

Chapter Four

AIRPORT FACILITY

REQUIREMENTS

Airport Master Plan Update
Mulino Airport

INTRODUCTION

In this chapter, existing airport facilities are evaluated to identify their functionality, condition, compliance with design standards, and capacity to accommodate demand projected in Chapter Three.

The objective of this effort is to identify, in general terms, what facilities are needed, the adequacy of the existing airport facilities in meeting those needs, note the differences, and then identify when those additional facilities may be needed. Once the facility requirements have been established, alternatives for providing these facilities will be created.

BACKGROUND

Airport Planning Criteria

Airport planning development criteria are often defined by both federal and state agencies. The FAA provides specific guidance in regard to dimensional standards where as many state agencies provide generalized guidance based on facilities offered and aircraft activity levels. Both sets of planning criteria are discussed below.

The Oregon Department of Aviation (ODA) has created general guidelines for airport

development planning based on the roles, or categories, of airports within the statewide system. Five unique categories were created, each with its own set of performance criteria. These categories are as current as of the writing of this chapter. However, new categories and the defining characteristics of which is under review and will be updated in 2007. This may necessitate an “earlier than later” reexamination of this master plan update; this will be determined by ODA. The categories are based on several factors including the airport’s function, the type and level of activity at the airport, and the facilities and services available. The categories are:

- Category 1 – Commercial Service Airports
- Category 2 – Business or High Activity General Aviation Airports
- Category 3 – Regional General Aviation Airports
- Category 4 – Community General Aviation Airports
- Category 5 – Low Activity General Aviation Airports

As mentioned in Chapter One, Strategic Analysis, Mulino Airport has been classified as Category 4 - Community General Aviation Airport. The function of this category is to accommodate general aviation users and local business activities. This category includes all airports that have at least 2,500 annual operations or more than 10 based aircraft. Category 4 airports are designed to accommodate light single and multi-engine aircraft weighing 12,500 pounds and less. ODA recommends that this type of airport also should include services such as aviation fuel, and aircraft maintenance and should have airfield lighting and basic navigational aids.

The FAA specifies design standards by Airport Reference Code (ARC) and instrument approach visibility minimums. In the previous chapter, it was determined that the critical aircraft for purposes of airport design is the Beech King Air, which has an ARC of B-II (small).

The Airport does not currently have an instrument approach and is classified as a visual runway. For determining airport design criteria, instrument approach visibility minimums are divided into three categories:

- visual and not lower than one-mile
- not lower than $\frac{3}{4}$ -mile
- lower than $\frac{3}{4}$ -mile

The Port and several Airport users have indicated that an instrument approach procedure at Mulino Airport would be desirable. New technology allows instrument approaches using the Global Positioning System (GPS) to be implemented at a minimal cost, in terms of navigational aids and cockpit equipment. For many small general aviation airports, however, the cost of upgrading facilities (i.e. larger safety area, installing lights) to the minimum requirements for the different approach visibility categories is a significant constraint to establishing an instrument approach. This chapter presents the requirements of all the different instrument approach visibility minimums, to aid in assessing the feasibility of an instrument approach, considering existing constraints.

AIRFIELD REQUIREMENTS

As discussed in Chapter Two, airfield facilities are those that are related to the arrival, departure, and ground movement of aircraft. Airfield facility requirements are addressed for the following areas:

- Airfield Capacity
- Airfield Design Standards
- Runway Orientation, Length, Width, and Pavement Strength
- Taxiways
- Airport Visual Aids
- Airport Lighting
- Radio Navigational Aids & Instrument Approach Procedures
- Helicopter Facilities
- Other Airfield Recommendations

Airfield Capacity

A demand/capacity analysis measures the capacity of the airfield configuration by determining its Annual Service Volume (ASV). This measure is an estimate of an Airport's maximum annual capacity based on factors such as aircraft mix, weather conditions, among others. FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*, provides guidance on determining and airport's ASV. The annual capacity of a single runway configuration with a parallel taxiway is approximately 230,000 operations (takeoffs, landings, and training operations). The forecasts project annual operations of 42,032 by 2027, remaining well below the maximum capacity of the existing airfield system.

