



## OREGON AVIATION PLAN AIRPORT SUMMARY CRATER LAKE-KLAMATH REGIONAL AIRPORT

In 2018, the Oregon Department of Aviation (ODA) updated the Oregon Aviation Plan (OAP v6.0) for the state airport system which includes 95 airports, one heliport and one seaplane base. The study area was statewide and considered both commercial service and general aviation airports. Airports outside of Oregon in proximity to the state were considered as well. The study includes Crater Lake-Klamath Regional Airport (LMT or the Airport). This section focuses on the system plan's individual findings and recommendations for this facility as well as documenting the various benefits the Airport provides in Oregon.

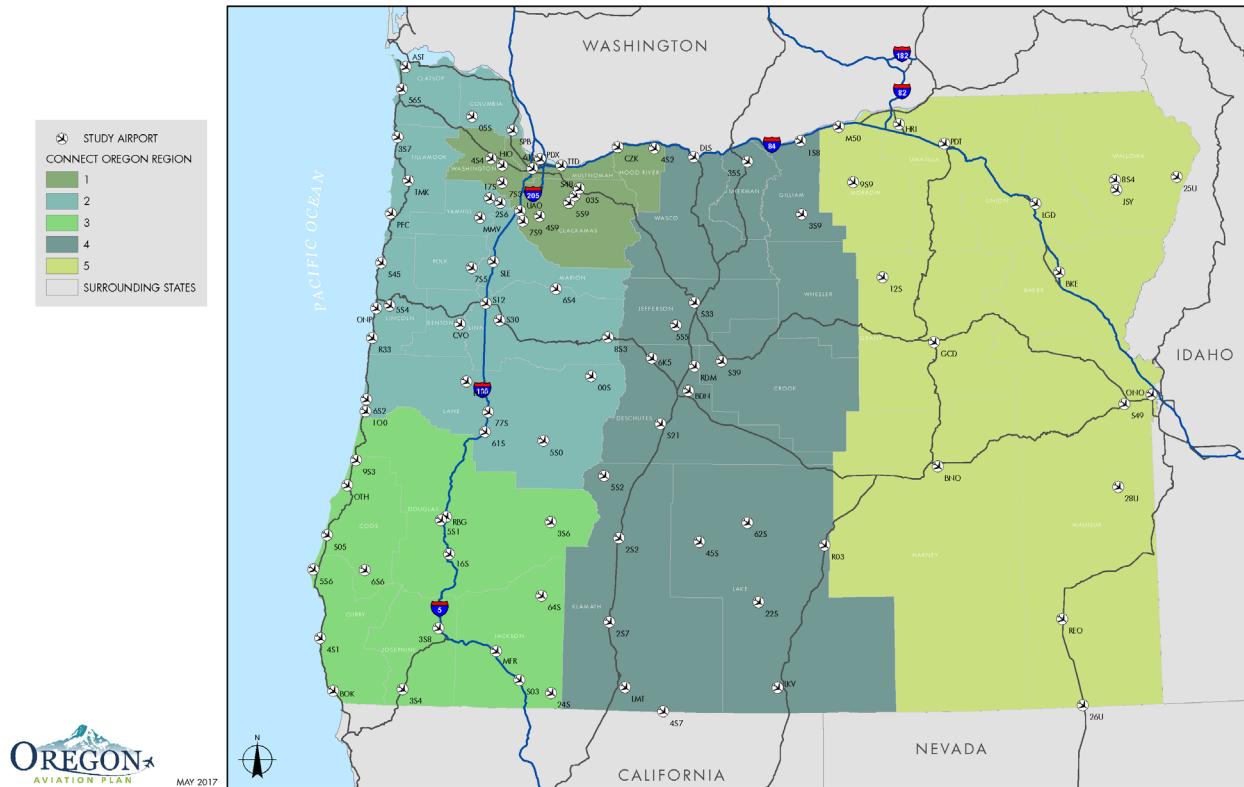
Aviation system plans are top down studies that must be implemented from the bottom up by individual airports. The ultimate success of the plan depends on each airport implementing recommendations from the study and following through on any identified improvement actions. Individual airport improvements will result in the enhancement of overall system performance.

