

Appendix A



Mulino State Airport – Pilot Survey Responses

There were 39 pilot surveys received between August 10, 2015 and January 6, 2016. The survey link was sent to the pilot chapter presidents in the Portland area for member dispersal, published in the OPA “Propwash” newsletter, mailed to airport tenants at Aurora State Airport, and mailed to 59 aircraft owners included on Mulino’s basedaircraft.com website.

Q1: At which airport is your aircraft stored?

<u>Answer Choices</u>	<u>Responses</u>
Mulino State Airport	18.42%
Aurora State Airport	5.26%
Lenhardt Airpark	2.63%
Troutdale Airport	36.84%
Hillsboro Airport	0%
Pearson Airfield	2.63%
Starks Twin Oaks Airpark	2.63%
Chehalem Airpark	0%
Grove Field	0%
Scappoose Industrial Airpark	0%
Valley View Airport	5.26%
Country Squire Airport	0%
Sportsman Airpark	0%
Other (Sandy River, Dietz Airport, Beck Field)	26.32%

Q2: If you base your aircraft at Aurora State Airport, do you foresee the new Air Traffic Control Tower affecting your operations at the airport?

<u>Answer Choices</u>	<u>Responses</u>
N/A (My aircraft is not based at Aurora)	84.85%
Yes	9.09%
No	6.06%

Q3: If your aircraft is not currently based at Mulino State Airport, would you consider relocating to Mulino State Airport?

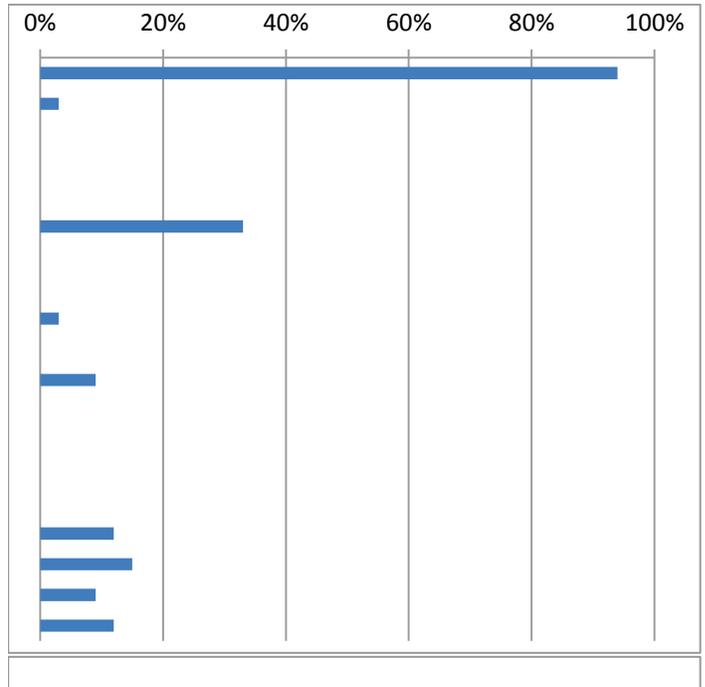
<u>Answer Choices</u>	<u>Responses</u>
N/A (My aircraft is based at Mulino)	15.79%
Yes	21.05%
No	63.16%

Q4: If you answered YES to the previous question, please tell us how you plan to store your aircraft at Mulino?

<u>Answer Choices</u>	<u>Responses</u>
Tiedown Apron	22.22%
Rent Existing Hangar	44.44%
Build New Hangar	22.22%
Rent existing hangar (if available), but if not available then I plan to build a new hangar	22.22%
Other	11.11%

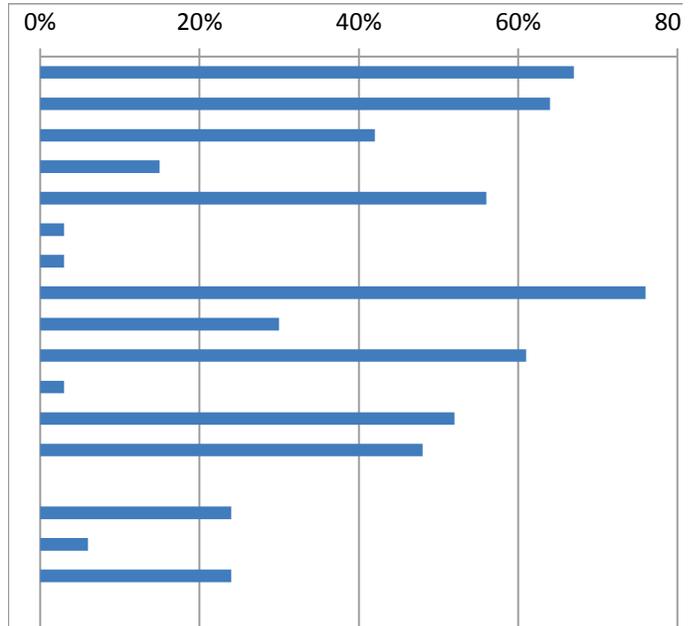
Q5: Which of the following aviation activities do you perform? Check all that apply.

<u>Answer Choices</u>	<u>Responses</u>
Recreational Flying	94.87%
Glider	2.56%
Ultralight	0%
Helicopter	0%
Balloons	0%
Turf Runway Operations	33.33%
Parachute/Skydiving	0%
Aerial Applicators (Agriculture)	0%
Emergency Medical Flights	2.56%
Aerial Advertising (Banner Towing)	0%
Aerial Photography	7.69%
Law Enforcement Flights	0%
Aerial Fire Response	0%
Air Cargo	0%
Aircraft Charters	0%
Flight Training	10.26%
Corporate/Business Flights	15.38%
Tourism (Scenic Flights for Hire)	7.69%
Other (Including Aircraft Ferry)	10.26%



Q6: Which facilities are important to support your operations at an airport? Check all that apply.

<u>Answer Choices</u>	<u>Responses</u>
Runway (Length/Surface)	69.23%
Hangars (Rental)	66.67%
Instrument Approach Capabilities	35.9%
Terminal Area (Apron)	12.82%
On-Field Weather	48.72%
Fuel Jet-A (Self-Serve)	2.56%
Fuel Jet-A (Full Service)	2.56%
Fuel AVGAS (Self-Serve)	76.92%
Fuel MOGAS (Self-Serve)	35.90%
Airfield Lighting	58.97%
Helicopter Parking	2.56%
Aircraft Parking/Tiedowns	52%
FBO Services	48.72%
Aerial Applicator (Loading Area)	0%
Fencing/Security	35.90%
Air Traffic Control Tower	5.13%
Other (Including Turf RWY, etc.)	23.08%



Appendix B





MEMO

To: Oregon Department of Aviation

CC: Jim Pex, Greg Reince, Matt Rogers

From: Century West Engineering

Date: January 6, 2016

Re: Mulino State Airport Water Improvements

The purpose of this memo is to describe the existing waterline conditions at the Mulino State Airport and provide potential solutions to increase fire flow for future development.

Water Constraints at the Airport

It has been noted by the Fire Marshal¹, the airport has limited hydrant flow. Notably, the hydrant flows are below state standards for capacity of 1,500 gallons per minutes at 20 PSI. The only possible development is the replacement of the T-hangars that were previously demolished. No additional future development is currently permitted. Expansion of the airport facilities would further strain the fire flow capacity and would not be supported by the state Fire Marshal if no improvements were proposed to the water system.

Existing Conditions

An overview of existing conditions at the Airport is shown in Figure 2-2 for reference.

After review of the existing water system maps and a technical memorandum (attached) prepared by Pietrok Engineering and Resources, LLC to update the Mulino Water District's water master plan, Century West Engineering (CWE) has compiled a short list of projects that would be needed to provide adequate fire protection for growth at the airport. Notably, the proposed projects by CWE were also identified within the technical memorandum prepared by Pietrok Engineering. Construction costs have been updated by CWE to reflect current market values.

The Mulino Water District's inventory map (see attached Drawing Sheet 1) showed a specific constraint on both sides of the airport waterline loop. On the north end starting at the intersection of Mulino Road and Highway 213, an 8" waterline is stubbed to the west (along Mulino Road) that is then downsized to 6" and eventually 4" at the intersection of Landing Way. This 4" line feeds the north end of the Airport facilities and several fire hydrants in the vicinity.

The waterline transitions from a 4" line to and 8" on airport property, travels south, and eventually ties back into a 4" waterline at Darnell Road. This 4" section then ties back into the main 8-inch line located in Highway 213.

¹ M. Penunuri (personal communication, October 26, 2015)

Review of Improvements

Upon review, it is evident that the issues with the existing fire flows are a direct result of constrained smaller pipe diameters that make up the loop in the water system at the Airport. The larger 8" water lines on Airport property are fed by 4" water lines at the north and south end of the loop. The 4" water lines do not have the capacity to provide adequate fire protection to meet minimum state standards. The minimum pipe size to supply fire flow is 6" in most cases but should be standardized to an 8" pipe to provide capacity for future growth.

The three options presented below have been identified to improve the fire flow capacity at the Airport. Refer to Figure 1 for a depiction of each of the options.

Project Option 1 – Replace Pipe along Mulino Road and Land Way

This option would install approximately 2,400' of undersize waterline pipe along Mulino Road and Land Way with a minimum 8" pipe. The existing pipe varies between 6" and 4". Because the waterline appears to be located outside of the existing pavement, the cost of replacement would be reduced significantly compared to if the water line was within the pavement section. The project would create an immediate improvement in water flow and fire suppression capability for the Airport due compared with the current pipe configuration.

This option is similar to Pipe Upgrade 3 of the Capital Improvement Projects described in the technical memorandum prepared by Pietrok Engineering. However, the project described in the technical memorandum only takes into account domestic use and fire suppression without consideration of growth at the Airport. The proposed Option 1, however, will install 8" pipe from Highway 213 to the existing 8" line on the north end of the Airport near valve M21 shown on Drawing Sheet 1.

- *Pro: Solves an immediate need with flow restrictions in the 4" and 6" waterlines that feed the north end of the Airport. The Airport would not maintain the waterline in the future.*
- *Con: Does not complete the loop in the 4" section that ties to Darnell Road. Because the waterline is looped, it will continue to have reduced flow ability due to the 4" line connection at Darnell Road. However, the losses would be minimal in comparison to Option 2 alone described below. The ideal situation would be to replace both locations of 4".*
- **Estimated project cost: \$250,000-\$350,000**

Project Option 2 – Replace Pipe along Darnell Road

This option would install approximately 1,400' of undersize waterline pipe along Darnell Road with a minimum 8" pipe. The existing pipe is only 4". The majority of the waterline is located outside of the roadway pavement, thus reducing costs to replace it with an 8" waterline.

This option is similar to Pipe Upgrade 4 of the Capital Improvements Project described in the technical memorandum prepared by Pietrok Engineering. However, the project described in the technical memorandum only takes into account upgrading the pipe in Darnell Road and not the extension onto Airport property. The

proposed Option 2, however, will install 8" pipe from Highway 213 to the existing 8" line on the south end of the Airport.

- *Pro: Helps increase the fire flows for the southern portion of the Airport. The Airport would not maintain the waterline in the future.*
- *Con: Does not solve the restricted fire flows at the north end of the Airport and hangar facilities. Replacement of the section on Darnell Road in Option 2 would minimally increase fire flow for the Airport due to the current configuration.*
- ***Estimated project cost: \$150,000-\$250,000***

Project Option 3 – Construct a New Well on Airport Property

This option would install a new well on Airport Property capable of supplying water for domestic use and fire suppression. The location of the well would be determined at a later date if the option was selected. This project would also need to place new pipe for the Airport to use because the water district will not allow cross-connection to their facilities from a private source.

This option is similar to Item 5 of the Capital Improvement Projects described in the technical memorandum prepared by Pietrok Engineering. However, the project described in the technical memorandum accounts for installing a new well for water district use only and does not include additional pipe for airport needs if the well was placed on Airport property. The proposed Option 3, however, will install a new well capable of supplying water for Airport needs.

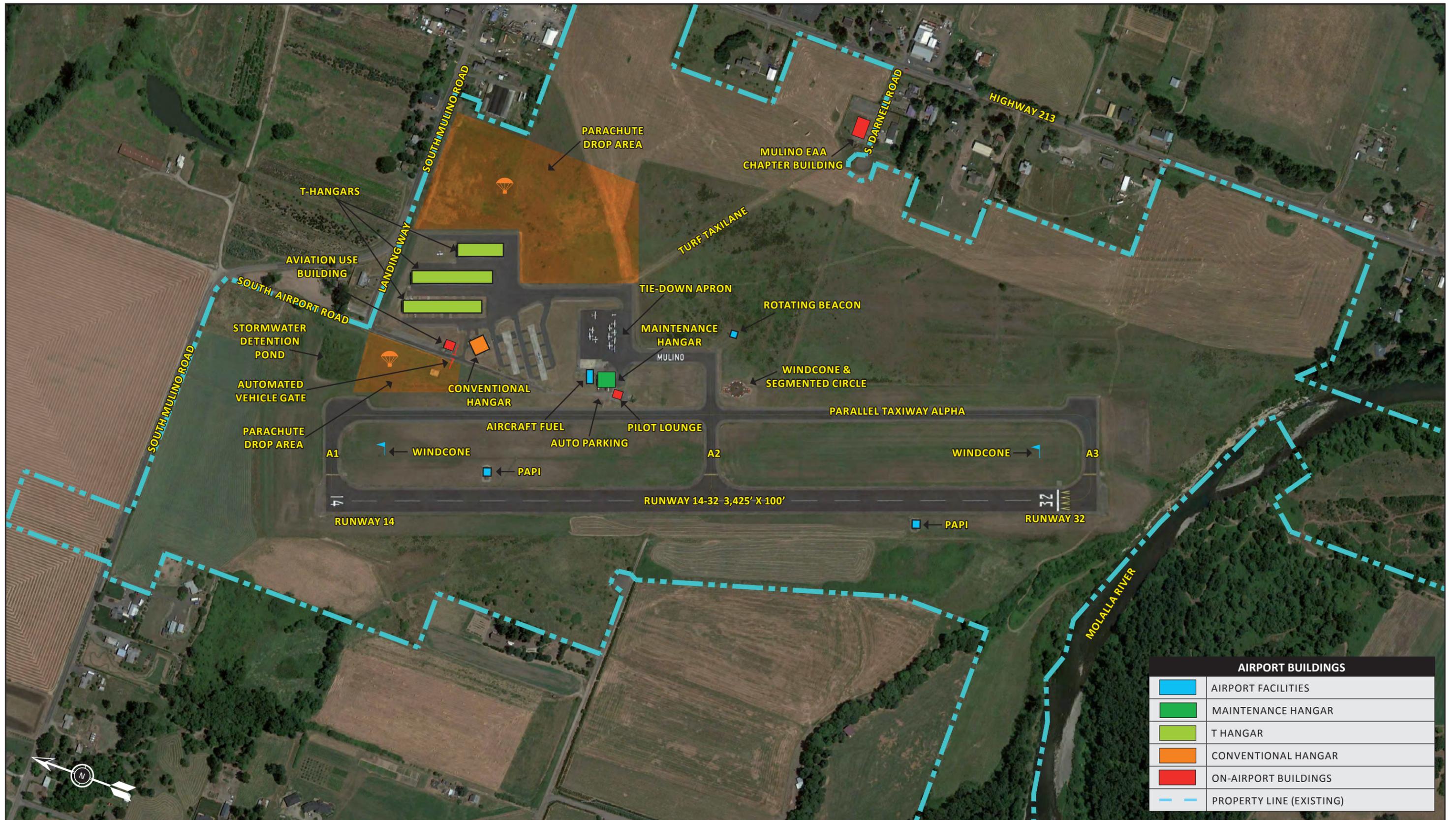
- *Pro: This would solve the water supply because the well could be sized to provide as much water as required.*
- *Con: Providing wells that supply both domestic and fire flow are expensive and must be maintained continuously. Per code, fire flow pumps must be redundant. As a result, at least (2)-20hp variable frequency pumps would be required to provide adequate fire suppression. An additional 3 hp domestic pump would be required, and the costs would further increase. The supply line would also need to be separate from the existing facility because the water district will not allow a private source to be combined to their system due to cross-contamination concerns. Maintenance costs will also be recurring for the pumps, well, and piping in the future.*
- ***Estimated project cost: \$450,000-\$500,000***

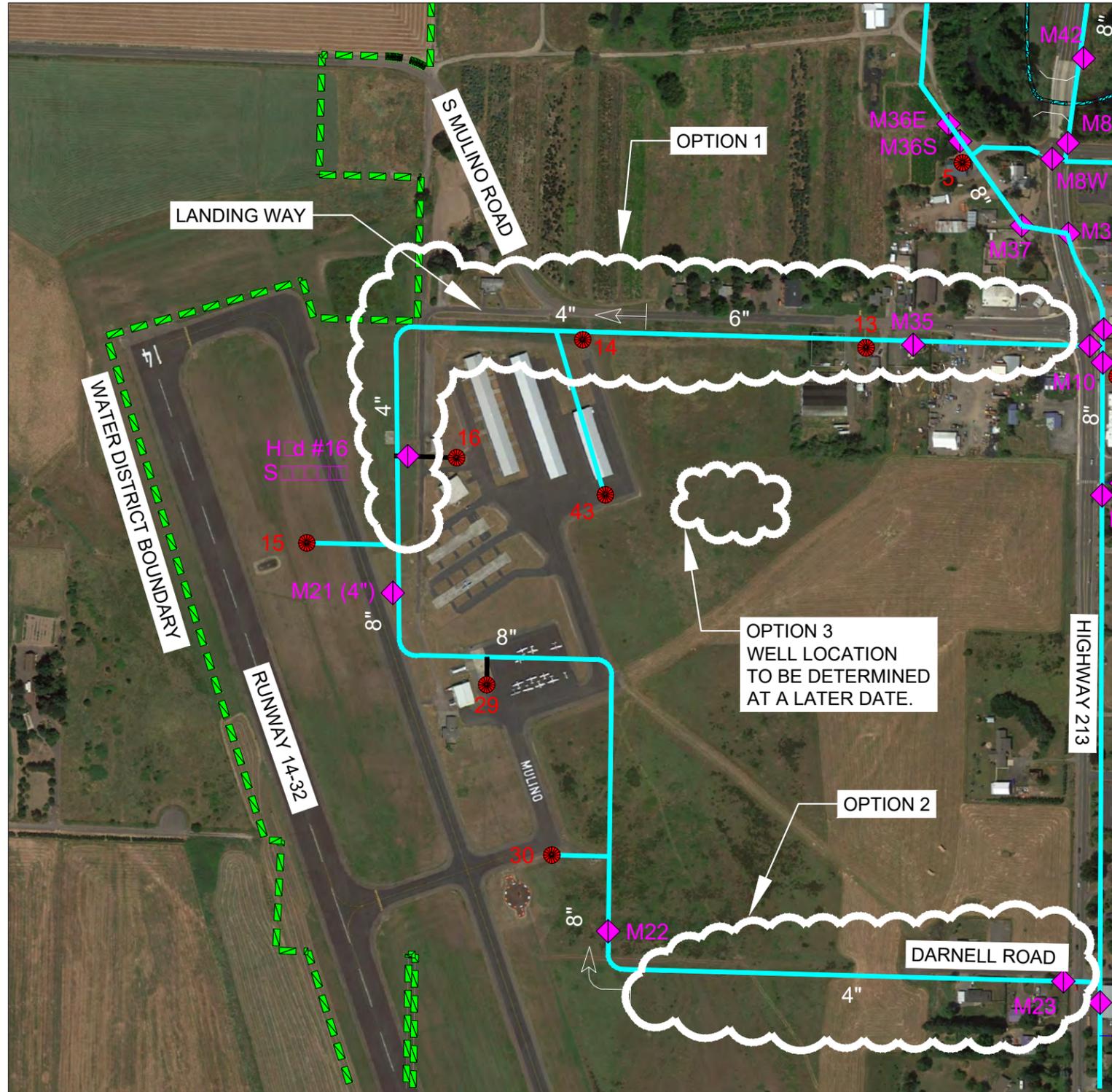


Recommendation

Combining Option 1 and Option 2 would completely solve any issues in the future growth of the Airport and could be phased as separate projects in the future as demand requires.

