



## OREGON AVIATION PLAN AIRPORT SUMMARY

### BEND MUNICIPAL 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 Bend Municipal Airport (BDN 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.

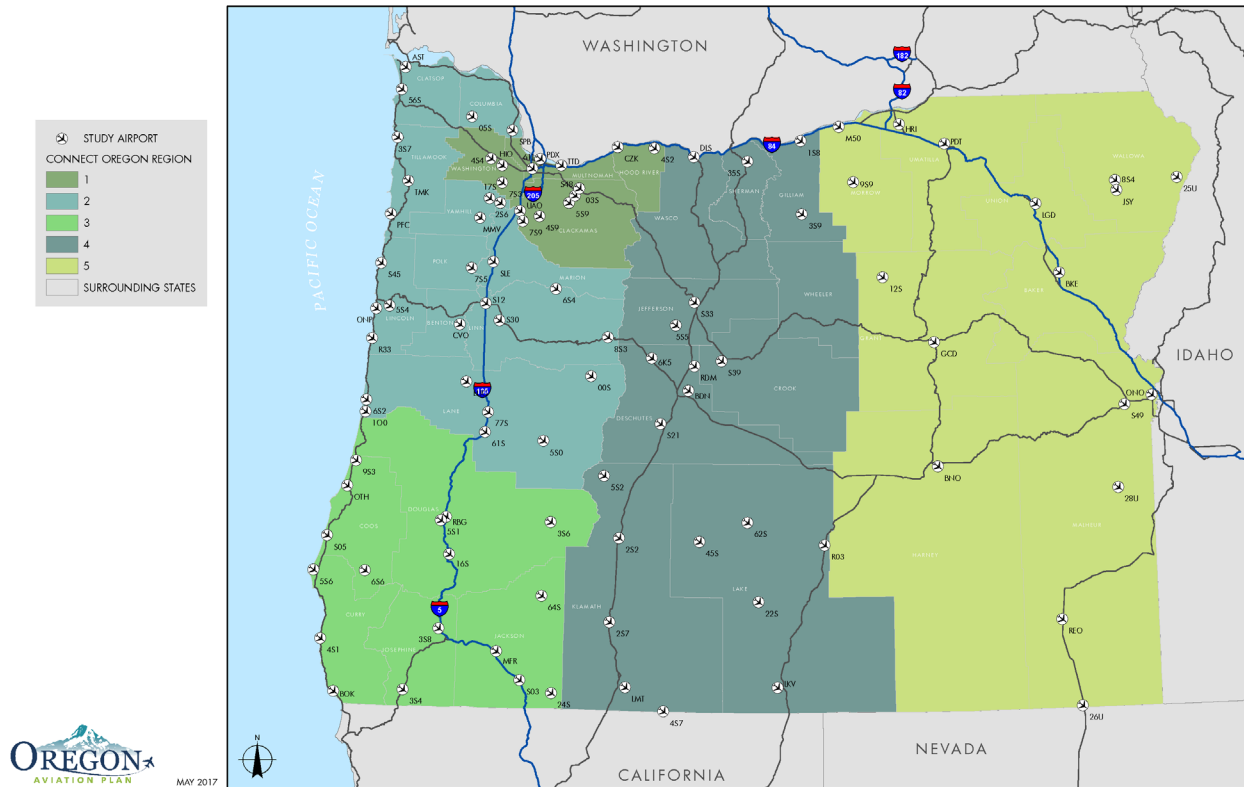
Aviation system plans are top down studies that must be implemented from the bottom up by individual airports. The ultimate success of the plan depends on each airport implementing recommendations from the study and following through on any identified improvement actions. Individual airport improvements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

Within the statewide system, the Bend Municipal Airport has been designated as a Category II – Urban General Aviation Airport in the 2007 OAP. Within the OAP, a Category II airports supports all general aviation aircraft and accommodates corporate aviation activity, including piston and turbine engine aircraft, business jets, helicopters, gliders, and other general aviation operations. The most demanding user requirements are business-related. These airports service a multi-state geographic region and/or experience robust levels of general aviation activity.