In addition to ASV, *Airport Capacity and Delay* also provides guidance on determining peak hour capacity. For Mulino Airport, the peak hourly capacity during VFR conditions is 98 operations. The forecasts project peak hour operations of 33 by 2027 (only 34% of the VFR hourly capacity); thus the Airport is expected to have sufficient hourly capacity throughout the 20 year planning period.

Airfield Design Standards

FAA AC 150/5300-13, *Airport Design*, sets forth the FAA's recommended standards for airport design. A few of the more critical design standards are those that relate to runways and the areas surrounding runways including:

- Runway Safety Area (RSA)
- Object Free Area (OFA)
- Obstacle Free Zone (OFZ)
- Runway Protection Zone (RPZ)

The RSA is a defined surface surrounding the runway that is prepared or suitable for reducing the risk of damage to airplanes in the event of an airplane undershoot, overshoot, or an excursion from the runway.

The OFA is an area on the ground centered on the runway or taxiway centerline that is provided to enhance the safety of aircraft operations. No above ground objects are allowed except for those that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

The OFZ is a volume of airspace that is required to be clear of objects, except for frangible items required for navigation of aircraft. It is centered along the runway and extended runway centerline.

The RPZ is defined as an area off each runway end whose purpose is to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The dimensions of an RPZ are a function of the runway ARC and approach visibility minimums. The FAA recommends that RPZs be clear of all residences and places of public assembly (churches, schools, hospitals, etc) and that Airports own the land within the RPZs.

In addition to these design standards, the FAA provides recommended dimensions for runway width, taxiway width, taxiway safety areas and others. It is important to note that while these recommendations are created by the FAA, ODA generally follows the same guidance criteria. **Table 3A** compares existing dimensions to the recommended design standards for Airplane Design Group (ADG) II (small) based on two different categories of approaches. One category reflects dimensions based on visual approaches and approach visibility minimums not lower than $\frac{3}{4}$ statute mile, while the other category depicts approach visibility minimums lower than $\frac{3}{4}$ statute mile.

As shown in Table 3A, the existing OFA is non-standard. The width of the OFA is 365 feet and should be 500 feet. There are several objects that are penetrating its surface: on the west side of the runway there is a berm located approximately 150 feet from the runway centerline. The berm extends the length of the runway and reaches its highest elevations near the runway ends, thereby penetrating the OFA. On the east side of the runway, both windsocks are located 214 feet from the runway centerline, however since these windsocks are supplemental and are on frangible mountings, their location is sufficient. The OFA lengths beyond both runway ends are adequate. In order to bring the OFA into compliance, the berm would need to be removed.

TABLE 4A. Airfield Design Standards

	Existing Dimensions	ADG II (small) Visual and Not lower than ¾ statute mile	ADG II (small) Lower than ¾ statute mile
Runway Width	100'	75'	100'
Runway Centerline to Parallel Taxiway Centerline Separation	400'	240'	300'
RSA			
Width	150'	150'	300'
Length beyond runway end (14/32)	300'/300'	300'	600'
OFA			
Width	365'	500'	800'
Length beyond runway end (14/32)	300'/300'	300'	600'
OFZ			
Width	250'/250'	250'	300'
Length beyond runway end (14/32)	200'	200'	200'
Precision OFZ ^{1/}			
Width	N/A	N/A	800'
Length	N/A	N/A	200'
RPZ			
Inner Width x Outer Width x Length	250' x 450' x 1,000'	250' x 450' x 1,000' ^{2/}	1,000' x 1,750' x 2,500'
Runway Blast Pads			
Length	0'	150'	150'
Width	0'	95'	120'
Runway Shoulder Width	20-25'	10'	10'
Taxiway Width	40'-50'	35'	35'
Taxiway Safety Area Width	79'	79'	79'
Taxiway Object Free Area Width	131'	131'	131'

Source: FAA Advisory Circular 150/5300-13

Notes: ^{1/} A Precision OFZ (POFZ) is a volume of airspace above an area beginning at the runway threshold, at the threshold elevation and is in effect only when the following three conditions are met: Vertically guided approach, reported ceiling below 250' and/or visibility less than ¾ mile, an aircraft on final approach within two miles of runway threshold.

