CHILOQUIN STATE AIRPORT

AIRPORT LAYOUT PLAN REPORT

Prepared for the

November 2003

Chiloquin State Airport
Airport Layout Plan Report

Final Report
November 2003

Prepared for

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CHAPTER ONE
INTRODUCTION AND CONCLUSIONS

This study will evaluate the configuration and condition of existing facilities and address the current, short-term and long-term needs of Chiloquin State Airport. The 2003 Airport Layout Plan Report will replace the previous Airport Layout Plan Report, completed in 1994.[1] Prior planning recommendations will be reviewed and revised as necessary, to reflect current conditions. Any changes in activity, utilization, or facility development that may affect future demand for airfield facilities will also be evaluated.

The Oregon Department of Aviation (ODA) has undertaken the Airport Layout Plan Report project with the support of the Federal Aviation Administration (FAA). The airport is included the National Plan of Integrated Airport Systems (NPIAS), administered by the FAA. NPIAS airports are eligible for federal funding of improvements through FAA programs such as the current Airport Improvement Program (AIP). The FAA requires that all NPIAS airports periodically update their airport plans to maintain effective long-term planning. This project will enable the airport to meet the FAA's requirement to maintain an up-to-date plan.

The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration as provided under Title 49, United States Code, section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable with appropriate public laws.

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[1] Airport Layout Plan Report – Chiloquin State Airport, SFC Engineering (1994)

The purpose of the study is to define the current, short-term and long-term improvements necessary to maintain a safe and efficient airport that is economically, environmentally, and socially sustainable. The Airport Layout Plan Report will:

- *Examine previous recommendations and development alternatives as appropriate to meet the current and projected airport facility needs;*
- *Determine current and future activity and facility requirements;*
- *Update the airport layout plan, airspace plan, and land-use plan for the airport and its surrounding areas; and*
- *Schedule priorities of improvements and estimate development costs for the 20-year planning period.*

Funding for the ALP project is provided through a Federal Aviation Administration (FAA) Airport Improvement Program Grant (90%) with the local match (10%) provided by ODA.

OVERVIEW

Chiloquin State is included in the "Core System of Airports" in the Oregon Aviation Plan (OAP).[2] Core system airports are defined as having "a significant role in the statewide aviation system." Chiloquin State is included in the "Community General Aviation Airport" category based on its current functional role. Community airports typically accommodate a wide range of general aviation users and local business activities. The airport serves local residents and businesses, government users, and visitors to Chiloquin and the surrounding area. The region is sparsely populated with small communities located along the highways traveling throughout south-central Oregon. Chiloquin State is the only paved and lighted runway serving middle and upper Klamath County.

Community airports are significant components in the statewide transportation system and often generate both direct (i.e. employment) and indirect economic activity for local community or regions. For smaller, remote communities without convenient access to commercial air travel, general aviation airports provide an option for reducing the time required for business and

[2] Oregon Aviation Plan (Dye Management/Century West) © Oregon Department of Transportation 2000.

personal travel. The availability of a safe, well-maintained general aviation airport is often a key factor in a business decision to locate in, or serve a small community.

West Aircraft Apron

PUBLIC INVOLVEMENT

The public involvement element of the planning process provided opportunities for all interested individuals, organizations and groups to participate in the project. At the project kickoff, a Joint Planning Conference (JPC) was held on January 30, 2002 and all parties with specific interest or responsibility associated with the airport or its vicinity were invited to attend. The purpose of the JPC was to identify any concerns or issues, which needed to be addressed as part of this airport layout plan update. The input provided by state airport staff, airport users, local citizens, and a variety of state and federal government agencies provided valuable information to be used in formulating the plan.

Over the next several months, draft chapters were prepared for several plan components, including facility inventory, activity forecasts, facility requirements, and preliminary development concepts. A follow-up public meeting was held in Chiloquin on December 12, 2002 to present the preliminary findings and to obtain additional local input. The public input provided at the meeting focused primarily on the proposed development concepts. Local airport users expressed preferences regarding future facility development and priorities. Based on the public input and subsequent comments provided through ODA review, a refined development concept (preferred alternative) was created for integration into the draft airport layout plan drawing.

The Draft ALP Report (April 2003) contained the entire work effort, including draft airport plans and 20-year capital improvement program, and reflects the input provided by all participants in the planning process. Following a period of review, all public and agency comments received were integrated into the Final ALP Report and drawing set.

The final Airport Layout Plan drawing will be signed by the airport sponsor and FAA and will serve as a document of record. The ALP Report should be adopted locally as a supporting document (transportation facility plan) to local and county comprehensive plans to ensure consistency with state land use compatibility guidelines.

Special Note:

In addition to a variety of suggested facility improvements identified at the JPC, airport users identified airport security as a critical operational issue. Local users report that the airport has a history of aircraft and hangar vandalism and unauthorized runway incursions. Local pilots have expressed concerns about their personal safety and protecting their aircraft from damage. Area flight schools have reportedly advised student pilots to minimize use of the airport for flight training due to concerns about safety.

The ALP Report includes specific recommendations for facility improvements, such as fencing to address safety and security issues. However, the existing security issue will require coordination between the airport sponsor and local law enforcement to investigate illegal access and other possible criminal activity. Unauthorized airfield access and threats to airport users may be subject to state or federal prosecution and may fall under the jurisdiction of the Transportation Security Administration (TSA).

AIRPORT LAYOUT PLAN REPORT CONCLUSIONS

1. Chiloquin State Airport has been owned and operated by the State of Oregon Department of Aviation (ODA), formerly Oregon Aeronautics Division, since 1960. The existing airport site has been in aeronautical use since approximately 1946 and was originally owned and maintained by the City of Chiloquin as an unpaved airstrip. Improvements, including paving the runway, were made by the State upon transfer of ownership in 1960. The runway was fully reconstructed in 1995.

2. Chiloquin State is categorized as a "Community General Aviation Airport" in the 2000 Oregon Aviation Plan and is included in Oregon's core system of airports, which denotes its significance in Oregon's aviation system. The airport is included in the National Plan of Integrated Airport System (NPIAS), making it eligible for federal funding assistance through the Federal Aviation Administration (FAA).

3. Chiloquin State has a single paved and lighted runway (3,735 feet by 60 feet) oriented in a north-south direction (170/350 degrees). Runway 17/35 is not served by a parallel taxiway, but has three individual access taxiways serving aircraft hangar and apron areas. The runway pavement is rated at 10,000 pounds for aircraft with single wheel landing gear.

4. Airfield lighting includes medium intensity runway edge lighting (MIRL), threshold lights, and an airport beacon.

5. The existing hangar area is located on the east side of the runway, near mid-field; an itinerant aircraft parking apron is located opposite the hangar area on the west side of the runway, adjacent to Highway 97, a motel and restaurant; the south aircraft apron is located near the end of Runway 35 on the east side.

6. The 1994 ALP listed the existing and ultimate critical aircraft as the Beechcraft Baron 58 and King Air B100, respectively. Both aircraft are included in Airplane Design Group I and Approach Category B. Airport reference code (ARC) B-I was previously recommended for the airport.

7. Based on a review of available data and information obtained at the local joint planning conference (JPC), Chiloquin State had four based aircraft in February 2002. All current based aircraft are single engine piston, although the airport accommodates a variety of itinerant multi-engine piston, turbine, and limited business jet operations. According to ODA, additional leases were signed to construct two conventional hangars in the east hangar area, which is expected to increase based aircraft.

8. The most recent activity count at the airport was made in 2001, with 866 operations, although due to abnormally high (34.03%) statistical sampling error, the activity could range from around 570 to 1,160 operations.

9. The condition of airfield pavements ranges from excellent (runway and aircraft turnarounds) to failed (south and west aprons). The west apron and access taxiway were subsequently resurfaced (2001) are presently in good condition. The east hangar taxiway was paved after the last inspection and is not rated.

10. Chiloquin State currently operates under day and night visual flight rules (VFR) and does not have instrument approach capabilities.

11. Aviation fuel or aircraft maintenance services are not currently available at the airport.

12. The airport has a land area of approximately 114 acres and is located entirely within the Chiloquin city limits. The airport is zoned Industrial (I) and Airport Hazard overlay zones coincide with the runway protection zones for each runway end.

13. The existing airport hazard overlay zoning does not fully comply with Oregon's airport overlay zone requirements law (ORS Ch. 836.600-630).

AIRPORT LAYOUT PLAN RECOMMENDATIONS

The recommendations of previous planning efforts were examined and revalidated or modified as appropriate, based on current considerations and design standards.

1. Airfield facilities at Chiloquin State Airport should be designed to meet FAA Airport Design Group I (small aircraft exclusively) (ADG I - Small) dimensional standards. A single wheel weight bearing capacity of 12,500 pounds (single wheel) is recommended for airfield pavements.

2. A regular schedule of pavement maintenance (vegetation control, crack filling, slurry seals, patching, etc.) should be conducted on airfield pavements to maximize the useful life and optimize life cycle maintenance expenditures.

3. The terrain located beyond the north end of the runway should be cleared and graded to the greatest extent possible to reduce or eliminate obstructions to the runway 17 approach surface.

4. Approximately 3.75 acres of private property near the northeast corner of the airport and 4.28 acres near the southeast corner of the airport should be acquired to enable airport improvements and preserve long-term development options for the airport.

5. Based on existing and forecast use, the "utility" designation for Runway 17/35 continues to be appropriate and is adequate to accommodate day-only non-precision instrument approach capabilities.

6. The portions of the expanded Runway 17 and 35 RPZs that extend beyond airport property should be controlled through avigation easement or purchase.

7. An east-side parallel taxiway should be constructed for Runway 17/35. The use of full ADG I standards (a 225-foot runway separation) is desired by the airport sponsor to protect long-term potential of upgrading beyond the “small aircraft exclusively” subcategory of ADG I.

8. New landside developments (aircraft hangars, apron, parking, fuel, etc.) should be located on the east side of the airfield, with adequate setbacks to accommodate the future parallel taxiway.

9. Extend electrical and water service to the hangars and other buildings (as needed) in the landside development area.

10. Install precision approach path indicators on Runways 17 and 35.

11. Install lighted wind cones near the ends of Runway 17 and 35 to improve the representation of surface wind conditions.

12. Overhead flood lighting should be provided in the landside development area (hangars, aircraft parking, fueling areas) to improve safety and security for airport users, parked aircraft and other airport facilities.

13. Fencing should be added around the entire airport boundary to limit unauthorized human, animal and vehicle access to the airfield. Vehicle access to the airport should be controlled through the use of locked gates at direct access points in active operational areas.

14. Klamath County and the City of Chiloquin should jointly develop, adopt and map an airport overlay zone that coincides with the airport’s FAR Part 77 Airspace Surfaces and is consistent with state law (ORS Ch. 836.600-630).

15. The Oregon Department of Aviation (ODA) should adopt the Airport Layout Plan Report and drawings in a timely manner to guide airport activities. Klamath County and the City of Chiloquin should adopt the Airport Layout Plan Report and drawings for incorporation into city and county comprehensive plans.

16. ODA should initiate the recommended improvements and major maintenance items in a timely manner, requesting funding assistance under FAA and other funding programs for all eligible capital improvements

CHAPTER TWO
INVENTORY AND FORECASTS

INTRODUCTION

This chapter documents existing conditions and aviation activity at the airport. The forecasts of aviation activity developed in the 1994 ALP Report will be evaluated, and updated as necessary to reflect current conditions and anticipated trends that may affect development needs at Chiloquin State Airport through the twenty-year planning period and beyond. The existing airfield facilities were also examined during recent on-site inspections. Historical data from a variety of sources are used in this evaluation:

- **Airport Layout Plan Report** - Chiloquin State Airport (SFC Engineering, 1994)
- **Oregon Continuous Aviation System Plan – Inventory and Forecasts** (AirTech, 1997)
- **Oregon Aviation Plan** (Dye Management Group; Century West, 2000)
- **Chiloquin State Airport - Pavement Maintenance-Management Program** (Pavement Consultants Inc., 2000)
- **City of Chiloquin Zoning Map and Ordinance**
- **Klamath County Comprehensive Plan and Zoning Ordinance, Assessor Maps**
- FAA Airport Master Record Form (5010-1), Terminal Area Forecasts.
- Local documents and regional socioeconomic data.

AIRPORT LOCALE

Chiloquin State Airport is located approximately one mile northwest of the city of Chiloquin in mid-Klamath County. Klamath County borders California to the south; Lake County to the east; Deschutes County to the north; and Jackson and Douglas Counties to the west. Chiloquin is located approximately 26 miles north of the county's largest city and county seat, Klamath Falls. Vehicle access to the airport is provided from Oregon State Highway 422 (South Chiloquin

Road) near the south end of the airport and from Applegate Street, an unimproved city street that enters the airport's east side, near midfield. Highway 97 borders the west side of the airport and is one of the primary north-south transportation corridors in Central Oregon. An airport location map is provided in **Figure 2-1**.

The airport provides access to Crater Lake National Park and many other recreational sites in the area, including Upper Klamath Lake, Rogue River National Forest, Winema National Forest, and Umpqua National Forest. Recreational activities in the local area include hunting, fishing, camping, hiking, visiting historical sites and gaming (the Klamath Tribe's Kla-Mo-Ya Casino).

Chiloquin is also home to the Train Mountain Railroad Museum, a facility for 1/8 scale train enthusiasts. Train Mountain is located across Highway 97 near the airport on 2,000 acres of forest land. According to the museum, the facility currently has 22 ¼ miles of 7 ½ gauge mainline track, yard and sidings. The facility attracts visitors from around the country and eventually may provide lodging accommodations and campgrounds for visitors. The owner of Train Mountain is also involved in several building renovation projects in downtown Chiloquin, which may be targeted toward attracting additional tourism activity.

CLIMATE

Chiloquin is located on the eastern slope of the Cascade Mountains, which parallel the coast and the Coast Range to the west. The effects of the Pacific Ocean and the forced ascent of moist air masses from the Pacific due to these mountains is a primary influence on the climate at Chiloquin. The amount of moisture is reduced somewhat by the obstruction of the coastal mountains and decreases as an air mass moves east over the crest of the Cascade Range.

Climatic data was available for a 20-year period between 1980 and 2000[3] in Chiloquin. The average monthly maximum temperature is 81.4 degrees Fahrenheit (August) and the average monthly minimum temperature is 19 degrees (January). The daily extreme temperatures for Chiloquin (data available from 1961-1979) are –19 degrees Fahrenheit (February) and 98 degrees (July). Chiloquin averages 21 inches of precipitation and 68 inches of snowfall annually. The depth of snow is highest, 9 inches, in January. According to local pilots, the prevailing winds are from the southwest.

[3] Western Regional Climate Center. Oregon Period of Record, Monthly Climate Summary 1980-2000.

Figure 2-1: Airport Location Map

PHYSICAL GEOGRAPHY/GEOLOGY

Klamath County is the fourth largest county in Oregon, with a land area of 6,151 square miles (3,936,640 acres). The region is comprised mainly of farmland, rangeland, forestland, mountains, and rivers. Most of the county is part of the high central Klamath plateau with elevations in the ranging from 4,000 to 6,000 feet. Mt. Scott, in Crater Lake National Park, is the highest peak at 8,938 feet. Chiloquin State Airport elevation is recorded at 4,217 feet above mean sea level (MSL).

The Soil Survey of Klamath County, Oregon, Southern Part (1985) lists the predominant soil in the vicinity of the airport as Maset coarse sandy loam. This soil was formed in air-deposited ash, from eruptions of Mount Mazama, that overlays a buried loam soil. The depth to bedrock (soft-weathered sandstone) is 20 to 40 inches (moderately deep), with 10 percent of this soil having a depth to bedrock of 10 to 20 percent. Permeability is moderately slow and the hazard of erosion is slight. This soil is described as well drained with an average slope of 4 percent. This soil is used mainly for timber (ponderosa pine) production and grazing by livestock. At the southern end of the airport, close the Williamson River, the soil is a well-drained loam, with a slope of 2 to 5 percent. This soil formed in alluvial and lacustrine (river and lake) sediment weathered from diatomaceous sandstone.

Chiloquin is located at the fork of the Sprague River and the Williamson River on the east slope of the Cascade Mountains. It is surrounded by the Winema National Forest on the south, east, north, and northwest; and by Agency Lake 2 1/2 miles to the west and southwest of the airport. The terrain is very complex surrounding the airport and includes such features at Steiger Butte (1 mile northwest), which reaches 4,760 feet, and Cave Mountain (3 miles northeast), reaches 5,255 feet. The local community and the airport lie in a valley formed by the Williamson River, which runs essentially north-south through the area. The terrain at the airport site gradually rises from south to north, with a 27-foot elevation change between runway ends. The area beyond the north end of the runway continues to rise above the runway elevation.

SOCIOECONOMIC CONDITIONS

Population

According to data compiled by the U.S. Census Bureau and Portland State University Center for Population Research and Census, the population in 2000 of Klamath County was 63,775 and the population of Chiloquin was 716. Chiloquin is located in central Klamath County. Overall population growth for both the City of Chiloquin and Klamath County was in the range of 6 to 10 percent between 1990 and 2000. The population of Klamath County is projected to increase to 91,547 (+27,772) by the year 2040, an increase of approximately 44 percent.[4] If current distributions continue, the population for Chiloquin would be expected to increase to approximately 1,031 residents by 2040 (+315).

Economy

The economy in Klamath County is based mainly on timber products, cattle ranching, irrigation farming, and tourism. Approximately 75 percent of the county's land is forested, with over 50 percent of the land managed by agencies including the Bureau of Land Management and the USDA Forest Service. Livestock sales, mainly cattle, account for approximately 49 percent of agricultural revenues, annually. Wheat, barley, hay, and oats are the principal crops and account for 51 percent of agricultural revenues, annually. The average farm size is 669 acres.

Employment in the timber products industry and in farming is highly seasonal. Lumber and wood products account for approximately 75 percent of the manufacturing employment in Klamath County. From 1990 to 2000, the wood products industry experienced a 25 percent loss. In 2000 the employment losses in the manufacturing sector were offset by an increase in non-manufacturing employment. This increase was due to growth in government (local educational institutions) and tribal employment (casino development). The 2000 average annual unemployment rate in Klamath County was 8.1 percent, higher than the state average.

Leading local employers include Jeld-Wen, the Klamath Tribe, and government. The development and operation of Train Mountain is expected to continue providing local employment within the community.

[4] State of Oregon, Office of Economic Analysis.

Airport History

The existing airport site has been in aeronautical use since approximately 1946 and was originally owned and maintained by the City of Chiloquin as an unpaved airstrip. The City transferred ownership to the Oregon Department of Aviation in 1960, and at that time the State made improvements to the airfield and paved the runway. The airfield remains in ownership of the State; however, the City of Chiloquin retains land interests in small parcels adjacent to the southwest and southeast corners of the airport. In 1995, the runway was completely reconstructed with new edge lighting. In 2003, the airport access road was reconstructed and extended to serve the new hangar area.

