extends outward from edges of ROFZ at a slope of 6 to 1 to an elevation 150 feet above airport elevation Precision OFZ: 800 feet wide and 200 feet long, beginning at runway threshold	ROFZ – 400 feet wide and 200 feet beyond runway ends.

Runway Protection Zone (RPZ)

The FAA defines runway protection zone as follows:

"The RPZ is trapezoidal in shape and centered about the extended runway centerline. The central portion and controlled activity area are the two components of the RPZ. The central portion of the RPZ extends from the beginning to the end of the RPZ, centered on the runway centerline. Its width is equal to the width of the runway OFA."

"The RPZ may begin at a location other than 200 feet beyond the end of the runway. When an RPZ begins at a location other than 200 feet beyond the end of the runway, two RPZs are required, i.e., a departure RPZ and an approach RPZ. The two RPZs normally overlap."

The FAA notes that when approach RPZs are required, they begin 200 feet beyond the (displaced) threshold.

"The RPZ's function is to enhance the protection of people and property on the ground. This is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities."

RPZs with buildings, roadways, or other items do not fully comply with FAA standards. It is recognized that realigning major surface roads located within the RPZs may not always be feasible. As noted earlier,

the FAA recommends that airport sponsors control the RPZs through ownership whenever possible, although avigation easements[7] are commonly used when outright purchase is not feasible.

NOTE: FAA GUIDANCE OF RPZS AND ROADS (FALL 2012)

In October 2012, the FAA released interim guidance regarding RPZs and incompatible land uses, with a particular focus on roads. The policy directs airport sponsors to evaluate any planned changes to existing RPZs that introduce or increase the presence of roads in RPZs. Existing roads within RPZs are also to be evaluated during master planning to determine if feasible alternatives exist for realignment of roads outside RPZs or for changes to the RPZs themselves. The FAA Seattle Airports District Office has subsequently indicated that their primary focus related to this policy is related to proposed changes to RPZs—as the result of a change to a runway end/RPZ location, approach visibility minimums, or the built items located in an RPZ. FAA funding for the removal of roads located in RPZs is currently limited based on the large number of cases involved, although changes in FAA funding priorities themselves, are subject to change. Any proposed changes in the length or configuration of either runway that changes the location of existing RPZs evaluated in this study are subject to review by FAA headquarters in Washington D.C.

A summary of the RPZs is presented below:

Runway Protection Zone (RPZ) Existing & Future Standards	
Runway 07/25 **ARC C-III**	**Runway 11/29** **ARC B-II**
Runway 07 (Visibility ≥ 1–mile) 500' x 1700 ' x 1000' Runway 25 (Visibility < 3/4 –mile) 1000' x 2500' x 1700'	Runway 11/29 (Visibility ≥ 1–mile) 500' x 1000' x 700'
Non-conforming Items	
• A portion of the Runway 25 RPZ is located off-airport property (verify avigation easement)	• A road is located in the RPZ for Runway 29.

Runway Visibility Zone (RVZ)

A runway visibility zone (RVZ) is required with intersecting runways, so that aircraft operating on each runway are visible to other pilots during critical runway operations. The FAA determines the boundaries of an RVZ by establishing imaginary lines that connect the two runways' line of sight points. The location of the line of site points are based on the overall length of each runway and the distance between the

[7] An avigation easement (*avigation = aviation + navigation*) involves the purchase of airspace rights over a particular defined ground area. The easement normally limits the maximum height of any natural or built items (to coincide with the runway approach surface slope) and may include provisions restricting the type of activities permitted. Compensation is negotiated between the airport owner and property owner.

intersection and each runway end. The line of sight standards for intersecting runways requires that "*any point 5 feet above runway centerline and in the runway visibility zone must be mutually visible with any other point 5 feet above the centerline of the crossing and inside the runway visibility zone.*"

The 2002 Airport Layout Plan depicted an RVZ based on three runways. Since the last master plan update, Runway 16/34 was closed and converted to a taxiway. This runway closure has changed the existing RVZ, which will be depicted on the updated airport layout plan. Any recommended changes to the existing runway configuration would affect the future RVZ.

Threshold Siting Surface (TSS)/Obstacle Clearance Surface (OCS)

The 2002 Runway 11-29 Approach Plan and Profile sheet of the ALP drawing set depicts an obstacle clearance surface (OCS), also known as a threshold siting surface (TSS), on Runway 29 associated with the 456-foot displaced threshold. As noted earlier, the displaced threshold addresses non-standard runway safety area beyond the end of Runway 29 and is not driven by obstruction clearance requirements for the approach. No obstructions to either the Runway 29 FAR Part 77 approach surface or the Runway 29 OCS are identified.

The design characteristics for the Runway 29 surface are defined by runway type and use, consistent with AC 150/5300-13A (Table 3-2. Approach/departure standards table), as noted below. A primary consideration in the evaluation is the RNAV GPS instrument approach to Runway 29, which is authorized for approach category A through D aircraft.

Approach Surfaces (OCS/TSS) Per AC 150/5300-13A (Table 3-2) Existing & Future Standards
Runway 29 (Displaced Threshold)
Dimensions: Length 10,000 feet Inner Width 800 feet Outer Width 3,800 feet Surface Begins 200 feet from displaced threshold Slope 20:1 Runway Type Approach end of runways expected to support instrument night operations serving greater than approach Category B aircraft.

Taxiway Safety Area (TSA)

Taxiway safety areas (TSA) serve a similar function as runway safety areas and use the same design criteria for surface conditions, with varying dimensions based on airplane design group.

As with runway safety areas, the ground surface located immediately adjacent to the taxiways periodically requires maintenance or improvement to adequately support the weight of an aircraft or an airport vehicle. Grading and/or soil compaction within taxiway safety areas should be completed as needed, and grass, brush or other debris should be regularly cleared to maintain FAA standards. Taxiway pavement edges should be periodically inspected to ensure that grass, dirt, or gravel build-ups do not exceed 3 inches. Items within the safety area that have locations fixed by function (taxiway reflectors, edge lights, signs, etc.) must be mounted on frangible (break away) mounts.

It is noted that safety area standards do not apply to *taxilanes* typically located within hangar developments or aircraft parking aprons. Taxilanes provide aircraft access within a parking or hangar area; taxiways provide aircraft access between points on the airfield and serve runways (e.g. parallel taxiways and exit taxiways).

There are no known non-standard TSA conditions on the airport. The major taxiways on the airfield are used by all aircraft types and should use the same design parameters as the main runway. Taxiway D extends east-west, north of the main apron, and is used to provide access to the apron and adjacent landside facilities by general aviation aircraft. A summary of the safety area standards for existing taxiways is presented below:

Taxiway Safety Area Existing & Future Standards	
Taxiway A, B, F, G, and D (East of TWY A) ADG III	**Taxiway D (West of TWY A) ADG II**
118 feet wide (59 feet each side of taxiway centerline)	79 feet wide (39.5 feet each side of taxiway centerline)

Taxiway/Taxilane Object Free Area (TOFA)

Taxiway and taxilane object free areas (TOFA) are intended to provide unobstructed taxi routes (adequate wingtip clearance) for aircraft. The outer edge of the TOFA defines the recommended standard distance from taxiway or taxilane centerline to a fixed or moveable object. The FAA clearing standard prohibits service vehicle roads, parked aircraft, and above ground objects (hangars, other built items, etc.), except for objects with locations fixed by function (navigational aids, airfield signs, etc.). The applicable design standard (ADG I, II, or III), is determined by the largest aircraft that may be accommodated in aircraft

parking areas or hangars served by that taxiway/taxilane. The taxiway/taxilane OFA standards are not affected by potential changes in approach visibility minimums. As with the taxiway safety area, any items within the taxiway OFA that have locations fixed by function, must be frangible (breakaway) to meet FAA standards.