Within the statewide system, the Crater Lake-Klamath Regional Airport has been designated as a Category I – Commercial Service Airport in the 2007 OAP. Within the OAP, these airports support some level of scheduled commercial airline service in addition to supporting a full range of general aviation aircraft activities. Commercial service includes both domestic and international destinations.

Some, but not all of the study airports also have federal role definitions from the FAA. Within FAA's ASSET Study and National Plan of Integrated Airport Systems (NPIAS), the Crater Lake-Klamath Regional Airport is designated as a Regional General Aviation Airport; this designation signifies the Airport's importance to the federal system of public-use airports. From the economic impacts it provides and the volume of business activity it serves, Crater Lake-Klamath Regional Airport has all the attributes of a Regional General Aviation Airport. Its airfield facilities are in line Regional General Aviation Airport; hence the OAP v6.0 recommends that this Airport maintain this role within the NPIAS.

From a facilities standpoint, the Crater Lake-Klamath Regional Airport meets most of the objectives for an OAP Category I Airport. It is worth noting, however, that the Airport's own capital improvement plan and/or master plan may recommend additional projects that it will be needed over the coming 10 years. The OAP also does not identify all maintenance, rehabilitation, and replacement costs that could be incurred by the Airport during this period.

## EXISTING OREGON AIRPORT SYSTEM 2018



More information on the OAP can be obtained from the ODA Aviation website at <https://www.oregon.gov/aviation/pages/index.aspx>. In addition to the complete Technical Report, a statewide Executive Summary was produced to support the OAP. More information on all OAP-related products can be obtained from ODA.



## OREGON AIRPORT ROLES/CATEGORIES

ODA’s Oregon Aviation Plan was last published in 2007. This update to the OAP re-sets the bar for future system performance by evaluating each airport’s facilities and services. Since 2007, a number of Oregon airports have made progress toward meeting various performance measures. As part of this study, airport infrastructure data, aviation activity projections and population growth in each airport’s environs were used to determine whether the airport should be elevated to a higher OAP Category to improve overall system accessibility and performance. The OAP v6.0 also addressed the need for airports to support resiliency efforts related to a potential Cascadia Earthquake and Tsunami Event.

Recommended categories for airports in the OAP are shown below.

### OAP AIRPORT CATEGORIES RECOMMENDED OREGON AIRPORT ROLES

<b>Category I</b>	<b>Commercial Service Airport:</b> These airports support some level of scheduled commercial airline service in addition to supporting a full range of general aviation aircraft activities. Commercial service includes both domestic and international destinations. Objectives call for a minimum runway length of 6,000 feet.
<b>Category II</b>	<b>Urban General Aviation Airport:</b> These airports support all general aviation aircraft and accommodate corporate aviation activity, including piston and turbine engine aircraft, business jets, helicopters, gliders, and other general aviation activity. The most demanding user requirements are business-related. These airports service a large/multi-state geographic region or experience high levels of general aviation activity. The minimum runway length objective for Category II airports is 5,000 feet.
<b>Category III</b>	<b>Regional General Aviation:</b> These airports support most twin and single-engine aircraft and may accommodate occasional business jets. These airports support regional transportation needs with a large and often sparsely populated service area. The minimum runway length objective for Category III airports is 4,000 feet.
<b>Category IV</b>	<b>Local General Aviation Airport:</b> These airports support primarily single-engine general aviation aircraft but are capable of accommodating smaller twin-engine general aviation aircraft. These airports support local air transportation needs and special-use aviation activities. The minimum runway length objective for Category IV airports is 3,000 feet.
<b>Category V</b>	<b>Remote Access/Emergency Services (RAES):</b> These airports support primarily single-engine general aviation aircraft, special-use aviation activities, access to remote areas, or provide emergency service access. These airports should have at least 2,500 feet of runway.