Option 1 presents to be the best alternative to the immediate issues of fire flow at the Airport. The project cost is medium-high in relation to Options 2 and 3; however, no further maintenance would be required once the project is complete. The existing pipe configuration would provide 8" piping for over 75% of the Airport region. The upgrade would increase capacity at or near the minimum state requirements. Option 2 could be constructed as funding is available.





- LEGEND:**
- WATER DISTRICT BOUNDARY
 - 6" WATER LINE
 - 13 FIRE HYDRANT
 - M21 (4") MAIN LINE VALVE

- NOTES:**
1. INFORMATION SHOWN BASED ON APPROXIMATE LOCATIONS PROVIDED BY THE MULINO WATER DISTRICT. NOT SURVEYED.

SOURCE: MULINO WATER DISTRICT, MARCH 2015

PLAN
NO SCALE

1
1



I:\SDSK\PROJ\40097\001\AMP\Water\0001\Fire.dwg



VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING.
0" = 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

NO.	DATE	BY	APPR	REVISIONS

CENTURY WEST ENGINEERING
BEND OFFICE
1020 SW EMKAY DRIVE, #100
BEND, OR 97702
541.322.8962
541.382.2423 FAX

DATE: JANUARY 2016 PROJECT NO: 40097.055.01

DESIGNED BY: GJR
DRAWN BY: GJR
CHECKED BY: WMR
SCALE: AS NOTED

**OREGON DEPARTMENT OF AVIATION
MULINO STATE AIRPORT
AIRPORT MASTER PLAN**

**FACILITY REQUIREMENTS
WATER IMPROVEMENT OPTIONS**

DRAWING NO. **1**
SHEET NO. **1 of 1**

DRAFT TECHNICAL MEMORANDUM

TO: Mulino Water District board

FROM: Neil Pietrok, PE

DATE: July 15, 2013

RE: Update of the Mulino Water District Master Plan and Capital Improvement Plan

CC: Yogi Trogden, Water District Superintendent

Introduction

The Mulino Water District is a small community water system in Clackamas County Oregon. The District serves approximately 210 customers. A Master Plan for the District was prepared by JMS Engineering in October, 1999. This technical memorandum will provide an update to that master plan. At the end of this Memorandum a list of proposed capital improvement projects will be presented in a 5-year, ten-year, and 15-year plan.

Chapter 1 Update

Chapter 1 of the existing Master Plan describes the District Background and the time span of the study (20 years). There are no updates to this chapter at this time.

Chapter 2 Update

Chapter 2 discusses the District formation, location, water supply sources, water rights, distribution system, water treatment, system operation, and storage facilities.

The Mulino Water District is still classified as a "Community Water System". An updated OAR 333-61-025, rules for community water systems, is attached to this Memorandum.

The water supply sources have not changed since the 1999 report. However, the report discusses Well #1 which was abandoned in 1973. It does not discuss whether the District still owns the water rights for this well. This should be investigated in case the District needs water rights in the future or needs another well.

The District Map has been updated recently to reflect construction changes and updated information. A reduced size version of this map is attached to this Memorandum.

Chapter 2 notes that the current water usage of 540 gallons-per-minute exceeds the permitted quantity of 235 gpm. It is not clear if this discrepancy was ever addressed by the District with State Water Resource Department.

The District Map has been updated recently to reflect construction changes and updated information for the water distribution system. A reduced size version of this map is attached to this Memorandum.

Chapter 2 discussed the need to upgrade 4" water mains to a minimum size of 6" diameter for fire flow. This will be a factor in assigning projects to the Capital Improvements Project Plan (CIP). This chapter also discusses a fire hydrant replacement program. That program is currently be implemented by the Water District Superintendent. Replacing the hydrants in the system should be considered a maintenance project for the district. Maintenance Projects are differentiated from CIP projects by their size and frequency and should have a different budget line item.

Treatment and system operations have not changed since the 1999 Master Plan.

Maintenance work on the storage reservoirs is ongoing with an annual program initiated by the District Superintendent.

Chapter 3 Update

Chapter 3 discusses land use and population projections. The original report projected a 2013 population (based on 3.5 people per household x number of system connections) of 906. Actual population is 735. This is consistent with the lower than expected water usage in Chapter 4 Update below.

Chapter 4 Update

Chapter 4 discusses water use, system water loss, metering and rates, future water requirements, and fire flows. The largest water users (V&V, Electronic Control Design, and the school) has not changed. Water production has remained consistent with the 1999 numbers of approximately 32 million gallons a year. This is due to the slower population growth than expected and system improvements which have reduced water loss.

The District Superintendent noted that the system water loss was checked several year ago and was around 5%. This is a good number compared to an average of 10-20% for most community systems.

At the time of this draft Memorandum, an update for the metering rates was not available. The final Memorandum will have the updated rates for the District.

The 1999 fire flows showed that the Fire Hydrant at Highway 213 and Passmore Road did not meet requirements. There have been substantial upgrades to the water system in this area since 1999. Data for fire flows from the Molalla Fire District was not available at the time of this draft Memorandum. Updated information will be included in the final Memorandum. Also the report notes that the spacing of hydrants in the District is farther than 500 feet apart. This affects the insurance requirements of the residents in the District. A separate study should be conducted to assess the cost versus benefit ratio of adding fire hydrants to the District's system in order to lower the district's population insurance rates.

The projected water demands in the original Report overestimate needed flows because of the slow population growth.

Chapter 5 Update

Chapter 5 discusses future water needs. As discussed previously the slow population growth has stunted the need for more water. However, the district has very little water reserve for emergencies, such as loss of power due to a storm.

The Report recommends adding another well to the District's water system as a back-up well. The costs for the proposed well in the report have approximately tripled based on Means cost estimating software. This would mean a new well for the district would cost about \$300,000.

Chapter 6 Update

Chapter 6 discusses water quality, regulations, testing, well head protection, and aesthetic concerns. The District's current testing program is showing very little contaminants in the water. Disinfection and treatment have not changed since the 1999 report nor have the regulations. There have been complaints about milky or dirty water at times but these issues have resolved themselves and are usually due to system flushing. This is consistent with other water districts' flushing programs.

Chapter 7 Update

Chapter 7 discusses water storage requirements. The water storage deficit was 127,000 gallons in 1999 and that has not changed much over the years. As a result, the District has very little emergency storage. The projections in the report were that the deficit would grow to approximately 320,000 gallons by 2020. At that time the deficit would affect emergency storage and fire reserve storage. This deficit has been delayed due to the slower than expected population growth. However, the storage expansion options should be considered.

Another discussion in this chapter concerned an emergency plan. Currently the two wells do not have a method for connecting a generator in the event of a power outage.

Chapter 8 Update

This chapter discusses the system hydraulic analysis. The system hydraulic model needs to be updated, but it is not considered a priority at this time. The update for the proposed system improvements discussed in this chapter will be addressed below in the Capital Improvements Plan.

Chapter 9 Update

This chapter addressed financial planning. Financial planning is not a part of the scope of work for this Technical Memorandum.

District Plan for Improvements

Maintenance Improvements

The District should continue the current maintenance programs of fire hydrant replacement and service upgrades as required. The fire hydrant replacement program replaces hydrants that are deficient in either age of the hydrant or water service to the hydrant. The water service upgrades general happens when a line break is reported or noticed by the District Superintendent. Typically, the repairs for the line breaks reveal other system repairs that are completed at the same time to save money. Also an adjacent service to the break may be upgraded at the same time to save future construction and permitting costs.

Another maintenance program the District has is storage tank inspection and cleaning. This program should continue.

Capital Improvements Projects

The noted projects in the 1999 Report that have not been completed to date include upgrading all 4" water mains to 6" or 8" water mains, adding a new well to the water system, and upgrading or adding storage.

Pipe Upgrades

1. Upgrade Graves Road Near Milk Creek Circle from 4" to 6" Pipe ~ \$120,000
2. Upgrade Graves Road Near Howards End from 4" to 6" ~ \$150,000
3. Upgrade Mulino Road from 4" to 6" ~ \$90,000
4. Upgrade Darnell Road from 4" to 8" ~ \$100,000

The upgrades for Graves road help complete a loop in the distribution system and provide better fire flow in the area. Item 1 connects past upgrade work from Passmore Road, Highway 213, and the Milk Creek Bridge Project.

The upgrades for Mulino Road and Darnell Road complete a water system loop around the airport and provide better fire flows at the airport property. These upgrades may be able to be partially paid for by SDC fees from future airport work.

New Well

5. Install new 300' Deep Well ~ \$300,000

This well was discussed in the original 1999 report. This is an updated cost estimate based on 2013 prices.

New Storage Reservoir

6. Construct New 250,000 gallon reservoir ~ \$750,000

This project would add water storage to the District system. This estimate does not include real property costs nor any demolition costs. As an alternative, the existing 100,000 gallon reservoir could be demolished and replaced with a 200,000 or 300,000 gallon reservoir. This would save property costs, but it is not clear at this time if a larger reservoir would fit on the existing property.

Well Upgrades

7. Add an Automatic Transfer Switch to the Well #3 ~ \$40,000

This project was discussed in the 1999 report. Only costs for Well #3 are included here.

Implementation Plan

The following is a 5-year, 10-year, 15-year, and 20-year plan for capital improvements projects in the district. Projects were prioritized based on factors of greatest impact to the District and safety improvements. Based on immediate past projects in the District (Passmore Road, Highway 213 bridge, and Graves Road Bridge), it was assumed that the District has funds for about \$100,000 per year for Capital Improvements. The 5-year incremental plans assumes about two-thirds of this budget is available and the remaining third would be used to cover projects that are unforeseen at this time (for example: Highway 213 Improvements).

5-year Plan

UPGRADE MULINO ROAD NEAR MILK CREEK CIRCLE – As mentioned this would complete a loop of prior improvements to Passmore Road, Highway 213, and Milk Creek Bridge. This would improve water service to more than 30 properties and seven fire hydrants.

UPGRADE GRAVES ROAD NEAR HOWARDS END – This project would complete a critical back up Milk Creek Crossing Loop (Main Crossing is on Highway 213 Bridge). An upgraded line would improve water service to more than 15 properties and 3 fire hydrants.

10-year Plan

REPLACE EXISTING 100,000 GALLON RESERVOIR WITH 250,000 GALLON RESERVOIR – This project would add security to the District system by providing reserve water in case of an emergency. The existing property for the 100,000 gallon reservoir is already owned by the District and at the correct elevation. This project would take up the entire 10-year plan capital improvement monies unless other fund sources are found.

15-Year Plan

ADD AN AUTOMATIC TRANSFER SWITCH TO THE WELL #3 – This project would add an additional layer of security to the District's water system in the event of a power outage.

IDENTIFY PROPERTY FOR NEW WELL AND SECURE THE WATER RIGHTS – Installing a new well on the District's water system will be a two-step process by identifying the preliminary steps in the 15-year plan and constructing the well in the 20-year plan.

20-year Plan

CONSTRUCT NEW WELL – A new well will provide a back-up for the District in case regulations change, the water table changes, or if there is an issue with the existing wells.

NOTE: The Mulino and Darnell Road upgrades were not included in the Capital Improvements Plan at this time. The District should build these projects when development at the airport results in SDC fees that can supplement the costs of these projects.

APPENDIX

D

FEDERAL AND STATE MANDATES RELATED TO GROUNDWATER

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Table D-1: Federal and State Mandates Related to Groundwater

Program/Agency	Federal Law/Regulations	State Law/Rules
Drinking Water/OHD	<i>Safe Drinking Water Act (SDWA)</i> 42 USC 1417 40 CFR 141, 142, 143	ORS 448.273
		ORS 448.277
		ORS 285.757
		OAR 333
Coliform Monitoring/OHD	40 CFR 141.21, 141.63	OAR 333-651-032 OAR 333-61-036
Disinfection/OHD	40 CFR 141.72	OAR 333-61-032
IOCs/OHD	40 CFR 141.11, 141.23, 141.62	OAR 333-61-030
		OAR 333-61-036
SOCs/OHD	40 CFR 141.12, 131.24, 141.61	OAR 333-61-030 OAR 333-61-036
VOCs/OHD	40 CFR 141.24, 141.61, 141.62	OAR 333-61-030
		OAR 333-61-036
Surface Water/OHD	40 CFR 141.71(b)	OAR 333-61-032
		OAR 333-61-030

Fluorides/OHD	40 CFR 141.11, 141.23, 141.62, 143.3	OAR 333-61-036
Lead Material Ban/OHD	SDWA 1417(a)(1) & (2),	OAR 333-61-034(5)
	42 USC 1417(a)(1) & (2)	OAR 333-61-036
Pb & Cu Rules/OHD	-	OAR 333-61-034
Radionuclides/OHD	40 CFR 141.16, 141.23, 141.62	OAR 333-61-036
Asbestos/OHD	40 CFR 141.23(b), 141.62(b)(2),	OAR 333-61-030
	OSHA 29 CFR 1910 & 1926	OAR 333-61-036
Public Notification/OHD	40 CFR 141, 142, & 143	OAR 333-61-025
		OAR 333-61-042
Operator Certification/OHD	-	ORS 448.405-470
		OAR 333-61-065
Plan Review/OHD	-	ORS 448.131
		OAR 333-61-060
PWS Permits/OHD	-	ORS 448.140 & .145
		OAR 333-61-046
PWS Construction Standards/OHD	-	ORS 448.131
		OAR 333-61-050
Area of Groundwater Concern/OHD	-	ORS 448.268
		OAR 333-61-032
Water Quality Standards/DEQ	<i>Federal Water Pollution Control Act of 1972 - Renamed the Clean Water Act (CWA) - and Amendments; 33 USC 1251 through 1376</i>	ORS 468B
		ORS 454
		OAR 340-41
		OAR 340-48
Injection Wells/DEQ	CWA	ORS 468B.005-035
		OAR 340-44-005
Septic Systems/DEQ	CWA	ORS 454.010-805
		OAR 340-71-100
National Pollutant Discharge Elimination System (NPDES) Permitting/DEQ	40 CFR 122, 123, 123, 125, 129-131	ORS 466B.050
		OAR 340-14

		OAR 340-45
Groundwater Quality Protection/DEQ	-	ORS 568.900-923 OAR 603-90
Hazardous Waste Storage, Treatment, Disposal DEQ	<i>Resource Conservation and Recovery Act of 1976 (RCRA) 40 CFR 260-272</i>	ORS 465 ORS 466 OAR 340-100
Solid Waste - Treatment Disposal/DEQ	RCRA	ORS 469 OAR 340-61 OAR 340-64 (tires) OAR 340-102
Underground Storage Tanks (USTs) Permitting & Cleanup/DEQ	RCRA 40 CFR 280 (FR 2-18-93)	OAR 340-122 OAR 340-150
Hazardous Waste Cleanup/EPA & DEQ	<i>Comprehensive Environmental Response Compensation and Liability Act (CERCLA); Superfund Amendments and Reauthorization Act (SARA); Emergency Planning and Community Right-to-Know Act (Title III)</i>	ORS 485 OAR 340-122
Manufactures Chemicals - Regulations/DEQ	Toxic Substances Control Act (TSCA)	ORS 465 OAR 340-135 ORS 634
Pesticides - Regulations/ODA & DEQ	<i>Federal Insecticide, Fungicide, and Roenticide Act (FIFRA)</i>	ORS 466.005(7) OAR 340-109
Spill Reporting and Response/DEQ	-	ORS 466.605 OAR 340-108-001
Enforcement and Civil Penalties/DEQ	-	ORS 468.090-140 OAR 340-12-026
Pollution Prevention Requirements/EPA & DEQ	<i>Federal Pollution Prevention Act of 1990 (Implemented through Toxic Release Inventory Reporting Requirements)</i>	-
Toxic Use Reduction and Hazardous Waste Reduction/DEQ	-	ORS 466.003 OAR 340-135
LEDGEND:		
USC - ODA - Oregon Department of Agriculture		

CFR - Code of Federal Regulations DLCD - Department of Land Conservation and Development

PWS - Public Water System ORS - Oregon Revised Statutes

OHD - Oregon Health Division OAR - Oregon Administrative Rules

DEQ - Department of Environmental Quality

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Appendix C





memorandum

date February 24, 2016

to Matt Rogers and Greg Reince, Century West Engineering

from Ava Laszlo and Susan Cunningham, ESA

subject **Environmental Documentation: Mulino State Airport Master Plan Updates**

The Oregon Department of Aviation (ODA) is developing a 2015-2035 Airport Master Plan update for the Mulino State Airport. The Master Plan will address the development needs at the airport over a 20-year planning horizon (2015-2035) and develop a realistic program for implementation within known funding constraints. This memorandum documents the existing conditions of wetlands and other waterbodies, floodplains, air quality, stormwater and water quality, compatible land use and Section 4(f), and species protected under the Endangered Species Act that could potentially occur within the project area for the Mulino State Airport. This memorandum identifies existing conditions and lists potential effects to these resources from the proposed development.

PROJECT LOCATION

The Mulino State Airport is located within the hamlet of Mulino, Oregon (Township 4 East, Range 3 East, Sections 17 and 20) approximately 25 miles south of the Portland, Oregon City Center. It has been in operation since 1949 and lies on tax lots: 42E20 00700, 42E20 00600, 42E20 00801, 42E20A 01200, 42E17D 00300, 42E17D 00100, 42E17DB 00900, 42E17C 01390, 42E17B 01000, 42E17C 01300, 42E20 00195, 42E20 00105, 42E20 00102, 42E20 00400, 42E20 00490, 42E20 00401 (WH Pacific 2008, Clackamas County 2016b). Mulino is one of four hamlets in Clackamas County, a largely rural county with dominant agriculture and timber industries (Clackamas County 2016a).

The Airport is bounded to the south by forest land, scrub/shrub vegetation and the Molalla River; to the west by farmland, single-family residential housing, and scrub/shrub vegetation; to the north by farmland and South Mulino Road; and to the east by Cascade Highway 213, farmland, and single-family residential housing. Development activities are set to occur within Airport property. Some objects (i.e., trees) may need to be removed or topped outside airport project if they are found to penetrate the object free zone of the runways.

Mulino is within the Willamette Valley ecoregion, which extends from the eastern flanks of the Coast Range to the western flanks of the Cascade Mountains, from St. Helens, Washington south to Drain, Oregon. Over seventy-five percent of this ecoregion's land use is agriculture, forest, and woodland. This ecoregion has a mild climate with wet winters and warm, dry summers (ODFW 2016b). Mulino

receives on average about 46 inches of precipitation annually (NRCS 2016). The project area is within a mixed-use environment with agricultural, commercial, and residential uses.

WETLANDS AND WATER RESOURCES

Wetlands are under the jurisdiction of the US Army Corps of Engineers (Corps). The Corps uses the *Corps of Engineers Wetland Delineation Manual* (Experimental Laboratory 1987) and the *Western Mountains, Valleys, and Coast Wetland Delineation Regional Supplement Manual* (Corps of Engineers 2010) for determining what a wetland is and the extent of a wetland. An area is determined to be a wetland if it has a dominance of hydrophytic vegetation (plants that grow in wet conditions), hydric soils, and positive wetland hydrology.

The National Wetlands Inventory (NWI) shows six wetlands within the Airport property (4 Freshwater Forested/Shrub, 1 Freshwater Emergent, and 1 Riverine). None of these occur within the study area. Table 1 lists the soils mapped to occur at the Airport by the Natural Resources Conservation Service (NRCS). Three of these soil series (Concord silt loam, Dayton silt loam, Riverwash) are considered to be hydric, and seven of the remaining eight soil types have hydric inclusions (Aloha silt loam, 0 to 3 percent slopes; Amity silt loam; Camas gravelly sandy loam; Cloquato silt loam; Newberg fine sandy loam; Newberg loam; and Woodburn silt loam, 3 to 8 percent slopes) (USDA 2016).