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 Bend Municipal 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, Bend Municipal 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 Bend Municipal Airport meets most of the objectives for an OAP Category II 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 Oregon Aviation Plan 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: Jviation

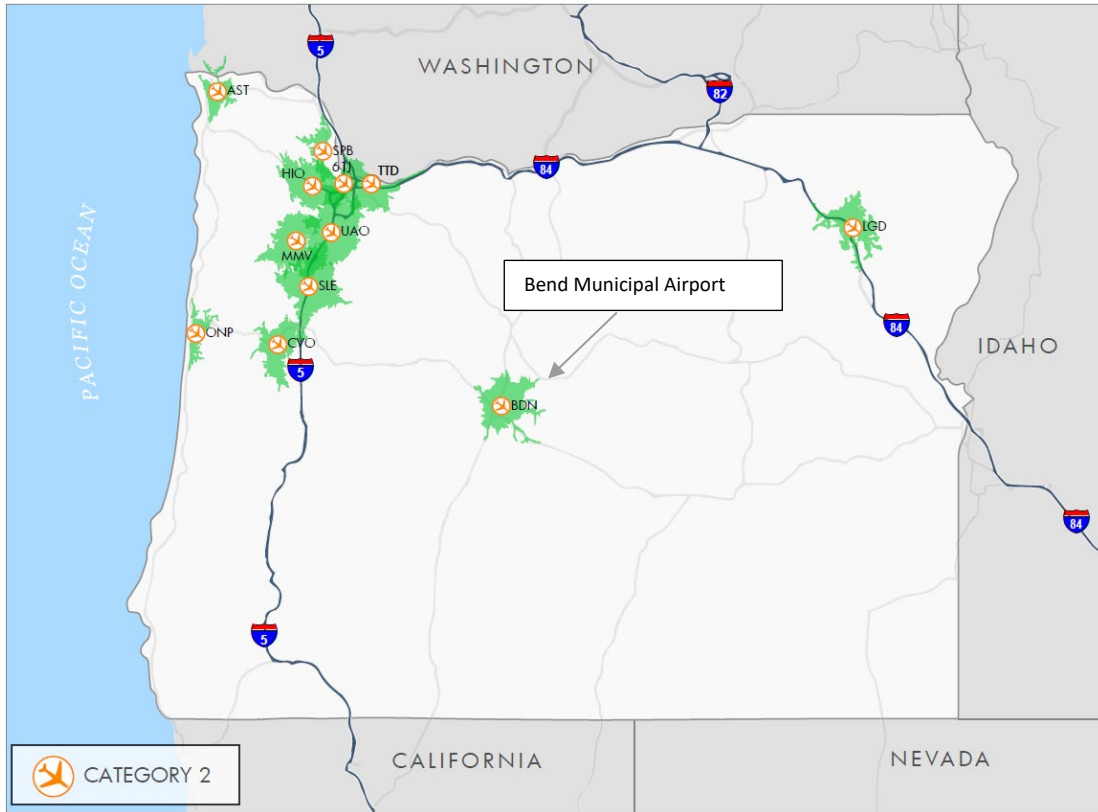
## BEND MUNICIPAL AIRPORT OVERVIEW

The City of Bend lies in central Oregon, in central Deschutes County. The City of Bend can be accessed via U.S. Highway 97 and U.S. Highway 20. Bend Municipal Airport, which is owned by the City, is situated on 415 acres, five miles northeast of the City of Bend. Nearby attractions include the Deschutes National Forest, a lava-cast forest, Newberry Crater, and numerous lakes. Skiing at Mt. Bachelor, area resorts, fishing, and rafting also attract numerous visitors to the area. The High Desert Museum, which traces the history of the Intermountain Northwest Aridlands, is located nearby. Major employers in the area include St. Charles Medical Center, Les Schwab Tire Centers, Sunriver Resort, and Mt. Bachelor. Bend Municipal Airport regularly supports air ambulance activity.