There are no known non-standard Taxiway OFA conditions on the airport. The design assumptions (aircraft use) previously described for taxiway safety area also apply to taxiway OFA. A summary of the object free area standards for existing taxiways is presented below:

Taxiway OFA Existing & Future Standards	
Taxiway A, B, F, G, and D (East of TWY A) ADG III	**Taxiway D (West of TWY A) ADG II**
186 feet (93 feet each side of centerline)	131 feet (65.5 feet each side of centerline)

TAXILANES

Eastern Oregon Regional Airport has taxilanes that are used by both small and large aircraft (ADG I and II). The taxilanes are located within the main apron area and in the aircraft hangar area at the west end of the main apron.

Hangar taxilane clearances are measured by the distance from the taxilane centerline to an adjacent fixed or moveable object (building, fence, tree, parked aircraft, etc.), on both sides of centerline. For T-hangars, hangar rows, and tiedown rows designed to accommodate small aircraft, the ADG I taxilane OFA standard is 79 feet. The existing OFA clearances for ADG I taxilanes on the airport vary from approximately 63 to 79 feet.

Since the type of aircraft located within a particular hangar can change over time, the appropriate method for determining taxilane clearance standards is based on the largest aircraft that can be physically accommodated within the hangar. ADG II standards are applied to taxilanes serving larger hangars (door openings 50 feet and larger) and ADG I standards are applied to taxilanes serving small individual hangars or T-hangars. While relocation of existing hangars is not considered highly feasible, any planned new hangars (and associated taxilanes) should meet the applicable ADG I or II taxilane object free area clearance standard. A modification to FAA standards should be requested for the existing hangars, with the recommended disposition (reconfiguration) to be addressed when the hangars reach the end of their useful lives.

Taxilanes on the main apron provide access to aircraft parking, circulation within the apron and access to hangars, fueling, the terminal building, and fixed base operators. The primary access taxilane extends along the north edge of the main apron, with connections to the west hangar area, the main apron, terminal area,

and adjacent taxiways. The west end of the main apron has five north-south taxilanes that serve small airplane tiedowns. These taxilanes are designed to meet the ADG I taxilane OFA standard, which includes clearance between the parked aircraft (rather than measuring from tiedown anchors) to the adjacent taxilanes.

Figure 5-2 presented earlier in the chapter illustrates the existing and standard taxilane OFA clearances on the airport. A summary of the object free area standards for existing taxilanes is presented below:

Taxilane OFA Existing & Future Standards	
Large Airplane Tiedown and Large Hangar Taxilanes ADG II	**T-Hangars and Small Airplane Tiedown Taxilanes ADG I**
115 feet (57.5 feet each side of centerline)	79 feet (39.5 feet each side of centerline)

Building Restriction Line (BRL)

A building restriction line (BRL) identifies the minimum setback required to accommodate a typical building height, such as hangar. The location of the BRL is based on the ability to remain clear of all runway and taxiway clearances on the ground and the protected airspace surrounding a runway. Taller buildings are located progressively farther from a runway in order to remain beneath the 7:1 transitional surface slope that extend laterally from both sides of a runway.

The 2002 Airport Layout Plan depicts a 750-foot BRL for Runway 7/25 and a 500-foot BRL or Runway 11/29 for areas that directly parallel the runways. Additional BRLs are defined based on the location the runway visibility zone (RVZ) and setbacks along the south side of the main apron. The existing BRLs are effective in avoiding building conflicts on the airfield for the existing and future design standards. A summary of the BRL requirements is presented below:

Building Restriction Lines (BRL) Existing & Future Standards	
Runway 07/25 ARC C-III Lower than 3/4-mile Visibility	**Runway 11/29 ARC B-II Not Lower than 1-mile Visibility**
750-foot BRL (distance from runway centerline)	500-foot BRL (distance from runway centerline)
Accommodates structures up to 35.7 feet above runway elevation based on 1,000-foot wide runway primary surface	Accommodates structures up to 35.7 feet above runway elevation based on 500-foot wide runway primary surface

All new construction on or in the immediate vicinity of the airport should involve FAA review for airspace compatibility. FAA Form 7460-1, Notice of Proposed Construction or Alternation, should be prepared and submitted to FAA at least 60 to 90 days prior to planned construction. The 7460 form should be submitted by the city for any projects located on the airport and submitted by the applicant for any projects located off airport property (coordinated with City of Pendleton and Umatilla County, if outside Pendleton city limits). The FAA will review all proposed development to determine if the proposed action would create any obstructions to FAR Part 77 airspace surfaces. In general, the FAA will object to proposals that result in a penetration to any FAR Part 77 airspace surfaces on the basis of safety.

Aircraft Parking Line

The aircraft parking line (APL) represents the minimum setback required for locating aircraft parking in order to clear the adjacent runway-taxiway system. The location of the APL is generally determined by the more demanding of runway airspace clearance and taxiway obstruction clearance. The 2002 Airport Layout Plan does not depict APLs.

All general aviation parking is located on the main apron or adjacent to Taxiway G (aerial applicator loading pads). These parking areas are located clear of adjacent taxiway OFA setbacks and the protected airspace surfaces for both runways.

Five UAS launch pads are located parallel to Runway 7/25 and Taxiway F, approximately 493 feet south of the runway centerline. This location protects the (C-III) taxiway OFA (93 feet from taxiway centerline), but does not avoid penetrations to the FAR Part 77 airspace defined for Runway 7/25. A review of the UAS pad location identifies a penetration to the primary surface and adjacent transitional surface when the pads are occupied with aircraft or support equipment.

With the exception of the UAS pads noted above, all other aircraft parking areas on the airfield are adequately sited to avoid airspace and design standards conflicts. Recommended APL locations will be reflected on the updated ALP. Minimum APL dimensions, based on a typical small aircraft with a 10-foot tail height are presented below:

Aircraft Parking Line (APL) Existing & Future Standards	
Runway 07/25 ARC C-III Lower than 3/4-mile	**Runway 11/29 ARC B-II Not Lower than 1-mile**
570-foot APL (distance from runway centerline) Distance to clear 10-foot aircraft tail height Based on 1,000-foot wide primary surface	320-foot APL (distance from runway centerline) Distance to clear 10-foot aircraft tail height Based on 500-foot wide primary surface
Other APL Setbacks Aircraft parking adjacent to ADG II Taxilane (north end of main apron - 65.5 feet from taxilane centerline)	

Runway - Parallel Taxiway Separation

Both runways have sections of parallel taxiways with a 400-foot runway-taxiway separation, which meets or exceeds the applicable design standards (Runway 7/25: ARC C-III 400 feet; Runway 11/29: ARC B-II 240 feet). The 2002 Airport Layout Plan depicts several recommended taxiway improvements, including construction of a parallel taxiway section to the Runway 11 end. The taxiway improvement recommendations will be reviewed in the updated alternatives analysis.