Table 1: Mapped Soil Units within the Study Area

Soil map symbol	Map unit name	Hydric?	Hydric inclusions?
1a	Aloha silt loam, 0 to 3 percent slopes	No	Huberly in swales on terraces, 3% Dayton on terraces, 2%
3	Amity silt loam	No	Dayton on terraces, 3% Huberly in swales on terraces, 2%
11	Camas gravelly sandy loam	No	Wapato on floodplains, 2%
19	Cloquato silt loam	No	Wapato on floodplains, 2%
21	Concord silt loam	Yes	NA
29	Dayton silt loam	Yes	NA
67	Newberg fine sandy loam	No	Wapato on floodplains, 2%
68	Newberg loam	No	Wapato on floodplains, 2%
73	Riverwash	Yes	NA
91b	Woodburn silt loam, 3 to 8 percent slopes	No	Huberly in swales on terraces, 2% Aquolls on floodplains, 1% Dayton on terraces, 1%
92F	Xerochrepts and Haploxerolls, very steep	No	No

Source: NRCS, 2016.

An on-site wetland reconnaissance was performed for the project on January 27, 2016, by John Vlastelicia and Ava Laszlo (environmental scientists). Only airport property was reviewed. Due to access, a site reconnaissance was not performed in the area south of the Molalla River. Several potential wetlands were found during the reconnaissance within areas of hydric soils or non-hydric soils with

hydric inclusions. The wetlands were grouped into three areas by location and each area was assigned a letter of A (north), B (northeast), or C (southeast), described below (Figure 2).

Potential Wetland Area A

Area A is located north and of Runway 14/32 and the parallel Taxiway A, bounded by South Mulino Road to the north and South Airport Road to the east (Figure 2). A stormwater detention pond ranging in depth from 1 to greater than 8 inches is present near the eastern border, and outflows into a roadside ditch of South Airport Road. Vegetation observed within the detention pond area included cattail (*Typha latifolia*), reed canarygrass (*Phalaris arundinacea*), black cottonwood seedlings (*Populus trichocarpa*), fescue (*Festuca sp.*), Queen Anne's Lace (*Daucus carota*), and mixed weedy pasture grasses. Pounded water was observed at shallower depths in the majority of the area outside of the detention pond, ranging in depth from 0.5 – 5 inches. Vegetation between the north runway and South Mulino Road consisted primarily of weedy pasture grasses with patches of reed canarygrass. Two drainage channels were observed flowing north out of Area A into a roadside ditch of South Mulino Road. This ditch contained common rush (*Juncus effusus*), Armenian blackberry (*Rubus armeniacus*), reed canarygrass, and rose (*Malus sp.*) among other unidentified grass species.

Three soil types are mapped within Area A (Concord silt loam, Amity silt loam, and Amity silt loam, 0 to 3 percent slopes). The detention pond, part of the South Airport Road roadside ditch, and closely neighboring soils are mapped in hydric soil (Concord silt loam). The area north of the runway and the roadside ditch of South Mulino Road are mapped in non-hydric soils with hydric inclusions (Amity silt loam, 0 to 3 percent slopes and Amity silt loam).

Potential Wetland Area B

Area B is a small potential wetland located east of South Airport Road and the Airport T-hangars, west of Oregon State Highway 213, and south of South Mulino Road adjacent to a single-family residential home and Hillview Gardens Orchids. Pockets of ponded water with algal mats and one drainage channel were observed within a fescue/blackberry/common rush dominated vegetation community (Photo 1). The drainage channel extends through a berm separating the Airport property from the South Mulino Road right-of-way, and into a roadside ditch (Photo 2). The entirety of Area B is mapped in hydric soil (Concord silt loam).



Photo 1. View of Potential Wetland Area B, facing southwest. Bottom right shows water flowing north through a drainage channel through a roadside berm.



Photo 2. Facing north toward South Mulino Road while standing in drainage channel of Potential Wetland Area B.

Potential Wetland Area C

Area C is located east, southeast, and south of the Airport taxiway. It contains several depressional strips and pockets of inundated land, with water depths ranging from 0.5 inches to 3 inches deep in addition to saturated gently sloping areas (Photos 3-5). Common rush, Armenian blackberry, fescue, weedy pasture grasses, and smatterings of Scotch broom (*Cytisus scoparius*)

were commonly seen across Area C. Oregon grape (*Mahonia aquifolium*), sticky willy (*Galium aparine*), and conifers were seen only near the right bank edge of the Molalla River (Photo 5).



Photo 3. Standing in Potential Wetland Area C facing south looking into an inundated strip of land parallel to the taxiway. Pockets of common rush can be seen in the center of the photo.



Photo 4. Standing in Potential Wetland Area C facing north looking into an inundated portion of the Airport. Pockets of common rush can be seen at the bottom and near the center of the photo.



Photo 5. Facing south while standing approximately 30 feet from the edge of the Molalla River right bank.

Several catchbasins were seen in wet areas parallel to the taxiway, and southeast of the taxiway. A wet depressional area with algal mat growth was seen south of the runway where a remnant railroad crossing of Willamette Valley Southern in the early 1900's once occurred (Photo 6). This area was thick with blackberry and weeds with many boulders strewn throughout.

Soils in Area C are generally mapped as hydric (Dayton silt loam) and non-hydric with hydric inclusions (Aloha silt loam, 0 to 3 percent slopes). A small sliver of non-hydric soil without hydric inclusions is mapped along the Molalla River right bank (Xerochrepts and Haploxerolls, very steep).



Photo 6. Facing south while standing in historic railroad bed.

South of the Molalla River

The area south of the Molalla River was inaccessible during the field survey and the presence of wetlands in this area was not evaluated (Figure 2, Photo 7). This area contains hydric soil (Riverwash) and non-hydric soils with hydric inclusions (Camas gravelly sandy loam, Cloquato silt loam, and Newberg fine sandy loam).



Photo 7. Standing at edge of Molalla River right bank, facing south toward area not accessed.

Recommendations

There is the potential for jurisdictional wetlands to occur where development is proposed. It is recommended that further evaluation and a formal wetland delineation with concurrence from DSL and the Corps be conducted in these areas.

MOLALLA RIVER

The Molalla River flows east to west through the study area, beginning in the Table Rock Wilderness and running for nearly 50 miles through Clackamas County before entering the Willamette River (USGS 2016). This river is the largest tributary of the Willamette River that is undammed, and its waters support a number of fish species including salmonids, lamprey, and trout (Native Fish Society 2016). Any development below the Ordinary High Water mark of the river would require a Joint Removal-Fill Permit from both the Corps and DSL. The river is also designated as Critical Habitat for both Upper Willamette River steelhead ESU and Upper Willamette River Chinook Salmon ESU. Alteration of riparian habitat or stormwater discharge could trigger review by the National Marine Fisheries Services (NOAA Fisheries).

FLOODPLAINS

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) for the purpose of reducing the impact of flooding on private and public structures. A FEMA FIRM (Flood Rate Insurance Map) of Clackamas County, Oregon and incorporated areas was referenced. This FIRM shows portions of the Molalla River floodway, 100-year floodplain, and 500-year floodplain to be within parts of Airport property or areas containing an avigation easement (Appendix A – FEMA FIRM Panel [FEMA 2008], and Figure 1). The nearly vertical right bank of the Molalla River within airport property is mapped concurrently as the floodway boundary, 100-year flood boundary, and 500-year flood boundary (Figure 1, FEMA 2008). Portions of the Airport and areas south of the Molalla River left bank are within the floodway, 100-year floodplain, and 500-year floodplain (Figure 1, FEMA 2008).

Development within the 100-year floodplain would require a Floodplain Development Permit from Clackamas County and a Permit for Floodplain Development from FEMA.

WATER QUALITY

Some surface features that are part of the Airport's stormwater system were observed during the on-site investigation. Several catch basins and a detention pond were observed within the study area. A 2007 storm utilities design drawing depicts a stormwater system with two central storm lines that run north/south and multiple branches that extend east and west across the property. Two stormwater detention ponds exist, one to the northwest (outside the study area) and one to the northeast (Potential Wetland Area A). The pond within Area A drains through roadside ditches offsite and is not managed onsite.

The current stormwater system will need to be updated to manage stormwater (quality and quantity) associated with future development. Provided that stormwater is managed on site (both for quality and quantity), the addition of new impervious surface from the project should not affect surface water flows. The water quality of the Molalla River may be affected or impaired by this project. If wetlands or other surface waters are impacted, permits and management requirements would need to be obtained from and fulfilled by state and federal agencies including the Oregon Department of State Lands, U.S. Army Corps of Engineers, Oregon Department of Environmental Quality, and National Marine Fisheries Service.

PROTECTED SPECIES AND HABITAT

Species evaluated in this memorandum are those listed as endangered or threatened, proposed for listing, or candidate for listing under the Endangered Species Act (16 US 1531, et seq.), as amended, that could occur in the project vicinity in Clackamas County. An official species list was obtained from the U.S. Fish and Wildlife Service (USFWS) website Information Planning and Conservation (IPaC) tool (January 25, 2016). Species listed under the ESA addressed in this memo are displayed in Table 1.

The Oregon Biodiversity Information Center was also queried to obtain records of known sensitive, threatened and endangered plant and animal species within the vicinity of the project area (ORBIC 2016).

StreamNet (2016) fish distribution data identifies mapping was used to identify the presence of listed species in the Molalla River. Species listed under the Endangered Species Act addressed in this memo

are displayed in Table 1. Field work was conducted on-site on January 27, 2016 to evaluate habitat conditions.

Table 1. Species Listed under the Endangered Species Act That Could Potentially Occur in the Project Area

Species Common Name (Scientific Name)	Federal Endangered Species Act Status	Actual and Potential Occurrence in Project Limits
Northern spotted owl (<i>Strix occidentalis caurina</i>) Population: Entire	Threatened	No documented occurrence (ORBIC 2016) and no suitable habitat.
Streaked Horned lark (<i>Eremophila alpestris strigata</i>)	Threatened	No documented occurrence (ORBIC 2016) and no suitable habitat.
Bradshaw's desert-parsley (<i>Lomatium bradshawii</i>)	Endangered	No documented occurrence (ORBIC 2016) and no suitable habitat.
Kincaid's Lupine (<i>Lupinus sulphureus ssp. kincaidii</i>)	Threatened	No documented occurrence (ORBIC 2016) and no suitable habitat.
Nelson's checker-mallow (<i>Sidalcea nelsoniana</i>)	Threatened	No documented occurrence (ORBIC 2016) and no suitable habitat.
Water howellia (<i>Howellia aquatilis</i>)	Threatened	No documented occurrence (ORBIC 2016) and no suitable habitat.
Willamette daisy (<i>Erigeron decumbens var.</i>)	Endangered	No documented occurrence (ORBIC 2016) and no suitable habitat.
Steelhead Trout (<i>Oncorhynchus mykiss</i>) Population: Upper Willamette River ESU	Threatened	Known occurrences. Molalla River is designated as Critical Habitat.
Chinook salmon (<i>Oncorhynchus tshawytscha</i>) Population: Upper Willamette River ESU	Threatened	Known occurrences. Molalla River is designated as Critical Habitat.

Northern Spotted Owl

Northern spotted owls live in forests characterized by dense canopy closure of mature and old-growth trees, abundant logs, standing snags, and live trees with broken tops. Although they are known to nest, roost, and feed in a wide variety of habitat types, these owls prefer older forest stands with variety: multi-layered canopies of several tree species of varying size and age; both standing and fallen dead trees; and open space among the lower branches to allow flight under the canopy. Forests do not typically attain these characteristics until they are at least 150 to 200 years old (USFWS 2012a). Critical Habitat was designated in 2012 (USFWS 2012c). There is no Critical Habitat within the project area or in the vicinity of Mulino and there is no suitable habitat on Airport property.

The project will have ***no effect on northern spotted owl*** for the following reason:

- There are no documented recent or historic occurrences of northern spotted owl within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat within the project area.

The project will have *no effect on northern spotted owl critical habitat* for the following reasons:

- There is no Critical Habitat within the project area or vicinity of Mulino.

Streaked Horned Lark

The streaked horned lark is a small, slender bird with long wings and feather tufts that give the appearance of black “horns”. These birds are generally found in bare ground or sparsely vegetated habitats, often nesting in grass seed fields, pastures, fallow fields, and wetland mudflats. In Oregon, this species was once abundant in Benton, Lane, Linn, Polk, and Yamhill counties in the Willamette Valley, and in Jackson County in the Rogue River Valley. Habitat loss has reduced the population, however, and today the bird is most abundant in the central Willamette Valley (USFWS 2012b). There are no documented occurrences of the streaked horned lark on or near the project site, and the site does not provide habitat suitable for this species. Critical Habitat was designated in 2013 (USFWS 2013). There is no Critical Habitat within the project area or in the vicinity of Mulino.

The project will have *no effect on streaked horned lark* for the following reason:

- There are no documented recent or historic occurrences of streaked horned lark within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat within the project area.

The project will have *no effect on streaked horned lark critical habitat* for the following reasons:

- There is no Critical Habitat designated within the project area or vicinity of Mulino.

Bradshaw’s Desert-Parsley

Bradshaw’s desert parsley is a perennial species with small, yellow flowers that appear generally mid-April through May (ODA 2010). It inhabits Willamette Valley wet prairie habits, with predominant populations in the southern Willamette Valley. No Critical Habitat has been designated for this species.

The project will have *no effect on Bradshaw’s desert-parsley* for the following reasons:

- There are no documented recent or historic occurrences of Bradshaw’s desert-parsley within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat within the project area.

Kincaid’s Lupine

Kincaid’s lupine is a perennial species in the pea or legume family. It is found mainly in the Willamette Valley, Oregon, in native grassland habitats, typically in native upland prairie with dominant species being red fescue and/or Idaho fescue (USFWS 2016b). There are no documented recent or historic sightings of Kincaid’s lupine within a 2-mile radius of the project (ORBIC 2016). Kincaid’s Lupine is not known to or is not believed to occur within Clackamas County (USFWS 2015a). Critical Habitat was designated in 2006 and does not include habitat within Clackamas County (USFWS 2006).

EFFECTS DETERMINATION:

The project will have *no effect on Kincaid’s lupine* for the following reasons:

- There are no documented recent or historic occurrences of Kincaid’s lupine within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat within the project area.
- Kincaid’s Lupine is not known to or believed to occur within Clackamas County.

The project will have *no effect on Kincaid's lupine critical habitat* for the following reason:

- There is no Critical Habitat designated within the project area or within Clackamas County.

Nelson's Checker-Mallow

Nelson's checker-mallow is a perennial herb in the mallow family. The plant generally occurs in Oregon ash swales and meadows with wet depressions, or along streams, but also grows in wetlands within remnant prairie grasslands. This species occurs primarily in open areas with little or no shade and is intolerant of encroachment by woody species (USFWS 2015b). The project area consists mostly of developed property or riparian forest which is not suitable habitat for the Nelson's checker-mallow. There are no documented recent or historic sightings of Nelson's checker-mallow within a 2-mile radius of the project (ORBIC 2016). No Critical Habitat has been designated for Nelson's Checker-mallow (USFWS 2015b).

The project will have *no effect on Nelson's checker-mallow* for the following reasons:

- There are no documented recent or historic occurrences of Nelson's checker-mallow within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat and no Critical Habitat within the project area.

Water Howellia

Water howellia is a winter annual aquatic plant. The plant grows in shallow water (1-2 meters deep) areas that were once associated with glacial potholes and former river oxbows that flood in the spring, but usually dry at least partially by late summer. There is no suitable habitat for water howellia within the project area. There are no documented recent or historic sightings of water howellia within a 2-mile radius of the project (ORBIC 2016). There are no currently known occurrences of water howellia in the State of Oregon (USDA 2010), though historically found in Clackamas County (USFWS 2016b).

The project will have *no effect on water howellia* for the following reasons:

- There are no documented recent or historic occurrences of water howellia within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat and no Critical Habitat within the project area.

Willamette Daisy

Willamette daisy is a perennial herb which inhabits Willamette Valley prairie habitats. It is found on alluvial soils, with light purple flowers that bloom during June and early July (USFWS 2016c). There are no documented recent or historic sightings of Willamette Valley daisy within a 2-mile radius of the project (ORBIC 2016). Critical Habitat was designated in 2006 (USFWS 2006).

The project will have *no effect on Willamette daisy* for the following reasons:

- There are no documented recent or historic occurrences of Willamette daisy within a 2-mile radius of the project area (ORBIC 2016).
- There is no suitable habitat within the project area.

The project will have *no effect on Willamette daisy critical habitat* for the following reason:

- There is no Critical Habitat designated within the project area or within Clackamas County.

Steelhead Trout, Upper Willamette River ESU

The UWR steelhead ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River and its tributaries upstream from Willamette Falls to the Calapooia River (NMFS

2005a, 2006). This ESA consists of four independent populations: Molalla River, North Fork Santiam River, South Fork Santiam River, and Calapooia River (Myers et al., 2006). These anadromous fish require clean, silt free gravel for spawning; a minimum dissolved oxygen concentration of seven parts per million; and deep slow-moving pools for wintering habitat.

StreamNet (2016) identifies both summer run (ocean-maturing type) and winter run (stream-maturing type) steelhead as occurring in the Molalla River for the purpose of migration (summer run, winter run) and rearing (winter run). There is current and historic distribution of steelhead trout in the vicinity of the project area, including the Molalla River and the nearby Milk Creek. The Molalla River and Milk Creek are designated as Critical Habitat for the UWR ESU (NMFS 2005b). Winter run steelhead were last observed within the Molalla River upper and lower watersheds, Milk Creek watershed, and additional watersheds in 2009 during migration and rearing (ORBIC 2016).

Additional analysis and development specifics relating to stormwater management and vegetation removal along the Molalla River is required before an effects determination can be made on UWR Steelhead ESU and Critical Habitat.

Chinook Salmon, Upper Willamette River ESU

The UWR Chinook salmon ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon (NMFS 2005a). The Willamette/Lower Columbia Technical Recovery Team (W/LC TRT) identified seven independent populations within this ESU: Clackamas River, Molalla River, North Fork Santiam River, South Fork Santiam River, Calapooia River, McKenzie River, and Middle Fork Willamette River (Myers et al., 2006).

StreamNet (2016) identifies both spring run and fall run Chinook salmon steelhead as occurring in the Molalla River for the purpose of spawning (fall run), rearing (spring run, fall run), migration (spring run). Chinook salmon have been verified as extant within the Molalla River upper and lower watersheds, Milk Creek watershed, and additional watersheds within the region (ORBIC 2016). Data from 2008 classifies an undocumented occurrence, and ODFW considers this to be a non-native reintroduction (ORBIC 2016).

Additional analysis and development specifics relating to stormwater management and vegetation removal along the Molalla River is required before an effects determination can be made on UWR Chinook Salmon ESU and Critical Habitat.

ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal fishery management plans to describe the habitat essential to the fish being managed and describe threats to that habitat from both fishing and non-fishing activities. The Pacific Fishery Management Council manages the fisheries for Coho, Chinook, and Puget Sound Pink Salmon and has defined Essential Fish Habitat (EFH) for these three species. Salmon EFH includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. Salmon EFH excludes areas upstream of longstanding naturally impassible barriers (i.e. natural waterfalls in existence for several hundred years), but includes aquatic areas above all artificial barriers except specifically named impassible dams. According to the

NOAA Essential Fish Habitat Mapper, the Molalla River contains EFH for Chinook salmon (NOAA 2016).

Additional analysis and development specifics relating to stormwater management and vegetation removal along the Molalla River is required before an effects determination can be made on EFH.

LAND USE COMPATABILITY AND SECTION 4(F)

Mulino Airport is considered a Category 4 Public Use Airport – Community General Aviation (ODA 2003). The function of a Category 4 airport is to accommodate general aviation users and local business activities, with 2,500 or more annual operations or more than ten based aircraft (ODA 2003).

Clackamas County Zoning and Development Section 700 - Special Districts contains Ordinance 713 - Public Use Airport and Safety Overlay Zones (Clackamas County 2014). Uses and activities permitted outright in this special use zoning district are listed in 713.04, and include but are not limited to:

1. Customary and usual aviation-related activities, including takeoffs and landings;
2. Air passenger and air freight services and facilities;
3. Emergency medical flight services, including activities, aircraft, accessory structures, and other facilities necessary to support emergency transportation for medical purposes
4. Aircraft service, maintenance and training;
5. Crop dusting activities; and
6. Agricultural and forestry activities.