Bend Municipal Airport's primary runway is oriented in a north-south direction. This runway, Runway 16/34, is 5,200 feet long and 75 feet wide and is served by a full-length parallel taxiway and MIRL. The runway offers a precision approach, PAPIs and REILs. The Airport is home to 241 based aircraft and 141,075 annual operations. Approximately 65 percent of these operations are performed by itinerant aircraft. Bend Municipal Airport has a new heliport which consists of a lighted landing concrete helipad with a dimension of 80'x 80'. The heliport also has parking pads of which three measure 72'x72' and 18 parking pads measuring 35'x35'. The development areas surrounding the heliport pads have full utilities available to each building site.

## 30-MINUTE DRIVE TIME SERVICE AREA AND POPULATION OAP CATEGORY II 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 140,802 residents within a 30-minute drive of BDN and a labor force of approximately 80,246.

Bend Municipal Airport	
<b>Population</b>	
<b>2016 30-minute drive</b>	140,802
<b>2016 Associated city</b>	88,920
<b>Labor force</b>	
<b>2016 30-minute drive</b>	80,246

Source: US Census Bureau, Jviation Analysis, Oregon Zoomprospector.com, Oregon Population Center – Portland State University



## RECOMMENDED ROLE FOR BEND MUNICIPAL 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. Bend Municipal Airport will remain a Category II – Urban General Aviation Airport within the OAP.

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

### OBJECTIVES FOR CATEGORY II – URBAN GENERAL AVIATION MINIMUM STANDARD GENERAL AVIATION AIRPORT

#### Airside Facilities

- » **Airport ARC:** C-II
- » **NPIAS:** Yes
- » **Based Aircraft:** ≥10 (NPIAS Standard)
- » **Runway orientation:** 95% wind coverage (combined primary/secondary rwy)
- » **Runway Pavement Type:** Bituminous, Concrete
- » **Runway Pavement Strength:** Varies by Airport\* (≥30,000 lbs.)
- » **Runway length:** Minimum 5,000 feet
- » **Runway width:** 75 feet or 100 feet
- » **Taxiway:** Full parallel
- » **Lighting systems:** MIRL and MITL
- » **Approach:** Precision w/ vertical guidance
- » **Visual Approach Aids:** One Runway End
- » **Instrument Approach Aids:** Not an Objective
- » **Runway Lighting:** MIRL/HIRL/ALS
- » **Taxiway Lighting:** MITL/HITL
- » **Fencing:** Operations area at a minimum; entire airport desirable

#### 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
- » **Fencing:** Perimeter; controlled access
- » **Cargo:** Designated Apron Area
- » **Deicing Facility:** Not an Objective