Airside Requirements

Airside facilities are those directly related to the arrival, departure, and movement of aircraft:

- Runways
- Taxiways
- Airfield Instrumentation and Lighting

Runways

The adequacy of the existing runway system at Eastern Oregon Regional Airport was analyzed from a number of perspectives including runway orientation, airfield capacity, runway length, and pavement strength.

Runway Orientation & Wind Coverage

The orientation of runways for takeoff and landing operations are primarily a function of wind velocity and direction, combined with the ability of aircraft to operate under adverse wind conditions. A runway's wind coverage is determined by an aircraft's ability to operate with a "direct" crosswind, which is defined as 90 degrees to the direction of travel. For planning purposes FAA has defined the maximum direct crosswind for small aircraft as 12 miles per hour (10.5 knots); for larger general aviation aircraft, a 15-mile per hour (13

knot) direct crosswind is used. Aircraft are able to operate safely in progressively higher wind speeds as the crosswind angle decreases and the wind direction aligns more closely to the direction of flight. In addition, some aircraft are designed to safely operate with higher crosswind components. Ideally, an aircraft will take off and land directly into the wind or with a light crosswind. The FAA recommends that primary runways accommodate at least 95 percent of local wind conditions; when this level of coverage is not provided, the FAA recommends development of a secondary (crosswind) runway.

The wind rose depicted on the 2002 Airport Layout Plan (data summary sheet), indicates that Runway 07/25 accommodates approximately 95.9 percent of local wind conditions for small aircraft and 98.0 percent of local wind conditions for larger aircraft. Runway 11/29 accommodates approximately 87.8 percent of local wind conditions for small aircraft and 93.1 percent of local wind conditions for larger aircraft. The wind data consists of 14,608 observations, although no reference to the observation period is cited.

Runway Length

CONCLUSION

Based on the composition of existing and forecast activity, the current lengths of Runways 7/25 and 11/29 are considered adequate.

OVERVIEW AND ANALYSIS

Runway length requirements are based primarily on airport elevation, mean maximum daily temperature of the hottest month, runway gradient, and the critical aircraft type expected to use the runway. For Eastern Oregon Regional Airport, the future design aircraft identified in the updated aviation activity forecasts is a multi-engine turboprop aircraft (above 12,500 pounds), such as a Saab 340. The airport also accommodates a wide range of business class turboprop and jet aircraft, and transport category military aircraft that are capable of operating on the existing runways in most conditions. Both runways are capable of accommodating the current and forecast mix of aircraft.

The large military fixed-wing operations are generated by C-130 and C-17 aircraft included in ARC B-IV and C-IV. It is noted that these aircraft are designed to operate on relatively short runways, and they do not typically operate at or near maximum gross weights at Eastern Oregon Regional Airport. Despite their physical size and weight, the runway length requirements for these aircraft are not disproportionately greater than most high-performance business aircraft or multi-engine aircraft used in regional commercial airline service.

For general aviation airports that accommodate regular business jet activity, the FAA recommends using a "family of design aircraft" approach to defining runway length requirements. FAA Advisory Circular (AC) 150/5325-4B, Runway Length Requirements for Airport Design identifies a group of "airplanes that make up 75 percent of the fleet," which represents the majority of business jets operating at Eastern Oregon

Regional Airport. Based on local site conditions, this segment of activity requires runway lengths ranging from 4,900 feet to 6,650 feet, with 60 and 90 percent useful loads, which is comparable to existing runway lengths available.

The runway length required to accommodate the representative multi-engine turboprop (Saab 340) reflected in the updated commercial passenger forecasts is estimated at approximately 5,130 feet (1,493 feet MSL, ISA +15 degrees C, MGTW 29,000 pounds, optimal flaps).

For reference, a summary of FAA-recommended runway lengths for planning based on the requirements of small and large general aviation aircraft in a variety of load configurations is presented in **Table 5-6**. The runway length requirements for a variety of business aircraft are summarized in **Table 5-7**.

TABLE 5-6: FAA RECOMMENDED RUNWAY LENGTHS FOR PLANNING

Runway Length Parameters for Eastern Oregon Regional Airport[1]

- Airport Elevation: 1,493 feet MSL
- Mean Max Temperature in Hottest Month: 88.0 F
- Maximum Difference in Runway Centerline Elevation: 9 Feet
- Dry Runway
- Existing Runway Lengths: Runway 07/25: 6,300 feet; Runway 11/29: 5,581 feet

Small Airplanes with less than 10 seats	
75 percent of these airplanes	**2,990**
95 percent of these airplanes	**3,560**
100 percent of these airplanes	**4,190**
Small airplanes with 10 or more seats	**4,520**
Large Airplanes of 60,000 pounds or less	
75 percent of these airplanes at 60 percent useful load	**5,000**
75 percent of these airplanes at 90 percent useful load	**6,790**
100 percent of these airplanes at 60 percent useful load	**5,900**
100 percent of these airplanes at 90 percent useful load	**8,800**
Airplanes of more than 60,000 pounds	**5,540**

1. Runway length parameters taken from 2002 ALP Data Table
2. Runway lengths determined by FAA Airport Design Software and tables in FAA AC

TABLE 5-7: TYPICAL BUSINESS AIRCRAFT RUNWAY REQUIREMENTS

AIRCRAFT	PASSENGERS (TYPICAL CONFIGURATION)	MAXIMUM TAKEOFF WEIGHT	RUNWAY LENGTH REQUIRED FOR TAKEOFF[1]	RUNWAY LENGTH REQUIRED FOR LANDING[2]
Cessna Citation Mustang	4-5	8,645	4,360	2,820
Cessna Citation CJ1+	5-6	10,700	4,860	2,900
Cessna Citation CJ2+	6-7	12,500	4,360	3,270
Cessna Citation CJ3	6-7	13,870	3,970	3,060
Cessna Citation CJ4	6-7	16,950	5,210	2,955
Cessna Citation Bravo	6-9	14,800	4,770	3,720
Cessna Citation Encore+	8-11	16,830	4,750	3,090
Cessna Citation XLS+	9-12	20,200	4,580	3,490
Cessna Citation VII	7-8	22,450	5,910	3,240
Citation Sovereign	9-12	30,300	4,250	2,890
Cessna Citation X	8-12	36,100	6,500	3,880
Learjet 45	7-9	20,500	5,660(a)	3,060(a)
Challenger 300	8-15	37,500	6,440(a)	2,990(a)
Gulfstream 100 (Astra)	6-8	24,650	7,010(a)	3,360(a)
Gulfstream 200 (G-II)	8-10	35,450	7,900(a)	3,770(a)
Gulfstream 300 (G-III)	11-14	72,000	6,630(a)	3,670(a)

1. FAR Part 25 or 23 Balanced Field Length (Distance to 35 Feet Above the Runway); 2,000 feet MSL, 86 degrees F; Zero Wind, Dry Level Runway, 15 degrees flaps, except as otherwise noted.
2. Distance from 50 Feet above the runway; Flaps Land, Zero Wind.