Uses not permitted outright and not identified in Section 713.04 are subject to review. These uses not permitted outright would require a Type III land use review as described in Section 713.05.

The Airport is outside of the Urban Growth Boundary for the Portland Metro Region and the tax lots within Airport property have multiple land use zones: RRFF5 – Rural Residential Farm Forest 5-Acre, EFU – Exclusive Farm Use, RA2 – Rural Area Residential 2-Acre, combination RRFF5/EFU, and combination RRFF5/RA2/EFU (Clackamas County 2016b). Surrounding land in the vicinity is primarily EFU and several types of Rural zoning (RC - Rural Commercial, RA1 - Rural Area Residential, RA-2, RRFF-5). Adjacent land uses include Arrowhead Golf Club, single-family residential homes, and farming.

The 2013 Oregon Revised Statutes (ORS) Vol. 17 Chapter 836 – Airports and Landing Fields, Section 625 states that limitations on uses made of land in EFU zones as described in ORS 215 do not apply to provisions of ORS 836 regarding airport uses (State of Oregon 2013); airports zoned EFU must comply with ORS 215.296. The Airport is considered a compatible land use in EFU zones by ORS 836. ORS 836.616 states that local government land use plans and regulations shall accommodate airport zones and uses, and shall authorize uses and activities allowed with airport boundaries defined in ORS 836.610 and ORS 836.608 (State of Oregon 2013).

Clackamas County has established several overlay zones for public airports within the county. These zones are listed in Section 713.06 and include the following: noise impact boundary, primary surface, runway protection zone, approach surface, horizontal surface, conical surface, transitional surface, direct impact boundaries, and secondary impact boundaries. Land use applications or building use applications must abide by and meet the requirements of Section 713. Development standards listed under Section 1000 of Clackamas County Code are to be abided by and followed. The Airport is considered a compatible use under its current zoning.

Mulino is outside of the Metropolitan (Metro) Urban Growth Boundary, and there are no Metro Title 13 Habitat Conservation Areas or Metro Title 3 Water Quality Resource Areas contained within the vicinity of the project area (Metro 2016a-c). Clackamas County Zoning and Development Ordinance Sections 709 – Water Quality Resource Area District and 706 – Habitat Conservation Area District do not apply to Mulino and areas outside of the Metro Urban Growth Boundary.

There is no publicly-owned land of a park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance near Airport property. The site of the former Willamette Valley Southern railroad crossing in Potential Wetland Area C may be considered a historic site and should be further evaluated if development is proposed near this site (WH Pacific 2008). No other land of a historic site of national, state, or local significance exists on or near Airport property.

The BLM considers a segment of the Molalla River upstream of the project site to be a Recreation Corridor, but this corridor does not include the segment of the Molalla River that passes through the project area (BLM 2016). The closest boat ramp (non-developed) is present at Wagon Wheel Park is located approximately one mile upstream on the left bank of the Molalla River.

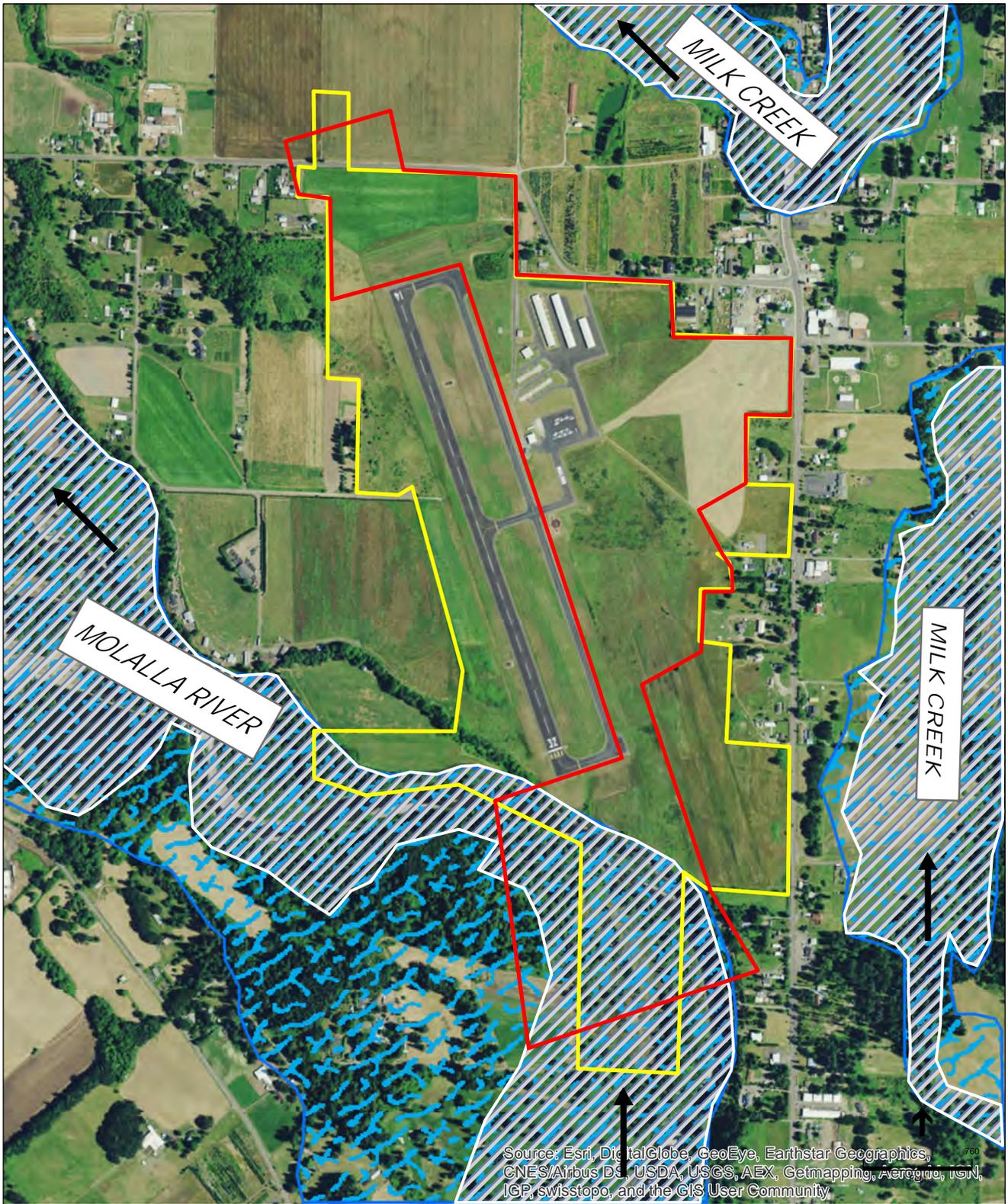
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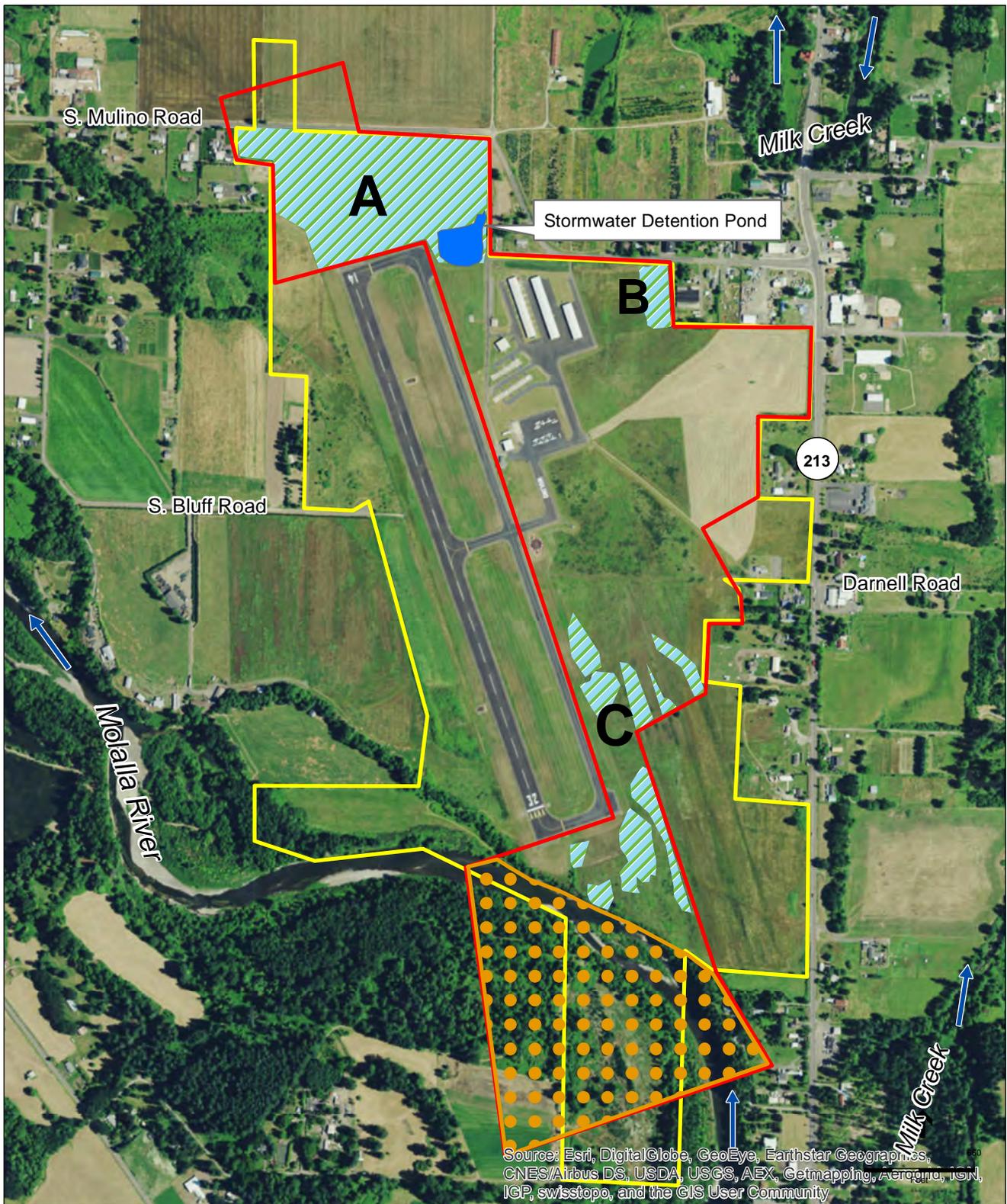
Legend

-  Study Area
-  Mulino Airport Property Limit
-  100-Year Floodplain
-  500-Year Floodplain

Mulino State Airport Master Plan Update. D160050.00

Figure 1
Vicinity Floodplain Map



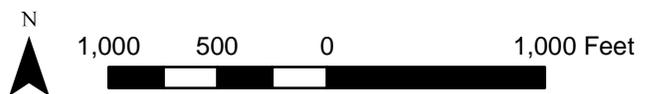


Legend

- Study Area
- Mulino Airport Property Limit
- Potential Wetlands
- Area Not Accessed

Mulino State Airport Master Plan Update. D160050.00

Figure 2
Potential Wetlands Map



Appendix D



MEMO

To: Matthew Maass, Heather Peck, Jeff Caines
Oregon Department of Aviation

From: Century West Engineering

Date: February 5, 2016

Re: **Mulino State Airport (4S9)**
Mulino, Oregon
Displaced Threshold with Declared Distances Memo

Introduction

This memorandum (memo) is intended to assess the impacts of the Molalla River, which is located immediately south of Runway 14/32 at the Mulino State Airport (4S9 or “the Airport”). Runway 14/32 currently has a relocated threshold off the south, Runway 32 end. The threshold was relocated in 2003 to meet FAA safety standards, based on information contained in the 2008 Airport Master Plan Report and noted on the approved Airport Layout Plan (ALP). The 2008 FAA Approved ALP included a note stating the threshold was relocated to provide the FAA recommended Runway Safety Area length of 300 feet. Specifically, Note 3 on the Approved ALP states:

“The Mulino River has eroded portions of the Runway 32 Runway Safety Area, which required a 175” Threshold relocation. If more erosion of the safety area occurs, it may be necessary to extend Runway 14 commensurate to the loss of runway length.”

The 2008 approved ALP also proposed removal of the 175 feet of existing runway pavement south of the relocated threshold. In addition, the ALP proposed removal of the existing access taxiway connecting the parallel taxiway to the Runway 32 end with future construction of a new access taxiway that would enter at the relocated threshold. These recommendations were proposed in accordance with guidance provided in FAA Engineering Brief 75: Incorporation of Runway Incursion Prevention into Taxiway and Apron Design.

A review of the existing terrain south of Runway 14/32 and the existing relocated threshold resulted in an effort to evaluate possible options for the optimum threshold location – either implementing a displaced threshold using Declared Distances or as an alternative, a threshold relocation that would reclaim some of the existing 175 feet of runway pavement.

This memo is being prepared to assess the existing relocated threshold in accordance with Federal Aviation Administration (FAA) Order 5200.8 Runway Safety Area Program, effective date October 1, 1999. This memo includes the following sections:

1. Existing Conditions – describes the location, airfield configuration, and the condition of Runway 14/32 (Runway 32 end) and the Molalla River. It includes a description of the Runway 32 Runway Protection Zone (RPZ), RSA, and OFA.
2. Recommended Alternative – Describes the recommended USE OF DECLARED DISTANCES TO REMOVE THE RELOCATED THRESHOLD AND THE MOLALLA RIVER FROM RUNWAY 14/32 RSA AND OFA.

Existing Conditions

LOCATION

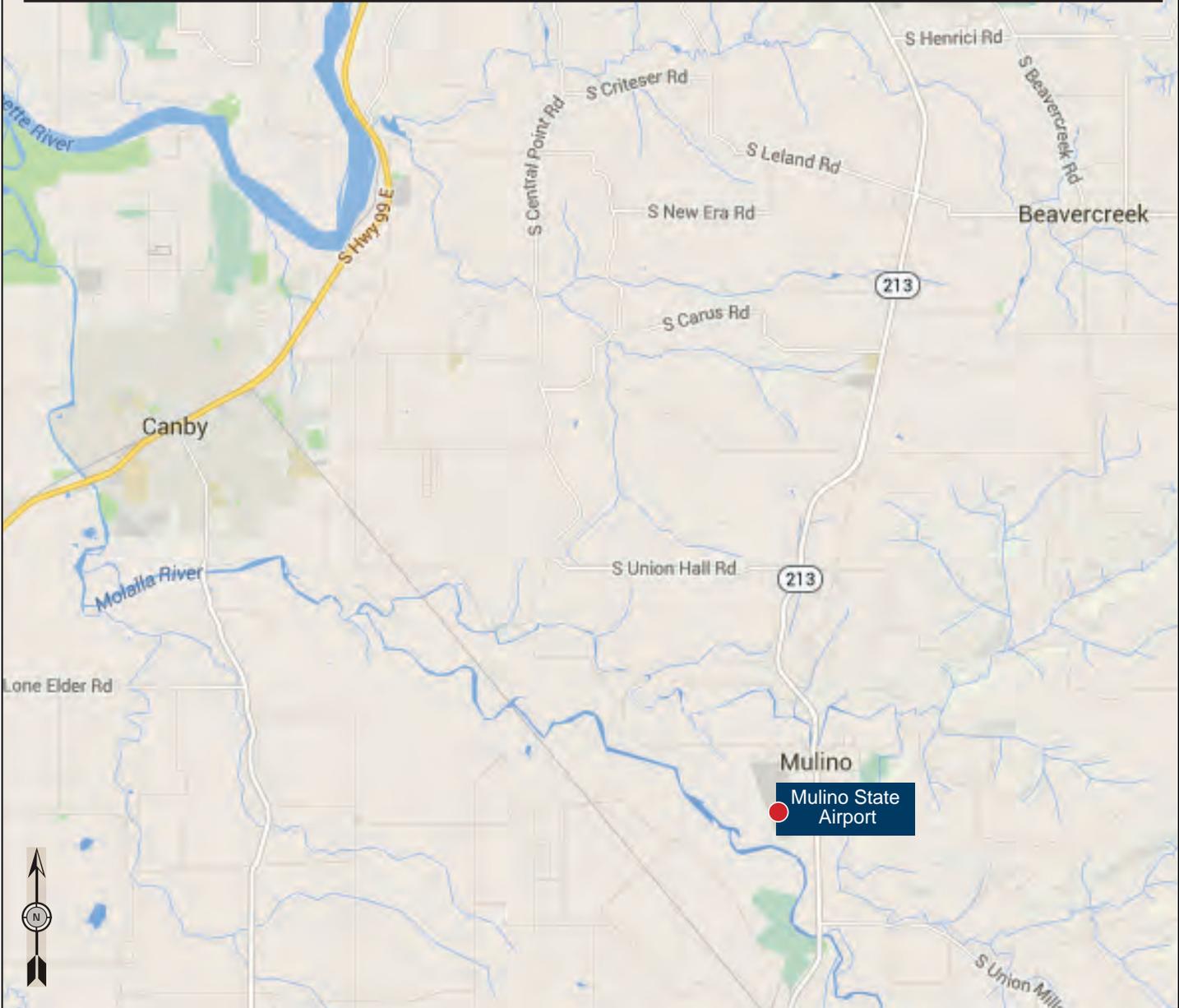
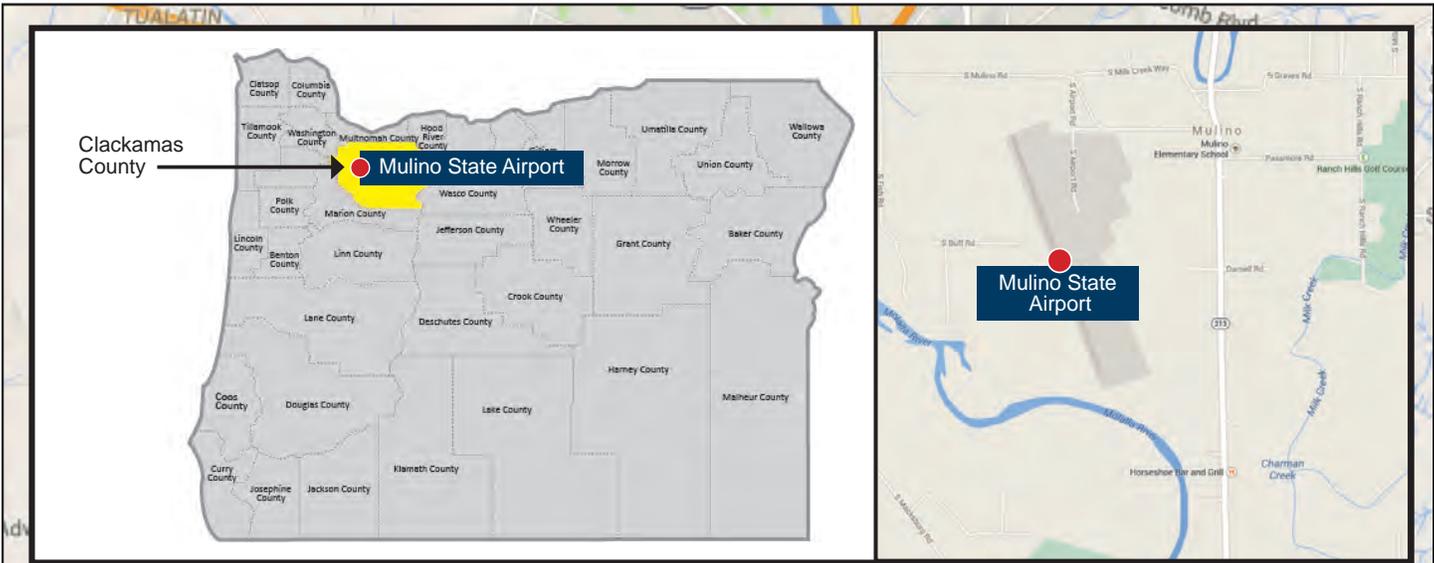
The Airport is located within the Hamlet of Mulino, near the southeastern corner of the Portland metropolitan area in northern Clackamas County. Mulino is located approximately 21 miles south of downtown Portland, ten miles south of Oregon City, and five mile north of Molalla on the eastern slopes of the Willamette Valley. Access to the airport is provided via South Mulino Road to Oregon State Highway 213 (OR-213). OR 213 interchanges with Interstate 205 in Oregon City approximately 12 miles north (Exit 10, between Gladstone and Oregon City). Highway 99E is located approximately 7 miles west of Mulino (at Canby) via South Mulino Road. Interstate 5 (Exit 278, south of Aurora State Airport) is approximately 13 miles west of Mulino. A location map is included in **Figure 1**.