Airport Environment

Chiloquin State Airport is located along U.S. Highway 97, approximately one mile northwest of Chiloquin, in Klamath County. The airport area is approximately 114 acres and is located within the Chiloquin city limits. The airport is bordered by U.S. Hwy 97 to the west; sparsely developed rangeland to the east and north; and rodeo grounds and rangeland south. Two legs of State Highway 422, joined at a point just east of the airport, meet at Hwy 97 both to the north and south of the airport forming a triangle.

AIRFIELD FACILITIES

Existing facilities at Chiloquin State Airport are depicted in **Figure 2-2** and summarized in **Table 2-1** through **Table 2-4**.

TABLE 2-1
AIRPORT DATA

Airport Name/Designation	Chiloquin State Airport (2S7)
Airport Owner	State of Oregon Department of Aviation
Date Established	1946
Airport Category	National Plan of Integrated Airport Systems (NPIAS) General Aviation FAA Airport Reference Code: B-I
Airport Acreage	114 Acres (as noted in 1994 ALP Report)
Airport Coordinates	N 42º34.99’ W 121º 52.57’

Airport Elevation	4,217 feet Mean Sea Level (MSL)
Airport Traffic Pattern Configuration/Altitude	Left Traffic - 1,000 feet above ground level

Runways and Taxiways

Chiloquin State Airport has a single paved, lighted runway (17/35), which is oriented in a north-south direction. The runway is not served by a parallel taxiway. The runway has a 440-foot displaced threshold at the Runway 17 end to provide improved obstruction clearance for the approach. Runway 17/35 has a double bituminous surface treatment (BST) surface, basic visual marking, and medium-intensity runway edge lighting (MIRL). The runway utilizes a standard left traffic pattern. Available wind data indicates that Runway 17/35 meets FAA wind coverage requirements.

An aircraft holding area/turnaround is located on the east side of the Runway 17 threshold. The runway has three taxiway connections serving landside facilities. An east-side exit taxiway is located at the Runway 35 end to access the south aircraft apron. Two additional access taxiways located near mid-field serve the apron and hangar areas on the east and west sides of the runway. **Tables 2-2** and **2-3** summarize existing runway and taxiway facilities.

TABLE 2-2
RUNWAY 17/35 DATA

Dimensions	3,735' x 60 feet; Aircraft Holding Area/Turnaround (approx. 140' x 140') at Runway 17 End; 440-foot displaced threshold at Rwy 17 end,
Effective Gradient	.02%
Surface	Double Bituminous Surface Treatment (BST) (good condition)
Weight Bearing Capacity (WBC)	10,000 pounds – Single Wheel Landing Gear[1]
Marking	Basic (runway numbers, centerline stripe)
Lighting	Medium Intensity Runway Edge Lighting (MIRL); Threshold Lights
Wind Coverage	99.5 percent (12 MPH). Data: 1981-83

1. Pavement Strength as published in U.S. Airport/Facility Directory

TABLE 2-3
TAXIWAY DATA

East Hangar Taxiway	500' x 20' Asphalt Concrete (excellent condition); access to hangar area.

West Apron Taxiway	355' x 25' Asphalt Concrete (excellent condition); access to apron.
South Taxiway	330' x 50' Asphalt Concrete (Failed); access to apron.
Lighting/Reflectors	Reflectors
Rwy-Parallel Taxiway Separation	N/A

Figure 2-2: Airport Site Map and Existing Conditions

During a recent site visit, the runways and taxiway appeared to be in good condition, although some cracking (> 1") was observed. The original south aircraft parking apron appeared to be in poor condition. The west access taxiway was resurfaced in 2001 and was in excellent condition. The east hangar taxiway also appeared to be in excellent condition. The runway numbers, displaced threshold markings, and other markings on the runway were observed to be in good condition.

Runway 35 Threshold

Aircraft Apron

The airport has two aircraft aprons, one located on each side of the runway. The original main apron is located on the east side of the runway near the end of Runway 35. This apron was previously used for aircraft parking and provided access to several hangars. The front edge of the apron is approximately 100 feet from runway centerline. The 1994 ALP recommended replacing/relocating the apron due to conflicts with a variety of runway clearances and a planned east-side parallel taxiway. The hangars previously located adjacent the south apron have been removed and no further maintenance is planned for the apron.

The west apron is located opposite Melita's Restaurant and the motel located on Highway 97. The apron is used primarily for transient aircraft parking, including customers of the restaurant and motel. Some local and visiting pilots occasionally park aircraft on the apron for extended periods, although aircraft vandalism has occurred. Pilots report that the apron's close proximity to the highway, lack of security fencing, locking gates, and lighting are significant concerns for leaving aircraft unattended for any length of time. The west apron is connected to the runway with a 355-foot paved taxiway. The apron was reconstructed in 2001 and is currently in excellent condition. **Table 2-4** summarizes existing apron facilities at the airport.

TABLE 2-4
AIRCRAFT APRON DATA

South Apron	290' x 100' (3,222 square yards) Two rows of aircraft tiedowns (10 positions) Asphalt Concrete (failed)
West Apron	140 x 100' Four to five light aircraft parking positions Asphalt Concrete (excellent condition)

Agricultural Aircraft Facilities

Chiloquin State Airport does not accommodate regular agricultural-related operations and does not have any AG-related facilities.

Airfield Pavement Condition

As part of the **Oregon Aviation System Plan**, the Oregon Department of Aviation manages a program of pavement evaluation and maintenance for Oregon's general aviation airports. This evaluation provides standardized pavement condition index (PCI) ratings, pavement features and current conditions. Through the use of MicroPAVER computer software, current pavement condition ratings are entered into the system with the specifics of each pavement section. The program is able to predict the future condition of the pavements if no action is taken (i.e. rate of deterioration) while also identifying the recommended measures needed to extend the useful life of the pavement section.

Table 2-5 summarizes airfield pavement conditions for Chiloquin State Airport based on the most recent inspection conducted in 2000. The runway, taxiway and aircraft holding area/turnaround pavements were reconstructed in 1995 and were rated "excellent." The older pavements were rated "very poor" or "failed." Since the last inspection, the west apron and access taxiway were reconstructed, and are now in excellent condition. The east hangar taxiway, which was not rated in 2000, was paved in 2001 and is also in excellent condition. Based on normal use, the runway pavement is projected to deteriorate to very good or good condition by 2010 without rehabilitation.

TABLE 2-5
SUMMARY OF AIRFIELD PAVEMENT CONDITION
(AUGUST 2000)

Pavement	Section Design/Age	PCI Rating[1]	Condition
Runway	Double BST (1995); 3" Crushed Aggregate Base (1995); 10" Crushed Aggregate Base (1995); Geotextile (1995). Slurry Seal (1999)	98 (south section) 86 (north section0	Excellent
North Aircraft Turnaround	Double BST (1995); 3" Crushed Aggregate Base (1995); 10" Crushed Aggregate Base (1995); Geotextile (1995). Slurry Seal (1999)	86	Excellent
West Taxiway	Reconstructed (2" AC & 6" Crushed Aggregate) in 2001. Originally 4" Crushed Aggregate (1960); 1.25" AC (1961); Seal Coat (1968).	Rating has not been updated since reconstruction. (PCI = 13 in 2000)	Should now be rated "Excellent" based on reconstruction
West Apron	4" Crushed Aggregate (1960); 1.25" AC (1961); Seal Coat (1968). Reconstructed (2" AC & 6" Crushed Aggregate) in 2001.	Rating has not been updated since reconstruction. (PCI = 0 in 2000)	Should now be rated "Excellent" based on reconstruction
South Apron	4" Crushed Aggregate (1960); 1.25" AC (1961); Seal Coat (1968).	0	Failed
South Taxiway	Double BST (1995); 3" Crushed Aggregate Base (1995); 10" Crushed Aggregate Base (1995); Geotextile (1995). Slurry Seal (1999)	95	Excellent
East Hangar Taxiway	Unknown	Not rated	Excellent (Paved in 2001)

1. The Pavement Condition Index (PCI) scale ranges from 0 to 100, with seven general condition categories ranging from "failed" to "excellent." For additional details, see *Oregon Aviation System Plan Pavement Evaluation/Maintenance Management Program* for Chiloquin State Airport.

LANDSIDE FACILITIES

Hangars and Airport Buildings

The aircraft hangar area is located on the east side of the runway, near mid-field. Two rows of hangars face a single access taxiway that connects to the runway. In early 2003, there were four conventional hangars located in the area. According to ODA, one additional lease has been signed for construction of a conventional hangar in this area, which should be completed in 2003 or 2004.

At the time the 1994 Airport Layout Plan Report was being prepared, there were five older hangars located near the south end of the runway, which have since been removed. The hangars were recommended for acquisition and demolition to accommodate a future aircraft apron and parallel taxiway.

Airport Lighting

The airport lighting at Chiloquin State Airport accommodates day-night operations in visual flight rules (VFR) conditions. The airport has runway edge lighting, threshold lights, a lighted wind sock/segmented circle and an airport beacon. There is limited taxiway edge lighting at north runway turnaround. The airport beacon is located adjacent to the south apron on the east side of the runway. Runway 17/35 has medium intensity runway edge lighting (MIRL) installed when the runway was reconstructed in 1995. The runway edge lights are set on a dusk-to-dawn automatic switch. The runway lights are in good condition. **Table 2-6** summarizes existing airport lighting at Chiloquin State Airport.

TABLE 2-6
AIRPORT LIGHTING

Component	Type	Condition
Runway Lighting	Medium Intensity Runway Lighting (MIRL); Threshold Lights	Good
Taxiway Lighting or Reflectors	Edge Lighting on Turnaround	Good
Lighted Airfield Signage	None	N/A
Visual Guidance Indicators	None	N/A
Airfield Lighting	Airport Beacon; Lighted Wind Cone / Segmented Circle	Good

Airspace and Navigational Aids

Chiloquin State Airport operates under visual flight rules (VFR) and has no electronic navigational aids or instrument approaches. The runway pattern altitude is 1,000 feet (AGL) with standard left traffic. **Table 2-7** summarizes existing navigational aids and related items.

TABLE 2-7
NAVIGATIONAL AIDS AND RELATED ITEMS

Type	Facilities
Electronic Navigational Aids	None on site. Nearest Locations: Klamath Falls VORTAC (26.6 nm SE) 115.9 MHz
Instrument Approaches	None
Weather Observation	None
Communication	Common Traffic Advisory Frequency (CTAF) - 122.9 MHz

Table 2-8 summarizes notable obstructions, special airspace designations and IFR routes in the vicinity of Chiloquin State Airport, as identified on the Klamath Falls Sectional Aeronautical Chart. Local airport operations and flight activity is not affected by the noted airspace or obstructions located in the vicinity of the airport.

TABLE 2-8
AIRSPACE/INSTRUMENT ROUTES/OBSTRUCTIONS

Airspace Item	Description	Location
Low Altitude Enroute Airway	Victor 25 – 12,000’ mean sea level minimum enroute altitude (MEA); 9,300’ minimum obstruction clearance altitude (MOCA).	10 nautical miles east. Connects Klamath Falls and Deschutes VORTACs on a 171-351 degree course.
Low Altitude Enroute Airway	Victor 452 – 11,000’ MSL minimum enroute altitude (MEA); 9,100‘ MSL minimum obstruction clearance altitude (MOCA).	7 nautical miles southwest. Connects Klamath Falls and Eugene VORTACs on a 134-314 degree course.
Class E Airspace	Associated with low altitude federal airways (1,200’ above ground level).	3 miles west; 5 miles south
Military Training Route	VR 1251 (surface upward)	5 miles north.
Overhead Power Line	Transmission Line	1 mile east and 4 miles north of airport.

AIRPORT SUPPORT FACILITIES/SERVICES

Aircraft Fuel

There is no aviation gasoline (AVGAS) or jet fuel available for sale at the airport.

Surface Access and Vehicle Parking

The airport does not have designated automobile parking areas, although areas adjacent to the south apron and the aircraft hangars have typically been used for vehicle parking. Vehicle access to the airport apron is provided by Highway 97 (for the west apron) and State Highway 422 for east side facilities. The existing airport access road enters the airport near the south end and serves the south apron and east hangar area. The airport access road was reconstructed in 2003. The adjacent rodeo grounds are also accessed from this road connection to Highway 422. Applegate Street is an unimproved road that ends near the east airport property line and hangar area. The road was not open for public use during a site visit in 2002. The City of Chiloquin has indicated that improvements to Applegate Street are planned in the future to serve the industrial property located adjacent to the east side of the airport. It is not known whether access to the airport could also be provided via Applegate Street.

As noted earlier, unauthorized access on the airfield has created concern about airport safety and security. A review of airport access will be included in the evaluation of related facility needs.

Fencing

Limited wire fencing is located along Highway 97 and various other locations along the airport property boundary, although the existing access road to the airport is not gated. As noted earlier, airport users have indicated that significant security problems exist due to unauthorized access on the airfield. Improved fencing and the installation of gates at all access points to the airport will be considered in the facility requirements evaluation.

Utilities

Electrical power to the airport is provided by Pacific Power & Light, but is currently limited to connections to airfield lighting. Electrical service does not currently extend to the east hangar lease area. Water and sewer in the vicinity of the airport are provided by individual wells and septic systems. Services such as restrooms and phone are not currently provided.

Land Use Planning and Zoning

The airport is located inside the northwestern edge of the Chiloquin Urban Growth Boundary and city limits and is zoned Industrial (I). It is surrounded by predominantly vacant lands in Klamath County's jurisdiction, with the exception of a narrow extension of City of Chiloquin, Industrial Zoning which connects the airfield on its east side and an industrial park to which urban utilities have recently been extended. Industrial development is anticipated and pending on Klamath County and City of Chiloquin lands east of the airport, under the County zoning designation of Heavy Industrial (IH) and in the City's I Zone as described above. **Table 2-9** summarizes existing zoning and land uses in the vicinity of the airport.

No significant issues or concerns were identified during preliminary data collection relative to the compatibility of existing or foreseeable land uses on property neighboring the airport. Chapter Six of this report will further discuss land use compatibility as it pertains to operations of the Chiloquin State Airport.

TABLE 2-9
AIRPORT VICINITY LAND USE AND ZONING

Land Use	Zoning
Airport Site:	City of Chiloquin Industrial (I)
North: Vacant Land Single Family Residential Intersection, US 97 / OR 422	 Klamath County Medium Density Residential (RM) – 8 units per acre RM & Klamath Co. Low Density Residential, One Acre Minimum (R-1)
South: Rodeo Grounds Intersection, US 97 / OR 422 Williamson River, Ranger Station	 City of Chiloquin (I) Zone Klamath County Exclusive Farm Use (EFU) Klamath County Forestry (F), Klamath County Transportation Commercial (CT)

East: Vacant Land State Hwy. Div. Maintenance Sta. Intersection, Branches of OR 422	 Klamath County Heavy Industrial (IH) and General Commercial (CG) City of Chiloquin Residential (R) City of Chiloquin Commercial (C)
West: US Highway 97 Winema National Forest	 Klamath County Forestry (F), Klamath County Transportation Commercial (CT)

Airport Service Area

The airport service area refers to the area surrounding an airport that is directly affected by the activities at that airport. Normally a 30 or 60-minute surface travel time is used to approximate the boundaries of a service area.

Chiloquin State Airport serves users from the area ranging from Crater Lake National Park to the north to the east shore of Upper Klamath Lake. Aircraft owner surveys conducted by ODA indicated that Chiloquin attracts users from a number of areas outside the local area. As noted in the 1994 ALP Report, a survey of aircraft operators at Chiloquin State Airport was conducted in 1990 with approximately 30 responses. The distribution of based aircraft locations included approximately one-third from Klamath Falls, one-third from various California airports, and one-third from other airports in Oregon, including Chiloquin.

Although there several public use airports located within a 50-mile (air) radius of Chiloquin, most of these have drive times of an hour or more. Klamath Falls International Airport is located within the local service area for Chiloquin State Airport and accommodates a full range of commercial, general aviation and military activity. Based on the availability of a commercial service airport within the service area, Chiloquin's primary user base is general aviation with some business and government-related activity. This type of activity is consistent with most community general aviation airports. It is also reported that Chiloquin is occasionally used by Federal Express Caravan, Airborne and other light cargo aircraft during fog or other poor weather conditions at Klamath Falls. **Table 2-10** lists the public airports in the vicinity of Chiloquin.

TABLE 2-10
PUBLIC AIRPORTS IN VICINITY
(WITHIN 50 NAUTICAL MILES)

Airport	Location	Runway Dimension (feet)	Surface	Runway Lights	Fuel

Beaver Marsh State	33 NM NE	4,500 x 60	Dirt	No	No
Silver Lake USFS	46 NM NE	3,000 x 55	Gravel	No	No
Prospect State	28 NM NE	4,000 x 50	Asphalt	Yes	No
Ashland Municipal	47 NM WSW	3,603 x 75 feet	Asphalt	Yes	Yes
Pinehurst State	35 NM SW	2,800 x 30 feet	Asphalt	No	No
Klamath Falls Int'l.	26 NM SSW	10,301 x 150 (primary rwy)	Asphalt	Yes	Yes
Rogue Valley Int'l. (Medford)	47 NM SW	8,798 x 150 (primary rwy)	Asphalt	Yes	Yes

AVIATION ACTIVITY AND FORECASTS

Historical Aviation Activity

Historical activity data for Chiloquin State airport is summarized in **Table 2-11.** In February 2002, there were four based aircraft at Chiloquin, including three single-engine, fixed-wing aircraft and one ultralight; one additional single-engine aircraft has since located at the airport in conjunction with construction of a new hangar in late 2002). The number of based aircraft at the airport has not changed significantly since the ALP was updated in 1994. Four new hangars have been constructed since the runway was reconstructed and five older hangars located near the south end of the runway have been demolished. At least two aircraft previously based at the airport relocated to other nearby airports when the older hangars were demolished. One of these aircraft returned to the airport when the new hangar was constructed in late 2002.

It appears that current aircraft operations levels at the airport are not significantly different than when the previous ALP was completed. The most recent ODA activity count for the airport was generated in 2000 (866 operations), although the estimate has a relatively high sampling error (34.03%).

The 1994 Airport Layout Plan Report concluded that over a period of several years, the deterioration of airport facilities appeared to contribute to declining airport activity. While airfield improvements have been made, user concerns about security and the lack of available hangar space may have contributed to lower activity levels in recent years.

TABLE 2-11
HISTORICAL AVIATION ACTIVITY

Year	Based Aircraft	Aircraft Operations	Avg. Operations per Based Aircraft	Data Source
1984	12	4,200	350	OASP Estimate
1989	3	4,046	1349	OASP Estimate (Based AC) RENS Data (Operations)
1993	3	1,200 to 1,900	400 to 633	Based Aircraft Count (ALP) Operations Estimate
2000	4	866	217	RENS Data (Operations)
2003	5	--	--	Updated Based Aircraft Inventory

Forecasts

Existing forecasts of aviation activity for Chiloquin State Airport include Oregon Aviation System Plan (OASP) forecasts (1997 and 2000), Federal Aviation Administration Terminal Area Forecasts (TAF), and forecasts developed in the 1994 Airport Layout Plan. These forecasts were reviewed and compared with historical data to determine which projections may best represent future activity at Chiloquin based on current conditions. Updated forecasts of based aircraft and operations are presented at the end of the chapter (see **Table 2-14**). The forecasts extend through the end of the current twenty-year planning period (2022) and reflect current conditions and recent activity trends at Chiloquin State Airport.