(a) For general comparison only. Manufacturer runway length data based on sea level and standard day temperature (59 degrees F) at maximum takeoff/landing weight;

Source: Aircraft manufacturers operating data, flight planning guides.

Based on local conditions and the methodology outlined in **AC 150/5325-4B**, Runway 07/25 (6,300 feet) can accommodate 100 percent of large airplanes (60,000 pounds or less maximum gross takeoff weight) at 60 percent useful load under typical operating conditions.[8] Runway 11/29 can also accommodate the majority of these aircraft. Some aircraft may experience operational limits (payload or fuel) on warmer days during the summer months or during the winter months if the runway has an accumulation of snow or ice.

As noted earlier, the FAA establishes a "substantial use threshold" of 500 annual itinerant operations (takeoffs and landings) for the design aircraft or family of design aircraft. To pursue a runway extension based on the higher demand profile, the City of Pendleton would need to document sufficient activity (either

[8] Useful load is generally defined as passengers, cargo, and usable fuel.

aircraft currently using the airport that are regularly constrained by current runway length or new aircraft unable to operate at the airport due to runway length) to meet the FAA substantial use threshold.

The 2002 Airport Layout Plan (ALP) depicts a 2,000-foot extension for Runway 07/25, increasing its ultimate length to 8,300 feet. The ALP notes that implementation is "to be determined" and the master plan narrative indicates that the recommended extension is intended to "accommodate the ultimate aircraft demand." Based on the updated forecast activity, no extension of Runway 7/25 is anticipated at this time. However, to preserve long-term options, the City may wish to consider retaining the extension on the updated ALP as a long-term development reserve.

The ALP also depicts a 2,000-foot north extension on Runway 11/29 that would coincide with a 2,000-foot relocation (shift) of the south end of the runway. No increase in runway length was recommended. A review of the proposed reconfiguration of the runway will be included in the alternative's analysis.

Runway Width

Runway 7/25

Runway 07/25 is 150 feet wide, which meets the 150-foot dimensional standard ARC C-III with current approach capabilities and approach visibility minimums.

As noted earlier, Runway 07/25 is capable of accommodating large military or commercial transport aircraft in a variety of missions critical to both national security and regional emergency response. This capability was preserved in the 2006 FAA-funded runway rehabilitation project and it is recommended that the existing runway dimensions be maintained during the current planning period.

Runway 11/29

Runway 11/29 is 100 feet wide, which exceeds the 75-foot dimensional standard for ARC B-II with current and future approach capabilities and approach visibility minimums.

As the airport's secondary runway, narrowing the runway to 75 feet may be considered at the time of the next major rehabilitation or reconstruction to meet the ADG II width standard. The cost of narrowing, including replacement/relocation of edge lighting and signage, changes in stormwater drainage systems, and pavement removal will be evaluated during design for comparison to maintaining the existing 100-foot width and determining FAA funding levels.

Airfield Pavement

An updated airfield pavement maintenance and management study for Eastern Oregon Regional Airport was completed by ODA in 2014, as noted in the Inventory Chapter. The updated pavement plan, along with other engineering analyses will be the primary decision making tools for the ongoing maintenance and replacement of airfield pavements.

The 2014 Pavement Condition Index (PCI) report identifies several rehabilitation, reconstruction, or maintenance projects for the 2015-2019 time period (recommended year based on rated condition, not available funding):

- Runway 7/25: Overlay (2015)
- Runway 11/29: Slurry Seal (2015)
- Taxiway G (north section): Reconstruct (2015)
- Taxiway G (south section): Overlay (2015)
- Taxiway A: Slurry Seal (2015)
- Taxiway B: Overlay; Reconstruct at intersection with Taxiway A (2015)
- Taxiway D: Overlay and Slurry Seal (2015)
- Taxiway E: Overlay (2015)
- Taxiway F: Slurry Seal (2019)
- Main Apron (west section): Slurry Seal (2018)
- Main Apron (east section): Slurry Seal (2015)
- West Hangar Taxilanes: Reconstruct (2015)

City engineering staff and their airport engineering consultant evaluate the PCI report recommendations as part of the ongoing capital improvement program for the airport. Specific recommendations on the timing and effort required for each project will be determined during design.

For planning purposes, rehabilitation of asphalt pavements is typically assumed on a 15- to 25-year cycle, depending on use and pavement design. Crack filling and fog/slurry seals should be performed on a regular basis for all asphalt sections to maximize the useful life of the pavement. A prioritized list of pavement rehabilitation or reconstruction projects will be provided in the updated capital improvement program.

Pavement Strength

Ideally, airfield pavements designed to accommodate all aircraft operating at an airport should have the same weight bearing capacity as the primary runway. Pavements accommodating small aircraft (tiedown apron, hangar taxilanes, etc.) are normally designed based on 12,500-pound aircraft weight. The 2002 Airport Layout Plan lists the pavement strength for Runway 07/25 as 210,000-pound dual tandem wheel and Runway 11/29 as 122,000-pound dual tandem wheel.

The runways, major taxiways and the main apron have historically accommodated a full range of general aviation, commercial and military aircraft and appear to meet future requirements.

Taxiways

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between aprons and runways, while other taxiways become necessary as activity increases and safer and more efficient circulation to and from the airfield is needed. The existing taxiway system at Eastern Oregon Regional Airport provides aircraft access to the runways and all landside facilities. The major taxiways on the airfield are 50 feet wide, consistent with the ADG III width standard.

No major capacity related improvements are anticipated during the current twenty-year planning period, although the addition of taxiway access to the Runway 11 threshold is identified as a safety-related improvement. Aircraft are currently required to back-taxi on the runway to reach the north end of the runway and turnaround for a full-length Runway 11 takeoff.

A future high-speed exit taxiway for Runway 25 (south side) and a connecting access taxiway to the terminal area is also depicted on the 2002 ALP. These taxiway improvements will be reviewed in the alternative's analysis.

Taxilanes

The development of new hangars or aircraft parking areas may require taxilane extensions or new taxilanes. New access taxiways and taxilanes serving small hangar development should be 25 feet wide for ADG I aircraft and 35 feet wide for ADG II aircraft. As noted earlier in this chapter, several existing hangar taxilanes do not meet FAA taxilane object free area clearing standards. While it may not be feasible to relocate existing hangars, new hangars should be configured to meet FAA standards.

Any new taxilanes added within the main aircraft apron should be configured to provide the standard object free area clearances for the specific aircraft types. Light airplane tiedown rows and adjacent taxilanes are typically designed to accommodate ADG I aircraft; parking positions for larger, business class aircraft should be designed based on ADG II taxilane clearing standards. The taxilane centerline to the nearest fixed or moveable object (parked aircraft) of 39.5 and 57.5 feet, correspond to the object free area dimensions for ADG I and II.

Hot Spots

Recent FAA guidance on runway-taxiway connections suggests that direct, unbroken taxiway routes extending from aircraft parking aprons directly to a runway have the potential of creating hot spots for runway safety/incursion.