#### Services

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



## BEND MUNICIPAL AIRPORT PROJECTIONS OF 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.

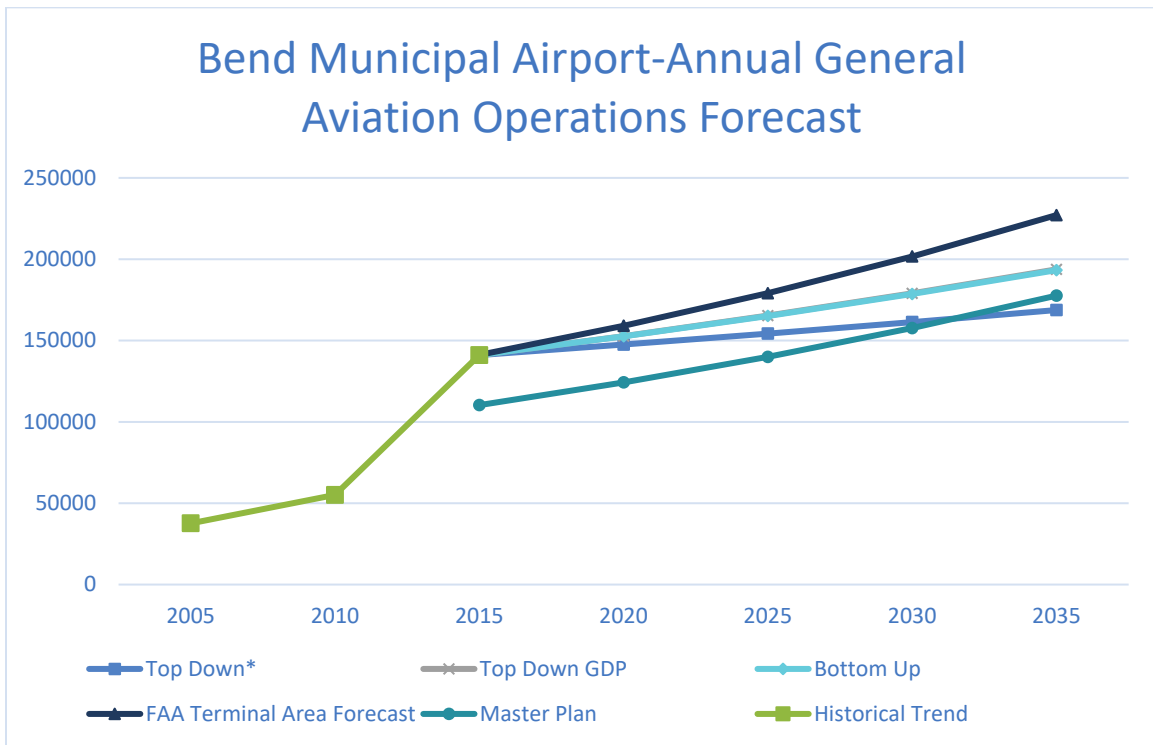
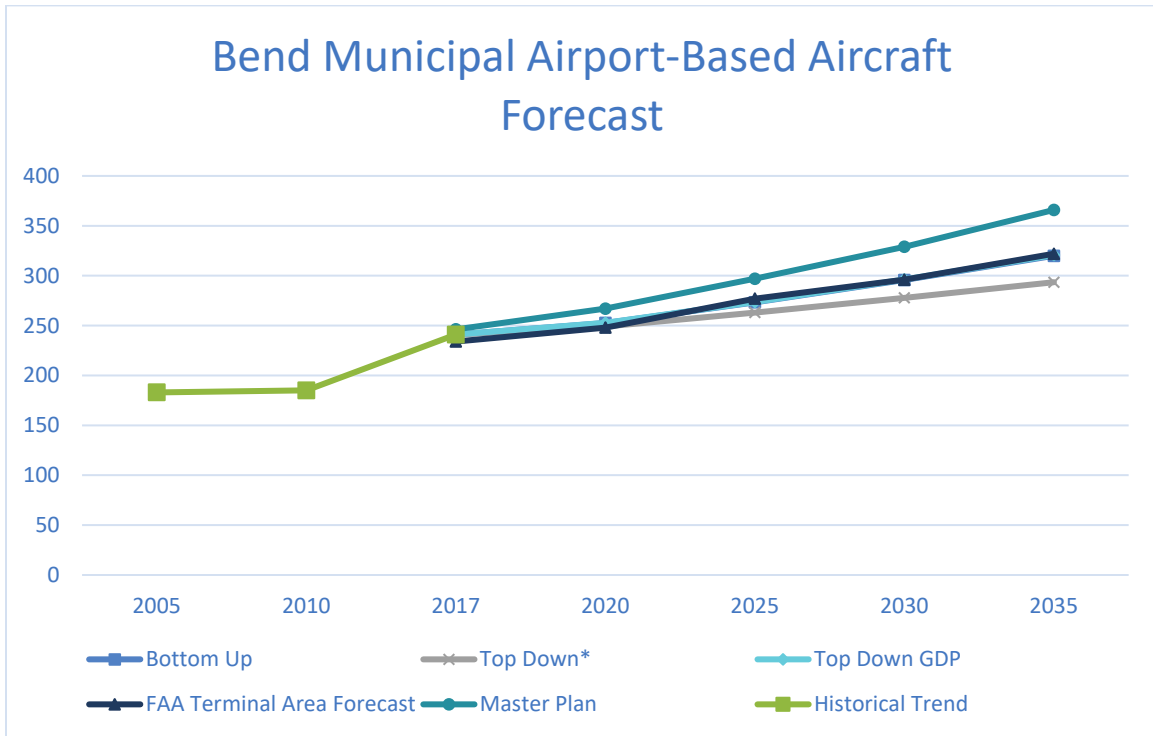
Recent economic recovery and increased use of general aviation as a tool to improve business efficiency have helped to stabilize the general aviation industry. For most airports in Oregon, however, including Bend Municipal Airport, anticipated growth in general aviation demand will be modest at best. The two graphs below show projections of based aircraft and annual general aviation operations for BDN 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 0.8 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 Bend Municipal Airport are projected to increase from 241 in 2017 to 278 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 top-down 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<sup>1</sup> at Bend Municipal Airport are projected to increase from 141,075 to 168,762 by 2035.