Source: Aviation

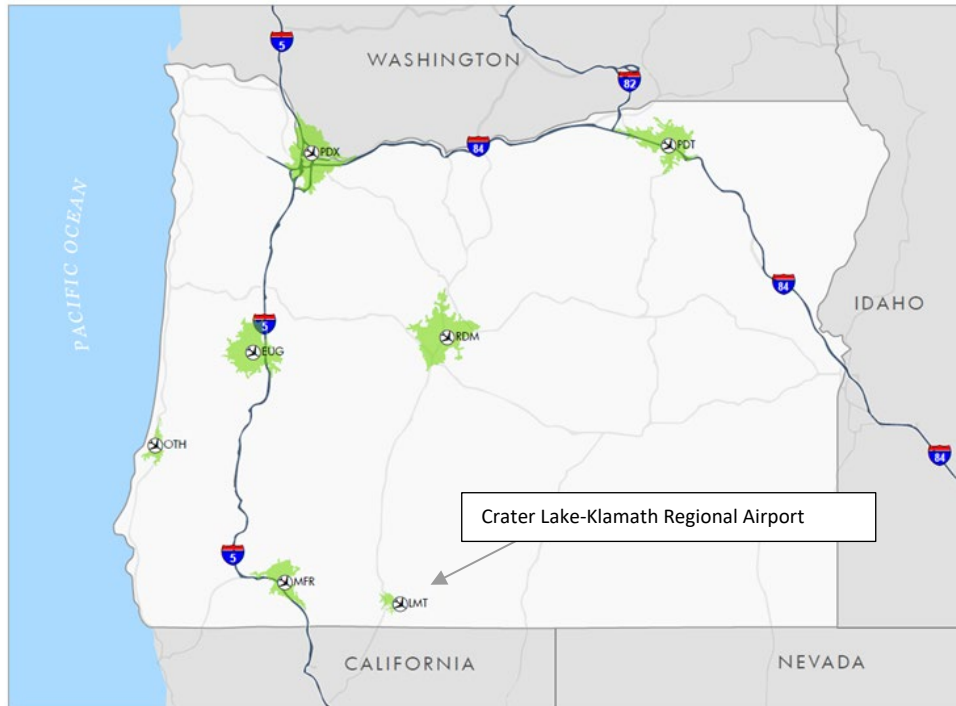
## CRATER LAKE-KLAMATH REGIONAL AIRPORT OVERVIEW

The City of Klamath Falls is located in Klamath County, in the southern portion of the state. Crater Lake-Klamath Regional Airport is located approximately five miles south of the City, on a 1,166-acre site. Klamath County is renowned for its outdoor recreation and sightseeing. Popular tourist destinations include Crater Lake National Park and Upper Klamath Lake. Major employers in the area include the Sky Lakes Medical Center, Oregon Institute of Technology, Collins Products, Jeld-Wen Inc., iQOR, U.S. Forest Service, and Columbia Forest Products. Crater Lake-Klamath Regional Airport is owned and operated by the City of Klamath Falls. The Airport is also known as Kingsley Field Air National Guard Base and is home to the Oregon Air National Guard's 173<sup>rd</sup> Fighter Wing. The Airport is a crucial asset as it frequently accommodates air ambulance, scheduled air cargo, and firefighting operations. Additionally, the Airport is host to an aerial firefighting aircraft base. FAA data indicates that there more than 47,000 total annual operations at the Airport, of which 27 percent were itinerant. The Airport is home to 84 based aircraft.



Crater Lake-Klamath Regional's primary runway, Runway 14/32, is 10,301 feet long and 150 feet wide. This runway is equipped with HIRL, MALSR, MALSF, and VASIs/PAPIs. Runway 32 has an ILS while Runway 14 has a precision approach. The Airport also has an air traffic control tower.

## 30-MINUTE DRIVE TIME SERVICE AREA AND POPULATION OAP CATEGORY I AIRPORTS



Source: Jviation

Airport roles consider the characteristics of the area the Airport serves. Analysis for the OAP was conducted using a geographic information system (GIS) and a 30-minute drive time for each airport. There are approximately 48,580 residents within a 30-minute drive of LMT and a labor force of approximately 10,412.

Crater Lake-Klamath Regional Airport	
<b>Population</b>	
– 2016 30-minute drive	48,580
– 2016 Associated city	39,990
<b>Labor force</b>	
– 2016 30-minute drive	10,412

Source: US Census Bureau, Jviation Analysis, Oregon [Zoomprospector.com](http://Zoomprospector.com), Oregon Population Center – Portland State University



## RECOMMENDED ROLE FOR CRATER LAKE-KLAMATH REGIONAL AIRPORT

Each airport’s level generally reflects the type of aircraft and customers the airport serves as well as the characteristics of the airport’s service area. Crater Lake-Klamath Regional Airport will remain a Category I – Commercial Service Airport within the OAP.