The FAA Runway Safety Action Team identifies known hot spots at airports, which are defined as:

> *"A location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary."*

Eastern Oregon Regional Airport has one hot spot documented by FAA:

> *"The hold line for Rwy 29 extends across a portion of the ramp and is approximately 360' long. The signs are difficult to see from some spots on the ramp."*

The airport development alternatives portion of the master plan will consider options for mitigating this hot spot. The alternatives evaluation will also review the existing airfield layout, including the configuration of Taxiway B, which provides a direct path between Oregon National Guard apron and the intersection of Runways 7/25 and 11/29, which may be inconsistent with current FAA design guidance, as contained in FAA Engineering Brief No. 75.[9]

Airfield Instrumentation, Lighting, and Marking

Navigational Aids

Runway 7/25 is equipped with a Category I instrument landing system that includes a glide slope located near the Runway 25 end and a localizer located beyond the end of Runway 07. Both navigational aids have FAA-defined critical areas designed to protect the integrity of the electronic transmission signals. It is noted that with the exception of Taxiway G, all existing exit taxiways for Runway 07/25 are located on the south side of the runway. Future expansion of landside facilities on the north side of the airport are likely to utilize Taxiway G. Any new north side taxiways, particularly taxiways that may be located near the east end of the runway, will need to meet all FAA location and "ILS hold" requirements to protect the glide slope, which is located approximately 1,000 feet west of the Runway 25 end.

The FAA's long-range plan for maintaining conventional ground-based navigation aids, particularly ILS equipment, remains unclear. However, it is possible that the next generation replacement for the ILS that provides comparable approach capabilities will be based entirely or largely on satellite navigation.

[9] FAA Engineering Brief No. 75: Incorporation of Runway Incursion Prevention into Taxiway and Apron Design (November 8, 2007)

However, until a clear replacement platform is identified by FAA, the airspace and protected ground areas associated with the ILS must continue to be protected.

Runways with Category I instrument landing systems (ILS) are often equipped with Runway Visual Range (RVR) instrumentation. Automated RVR systems provide pilots with distances (in feet) where runway markings are visible, compared to normal AWOS or ASOS visibility measurements in increments of a mile. The RVR sensors are installed adjacent to the runway at one or more points in order to provide accurate, unbroken line of sight measurements along the entire length of the runway. The addition of RVR on Runway 7/25 may be considered to improve the operational capabilities of the current instrument approaches and weather reporting.

When an existing navigational aid reaches the end of its useful life, it will be replaced with the most current navigational aids available. For example, when the visual approach slope indicator (VASI) for Runway 7 requires replacement, it would be replaced with a precision approach path indicator (PAPI), or the standard in effect at the time. For planning purposes, the useful life for visual navigational aids is 20 years and replacement projects for the systems will be included in the twenty-year capital improvement program.

FAA-owned navigational aids will be replaced or decommissioned by FAA at the end of their useful life. This includes the Pendleton VORTAC, located 4 miles west of the airport.

Runway & Taxiway Lighting

As noted in the Inventory Chapter, the lighting systems associated with Runway 07/25, Runway 11/29, major taxiways, and the airfield are all in good operating condition. Replacement of lighting systems is usually assumed at 20 years for airports in climatic areas similar to Pendleton, although some systems remain reliable, serviceable and fully function for a considerably longer period. For planning purposes, the useful life for airfield lighting systems is 20 years and replacement projects for the systems will be included in the twenty-year capital improvement program.

Runway & Taxiway Markings

Runway 07/25 has precision instrument markings on the Runway 25 end and non-precision markings on the Runway 07 end, consistent with existing instrument approach capabilities. The markings include side and edge stripes, threshold markings (12 vertical bars at each end), runway end numbers, and aiming point markings, and touchdown zone markings (Runway 25 end only). The runway has a yellow aircraft hold line located approximately 500 feet east of the intersection with Runway 11/29. The markings were applied during the runway sealcoat project in 2010 and are in good condition.

Runway 11/29 has non-precision instrument markings at both ends. The markings include side stripes, threshold markings (8 vertical bars at each end), runway designation numbers, centerline stripe, and aiming point markings. Runway 29 also has displaced threshold markings that include two arrows (centerline) leading to four arrows and the threshold bar. The runway has yellow aircraft hold lines located approximately 500 feet north and south of the intersection with Runway 7/25. The markings were applied during the runway sealcoat project in 2012 and are in good condition.

All runway exit taxiways have yellow aircraft hold line markings located outside the runway obstacle free zone (OFZ) and runway safety area (RSA) for Runways 07/25 and 11/29. Major taxiways have yellow edge stripes and centerline edge stripes, including enhanced (dashed) centerline stripes leading to each hold line. An aircraft hold line extends across the terminal apron and Taxiway D near the Runway 29 threshold.

All pavement markings will require periodic repainting as they wear or when sealcoats are applied.

Airfield Signage

The lighted airfield signage (location, mandatory, directional, destination, and distance remaining signs) are internally illuminated and are generally in good condition, with the exception of a few older signs that will need to be replaced as part of an airfield construction project.

Airfield Lighting

The airfield lighting systems (airport beacon, wind cones) are in good condition and reportedly function normally. It was recommended in the 2014 Airport Certification Inspection that the wind cones should not be tied into the runway's lighting circuit, since the wind cone lighting is not clearly visible when the runway lights are set on a lower intensity.

On Field Weather Data

The airport has an automated surface observing system (ASOS), which allows aircraft licensed under FAR Part 135 (air taxi/charter) and private aircraft operating under FAR Part 91 to operate in IFR conditions. The ASOS provides weather data to support airport operations in both visual and instrument conditions. Pendleton also has a hazardous inflight weather advisory service (HIWAS), which provides pilots with a continuous broadcast of hazardous weather information transmitted through the Pendleton VORTAC. The VORTAC consists of a co-located VHF omnidirectional range beacon (VOR) and a tactical air navigation system (TACAN). Both systems reportedly provide adequate weather data.

Landside Facilities

Landside facilities at Eastern Oregon Regional Airport include the terminal building, terminal apron, general aviation apron, agriculture apron, hangars, fixed base operator (FBO) facilities, and aircraft fueling facilities. The terminal apron provides adequate space for the current air service provider to load and unload passengers.

The FBO building and primary aircraft fueling area is located on the south edge of the main apron area, roughly mid-apron. This location provides direct access to the terminal apron, aircraft tiedowns, and hangars without having to enter the tower-controlled aircraft movement area. The 2002 Airport Master Plan recommended relocating the FBO building to the southwest corner of the main apron, which has not yet occurred. This recommendation will be reviewed in the alternative's analysis. Additional FBO facilities (hangars, fueling, etc.) are located near the west end of the main apron.

Terminal Building

The terminal building is located east of the main apron, near the approach end of Runway 29. The terminal building consists of airline ticketing counters, rental car counters, baggage claim area, passenger waiting area, airport administration offices, air traffic control tower, and airport restaurant. Expansion of the terminal building in its current location is limited to the east, due to the location of Runway 11/29. However, there is available space to the west of the terminal if needed as part of one of the development alternatives.

A Terminal Building Assessment was conducted as part of the master plan update and is included in **Appendix E**. The assessment provides detailed information of the buildings existing condition and facility needs based on the preferred forecast.