AIRFIELD CONFIGURATION

The airport has a single runway, Runway 14/32. The runway is generally aligned in a north northwest – south southeast direction. As constructed, Runway 14/32 is 3,600 feet long by 100 feet wide with an asphalt surface. Available records indicate that the Runway 32 threshold was relocated 175 feet to the north in 2003.

FAA design standards for Runway 14/32 are based on an ARC B-II.¹ The runway has an effective gradient of 0.34 percent, with a high point (elevation 259.6 feet MSL) located at the southeast end relocated threshold (Runway 32 threshold). Runway 14/32 is served by a full-length parallel taxiway (Taxiway A) located on the east side of the runway. The runway has Basic markings on both runway ends, which is consistent with the current visual approach capabilities. Runway 14/32 is equipped with medium intensity runway lighting (MIRL). Both the Runway 14 and Runway 32 thresholds are equipped with Precision Approach Path Indicator (PAPI-2) units. This memo addresses the relocated threshold on Runway 14/32.

¹ Mulino State Airport, Airport Layout Plan (April 2008)



MULINO STATE AIRPORT

LOCATION MAP | FIGURE 1



MOLALLA RIVER

The Molalla River and the Clackamas River are major drainages from the Cascade Range that connect with the Willamette River, northwest of Mulino. The Molalla River forms the southern end of the airfield, although a small area of airport property extends south of the river. At the nearest point, the ravine formed by the Molalla River is located approximately 217 feet beyond the end of Runway 32, thereby placing it within the Runway 14/32 RSA, OFA, and RPZ.

FAA Design Standards

FAA AC 150/5300-13A establishes the guidelines applicable to all development on the Airport. Airport runways have specific design requirements that are outlined in this Advisory Circular. These requirements include the RSA, OFA, OFZ, and RPZ. Of primary concern to this study are RSA on the Runway 32 end of Runway 14/32.

The RSA enhances the safety of aircraft that undershoot, overrun, or veer off the runway. The FAA recommended RSA dimensions for Runway 14/32 are 150 feet wide and 300 feet prior to threshold and 300 feet beyond the runway end.

The OFA is an area centered on the runway with specific clearing standards. FAA requires the OFA be clear of aboveground objects protruding above the nearest point of the RSA. Terrain should not protrude above the nearest point of the RSA within a distance from the edge of the RSA equal to one-half the most demanding wingspan of the Runway Design Code (RDC) of the runway. Objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes may protrude above the nearest point of the RSA, but should meet the same frangibility requirements as the RSA. In addition, aircraft may taxi and hold in the OFA, but may not park within it. The OFA for Runway 14/32 is 500 feet wide, 300 feet prior to threshold, and 300 feet beyond runway end.

The OFZ is a three-dimensional airspace centered along the runway and extended runway centerline. FAA criteria stipulate the OFZ be clear of obstacles for the protection of aircraft landing or taking off from the runway and for missed approaches. Parked or holding aircraft and other object penetrations, except frangible NAVAIDs that need to be located in the OFZ because of their function are also precluded from being in the OFZ. The OFZ for Runway 14/32 is 250 feet wide and extends 200 feet beyond each runway end.

The RPZ's function is to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered on the runway centerline. The RPZ begins 200 feet from the end of the threshold and its length is dependent on the design aircraft and runway visibility minimums.

Standard RPZ dimensions for Runway 14/32 are an inner width of 500 feet, an outer width of 700 feet, an overall length of 1,000 feet with the RPZ sited 200 feet beyond the relocated threshold on Runway 32 and 200 feet beyond the Runway 14 threshold.

Recommended Alternative

USE DECLARED DISTANCES TO MITIGATE MOLALLA RIVER IN THE RUNWAY 14/32 RSA.

This alternative uses a displaced threshold with declared distances to mitigate the Molalla River’s location within the RSA for Runway 14/32. Declared distances can be applied when a standard safety area beyond the runway threshold cannot be met. The Airport would therefore be able to mitigate deviations from the RSA standards by using declared distances.

Implementation of a displaced threshold with declared distances will result in the Runway 32 end having both an approach RPZ and departure RPZ. The approach RPZ extends from a point 200 feet from the displaced runway threshold, for a distance specific to the runway’s aircraft approach category and approach visibility minimums associated with the approach runway end. The departure RPZ begins 200 feet beyond the runway end or, if the TORA and the runway end are not the same, 200 feet beyond the far end of the TORA. The approach and departure RPZ dimensions for Runway 14/32 are included in **Table 1**.

TABLE 1: RUNWAY 14/32 APPROACH AND DEPARTURE RPZ.

DIMENSION	RUNWAY 14		RUNWAY 32	
	APPROACH RPZ	DEPARTURE RPZ	APPROACH RPZ	DEPARTURE RPZ
LENGTH	1,000 feet	1,000 feet	1,000 feet	1,000 feet
INNER WIDTH	500 feet	500 feet	500 feet	500 feet
OUTER WIDTH	700 feet	700 feet	700 feet	700 feet

Table 2 lists the declared distances associated with this recommended alternative. The declared distances are overlaid in plan view in the attached **Figure 2 - Displaced Threshold Alternative**.

“Declared distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distances performance requirements for turbine powered aircraft as outlined in FAA AC 150/5300-13A. The declared distances are:

- *TORA - Takeoff run available* is the length of runway available and suitable for the ground run of an airplane takeoff.
- *TODA - Takeoff distance available* is the length of the takeoff run available plus the length of a clearway (if provided).

- *ASDA - Accelerate stop distance available* includes the length of the runway and stopway available for the acceleration and deceleration of an airplane aborting takeoff.
- *LDA - Landing distance available* is the runway length declared available and suitable for landing an aircraft.”²

“Declared distances may be used to obtain additional RSA and/or ROFA prior to the runway’s threshold (the start of the LDA) and/or beyond the stop end of the LDA and ASDA, to mitigate unacceptable incompatible land uses in the RPZ, to meet runway approach and/or departure surface clearance requirements, in accordance with airport design standards, or to mitigate environmental impacts. Declared distances may also be used as an incremental improvement technique when it is not practical to fully meet these requirements. However, declared distances may only be used for these purposes where it is impracticable to meet the airport design standards or mitigate the environmental impacts by other means, and the use of declared distances is practical.”

TABLE 2: RECOMMENDED DECLARED DISTANCES FOR RUNWAY 14/32.

DECLARED DISTANCE COMPONENT	RELOCATED THRESHOLD		DISPLACED THRESHOLD	
	RUNWAY 14	RUNWAY 32	RUNWAY 14	RUNWAY 32
Takeoff Distance Available (TODA)	3,425 feet	3,425 feet	3,517 feet	3,600 feet
Takeoff Run Available (TORA)	3,425 feet	3,425 feet	3,517 feet	3,600 feet
Accelerate Stop Distance Available (ASDA)	3,425 feet	3,425 feet	3,517 feet	3,600 feet
Landing Distance Available (LDA)	3,425 feet	3,425 feet	3,517 feet	3,517 feet

Implementation of a displaced threshold with declared distances will enable the Airport to regain the full 3,600 feet of pavement for departures to the north (TORA, TODA, ASDA) while eliminating the removal of any existing runway pavement. This alternative would also retain the existing entrance taxiway pavement while eliminating the need to construct a new entrance taxiway to the existing relocated threshold.

This option would result in an LDA of 3,517 feet for Runway 32 as well as revised TORA, TODA, ASDA, and LDA of 3,517 feet for Runway 14. However, all of the TORA, TODA, ASDA, and LDA’s for Runways 14 and 32 would exceed those currently provided with the existing relocated threshold.

Note that the location of the Runway 32 PAPI may need to be adjusted to accommodate a displaced threshold.

² AC 150/5300-13A (Change 1) 322.B(1), pg. 96, notes:

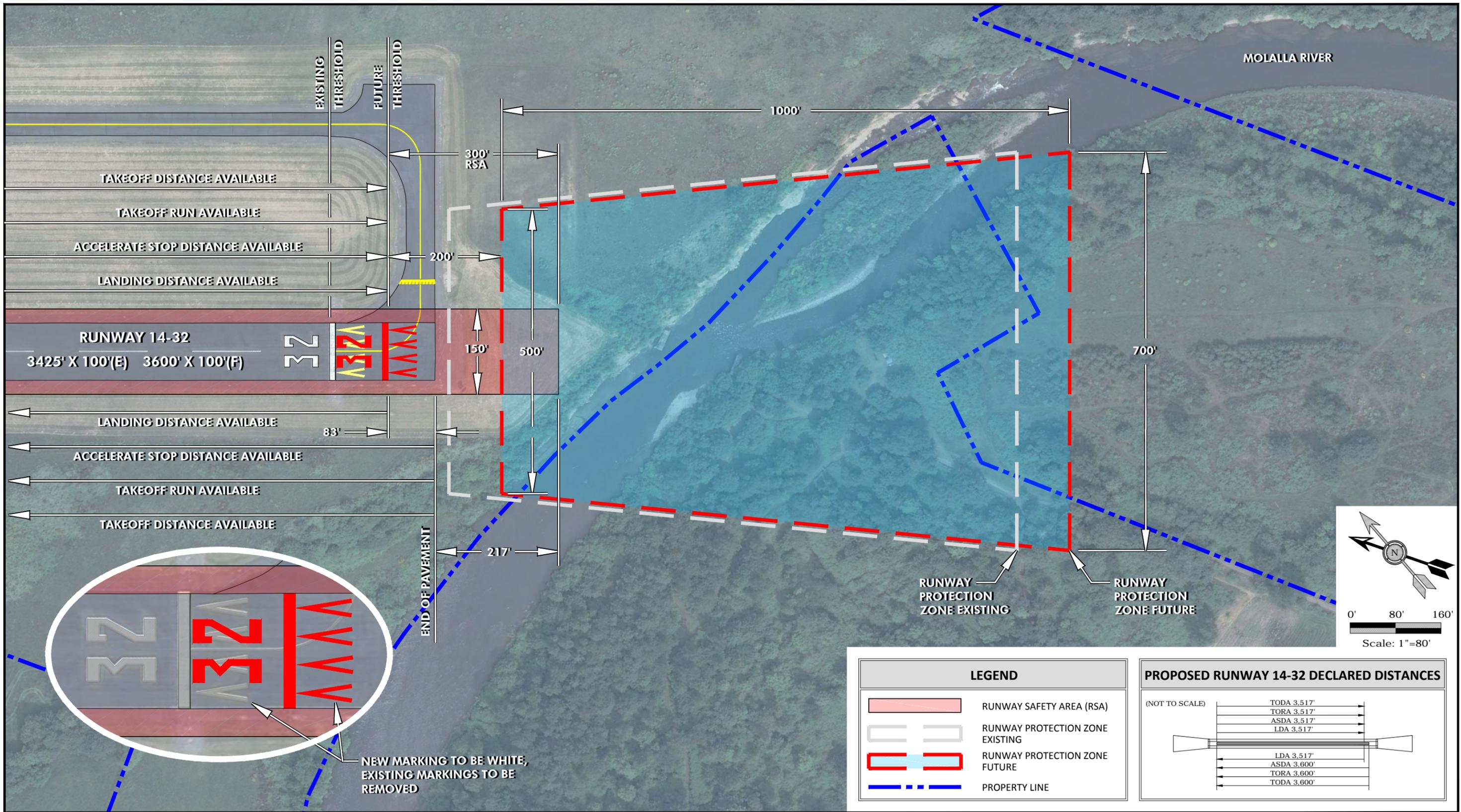


FIGURE 2

MILLPORT STATE AIRPORT
 RUNWAY 14-32 PROPOSED TO REPLACE OLD
 RUNWAY 14-32



Appendix E



CLACKAMAS COUNTY ZONING AND DEVELOPMENT ORDINANCE

- E. Airport Noise Impact Boundary. Areas located within 1,500 feet of an airport runway or within established noise contour boundaries exceeding 55 Ldn.
- F. Airport Sponsor. The owner, manager, or other person or entity designated to represent the interests of an airport.
- G. Approach Surface. A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface.
1. The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:
 - a. 1,250 feet for a utility runway having only visual approaches;
 - b. 1,500 feet for a runway other than a utility runway with only visual approaches;
 - c. 2,000 feet for a runway with a non-precision instrument approach;
 - d. 3,500 feet for a non-precision instrument runway other than utility, having visibility minimums greater than three-fourths statute mile;
 - e. 4,000 feet for a non-precision instrument runway, other than utility, having a non-precision approach with visibility minimums as low as three-fourths statute mile; and
 - f. 16,000 feet for precision instrument runways.
 2. The approach surface extends for a horizontal distance of:
 - a. 5,000 feet at a slope of 20 feet outward for each foot upward for all utility and visual runways;
 - b. 10,000 feet at a slope of 34 feet outward for each foot upward for all non-precision instrument runways, other than utility; and
 - c. 10,000 feet at a slope of 50 feet outward for each one foot upward, with an additional 40,000 feet at a slope of 40 feet outward for each one foot upward, for precision instrument runways.
 3. The outer width of an approach surface will be that width prescribed in this subsection for the most precise approach existing or planned for that runway end.
- H. Conical Surface. A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to one for a horizontal distance of 4,000 feet.

- I. Hazard. All hazards within and around airports shall be as determined by the Oregon Department of Aviation or Federal Aviation Administration (FAA).
- J. Heliports. A heliport is an area of land, water, or structure designated for the landing and take-off of helicopters or other rotorcraft. The heliport overlay zone applies the following imaginary surfaces. The heliport approach surfaces begin at each end of the heliport primary surface and have the same width as the primary surface. They extend outward and upward for a horizontal distance of 4,000 feet where their width is 500 feet. The slope of the approach surfaces is eight to one for civilian heliports and 10 to one for military heliports. The heliport primary surface coincides in size and shape with the designated takeoff and landing area of a heliport. The heliport primary surface is a horizontal plane at the established heliport elevation. The heliport transitional surfaces extend outward and upward from the lateral boundaries of the heliport primary surface and from the approach surfaces at a slope of two to one for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces.
- K. Horizontal Surface. A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:
1. 5,000 feet for all runways designated as utility or visual.
 2. 10,000 feet for all other runways.
 3. The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be the highest determined for either end of the runway. When a 5,000 foot arc is encompassed by tangents connecting two adjacent 10,000 foot arcs, the 5,000 foot arc shall be disregarded on the construction of the perimeter of the horizontal surface.
- L. Non-Precision Instrument Runway. A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach has been approved, or planned, and for which no precision approach facilities are planned or indicated on an FAA-approved airport layout plan or other FAA planning document.
- M. Other than Utility Runway. A runway that is constructed for and intended to be used by turbine-driven aircraft or by propeller-driven aircraft exceeding 12,500 pounds gross weight.

- N. Precision Instrument Runway. A runway having an existing instrument approach procedure utilizing air navigation facilities that provide both horizontal and vertical guidance, such as an Instrument Landing System (ILS) or Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated by an FAA-approved airport layout plan or other FAA planning document.
- O. Primary Surface. A surface longitudinally centered on a runway. When a runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway. When a runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is:
1. 250 feet for utility runways having only visual approaches;
 2. 500 feet for utility runways having non-precision instrument approaches;
 3. For other than utility runways the width is:
 - a. 500 feet for visual runways having only visual approaches;
 - b. 500 feet for non-precision instrument runways having visibility minimums greater than three-fourths statute mile;
 - c. 1,000 feet for a non-precision instrument runway having a non-precision instrument approach with a visibility minimum as low as three-fourths statute mile, and for precision instrument runways.
- P. Public Assembly Facility. A permanent or temporary structure or facility, place or activity where concentrations of people gather in reasonably close quarters for purposes such as deliberation, education, worship, shopping, employment, entertainment, recreation, sporting events, or similar activities. Public assembly facilities include, but are not limited to, schools, churches, conference or convention facilities, employment and shopping centers, arenas, athletic fields, stadiums, clubhouses, museums, and similar facilities and places, but do not include parks, golf courses or similar facilities unless used in a manner where people are concentrated in reasonably close quarters. Public assembly facilities also do not include air shows, structures or uses approved by the FAA in an adopted airport master plan, or places where people congregate for short periods of time such as parking lots or bus stops.
- Q. Runway. A defined area on an airport prepared for landing and takeoff of aircraft along its length.

- R. Runway Protection Zone (RPZ). An area off the runway end used 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 inner width of the RPZ is the same as the width of the primary surface. The outer width of the RPZ is a function of the type of aircraft and specified approach visibility minimum associated with the runway end. The RPZ extends from each end of the primary surface for a horizontal distance of:
1. 1,000 feet for utility runways.
 2. 1,700 feet for other than utility runways having non-precision instrument approaches.
 3. 2,500 feet for precision instrument runways.
- S. Structure. Any constructed or erected object which requires location on the ground or is attached to something located on the ground. Structures include but are not limited to buildings, decks, fences, signs, towers, cranes, flagpoles, antennas, smokestacks, earthen formations and overhead transmission lines. Structures do not include paved areas.
- T. Transitional Surface. Those surfaces that extend upward and outward at 90 degree angles to the runway centerline and the runway centerline extended at a slope of seven feet horizontally for each foot vertically from the sides of the primary and approach surfaces to the point of intersection with the horizontal and conical surfaces. Transitional surfaces for those portions of the precision approach surfaces which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at a 90 degree angle to the extended runway centerline.
- U. Utility Runway. A runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight or less.
- V. Visual Runway. A runway intended solely for the operation of aircraft using visual approach procedures, where no straight-in instrument approach procedures or instrument designations have been approved or planned, or are indicated on an FAA-approved airport layout plan or any other FAA planning document.
- W. Water Impoundment. Includes wastewater treatment settling ponds, surface mining ponds, detention and retention ponds, artificial lakes and ponds, and similar water features. A new water impoundment includes an expansion of an existing water impoundment except where such expansion was previously authorized by land use action approved prior to the effective date of Section 713.

713.04 USES PERMITTED OUTRIGHT

The following uses and activities are permitted outright in the Public Use Airport special use zoning district:

CLACKAMAS COUNTY ZONING AND DEVELOPMENT ORDINANCE

- A. Customary and usual aviation-related activities, including but not limited to takeoffs and landings; aircraft hangars and tie-downs; construction and maintenance of airport facilities; fixed-base operator facilities; one single-family dwelling in conjunction with an airport (if there is not one there already) for an airport manager, caretaker, or security officer; and other activities incidental to the normal operation of an airport. Except as provided in this ordinance, "customary and usual aviation-related activities" do not include residential, commercial, industrial, manufacturing, and other uses.
- B. Air passenger and air freight services and facilities, at levels consistent with the classification and needs identified in the Oregon Department of Aviation Airport System Plan.
- C. Emergency medical flight services, including activities, aircraft, accessory structures, and other facilities necessary to support emergency transportation for medical purposes. Emergency medical flight services do not include hospitals, medical offices, medical labs, medical equipment sales, and other similar uses.
- D. Law enforcement, military, and firefighting activities, including aircraft and ground-based activities, facilities and accessory structures necessary to support federal, state or local law enforcement or land management agencies engaged in law enforcement or firefighting activities. Law enforcement and firefighting activities include transport of personnel, aerial observation, and transport of equipment, water, fire retardant and supplies.
- E. Search and rescue operations, including aircraft and ground based activities that support the orderly and efficient conduct of search or rescue related activities.
- F. Flight instruction, including activities, facilities, and accessory structures located at airport sites that provide education and training directly related to aeronautical activities. Flight instruction includes ground training and aeronautic skills training, but does not include schools for flight attendants, ticket agents or similar personnel.
- G. Aircraft service, maintenance and training, including activities, facilities and accessory structures provided to teach aircraft service and maintenance skills and to maintain, service, refuel or repair aircraft and aircraft components. "Aircraft service, maintenance and training" includes the construction and assembly of aircraft and aircraft components for personal use, but does not include activities, structures or facilities for the manufacturing of aircraft, aircraft components or other aircraft-related products for sale to the public.
- H. Aircraft rental, including activities, facilities and accessory structures that support the provision of aircraft for rent or lease to the public.