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<sup>1</sup> Includes air taxi and commuter operations



Source: FAA TAF, Aviation analysis, BDN 2013 airport master plan, \* indicates preferred growth rate





## BEND MUNICIPAL 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:** Bend Municipal Airport is owned and operated by the City of Bend. General aviation operations at the Airport accounted for approximately 24,013 visitors who arrived in the area via aircraft. 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 \$96.9 million. On-airport tenants and visitors accounted for nearly 414 direct jobs with an estimated direct payroll of \$21.1 million.

### BEND MUNICIPAL AIRPORT

	Direct	Indirect/Induced	Total
<b>Employment</b>			
– Tenant	350.0	510.3	860.3
– GA Visitor	44.4	18.5	62.9
– CIP	19.5	20.5	39.9
<b>Employment Total</b>	<b>413.9</b>	<b>549.2</b>	<b>963.1</b>
<b>Payroll</b>			
– Tenant	\$18,527,000	\$13,691,308	\$32,218,308
– GA Visitor	\$1,500,485	\$1,178,368	\$2,678,853
– CIP	\$1,064,511	\$795,106	\$1,859,616
<b>Payroll Total</b>	<b>\$21,091,996</b>	<b>\$15,664,782</b>	<b>\$36,756,777</b>
<b>Sales/Output</b>			
– Tenant	\$2,226,000	\$74,206,595	\$166,432,595
– GA Visitor	\$2,199,319	\$1,531,818	\$3,731,137
– CIP	\$2,435,278	\$1,929,731	\$4,365,009
<b>Sales/Output Total</b>	<b>\$96,860,597</b>	<b>\$77,668,145</b>	<b>\$174,528,741</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 Bend Municipal Airport was approximately \$174.5 million. Total full-time employment related to all tenants and general aviation visitors, including all multiplier impacts is approximately 963 jobs. A total annual payroll associated with these jobs is estimated at \$36.8 million.



## MUNICIPALITIES NEAR BEND MUNICIPAL 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 Bend Municipal 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 BEND MUNICIPAL AIRPORT

Type of Control	Jurisdictions Impacting Airport	
	City of Bend*	Deschutes County
<b>Airport Zone</b>	-	Yes
<b>Adopted Height Zoning Restrictions</b>	-	Yes
<b>RPZ Protection</b>	-	Yes
<b>Airport Safety Overlay Zone</b>	-	Yes

Source: Angelo Planning Group, Aviation

Note: \*Information was not gathered for cities where 100% of the airport’s horizontal surface is located outside the municipal boundary.