^{2/} If an instrument approach with visibility minimums between ¾ mile and 1 mile is implemented, the recommended RPZ size is 1,000' x 1,510' x 1,700.

Runway Orientation

For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of crosswind components during landing or takeoff.

The FAA recommends providing a crosswind runway when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent

wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for aircraft in ADG I or 13 knots for aircraft in ADG II.

Mulino Airport has a single runway oriented northwest-southeast (Runway 14-32). Wind coverage data is unavailable for Mulino; however, wind coverage at nearby airports was analyzed. The National Climatic Data Center (NCDC) has recorded prevailing wind information for several locations in Oregon, including Portland and Salem, the two cities closest to Mulino. The data is a summary of the period between 1930 and 1996. The data for Portland indicates that winds are consistently out of the east-southeast and average speeds between seven and ten miles per hour. The data for Salem indicates that winds are out of the north during the summer months (June through September) and out of the south during the fall, winter, and spring months with average wind speeds between six and eight miles per hour. Portland International Airport's primary runway is oriented on a heading of 10-28 (east-west) consistent with the prevailing wind direction reported by the NCDC. Salem's primary runway is oriented on a heading of 13-31 (northwest-southeast), consistent with the prevailing wind direction.

Mulino Airport users have reported that the prevailing winds at the Airport are out of the south-southwest, and therefore are frequently at a 45 degree angle to the runway, especially during the fall and spring months. Based on this information, it is possible that the existing runway orientation may not meet the FAA's recommended 95% wind coverage. The Port could conduct a wind survey to obtain information on wind direction/strength to help determine the appropriate runway orientation. In the past, the FAA recommended increasing the width of the runway to the next highest ADG for runways that do not meet the recommended wind coverage, when the provision of a crosswind runway is infeasible. Mulino's runway width currently meets the recommended width of the next highest ADG.

Runway Length

Runway length requirements for an airport are based on several factors such as airport elevation, mean maximum temperature of the hottest month, runway gradient, airplane operating weights, runway surface conditions (i.e., wet or dry), and others. FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*, as well as the FAA's Airport Design Computer Program was consulted for guidance on recommended runway length at Mulino Airport.

Both the Advisory Circular and the computer program classify aircraft based on weight. For "small" airplanes (those weighing no more than 12,500 pounds), the classifications are further divided into two additional categories - small airplanes with fewer than 10 passenger seats and small airplanes with 10 or more passenger seats. The computer program, using site-specific data, reflects runway length recommendations by grouping general aviation aircraft into several categories, reflecting the percentage of the fleet within each category. **Table 3B** summarizes the FAA's generalized recommended runway lengths for Mulino Airport.

Table 4B. Runway Length Requirements

Airport and Runway Data	
Airport elevation	260 feet
Mean daily maximum temperature of the hottest month	80° F
Maximum difference in runway centerline elevation.....	12 feet
Wet and slippery runways	
Runway Lengths Recommended for Airport Design	
Small airplanes with less than 10 passenger seats	
To accommodate 75 percent of these small airplanes	2,480 feet
To accommodate 95 percent of these small airplanes	3,030 feet
To accommodate 100 percent of these small airplanes	3,600 feet
Small airplanes with 10 or more passenger seats	4,140 feet

Source: FAA’s Airport Design Computer Program, Version 4.2D, AC 150/5325-4B, Runway Length Requirements for Airport Design

The current runway length of 3,425 feet accommodates nearly 100% of the small aircraft fleet with fewer than 10 passenger seats. This runway length will be adequate for the remainder of the planning period; however, past Airport Layout Plan drawings show a runway extension to 5,025 feet. The runway length required for takeoff by the critical aircraft (King Air 200) at Mulino Airport is 3,034 feet¹. A 1,600 foot runway extension was recommended in the 1993 master plan and the Port of Portland, and/or any future airport owner, is reserving the right extend beyond the current planning period.

Runway Width

The current runway width of 100 feet exceeds the FAA’s recommended standard of 75 feet for ADG II (small) aircraft and runways with visual approaches. It is recommended that the 100-foot width be maintained. If the existing runway orientation does not meet the 95% wind coverage recommendation (discussed on previous page) or if an instrument approach with visibility minimums of lower than ¾ mile was implemented, the recommended runway width standard would be satisfied.