OASP/TAF Forecasts

Table 2-12 summarizes the forecasts of based aircraft and aircraft operations (takeoffs and landings) developed through the OASP and TAF. These forecasts reflect relatively flat or even slightly declining growth in activity, which provides a baseline projection.

Based Aircraft

The 1997 OASP projected based aircraft at Chiloquin State Airport to increase from three to four between 1994 and 2014. The 2000 Oregon Aviation Plan projected based aircraft at Chiloquin to increase to five by the year 2018. The FAA TAF projects five based aircraft at the airport through 2015.

Aircraft Operations

The 1997 OASP projected aircraft operations at Chiloquin State Airport to increase from 1,400 to 1,750 between 1994 and 2014. The 2000 Oregon Aviation Plan forecast 1,841 aircraft operations for Chiloquin in the year 2018. The OASP split between local and itinerant traffic was 23/77 percent. The FAA TAF projects the number of aircraft operations at Chiloquin to decline slightly through 2015, although the projection remains slightly higher than the OASP forecasts.

TABLE 2-12
OASP/TAF FORECASTS

	Base Year (2002)	2004[1]	2014	2018	2022[2]
OASP FORECAST					
Based Aircraft					
Single Engine		3	4	5	6
Multi Engine		0	0	0	0
Rotor		0	0	0	0
Other		0	0	0	0
Total		3	4	5	6
Aircraft Operations					
Local		360	404	423	440
Itinerant		1,205	1,346	1,418	1,472
Total		1,565	1,750	1,841	1,912
Average Operations per Based Aircraft		*522*	*438*	*368*	*319*
FAA TAF [3]					
Aircraft Operations					
Local	339	356	438	-	-
Itinerant	2,795	2,637	1,847	-	-
Total	3,134	2,993	2,285	-	-
Based Aircraft	5	5	5	-	-
Average Operations per Based Aircraft	*627*	*599*	*457*	-	-

1. Century West Engineering Data Interpolation.
2. Century West Engineering Data Extrapolation
3. TAF Forecasts 1996-2015

1994 ALP Forecasts

The 1994 ALP forecasts included two scenarios that reflected continuation of the status quo and the improvement of facilities (see **Table 2-13**). The "airport improvement" scenario was based on short-term runway reconstruction (completed) in addition to development of new aircraft apron and a runway extension by 2002 (not completed). A change in the hangar development location may have delayed the construction of hangars due to site development issues, lack of road access, utilities, etc. The east hangar area has been improved recently (taxiway access), although electrical power and road access has not yet been extended to the area. As noted earlier, additional leases for construction of new hangars will likely result in a near-term increase of two or three aircraft over 2002 levels.

It was noted at the joint planning conference that the airport currently accommodates a variety of business related aircraft activity. This includes a King Air twin-engine turboprop operated Jeld-Wen, the community's largest employer; two business jets operated by the owners of Goose Bay Farms; fixed wing medevacs; a Cessna 310 twin-engine piston aircraft operated the Bureau of Indian Affairs; and Federal Express Cessna Caravan single-engine turboprops that occasionally divert from Klamath Falls when local fog conditions prevent landing. It appears that this segment of activity could be expected to increase as ongoing local economic development activities continue. Local pilots that attended the joint planning conference also indicated that availability of FBO services and fuel would increase operations levels at the airport.

Preferred Forecast

For the purposes of updating the activity forecasts, the 1994 ALP forecasts (modified) provide a reasonable growth projection for use as the preferred forecast. The OASP/TAF forecasts, described earlier, provide a baseline projection. Two specific adjustments were made to the 1994 ALP forecasts to provide the basis for a long-term projection.

For based aircraft, a mid-range projection was developed between the two previous ALP scenarios to reflect a slightly more moderate expectation for growth. This projection reflects the airport's potential for attracting more aircraft as facility improvements continue to be made (i.e. hangars, aircraft parking, security, etc.). The second adjustment is related to the aircraft utilization ratios used in the 1994 forecasts. The "no improvement" scenario used an average of 400 annual operations per based aircraft and the "airport improvement" scenario used a ratio of 636 operations per based aircraft. It appears that based on the number of local aircraft and typical itinerant activity levels, the lower activity ratio (400 ops) is more consistent with current use.

By incorporating these two adjustments, a new forecast was developed that provides an intermediate projection based on the 1994 ALP forecasts. The updated forecast of based aircraft represents an intermediate projection (based on the forecast years 1995 through 2010), which is extended to 2022 using approximately the same rate of increase. The updated forecast of aircraft operations was generated by applying the modified utilization ratio (400 operations per based aircraft) to the updated based aircraft projection. The preferred activity forecasts are summarized in **Table 2-13** and **Table 2-14**.

TABLE 2-13
1994 ALP FORECASTS & MODIFIED 2002 FORECASTS

	Previous Existing (1993)	1995	2000	2005	2010	2015	2022
Airport Improvement Scenario							
Based Aircraft	3	7	9	11	15		
Annual Operations	1,900	4,460	5,730	7,000	9,550		
No Improvement Scenario							
Based Aircraft	3	4	4	4	4		
Annual Operations	1,200*	1,600	1,600	1,600	1,600		
Modified Intermediate Projection (2002 Preferred Forecast)							
Based Aircraft			4	7	8	10	12
Annual Operations			866	2,800	3,200	4,000	4,800
Operations Per Based Aircraft			210	400	400	400	400

Airfield Capacity

Airfield capacity for a single runway without a parallel taxiway ranges from 30 to 60 operations per hour in VFR conditions. Runway capacity at Chiloquin is considered to be adequate through the planning period, with both current runway configuration and with a parallel taxiway. The addition of a parallel taxiway would increase hourly capacity to approximately 70 to 85 operations.

TABLE 2-14
FORECAST SUMMARY
(PREFERRED FORECAST)

	Base Year (2002)	2005	2010	2015	2022
Based Aircraft					
Single Engine	3	6	7	8	9
Multi Engine	0	0	0	0	1
Rotor	0	0	0	0	0
Other	1	1	1	2	2
Total	4	7	8	10	12
Aircraft Operations					
Local	200	640	740	920	1,100
Itinerant	666	2,160	2,460	3,080	3,700
Total	866	2,800	3,200	4,000	4,800
Average Operations per Based Aircraft	*210*	*400*	*400*	*400*	*400*

CHAPTER THREE

AIRPORT FACILITY REQUIREMENTS

INTRODUCTION

This chapter uses the results of the inventory and forecasts conducted in **Chapter Two** and established planning criteria to determine the airport's airside and landside facility requirements through the twenty-year planning period. Airside facilities include runways, taxiways, navigational aids and lighting systems. Landside items include hangars, fixed base operator (FBO) facilities, aircraft parking apron, aircraft fuel storage and dispensing facilities, automobile parking, utilities and surface access.

The facility requirements evaluation is used to identify the adequacy or inadequacy of existing facilities and identify what new facilities may be needed during the current twenty-year planning period. Options for providing these facilities will be evaluated in **Chapter Four** to determine the most cost effective and efficient means for implementation.

As noted in the previous chapter, activity at Chiloquin State Airport is low and has remained relatively steady since the runway was reconstructed in 1995. The number of based aircraft has generally fluctuated between three and four, and aircraft operations have ranged from approximately 1,000 to 4,000 since the late 1980s. The most recent ODA activity count for the airport was generated in 2000 (866 operations). The updated forecasts of aviation activity projects an increase in based aircraft from 4 to 12 over the next twenty years (+8 aircraft) with an operations forecast to increase to approximately 4,800 operations during the same period.

The aircraft currently based at the airport are stored in hangars and ODA has signed leases for construction of additional hangars, which may raise the number of based aircraft to six or seven over the next 12 to 18 months. Based on the relatively modest growth projections for the airport, the majority of facility requirements will be associated with maintaining current facilities and overall capabilities. Despite the modest projections of growth, it is difficult to predict how quickly demand for facilities can change. For this reason, basic facility improvements (aircraft parking, hangar areas, fuel storage, etc.) will be incorporated into alternatives that are able to meet projected long-term demand while providing adequate reserve areas to accommodate unanticipated demand.

AIRPORT PLANNING OVERVIEW

Runway 17/35 was reconstructed in 1995 based on Airplane Design Group I (ADG I) standards.[5] No significant changes in the type of aircraft using the airport have occurred since the last ALP update was completed. The 1994 Airport Layout Plan (ALP)[6] was subsequently updated in 2001 by ODA to reflect several changes in the layout of facilities on the east side of the runway.[7]

A review of the 1994 Airport Layout Plan (ALP) recommendations and current FAA design standards identifies some minor changes affecting the planning criteria previously used at Chiloquin State Airport. The 1994 ALP recommended design standards based on Airplane Design Group (ADG) I and Aircraft Approach Category B (B-I). The design aircraft were identified as light twin (existing) and turboprop (future) aircraft, both of which typically weigh less than 12,500 pounds. Runway 17/35 was planned as a utility (visual) runway, which would also support development of a nonprecision instrument approach with visual final approach segments. The existing and future runway protection zone dimensions were 250 x 450 x 1000 feet.

According to current FAA planning guidelines "the RPZ dimension for a particular runway end is a function of the type of aircraft and approach visibility minimum associated with that runway end." Based on current FAA standards, the previously recommended RPZ dimensions are now recommended for "Facilities Expected to Serve Small Aircraft Exclusively." Under the FAA's airport planning guidelines a "small airplane" is defined as "an airplane of 12,500 pounds or less maximum certificated takeoff weight." Under Part 77, utility runways are "constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less."

At both its current length and the previously recommended future length of 4,400 feet, Runway 17/35 is able to accommodate a relatively low percentage of the small aircraft fleet, as defined by the FAA's runway length model (see Airside Requirements section for detailed discussion

[5] See Page 3-6 for a detailed description of FAA airport planning/design criteria
[6] Chiloquin State Airport – Airport Layout Plan, Devco Engineering (5/94)
[7] For consistency purposes, the Airport Layout Plan will be referred to as "the 1994 ALP" since subsequent revisions have not been submitted to, or approved by the FAA.

regarding runway length requirements). Considering the airport's physical site limitations and the anticipated use of the runway, a change in design category to ADG I (small) appears to be warranted. ADG I (small) differs from ADG I in a few areas including object free area, aircraft parking line, and parallel taxiway separation dimensions.

Based on past planning recommendations and the potential for unexpected shifts in activity it may be prudent to preserve the option of a future upgrade to full ADG I standards by maintaining existing development setbacks (reflected by the previous 225-foot parallel taxiway separation). A decision regarding the appropriate parallel taxiway separation (150 or 225 feet) can be made based on the conditions in effect at the time the project is programmed for design/construction. If the 150-foot parallel taxiway separation is maintained, future ALP updates can adjust the location of aircraft parking lines and building restriction lines, if desired.

LAND UTILIZATION

The total airport land area consists of 114 acres, which includes the runway-taxiway system, airside protected areas, and landside areas on the east and west sides of the runway. **Table 3-1** summarizes existing airport land uses based on current and previously planned airfield configurations.

In its current configuration, the runway and most required clear areas associated with the airside facilities are contained within airport property. The runway protection zones (RPZ) for both runway ends extend beyond airport property and have public highways located within their boundaries. The airside areas of the airport account for approximately 67 acres. This area is adequate to accommodate construction of parallel taxiway(s) on the existing runway. However, it appears that the future (4,400-foot) runway configuration depicted on the 1994 ALP, which includes runway extensions at both ends of the runway, would require small areas of property acquisition or easements to accommodate facilities and required clear areas. A review of previous recommendations for property acquisition or easements will be completed based on the configuration of facilities depicted on the updated airport layout plan.

The landside areas of the airport consist of approximately 47 acres, of which less than 5 acres is currently developed or otherwise protected (utility easements, protected cultural site, etc.). Approximately 90 percent of the existing landside area is available for development, which appears adequate to accommodate facility demand through the current planning period and well beyond.

TABLE 3-1
AIRPORT LAND USE CONFIGURATION
CHILOQUIN STATE AIRPORT

Existing Land Use	Acreage	Percentage of Total Airport Property
Airside *(Developed or Reserved)* Runway, Parallel Taxiway Reserve, Runway Protection Zones, Object Free Area, Runway Safety Area, Obstacle Free Zone, Primary Surface.	67	59%
East Landside *(Developed or Reserved)* Aircraft Apron, Hangars, Vehicle Parking, Access Roads, Undeveloped Land.	19	17%
West Landside *(Developed or Reserved)* Aircraft Apron, Hangars, Vehicle Parking, Access Roads, Undeveloped Land.	28	24%
Total	**114**[1]	**100%**

1. Rounded from 114.4 acres, ALP drawing.

AIRSPACE

The airspace surfaces depicted on the 1994 Airspace Plan[8] were based on utility runways and visual approaches. The airport is located in a valley with rising terrain in all directions. Several areas of terrain penetration to the airspace surfaces were depicted on the 1994 plan including large areas located in the horizontal and conical surfaces west of the runway. Additional conical surface penetrations are located southeast and northwest of the runway and at the outer end of the Runway 17 approach surface. The 1994 Airspace Plan also identified 39 specific airspace obstructions based on the existing[9] runway dimension (3,735 feet long).

Obstruction information related to the proposed ultimate runway (4,400 feet) was not provided, although the FAR Part 77 airspace surfaces (plan view only) reflect the ultimate runway dimension. Of the listed obstructions, the plan recommended that 31 obstructions be removed and 8 be lowered and lighted. The airspace plan was completed prior to the reconstruction of the runway in 1995 and it is believed that some obstruction removal was conducted as part of that project. The current status of the obstruction removal plan will be reviewed with ODA staff.

[8] Chiloquin State Airport – Airport Airspace Plan, Devco Engineering (5/94)
[9] Runway length presented as "existing" based on planned reconstruction in 1995; actual length after reconstruction was 3,750 feet.

The airspace features described in Chapter Two (IFR airways, military training routes, etc.) do not affect local airport operation. The airspace structure surrounding Chiloquin State Airport is uncomplicated and is not expected to constrain future airport development or operation.

INSTRUMENT APPROACH CAPABILITIES

Chiloquin State Airport does not currently have a published instrument approach procedure (IAP). Recent changes in FAA standards for establishing instrument approaches at small airports now require that straight-in approach procedures be developed in order to obtain authorization for nighttime use. As noted earlier, previous airfield/airspace planning for Chiloquin has been based on visual approach surfaces, as defined by FAR Part 77. However, a non-precision instrument approach with a circle-to-land procedure for daytime use only can be developed at Chiloquin based on the existing runway and airspace configuration.

The option of upgrading the airspace to accommodate a straight-in approach on Runway 17/35 would require significant changes in the airfield development configuration and airspace. Chief among these changes would be a requirement to double the width of the runway primary surface (clear area surrounding the runway) to 500 feet. This would also require that the existing building restriction line (BRL) (currently 262.5 feet from runway centerline) be relocated to a distance of 376 feet from runway centerline to provide adequate obstruction clearance for the relocated runway transitional surface. It appears that some of the existing hangars would obstruct the reconfigured airspace and would require obstruction lighting; no new hangars would be permitted inside the relocated BRL. The developable east-side area now consists of approximately 20 acres (the area from the existing BRL to the eastern airport property line). Relocating the BRL to 376 feet would reduce the available development area to around 10 acres. In addition, aircraft on parking aprons would not be permitted to penetrate the expanded airspace surfaces.

In addition to the airport site development issues described above, it appears that the high terrain located in the vicinity of the airport may significantly affect instrument approach development options and approach minimums. If strong interest exists in establishing a night-authorized approach among airport users, additional coordination would be recommended between the airport sponsor and the FAA's Flight Procedures Office in Renton to determine the feasibility of developing a straight-in procedure before major changes are implemented that would affect landside development.

Based on a consideration of potential impacts on existing landside development areas and overall airport land utilization, it is recommended that Runway 17/35 and the associated airspace surfaces continue to be planned based on visual approaches. Development of a future non-precision instrument approach that is authorized for daytime use only can be accommodated within the existing airfield development and airspace configuration.

AIRPORT DESIGN STANDARDS

The selection of the appropriate design standards for the development of airfield facilities is based primarily upon the characteristics of the aircraft that are expected to use the airport. The most critical characteristics are the approach speed and wingspan of the design aircraft anticipated for the airport. Federal Aviation Administration (FAA) **Advisory Circular (AC) 150/5300-13, Airport Design**, serves as the primary reference in planning airfield facilities. **FAR Part 77, Objects Affecting Navigable Airspace**, 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, terrain, trees, etc.) to the greatest extent possible.

FAA **Advisory Circular 150/5300-13** groups aircraft into five categories based upon their approach speed. Categories A and B include small propeller aircraft, some smaller business jet aircraft, and some larger aircraft with approach speeds of less than 121 knots. Categories C, D, and E consist of the remaining business jets as well as larger jet and propeller aircraft generally associated with commercial and military use; these aircraft have approach speeds of 121 knots or more. The advisory circular also establishes six aircraft design groups, based on the physical size (wingspan) of the aircraft. The categories range from Airplane Design Group (ADG) I, for aircraft with wingspans of less than 49 feet, to ADG VI for the largest commercial and military aircraft. A summary of typical aircraft and their respective design categories is presented in **Table 3-2.**

The 1994 Airport Layout Plan Report[10] recommended that facilities at Chiloquin be planned based on Aircraft Approach Category B and Airplane Design Group I (B-I). The airport currently accommodates predominately Approach Category A or B and Airplane Design Group I aircraft, including four based aircraft, all of which are A-I. All locally based aircraft and the majority of itinerant aircraft using the airport on a regular basis are classified as small aircraft, weighing less than 12,500 pounds.

[10] Airport Layout Plan Report for Chiloquin State Airport (SFC Engineering, October 1994).

As noted earlier, based on a review of air traffic, site considerations and prior planning recommendations, it is recommended that airport reference code (ARC) B-I (small aircraft exclusively) be selected as the appropriate planning criteria for Chiloquin State Airport. Airfield design standards for ADG I and ADG I (small aircraft exclusively) are summarized in **Table 3-3**. A summary of Chiloquin State Airport's current compliance with the design standards is presented in **Table 3-4**. A detailed description of the applicable airport design standards is presented later in this chapter.