- I. Aircraft sales and the sale of aeronautic equipment and supplies, including activities, facilities and accessory structures for the storage, display, demonstration and sales of aircraft and aeronautic equipment and supplies to the public but not including activities, facilities or structures for the manufacturing of aircraft, aircraft components or other aircraft-related products for sale to the public.
- J. Crop dusting activities, including activities, facilities and structures accessory to crop dusting operations. Crop dusting activities include, but are not limited to, aerial application of chemicals, seed, fertilizer, defoliant and other chemicals or products used in a commercial agricultural, forestry or rangeland management setting.
- K. Agricultural and Forestry Activities, including activities, facilities and accessory structures that qualify as a "farm use" as defined in ORS 215.203 or "farming practice" as defined in ORS 30.930.
- L. Aeronautic recreational and sporting activities, including activities, facilities and accessory structures at airports that support recreational usage of aircraft and sporting activities that require the use of aircraft or other devices used and intended for use in flight. Aeronautic recreation and sporting activities authorized under this paragraph include, but are not limited to, fly-ins; glider flights; hot air ballooning; ultralight aircraft flights; displays of aircraft; aeronautic flight skills contests; and gyrocopter flights, but do not include flights carrying parachutists or parachute drops (including all forms of skydiving).
- M. Flights carrying parachutists, and parachute drops (including all forms of skydiving) onto an airport, but only upon demonstration that the parachutist business has secured approval to use a drop zone that is at least 10 contiguous acres in size. The configuration of the drop zone shall roughly approximate a square or a circle and may contain structures, trees, or other obstacles only if the remainder of the drop zone provides adequate areas for parachutists to land safely.
- N. Uses not identified in Subsection 713.04, but permitted in the underlying zoning district, may be permitted if they do not conflict with permitted uses in Subsection 713.04, safety, or the continued operation and vitality of the airport.

713.05 USES PERMITTED SUBJECT TO REVIEW

Uses not identified in Subsection 713.04 and contained in an Airport Expansion Plan approved by the County as part of the Comprehensive Plan shall require review as a Type III application pursuant to Section 1307 and shall be subject to the following standards and criteria:

- A. The use is, or will be, supported by adequate types and levels of public facilities, services, and transportation systems authorized by applicable statewide land use planning goals;

- B. The use does not seriously interfere with existing land uses in areas surrounding the airport; and
- C. For airports where the underlying zoning district is EFU, the use shall comply with the standards described in ORS 215.296.
- D. The development standards in Section 1000 shall be applied appropriate to the type of use permitted.
- E. An applicant may demonstrate that these standards will be satisfied through the imposition of clear and objective conditions.

713.06 IMAGINARY SURFACE AND NOISE IMPACT BOUNDARY DELINEATION

The airport elevation, the airport noise impact boundary, and the location and dimensions of the runway, primary surface, runway protection zone, approach surface, horizontal surface, conical surface and transitional surface, direct and secondary impact boundaries shall be delineated for each public use airport where this district is applied and shall be made part of the zoning maps adopted pursuant to Subsection 103.02. All lands, waters, and airspace, or portions thereof, that are located within these boundaries or surfaces shall be subject to the requirements of this zone.

713.07 LAND USE COMPATIBILITY REQUIREMENTS

Applications for land use or building permits for properties within the boundaries of these safety overlay zones shall comply with the requirements of this Section as provided herein.

713.08 WATER IMPOUNDMENTS WITHIN SAFETY OVERLAY ZONES

Any use or activity that would result in the establishment or expansion of a water impoundment shall comply with the requirements of this section.

713.09 NONCONFORMING USES

Section 713 shall not be construed to require the removal, lowering, or alteration of any existing structure or vegetation not conforming to Section 713. Section 713 shall not require any change in the construction, or alteration of the intended use of any structure, the construction or alteration of which was begun or completed prior to the effective date of this safety overlay zone.

[Amended by Ord. ZDO-248, 10/13/14]

Appendix F





ASSURANCES

Airport Sponsors

A. General.

1. These assurances shall be complied with in the performance of grant agreements for airport development, airport planning, and noise compatibility program grants for airport sponsors.
2. These assurances are required to be submitted as part of the project application by sponsors requesting funds under the provisions of Title 49, U.S.C., subtitle VII, as amended. As used herein, the term "public agency sponsor" means a public agency with control of a public-use airport; the term "private sponsor" means a private owner of a public-use airport; and the term "sponsor" includes both public agency sponsors and private sponsors.
3. Upon acceptance of this grant offer by the sponsor, these assurances are incorporated in and become part of this grant agreement.

B. Duration and Applicability.

1. **Airport development or Noise Compatibility Program Projects Undertaken by a Public Agency Sponsor.**

The terms, conditions and assurances of this grant agreement shall remain in full force and effect throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project. However, there shall be no limit on the duration of the assurances regarding Exclusive Rights and Airport Revenue so long as the airport is used as an airport. There shall be no limit on the duration of the terms, conditions, and assurances with respect to real property acquired with federal funds. Furthermore, the duration of the Civil Rights assurance shall be specified in the assurances.

2. **Airport Development or Noise Compatibility Projects Undertaken by a Private Sponsor.**

The preceding paragraph 1 also applies to a private sponsor except that the useful life of project items installed within a facility or the useful life of the facilities developed or equipment acquired under an airport development or noise compatibility program project shall be no less than ten (10) years from the date of acceptance of Federal aid for the project.

3. **Airport Planning Undertaken by a Sponsor.**

Unless otherwise specified in this grant agreement, only Assurances 1, 2, 3, 5, 6, 13, 18, 25, 30, 32, 33, and 34 in Section C apply to planning projects. The terms, conditions, and assurances of this grant agreement shall remain in full force and effect during the life of the project; there shall be no limit on the duration of the assurances regarding Airport Revenue so long as the airport is used as an airport.

C. Sponsor Certification.

The sponsor hereby assures and certifies, with respect to this grant that:

1. **General Federal Requirements.**

It will comply with all applicable Federal laws, regulations, executive orders, policies, guidelines, and requirements as they relate to the application, acceptance and use of Federal funds for this project including but not limited to the following:

Federal Legislation

- a. Title 49, U.S.C., subtitle VII, as amended.
- b. Davis-Bacon Act - 40 U.S.C. 276(a), et seq.¹
- c. Federal Fair Labor Standards Act - 29 U.S.C. 201, et seq.
- d. Hatch Act – 5 U.S.C. 1501, et seq.²
- e. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 Title 42 U.S.C. 4601, et seq.^{1 2}
- f. National Historic Preservation Act of 1966 - Section 106 - 16 U.S.C. 470(f).¹
- g. Archeological and Historic Preservation Act of 1974 - 16 U.S.C. 469 through 469c.¹
- h. Native Americans Grave Repatriation Act - 25 U.S.C. Section 3001, et seq.
- i. Clean Air Act, P.L. 90-148, as amended.
- j. Coastal Zone Management Act, P.L. 93-205, as amended.
- k. Flood Disaster Protection Act of 1973 - Section 102(a) - 42 U.S.C. 4012a.¹
- l. Title 49, U.S.C., Section 303, (formerly known as Section 4(f))
- m. Rehabilitation Act of 1973 - 29 U.S.C. 794.
- n. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
- o. Americans with Disabilities Act of 1990, as amended, (42 U.S.C. § 12101 et seq.), prohibits discrimination on the basis of disability).
- p. Age Discrimination Act of 1975 - 42 U.S.C. 6101, et seq.
- q. American Indian Religious Freedom Act, P.L. 95-341, as amended.
- r. Architectural Barriers Act of 1968 -42 U.S.C. 4151, et seq.¹
- s. Power plant and Industrial Fuel Use Act of 1978 - Section 403- 2 U.S.C. 8373.¹
- t. Contract Work Hours and Safety Standards Act - 40 U.S.C. 327, et seq.¹
- u. Copeland Anti-kickback Act - 18 U.S.C. 874.1
- v. National Environmental Policy Act of 1969 - 42 U.S.C. 4321, et seq.¹
- w. Wild and Scenic Rivers Act, P.L. 90-542, as amended.
- x. Single Audit Act of 1984 - 31 U.S.C. 7501, et seq.²
- y. Drug-Free Workplace Act of 1988 - 41 U.S.C. 702 through 706.

- z. The Federal Funding Accountability and Transparency Act of 2006, as amended (Pub. L. 109-282, as amended by section 6202 of Pub. L. 110-252).

Executive Orders

- a. Executive Order 11246 - Equal Employment Opportunity¹
- b. Executive Order 11990 - Protection of Wetlands
- c. Executive Order 11998 – Flood Plain Management
- d. Executive Order 12372 - Intergovernmental Review of Federal Programs
- e. Executive Order 12699 - Seismic Safety of Federal and Federally Assisted New Building Construction¹
- f. Executive Order 12898 - Environmental Justice

Federal Regulations

- a. 2 CFR Part 180 - OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement).
- b. 2 CFR Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards. [OMB Circular A-87 Cost Principles Applicable to Grants and Contracts with State and Local Governments, and OMB Circular A-133 - Audits of States, Local Governments, and Non-Profit Organizations].^{4, 5, 6}
- c. 2 CFR Part 1200 – Nonprocurement Suspension and Debarment
- d. 14 CFR Part 13 - Investigative and Enforcement Procedures 14 CFR Part 16 - Rules of Practice For Federally Assisted Airport Enforcement Proceedings.
- e. 14 CFR Part 150 - Airport noise compatibility planning.
- f. 28 CFR Part 35- Discrimination on the Basis of Disability in State and Local Government Services.
- g. 28 CFR § 50.3 - U.S. Department of Justice Guidelines for Enforcement of Title VI of the Civil Rights Act of 1964.
- h. 29 CFR Part 1 - Procedures for predetermination of wage rates.¹
- i. 29 CFR Part 3 - Contractors and subcontractors on public building or public work financed in whole or part by loans or grants from the United States.¹
- j. 29 CFR Part 5 - Labor standards provisions applicable to contracts covering federally financed and assisted construction (also labor standards provisions applicable to non-construction contracts subject to the Contract Work Hours and Safety Standards Act).¹
- k. 41 CFR Part 60 - Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor (Federal and federally assisted contracting requirements).¹
- l. 49 CFR Part 18 - Uniform administrative requirements for grants and cooperative agreements to state and local governments.³
- m. 49 CFR Part 20 - New restrictions on lobbying.
- n. 49 CFR Part 21 – Nondiscrimination in federally-assisted programs of the Department of Transportation - effectuation of Title VI of the Civil Rights Act of 1964.
- o. 49 CFR Part 23 - Participation by Disadvantage Business Enterprise in Airport Concessions.

- p. 49 CFR Part 24 – Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs.^{1 2}
- q. 49 CFR Part 26 – Participation by Disadvantaged Business Enterprises in Department of Transportation Programs.
- r. 49 CFR Part 27 – Nondiscrimination on the Basis of Handicap in Programs and Activities Receiving or Benefiting from Federal Financial Assistance.¹
- s. 49 CFR Part 28 – Enforcement of Nondiscrimination on the Basis of Handicap in Programs or Activities conducted by the Department of Transportation.
- t. 49 CFR Part 30 - Denial of public works contracts to suppliers of goods and services of countries that deny procurement market access to U.S. contractors.
- u. 49 CFR Part 32 – Governmentwide Requirements for Drug-Free Workplace (Financial Assistance)
- v. 49 CFR Part 37 – Transportation Services for Individuals with Disabilities (ADA).
- w. 49 CFR Part 41 - Seismic safety of Federal and federally assisted or regulated new building construction.

Specific Assurances

Specific assurances required to be included in grant agreements by any of the above laws, regulations or circulars are incorporated by reference in this grant agreement.

Footnotes to Assurance C.1.

- ¹ These laws do not apply to airport planning sponsors.
- ² These laws do not apply to private sponsors.
- ³ 49 CFR Part 18 and 2 CFR Part 200 contain requirements for State and Local Governments receiving Federal assistance. Any requirement levied upon State and Local Governments by this regulation and circular shall also be applicable to private sponsors receiving Federal assistance under Title 49, United States Code.
- ⁴ On December 26, 2013 at 78 FR 78590, the Office of Management and Budget (OMB) issued the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards in 2 CFR Part 200. 2 CFR Part 200 replaces and combines the former Uniform Administrative Requirements for Grants (OMB Circular A-102 and Circular A-110 or 2 CFR Part 215 or Circular) as well as the Cost Principles (Circulars A-21 or 2 CFR part 220; Circular A-87 or 2 CFR part 225; and A-122, 2 CFR part 230). Additionally it replaces Circular A-133 guidance on the Single Annual Audit. In accordance with 2 CFR section 200.110, the standards set forth in Part 200 which affect administration of Federal awards issued by Federal agencies become effective once implemented by Federal agencies or when any future amendment to this Part becomes final. Federal agencies, including the Department of Transportation, must implement the policies and procedures applicable to Federal awards by promulgating a regulation to be effective by December 26, 2014 unless different provisions are required by statute or approved by OMB.

⁵ Cost principles established in 2 CFR part 200 subpart E must be used as guidelines for determining the eligibility of specific types of expenses.

⁶ Audit requirements established in 2 CFR part 200 subpart F are the guidelines for audits.

2. Responsibility and Authority of the Sponsor.

a. Public Agency Sponsor:

It has legal authority to apply for this grant, and to finance and carry out the proposed project; that a resolution, motion or similar action has been duly adopted or passed as an official act of the applicant's governing body authorizing the filing of the application, including all understandings and assurances contained therein, and directing and authorizing the person identified as the official representative of the applicant to act in connection with the application and to provide such additional information as may be required.

b. Private Sponsor:

It has legal authority to apply for this grant and to finance and carry out the proposed project and comply with all terms, conditions, and assurances of this grant agreement. It shall designate an official representative and shall in writing direct and authorize that person to file this application, including all understandings and assurances contained therein; to act in connection with this application; and to provide such additional information as may be required.

3. Sponsor Fund Availability.

It has sufficient funds available for that portion of the project costs which are not to be paid by the United States. It has sufficient funds available to assure operation and maintenance of items funded under this grant agreement which it will own or control.

4. Good Title.

a. It, a public agency or the Federal government, holds good title, satisfactory to the Secretary, to the landing area of the airport or site thereof, or will give assurance satisfactory to the Secretary that good title will be acquired.

b. For noise compatibility program projects to be carried out on the property of the sponsor, it holds good title satisfactory to the Secretary to that portion of the property upon which Federal funds will be expended or will give assurance to the Secretary that good title will be obtained.

5. Preserving Rights and Powers.

a. It will not take or permit any action which would operate to deprive it of any of the rights and powers necessary to perform any or all of the terms, conditions, and assurances in this grant agreement without the written approval of the Secretary, and will act promptly to acquire, extinguish or modify any outstanding rights or claims of right of others which would interfere with such performance by the sponsor. This shall be done in a manner acceptable to the Secretary.

- b. It will not sell, lease, encumber, or otherwise transfer or dispose of any part of its title or other interests in the property shown on Exhibit A to this application or, for a noise compatibility program project, that portion of the property upon which Federal funds have been expended, for the duration of the terms, conditions, and assurances in this grant agreement without approval by the Secretary. If the transferee is found by the Secretary to be eligible under Title 49, United States Code, to assume the obligations of this grant agreement and to have the power, authority, and financial resources to carry out all such obligations, the sponsor shall insert in the contract or document transferring or disposing of the sponsor's interest, and make binding upon the transferee all of the terms, conditions, and assurances contained in this grant agreement.
- c. For all noise compatibility program projects which are to be carried out by another unit of local government or are on property owned by a unit of local government other than the sponsor, it will enter into an agreement with that government. Except as otherwise specified by the Secretary, that agreement shall obligate that government to the same terms, conditions, and assurances that would be applicable to it if it applied directly to the FAA for a grant to undertake the noise compatibility program project. That agreement and changes thereto must be satisfactory to the Secretary. It will take steps to enforce this agreement against the local government if there is substantial non-compliance with the terms of the agreement.
- d. For noise compatibility program projects to be carried out on privately owned property, it will enter into an agreement with the owner of that property which includes provisions specified by the Secretary. It will take steps to enforce this agreement against the property owner whenever there is substantial non-compliance with the terms of the agreement.
- e. If the sponsor is a private sponsor, it will take steps satisfactory to the Secretary to ensure that the airport will continue to function as a public-use airport in accordance with these assurances for the duration of these assurances.
- f. If an arrangement is made for management and operation of the airport by any agency or person other than the sponsor or an employee of the sponsor, the sponsor will reserve sufficient rights and authority to insure that the airport will be operated and maintained in accordance Title 49, United States Code, the regulations and the terms, conditions and assurances in this grant agreement and shall insure that such arrangement also requires compliance therewith.
- g. Sponsors of commercial service airports will not permit or enter into any arrangement that results in permission for the owner or tenant of a property used as a residence, or zoned for residential use, to taxi an aircraft between that property and any location on airport. Sponsors of general aviation airports entering into any arrangement that results in permission for the owner of residential real property adjacent to or near the airport must comply with the requirements of Sec. 136 of Public Law 112-95 and the sponsor assurances.

6. Consistency with Local Plans.

The project is reasonably consistent with plans (existing at the time of submission of this application) of public agencies that are authorized by the State in which the project is located to plan for the development of the area surrounding the airport.

7. Consideration of Local Interest.

It has given fair consideration to the interest of communities in or near where the project may be located.

8. Consultation with Users.

In making a decision to undertake any airport development project under Title 49, United States Code, it has undertaken reasonable consultations with affected parties using the airport at which project is proposed.

9. Public Hearings.

In projects involving the location of an airport, an airport runway, or a major runway extension, it has afforded the opportunity for public hearings for the purpose of considering the economic, social, and environmental effects of the airport or runway location and its consistency with goals and objectives of such planning as has been carried out by the community and it shall, when requested by the Secretary, submit a copy of the transcript of such hearings to the Secretary. Further, for such projects, it has on its management board either voting representation from the communities where the project is located or has advised the communities that they have the right to petition the Secretary concerning a proposed project.

10. Metropolitan Planning Organization.

In projects involving the location of an airport, an airport runway, or a major runway extension at a medium or large hub airport, the sponsor has made available to and has provided upon request to the metropolitan planning organization in the area in which the airport is located, if any, a copy of the proposed amendment to the airport layout plan to depict the project and a copy of any airport master plan in which the project is described or depicted.

11. Pavement Preventive Maintenance.

With respect to a project approved after January 1, 1995, for the replacement or reconstruction of pavement at the airport, it assures or certifies that it has implemented an effective airport pavement maintenance-management program and it assures that it will use such program for the useful life of any pavement constructed, reconstructed or repaired with Federal financial assistance at the airport. It will provide such reports on pavement condition and pavement management programs as the Secretary determines may be useful.

12. Terminal Development Prerequisites.

For projects which include terminal development at a public use airport, as defined in Title 49, it has, on the date of submittal of the project grant application, all the safety equipment required for certification of such airport under section 44706 of Title 49, United States Code, and all the security equipment required by rule or regulation, and

has provided for access to the passenger enplaning and deplaning area of such airport to passengers enplaning and deplaning from aircraft other than air carrier aircraft.

13. Accounting System, Audit, and Record Keeping Requirements.

- a. It shall keep all project accounts and records which fully disclose the amount and disposition by the recipient of the proceeds of this grant, the total cost of the project in connection with which this grant is given or used, and the amount or nature of that portion of the cost of the project supplied by other sources, and such other financial records pertinent to the project. The accounts and records shall be kept in accordance with an accounting system that will facilitate an effective audit in accordance with the Single Audit Act of 1984.
- b. It shall make available to the Secretary and the Comptroller General of the United States, or any of their duly authorized representatives, for the purpose of audit and examination, any books, documents, papers, and records of the recipient that are pertinent to this grant. The Secretary may require that an appropriate audit be conducted by a recipient. In any case in which an independent audit is made of the accounts of a sponsor relating to the disposition of the proceeds of a grant or relating to the project in connection with which this grant was given or used, it shall file a certified copy of such audit with the Comptroller General of the United States not later than six (6) months following the close of the fiscal year for which the audit was made.