Runway Pavement Strength

The most important feature of airfield pavement is its ability to withstand repeated use by the most weight-demanding aircraft that operates at an airport. The pavement strength rating of Runway 14-32 is 12,500 pounds single-wheel gear (SWG). This strength rating will be adequate through the planning period, although occasional maintenance will be needed to preserve this strength. A crack seal and slurry seal coat was applied to the runway in 2005. The next round of preventative maintenance is slated for 2008.

¹ The King Air B200 models needs 2,579 feet of runway length at standard temperature and sea level. FAA Central Region guidance states that the runway length required for standard conditions should be increased 0.5% for each degree above the standard temperature in the hottest month and 7% for every 1000’ above sea level.

Taxiways

Mulino Airport currently has a full length parallel taxiway. A full length parallel taxiway provides a safe, efficient traffic flow and eliminates the need for aircraft to back taxi before take-off or after landing. The FAA recommends a parallel taxiway for non-precision instrument approaches with visibility minimums of one mile or more and requires a parallel taxiway for instrument approaches with visibility minimums lower than one mile.

Similar to runway width, taxiway width is also determined by the ADG of the most demanding aircraft to use the taxiway. The existing taxiways at the Airport range between 40 and 50 feet wide. Both widths exceed the ADG II recommendation of 35 feet. Those taxiways that are 50 feet wide meet the ADG III standard.

Runway centerline to parallel taxiway centerline separation distance is another important criterion to examine. The recommended distance is based on satisfying the requirement that no part of an aircraft on a taxiway or taxilane centerline is within the runway safety area or penetrates the runway obstacle free zone (OFZ). The current distance between the runway centerline and the full length parallel taxiway centerline is 400 feet, which exceeds the 240-foot standard for ADG II visual runways and the 300-foot standard for ADG II runways with lower than $\frac{3}{4}$ mile visibility minimums.

The taxiway system at Mulino Airport either meets or exceeds all FAA recommended standards and should be maintained through preventative pavement maintenance. The Oregon Department of Aviation's pavement maintenance program recommends that both fog and crack seals be completed in 2011.

Future airport development should maintain the turf/grass taxiway, which currently provides direct access to the restaurant.

Airport Visual Aids

Airports commonly include a variety of visual aids, such as pavement markings and signage to assist pilots using the airport.

Pavement Markings. Runway markings are designed according to the type of instrument approach available on the runway. FAA Advisory Circular 150/5340-1J, *Standards for Airport Markings*, provides the guidance necessary to design airport markings. Basic (visual) markings are currently in place on Runway 14-32. If a non-precision approach were to be implemented, the runway markings would need to be upgraded to non-precision markings.

There are hold markings on all taxiways adjoining the runway. The purpose of hold markings is to ensure that aircraft waiting for arriving or departing aircraft to clear the runway are not in the RSA. In addition to hold markings, all taxiways are clearly marked with centerlines. Existing hold and taxiway markings at Mulino Airport are adequate.

Airfield Signage. The airport currently has lighted hold signs on taxiways adjoining the

runway. There is also a “Fly Neighborly” sign located near the Runway 14 end and a sign near midfield designating the Runway 14 end as the calm wind runway. The existing signage is adequate and should be maintained.

Airport Lighting

Beacon. The Airport’s rotating beacon, installed in 2003, should be maintained.

Visual Glide Slope Indicators. As discussed in Chapter One, the Airport has a two-box PAPI on both runway ends. It is recommended that the Port maintain the existing PAPI system.

Runway and Taxiway Lighting. Airport lighting systems provide critical guidance to pilots during nighttime and low visibility operations. Runway 14-32 is equipped with medium intensity runway lighting (MIRL). It is recommended that this system be maintained throughout the planning period.

Runway identification lighting provides the pilot with a rapid and positive identification of the runway end. The most basic system involves runway end identifier lights (REILs). Currently, there are no REILs installed at Mulino Airport. If a night time instrument approach procedure is implemented, REILs would aid pilots in locating the runway ends quickly. It is recommended that REILs be installed at both runway ends.

If an instrument approach with visibility minimums lower than 1 mile is implemented, an instrument approach lighting system would be required.