Aircraft Parking and Tiedown Apron

Aircraft aprons provide parking for locally based aircraft that are not stored in hangars, for transient aircraft visiting the airport, and for specialized ground operations such as aircraft fueling or air cargo operations. The main apron area at Eastern Oregon Regional Airport is approximately 126,690 square yards and provides (22) single-engine airplane tiedowns and (2) multi-engine airplane tiedowns in six north-south rows. The tiedown apron was reconstructed in 1999 and designed to provide adequate spacing between parked aircraft.

Conservative development reserves should be established to accommodate a combination of aircraft parking positions, roughly equal to 50 to 100 percent of the twenty-year forecast (net) demand. The location and configuration of the development reserves will be addressed in the alternative's analysis.

The projected aircraft parking requirements at Eastern Oregon Regional Airport are presented in **Table 5-8.**

SMALL GENERAL AVIATION PARKING DEMAND (LOCAL AND ITINERANT)

For planning purposes, it is assumed that 85 percent of forecast civilian based aircraft will be stored in hangars and 15 percent will use apron parking. Based on the projected increase over the twenty-year planning period, 11 small aircraft tiedowns will be required for locally based aircraft by 2035. These estimates may prove to be overly optimistic in gauging apron parking demand for based aircraft as additional hangar space is developed at the airport. However, this approach will ensure that adequate apron space is preserved for long-term use.

FAA Advisory Circular 150/5300-13 suggests a methodology by which itinerant parking requirements can be determined from knowledge of busy day operations. Future demand for itinerant parking spaces was estimated based on 40 percent of design day itinerant operations (40% of daily itinerant operations divided by two, to identify peak parking demand). The FAA planning criterion of 360 square yards per itinerant aircraft was applied to the number itinerant spaces to determine future itinerant ramp requirements. By 2035, itinerant aircraft parking requirements are estimated at eight aircraft positions including small airplane tiedowns, multi-engine and jet drive-through positions, and helicopter positions. It is anticipated that the parking requirements would include space for small airplanes, business aircraft, and helicopters.

LARGE AIRCRAFT PARKING

The airport accommodates regular itinerant business aircraft activity including turboprops and business jets, and large itinerant military aircraft in the apron area between the terminal and FBO. This section of pavement is not marked with specific aircraft parking positions, but it is assumed that multi-engine or business aircraft would need approximately 625 square yards for a parking position. The alternatives analysis will evaluate aircraft parking configuration options for this section of apron that meet FAA design standards for taxilane clearance and provide efficient movement of aircraft.

It is projected that the airport would need approximately two to three large aircraft parking positions (drive-through) for transient multi-engine and business aircraft through 2035.

AIR CARGO AIRCRAFT

The airport accommodates daily small package express flights with Cessna Caravan, single-engine turbine aircraft and the occasional Beechcraft 99, multi-engine turboprop. The airport does not currently have a dedicated air cargo apron for aircraft loading and unloading, although the area between the FBO and the City-owned T-hangar to the east is used for this purpose. It is projected that the airport will need to accommodate cargo ground operations and one or two parking positions for aircraft loading/unloading. The 2002 Airport Layout Plan depicts a future air cargo apron near the end of Runway 7, immediately west of the OANG facility. This recommendation will be reviewed in the alternative's analysis.

TERMINAL APRON

The terminal apron has adequate space available to accommodate forecast passenger aircraft demand and additional activity as required. The terminal apron has historically accommodated a variety of commercial aircraft ranging from regional turboprops to narrow body jets.

HELICOPTER PARKING

The airport accommodates locally based civilian and military helicopters and transient helicopters. OANG maintains an aircraft parking apron for their fleet of CH-47 Chinook helicopters. Transient civilian and military helicopters typically park on the main apron. Non-military locally-based helicopters are also parked on the apron when not stored in hangars or off-site. One to two parking positions for transient helicopters should be adequate to meet forecast demand through 2035.

The Life Flight helicopter based at the airport has also been parked on the main apron, adjacent to the City-owned T-hangar. Life Flight is currently constructing a hangar and small parking area near the northwest corner of the apron to accommodate their aircraft.

AGRICULTURAL OPERATIONS

The agricultural apron located east of Taxiway G has three loading pads with adjacent storage areas for equipment and supplies. The apron appears to be adequate for current and projected needs. An open collection basin, located adjacent to the intersection of Taxiway G and F, is hard piped from the apron. The status of the collection basin will be reviewed in the environmental review element of the master plan.

Aircraft Hangars

Eastern Oregon Regional Airport provides a variety of hangars including commercial hangars and hangars used primarily for aircraft storage. It is estimated that 85 percent of the airport's 61 civilian based aircraft are stored in hangars, with the remaining aircraft parked at tiedowns on the aircraft apron. For planning purposes, it is assumed that existing hangar space is committed and all additional (forecast) demand would need to be met through new construction.

As indicated in the aviation activity forecasts, the number of civilian based aircraft at Eastern Oregon Regional Airport is projected to increase by 13 aircraft during the twenty-year planning period. Based on a projected 85 percent hangar utilization level, additional long-term demand for new hangar space is estimated to be 11 spaces (approximately 16,500 square feet). A planning standard of 1,500 square feet per based aircraft stored in hangars is used to project gross space requirements. The projected hangar requirements for aircraft storage at Eastern Oregon Regional Airport are presented in **Table 5-8.**

In addition to aircraft storage, additional demand for business related and commercial hangar needs is anticipated. Specialized aviation service businesses such as engine & airframe repair, avionics, interior, paint shops, and UAS/UAV facilities generally prefer locations that provide convenient aircraft access. Highly successful aviation service businesses generally rely on both locally based aircraft and their ability to attract customers from outside the local area. While there is no specific formula to predict demand for general aviation service businesses at a particular airport, reserving space for additional commercial hangars is recommended.

Individual aircraft owner needs vary and demand can be influenced by a wide range of factors beyond the control of an airport. In addition, the moderate forecast growth in based aircraft may be exceeded if conditions are favorable. For this reason, it is recommended that hangar development reserves be identified to address the uncertainty of hangar market conditions and demand factors. Conservative development reserves should be established to accommodate a combination of conventional hangars and T-hangars, roughly equal to 50 to 100 percent of the twenty-year forecast (net) demand. The location and configuration of the development reserves will be addressed in the alternative's analysis.