TABLE 3-2
TYPICAL AIRCRAFT & DESIGN CATEGORIES

Aircraft	Airplane Design Group	Aircraft Approach Category	Maximum Gross Takeoff Weight (Lbs)
Piper PA-28/32 Cherokee	A	I	2,550
Cessna 182	A	I	2,950
Cessna 206	A	I	3,600
Beechcraft Bonanza A36	A	I	3,650
Cessna 210	A	I	3,850
Beechcraft Baron 55	A	I	5,300
Ayres 400 Turbo Thrush	A	I	9,300
Piper Aerostar 602P	B	I	6,000
Cessna 310	B	I	5,500
Cessna 402	B	I	6,300
Cessna 421	B	I	7,450
Cessna Citation I	B	I	11,850
Beechcraft Super King Air 200	B	II	12,500
Air Tractor 502B	A	II	9,700
Piper Malibu	A	II	4,300
Ayres 660 Turbo Thrush	A	II	12,500
Cessna Caravan 1	A	II	8,000
Beech King Air B200	B	II	12,500
Cessna Citation III	B	II	22,000
Dassault Falcon 20	B	II	28,660
Learjet 60	C	I	23,100
Canadair Challenger	C	II	45,100
Gulfstream III	C	II	69,700

Source: FAA Advisory Circular (AC) 150/5300-13; Jane's Aircraft Guide.

TABLE 3-3
AIRPORT DESIGN STANDARDS SUMMARY
(Dimensions in feet)

Standard	Existing Runway 17/35	ADG I[1] Small Aircraft Exclusively	ADG I[1] A&B Aircraft
Runway Length	3,735	4,030/5,270[2]	4,030/5,270[2]
Runway Width	60	60	60
Runway Shoulder Width	10	10	10
Runway Safety Area Width	120	120	120
Runway Safety Area Length (Beyond Rwy End)	240	240	240
Obstacle-Free Zone	250	250	250
Object Free Area Width	250	250	400
Object Free Area Length (Beyond Runway End)	240	240	240
Primary Surface Width	250	250[1]	500[1]
Primary Surface Length (Beyond Runway End)	200	200[1]	200[1]
Runway Protection Zone Length	1,000	1,000[1]	1,000[1]
Runway Protection Zone Inner Width	250	250[1]	500[1]
Runway Protection Zone Outer Width	450	450[1]	700[1]
Runway Centerline to:			
Parallel Taxiway Centerline	n/a	150	225
Aircraft Parking Area	none identified	125/194.5[3]	200/269.5[3]
Building Restriction Line	262.5 (east) / 257.5 (west)[6]	251[4]	376[4]
Taxiway Width	25/50[5]	25	25
Taxiway Shoulder Width	varies	10	10
Taxiway Safety Area Width	varies	49	49
Taxiway Object Free Area Width	varies	89	89
Taxiway Centerline to Fixed/Movable Object	varies	44.5	44.5

Notes:
1. Utility runways (Per FAR Part 77); all other dimensions reflect nonprecision runways with not lower than 3/4-statute mile approach visibility minimums (per AC 150/5300-13, Change 7). RPZ dimensions based on visual and not lower than 1-mile approach visibility minimums for “small aircraft exclusively” or “Category A & B Aircraft.”
2. Runway length required to accommodate 75 and 95 percent of General Aviation Fleet 12,500 pounds or less. 84.2 degrees F, 29-foot change in runway centerline elevation
3. Standard distance per AC150/5300-13 & distance required to accommodate a 10-foot aircraft tail height (at the APL) beneath the 7:1 Transitional Surface with an ADG I/ADG I (small) parallel taxiway object free area.
4. Distance required to accommodate an 18-foot structure (at the BRL) beneath the 7:1 Transitional Surface for runways with visual approaches or nonprecision instrument approaches with circle-to-land procedure; also protects ADG I/ ADG I (small) parallel taxiway object free area.
5. Existing width of West Taxiway and South Taxiway.
6. As depicted on ALP (Revised in 2001 by ODA)

TABLE 3-4
RUNWAY 17/35 COMPLIANCE WITH FAA DESIGN STANDARDS

Item	Airplane Design Group I (Small Aircraft Exclusively)[1]	Airplane Design Group I (A&B Aircraft)[1]
Runway Safety Area	Yes	Yes
Runway Object Free Area	Yes	Yes
Runway Obstacle Free Zone	Yes	Yes
Taxiway Safety Area	Yes[2]	Yes[2]
Taxiway Object Free Area	Yes[2]	Yes[2]
Building Restriction Line	Yes	No[3]
Aircraft Parking Line	No[4]	No[4]
Runway Protection Zones	No[5]	No[5]
Runway-Parallel Taxiway Separation	N/A Yes (Future)	N/A No (Future)[6]
Runway Width	Yes	Yes
Runway Length	No[7]	No[7]
Runway Pavement Strength	Yes	Yes
Taxiway Width	Yes[2]	Yes[2]

Notes:
1. Runway design standards for visual runways and runways with not lower than ¾-statute mile approach visibility minimums.
2. Based on existing access taxiways; new taxiways will need to be designed to meet FAA specifications.
3. Clearance required for 500-foot wide primary surface and 18-foot building under transitional surface.
4. South Apron parking area located within runway object free area, obstacle free zone, primary surface, and transitional surface.
5. Public roadways located within RPZs.
6. As depicted on 2001 ALP; however, it does appear possible to locate taxiway with standard separation.
7. Per FAA Runway Length Model – length needed to accommodate 75% of the general aviation fleet under 12,500 pounds.

<u>Airport Design Standards Note:</u>

The following airport design standards are based on visual runways and runways with not lower than ¾ statute mile visibility minimums. For defining runway protection zones (RPZ), the visibility standard is "visual and not lower than 1-mile." All references to the "standards" are based on these approach visibility assumptions, unless otherwise noted. (Per FAA Advisory Circular 150/5300-13, change 7). Existing and future Airport Design Standards are based on Airport Reference Code (ARC) B-I (small aircraft exclusively). FAR Part 77 airspace planning criteria based on "utility runways" with visual approaches. See Table 3-3 for recommended dimensions for all design standards.

Runway Safety Area (RSA)

The FAA defines runway safety area (RSA) as "A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway." RSAs are most commonly used by aircraft that inadvertently leave (or miss) the runway environment during landing or takeoff.

By FAA design standard, the RSA *"shall 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 firefighting 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 runway safety area because of their function. Objects higher than 3 inches above grade should be constructed on low impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than 3 inches. Other objects such as manholes, should be constructed at grade. In no case should their height exceed 3 inches."

The recommended transverse grade for the lateral RSA ranges between 1½ and 5 percent from runway shoulder edges. The recommended longitudinal grade for the first 200 feet of extended

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.

The RSA along the sides and beyond the ends of Runway 17/35 has been cleared and graded to meet FAA dimensional standards. The RSA appears to be free of physical obstructions and within grade standards. The runway edge lights and threshold lights are located within the RSA and should be mounted on frangible supports. Any future lighting (such as PAPI) located within the RSA will also need to meet the FAA frangibility standard.

The airport sponsor should regularly clear the RSA of brush or other debris and periodically grade and compact the RSA to maintain FAA standards.

Runway Object Free Area (OFA)

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

"The OFA clearing standard requires clearing the OFA of above ground objects protruding above the runway safety area edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the OFA. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the OFA. This includes parked airplanes and agricultural operations."

The OFA meets the ADG I (small) dimensional standards and appears to be free of physical obstructions. The airport sponsor should periodically inspect the OFA and remove any objects that protrude into the OFA.

Obstacle Free Zone (OFZ)

The OFZ is a plane of clear airspace extending upward to a height of 150 feet above runway elevation, which coincides with the FAR Part 77 horizontal surface elevation. The FAA defines the following clearing standard for the OFZ:

"The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to located in the OFZ because of their function."

The OFZ may include the runway OFZ, the inner-approach OFZ (for runways with approach lighting systems), and the inner-transitional OFZ (for runways with lower than ¾-statute mile approach visibility minimums. For Chiloquin State Airport, only the runway OFZ is required based on runway configuration and instrument approach capabilities. The FAA defines the runway OFZ as:

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

The standard OFZ for runways serving small aircraft is 250 feet wide. This dimension corresponds with visual or nonprecision instrument approaches (not lower than ¾ mile approach visibility minimums). The OFZ for Runway 17/35 appears to be free of physical obstructions and will meet the required dimensional standards.

The aircraft turnaround/holding area at the north end of the runway has an aircraft hold line located 125 feet from runway centerline, which marks the outer edge of the OFZ boundary. Approximately 50 feet of holding area is physically located outside the hold line, which allows aircraft to hold outside the OFZ. By FAA definition "the OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDS that need to be located in the OFZ because of their function."

The south exit taxiway and apron are partially located within the OFZ and therefore do not meet FAA clearance standards for aircraft parking or holding. The west aircraft apron and east hangar area developments are located outside the OFZ, although aircraft hold lines should be marked on the access taxiways (125 feet from runway centerline).

Taxiway Safety Area

The existing taxiways at Chiloquin State Airport provide access between the runway and adjacent landside facilities. These include the west taxiway serving the west apron; the east hangar taxiway; and the south taxiway serving the apron on the east side of the runway. These taxiways vary in width (20 to 50 feet) and appear to meet the dimensional standard for ADG I taxiway safety area. The taxiway safety areas should be regularly cleared of brush or other debris and periodically graded and compacted to maintain FAA standards.

Taxiway/Taxilane Object Free Area

The existing taxiways on the airport meet the dimensional standard for ADG I taxiway object free area. The configurations of any future aircraft parking apron or hangar development should reflect required taxiway OFA clearances. Fixed or moveable objects (parked aircraft, hangars, etc.) should be located at least 44.5 feet from a taxiway centerline to protect the ADG I taxiway OFA. Within an aircraft apron, the taxilane serving aircraft parking areas or hangars should have a clearance is 39.5 feet from centerline to protect the taxilane OFA.

Building Restriction Line (BRL)

The 1994 ALP depicted a 270-foot building restriction line (BRL) on the east side of the runway and a 250-foot BRL on the west side of the runway. These BRL locations were based on a planned 225-foot runway-parallel taxiway separation on the east side and no parallel taxiway on the west side of the runway. An ODA-updated ALP (2001) depicts revised BRL locations on the east (262.5 feet) and west (257.5 feet) sides of the runway. The revised 262.5-foot east BRL will not accommodate a standard ADG I parallel taxiway separation (225 feet) with taxiway object free area (44.5 feet from taxiway centerline).

The recommendation to use ADG I (small) design standards for Runway 17/35 would allow a future parallel taxiway to be located 150 feet from the runway centerline. However, as noted earlier, it may be prudent to preserve the option of meeting full ADG I standards by maintaining existing (1994) BRL locations and development setbacks. If a 150-foot parallel taxiway separation is selected, the BRL can be relocated to 251 feet from runway centerline or maintained in its current location to provide additional clearance between airside and landside facilities. If the ADG I reserve is provided, the east BRL should be located 269.5 feet from runway centerline.

Since no parallel taxiway reserve is identified on the west side of the runway, a 257.5-foot BRL is adequate to accommodate an 18-foot high structure. However, if adding a west parallel taxiway reserve is desired, the BRL would need to be relocated to at least 269.5 feet.

The BRL represents the minimum recommended development setback from the runway-taxiway system (based on a typical 18-foot high small hangar roof height). Structures with higher roof elevations will require additional setback distances to remain clear of the runway transitional surface.

It is noted that the existing BRLs depicted on the ALP are not contained entirely within airport property, particularly at the south end of the runway. Local land use authorities should ensure that any off-airport development observes appropriate height limitations (as represented by the BRL) to prevent unintended penetration of airport airspace.

Runway Protection Zones (RPZ)

The FAA provides the following definition for runway protection zones (RPZ):

"The RPZ's function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZs. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through the acquisition of property interest in the RPZ. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The RPZ begins 200 feet beyond the end of the area useable for takeoff or landing."

The 1994 ALP depicted RPZs that are consistent with visual and not lower than one-mile approach minimums for runways serving small aircraft exclusively. As noted earlier, it is recommended that the 250 x 450 x 1,000-foot RPZs be maintained for Runways 17 and 35. Portions of the RPZs for both runways extend off airport property and include public highways. The 1994 ALP identifies several proposed avigation easements for portions of the RPZs that extend beyond airport property. Any portions of the RPZs that extend beyond airport property should be controlled, either through airport ownership or avigation easement.

Aircraft Parking Line (APL)

The 1994 Airport Layout Plan does not depict aircraft parking lines (APL), although the front rows of aircraft tiedowns on the future south apron are located in line with the 270-foot east BRL. The front edge of the existing south apron is located approximately 100 feet from runway centerline, which does not meet the FAA standard for ADG I runways. The front edge of the west itinerant apron is located approximately 350 feet from runway centerline.

Aircraft parking areas may be located as close as 194.5 feet from runway centerline to remain below the transitional surface and clear of the ADG I (small) parallel taxiway OFA. When a parallel taxiway is not planned, FAA standards indicate that the APL can be located 125 feet from runway centerline. However, a 125-foot APL does not provide adequate tail height clearance for the runway transitional surface. An APL located 194.5 feet from runway centerline will accommodate parked aircraft with up to 10-foot tail heights without penetrating the transitional surface.

Runway-Parallel Taxiway Separation

Runway 17/35 is not currently served by a parallel taxiway. The 1994 ALP depicted a future full-length parallel taxiway on the east side of the runway with a separation of 225 feet. However, in a subsequent revision to the drawing, the separation of the parallel taxiway was reduced to 221.5 feet. It is not known why a deviation from FAA design standards was reflected on the modified plan. However, the recommended use of ADG I (small) design standards reduces the minimum runway-parallel taxiway separation distance to 150 feet. As noted earlier, the airport sponsor would also have the option of maintaining a greater than minimum separation (225 feet) for a future parallel taxiway, which would accommodate a potential upgrade to full ADG I standards, if needed in the future.

FAR PART 77 SURFACES

Airspace planning for U.S. airports is defined by Federal Air Regulations (FAR) Part 77 – Objects Affecting Navigable Airspace. FAR Part 77 defines the airspace surfaces to be protected surrounding airports. **Figure 3-1** illustrates plan and isometric views of the Part 77 surfaces, which are referred to as imaginary surfaces.

The 1994 Approach and Clear Zone Plan airspace surfaces are consistent with visual approach capabilities and utility runways. The airspace surfaces depicted on the drawing are based on an ultimate runway length of 4,400 feet. Terrain penetrations are identified within the airspace surfaces. **Table 3-5** summarizes FAR Part 77 standards with the corresponding runway type and approach capability.

Figure 3-1: FAR Part 77 Diagram

TABLE 3-5
FAR PART 77 AIRSPACE SURFACES
CHILOQUIN STATE AIRPORT - RUNWAY 17/35

Item	Utility (Visual)[1]
Width of Primary Surface	250 feet
Radius of Horizontal Surface	5,000 feet
Approach Surface Width at Inner Edge	250 feet
Approach Surface Width at End	1,250 feet
Approach Surface Length	5,000 feet
Approach Surface Slope	20:1
Conical Surface Width and Slope	4,000 feet / 20:1

1. Utility runways are designed for aircraft weighing 12,500 pounds or less.

Approach Surfaces

Runway approach surfaces extend outward and upward from each runway end, along the extended runway centerline. The FAR Part 77 standard slope for utility runway approach surfaces is a 20:1. The inner edge of the approach surface connects to the primary surface and extends outward 5,000 feet. For Runway 17/35, the inner width of the visual approach surface is 250 feet and the outer width is 1,250 feet.

As noted earlier, the 1994 Airspace Plan identified numerous obstructions within the approach surfaces for Runway 17/35. The obstruction chart indicated that trees would be removed and power poles would be lowered and lighted. The status of the obstruction removal plan will be verified with ODA and depicted on the updated airspace plan. Public highways cross both approach surfaces for the runway, although no obstructions are created by vehicles traveling on the roads.

Primary Surface

The primary surface is a rectangular plane of airspace, which rests on the runway (at centerline elevation) and extends 200 feet beyond the runway end. The end of the primary surface connects to the inner portion of the runway approach surface. The primary surface should be free of any penetrations, except items with locations fixed by function (i.e., VASI, runway lights, etc.).

The primary surface for Runway 17/35 has historically been maintained to meet utility/visual runway standards (250 feet wide). No obstructions to the primary surface were noted on the 1994 Airspace Plan and none appear to exist at this time.

Transitional Surface

The transitional surface is located at the outer edge of the primary surface, represented by a plane of airspace that rises perpendicularly at a slope of 7 to 1, until reaching an elevation 150 feet above runway elevation. This surface should be free of obstructions (i.e., parked aircraft, structures, trees, natural terrain, etc.). The 1994 Airspace Plan identified several trees near the southeast corner of the airport that penetrated the transitional surface. The obstruction plan indicated that the trees were to be removed, although several tall trees (in the vicinity of the airport beacon) were observed during recent site visits. Several light poles, power poles and trees were identified as transitional surface obstructions on the west side of the runway. The obstruction plan indicated that poles were to be lowered and lighted and the trees removed. The status of the obstruction removal plan will be verified with ODA and depicted on the updated airspace plan.

Horizontal Surface

The horizontal surface is a flat plane of airspace located 150 feet above the runway at an elevation of 4,373 feet mean sea level. The outer boundary of the Runway 17/35 horizontal surface is defined by two 5,000-foot radii, which extend from each runway end (the intersection point of the extended runway centerline, the outer edge of primary surface, and the inner edge of the approach surface). The outer points of the radii for each runway are connected to form an oval, which is defined as the horizontal surface. Several terrain penetrations to the horizontal surface were identified on the 1994 Airspace Plan east and west of the runway. Terrain in this area rises from about 4,400 to 4,500 feet.

Conical Surface

The conical surface is an outer band of airspace, which abuts 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 top elevation of the conical surface is 200 feet above the horizontal surface and 350 feet above airport elevation. Several areas of terrain penetration to the conical surface are identified southeast and northwest of the runway.

AIRSIDE REQUIREMENTS

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

- *Runways*
- *Taxiways*
- *Airfield Instrumentation and Lighting*

RUNWAYS

The adequacy of the existing runway system at Chiloquin State Airport was analyzed from a number of perspectives including runway orientation, airfield capacity, runway dimensions, and pavement strength.

Runway Orientation

The orientation of a runway for takeoff and landing operations is primarily a function of wind speed and direction, combined with the ability of aircraft to operate under adverse wind conditions. Runway 17/35 is oriented in a north-south direction, which generally corresponds to the terrain in the surrounding area (rising terrain is located east and west of the airport).

The maximum allowable crosswind for a runway depends on the size of aircraft, the wing configuration and the condition of the runway surface. For runway planning and design, a direct (90-degree) crosswind component is considered excessive at 12 miles per hour for smaller aircraft (gross takeoff weight 12,500 pounds or less) and 15 miles per hour for larger aircraft. FAA planning standards indicate that an airport should be planned with the capability to operate under allowable wind conditions at least 95 percent of the time. Detailed wind data for Chiloquin is available in the form of anemometer readings on the airport from June 12, 1980, through October 31, 1981. Based on these data, the wind coverage for Runway 17/35 was estimated at 99.5 percent at 12 miles per hour, which exceeds FAA standards.

Runway Dimensions

The length of Runway 17/35 is 3,735 feet. The runway was reconstructed in 1995 at approximately the same length as its previous configuration (3,733 feet). Runway 17 has a 440-foot displaced threshold for improved obstruction clearance for landing aircraft. The displaced threshold reduces runway length available for landing (on Runway 17 only) to 3,295 feet. Runway width was increased from 45 to 60 feet and the displaced threshold on Runway 17 was increased from 360 to 440 feet as part of the most recent reconstruction.