Effective ground movement of aircraft at night is enhanced by the availability of taxiway lighting. All taxiways at the Airport are lit; taxilanes and the apron area are lined with edge reflectors. Taxiway lighting is not required at Mulino Airport so the current conditions are adequate (although future improvements to the hangar area could include the installation of taxilane edge lights).

Mulino Airport is equipped with pilot-controlled lighting (PCL). PCL allows pilots to turn runway lighting on and control its intensity using the radio transmitter in their aircraft. The PCL system should be maintained.

Radio Navigational Aids & Instrument Approach Procedures

Radio Navigational Aids. There are no radio navigational aids at Mulino Airport; however, Newberg and Portland Airports both have VOR/DME (Very High Frequency Omni-Directional Range/Distance Measuring Equipment), which can be used to guide a pilot to the Airport.

Instrument Approach Procedures. There are currently no instrument approach aids available at the Airport. Visual approaches are used on both runway ends, and the current approach slope for both runways is 20:1.

The advent of Global Positioning System (GPS) technology can ultimately provide the airport

with the capability of establishing new instrument approaches at minimal cost since there is not a requirement for the installation and maintenance of costly ground-based transmission equipment. The FAA is proceeding with a program to transition from existing ground-based navigational aids to a satellite-based navigation system utilizing GPS technology. The FAA commissioned the Wide Area Augmentation System (WAAS) in July 2003. WAAS refines GPS guidance for enroute navigation and approaches. General aviation, corporate, air taxi, and regional airline operators are expected to benefit from this augmentation to GPS signals. The FAA is certifying new approaches at the current rate of about 300 per year, nationally.

GPS approaches fit into three categories, each based upon the desired visibility minimum of the approach. The three categories of GPS approaches are: precision, non-precision with vertical guidance, and non-precision. To be eligible for a GPS approach, the airport landing surface must meet specific standards as outlined in FAA AC 150/5300-13, *Airport Design*. The FAA requires that airports having a non-precision GPS approach must have a minimum runway length of 3,200 feet. *Airport Design* states that airports having runways as short as 2,400 feet could support an instrument approach if the lowest Height Above Touchdown (HAT) is based on clearing a 200-foot obstacle within the final approach segment.

The Port has been proactively identifying and removing obstructions as necessary to provide clear airspace and make way for a straight-in non-precision GPS approach to the Airport. The existing runway length meets the minimum length requirements for this type of approach and therefore would not require an adjustment to the lowest Height Above Touchdown elevation as described above. A straight-in non-precision approach requires a cleared threshold siting surface slope of 34:1 (versus the 20:1 slope required for a visual approach). Initial examination indicates that the threshold siting surface dimensions required by this type of approach would be clear of penetrations with the exception of a few trees near the Molalla River. However, further analysis will need to be conducted and will be outlined in the upcoming chapters and the ALP drawing set. Final determination of feasibility of implementing an instrument approach procedure would need to be conducted by the FAA Flight Procedures Office.

Helicopter Facilities

There is an existing helipad located east of the hangar area. This helipad is marked with an “LF” and is designated for LifeFlight emergency medical transport helicopters. While its current location is adequate, if additional rows of hangars are constructed as currently proposed, the helipad will interfere with aircraft taxiing to the hangar area. It is recommended that an alternate helipad location be found. Chapter 5, Development Alternatives, will identify potential locations where a helipad could be located.

Other Airfield Recommendations

Traffic Pattern. The current traffic pattern requires left hand traffic for Runway 32 and right hand traffic for Runway 14. This pattern is in place as a noise abatement procedure to reduce over flight of the community. The existing traffic pattern procedure is adequate.

Wind Indicators/Segmented Circle. The existing windcone and segmented circle are

located on the east side of the parallel taxiway at about midfield. These facilities are adequate and should be maintained throughout the planning period. There are also two supplemental windcones, one near each runway end.