As a Category I airport, the OAP has identified certain facilities and services that should ideally be in place. These objectives are considered the “minimums” to which the Airport should be developed. Based on local needs and other justifications, it is quite possible that the Airport could exceed its minimum development objectives established in the OAP. Crater Lake-Klamath Regional Airport’s specific objectives, as they pertain to the Airport’s Category I role in the state airport system, are listed below.

### OBJECTIVES FOR CATEGORY I – COMMERCIAL SERVICE MINIMUM STANDARD

#### Airside Facilities

- » **Airport ARC:** C-II
- » **NPIAS:** Yes
- » **Based Aircraft:** Not an Objective
- » **Runway orientation:** 95% wind coverage (combined primary/secondary rwy)
- » **Runway Pavement Type:** Bituminous, Concrete
- » **Runway Pavement Strength:** Varies by Airport\*/Design Aircraft
- » **Runway length:** Minimum 6,000 feet
- » **Runway width:** 100 feet
- » **Taxiway:** Full parallel
- » **Lighting systems:** MIRL/HIRL/ALS
- » **Approach:** Precision w/ vertical guidance
- » **Visual Approach Aids:** Both Runway Ends
- » **Instrument Approach Aids:** One Runway End
- » **Runway Lighting:** MIRL/HIRL/ALS
- » **Taxiway Lighting:** MITL/HITL
- » **Fencing:** Perimeter; controlled access

#### General Aviation Facilities

- » **Rotating Beacon:** Yes
- » **Weather reporting:** AWOS or ASOS
- » **Lighted Wind Indicator:** Yes
- » **Hangared aircraft storage:** 75% of based aircraft fleet
- » **Apron parking/storage:** 75% of Daily Transient
- » **Terminal/Building:** Yes
- » **Auto parking:** Moderate
- » **Cargo:** Small Handling Facility w/ Apron
- » **Deicing Facility:** Yes

#### Services

- » **Fuel:** 100 LL (24-hour self-service) & Jet A
- » **FBO:** Full Service (normal business hours)
- » **Transportation:** Offsite Rental Car, Taxi, etc.
- » **Food Service:** Coffee Shop/Deli & Cold Foods
- » **Restrooms:** Yes
- » **Pilot Lounge:** Yes w/ Weather Reporting Station
- » **Snow Removal:** Yes
- » **Telephone:** Yes



## CRATER LAKE-KLAMATH REGIONAL AIRPORT PROJECTIONS OF GENERAL AVIATION DEMAND

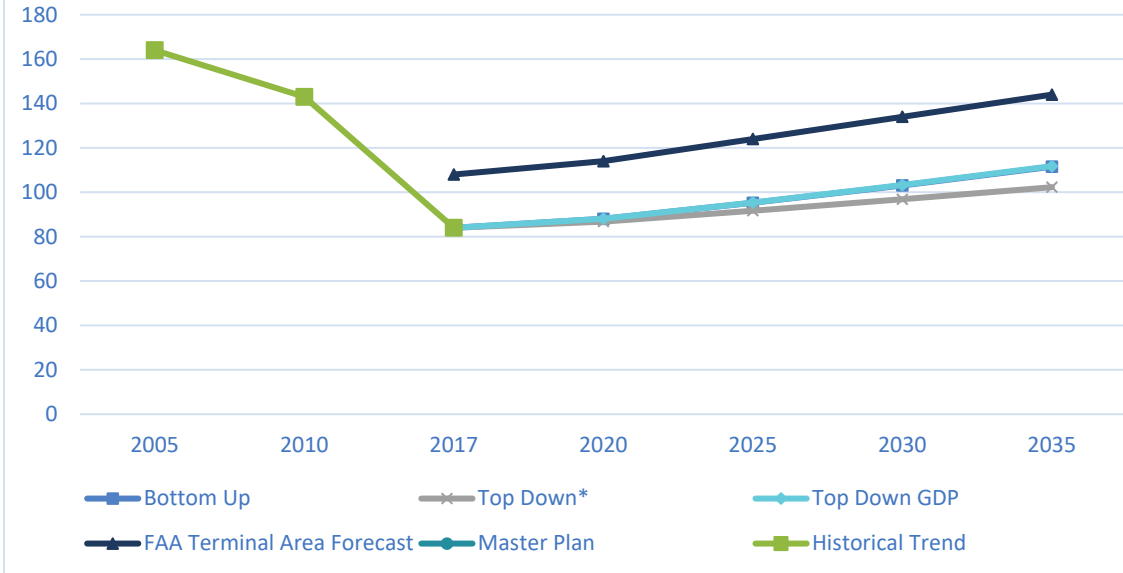
Over the past 10 years, general aviation has experienced a general decline on a nationwide basis and in Oregon. The high cost of acquiring and maintaining a general aviation aircraft, the cost to secure a private pilot's license, competing opportunities for allocation of disposable income, the economic recession, along with significant increases in the cost of aviation fuel, have all contributed to a contraction in general aviation demand.