The 1994 ALP identified a future runway length of 4,400 feet, with "Stage II" runway extensions identified at both ends of the runway. This recommended length reflected the practical limitations of the existing site and was considered to be at the upper end of feasibility for the airport.

With its existing length, the runway can accommodate approximately 70 percent of the general aviation fleet under most conditions, as defined in the FAA's runway length model. At a length of 4,400 feet, the percentage would increase to approximately 80 percent. The FAA model confirms that the airfield elevation combined with moderately high summer temperatures effectively limits a 3,700 to 4,400-foot runway to use by small aircraft under the most demanding conditions.

Given the inability of the runway to accommodate a larger portion of the general aviation small aircraft fleet, providing additional runway length was considered an important improvement, as defined in the 1994 Airport Layout Plan Report. The recommendation remains valid based on current conditions and should be reflected on the updated ALP. In the event that the runway cannot be extended to the recommended 4,400 feet, a minor extension to around 4,000 feet may be more feasible and would increase the percentage of the small aircraft fleet that could be accommodated to 75 percent.

A summary of FAA-recommended runway lengths for a variety of aircraft types and load configurations is described below.

FAA Runway Lengths Recommended For Airport Design (From FAA Computer Model):

Airport Elevation: 4,217 MSL
Mean Max Temperature in Hottest Month: 84.2 F
Maximum Difference in runway centerline elevation: 29 Feet
Current Runway Length: 3,735 feet

Small Airplanes with less than 10 seats

75 percent of these airplanes 4,030 feet

95 percent of these airplanes 5,270 feet

100 percent of these airplanes 5,570 feet

Small airplanes with 10 or more seats 5,570 feet

Large Airplanes of 60,000 pounds or less

75 percent of these airplanes at 60 percent useful load 6,390 feet

75 percent of these airplanes at 90 percent useful load 8,890 feet

Airplanes of more than 60,000 pounds 6,490 feet

The existing and future width of Runway 17/35 depicted on the 1994 ALP is 60 feet, which meets the Airplane Design Group (ADG) I standard.

Airfield Pavement

Table 3-6 summarizes existing and forecast airfield pavement conditions for Chiloquin State Airport based on the most recent inspection conducted in 2000. The projected pavement condition for 2010 reflects a normal rate of deterioration that would occur if maintenance is not performed in the intervening years. According to the PCI Report, the reconstructed pavements at Chiloquin State Airport consist of a double bituminous surface treatment (BST) over two separate crushed aggregate base courses totaling 13 inches.

The 2000 Pavement Report outlined a five-year pavement maintenance and rehabilitation program, which included the following items:

- West Taxiway – Reconstruct with 2” Asphalt Concrete (AC) and 6” Crushed Aggregate
- West Apron – Reconstruct with 2” Asphalt Concrete (AC) and 6” Crushed Aggregate
- South Apron – Reconstruct with 2” Asphalt Concrete (AC) and 6” Crushed Aggregate

TABLE 3-6
SUMMARY OF AIRFIELD PAVEMENT CONDITION
(APRIL 2000)

Pavement	Existing (2000) PCI Rating[1] / Condition	Forecast (2010)[2] PCI Rating / Condition
Runway – Main Section Runway - North End and Turnaround	86 / Excellent[3] 98 / Excellent[3]	77 / Very Good 65 / Good
South Taxiway (to Old Apron)	95 / Excellent[3]	58 / Good
West Taxiway – main section West Taxiway – rwy connection	13 / Very Poor 90 / Excellent	4 / Failed 54 / Fair
East Hangar Taxiway	Not rated	Not rated
West Apron	0 / Failed[4]	0 / Failed[4]
South Apron	0 / Failed	0 / Failed

Notes:
1. The Pavement Condition Index (PCI) scale ranges from 0 to 100, with seven general condition categories ranging from "failed" to "excellent." For additional details, see *Oregon Aviation System Plan Pavement Evaluation/Maintenance Management Program for Chiloquin State Airport*.
2. Forecast PCI based on pavement deterioration models developed by MicroPAVER and present condition if no additional maintenance is performed.
3. PCI Report indicates "increase in PCI due to maintenance or rehabilitation."
4. This pavement was resurfaced after the 2000 inspections were conducted. PCI ratings have not been updated but the pavement should ratings should remain in good condition during the 20-year planning period with appropriate maintenance.

As noted above, the west apron and access taxiway were resurfaced in 2001, although it is not known if the pavements underwent full reconstruction as part of the project. The south apron located near the end of Runway 35 was recommended in the 1994 ALP to be relocated because of non-standard separation with the runway and future parallel taxiway. Reconstruction of the south apron in its current location is not recommended.

The current Airport/Facility Directory, published by NOAA, lists pavement weight bearing capacity for Runway 17/35 at 10,000 lbs. (single wheel land gear design), although the ALP lists the pavement strength at 12,500 pounds. All future improvements to the runway, taxiway and apron pavements should be based on the 12,500-pound weight bearing capacity. Existing pavement markings will require periodic repainting during the current planning period.

Airfield Capacity

The airport's annual service volume (ASV) is currently estimated at 60,000 operations. Over the course of the planning period, the ASV for Chiloquin State Airport is anticipated to remain relatively stable. The addition of a parallel taxiway would increase the ASV to approximately 95,000 operations. The projected ASV for the year 2020 is 65,000 operations, slightly above current levels. The airport is currently operating at less than 5 percent of its ASV. FAA **Order 5090.3B**, **Field Formulation of the National Airport Systems**, indicates that improvements should be considered when operations reach 60 percent of annual capacity.

Hourly capacity for Runway 17/35 without a parallel taxiway ranges from 30 to 60 operations per hour. The turnarounds and exit taxiways (to west apron and east hangar area) on Runway 17/35 provide aircraft opportunities to exit the runway environment to facilitate aircraft movement. Adding a full-length or partial-length parallel taxiway will increase runway capacity by eliminating back-taxiing for aircraft. However, based on forecast operations, the runway will continue to operate below capacity during the twenty-year planning period and beyond with the existing runway-taxiway configuration.

Taxiways

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between apron and runways, while other taxiways become necessary as activity increases and safer and more efficient use of the airfield is needed.

Runway 17/35 is not served by a parallel taxiway and taxiway access is not provided to the north end of the runway. The runway has three eastside and one west-side exit taxiways or turnarounds that enable aircraft to maneuver on and off the runway. The south taxiway serves the former apron and hangar area; the mid-field taxiway is used to access to the new hangar area, and the north holding area is used for aircraft turnaround. A west taxiway is located approximately 1,400 feet south of the end of Runway 17 and serves the itinerant parking apron.

A future east-side parallel taxiway is depicted on the 1994 Airport Layout Plan with a runway separation of 225 feet. Based on the recommendation to use ADG I (small) design standards, the taxiway separation may be reduced to 150 feet.

Airfield Instrumentation and Lighting

Runway 17/35 has medium-intensity runway edge lighting (MIRL). The MIRL system was installed new as part of the runway reconstruction project in 1995. The airport beacon is located on the east side of the runway, adjacent to the former hangar area (south end of the runway).

Runways 17 and 35 are not equipped with visual guidance indicators (VGI). The 1994 ALP recommended Precision Approach Path Indicators (PAPI) for both runway ends. The PAPI is the primary visual guidance system used at general aviation airports. Edge reflectors should be maintained on all taxiways and aircraft turnarounds for safety.

Overhead lighting should be provided in aircraft hangar and aircraft parking areas to improve airport security. The existing aircraft hangar area is not currently served with electrical power.

On-Field Weather Data

Weather data is not available at the airport. Adding an on-site automated weather observation system (AWOS) or automated surface observing system (ASOS) has not been identified as a high priority need.

LANDSIDE FACILITIES

The purpose of this section is to determine the space requirements during the planning period for the following types of facilities normally associated with general aviation operations areas:

- *Hangars*
- *Aircraft Parking and Tiedown Apron*
- *Agricultural Aircraft Facilities*

Hangars

Chiloquin State Airport currently has four conventional hangars that house all of the airport's based aircraft. A lease for construction of one additional hangar has also been signed. It is expected that the current level of hangar utilization will remain high during the planning period. For facility planning purposes, it is assumed that 90 percent of future based aircraft will be stored in hangars and 10 percent will be parked on an apron. A planning standard of 1,500 square feet per based aircraft stored in hangars is used to project gross space requirements for single engine aircraft. For the purposes of projecting gross hangar requirements, it is assumed that all existing hangars are utilized and will not be available to accommodate future demand.

Projections of hangar needs for Chiloquin State Airport are presented in **Table 3-8.** Individual aircraft owners needs vary and demand can be influenced by a wide range of factors beyond the control of an airport. For this reason, it is recommended that an additional hangar development reserve be identified to accommodate any unanticipated demand. Reserves should be established to accommodate a combination of conventional hangars and T-hangars.

Aircraft Parking and Tiedown Apron

An aircraft parking apron is provided for locally based aircraft that are not stored in hangars and for transient aircraft visiting the airport. Currently, with all locally based aircraft stored in hangars, the aircraft aprons are used primarily by itinerant aircraft. The south apron located near the end of Runway 35 is located too close to the runway to meet FAA separation standards. The 1994 ALP recommended developing a replacement apron on the east side of the runway. A modified landside configuration was added to the 2001 ALP revision, which locates a future apron near the south end of the runway on its east side. Minor expansion of the west itinerant apron was also recommended in the 1994 ALP update. A review of potential apron locations and configurations will be included in the alternatives evaluation contained in **Chapter Four**.

The south and west aprons have parking capacity for about four to six small aircraft each. For the purposes of estimating apron requirements, the south apron positions will not be included in the existing count due to conflicts with FAA design standards.

The approach for estimating demand for itinerant parking spaces at Chiloquin reflects moderate demands typically associated with itinerant activity. The forecasts of parking demand are based on a percentage of busy day itinerant operations during the peak month. For Chiloquin, peak month is estimated to equal 15 percent of annual operations. Busy day activity is estimated to account for 20 percent of the operations that occur during average week in the peak month. It was estimated that 40 percent of the airport's busy day operations were associated with itinerant aircraft. One-half of that total equals the number of itinerant aircraft on the airport during the busy day. Due to the relatively low numbers involved and potential for weather-related peaks (i.e. fog at Klamath Falls, etc.), the number of itinerant aircraft at the airport during the busy day will be used to define peak apron requirements.

This peak demand translates into four to seven itinerant parking spaces through the current planning period. Based on this analysis, the existing tiedown spaces located on the west side of the runway would be able to accommodate forecast itinerant parking demand during the early part of the planning period. However, due to concerns about the security of unattended aircraft, the west apron is used on a limited basis for overnight parking and has not been used in the past by local pilots. Development of a new apron on the east side of the runway would accommodate local and itinerant aircraft with more convenient access to the community and potential on-airport facilities or services such as fuel.

The FAA planning criterion of 360 square yards per itinerant aircraft was applied to the number itinerant spaces to determine future itinerant ramp requirements. Locally based aircraft tiedowns are planned at 300 square yards per position. The aircraft parking area requirements are summarized in **Table 3-7.** A portion of the aircraft apron could also accommodate the periodic parking and passenger loading needs of larger fixed wing business or medevac aircraft.

TABLE 3-7
APRON AND HANGAR
FACILITY REQUIREMENTS SUMMARY

Item	Base Year (2002)	2005	2010	2015	2022
Demand					
Based Aircraft	4	7	8	10	12
Itinerant GA Peak Day Aircraft	2	4	5	6	7
Existing Facilities					
Light Aircraft Tiedowns	4-6				
Existing Hangar Spaces	3 hangars 5 spaces / 6,000 sf (est.)				
Total Apron Area	1,550 sy				
Projected Needs					
Itinerant Aircraft Parking (@ 360 sy each)		4 spaces / 1,440 sy	5 spaces / 1,800 sy	6 spaces / 2,160 sy	7 spaces / 2,520 sy
Locally-Based Tiedown Needs (@ 300 sy each)		1 spaces / 300 sy	1 space / 300 sy	1 space / 300 sy	1 space / 300 sy
Total Apron Needs		5 spaces / 1,740 sy	7 spaces / 2,100 sy	7 spaces / 2,460 sy	8 spaces / 2,820 sy
Hangar Spaces (@ 1,500 sf per space)		6 spaces / 9,000 sf	7 spaces / 10,500 sf	9 spaces / 13,500 sf	11 spaces / 16,500 sf

Demand for aircraft parking could also exceed the modest projections developed for the airport. Apron development reserves should be identified to accommodate any unanticipated needs, and the needs beyond the current planning period. An aircraft fuel storage reserve should also be located near the aircraft parking apron to accommodate future demand for aviation fueling.

Agricultural Aircraft Facilities

Chiloquin State Airport does not have a designated agricultural apron or operations area, nor does the airport accommodate regular aerial applicator activity. As such, no apparent demand exists to develop an agricultural aircraft loading facility. If demand does occur in the future, the airport has ample space available adjacent to the apron and hangar area to accommodate a loading pad.

Surface Access Requirements

The airport does not have designated automobile parking areas, although areas adjacent to the south apron and the aircraft hangars have typically been used for vehicle parking. Vehicle access to the airport apron is provided by Highway 97 (for the west apron) and State Highway 422 for east side facilities. The existing airport access road enters the airport near the south end and serves the south apron and east hangar area. The adjacent rodeo grounds are accessed from this road connection to Highway 422. The airport access road was reconstructed in 2003 to provide improved access to east-side facilities.

Applegate Street is an unimproved road that ends near the east airport property line and hangar area. The City of Chiloquin plans to improve Applegate Street to serve adjacent industrial property and it is possible that the road could also provide public access to the east side of the airport.

As noted earlier, unauthorized access on the airfield has created concern about airport safety and security. The existing south access road should be maintained for emergency or maintenance use (gated and locked to prevent unauthorized entry into the airport).

Vehicle parking should be developed adjacent to aircraft hangars and aircraft parking areas.

SUPPORT FACILITIES

Aviation Fuel Storage

Aviation fuel is not available for public sale at Chiloquin State Airport. The potential demand for aviation fuel at Chiloquin cannot be accurately predicted based on current/historic low activity levels. However, for planning purposes, a fuel storage development reserve capable of accommodating one or two small (6,000 to 9,000-gallon) aboveground fuel tanks should be identified adjacent to the aircraft parking apron.

Airport Utilities

Electrical power to the airport is provided by Pacific Power & Light, although electrical service is not provided to the hangar area. Water and sewer in the vicinity of the airport are provided by individual wells and septic systems. Services such as restrooms and phone are not currently provided. Extending electrical service to the east side hangar and apron areas is recommended to provide interior/exterior lighting and heat the structures. New airfield electrical requirements include providing power to the PAPIs and lighted wind socks at each runway end.

Security

Limited wire fencing is located along Highway 97 and various other locations along the airport boundary. As noted earlier, airport users have indicated that significant security problems exist due to uncontrolled unauthorized access on the airfield. Local pilots also report that vandalism to aircraft has occurred in the past. Installing fencing with vehicle gates and overhead lighting at all access points to the airport is recommended to improve existing security capabilities. It would also be desirable to increase the level of local police presence to discourage unauthorized access on the airport.

FACILITY REQUIREMENTS SUMMARY

The facility requirements for Chiloquin State Airport are largely related to maintaining existing airfield capabilities through preservation and modernization. The redevelopment of the airport that began with reconstruction of the runway in 1995 will continue with replacement of the aircraft parking apron and access road improvements. The addition of fencing (airport perimeter and adjacent to operations areas) and vehicle gates is considered to be a high priority improvement for the airport. The demand for new aircraft hangars will be market driven and can be accommodated within existing and planned hangar development areas. Development of an east side parallel taxiway is recommended to reduce runway aircraft back-taxiing on the runway.

The projected facility requirements summarized in **Table 3-8** are based on the forecasts of aviation activity contained in **Chapter Two**. These projections reflect nominal growth that results in modest facility demands beyond existing capabilities. The basic airfield facilities have the ability to accommodate a significant increase in activity, without requiring major facility upgrades or expansion. As noted before, the use of development reserves is recommended to accommodate unforeseen changes in facility demand, particularly hangars and aircraft parking. The next step in the planning process is to analyze alternatives that can accommodate these requirements.

TABLE 3-8
FACILITY REQUIREMENTS SUMMARY

Item	Short Term	Long Term
Runway	Pavement Maintenance Slurry Seal North End Obstruction Removal & Grading	Pavement Maintenance Slurry Seals (3 to 5 year intervals) Runway Extension
Taxiways	Pavement Maintenance Slurry Seal	Pavement Maintenance Slurry Seals (3 to 5 year intervals) Taxiways to New Hangars East Parallel Taxiway Aircraft Holding Area (Rwy 35)
Aircraft Aprons	Relocated Apron (New)	Pavement Maintenance Slurry Seals (3 to 5 year intervals) Apron Expansion Reserve
Hangars	T-Hangar and Conventional Hangar Development (Private Development)	Development Reserve
Navigational Aids and Lighting	PAPI (Rwy 17 & 35) Taxiway Edge Reflectors	GPS Instrument Approach (daytime only) Flood Lighting (a/c parking & hangar areas)
Fuel Storage	Fuel Storage Reserve	Same
Utilities	Extend Water & Electrical Service to Apron/Hangars	Same
Roadways	None	Internal Access to New Development Areas (Optional Connection to Applegate Street

		on East Side of Airport)
Security	Fencing and Gates at All Access Points	Additional Flood Lighting Airport Perimeter Fencing

CHAPTER FOUR
AIRPORT DEVELOPMENT ALTERNATIVES AND AIRPORT LAYOUT PLANS

OVERVIEW

Preliminary development alternative concepts were developed to evaluate options for developing new airport facilities at Chiloquin State Airport. As noted in the forecasts, demand for hangars, aircraft parking and associated facilities at the airport within the current 20-year planning period is expected to be modest. However, providing development reserves capable of accommodating roughly double the 20-year forecast demand is recommended to accommodate any unexpected surge in demand and to protect the long term viability of the airport site.

The proposed development is concentrated on the east side of the runway in each of the alternatives. This approach seems to be generally agreeable to local users and is consistent with past plans. All three conceptual alternatives include an east-side parallel taxiway. Future runway extensions (as planned in 1994) would be retained as long-term projects. Each of the alternatives described below are depicted in figures at the end of this section.

ALTERNATIVE I

"Alternative I" locates new hangar rows immediately south of the existing row, near mid-field. This development area identified is capable of accommodating significantly more demand than is presently forecast. The proposed development is configured for individual conventional hangars, but the concept could also include T-hangars with only minor reconfiguration of taxiway location and/or configuration required. In this alternative, vehicle access to the hangar area is provided via Applegate Street, which would require improvement and extension to the airport; however, the existing south airport access road could also be extended within the airport to provide vehicle access to the hangar area and apron.

A new apron area, with an FBO development reserve, auto parking, and fuel storage reserve is located near the existing south apron. As noted earlier, the existing apron is located too close to the runway to meet FAA design standards and obstruction clearances. This apron will be removed and replaced with a new aircraft apron located to meet all FAA requirements. Lease areas would be available behind the apron for large hangars related to aircraft maintenance, FBO, local business tenants, etc. The existing airport access road would be retained.