Weather Reporting. There is currently no weather reporting facility at Mulino Airport. The closest weather reporting station to Mulino Airport is located at Aurora State Airport, eight nautical miles west. If an instrument approach is implemented, an approved altimeter reporting source will also be needed. Either an Automated Weather Observation System (AWOS) or a SuperUnicom could be installed (both have been approved by the FAA). An AWOS consists of a sensor located on top of a tower that provides automatic recordings of cloud heights, visibility, wind speed, wind direction, temperature, dew point, and altimeter setting. An AWOS requires a 500-foot critical radius in which buildings taller than a specified height can not be located. A SuperUnicom (also known as a SuperAWOS) will provide both wind and altimeter information. A SuperUnicom is a small box that is typically collocated with an Airport's windcone. The device does not have the height restrictions typically associated with a traditional AWOS and its installation costs are significantly less.

LANDSIDE REQUIREMENTS

Landside facilities are those facilities necessary for handling aircraft on the ground, and those facilities which provide an interface between the air and ground transportation modes. Landside requirements are addressed for the following facilities:

- Hangars
- Aprons and Aircraft Parking
- Airport Access & Vehicle Parking
- Aviation Services

Hangars

The utilization of hangars varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft is toward higher performance, higher value aircraft; therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs. In planning for hangar development, the number and type of aircraft to be based at the Airport is analyzed. Hangar development should be based upon actual demand trends and financial investment conditions, not solely on forecasts. At Mulino Airport 37 of the 40 based aircraft (92%) are currently stored in hangars; the remaining three aircraft are stored in tie-downs. In the future, it is expected that this ratio will increase slightly to 95%, creating a need for 33 additional hangar spaces by 2027. This increase accounts for the trend that aircraft owners are purchasing higher valued aircraft and that the based aircraft forecast includes the addition of multi-engine aircraft to the fleet mix.

Hangar facilities at an airport typically consist of some combination of T-hangars and conventional/private hangars. T-hangars typically store one aircraft in one unit, while conventional/private hangars can store more than one aircraft in one large enclosed structure. In order to determine the number of T-hangars versus conventional hangars, the following

assumptions were made:

- All multi-engine aircraft will be stored in conventional hangars
- 5% of all single engine aircraft stored in hangars will be stored in conventional hangars, while the remaining single engine aircraft will be stored in T-hangars.

Applying these assumptions, 31 additional T-hangars will be needed and 5 additional conventional hangars will be needed by 2027. For space planning purposes, a ratio of 1,200 square feet per aircraft is used for T-hangar development, resulting in a total of 76,800 square feet of building area; including taxiway construction around the T-hangar area, this equates to approximately three acres of land. Conventional hangar sizes generally range between 1,400 to 3,600 square feet per aircraft. For planning purposes at Mulino Airport, a ratio of 2,500 square feet will be used, resulting in a need for 15,000 square feet of conventional hangar building area. After the apron areas in front of each hangar and taxiway access to the hangars are constructed, it is estimated that approximately one acre of land will be needed for conventional hangars. **Table 3C** summarizes the hangar development needs for each milestone year.

Aprons and Aircraft Parking

Currently, there is a total of 18 tiedown positions at the Airport, 16 on the apron, and two usable tiedowns in the grassy area adjacent to the apron. Three based aircraft (8%) are presently stored in tiedowns. As noted earlier, due to the desire for aircraft owners to store their aircraft in hangars, it has been assumed that the number of aircraft stored in tiedowns will decrease over the planning period to 5%. Using this ratio, four based aircraft will be stored in tiedowns by 2027.

The FAA has developed an approach for determining the number of tiedowns needed for itinerant aircraft operating at an airport. The following general methodology was taken from *Airport Design*, Appendix 5, Change 10 and is based on peak operations calculations:

1. Total annual operations (from Chapter Two)
2. Multiplied by 50 percent (50 percent of annual operations are departures)
3. Divided by 12 (Number of departures per month in a one year period)
4. Divided by 30 (Number of departures per day, based on a typical 30-day month)
5. Reduced by 80 percent to account for aircraft that do not remain at the Airport.