Recent economic recovery and increased use of general aviation as a tool to improve business efficiency have helped to stabilize the general aviation industry. For most airports in Oregon, however, including Crater Lake-Klamath Regional Airport, anticipated growth in general aviation demand will be modest at best. The two graphs below show projections of based aircraft and annual general aviation operations for LMT as they were developed in the OAP v6.0.

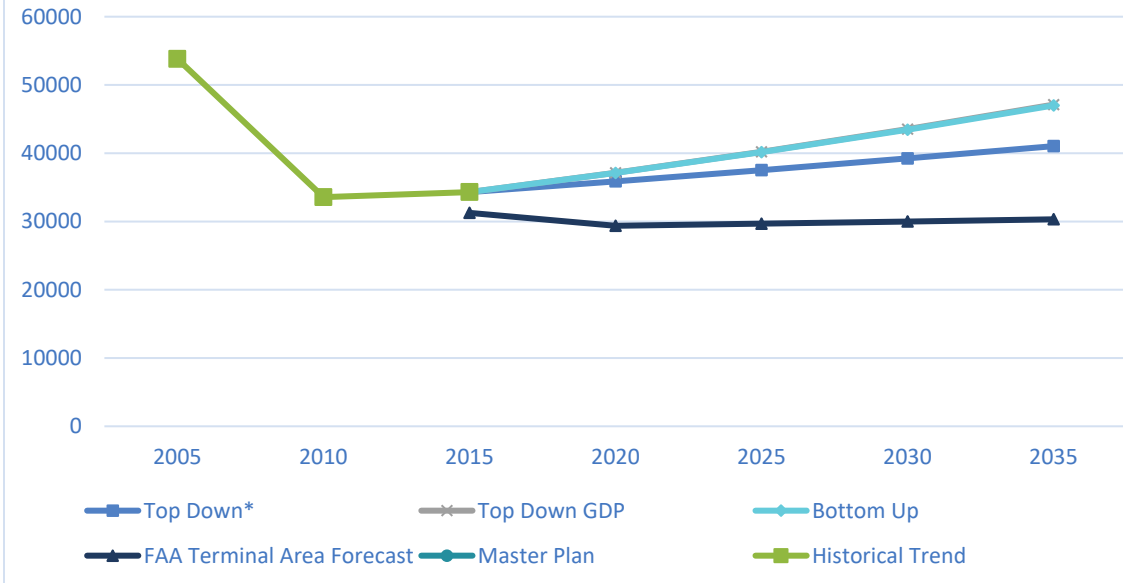
Three based aircraft projection methodologies were developed in this forecast. The bottom-up methodology produced an average annual growth rate of 1.0 percent and the top-down methodology based on historical Per Capita Real GDP produced the highest average annual growth rate, of the three projections, at 1.6 percent. The alternative top-down methodology utilizing FAA Terminal Area Forecast (TAF) projections for NPIAS airports in Oregon produced more moderate growth rate. Comparing the results of the forecasts indicated that the historical Per Capita Real GDP projection had the strongest growth, but was considered to be overly optimistic, since sustaining a 1.6 percent GDP growth rate over the planning period is unlikely. Therefore, the more conservative bottom-up growth rate of 1.1 percent, which is based on FAA TAF growth rates for based aircraft, was chosen as the preferred forecast. Based aircraft at LMT are projected to increase from 84 in 2017 to 97 by 2035.