The basic concept of this alternative is to develop facilities from the existing hangar row south toward the new apron. Although this option creates a split development between the hangar and apron areas (due to the cultural resource site), the south area would probably be easier to develop for apron based on its current site conditions, access, and utilities. Incremental southward development of individual hangar rows should also be relatively economical.

ALTERNATIVE II

"Alternative II" also locates new hangar rows immediately south of the existing hangars, near mid-field in the same configuration as Alternative I. However, in this concept, the new apron area, FBO, auto parking, and fuel storage reserves are located immediately north of the existing hangar row. This option consolidates all east landside facilities into a single area and public vehicle access would be limited to Applegate Street. The existing south airport access road would be closed to regular use (locked gate). ODOT maintenance crews would continue to access to this area for routine maintenance and to load water from the well. Securing the south end of the airport with fencing and a locked gate should reduce unauthorized access on the airfield, which is currently unchecked.

ALTERNATIVE III

"Alternative III" is a reversed view of Alternative II, with new hangar rows located immediately north of the existing row, near mid-field. The new aircraft apron, FBO reserve, auto parking, and fuel storage reserves are located immediately south of the existing hangar row. This option also consolidates all east landside facilities into a single area and vehicle access would be provided via Applegate Street; the option of extending the existing access road from the south end of the airport is also available. The primary considerations related to this configuration include site development costs, staging of development, anticipated demand for hangars versus apron, utility extension costs, etc.

ALTERNATIVE IV (MODIFIED BRL)

This concept illustrates the reduction in developable landside area that would be required to accommodate a day/night instrument approach. The configuration of landside facilities in this option is most comparable to Alternative I, although due to increased setbacks within the landside area, the aircraft parking apron would also need to be narrowed by approximately 50 feet to accommodate a relocated aircraft parking line (to accommodate aircraft with 10-foot tail heights).

Each of the previous three concepts were based on a building restriction line (BRL) for utility runways with visual approaches. If a day/night non-precision instrument approach is desired, the runway primary surface would need to be widened to 500 feet (250 feet each side of runway centerline) and the BRL would be relocated to 376 feet from runway centerline to accommodate a typical small hangar with a 20-foot roof height. As shown on the figure, the inner ends of the hangar rows would need to set back further (behind the BRL) and the number of buildings per row would be reduced. Due to the narrow depth of developable land east of the 376-foot BRL and the close proximity to cultural resource no development site on the airport, it appears that long-term hangar development capacity would be limited without acquisition of additional property along the eastern edge of the airport.

This evaluation suggests that the decision regarding the desired future instrument approach capabilities for this airport will directly affect the landside development options. As noted in the facility requirements chapter, a daytime only non-precision approach can be developed at Chiloquin (assuming overall feasibility based on surrounding terrain) based on the existing airspace and configuration of airport developments. Although a daytime only approach does not provide the highest level of capability, it does provide instrument capabilities without significantly reducing the landside development potential of the airport.

Figure 4-1: Alternative I

Figure 4-2: Alternative II

Figure 4-3: Alternative III

Figure 4-4: Alternative IV

PREFERRED ALTERNATIVE

Based on input provided by airport users at a public meeting held in December 2002, and through subsequent review and comment provided by the airport sponsor, a preferred alternative was developed for Chiloquin State Airport that reflected the best combination of development elements and operational considerations. The preferred alternative is a modified version of Alternative III, which extends new hangar rows to the north of the existing rows and develops a new aircraft apron to south of the existing hangar rows. The preferred alternative is depicted on the airport layout plan drawing, located at the end of this chapter.

Other refinements reflected in the preferred alternative include an extension of the existing airport access road from the south end of the airport northward, to serve the existing and future landside development areas. Secondary vehicle access via Applegate Street remains an option, although this potential access point will be gated as part of the fencing plan for the airport. Additional lease area for hangar construction will be located between the future east-side parallel taxiway and the airport access road, near the south end of the runway.

The planned apron area has space to accommodate two phases of development for hangars and aircraft parking, which exceeds long-term demand projections. Due to the limited amount of direct apron frontage behind the apron, these hangar development areas should be reserved for commercial related hangars (FBO, maintenance shops, etc.); hangars used primarily for aircraft storage should be developed in the other designated hangar areas to ensure the best use of available space.

AIRPORT LAYOUT PLAN DRAWINGS

The evaluation of options for the long-term development of Chiloquin State Airport was described in the previous section. This evaluation resulted in the selection of a preferred alternative, which has been incorporated into the draft airport layout plan. The set of airport plans, which is referred to in aggregate as the “Airport Layout Plan” (ALP) has been prepared in accordance with FAA guidelines. The drawings illustrate existing conditions, recommended changes in airfield facilities, existing and recommended property ownership, land use, and obstruction removal.

The ALP set is presented at the end of this chapter:

- *Drawing 1– Airport Layout Plan*
- *Drawing 2a– FAR Part 77 Airspace Plan*
- *Drawing 2b–Runway Surface Approach Plan and Profile*
- *Drawing 3– Airport Land Use Plan with 2005 Noise Contours*

Airport Layout Plan

The Airport Layout Plan (ALP) presents the existing and ultimate airport layout and depicts the improvements that will enable the airport to meet forecast aviation demand. Detailed airport and runway data tables, a list of existing/future buildings and a wind rose are provided to facilitate the interpretation of the planning recommendations.

The improvements depicted on the ALP reflect all major airfield developments recommended in the twenty-year planning period. Decisions made by the airport sponsor regarding the actual scheduling of projects will be based on specific demand and the availability of funding. Long-term development reserves are also identified on the ALP to accommodate potential demand that could exceed current expectations or could occur beyond the current twenty-year planning period. The major improvements depicted on the ALP are summarized below:

- The ALP depicts Runway 17/35 with ultimate length of 4,400 feet, with future extensions shown at both ends of the runway. A full-length parallel taxiway is depicted on the east side of Runway 17/35 with an ADG I runway centerline separation of 225 feet. The airport sponsor may opt to reduce this separation to 150 feet based on the ADG I (small aircraft exclusively) design standards recommended for the airport, although the increased separation maintains the option of future upgrade to ADG I (all aircraft) without having to relocate the parallel taxiway at a future date.

- The existing (south) apron will be removed and replaced with a new apron located adjacent (south) to the existing hangar rows. The location of the existing south apron is not compatible with FAA airfield design standards and it also needs to be removed to accommodate a future east-side parallel taxiway. The new aircraft apron is configured to be developed in phases, which can be adjusted based on actual demand levels.

- The ALP depicts future hangar development in three areas on the east side of the runway: the existing hangar area is expanded northward (with additional hangar taxilanes) to accommodate a combination of small/medium conventional hangars and T-hangars; a separate hangar development area is located adjacent to the future parallel taxiway near the end of Runway 35 that will accommodate small/medium conventional hangars only; a development area for medium/large conventional hangars, typically associated with commercial activities is located along the east side of the future apron.

- The building restriction line (BRL) for Runway 17/35 is located 269.5 feet from runway centerline. This dimension will accommodate buildings with roof heights of 20 feet without penetrating the runway transitional surface and will be clear of the ADG I taxiway object free area. Larger hangars with higher roof elevations will need to be sited to avoid penetrations to the transitional surface.

- The area located east of the future apron will accommodate a variety of conventional hangars and associated facilities that may be associated with aviation-related business or government activities (aerial application, natural resource management, aircraft services, fixed base operator, etc). Vehicle parking may be developed in this area as an interim use until other landside facilities needs occur.

- Precision approach path indicators (PAPI) are recommended for both runway ends.

- Lighted wind cones are recommended at both ends of the runway.

- Areas of property acquisition are identified along the northeast and southeast corners of the airport. Acquisition of the northeast area (approximately 3.7 acres) would preserve the airport's long-term ability to continue extending landside developments toward the north end of the runway. The current NW-SE angle of the property line significantly narrows the developable area of the airport. The north end of the property acquisition would is required to control the existing/future runway protection zones and to allow obstruction removal and terrain leveling beyond the north end of the runway. The property acquisition located at the southeast corner of the airport involves city owned land that is directly adjacent to the runway and future parallel taxiway. Acquisition of this property is recommended to ensure long-term land use compatibility and to protect the airspace surrounding the runway from potential obstructions.

Projects such as maintenance or reconstruction of airfield pavements, which are not depicted on the ALP, are described in the Capital Improvements Program, in **Chapter Five**.

FAR Part 77 Airspace Plan

The FAR Part 77 Airspace Plan for Chiloquin State Airport was developed based on Federal Aviation Regulations (FAR) **Part 77, Objects Affecting Navigable Airspace**. The Airspace Plan provides the plan view of the airspace surfaces, profile views of the runway approach surfaces, and a detailed plan view of the runway approach surfaces. This information is intended to define and protect the airspace surfaces from encroachment due to incompatible land uses, which could adversely affect safe airport operations. By comparing the elevations of the airspace surfaces with the surrounding terrain, an evaluation of potential obstructions to navigable airspace was conducted.

The airspace surfaces depicted for Chiloquin State Airport reflect the ALP-recommended runway length of 4,400 feet. The runway is designed for use by small aircraft (weighing 12,500 pounds or less), which places it in the “utility” category under FAR Part 77. The airspace reflects the existing and planned visual approach capabilities for the airport. The future development of a daytime only non-precision instrument approach would also correspond to this airspace configuration.

The airspace surfaces for Chiloquin State Airport have areas of terrain penetration located immediately west of the runway (Steiger Butte) in the horizontal and conical surfaces; additional areas of terrain penetrate the conical surface east and southeast of the runway. A small area of terrain penetration is also located approximately 2,000 feet east of the north end of the runway.

The drawing includes a table listing trees, light poles and power poles previously identified as obstructions. No record of obstruction removal has been provided to indicate that these obstructions have been removed. The status of the noted obstructions should be reviewed by the airport sponsor, and if necessary an updated obstruction survey should be completed.

Runway Approach Surface Plan & Profile

This drawing provides additional plan and profile views for the runway and the approaches. The obstructions identified on the Airspace Plan are also depicted on this drawing. The profile view depicts the rising terrain located beyond the north end of the runway that results in the 440-foot displaced threshold on Runway 17.

Land Use Plan

The Airport Land Use Plan for Chiloquin State Airport depicts existing zoning in the immediate vicinity of the airport. The airport is zoned "Industrial" and is within the City of Chiloquin jurisdiction. Zoning in the areas abutting the east side of the airport (toward town) includes industrial (heavy), residential, and commercial. Zoning in the areas located west of the airport (on the west side of Highway 97) include commercial, forestry, and residential. Zoning in the areas located beyond the north and south ends of the runway include exclusive farm use, commercial, and residential.

Noise exposure contours based on the 2005 forecasts of aircraft activity are depicted on the Land Use Plan. The noise contours were created using the FAA's Integrated Noise Model (INM). Data from activity forecasts and aircraft fleet mix are combined with common flight tracks and runway use to create a general indication of airport-generated noise exposure. The 2005 55 DNL noise contour extends outward along the sides of the runway, with some portions extending slightly beyond airport property over undeveloped lands. The 60 and 65 DNL contours are contained almost entirely within airport property, with the exception of a small area located near the southwest corner of the airport (over the adjacent rodeo grounds). Although this facility is used on a limited basis, its location is not considered highly compatible with airport operations. An additional safety issue is created by the access road to the rodeo grounds running directly through the runway protection zone for Runway 35.

Based on the modest forecasts of air traffic, the level of noise exposure during the twenty-year planning period is not expected to increase significantly above current levels. A detailed description of airport noise and land use compatibility is presented in **Chapter Six**.

Drawing 1: Airport Layout Plan

Drawing 2a: FAR Part 77 Airspace Plan

Drawing 2b: Runway Approach Surface Plan & Profile

Drawing 3: Land Use Plan with Noise Contours

CHAPTER FIVE

FINANCIAL MANAGEMENT AND DEVELOPMENT PROGRAM

The analyses conducted in the previous chapters have evaluated airport development need based on forecast changes in aircraft activity, environmental factors, and operational efficiency. One of the most important elements of the master planning process is the application of basic economic, financial and management rationale so that the feasibility of the implementation can be assured.

The funding for the last major capital projects (runway reconstruction, widening, lighting, etc.) at the airport consisted of federal aviation trust fund monies, with additional funding provided by the State of Oregon. The FAA Airport Improvement Program (AIP) is currently the primary source of funding for major capital improvements at the airport. The recent addition of annual entitlement funding for general aviation airports provides a set annual funding amount, which is based on a formula used in the legislation. The structure the program has significantly improved the ability to plan capital improvements over a longer period due to the regular availability of funds. However, in cases where federal grant monies or sponsor funds are not sufficient to conduct a particular project or group of projects, other funding sources may need to be pursued, or the project deferred until adequate funding may be obtained.

Minor pavement maintenance items such as crack filling or localized patching are not included in the capital improvement program, but will need to be undertaken by the airport sponsor on an annual or semi-annual basis. Funds from the ODA Pavement Management Program (PMP) are available to address airfield pavement maintenance needs on established multi-year cycles. This program is intended to preserve and maintain existing airfield pavements in order to maximize their useful lives and the economic value of the pavement. As noted earlier, several short-term pavement maintenance projects are identified for Chiloquin State Airport in the current PMP.

AIRPORT DEVELOPMENT SCHEDULE AND COST ESTIMATES

The analyses presented in Chapter Four described the airport's overall development needs for the next twenty years. Estimates of project costs were developed based on 2003 dollars. A 30 percent contingency overhead for engineering, administration, and unforeseen circumstances has been included in the estimated component and total costs. In future years, as the plan is carried out, these cost estimates can continue to assist management by adjusting the 2003-based figures for subsequent inflation. This may be accomplished by converting the interim change in the United States Consumer Price Index (USCPI) into a multiplier ratio through the following formula:

$$\frac{X}{I} = Y$$

Where:

X = USCPI in any given future year
Y = Change Ratio
I = Current Index (USCPI)

USCPI
181.1
(1982-1984 = 100)
January 2003

Multiplying the change ratio (Y) times any 2003-based cost figures presented in this study will yield the adjusted dollar amounts appropriate in any future year evaluation.

The following sections outline the recommended development program and detailed funding distribution assumptions. The scheduling has been prepared according to the facility requirements determined earlier and overall economic feasibility. The staging of development projects is based upon projected airport activity levels. Actual activity levels may vary from projected levels; therefore, the staging of development in this section should be viewed as a general guide. When activity does vary from projected levels, implementation of development projects should occur when demand warrants, rather than according to the estimated staging presented in this chapter. In addition to major development projects, the airport will require regular facility maintenance.

A summary of development costs during the twenty-year capital improvement plan is presented in **Table 5-1**. The twenty-year CIP is divided between short-term and long-term projects. The distribution of project types within the CIP is summarized in **Table 5-2**. The tables provide a listing of the major capital projects included in the twenty-year CIP, including each project's eligibility for FAA funding. The FAA will not participate in vehicle parking, hangar development, building renovations, utilities, or costs associated with non-aviation developments.

The short-term phase of the capital improvement program includes the highest priority projects recommended during the first five years. Long-term projects are expected to occur beyond the next five years, although changes in demand or other conditions could accelerate or slow demand for some improvements. As with most airports, pavement related improvements represent the largest portion (66 % +) of CIP needs at Chiloquin State during the current planning period:

• Preserve/Resurface Existing Airfield Pavement	26%
• New or Reconstructed Airfield Pavement	40%
• NAVAIDS, Lighting, Marking	5%
• Other Items (Fencing, Access Roads, etc.)	29 %
Total	100%

Short Term Projects

The majority of short-term projects identified for Chiloquin State Airport are related to continued development of facilities on the east of the airfield. Major projects include a parallel taxiway and a new aircraft apron, which will replace the existing south apron that is located too close to the runway to meet FAA standards. *Note: The existing airport access road was improved and extended in 2003 to serve the hangar and apron development areas, located near mid-field.*

The eastside parallel taxiway is recommended to reduce the back-taxiing distances currently required on the runway. The taxiway has been is planned based on ADG I design standards, with a runway separation of 225 feet to protect potential upgrades in design standards. However, based on the ADG I (small aircraft exclusively) design standards recommended for the airport, the airport sponsor could opt to reduce runway separation to 150 feet. These planning assumptions should be reevaluated during pre-design in the event that a change is warranted based on conditions in effect at that time. Based on the low volume of night operations anticipated at the airport, edge reflectors are recommended for the taxiway in lieu of edge lighting.

As part of the initial improvements, fencing will be added to along the eastern and southeastern sides of the airport to address concerns about vandalism and unauthorized vehicle access on the airport. Vehicle gates with electronic key pad or combination locks will be located at key access points for airport users. Additional fencing will be added in phases (as funding permits) by extending from south to north until the entire airport perimeter is secured.

An area of property acquisition (4.28 acres) is identified near the southeast corner of the airport. The triangular shaped parcel is bordered by the airfield, the airport access road, and Highway 422. The property is owned by the City of Chiloquin. A portion of the property is required to accommodate recommended airfield improvements (future parallel taxiway, taxiway object free areas, etc.). It is also desirable to acquire the property to prevent potential incompatible land uses that may conflict with airport operations and safety.

Based on the existing and projected condition of the airfield pavements, projects are identified to slurry seal the runway, taxiways and west apron in the short-term development period.

Long Term Projects

Long-term projects at Chiloquin State Airport include several maintenance and resurfacing projects for the airfield pavements, some of which are recommended on a regular interval. It is anticipated that the existing BST surface on the runway will require replacement toward the end of the current planning period.

An area of property acquisition (3.75 acres) is identified along the northeast corner of the airport. Acquiring this property will preserve long-term aviation development options near the north end of the runway, which is now limited by the narrow property configuration. A portion of this area is also required to allow site grading and obstruction removal at the north end of the runway and to accommodate a planned north runway extension. For the current runway, grading and leveling terrain and removing some additional trees would allow a reduction in the existing 440-foot displaced threshold on Runway 17.

New airfield pavements included in long-term program include additional hangar taxilanes, a second phase of apron development, and runway extensions at both ends of the runway.

Providing lighted windsocks at both ends of the runway is recommended to improve the accuracy of surface wind conditions for pilots. Local pilots report that conditions at the opposite ends of the runway can differ significantly, and unexpectedly of pilots unaware of local conditions. Precision approach path indicators (PAPI) are also recommended for both ends of the runway.

A project to extend fencing (Phase II) around the exposed perimeter is identified as a single long-term project. However, this project may be broken into smaller segments if funding is limited. If done in smaller sections, the highest priority areas are the southern and western airport boundaries, followed by the north and northeast portions of the airport boundary.

Improvements associated with aircraft hangar development will be completed based on demand that develops during the planning period. Specific improvement projects would include access taxiways that extend from the parallel taxiway, overhead flood lighting in the hangar area and extension of electrical power to the landside facilities.