Using this methodology, the Airport will need to have transient tiedown space for 11 aircraft by 2027. Combining based and transient tiedown needs, a total of 15 tiedown positions will be needed throughout the planning period. The FAA recommends using a ratio of 300 square yards per based aircraft tiedown, and 360 square yards per transient aircraft tiedowns, creating a total need of 5,160 square yards. The current apron is approximately 5,300 square yards and will be adequate for the 20 year planning period; however, it is recommended that three to four existing tiedowns be reconfigured to allow enough room for aircraft with wingspans in ADG II to park on the apron. The forecasted transient operations have a larger turboprop fleet than the based aircraft fleet and many turboprops are ADG II aircraft. In addition, the critical aircraft (Beech King Air) is also an ADG II aircraft. Reconfiguring the existing tiedown layout will allow the Airport to better accommodate these types of aircraft on the paved apron.

TABLE 4C. Landside Facility Needs

	2006	2012	2017	2027
Based Aircraft	40	51	58	74
Total Hangar Units	34	48	55	70
Total T-Hangars	33	45	50	64
Total Square Feet	39,900	54,000	60,000	76,800
Total Conventional Hangars	1	3	5	6
Total Square Feet	2,500	7,500	12,500	15,000
Semi-Enclosed Hangars	3	0	0	0
Total Square Feet	2,700	0	0	0
Tiedown Positions	18	11	12	15
Based Aircraft Tiedowns	3	3	3	4
Total Square Yards	5,300	900	900	1,200
Transient Aircraft Tiedowns	N/A	8	9	11
Total Square Yards	N/A	2,880	3,240	3,960

Source: W&H Pacific, 2006

Note: Square footages for hangars do not include areas needed for taxilanes between hangars.

In addition to the hangars and paved tiedowns in Table 3C, the airport development plan should also preserve the grass tiedown area needed during the summer fly-in.

Airport Access and Vehicle Parking

The current single point of access to the Airport, via Mulino Road, is adequate. No changes are recommended.

There are six designated automobile parking spaces near the pilot's lounge, inside the access gate. It is recommended that an automobile parking area designated for use by the general public be made available outside of the gate. Such a designated area will reduce safety hazards between vehicles and aircraft on taxiways and taxilanes, thereby enhancing the overall safety and security of people and aircraft.

Aviation Services

As discussed in Chapter Two, there are no FBOs currently operating at the Airport. However, a pilot's lounge/FBO building is available. This building houses restrooms, telephones, a lounge area, flight planning area, and other amenities. It is recommended that this building be maintained.

As aviation activity grows, an FBO business may be attracted to the Airport. The FBO may lease existing building(s) or prefer to lease land and construct a new facility. In the planning of the Airport's landside area, it is recommended that at least one acre be designated for a FBO

facility. The FBO site should be located with easy access and visibility from the airfield and should have adjacent land available for future expansion.

SUPPORT FACILITY REQUIREMENTS

Various facilities that do not logically fall within the classifications of airfield, or landside have been categorized as Support Facilities. The following components were evaluated to determine the need for future improvements:

- Emergency Services
- Airport Maintenance
- Airport Fencing
- Utilities
- Storm Drainage
- Aviation Fueling Facilities

Emergency Services

There are no Aircraft Rescue and Firefighting (ARFF) facilities available at the Airport. Emergency services are provided by the City of Molalla Volunteer Fire Department and the Clackamas County Sheriff's Department. The Port provides aircraft emergency training to the volunteer firefighters once per year.

Airport Maintenance

Airport maintenance is currently provided by the Port. No changes are recommended.

Airport Fencing

Three-foot tall, primitive wildlife fencing surrounds the perimeter of the Airport. There is one automated six-foot, chain link vehicle gate, which is controlled by a punch-type combination. There is also one open pedestrian access point located near the OPA building on Airport Road. While fencing is not required, the Port may want to upgrade the existing wildlife fencing. Typically, either six or eight-foot secure chain link fencing with three strand barbed wire is used.

Utilities

Utilities available at the Airport include: electricity, water, and telephone. A storm water detention pond is located on the north side of the Airport's property boundary. There is no sanitary treatment facility in the community of Mulino.

Storm Drainage

The need for additional hangar and taxilanes facilities has been identified. The construction of these types of facilities will increase the Airport's existing impervious surfaces. As noted in Chapter 2, Inventory, these additional surfaces must be evaluated to ensure that the requirements

of the 1200-Z² stormwater discharge permit are met. Because a specific layout for future development has not been defined yet, the exact amount of increased impervious surface is to be determined. The alternatives analysis will provide additional details regarding stormwater impacts of each alternative. The analysis will also include Department of Environmental Quality (DEQ) requirements, and water treatment and detention.