14. Minimum Wage Rates.

It shall include, in all contracts in excess of \$2,000 for work on any projects funded under this grant agreement which involve labor, provisions establishing minimum rates of wages, to be predetermined by the Secretary of Labor, in accordance with the Davis-Bacon Act, as amended (40 U.S.C. 276a-276a-5), which contractors shall pay to skilled and unskilled labor, and such minimum rates shall be stated in the invitation for bids and shall be included in proposals or bids for the work.

15. Veteran's Preference.

It shall include in all contracts for work on any project funded under this grant agreement which involve labor, such provisions as are necessary to insure that, in the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to Vietnam era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns owned and controlled by disabled veterans as defined in Section 47112 of Title 49, United States Code. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

16. Conformity to Plans and Specifications.

It will execute the project subject to plans, specifications, and schedules approved by the Secretary. Such plans, specifications, and schedules shall be submitted to the Secretary prior to commencement of site preparation, construction, or other performance under this grant agreement, and, upon approval of the Secretary, shall be incorporated into this grant agreement. Any modification to the approved plans,

specifications, and schedules shall also be subject to approval of the Secretary, and incorporated into this grant agreement.

17. Construction Inspection and Approval.

It will provide and maintain competent technical supervision at the construction site throughout the project to assure that the work conforms to the plans, specifications, and schedules approved by the Secretary for the project. It shall subject the construction work on any project contained in an approved project application to inspection and approval by the Secretary and such work shall be in accordance with regulations and procedures prescribed by the Secretary. Such regulations and procedures shall require such cost and progress reporting by the sponsor or sponsors of such project as the Secretary shall deem necessary.

18. Planning Projects.

In carrying out planning projects:

- a. It will execute the project in accordance with the approved program narrative contained in the project application or with the modifications similarly approved.
- b. It will furnish the Secretary with such periodic reports as required pertaining to the planning project and planning work activities.
- c. It will include in all published material prepared in connection with the planning project a notice that the material was prepared under a grant provided by the United States.
- d. It will make such material available for examination by the public, and agrees that no material prepared with funds under this project shall be subject to copyright in the United States or any other country.
- e. It will give the Secretary unrestricted authority to publish, disclose, distribute, and otherwise use any of the material prepared in connection with this grant.
- f. It will grant the Secretary the right to disapprove the sponsor's employment of specific consultants and their subcontractors to do all or any part of this project as well as the right to disapprove the proposed scope and cost of professional services.
- g. It will grant the Secretary the right to disapprove the use of the sponsor's employees to do all or any part of the project.
- h. It understands and agrees that the Secretary's approval of this project grant or the Secretary's approval of any planning material developed as part of this grant does not constitute or imply any assurance or commitment on the part of the Secretary to approve any pending or future application for a Federal airport grant.

19. Operation and Maintenance.

- a. The airport and all facilities which are necessary to serve the aeronautical users of the airport, other than facilities owned or controlled by the United States, shall be operated at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable Federal,

state and local agencies for maintenance and operation. It will not cause or permit any activity or action thereon which would interfere with its use for airport purposes. It will suitably operate and maintain the airport and all facilities thereon or connected therewith, with due regard to climatic and flood conditions. Any proposal to temporarily close the airport for non-aeronautical purposes must first be approved by the Secretary. In furtherance of this assurance, the sponsor will have in effect arrangements for-

- 1) Operating the airport's aeronautical facilities whenever required;
 - 2) Promptly marking and lighting hazards resulting from airport conditions, including temporary conditions; and
 - 3) Promptly notifying airmen of any condition affecting aeronautical use of the airport. Nothing contained herein shall be construed to require that the airport be operated for aeronautical use during temporary periods when snow, flood or other climatic conditions interfere with such operation and maintenance. Further, nothing herein shall be construed as requiring the maintenance, repair, restoration, or replacement of any structure or facility which is substantially damaged or destroyed due to an act of God or other condition or circumstance beyond the control of the sponsor.
- b. It will suitably operate and maintain noise compatibility program items that it owns or controls upon which Federal funds have been expended.

20. Hazard Removal and Mitigation.

It will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

21. Compatible Land Use.

It will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.

22. Economic Nondiscrimination.

- a. It will make the airport available as an airport for public use on reasonable terms and without unjust discrimination to all types, kinds and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the airport.
- b. In any agreement, contract, lease, or other arrangement under which a right or privilege at the airport is granted to any person, firm, or corporation to conduct or

to engage in any aeronautical activity for furnishing services to the public at the airport, the sponsor will insert and enforce provisions requiring the contractor to-

- 1) furnish said services on a reasonable, and not unjustly discriminatory, basis to all users thereof, and
 - 2) charge reasonable, and not unjustly discriminatory, prices for each unit or service, provided that the contractor may be allowed to make reasonable and nondiscriminatory discounts, rebates, or other similar types of price reductions to volume purchasers.
- c. Each fixed-based operator at the airport shall be subject to the same rates, fees, rentals, and other charges as are uniformly applicable to all other fixed-based operators making the same or similar uses of such airport and utilizing the same or similar facilities.
 - d. Each air carrier using such airport shall have the right to service itself or to use any fixed-based operator that is authorized or permitted by the airport to serve any air carrier at such airport.
 - e. Each air carrier using such airport (whether as a tenant, non-tenant, or subtenant of another air carrier tenant) shall be subject to such nondiscriminatory and substantially comparable rules, regulations, conditions, rates, fees, rentals, and other charges with respect to facilities directly and substantially related to providing air transportation as are applicable to all such air carriers which make similar use of such airport and utilize similar facilities, subject to reasonable classifications such as tenants or non-tenants and signatory carriers and non-signatory carriers. Classification or status as tenant or signatory shall not be unreasonably withheld by any airport provided an air carrier assumes obligations substantially similar to those already imposed on air carriers in such classification or status.
 - f. It will not exercise or grant any right or privilege which operates to prevent any person, firm, or corporation operating aircraft on the airport from performing any services on its own aircraft with its own employees [including, but not limited to maintenance, repair, and fueling] that it may choose to perform.
 - g. In the event the sponsor itself exercises any of the rights and privileges referred to in this assurance, the services involved will be provided on the same conditions as would apply to the furnishing of such services by commercial aeronautical service providers authorized by the sponsor under these provisions.
 - h. The sponsor may establish such reasonable, and not unjustly discriminatory, conditions to be met by all users of the airport as may be necessary for the safe and efficient operation of the airport.
 - i. The sponsor may prohibit or limit any given type, kind or class of aeronautical use of the airport if such action is necessary for the safe operation of the airport or necessary to serve the civil aviation needs of the public.

23. Exclusive Rights.

It will permit no exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public. For purposes of this paragraph, the providing of the services at an airport by a single fixed-based operator shall not be construed as an exclusive right if both of the following apply:

- a. It would be unreasonably costly, burdensome, or impractical for more than one fixed-based operator to provide such services, and
- b. If allowing more than one fixed-based operator to provide such services would require the reduction of space leased pursuant to an existing agreement between such single fixed-based operator and such airport. It further agrees that it will not, either directly or indirectly, grant or permit any person, firm, or corporation, the exclusive right at the airport to conduct any aeronautical activities, including, but not limited to charter flights, pilot training, aircraft rental and sightseeing, aerial photography, crop dusting, aerial advertising and surveying, air carrier operations, aircraft sales and services, sale of aviation petroleum products whether or not conducted in conjunction with other aeronautical activity, repair and maintenance of aircraft, sale of aircraft parts, and any other activities which because of their direct relationship to the operation of aircraft can be regarded as an aeronautical activity, and that it will terminate any exclusive right to conduct an aeronautical activity now existing at such an airport before the grant of any assistance under Title 49, United States Code.

24. Fee and Rental Structure.

It will maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport, taking into account such factors as the volume of traffic and economy of collection. No part of the Federal share of an airport development, airport planning or noise compatibility project for which a grant is made under Title 49, United States Code, the Airport and Airway Improvement Act of 1982, the Federal Airport Act or the Airport and Airway Development Act of 1970 shall be included in the rate basis in establishing fees, rates, and charges for users of that airport.

25. Airport Revenues.

- a. All revenues generated by the airport and any local taxes on aviation fuel established after December 30, 1987, will be expended by it for the capital or operating costs of the airport; the local airport system; or other local facilities which are owned or operated by the owner or operator of the airport and which are directly and substantially related to the actual air transportation of passengers or property; or for noise mitigation purposes on or off the airport. The following exceptions apply to this paragraph:
 - 1) If covenants or assurances in debt obligations issued before September 3, 1982, by the owner or operator of the airport, or provisions enacted before September 3, 1982, in governing statutes controlling the owner or operator's financing, provide for the use of the revenues from any of the airport owner or

operator's facilities, including the airport, to support not only the airport but also the airport owner or operator's general debt obligations or other facilities, then this limitation on the use of all revenues generated by the airport (and, in the case of a public airport, local taxes on aviation fuel) shall not apply.

- 2) If the Secretary approves the sale of a privately owned airport to a public sponsor and provides funding for any portion of the public sponsor's acquisition of land, this limitation on the use of all revenues generated by the sale shall not apply to certain proceeds from the sale. This is conditioned on repayment to the Secretary by the private owner of an amount equal to the remaining unamortized portion (amortized over a 20-year period) of any airport improvement grant made to the private owner for any purpose other than land acquisition on or after October 1, 1996, plus an amount equal to the federal share of the current fair market value of any land acquired with an airport improvement grant made to that airport on or after October 1, 1996.
 - 3) Certain revenue derived from or generated by mineral extraction, production, lease, or other means at a general aviation airport (as defined at Section 47102 of title 49 United States Code), if the FAA determines the airport sponsor meets the requirements set forth in Sec. 813 of Public Law 112-95.
- b. As part of the annual audit required under the Single Audit Act of 1984, the sponsor will direct that the audit will review, and the resulting audit report will provide an opinion concerning, the use of airport revenue and taxes in paragraph (a), and indicating whether funds paid or transferred to the owner or operator are paid or transferred in a manner consistent with Title 49, United States Code and any other applicable provision of law, including any regulation promulgated by the Secretary or Administrator.
 - c. Any civil penalties or other sanctions will be imposed for violation of this assurance in accordance with the provisions of Section 47107 of Title 49, United States Code.

26. Reports and Inspections.

It will:

- a. submit to the Secretary such annual or special financial and operations reports as the Secretary may reasonably request and make such reports available to the public; make available to the public at reasonable times and places a report of the airport budget in a format prescribed by the Secretary;
- b. for airport development projects, make the airport and all airport records and documents affecting the airport, including deeds, leases, operation and use agreements, regulations and other instruments, available for inspection by any duly authorized agent of the Secretary upon reasonable request;
- c. for noise compatibility program projects, make records and documents relating to the project and continued compliance with the terms, conditions, and assurances of this grant agreement including deeds, leases, agreements, regulations, and other instruments, available for inspection by any duly authorized agent of the Secretary upon reasonable request; and

- d. in a format and time prescribed by the Secretary, provide to the Secretary and make available to the public following each of its fiscal years, an annual report listing in detail:
 - 1) all amounts paid by the airport to any other unit of government and the purposes for which each such payment was made; and
 - 2) all services and property provided by the airport to other units of government and the amount of compensation received for provision of each such service and property.

27. Use by Government Aircraft.

It will make available all of the facilities of the airport developed with Federal financial assistance and all those usable for landing and takeoff of aircraft to the United States for use by Government aircraft in common with other aircraft at all times without charge, except, if the use by Government aircraft is substantial, charge may be made for a reasonable share, proportional to such use, for the cost of operating and maintaining the facilities used. Unless otherwise determined by the Secretary, or otherwise agreed to by the sponsor and the using agency, substantial use of an airport by Government aircraft will be considered to exist when operations of such aircraft are in excess of those which, in the opinion of the Secretary, would unduly interfere with use of the landing areas by other authorized aircraft, or during any calendar month that –

- a. Five (5) or more Government aircraft are regularly based at the airport or on land adjacent thereto; or
- b. The total number of movements (counting each landing as a movement) of Government aircraft is 300 or more, or the gross accumulative weight of Government aircraft using the airport (the total movement of Government aircraft multiplied by gross weights of such aircraft) is in excess of five million pounds.

28. Land for Federal Facilities.

It will furnish without cost to the Federal Government for use in connection with any air traffic control or air navigation activities, or weather-reporting and communication activities related to air traffic control, any areas of land or water, or estate therein, or rights in buildings of the sponsor as the Secretary considers necessary or desirable for construction, operation, and maintenance at Federal expense of space or facilities for such purposes. Such areas or any portion thereof will be made available as provided herein within four months after receipt of a written request from the Secretary.

29. Airport Layout Plan.

- a. It will keep up to date at all times an airport layout plan of the airport showing
 - 1) boundaries of the airport and all proposed additions thereto, together with the boundaries of all offsite areas owned or controlled by the sponsor for airport purposes and proposed additions thereto;
 - 2) the location and nature of all existing and proposed airport facilities and structures (such as runways, taxiways, aprons, terminal buildings, hangars and

roads), including all proposed extensions and reductions of existing airport facilities;

- 3) the location of all existing and proposed nonaviation areas and of all existing improvements thereon; and
 - 4) all proposed and existing access points used to taxi aircraft across the airport's property boundary. Such airport layout plans and each amendment, revision, or modification thereof, shall be subject to the approval of the Secretary which approval shall be evidenced by the signature of a duly authorized representative of the Secretary on the face of the airport layout plan. The sponsor will not make or permit any changes or alterations in the airport or any of its facilities which are not in conformity with the airport layout plan as approved by the Secretary and which might, in the opinion of the Secretary, adversely affect the safety, utility or efficiency of the airport.
- b. If a change or alteration in the airport or the facilities is made which the Secretary determines adversely affects the safety, utility, or efficiency of any federally owned, leased, or funded property on or off the airport and which is not in conformity with the airport layout plan as approved by the Secretary, the owner or operator will, if requested, by the Secretary (1) eliminate such adverse effect in a manner approved by the Secretary; or (2) bear all costs of relocating such property (or replacement thereof) to a site acceptable to the Secretary and all costs of restoring such property (or replacement thereof) to the level of safety, utility, efficiency, and cost of operation existing before the unapproved change in the airport or its facilities except in the case of a relocation or replacement of an existing airport facility due to a change in the Secretary's design standards beyond the control of the airport sponsor.

30. Civil Rights.

It will promptly take any measures necessary to ensure that no person in the United States shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in any activity conducted with, or benefiting from, funds received from this grant.

- a. Using the definitions of activity, facility and program as found and defined in §§ 21.23 (b) and 21.23 (e) of 49 CFR § 21, the sponsor will facilitate all programs, operate all facilities, or conduct all programs in compliance with all non-discrimination requirements imposed by, or pursuant to these assurances.
- b. Applicability
 - 1) Programs and Activities. If the sponsor has received a grant (or other federal assistance) for any of the sponsor's program or activities, these requirements extend to all of the sponsor's programs and activities.
 - 2) Facilities. Where it receives a grant or other federal financial assistance to construct, expand, renovate, remodel, alter or acquire a facility, or part of a facility, the assurance extends to the entire facility and facilities operated in connection therewith.

- 3) Real Property. Where the sponsor receives a grant or other Federal financial assistance in the form of, or for the acquisition of real property or an interest in real property, the assurance will extend to rights to space on, over, or under such property.

c. Duration.

The sponsor agrees that it is obligated to this assurance for the period during which Federal financial assistance is extended to the program, except where the Federal financial assistance is to provide, or is in the form of, personal property, or real property, or interest therein, or structures or improvements thereon, in which case the assurance obligates the sponsor, or any transferee for the longer of the following periods:

- 1) So long as the airport is used as an airport, or for another purpose involving the provision of similar services or benefits; or
- 2) So long as the sponsor retains ownership or possession of the property.

d. Required Solicitation Language. It will include the following notification in all solicitations for bids, Requests For Proposals for work, or material under this grant agreement and in all proposals for agreements, including airport concessions, regardless of funding source:

“The **(Name of Sponsor)**, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises and airport concession disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.”

e. Required Contract Provisions.

- 1) It will insert the non-discrimination contract clauses requiring compliance with the acts and regulations relative to non-discrimination in Federally-assisted programs of the DOT, and incorporating the acts and regulations into the contracts by reference in every contract or agreement subject to the non-discrimination in Federally-assisted programs of the DOT acts and regulations.
- 2) It will include a list of the pertinent non-discrimination authorities in every contract that is subject to the non-discrimination acts and regulations.
- 3) It will insert non-discrimination contract clauses as a covenant running with the land, in any deed from the United States effecting or recording a transfer of real property, structures, use, or improvements thereon or interest therein to a sponsor.
- 4) It will insert non-discrimination contract clauses prohibiting discrimination on the basis of race, color, national origin, creed, sex, age, or handicap as a

covenant running with the land, in any future deeds, leases, license, permits, or similar instruments entered into by the sponsor with other parties:

- a) For the subsequent transfer of real property acquired or improved under the applicable activity, project, or program; and
 - b) For the construction or use of, or access to, space on, over, or under real property acquired or improved under the applicable activity, project, or program.
- f. It will provide for such methods of administration for the program as are found by the Secretary to give reasonable guarantee that it, other recipients, sub-recipients, sub-grantees, contractors, subcontractors, consultants, transferees, successors in interest, and other participants of Federal financial assistance under such program will comply with all requirements imposed or pursuant to the acts, the regulations, and this assurance.
- g. It agrees that the United States has a right to seek judicial enforcement with regard to any matter arising under the acts, the regulations, and this assurance.

31. Disposal of Land.

- a. For land purchased under a grant for airport noise compatibility purposes, including land serving as a noise buffer, it will dispose of the land, when the land is no longer needed for such purposes, at fair market value, at the earliest practicable time. That portion of the proceeds of such disposition which is proportionate to the United States' share of acquisition of such land will be, at the discretion of the Secretary, (1) reinvested in another project at the airport, or (2) transferred to another eligible airport as prescribed by the Secretary. The Secretary shall give preference to the following, in descending order, (1) reinvestment in an approved noise compatibility project, (2) reinvestment in an approved project that is eligible for grant funding under Section 47117(e) of title 49 United States Code, (3) reinvestment in an approved airport development project that is eligible for grant funding under Sections 47114, 47115, or 47117 of title 49 United States Code, (4) transferred to an eligible sponsor of another public airport to be reinvested in an approved noise compatibility project at that airport, and (5) paid to the Secretary for deposit in the Airport and Airway Trust Fund. If land acquired under a grant for noise compatibility purposes is leased at fair market value and consistent with noise buffering purposes, the lease will not be considered a disposal of the land. Revenues derived from such a lease may be used for an approved airport development project that would otherwise be eligible for grant funding or any permitted use of airport revenue.
- b. For land purchased under a grant for airport development purposes (other than noise compatibility), it will, when the land is no longer needed for airport purposes, dispose of such land at fair market value or make available to the Secretary an amount equal to the United States' proportionate share of the fair market value of the land. That portion of the proceeds of such disposition which is proportionate to the United States' share of the cost of acquisition of such land will, (1) upon application to the Secretary, be reinvested or transferred to another

eligible airport as prescribed by the Secretary. The Secretary shall give preference to the following, in descending order: (1) reinvestment in an approved noise compatibility project, (2) reinvestment in an approved project that is eligible for grant funding under Section 47117(e) of title 49 United States Code, (3) reinvestment in an approved airport development project that is eligible for grant funding under Sections 47114, 47115, or 47117 of title 49 United States Code, (4) transferred to an eligible sponsor of another public airport to be reinvested in an approved noise compatibility project at that airport, and (5) paid to the Secretary for deposit in the Airport and Airway Trust Fund.