TABLE 5-8: APRON AND HANGAR FACILITY REQUIREMENTS SUMMARY

ITEM	BASE YEAR (2014)	2020	2025	2030	2035
Based Aircraft Forecast (Civilian)	61	64	66	70	74
Based Aircraft Forecast (Military)	10	10	10	10	10
Aircraft Parking Apron (Note: capacities reflect current configuration of existing public use apron areas, actual capacity when reconfigured may be different.)					
Small Aircraft Tiedowns (SE/ME)	24				
Large Aircraft Parking Positions	0*				
Small Helicopter Parking Spaces	0*				
Air Cargo Aircraft Parking Spaces	0*				
Total Designated Parking Spaces Available	24*				
Main Apron Area (includes taxilanes, tiedown apron, terminal apron, and unusable space)	**126,690 sy (estimated)**				
Projected Needs (Gross Demand) [1]					
Locally Based Tiedowns (@ 300 SY each)		3 spaces / 900 sy	6 spaces / 1,800 sy	9 spaces / 2,700 sy	11 spaces / 3,300 sy
Small Airplane Itinerant Tiedowns (@ 360 SY each)		1 space / 360 sy	2 space / 720 sy	4 space / 1,440 sy	5 space / 1,800 sy
Business Aircraft Parking Positions (@ 625 SY each)		1 space / 625 sy	1 space / 625 sy	2 spaces / 1,250 sy	2 spaces / 1,250 sy
Small Helicopter Parking Positions (@ 380 SY each)		1 space / 380 sy	1 space / 380 sy	2 spaces / 760 sy	2 spaces / 760 sy
Air Cargo Parking Positions (@ 625 SY each)		1 space / 625 sy	1 space / 625 sy	2 spaces / 1,250 sy	2 spaces / 1,250 sy
Total Apron Needs		**7 Spaces / 2,890 sy**	**11 Spaces / 4,150 sy**	**19 Spaces / 7,400 sy**	**22 Spaces / 8,360 sy**
Aircraft Hangars (Existing Facilities)					
Existing Hangar Spaces[3]	45 spaces (estimated)				
Projected Needs (Net Increase in Demand) [2]					
(New) Hangar Space Demand (@ 1,500 SF per space) (Cumulative twenty-year projected demand: 11 spaces / 16,500 SF)		**+2 spaces / 3,000 sf**	**+3 spaces / 4,500 sf**	**+3 spaces / 4,500 sf**	**+3 spaces / 4,500 sf**

* These aircraft are accommodated on the main apron (open areas)

1. Aircraft parking demand levels identified for each forecast year represent forecast gross demand.
2. Hangar demand levels identified for each forecast year represent the net increase above current hangar capacity.
3. Hangar space estimated from conventional hangars and T-hangars

Aircraft Wash Down Facilities

Wash down facilities are recommended to accommodate general aviation aircraft with a catch basin and hard piping to divert wash residue into a sewer or stormwater treatment system. Wash facilities are typically sized to accommodate one aircraft on a pad approximately 50-foot-by-50-foot. The wash pad may be located adjacent to an existing parking apron or hangars; close access to utility systems is a key siting factor.

Surface Access

Surface access to Eastern Oregon Regional Airport is provided by Airport Road, which connects to Interstate 84 (I-84) at exit 207 and exit 202. Airport Road provides direct access to the airport terminal building, Pendleton Business and Industrial Park, and the south and west landside facilities. The UAS/UAV and agricultural operations area is connected to Airport Road by an on-airport service road that travels around the south end of Runway 11/29.

Continued development in the hangar area located at the west end of the main apron will require upgrades to existing access, fencing and controlled access gates.

Future development on the north side of the airport will require the construction of new access roads and airport service roads. Vehicle access roads can connect to NW Stage Gulch Road along the far west side of airport property, Daniel Road along the north side of airport property, or Pendleton Cold Springs Highway to the east. Airport service roads may also be required to accommodate aviation fuel trucks, airport personnel, tenants, and emergency vehicles transitioning from the south side of the airport to the north.

Vehicle Parking

The terminal vehicle parking lot has 176 paved and striped parking spaces. A rental car parking lot located adjacent to the terminal building parking lot has an additional parking 18 spaces. The airport maintenance building and fire station have 5 striped parking spaces. In addition, there are several large gravel and paved parking areas adjacent to the main apron area (outside the perimeter fence) and space adjacent to hangars (inside the perimeter fence).

Vehicle parking in the terminal parking lot may be reduced with the construction of a new hotel or expansion of the existing terminal building. If additional parking is needed, the airport has a large gravel area west of the terminal parking lot and Airport Road that could be converted into vehicle parking.

Agricultural Aircraft Facilities

As noted earlier, the airport has three loading pads and an associated apron located on the east side of the airfield adjacent to Taxiway G supporting agricultural aircraft operations. Additional tenant facilities are located at the west end of the main apron. The existing facilities appear to be adequate to meet current and future anticipated demand.

Air Traffic Control Tower (ATCT)

Eastern Oregon Regional Airport is served by an air traffic control tower (ATCT), located above the terminal building. Serco Inc., operates the airport traffic control tower under a contract with the FAA Contract Tower Program (FCT). The tower operates daily from 0600 to 2000 local time.

The ATCT operation is a key element in the emergence of unmanned aerial systems (UAS) activity at Eastern Oregon Regional Airport and the Pendleton UAS Range (PUR). Under current FAA rules, UAS and conventional aircraft operations are fully segregated. It is anticipated that changes in flight rules may occur in the current planning period, which makes continued ATCT operation a key safety need.

Unmanned Aerial Systems (UAS) Facilities

Eastern Oregon Regional Airport is a designated test site airport located in the Pendleton UAS Range (PUR). The Oregon Army National Guard (OANG) currently uses a 50-foot-by-50-foot compacted gravel pad located adjacent to the agriculture apron and Taxiway F for UAS recovery. The City is working with a developer to construct new hangars for UAS storage on the southwest corner of the airfield, near the T-hangars. Future launch site and development area is planned on the north side of Runway 7/25.

The ongoing growth of unmanned aerial systems (UAS) activity at Eastern Oregon Regional Airport is expected to generate specific facility requirements that are unique to the activity. As noted in the Forecast Chapter, growth in UAS activity has been recent and rapid, and this trend is expected to continue for the foreseeable future. UAS-related facility requirements include both airside and landside elements.

Airside

As noted in the updated aviation activity forecasts, UAS aircraft are expected to account for an increasing portion of overall airport activity during the current 20-year planning period. This activity currently consists of catapult launch devices (smaller UAS) and limited takeoffs and landings of larger UAS aircraft on closed taxiways (by NOTAM).

As UAS air traffic increases, the volume of full size UAS aircraft operations is expected to grow. These aircraft physically resemble conventional fixed wing aircraft and require normal takeoffs and landings. For long term planning purposes, physically separating conventional aircraft and UAS aircraft is

recommended, whenever feasible. A future UAS runway is recommended to accommodate small fixed-wing UAS aircraft. It is anticipated that a runway length less than 3,000 feet would be adequate to accommodate the majority of this activity; larger UAS aircraft requiring longer runways would operate on Runway 7/25 or 11/29.

Landside

The development of UAS activity at Eastern Oregon Regional Airport generates a variety of landside facility needs associated with aircraft storage (apron, hangar, support equipment, etc.) and operations (flight test, research and development, remote in-flight monitoring, etc.). The updated aviation activity forecasts project 56 UAS aircraft will be based at the airport by 2035. It is assumed that the majority of these aircraft will require both hangar space for storage and apron space to support ground operations. Additional transient UAS activity is expected to require similar landside facilities. Due to rapidly changing conditions in this activity segment, it is recommended that large development reserves be identified on the airport to accommodate a wide range of demand scenarios. Specific facilities will be developed in response to market demand.

An Unmanned Aircraft Systems Evaluation was conducted as part of the master plan update and is included in Chapter 4.