The results from the three general aviation operations projection methodologies developed in this forecast are compared in the graphs below. The bottom-up methodology produced an average annual growth rate of 1.1 percent while the top-down methodology based on FAA Hours Flown projections produced an average annual growth rate of 0.9 percent. The alternative top-down methodology based on historical GDP growth produced an average annual growth rate of 1.6 percent. The bottom-up growth rate of 0.9 percent was chosen as the preferred growth rate since it is based on FAA national average growth forecasted for hours flown. Annual general aviation aircraft operations at LMT are projected to increase from 34,305 to 41,037 by 2035.

### Crater Lake-Klamath Regional Airport-Based Aircraft Forecast



### Crater Lake-Klamath Regional Airport - Annual General Aviation Operations Forecast



Source: FAA TAF, Aviation analysis, \* indicates preferred growth rate, No master plan growth rate used



## CRATER LAKE-KLAMATH REGIONAL AIRPORT ECONOMIC IMPACT UPDATE

Annual economic impacts for 97 study airports were estimated as part of ODA’s economic impact research. Total annual economic impacts for the Airport are attributed to one or more of the following four economic activity centers: airport management, airport tenants, average annual capital investment, and spending by visitors who arrive on general aviation aircraft.

This study uses three primary measures to express both statewide and airport-specific annual economic impacts:

- » Employment
- » Annual Payroll
- » Sales/Output (or total annual economic activity)

**Direct Impacts:** Crater Lake-Klamath Regional Airport is owned and operated by the City of Klamath Falls. Approximately 5,500 visitors arrived on commercial airlines while general aviation aircraft operations at the Airport accounted for approximately 4,057 visitors who arrived in the area. The direct employment, payroll, and sales/output impacts relate to the Airport’s tenants were derived from survey data. Visitor impacts were calculated using airport-specific expenditure estimates. Construction expenditures are based on FAA Airport Improvement Records. The total combined direct output stemming from all on-airport aviation-related tenants, capital improvements, and visitor-related expenditures was estimated at \$162.2 million. On-airport tenants and visitors accounted for nearly 1,055 direct jobs with an estimated direct payroll of \$82.3 million.

### CRATER LAKE-KLAMATH REGIONAL AIRPORT

	Direct	Indirect/Induced	Total
<b>Employment</b>			
– Tenant	987.0	1,439.0	2,426.0
– GA Visitor	9.4	3.9	13.4
– CS Visitor	32.9	13.7	46.5
– CIP	25.6	26.9	52.4
<b>Employment Total</b>	<b>1,054.9</b>	<b>1,483.5</b>	<b>2,538.4</b>
<b>Payroll</b>			
– Tenant	\$79,522,000	\$58,766,135	\$138,288,135
– GA Visitor	\$319,276	\$250,735	\$570,011
– CS Visitor	\$1,110,498	\$872,101	\$1,982,599
– CIP	\$1,397,610	\$1,043,904	\$2,441,514
<b>Payroll Total</b>	<b>\$82,349,383</b>	<b>\$60,932,876</b>	<b>\$143,282,258</b>
<b>Sales/Output</b>			
– Tenant	\$155,761,000	\$125,327,927	\$281,088,927
– GA Visitor	\$467,975	\$325,943	\$793,918
– CS Visitor	\$2,738,197	\$2,005,789	\$4,743,985
– CIP	\$3,197,307	\$2,533,569	\$5,730,876
<b>Sales/Output Total</b>	<b>\$162,164,479</b>	<b>\$130,193,228</b>	<b>\$292,357,707</b>

Source: Mead and Hunt, EDR Group, Aviation, IMPLAN econometric package

**Multiplier Impacts:** Direct on-airport tenant and general aviation visitor impacts also create multiplier impacts throughout Oregon. These benefits are made up of indirect and induced impacts calculated with IMPLAN multipliers. Induced impacts result from employees on the airports and in the hospitality sector off-airport spending their earnings in Oregon while indirect impacts result from on-airport businesses and hospitality sector businesses spending for goods and services in Oregon. The table above presents the Airport’s direct, indirect/induced, and total economic impacts for sales/output, payroll, and employment as they relate to all on-airport tenants and all general aviation visitors.