## AIRPORT REPORT CARD AND RECOMMENDATIONS

This section provides information on ODA facility/service objectives associated with a Category II airport in the OAP. The “report card” shows Bend Municipal 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. The report card for Bend Municipal Airport, developed as part of the OAP, is shown below. A number of deficiencies are identified as necessary for improving the Airport to meet all the facility objectives. Total costs to address OAP deficiencies are estimated at \$1.5 million.

Category II Performance Criteria		BDN	Bend Municipal Airport	Bend
Facilities	Basic Criteria	Actual	Action Needed to Meet Criteria	Estimated Cost
<b>Airside Facilities</b>				
FAA – ARC	C-II		B-II Improve ARC	
NPIAS	Yes		Yes	
Based Aircraft	≥10 (NPIAS Standard)		241	
Runway Orientation	95% wind coverage (combined primary/secondary rwy)		Yes	
Runway Length	5,000 feet		5,200	\$ -
Runway Width	75 or 100 feet		75	\$ -
Runway Pavement Type	Bituminous, Concrete		Bituminous	
Runway Pavement Strength	Varies by Airport* (≥30,000 lbs.)		30,000	\$ -
Runway Pavement PCI	60		90	\$ -
Taxiways	Full Parallel		Full Parallel	\$ -
Approach Type	Precision		Precision	\$ -
Visual Approach Aids	One Runway End		PAPI, REIL	
Instrument Approach Aids	Not an Objective		None	
Runway Lighting	MIRL/HIRL/ALS		MIRL	
Taxiway Lighting	MITL/HITL		Reflectors Install MITL/HITL	\$ 964,000
<b>General Facilities</b>				
Rotating Beacon	Yes		Yes	\$ -
Lighted Wind Indicator	Yes		Wind Cone, Lighted Wind Cone	\$ -
Weather Reporting	AWOS/ASOS		AWOS	\$ -
Hangared Aircraft Storage	75% of Based Aircraft		88%	\$ -
Apron Parking/Storage	75% of Daily Transient		100%	\$ -
Terminal Building	Yes		Yes	\$ -
Auto Parking Spaces	Moderate		36	\$ -
Fencing	Perimeter; controlled access		No fencing Provide full perimeter fencing and controlled access	\$ 558,000
Cargo	Designated Apron Area		Any available space on apron Provide dedicated apron area	\$ 25,000
Deicing Facility	Not an Objective		None	
<b>Services</b>				
Fuel	100 LL (24-hour self-service) Jet A		Yes	\$ -
FBO	Full Service (normal business hours)		Yes	
Ground Transportation	Offsite Rental Car, Taxi, or Other		Onsite rental car, offsite rental car, Uber/taxi, courtesy car	
Food Service	Vending		Yes	
Restrooms	Yes		Yes	
Pilot Lounge	Yes w/ Weather Reporting Station		Yes	
Snow Removal	Yes		Yes	\$ -
Telephone	Yes		Yes	
<b>Total</b>				<b>\$ 1,547,000</b>

Source: Jviation, 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 Management Plan (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 \$2.1 million in improvements for Bend Municipal Airport are identified in the SCIP over the next five to ten years. This estimate does not include transfers or PMP funds.

ODA SCIP Improvements (BDN)	Costs
Apron Rehabilitation	\$1,539,930
Master Plan & AGIS	\$415,916
Rehab Taxilanes: Phase I	\$166,667
<b>Total</b>	<b>\$2,122,513</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. Projects in the pavement management plan for Bend Municipal Airport are estimated at more than \$3.5 million between 2018 and 2023.

**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 Management Plan and the Airport’s own locally generated capital improvement plan reported to ODA (SCIP). These three sources indicate an estimated \$7.2 million will be needed to maintain and improve the Airport over the next ten years.

As ODA’s Statewide Economic Impact Study has shown, on an annual basis the Bend Municipal Airport supports an estimated \$174.5 million in economic benefit. The Airport’s annual economic impact far exceeds its annual financial need for maintenance and improvement. ODA’s economic impact analysis shows the Airport is well worth the investment.



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