Support Facilities

Fuel Facilities

Pendleton Aviation offers both 100-octane low lead (100LL) aviation gasoline (AVGAS) and Jet-A fuel. The FBO owns three underground storage tanks (10,000-gallon and 8,000-gallon Jet-A tanks and 10,000-gallons 100LL tank) located in the Pendleton Business and Industrial Park; one aboveground self-serve dispensing storage tank (1,000-gallon) located on-airport; four mobile dispensing trucks (3) Jet-A and (1) 100LL. In addition, several tenants own storage tanks, mobile dispensing trucks, and mobile dispensing trailers. Tenant individual fuel storage and dispensing tanks are for personal use only and are not used for fuel sales, unless authorized by the airport.

Based on current and forecast demand, the existing fuel storage tanks and dispensing facilities appear to be adequate. However, the City may wish to consider the development of a common fuel storage and dispensing location in terminal area that could accommodate multiple FBOs and eliminate underground fuel storage. It is also recommended that a secondary containment area for mobile fuel trucks and trailer parking be planned and constructed. Most mobile fuel trucks in use today have single wall tank construction and do not provide the secondary containment of double wall above-ground bulk storage tanks. It is anticipated that federal or state regulations will eventually require secondary containment for

single wall tank mobile fuel trucks when unattended, such as for overnight parking when the trucks are not in service or otherwise monitored.

Utilities

The existing utilities on the airport appear to be adequate both in capacity and service, within the developed areas of the airport. However, if future development occurs on the north side of the airport, extensions of water, sanitary sewer, electric, gas, and telephone service will be required to support future expansion. Any proposed electric lines in the vicinity of the airfield should be buried.

Security

Eastern Oregon Regional Airport has a perimeter security fence and controlled access gates that meet both FAA and TSA standards for a Part 139 certificated airport. Airport fencing consists of a 7- and 8-foot chain link with three strands of barbed wire. There are floodlights around the terminal building, vehicle parking lot, and hangars. Any new development will be required to meet FAA and TSA security standards. Flood lighting should be provided in expanded aircraft parking and hangar areas and any other new development areas on the airport to maintain adequate security. The use of full or partial cutoff light fixtures is recommended for all exterior lighting on the airport to limit upward glare.

Aircraft Rescue and Firefighting (ARFF)

Eastern Oregon Regional Airport is governed by FAA Part 139 requirements, which require airports to provide aircraft rescue and firefighting (ARFF) services during operations conducted by air carriers certified under FAR Part 121. The current level of commercial passenger service operated under FAR Part 135, does not require an active ARFF response. The City constructed a 2-bay ARFF building in 2009 with direct access to the main apron, terminal and runway–taxiway system.

The current ARFF index (Index A) includes aircraft less than 90 feet in length. The equipment needed to meet Index A requirement includes; one vehicle that holds 100 gallons of water/AFFF and 500 pounds of sodium based dry chemical, or 450 pounds of potassium based dry chemical, or 460 pounds of halogenated agent. The airport's existing equipment and staffing meet Index A requirements and an upgrade to Index B is not projected in the twenty-year planning period.

Facility Requirements Summary

The projected twenty-year facility needs for Eastern Oregon Regional Airport are summarized in **Table 5-9**. As noted in the table, maintaining existing pavements represents a significant, ongoing facility need. The updated forecasts of aviation activity anticipate modest growth in activity that will result in similarly moderate airside and landside facility demands beyond existing capabilities. The existing airfield facilities

have the ability to accommodate a significant increase in activity, with targeted facility improvements. For the most part, the need for new or expanded facilities, such as aircraft hangars, will be market driven. The non-conforming items noted at the beginning of this chapter are minor and can be addressed systematically during the current planning period to improve overall safety for all users.

TABLE 5-9: FACILITY REQUIREMENTS SUMMARY

ITEM	SHORT-TERM	LONG-TERM
Runway 07/25	Pavement Maintenance and Rehabilitation	Pavement Reconstruction/Rehabilitation Pavement Maintenance
Runway 11/29	Pavement Maintenance and Rehabilitation	Runway Width Reduction (75 feet) Pavement Rehabilitation Pavement Maintenance
Taxiways and Taxilanes	Pavement Rehabilitation (Taxiway A, D) West Hangar Taxilanes • Rehabilitation / Reconstruction (3 existing) • New Construction Pavement Maintenance	Pavement Reconstruction (Taxiway B, E, G, and section of Taxiway A where it intersects Taxiway B) Pavement Maintenance
Aircraft Aprons	Pavement Maintenance (main apron)	Pavement Reconstruction (terminal apron)
Hangars	Site Preparation (southwest hangar area)	Hangar Development Reserves
Navigational Aids and Lighting	Replacement (at end of useful life) • Visual Guidance Indicator (VASI)	Replacement (at end of useful life) • Visual Guidance Indicators (PAPI) • Runway/Taxiway Edge Lighting • Signage • Approach Lighting • ASOS • Windsocks
Fuel Storage	Secondary Containment Area(s) for Fuel Truck Parking	Bulk Fuel Storage and Dispensing Area
FBO	Identify Facility Needs/Upgrade (Building, Self-Serve Fuel Dispensing Tank)	Same
Utilities	Extend Utilities to New Development Areas	Same
Roadways & Vehicle Parking	Extend/Improve Roads to New Development Areas Add Vehicle Parking in Existing/Future Hangar Areas Construct New Service Roads to Future Development Areas	Same
Security	Maintain Existing Fencing/Gates Install New Fencing/Gates in New Development Areas	Same
-Vegetation control, crackfill, sealcoat, slurry seal, localized patching, joint rehabilitation, etc., as required.		

Airfield Capacity

Annual service volume (ASV) is a measure of estimated airport capacity and delay used for long-term planning. ASV, as defined in FAA Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay, provides a reasonable estimate of an airport's operational capacity. The ratio between demand and capacity helps to define a timeline to address potential runway capacity constraints before they reach a critical point. If average delay becomes excessive (greater than 3 minutes per aircraft), significant congestion can occur on a regular basis, which significantly reduces the efficient movement of air traffic. ASV is calculated based on the runway and taxiway configuration, percent of VFR/IFR traffic, aircraft mix, lighting, instrumentation, the availability of terminal radar coverage and the level of air traffic control at an airport.

Based on the intersecting configuration of Runways 7/25 and 11/29, the FAA capacity manual credits only one active runway for the purposes of calculating capacity. For long-term planning purposes, the FAA estimates annual capacity (ASV) for a single runway with no air carrier traffic is approximately 230,000 operations; hourly capacity is estimated to be 98 operations during visual flight rules (VFR) conditions and 59 operations during instrument flight rules (IFR) conditions. Although these estimates assume optimal conditions (air traffic control, radar, etc.), they provide a reasonable basis for approximating existing and future capacity:

Existing Capacity 12,911 Annual Operations / 230,000 ASV = 5.6% (demand/capacity ratio)

Future Capacity: 17,131 Annual Operations / 230,000 ASV = 7.4% (demand/capacity ratio)

Based on these ratios, the average delay per aircraft would be expected to remain below one minute through the planning period. The FAA recommends that airports proceed with planning to provide additional capacity when 60 percent of ASV is reached. As indicated in the updated aviation activity forecasts, peak hour activity is projected to remain well below the 60 percent threshold during the planning period.