**Total Impacts:** The total output (including direct and multiplier impacts) stemming from all on-airport tenants, construction and all general aviation visitors to Crater Lake-Klamath Regional Airport was approximately \$292.4 million. Total full-time employment related to all tenants and general aviation visitors, including all multiplier impacts is approximately 2,538 jobs. A total annual payroll associated with these jobs is estimated at \$143.3 million.



## MUNICIPALITIES NEAR CRATER LAKE-KLAMATH REGIONAL AIRPORT WITH LAND USE CONTROLS

Having land uses adjacent to airports that are compatible with aircraft operations is imperative from a safety standpoint. Airports that accept state and/or federal grants are obligated to take steps to promote compatible land use and activities in the environs of their airport. For the OAP analysis, airports and their immediate or adjacent municipalities in the environs of the airport were identified. Analysis of each airport’s airspace were compared to local jurisdiction boundaries on Google Earth. If a jurisdiction was entirely or partly under the airport’s airspace local zoning ordinances were reviewed. County land use ordinances related to airports and height restrictions were also analyzed.

Research was undertaken for municipalities identified during the OAP to determine if the municipalities are taking steps to promote compatible land use and protect the operating environments for airports. Municipalities near Oregon airports were investigated to determine the following key land uses controls:

- » **Has the municipality adopted land use zoning controls?**
- » **Does the municipality have an airport-specific overlay zone or district?**
- » **Does the municipality have a land use map that shows the location of the airport?**
- » **Has the municipality adopted some type of height zoning?**

The following table shows municipalities near Crater Lake-Klamath Regional Airport and summarizes the status of land use controls for each. Municipalities and airports throughout Oregon should work together to help ensure airports are protected from incompatible land uses and from the encroachment of obstacles that pose a height hazard to safe airport operations.

### LAND USE CONTROL SUMMARY FOR CRATER LAKE-KLAMATH REGIONAL AIRPORT

Type of Control	Jurisdictions Impacting Airport	
	City of Klamath Falls	Klamath County
Airport Zone	Yes	No
Adopted Height Zoning Restrictions	No	Yes
RPZ Protection	No	Yes
Airport Safety Overlay Zone	Yes	Yes

Source: Angelo Planning Group, Aviation

## AIRPORT REPORT CARD AND RECOMMENDATIONS

This section provides information on ODA facility/service objectives associated with a Category I airport in the OAP. The report card below shows Crater Lake-Klamath Regional Airport’s ability to meet its objectives. If the Airport does not meet an objective, an estimated cost to enable the Airport to meet the objective was developed.

Only two deficiencies, deicing facility and 24-hour credit card fuel pump, were identified as necessary for improving the Airport to meet all the facility objectives.