TABLE 5-1
20-YEAR CAPITAL IMPROVEMENT PROGRAM
2003 TO 2022

Project	Qty.	Unit	Unit $	Total Cost*	FAA Eligible	State
Short Term Projects (Years 1 - 5)						
East Apron/Hangar Access Road (Phase I)	1,900	LF	$45	$85,500	$76,950	$8,550
Airport Fencing Phase I (Terminal Area; East, Southeast Airfield w/ 3 gates)	3,500	LF	$15	$75,000	$67,500	$7,500
Construct East Aircraft Apron - Phase I	5,000	SY	$30	$155,000	$139,500	$15,500
Apron/Hangar Flood Lighting	4	ea	$6,000	$24,000	$21,600	$2,400
SE Property Acquistion	4.28	Acres	$10,000	$42,800	$38,520	$4,280
Construct East Parallel Taxiway w/ 2 Mid Field Exits & N/S AC Holding Areas (3,735 x 25')	13,950	SY	$30	$423,500	$381,150	$42,350
Parallel Taxiway Edge Reflectors	3,735	LF	$3	$11,205	$10,085	$1,121
Slurry Seal Runway and North Holding Area (2005)	26,465	SY	$3.60	$95,274	$85,747	$9,527
Slurry Seal Taxiways and West Apron (2005)	5,850	SY	$3.60	$21,060	$18,954	$2,106
Total Short Term Projects				**$933,339**	**$840,005**	**$93,334**
Long Term Projects (Years 6 - 20)						
Construct Hangar Taxilane #1 (250 x 20')	555	SY	$30	$21,650	$19,485	$2,165
Excavation/Grading Beyond North End of Runway	40,000	CY	$3	$125,000	$112,500	$12,500
Lighted Wind Socks (Both Ends of Rwy)	2	ea	$7,500	$15,000	$13,500	$1,500
Precision Approach Path Indicators (PAPI)	2	ea	$35,000	$70,000	$63,000	$7,000
Relocate/Replace Airport Beacon	1	ea	$15,000	$15,000	$13,500	$1,500
NE Property Acquistion	3.75	Acres	$10,000	$37,500	$33,750	$3,750
Slurry Seal Runway & Parallel Taxiway (2010)	40,400	SY	$3.60	$145,440	$130,896	$14,544
Slurry Seal Access Taxiways and Aprons (2010)	12,275	SY	$3.60	$44,190	$39,771	$4,419
Airport Fencing Phase II (South, West, North Sides of Airfield) W/ 2 Vehicle Gates	11,600	LF	$15	$189,000	$170,100	$18,900
Slurry Seal Runway & Parallel Taxiway (2015)	40,400	SY	$3.60	$145,440	$130,896	$14,544
Slurry Seal Access Taxiways and Aprons (2015)	12,275	SY	$3.60	$44,190	$39,771	$4,419
Aircraft Apron - Phase II	5,000	SY	$30	$155,000	$139,500	$15,500
Apron/Hangar Flood Lighting	2	ea	$6,000	$12,000	$10,800	$1,200
South Rwy/P.Txy Extension (350 feet) w/ MIRL	4,420	SY	$30	$144,600	$130,140	$14,460
South Rwy. Extension/RSA Fill	18,000	CY	$8	$149,000	$134,100	$14,900
East Hangar Access Road (Phase II)	800	LF	$45	$36,000	$32,400	$3,600
Construct Hangar Taxilane #2 (250 x 20')	555	LF	$30	$21,650	$19,485	$2,165
Resurface Runway (Double BST)	26,465	SY	$5.00	$132,325	$119,093	$13,233
Slurry Seal Access Taxiways and Aprons (2015)	12,275	SY	$3.60	$44,190	$39,771	$4,419
North Rwy/P.Txy Extension (300 feet) w/ MIRL	3,100	SY	$30	$102,600	$92,340	$10,260
Total Long Term Projects				**$1,649,775**	**$1,484,798**	**$164,978**
TOTAL SHORT & LONG TERM PROJECTS				**$2,583,114**	**$2,324,803**	**$258,311**

* Project costs include 30% engineering and contingency.

TABLE 5-2
CIP PROJECTS BY CATEGORY
2003 TO 2022

Project	Qty.	Unit	Unit $	Total Cost*	FAA Eligible	State
Short Term Projects (Years 1 - 5)						
East Apron/Hangar Access Road (Phase I)	1,900	LF	$45	$85,500	$76,950	$8,550
Airport Fencing Phase I (Terminal Area; East, Southeast Airfield w/ 3 gates)	3,500	LF	$15	$75,000	$67,500	$7,500
Construct East Aircraft Apron - Phase I	5,000	SY	$30	$155,000	$139,500	$15,500
Apron/Hangar Flood Lighting	4	ea	$6,000	$24,000	$21,600	$2,400
SE Property Acquistion	4.28	Acres	$10,000	$42,800	$38,520	$4,280
Construct East Parallel Taxiway w/ 2 Mid Field Exits & N/S AC Holding Areas (3,735 x 25')	13,950	SY	$30	$423,500	$381,150	$42,350
Parallel Taxiway Edge Reflectors	3,735	LF	$3	$11,205	$10,085	$1,121
Slurry Seal Runway and North Holding Area (2005)	26,465	SY	$3.60	$95,274	$85,747	$9,527
Slurry Seal Taxiways and West Apron (2005)	5,850	SY	$3.60	$21,060	$18,954	$2,106
Total Short Term Projects				**$933,339**	**$840,005**	**$93,334**
Long Term Projects (Years 6 - 20)						
Construct Hangar Taxilane #1 (250 x 20')	555	SY	$30	$21,650	$19,485	$2,165
Excavation/Grading Beyond North End of Runway	40,000	CY	$3	$125,000	$112,500	$12,500
Lighted Wind Socks (Both Ends of Rwy)	2	ea	$7,500	$15,000	$13,500	$1,500
Precision Approach Path Indicators (PAPI)	2	ea	$35,000	$70,000	$63,000	$7,000
Relocate/Replace Airport Beacon	1	ea	$15,000	$15,000	$13,500	$1,500
NE Property Acquistion	3.75	Acres	$10,000	$37,500	$33,750	$3,750
Slurry Seal Runway & Parallel Taxiway (2010)	40,400	SY	$3.60	$145,440	$130,896	$14,544
Slurry Seal Access Taxiways and Aprons (2010)	12,275	SY	$3.60	$44,190	$39,771	$4,419
Airport Fencing Phase II (South, West, North Sides of Airfield) W/ 2 Vehicle Gates	11,600	LF	$15	$189,000	$170,100	$18,900
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Slurry Seal Access Taxiways and Aprons (2015)	12,275	SY	$3.60	$44,190	$39,771	$4,419
Aircraft Apron - Phase II	5,000	SY	$30	$155,000	$139,500	$15,500
Apron/Hangar Flood Lighting	2	ea	$6,000	$12,000	$10,800	$1,200
South Rwy/P.Txy Extension (350 feet) w/ MIRL	4,420	SY	$30	$144,600	$130,140	$14,460
South Rwy. Extension/RSA Fill	18,000	CY	$8	$149,000	$134,100	$14,900
East Hangar Access Road (Phase II)	800	LF	$45	$36,000	$32,400	$3,600
Construct Hangar Taxilane #2 (250 x 20')	555	LF	$30	$21,650	$19,485	$2,165
Resurface Runway (Double BST)	26,465	SY	$5.00	$132,325	$119,093	$13,233
Slurry Seal Access Taxiways and Aprons (2015)	12,275	SY	$3.60	$44,190	$39,771	$4,419
North Rwy/P.Txy Extension (300 feet) w/ MIRL	3,100	SY	$30	$102,600	$92,340	$10,260
Total Long Term Projects				**$1,649,775**	**$1,484,798**	**$164,978**
TOTAL SHORT & LONG TERM PROJECTS				**$2,583,114**	**$2,324,803**	**$258,311**

* Project costs include 30% engineering and contingency.

FINANCING OF DEVELOPMENT PROGRAM

Federal Grants

A primary source of potential funding identified in this plan is the Federal Airport Improvement Program (AIP). As proposed, approximately 90 percent of the airport's 20-year CIP will be eligible for federal funding. Funds from this program are derived from the Aviation Trust Fund, which is the depository for all federal aviation taxes collected on such items as airline tickets, aviation fuel, lubricants, tires, aircraft registrations, and other aviation-related fees. These funds are distributed under appropriations set by Congress to all airports in the United States that have certified eligibility. The funds are distributed through grants administered by the Federal Aviation Administration (FAA).

According to FAA guidelines, Chiloquin State Airport is eligible under AIP to receive discretionary grants and general aviation entitlement grants. Under the current authorization, airports like Chiloquin may receive up to $150,000 per year in the GA entitlement grants. Under current guidelines, AIP grants fund 90 percent of eligible project cost and require a 10 percent local match. The future availability of the GA non-primary entitlement funding is dependent on congressional reauthorization. However, based on the favorable response to current legislation, these grants have become a very significant source of FAA funding for general aviation airports. Because the GA non-primary grants can only be rolled over for a maximum of three years and $450,000, AIP discretional grants may be used for projects requiring additional funding.

The constraints of AIP funding availability will dictate in large part, the actual schedule for completing airport improvement projects through the planning period. As a result, some projects included in the twenty-year CIP may be deferred beyond the twenty-year time frame. However, federal grants are expected to continue playing a significant role in the financing of the airport's projected capital expenditures.

State Funding

The ODA Pavement Maintenance Program (PMP) provides funding for pavement maintenance and associated improvements (crack filling, repair, sealcoats, etc.), which have not traditionally been eligible for FAA funding. As a state-owned airport, routine airport maintenance and operations (M&O) expenses are funded through the ODA operating budget. The PMP program combined with M&O funding is expected to be adequate to address the airport's normal maintenance needs during the planning period.

As noted earlier, ODA as the owner of Chiloquin State Airport is responsible for funding the local 10 percent match for FAA grants and 100 percent of non-eligible projects (except for tenant-specific projects like hangars, which are privately funded). In some cases, ODA will seek funding assistance from the local community or county government for projects.

Financing the Local Share of Capital Improvements

The development of facilities such as aircraft hangars, fuel storage, or other tenant specific projects that are not eligible for federal funding would typically be funded through private development sources. In addition, utility extensions (water, sewer, electric, etc.) are not eligible for FAA funding. As noted above, local funding may occasionally be required for larger projects.

CHAPTER SIX

ENVIRONMENTAL CHECKLIST

INTRODUCTION

The purpose of the Environmental Checklist is to identify physical, social and environmental conditions of record, which may affect the ability to undertake future improvements at Chiloquin State Airport. In comparison to an Environmental Assessment, the project scope for this review is limited and focuses on gathering and summarizing information of record from the applicable local, State and Federal sources, pertaining to existing conditions as they apply to the subject site and its environs. The scope of the review research does not involve extensive professional interpretation of the information; in-depth analyses; detailed descriptions of preferred development alternatives and their potential impacts; or the more comprehensive, follow-up correspondence and inquiries with affected agencies and persons as are normally associated with an Environmental Assessment (EA). However, as each federally funded project is undertaken, the FAA, in the capacity as the lead federal agency, will evaluate the need for more detailed environmental analyses on a case-by-case basis.

All research activities for this report, including correspondence, data collection and documentation, proceeded under the provisions of FAA Order 5050.4A, The Airport Environmental Handbook, which is intended to implement the requirements of Sections 1505.1 and 1507.3 of the National Environmental Policy Act (NEPA). This report briefly addresses, either in narrative or in the attached checklist format, each potential impact category identified by Order 5050.4A. If, however, a particular specific impact category does not appear to apply to this study site, the checklist is noted accordingly.

Included below is a brief summary of the impact categories in which potentially significant impacts were identified, or appear to be possible, and where notable ecological or social conditions appear pertinent to the future development of this facility. Of particular interest in this location is the potential for cultural resources in the project area, based upon archaeological and

LAND USE

The airport is located at the northwestern edge of and entirely within the Chiloquin Urban Growth Boundary and City limits, and is zoned City of Chiloquin Industrial (I). It is surrounded by predominantly vacant lands in Klamath County's jurisdiction, with the exception of a narrow extension of City of Chiloquin, Industrial Zoning which connects the airfield on its east exterior with the City of Chiloquin proper, and an industrial park to which urban utilities have recently been made available. Industrial development is anticipated and pending on Klamath County and City of Chiloquin lands east of the airport, under the County zoning designation of Heavy Industrial (IH) and in the City's I Zone as described above.

Oregon Revised Statutes (ORS) Chapter 836.600 through 836.630 addresses the appropriate zoning and protection of Oregon's airports and their surroundings. Under the statute, height restrictive zoning and, to some extent, use-restrictive zoning, are indicated as necessary components affecting land uses in the immediate vicinity of a public airport. An Airport Overlay Zone, which protects necessary airspaces and limits incompatible uses in proximity to an airfield, is the primary means of ensuring the compatibility of surrounding land uses with operations of a general aviation airstrip. Both the City and Klamath County provided mapping of Clear Zones and associated ordinances implementing airstrip safety zones around the Chiloquin State Airport. These conditions do not, however, constitute compliance with FAA regulations and / or ORS Ch. 836.600 *et. seq*. In addition to ensuring quality and cohesive mapping of all of the areas affected by the required Chiloquin State Airport Approach Overlay and related safety Zones, in both the City and Klamath County jurisdictions, the existing respective City and County zoning and transportation plan languages must also be reviewed and amended to ensure compliance with ORS Chapter 836.600-630.

Among the provisions of this statute are the following (Please note: This is not intended to be a comprehensive summation of this legislation. Additional requirements may apply to this site under the cited or related statutes):

OAR 660-13-160(1) Requires jurisdictions to update Plan, land use regulations at Periodic Review to conform with provisions of this statute, or at next update of Transportation System Plan, per OAR 660-12-0015(4) and OAR 660-12-0045(2)(c)&(d). If more than one local government is affected by the Airport Safety Overlay (see below), a Coordinated Work Program for all jurisdictions is required, concurrent with timing of Periodic Review (or TSP update) for the jurisdiction having the most land area devoted to the airport use(s).

The respective Chiloquin and Klamath County Comprehensive Plans and Transportation Plans, Zoning Ordinances, and mapping should be amended no later than the affected jurisdictions' next Periodic Review work cycles, to ensure compliance with these provisions. An Inter-Governmental Agreement is one potential mechanism for complying with the requirement for a "coordinated work program" between concerned jurisdictions under this section.

(8) Adopt map delineating Safety Zones, compatibility zones, and existing noise impact boundaries identified by OAR 340-35. See also OAR 660-13-0070(1) and Exhibits 1 & 2 to Division 13. The limited mapping provided the consultant is not adequate to meet these requirements, as discussed above. It does not appear that compatibility zones exist currently in either affected jurisdiction. This Airport Layout Plan Update Report will provide the information and graphics necessary to incorporate into the City and County zoning data and mapping files in order to establish compliance with the requirement for mapping "noise impact boundaries." Additional analyses, safety zone designations and mapping may likely be necessary to establish full conformity with this section.

OAR 660-13-0070(2): Review future development in Airport Safety Overlay for compliance with maximum height limitations. The airstrip safety zones language provided by the local planners includes some use and height limitations in airspace surfaces as defined by the FAA; however, these ordinances around the state are generally outdated, in the consultant's experience, and the definitions of the required surfaces have invariably been amended since their adoption. Further analysis is recommended to ensure compliance with this section.

In addition to Airport Hazard Overlay requirements described above, OAR 660-13-0040(1)-(3) also requires that jurisdictions adopt a map of existing and planned airport improvements.

Consistent with the Airport Land Use Compatibility Guidelines for small general aviation airports, from the Oregon Department of Aviation (formerly the State of Oregon Department of Transportation's Aeronautics Section), a 1,300-foot wide "Airport Development Area" is typically recommended to be established, centered on the runway centerline, for a length of 5,400 feet. This Airport Development Area should be "*...under the airport's control to prevent incompatible land use development*." It is noted that most, but not all of this area is under the ownership and control of the airport sponsor. The recommended property acquisition identified in the previous chapter would also improve the airport's compliance with these land use guidelines.

A detailed review of all Ordinance and Comprehensive Plan language, and mapping pertaining to the Chiloquin State Airport should be performed to compare those with the requirements of ORS Chapter 836.600-630 to ensure airport compatibility. This would identify any amendments to the

City or County codes, Plans and maps, which may be necessary in order to demonstrate compliance. It is further recommended that this Airport Layout Plan Report be adopted as part of the Transportation Elements of the City of Chiloquin and Klamath County Comprehensive Plans.

In addition to the consultant's general safety and compatibility related concerns regarding the proximity of the rodeo grounds to the runway, the lack of substantial land and zoning based protections, for the airport from encroachment of incompatible development, as well as for surrounding properties from certain, avoidable aviation hazards, ranks highest among the consultant's concerns relative to land use compatibility issues observed at this facility. Adherence to the recommendations contained in this report, and the subsequent adoption of amendments under ORS 836, as recommended by this study, of local regulations pertaining to development in the airport's vicinity, would adequately address this concern by working to ensure the harmonic functioning of this airfield with its present and future neighbors. In addition, the County may wish to consider whether another location may be feasible for relocating the rodeo grounds.

NOISE EVALUATION – INTRODUCTION

Noise is sometimes defined as unwanted sound. However, sound is measurable, whereas noise is subjective. The relationship between measurable sound and human irritation is the key to understanding aircraft noise impact. A rating scale has been devised to relate sound to the sensitivity of the human ear. The A-weighted decibel scale (dBA) is measured on a "log" scale, by which is meant that for each increase in sound energy level by a factor of 10, there is a designated increase of 1 dBA. This system of measurement is used because the human ear functions over such an enormous range of sound energy impacts. At a psychological level, there is a rule of thumb that the human ear often "hears" an increase of 10 decibels as equivalent to a "doubling" of sound.

The challenge to evaluating noise impact lies in determining what amount and what kind of sound constitutes noise. The vast majority of people exposed to aircraft noise are not in danger of direct physical harm. However, much research on the effects of noise has led to several generally accepted conclusions:

- The effects of sound are cumulative therefore, the duration of exposure must be included in any evaluation of noise.
- Noise can interfere with outdoor activities and other communication.

- Noise can disturb sleep, TV/radio listening, and relaxation.
- When community noise levels have reached sufficient intensity, community wide objection to the noise will likely occur.

Research has also found that individual responses to noise are difficult to predict[11]. Some people are annoyed by perceptible noise events, while others show little concern over the most disruptive events. However, it is possible to predict the responses of large groups of people – i.e. communities. Consequently, community response, not individual response, has emerged as the prime index of aircraft noise measurement.

DNL Methodology

On the basis of the findings described above, a methodology has been devised to relate measurable sound from a variety of sources to community response. It has been termed "Day-Night Average Sound Level" (DNL) and has been adopted by the U. S. Environmental Protection Agency (EPA), the Department of Housing and Urban Development (HUD), and the Federal Aviation Administration (FAA) for use in evaluating noise impacts. In a general sense, it is the yearly average of aircraft-created noise for a specific location (i.e., runway), but includes a calculation penalty for each night flight.