Aviation Fuel Facility

Fuel is not available for sale at the present time. However, the Port has recently installed the infrastructure required for a self-service fuel-dispensing facility. Aurora State Airport is the closest airport where aviation gasoline and jet fuel are sold. Airport users have indicated that one of the most important improvements that could be made to Mulino Airport is the installation of a fueling facility.

For some GA airport sponsors, the major source of revenue at an airport is profit from selling fuel. The first entry into fuel sales for a small general aviation airport is usually a self-service facility, wherein revenues gained from fuel sales can be used toward facility improvements. In the event that an FBO begins operating at the Airport, fee restructuring will likely be needed as management of the fuel facility would shift from Port-owned self service to FBO-owned fueling. It is important to note that even when airport sponsors are not the fuel vendor, airport sponsors still derive revenue from fuel flowage fees imposed on vendors. These revenues remain on the airport in the form of future facility improvements.

AIRPARK

Interest in a residential airpark at the Airport has been expressed by several Airport users. Currently, there are two options for development: on-Airport and off-Airport. This section discusses both development options.

If the airpark were to be developed off-Airport, a private developer would be able to acquire land and finance all development. Once developed, the residential airpark's homeowner's association would enter negotiations with the Port to gain ingress and egress to and from the Airport. The agreement would require the homeowner's association to pay a fee, which would then be direct revenue to the Airport.

Alternatively, on-Airport development has inherent obstacles for both the Airport Sponsor and the developer to overcome. Most importantly, the question arises as to who would finance the development and infrastructure, as the FAA would not fund development that isn't open to the public. Second, without having a deed to the land, potential homeowners would have difficulty securing a loan or mortgage to finance development. Because of these impediments, it is

² The federal Clean Water Act mandates jurisdictional control of the quality of stormwater runoff. This mandated program is found in the Code of Federal Regulation part 122.26. The Airport may fall under the scope of these regulations and may need to apply for a National Pollution Discharge Elimination Permit (NPDES) for the discharge of rain water to the surface water system. In Oregon this is typically referred to as a 1200-Z General Permit.

recommended that any land currently owned by the Port that is ideal for residential airpark development be identified as surplus. The land would then be eligible to be sold to a private developer, notwithstanding FAA approval and possible grant repayment. Once purchased, the land could be developed in the same manner as the off-Airport scenario.

For either on- or off-Airport development scenario, access would be provided via secured taxiway(s). This taxiway(s) would be financed by the private developer/homeowner's association. Additionally, it would be necessary to apply for zoning changes to allow for residential development, if the land is not already appropriately zoned.

Chapter 5, Development Alternatives, will illustrate possible locations of airpark development, both on- and off-Airport property. Using zoning ordinances from existing airparks, particularly the airpark at Independence State Airport as an example, the development alternatives will take into consideration development density and other facilities such as sanitation.

LAND USE PLANNING & ZONING RECOMMENDATIONS

In general, as highlighted within Chapter 2, Inventory, the Port meets all State and County land use requirements. Even so, there are several items the Port should work towards with regard to land use and zoning around the Airport. Recommendations are provided below. The Capital Improvement Plan (CIP) (included in Chapter Seven) will provide a cost estimate to implement these recommendations.

Zoning Code:

- Consider rezoning the underlying designations within the Airport property as “Airport” to ensure that only compatible uses are occurring within the Airport property boundary. The rezoning would be based on Oregon Administrative Rules.

Comprehensive Plan:

- Adopt the final Airport Layout Plan, by reference, into Clackamas County's Comprehensive Plan.
- Adopt a title notice or similar requirement to inform purchasers of property within one mile of the Airport that their property is located adjacent to or in close proximity to the Mulino Airport and that their property may be impacted by a variety of aviation activities. Note that such activities may include but are not limited to noise, vibration, chemical odors, hours of operations, low overhead flights, and other associated activities.

SUMMARY

The intent of this chapter has been to outline the facilities that may be required to meet potential aviation demand projected for Mulino Airport through the long term planning horizon. The next step is to create development alternatives and select one which best meets these projected needs.