### CRATER LAKE-KLAMATH REGIONAL AIRPORT REPORT CARD

Category I Performance Criteria		LMT	Crater Lake-Klamath Regional Airport	Klamath Falls
Facilities	Basic Criteria	Actual	Action Needed to Meet Criteria	Estimated Cost
<b>Airside Facilities</b>				
FAA – ARC	C-II		D-IV	
NPIAS	Yes		Yes	
Based Aircraft	Not an Objective		84	
Runway Orientation	95% wind coverage (combined primary/secondary rwy)		Yes	
Runway Length	6,000 feet		10,301	\$ -
Runway Width	100 feet		150	\$ -
Runway Pavement Type	Bituminous, Concrete		Bituminous / Concrete	
Runway Pavement	Varies by Airport*/Design Aircraft		110,000	\$ -
Runway Pavement PCI	65		92	\$ -
Taxiways	Full Parallel		Partial Parallel*	\$ -
Approach Type	Precision		Precision	\$ -
Visual Approach Aids	Both Runway Ends		PAPI, VASI	
Instrument Approach	One Runway End		MALSR, ALSF	
Runway Lighting	MIRL/HIRL/ALS		HIRL	
Taxiway Lighting	MITL/HITL		MITL	\$ -
<b>General Facilities</b>				
Rotating Beacon	Yes		Yes	\$ -
Lighted Wind Indicator	Yes		Wind Cone, Lighted Wind	\$ -
Weather Reporting	AWOS/ASOS		ASOS	\$ -
Hangared Aircraft	75% of Based Aircraft		98%	\$ -
Apron Parking/Storage	75% of Daily Transient		100%	\$ -
Terminal Building	Yes		Yes	\$ -
Auto Parking Spaces	Moderate		600	\$ -
Fencing	Perimeter; controlled access		Entire airport perimeter with controlled access gates	\$ -
Cargo	Small Handling Facility w/ Apron		Cargo facility/building with apron	\$ -
Deicing Facility	Yes		None	Provide deicing facility \$ 3,750,000
<b>Services</b>				
Fuel	100 LL & Jet A (24-hour self-service)		No	Provide 24 hour self-service for 100 LL \$ 200,000
FBO	Full Service (normal business hours)		Yes	
Ground Transportation	Rental Car, Taxi, or Other		Onsite rental car, offsite rental car	
Food Service	Coffee Shop/Deli & Cold Foods		Yes	
Restrooms	Yes		Yes	
Pilot Lounge	Yes w/ Weather Reporting Station		Yes	
Snow Removal	Yes		Yes	\$ -
Telephone	Yes		Yes	
<b>Total</b>				<b>\$ 3,950,000</b>

Source: Aviation, Century West, Marr Arnold Planning

## OTHER IDENTIFIED FACILITY IMPROVEMENT COSTS

Projects identified in the deficiencies analysis from the OAP represent a portion of the total development and maintenance costs that Oregon airports could require in the near term. In order to have a better picture of total investment needs for Oregon’s airport system, it is important to also consider projects identified in each airport’s current Statewide Capital Improvement Program (SCIP) and in Oregon’s most recent Statewide Pavement Maintenance Program (PMP).

**SCIP:** Current SCIPs were reviewed to provide ODA with a general understanding of what projects are already being considered on the local level that would address deficiencies noted in the OAP. A review was performed to ensure project costs were not duplicated between the OAP and current SCIP projects for each airport. Analysis of 2018 SCIP data indicates that over \$22.6 million in improvements for Crater Lake-Klamath Regional Airport are identified in the SCIP over the next five to ten years. This estimate does not include transfers or PMP funds. ODA SCIP focuses primarily on general aviation airports.

ODA SCIP Improvements (LMT)	Costs
Runway 7/25 & Taxiway F - Rehab (Design)	\$166,667
Runway 7/25 & Taxiway F - Rehab (Construct)	\$6,230,000
Master Plan & AGIS	\$688,889
Wildlife Hazard Assessment	\$5,722,222
Taxiway G - Design & Construct	\$6,833,333
Taxiway D & B Rehab	\$2,944,444
<b>Total</b>	<b>\$22,585,555</b>

Source: ODA SCIP 2018, Aviation analysis

**PMP:** ODA’s Pavement Maintenance Program (PMP) identifies maintenance, repair, and rehabilitation projects needed to sustain functional pavements at Oregon airports. The PMP program provides some level of pavement maintenance for all paved airports across the state. For NPIAS airports receiving federal monies, this work assists the airports in meeting their grant assurances. Since LMT is a primary airport with AIP funding, the Airport is not included in the ODA pavement maintenance program.

**Cost Summary:** The OAP v6.0 summarized the Airport’s development needs over the next five to ten years. Costs to improve and maintain the Airport over that time frame consider not only projects identified by the OAP, but also projects from ODA’s Pavement Maintenance Program and the Airport’s own locally generated capital improvement plan reported to ODA (SCIP). These three sources indicate an estimated \$26.6 million will be needed to maintain and improve the Airport over the next ten years.

As ODA’s Statewide Economic Impact Study has shown that on an annual basis the Crater Lake-Klamath Regional Airport supports an estimated \$292.4 million in economic benefit. The Airport’s annual economic impact far exceeds its financial need for maintenance and improvement. ODA’s economic impact analysis shows the Airport is well worth the investment.



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