The basic unit in the computation of DNL is the sound exposure level (SEL). An SEL is computed by mathematically summing the dBA level for each second during which a noise event occurs. For example, the noise level of an aircraft might be recorded as it approaches, passes overhead, and then departs. The recorded noise level of each second of the noise event is then added logarithmically to compute the SEL. To provide a penalty for night time flights (considered to be between 10 PM and 7 AM), 10 dBA is added to each night-time dBA measurement, second by second. Due to the mathematics of logarithms, this calculation penalty is equivalent to 10 day flights for each night flight[12].

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[11] Beranek, Leo, *Noise and Vibration Control*, McGraw-Hill, 1971, pages ix-x.

[12] Where Leq ("Equivalent Sound Level") is the same measure as DNL without the night penalty incorporated, this can be shown through the mathematical relationship of:

$$Leq_d = 10 \log \left(\frac{N_d \times 10^{(SEL/10)}}{86{,}400} \right) \qquad Leq_n = 10 \log \left(\frac{N_n \times 10^{((SEL+10)/10)}}{86{,}400} \right)$$

If SEL equals the same measured sound exposure level for each computation, and if $N_d = 10$ daytime flights, and $N_n = 1$ night-time flight, then use of a calculator shows that for any SEL value inserted, $Leq_d = Leq_n$.

A DNL level is approximately equal to the average dBA level during a 24-hour period with a weighing for nighttime noise events. The main advantage of DNL is that it provides a common measure for a variety of different noise environments. The same DNL level can describe an area with very few high noise events as well as an area with many low level events.

Noise Modeling and Contour Criteria

DNL levels are typically depicted as contours. Contours are an interpolation of noise levels drawn to connect all points of a constant level, which are derived from information processed by the FAA-approved computer noise model. They appear similar to topographical contours and are superimposed on a map of the airport and its surrounding area. It is this map of noise levels drawn about an airport, which is used to predict community response to the noise from aircraft using that airport. DNL mapping is best used for comparative purposes, rather than for providing absolute values. That is, valid comparisons can be made between scenarios as long as consistent assumptions and basic data are used for all calculations. It should be noted that a line drawn on a map by a computer does not imply that a particular noise condition exists on one side of the line and not on the other. These calculations can only be used for comparing average noise impacts, not precisely defining them relative to a specific location at a specific time.

Noise contours are plotted in 5 DNL increments, starting at 55 DNL based on forecast aircraft activity levels for 2005. The noise contours prepared for Chiloquin State Airport are depicted in **Figure 6-1**. The planned runway extensions at both ends of the runway will be constructed after 2005 and therefore is not factored into the 2005 noise contours.

The 55 DNL contour extends approximately 300 feet beyond both runway ends and outward 400 to 500 feet from the sides of the runway, but remains largely within airport property. The 60 DNL contour extends approximately 150 feet beyond both runway ends and outward approximately 100 feet from the sides of the runway. The 65 DNL contour extends less than 100 feet beyond both runway ends and outward from the sides of the runway.

The adjacent rodeo grounds are located within a few hundred feet of the end of Runway 35. The 55 DNL noise contour extends over approximately one-half of the rodeo area and the 60 DNL extends approximately 50 feet onto the rodeo grounds property (the outer edge of the site, which does not contain facilities, spectator seating, etc.). As noted in **Table 6-1**, outdoor sports arenas are compatible with noise levels below 65 DNL. While the close proximity of the rodeo grounds to the runway is not desirable based on a number considerations, the projected noise exposure does not create a significant noise compatibility issue.

Figure 6-1: Noise Contours

Noise and Land-Use Compatibility Criteria

Federal regulatory agencies of government have adopted standards and suggested guidelines relating DNL to compatible land uses. Most of the noise and land-use compatibility guidelines strongly support the concept that significant annoyance from aircraft noise levels does not occur outside a 65 DNL noise contour. Federal agencies supporting this concept include the Environmental Protection Agency, Department of Housing and Urban Development, and the Federal Aviation Administration.

Part 150, Airport Noise Compatibility Planning, of the Federal Aviation Regulations, provides guidance for land-use compatibility around airports. **Table 6-1** presents these guidelines. Compatibility or non-compatibility of land use is determined by comparing the noise contours with existing and potential land uses. All types of land uses are compatible in areas below 65 DNL. Generally, residential and some public uses are not compatible within the 65-70 DNL, and above. As noted in Table 5-1, some degree of noise level reduction (NLR) from outdoor to indoor environments may be required for specific land uses located within higher-level noise contours. Land uses such as commercial, manufacturing, some recreational uses, and agriculture are compatible within 65-70 DNL contours.

TABLE 6-1
LAND-USE COMPATIBILITY WITH DNL

Land Use	Yearly Day-Night Average Sound Level (DNL) In Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes & transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile Home Parks	Y	N	N	N	N	N
Transient Lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and Nursing Homes	Y	25	30	N	N	N
Churches, Auditoriums, and Concert Halls	Y	25	30	N	N	N
Governmental Services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, Business and Professional	Y	Y	25	30	N	N
Wholesale and Retail—Building Materials, Hardware and Farm Equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail Trade--General	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing General	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and Optical	Y	Y	25	30	N	N
Agriculture (except livestock) and Forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock Farming and Breeding	Y	Y(6)	Y(7)	N	N	N
Mining and Fishing, Resource Production and Extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor Sports Arenas, Spectator Sports	Y	Y(5)	Y(5)	N	N	N
Outdoor Music Shells, Amphitheaters	Y	N	N	N	N	N
Nature Exhibits and Zoos	Y	Y	N	N	N	N
Amusements, Parks, Resorts and Camps	Y	Y	Y	N	N	N
Golf Courses, Riding Stables and Water Recreation	Y	Y	25	30	N	N

Y (Yes) Land-use and related structures compatible without restrictions.
N (No) Land-use and related structures are not compatible and should be prohibited.
NLR Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into design and construction of the structure.
25, 30 or 35 Land uses and structures generally compatible; measures to achieve NLR or 25, 30, or 35 dB must be incorporated into design and construction of the structure.

NOTES:

1. Where the community determines that residential uses must be allowed, measures to achieve outdoor to indoor Noise Levels Reduction (NLR) of at least 25dB and 30dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2. Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3. Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
4. Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received office areas, noise sensitive areas, or where the normal noise level is low.
5. Land-use compatible, provided special sound reinforcement systems are installed.
6. Residential buildings require an NLR of 25.
7. Residential buildings require an NLR of 30.
8. Residential buildings not permitted.

SOURCE: Federal Aviation Regulations, Part 150, Airport Noise Compatibility Planning, dated January 18, 1985.

CULTURAL RESOURCES

Native American historic activities and discoveries are known to exist within the local Chiloquin area. To date, the local officials report that the airport property has not been the subject of a comprehensive physical survey to determine whether significant cultural resources are located within the potential project area. Klamath Tribe officials indicate that portions of the airport have been identified as a former cremation site. A portion of the subject site has been surveyed, however, and an area which was found to contain historic, cultural or archaeological resources has been identified on the Airport Layout Plan (ALP) for protection from development. No planned development recommended in this plan occurs within the boundaries of the previously defined sensitive area.

Mr. Gerald Skelton of the Klamath Tribe stated in telephone communication with the consultant that the ownership of this area is unclear among investigating parties with the City, County and Tribe. He stated that he is also unclear about the means and level of protection currently available to ensure that this area is kept free from encroachment of development. He further indicated that a number of cultural resources have been located in the immediate vicinity of the airfield, on property which is in private ownership but adjacent to the airport.

Mr. Skelton indicated that the airport generally is located in an area near a native village, where a number of indigenous people would have once resided. He has requested prior notice to the tribe regarding all future development activities; that a Tribal Cultural Resource Technician be invited to attend during any construction or development activities on ground which was previously un-disturbed; and that a cultural survey of the airport property be performed. The consultant stated to Mr. Skelton that the most likely means by which a survey would be performed would be in conjunction with an Environmental Assessment, which may not be required by the FAA unless a major construction project, such as new runway or significant runway extension, were proposed. Mr. Skelton reiterated his concern that any area not already bearing development may harbor significant cultural resources. He requested that the Klamath Tribe be provided layouts of areas planned for development under the preferred alternative and any future potential development scenarios.

If any historic or cultural resources are discovered during construction, the sponsor is responsible for immediately notifying SHPO, the Tribe, and the other appropriate authorities. Work would be required to be halted until the physical extent and relative cultural significance of the resource(s) could be identified.

The Oregon State Historic Preservation Office, SHPO, has indicated in the attached correspondence that, as of April 15, 2001, considerable documentation is required to be provided by any party inquiring about the existence of any significant cultural resources. The new procedure requires such information as architectural classification, window and roof types of all structures within the study area, if they may be considered as a resource; dates of any alterations; and "Significance Statements" for all types of resources. SHPO has provided specific forms, "Section 106 (of the National Historic Preservation Act) Documentation Forms" and "Section 106 Level of Effect Forms", for use in making such a request. This level of investigation surpasses the scope of this ALP Update Report.

OTHER SOCIAL/ENVIRONMENTAL CONSIDERATIONS

Chiloquin State Airport is a vital transportation component for local community, playing a significant role in the region's economy. As noted earlier, the airport supports several locally-based aircraft and accommodates business-related travel for local government (including tribal) and industry (such as Jeld-Wen). Various local businesses, emergency care providers, and the Klamath Tribe either have aircraft based at the facility, or are users of the airport. Based upon existing usage, anticipated industrial development within the community, ongoing Klamath Tribe developments, and the development of "Train Mountain," a train enthusiast's recreation center, the airport is expected to continue being a key transportation and economic element within the local area.

Planned improvements to airport facilities and other support facilities will have positive social impacts by increasing the safety of airport users and their neighbors. No existing residences would be displaced under the preferred alternative. As described above, proposed airport improvement projects would be expected to have positive social and socio-economic impacts. Implementation of the preferred alternative will result in the creation of jobs, and improvements to the safety and longevity of the airport facilities.

Air quality is not expected to be adversely impacted as a result of planned airport improvements. A representative of the Oregon Department of Environmental Quality stated that the area is "in attainment for" (meaning 'in compliance with') applicable air quality standards. No significant increase over existing levels of air and/or surface traffic is anticipated under the preferred alternative.

Water quality impacts are always a concern with any construction project, and especially when considering uses and sites where potentially hazardous materials, such as aviation fuel, fire retardants, and/or agricultural chemicals are involved. The Oregon Department of Environmental Quality generally recommends that airports perform investigations to document any past agricultural spraying practices, aviation fuel storage facilities, and other potential sources of water quality impacts.

Agricultural and/or forestry-related chemical operators and airport sponsors must ensure that wash down, collection, treatment and storage areas and devices comply with Oregon Administrative Rule 340-109 and all applicable environmental standards. This includes, but is not limited to, obtaining and complying with a National Discharge Elimination System (NPDES) Permit, as required, for all airport construction projects and ongoing operations. As noted earlier, no aerial applicators or agricultural chemicals are reported as currently being based at Chiloquin State Airport and no fuel storage is currently located at the airport.

For construction-related activities, adherence to the applicable local, state, and federal regulations and standards, and compliance with the guidelines of FAA Advisory Circular 150/5370-10, are intended to protect against adverse water quality impacts. In telephone communication with Mr. Jack Arendt, a representative of DEQ's Eastern Oregon Region Water Quality Division, it was stated that the stretch of the Williamson River which neighbors Chiloquin State Airport is subject to a water quality improvement program known as Total Maximum Daily Loads (TMDL). This is a procedure and designation which is reserved for sensitive or problem areas, and is intended to limit the input of toxins and pollutants into affected water bodies. This particular TMDL designation is associated with the Upper Klamath Basin Lake, and as stated, it also includes this stretch of the Williamson River. The airport is sufficiently physically separated and buffered from the Williamson River by the southerly branch of Highway 422 to avoid direct foreseeable impacts to the river resulting from the preferred alternative; however, the presence of a TMDL water body in proximity to the subject site reinforces the need for storm water and other airport related drainage to be properly handled, and treated as needed, prior to discharging that to any natural drainage system which might ultimately feed into the Williamson River.

The sponsor is further cautioned that, under the Department of Transportation Act, Section 4(f), (49 USC, Subtitle I, Section 303), projects which would require use of lands having historic significance on a national, state or local level, or projects which require the use of any publicly owned park; recreation area; or wildlife or waterfowl refuge of national, state, or local significance must be prior demonstrated to be the only "*feasible and prudent alternative*" and must "*include all possible planning to minimize harm resulting from the use*."

Representatives from the Oregon Department of Fish and Wildlife declined to comment on the potential improvement project. A search of the database of the Oregon Natural Heritage Information Center, which was recently transferred to Oregon State University from the Nature

Conservancy, revealed three one noteworthy species of birds; three species of fish; one mammal; and four species of snails which are species of interest to the State of Oregon and which may occur in the project vicinity. Among those are the Bald Eagle, or *Haliaeetus leucocephalus*, which is listed as Threatened with the U.S. Department of Interior's Fish and Wildlife Service (USFWS); Lewis' Woodpecker, *Melanerpes lewis*, a Species of Concern to USFWS and a Sensitive-Critical species to the State of Oregon; and the Tricolored Blackbird, or *Agelaius tricolor*, which is a Species of Concern to the USFWS and is listed as "Sensitive peripheral or naturally rare"; the Klamath Largescale Sucker, or *Catostomus snyderi,* a Species of Concern to the USFWS with no State status listed; the Shortnose Sucker, *Chasmistes brevirostris*; and the Lost River Sucker, or *Deltistes luxatus*, both of which are listed as Endangered with the USFWS and State of Oregon.

Also indicated in the records search was one specie of mammal, the American Marten, *Martes Americana,* (a member of the weasel family), and four species of snails which are associated with the Sprague and Williamson Rivers. The American Marten is listed as "Sensitive-vulnerable" with the State of Oregon, and the records provided for the snails do not indicate any state or Federal status for those species.

In addition to some of the species discussed above, the USFWS lists one species of bird, the Northern Spotted Owl, *Strix occidentalis caurina,* a Threatened species for which critical habitat has been designated, as possibly occurring in the vicinity of the Chiloquin State Airport. In addition, one variety of flora, the Applegate's milk vetch, or *Astragalus applegatei*, is an Endangered Species which may occur in the project area. One bird and one frog are Candidate Species for some type of Federal listing; and one rabbit; one marten; and seven species of bats are listed as Species of Concern, along with nine birds in addition to those discussed in the above paragraph; one lizard; three species of fishes; five invertebrates (mussels, snails, caddisflies); and three additional species of flora.

The USFWS states in the attached correspondence that a Biological Assessment is required for "*construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2) (c)). For projects other than major construction activities,"* the USFWS' correspondence continues, "*the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species.*"

According to a review of the US Fish and Wildlife Service's National Wetlands Inventory (NWI), no inventoried wetland resources appear to be present within or in direct proximity to areas planned for airport related development. No floodplain would be affected by the planned airport improvements. Information provided by the by the USDA's Natural Resources Conservation Service describes the soils on the site as subject to erosion and stony content, both of which severely limit the potential of the subject soils types for agricultural productivity. Agricultural Capability Classifications of soils found on the subject site range from IV to VI. Because no federal lands are proposed to be committed or otherwise involved in the Preferred Alternative, the Farmland Protection Policy Act (FPPA) does not apply to this proposal, and no further analysis under this impact category is necessary to demonstrate compliance with NEPA.

Silt fences, runoff diversion tactics, and storm water detention are commonly implemented in similar construction projects, and should be utilized for any project on the airport in order to minimize adverse impacts of development related activities. FAA Advisory Circular 150/5370-10 provides additional measures which are advised to be implemented to minimize adverse impacts of airport construction activities. Please see the above related discussion regarding water quality impacts.

TABLE 6-2
CHILOQUIN AIRPORT
ENVIRONMENTAL CHECKLIST

Potential Impact Category	Existing Conditions / Comments	Further Action Anticipated?
Noise	No incompatible land uses located with 55, 60 or 65 DNL noise contours based on 2005 forecast operations.	NO
Compatible Land Use	Local governments must adopt and map airport overlay zoning to ensure consistency of zoning provisions with state law. Future uses in the vicinity must have the burden of demonstrating compatibility with aviation and compliance with ORS Ch. 836.600-630. Consider relocating Rodeo Grounds	YES
Social / Socio-Economic	Expected to be positive, as is typical with airport projects, including but not limited to the enhancement of safety features at the airfield, creation of jobs, fencing, and improvement to the region's transportation systems base.	YES
Air Quality	Area is in attainment for air quality; no change in current conditions is anticipated.	NO

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Potential Impact Category	Existing Conditions / Comments	Further Action Anticipated?
Water Quality	Williamson River part of TMDL program, ensure quality of storm water runoff. DEQ requires location of disposal for domestic wastewater (sewage) from airports' facilities be divulged, surface storm water runoff be contained, treated, prior to discharge to any natural drainage system, water body. NPDES Permit; maintaining maximum physical separation between construction and sensitive waterways, adherence to FAA Advisory Circular 150/5370-10 required. See Construction Impacts, below. If fuel or agricultural chemical storage are to be established at this site, see Water Quality section of the above narrative and observe compliance with DEQ requirements.	YES
Special Land Uses, DOT Act Section 4(f)	No parks, recreation areas, or refuge areas per this section affected.	NO
Historic, Architectural, Archaeological, and Cultural Resources	Records no longer provided by SHPO. Significant cultural resources possible on-site. Please see above discussion. Avoid impacting known or suspected resources, notify Klamath Tribe, SHPO of all development plans.	POSSIBLE
Biotic Communities	Various species of flora and fauna discussed above as possibly occurring in project vicinity. Biological Assessment may be advisable and would be required in conjunction with an Environmental Assessment, if required.	YES
Endangered and Threatened Species	Several Threatened, Endangered, Species of Concern and Candidate Species were identified as occurring in vicinity. A Biological Evaluation or Assessment is recommended by USFWS prior to major construction or similar undertakings. See narrative.	YES
Wetlands	According to National Wetlands Inventory Maps produced by the USFWS, no wetland resources affected by the project.	NO
Floodplain	No flood plain affected by the project.	NO
Shoreline Management	Not Applicable to this facility.	NO

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CHILOQUIN AIRPORT
ENVIRONMENTAL CHECKLIST

Potential Impact Category	Existing Conditions / Comments	Further Action Anticipated?
Coastal Barriers	Not Applicable to this facility.	NO
Wild and Scenic Rivers	Not Affected by the preferred alternative.	NO
Farmland	Public airport improvement projects on private lands are exempt from Farmland Protection Policy Act (FPPA).	NO
Energy Supply and Natural Resources	No adverse impacts anticipated.	NO
Light Emissions and Glare	No analysis of existing light emissions, which might pose potential hazards to aviation, performed. No such hazards reported by local planners or operators, upon inquiry.	POSSIBLE
Solid Waste Impacts	Ground and surface water systems must be considered and protected from contamination during the handling of waste materials. Development under the Preferred Alternative would not considerably increase production of waste at the facility, except during construction phase.	NO
Construction Impacts	Temporary impacts will accrue during construction phase. Of particular concern is any runoff which might make its way to the Williamson River. Adherence to the provisions of FAA Advisory Circular 150/5370-10 should preclude foreseeable adverse impacts.	YES