- c. Land shall be considered to be needed for airport purposes under this assurance if (1) it may be needed for aeronautical purposes (including runway protection zones) or serve as noise buffer land, and (2) the revenue from interim uses of such land contributes to the financial self-sufficiency of the airport. Further, land purchased with a grant received by an airport operator or owner before December 31, 1987, will be considered to be needed for airport purposes if the Secretary or Federal agency making such grant before December 31, 1987, was notified by the operator or owner of the uses of such land, did not object to such use, and the land continues to be used for that purpose, such use having commenced no later than December 15, 1989.
- d. Disposition of such land under (a) (b) or (c) will be subject to the retention or reservation of any interest or right therein necessary to ensure that such land will only be used for purposes which are compatible with noise levels associated with operation of the airport.

32. Engineering and Design Services.

It will award each contract, or sub-contract for program management, construction management, planning studies, feasibility studies, architectural services, preliminary engineering, design, engineering, surveying, mapping or related services with respect to the project in the same manner as a contract for architectural and engineering services is negotiated under Title IX of the Federal Property and Administrative Services Act of 1949 or an equivalent qualifications-based requirement prescribed for or by the sponsor of the airport.

33. Foreign Market Restrictions.

It will not allow funds provided under this grant to be used to fund any project which uses any product or service of a foreign country during the period in which such foreign country is listed by the United States Trade Representative as denying fair and equitable market opportunities for products and suppliers of the United States in procurement and construction.

34. Policies, Standards, and Specifications.

It will carry out the project in accordance with policies, standards, and specifications approved by the Secretary including but not limited to the advisory circulars listed in the Current FAA Advisory Circulars for AIP projects, dated _____ (the latest approved version as of this grant offer) and included in this grant, and in accordance

with applicable state policies, standards, and specifications approved by the Secretary.

35. Relocation and Real Property Acquisition.

- a. It will be guided in acquiring real property, to the greatest extent practicable under State law, by the land acquisition policies in Subpart B of 49 CFR Part 24 and will pay or reimburse property owners for necessary expenses as specified in Subpart B.
- b. It will provide a relocation assistance program offering the services described in Subpart C and fair and reasonable relocation payments and assistance to displaced persons as required in Subpart D and E of 49 CFR Part 24.
- c. It will make available within a reasonable period of time prior to displacement, comparable replacement dwellings to displaced persons in accordance with Subpart E of 49 CFR Part 24.

36. Access By Intercity Buses.

The airport owner or operator will permit, to the maximum extent practicable, intercity buses or other modes of transportation to have access to the airport; however, it has no obligation to fund special facilities for intercity buses or for other modes of transportation.

37. Disadvantaged Business Enterprises.

The sponsor shall not discriminate on the basis of race, color, national origin or sex in the award and performance of any DOT-assisted contract covered by 49 CFR Part 26, or in the award and performance of any concession activity contract covered by 49 CFR Part 23. In addition, the sponsor shall not discriminate on the basis of race, color, national origin or sex in the administration of its DBE and ACDBE programs or the requirements of 49 CFR Parts 23 and 26. The sponsor shall take all necessary and reasonable steps under 49 CFR Parts 23 and 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts, and/or concession contracts. The sponsor's DBE and ACDBE programs, as required by 49 CFR Parts 26 and 23, and as approved by DOT, are incorporated by reference in this agreement. Implementation of these programs is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the sponsor of its failure to carry out its approved program, the Department may impose sanctions as provided for under Parts 26 and 23 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1936 (31 U.S.C. 3801).

38. Hangar Construction.

If the airport owner or operator and a person who owns an aircraft agree that a hangar is to be constructed at the airport for the aircraft at the aircraft owner's expense, the airport owner or operator will grant to the aircraft owner for the hangar a long term lease that is subject to such terms and conditions on the hangar as the airport owner or operator may impose.

39. Competitive Access.

- a. If the airport owner or operator of a medium or large hub airport (as defined in section 47102 of title 49, U.S.C.) has been unable to accommodate one or more requests by an air carrier for access to gates or other facilities at that airport in order to allow the air carrier to provide service to the airport or to expand service at the airport, the airport owner or operator shall transmit a report to the Secretary that-
 - 1) Describes the requests;
 - 2) Provides an explanation as to why the requests could not be accommodated; and
 - 3) Provides a time frame within which, if any, the airport will be able to accommodate the requests.
- b. Such report shall be due on either February 1 or August 1 of each year if the airport has been unable to accommodate the request(s) in the six month period prior to the applicable due date.

Glossary of Terms



GLOSSARY OF AVIATION TERMS

The following glossary of aviation terms was compiled from a variety of aviation industry sources.

Above Ground Level (AGL) – As measured above the ground; used to identify heights of built items (towers, etc.) on aeronautical charts in terms of absolute height above the ground.

Accelerate Stop Distance Available (ASDA) – The length of the takeoff run available plus the length of a stopway, when available.

Agricultural Aviation – The use of fixed-wing or rotor-wing aircraft in the aerial application of agricultural products (i.e., fertilizers, pesticides, etc.).

Air Cargo - All commercial air express and air freight with the exception of airmail and parcel post.

Air Carrier/Airline - All regularly scheduled airline activity performed by airlines certificated in accordance with Federal Aviation Regulations (FAR Part 121).

Air Taxi - Operations of aircraft "for hire" for specific trips, commonly referred to as aircraft available for charter (FAR Part 135).

Aircraft Approach Category - Grouping of aircraft based on the speed they are traveling when configured for landing (typically 1.3 times the aircraft stall speed in landing configuration). As a rule of thumb, slower approach speeds mean smaller airport dimensions and faster approach speeds require larger dimensions. The aircraft approach categories are:

Category A - Speed less than 91 knots;

Category B - Speed 91 knots or more but less than 121 knots

Category C - Speed 121 knots or more but less than 141 knots

Category D - Speed 141 knots or more but less than 166 knots

Category E - Speed 166 knots or more

Aircraft Holding Area – An area typically located adjacent to a taxiway and runway end designed to accommodate aircraft prior to departure (for pre-takeoff engine checks, instrument flight plan clearances, etc.). Per FAA design standards, aircraft holding areas should be located outside the runway safety area (RSA) and obstacle free zone (OFZ) and aircraft located in the holding area should not interfere with normal taxiway use (taxiway object free area). Sometimes referred to as holding bays or "elephant ear." Smaller areas (aircraft turnarounds) are used to facilitate aircraft movement on runways

without exit taxiways or where back-taxiing is required.

Aircraft Operation - A landing or takeoff is one operation. An aircraft that takes off and then lands creates two aircraft operations.

Aircraft Owners and Pilots Association (AOPA) – A general aviation organization.

Aircraft Parking Line (APL) – A setback depicted on an ALP or other drawings that defines the minimum separation between aircraft parking areas and an adjacent runway or taxiway. The APL dimension reflects runway and taxiway clearances (object free area, etc.) and FAR Part 77 airspace surface clearance (transitional surface penetrations) for parked aircraft. Typically the tail height of the parked aircraft is used to determine adequate clearance for the transitional surface.

Airplane Design Group - A grouping of airplanes based on wingspan and tail height. As with Approach Category, the wider the wingspan, the bigger the aircraft is, the more room it takes up for operating on an airport. The Airplane Design Groups are:

Group I: Up to but not including 49 feet or tail height up to but not including 20 feet.

Group II: 49 feet up to but not including 79 feet or tail height from 20 up to but not including 30 feet.

Group III: 79 feet up to but not including 118 feet or tail height from 30 up to but not including 45 feet.

Group IV: 118 feet up to but not including 171 feet or tail height from 45 up to but not including 60 feet.

Group V: 171 feet up to but not including 214 feet or tail height from 60 up to but not including 66 feet.

Group VI: 214 feet up to but not including 262 feet or tail height from 66 up to but not including 80 feet.

Airport - A landing area regularly used by aircraft for receiving or discharging passengers or cargo, including heliports and seaplane bases.

Airport Beacon (also Rotating Beacon) – A visual navigational aid that displays alternating green and white flashes for a lighted land airport and white for an unlighted land airport.

GLOSSARY OF AVIATION TERMS

Airports District Office (ADO) - The "local" office of the FAA that coordinates planning and construction projects. The Seattle ADO is responsible for airports located in Washington, Oregon, and Idaho.

Airport Improvement Program (AIP) - The funding program administered by the Federal Aviation Administration (FAA) with user fees which are dedicated to improvement of the national airport system. This program currently provides 95% of funding for eligible airport improvement projects. The local sponsor of the project (i.e., airport owner) provides the remaining 5% known as the "match."

Airport Layout Plan (ALP) - The FAA approved drawing which shows the existing and anticipated layout of an airport for the next 20 years. An ALP is prepared using FAA design standards. Future development projects must be consistent with the ALP to be eligible for FAA funding. ALP drawings are typically updated every 7 to 10 years to reflect significant changes, or as needed.

Airport Reference Code (ARC) - An FAA airport coding system that is defined based on the critical or design aircraft for an airport or individual runway. The ARC is an alpha-numeric code based on aircraft approach speed and airplane wingspan (see definitions in glossary). The ARC is used to determine the appropriate design standards for runways, taxiways, and other associated facilities. An airport designed to accommodate a Piper Cub (an A-I aircraft) requires less room than an airport designed to accommodate a Boeing 747 (a D-V aircraft).

Airport Reference Point (ARP) - The approximate mid-point of an airfield that is designated as the official airport location.

Aircraft Rescue and Fire Fighting (ARFF) - On airport emergency response required for certificated commercial service airports (see FAR Part 139).

Airside - The portion of an airport that includes aircraft movement areas (runways, taxiways, etc.).

Airspace - The area above the ground in which aircraft travel. It is divided into enroute and terminal airspace, with corridors, routes, and restricted zones established for the control and safety of air traffic.

Alternate Airport - An airport that is available for landing when the intended airport becomes unavailable. Required for instrument flight planning in the event that weather conditions at destination airport fall below approach minimums (cloud ceiling or visibility).

Annual Service Volume (ASV) - An estimate of how many aircraft operations an airport can handle based upon the number, type and configuration of runways, aircraft mix (large vs. small, etc.), instrumentation, and weather conditions with a "reasonable" amount of delay. ASV is a primary planning standard used to determine when a runway (or an airport) is nearing its capacity, and may require new runways or taxiways. As operations levels approach ASV, the amount of delay per operation increases; once ASV is exceeded, "excessive" delay generally exists.

Approach End of Runway - The end of the runway used for landing. Pilots generally land into the wind and choose a runway end that best aligns with the wind.

Approach Light System (ALS) - Configurations of lights positioned symmetrically beyond the runway threshold and the extended runway centerline. The ALS visually augments the electronic navigational aids for the runway.

Approach Reference Code (APRC) - The APRC is composed of three components: AAC, ADG, and visibility minimums. Visibility minimums are expressed as Runway Visual Range (RVR) values in feet of 1600, 2400, 4000, and 5000 (nominally corresponding to lower than 1/2 mile, lower than 3/4 mile but not lower than 1/2 mile, not lower than 3/4 mile, and not lower than one mile, respectively).

Approach Surface (Also FAR Part 77 Approach) - An imaginary (invisible) surface that rises and extends from the ends of a runway to provide an unobstructed path for aircraft to land or take off. The size and slope of the approach surface vary depending upon the size of aircraft that are accommodated and the approach capabilities (visual or instrument).

Apron - An area on an airport designated for the parking, loading, fueling, or servicing of aircraft (also referred to as tarmac and ramp).

Aqueous Film Forming Foam (AFFF) - A primary fire-fighting agent that is used to create a blanket that smothers flame or prevents ignition (fuel spills, etc.). AFFF is also used to foam runways during emergency landings.

Asphalt or Asphaltic Concrete (AC) - Flexible oil-based pavement used for airfield facilities (runways, taxiways, aircraft parking apron, etc.); also commonly used for road construction.

GLOSSARY OF AVIATION TERMS

Automated Surface Observation System (ASOS) and Automated Weather Observation System (AWOS) – Automated observation systems providing continuous on-site weather data, designed to support aviation activities and weather forecasting.

AVGAS – Highly refined gasoline used in airplanes with piston engines. The current grade of AVGAS available is 100 Octane Low Lead (100LL).

Avigation Easement - A grant of property interest (airspace) over land to ensure unobstructed flight. Typically acquired by airport owners to protect the integrity of runway approaches. Restrictions typically include maximum height limitations for natural (trees, etc.) or built items, but may also address permitted land uses by the owner of the underlying land that are compatible with airport operations.

Back-Taxiing – The practice of aircraft taxiing on a runway before takeoff or after landing, normally, in the opposite direction of the runway's traffic pattern. Back-taxiing is generally required on runways without taxiway access to both runway ends.

Based Aircraft - Aircraft permanently stationed at an airport usually through some form of agreement with the airport owner. Used as a measure of activity at an airport.

Capacity - A measure of the maximum number of aircraft operations that can be accommodated on the runways of an airport in an hour.

Ceiling – The height above the ground or water to base of the lowest cloud layers covering more than 50 percent of the sky.

Charter - Operations of aircraft "for hire" for specific trips, commonly referred to an aircraft available for charter.

Circle to Land or Circling Approach – An instrument approach procedure that allows pilots to "circle" the airfield to land on any authorized runway once visual contact with the runway environment is established and maintained throughout the procedure.

Commercial Service Airport - An airport designed and constructed to serve scheduled or unscheduled commercial airlines. Commercial service airports are certified under FAR Part 139.

Common Traffic Advisory Frequency (CTAF) – A frequency used by pilots to communicate and obtain airport advisories at an uncontrolled airport.

Complimentary Fire Extinguishing Agent – Fire extinguishing agents that provide rapid fire suppression, which may be used in conjunction with principal agents (e.g., foam). Examples include sodium-based and potassium-based dry chemicals, Halocarbons, and Carbon dioxide. Also recommended for electrical and metal fires where water-based foams are not used. Complimentary agents are paired with principal agents based on their compatibility of use.

Conical Surface - One of the "FAR Part 77 "Imaginary" Surfaces. The conical surface extends outward and upward from the edge of the horizontal surface at a slope of 20:1 to a horizontal distance of 4,000 feet.

Controlling Obstruction – The highest obstruction relative to a defined plane of airspace (i.e., approach surface, etc.).

Critical Aircraft - Aircraft which controls one or more design items based on wingspan, approach speed and/or maximum certificated take-off weight. The same aircraft may not be critical to all design items (i.e., runway length, pavement strength, etc.). Also referred to as "design aircraft."

Crosswind - Wind direction that is not parallel to the runway or the path of an aircraft.

Crosswind Runway – An additional runway (secondary, tertiary, etc.) that provides wind coverage not adequately provided by the primary runway. Crosswind runways are generally eligible for FAA funding when a primary runway accommodates less than 95 percent of documented wind conditions (see wind rose).

Decision Height (DH) – For precision instrument approaches, the height (typically in feet or meters above runway end touchdown zone elevation) at which a decision to land or execute a missed approach must be made by the pilot.

Declared Distances – The distances the airport owner declares available for airplane operations (e.g., takeoff run, takeoff distance, accelerate-stop distance, and landing distance). In cases where runways meet all FAA design criteria without modification, declared distances equal the total runway length. In cases where any declared distances are less than full runway length, the dimension should be published in the FAA Airport/Facility Directory (A/FD).

Departure Reference Code (DPRC) – The DPRC represents aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operational procedures necessary.

GLOSSARY OF AVIATION TERMS

Departure Surface – A surface that extends upward from the departure end of an instrument runway that should be free of any obstacle penetrations. For instrument runways other than air carrier, the slope is 40:1, extending 10,200 feet from the runway end. Air carrier runways have a similar surface designed for one-engine inoperative conditions with a slope of 62.5: 1.

Design Aircraft - Aircraft which controls one or more design items based on wingspan, approach speed and/or maximum certificated takeoff weight. The same aircraft may not represent the design aircraft for all design items (i.e., runway length, pavement strength, etc.). Also referred to as "critical aircraft."

Displaced Threshold – A landing threshold located at a point other than on the runway end, usually provided to mitigate close-in obstructions to runway approaches for landing aircraft. The area between the runway end and the displaced threshold accommodates aircraft taxi and takeoff, but not landing.

Distance Measuring Equipment (DME) – Equipment that provides electronic distance information to enroute or approaching aircraft from a land-based transponder that sends and receives pulses of fixed duration and separation. The ground stations are typically co-located with VORs, but they can also be co-located with an ILS.

Distance Remaining Signs – Airfield signs that indicate to pilots the amount of useable runway remaining in 1,000-foot increments. The signs are located along the side of the runway, visible for each direction of runway operation.

DNL - Day-night sound levels, a mathematical method of measuring noise exposure based on cumulative, rather than single event impacts. Night time operations (10pm to 7AM) are assessed a noise penalty to reflect the increased noise sensitivity that exists during normal hours of rest. Previously referred to as Ldn.

Easement – An agreement that provides use or access of land or airspace (see aviation easement) in exchange for compensation.

Enplanements - Domestic, territorial, and international revenue passengers who board an aircraft in the states in scheduled and non-scheduled service of aircraft in intrastate, interstate, and foreign commerce and includes in-transit passengers (passengers on board international flights that transit an airport in the US for non-traffic purposes).

Entitlements - Distribution of Airport Improvement Plan (AIP) funds by FAA from the Airport & Airways Trust Fund to commercial service airport sponsors based on passenger enplanements or cargo volumes and smaller fixed amounts for general aviation airports (Non-Primary Entitlements).

Experimental Aircraft – See homebuilt aircraft.

Federal Aviation Administration (FAA) - The FAA is the branch of the U.S. Department of Transportation that is responsible for the development of airports and air navigation systems.

FAR Part 77 - Federal Air Regulations (FAR) which establish standards for determining obstructions in navigable airspace and defines imaginary (airspace) surfaces for airports and heliports that are designed to prevent hazards to air navigation. FAR Part 77 surfaces include approach, primary, transitional, horizontal, and conical surfaces. The dimensions of surfaces can vary with the runway classification (large or small airplanes) and approach type of each runway end (visual, non-precision instrument, precision instrument). The slope of an approach surface also varies by approach type and runway classification. FAR Part 77 also applies to helicopter landing areas.

FAR Part 139 - Federal Aviation Regulations which establish standards for airports with scheduled passenger commercial air service. Airports accommodating scheduled passenger service with aircraft more than 9 passenger seats must be certified as a "Part 139" airport. Airports that are not certified under Part 139 may accommodate scheduled commercial passenger service with aircraft having 9 passenger seats or less.

Final Approach Fix (FAF) – The fix (location) from which the final instrument approach to an airport is executed; also identifies beginning of final approach segment.

Final Approach Point (FAP) – For non-precision instrument approaches, the point at which an aircraft is established inbound for the approach and where the final descent may begin.

Fixed Base Operator (FBO) - An individual or company located at an airport providing aviation services. Sometimes further defined as a "full service" FBO or a limited service. Full service FBOs typically provide a broad range of services (flight instruction, aircraft rental, charter, fueling, repair, etc.) where a limited service FBO provides only one or two services (such as fueling, flight instruction or repair).

Fixed Wing - A plane with one or more "fixed wings," as opposed to a helicopter that utilizes a rotary wing.

GLOSSARY OF AVIATION TERMS

Flexible Pavement – Typically constructed with an asphalt surface course and one or more layers of base and subbase courses that rest on a subgrade layer.

Flight Service Station (FSS) – FAA or contracted service for pilots to contact (on the ground or in the air) to get weather and airport information. Flight plans are also filed with the FSS.

General Aviation (GA) - All civil (non-military) aviation operations other than scheduled air services and non-scheduled air transport operations for hire.

Glide Slope (GS) – For precision instrument approaches, such as an instrument landing system (ILS), the component that provides electronic vertical guidance to aircraft.

Global Positioning System (GPS) - GPS is a system of navigating which uses multiple satellites to establish the location and altitude of an aircraft with a high degree of accuracy. GPS supports both enroute flight and instrument approach procedures.

Helicopter Landing Pad (Helipad) – A designated landing area for rotor wing aircraft. Requires protected FAR Part 77 imaginary surfaces, as defined for heliports (FAR Part 77.29).

Helicopter Parking Area – A designated area for rotor wing aircraft parking that is typically accessed via hover-taxi or ground taxiing from a designated landing area (e.g., helipad or runway-taxiway system). If not used as a designated landing area, helicopter parking pads do not require dedicated FAR Part 77 imaginary surfaces.

Heliport – A designated helicopter landing facility (as defined by FAR Part 77).

Height Above Airport (HAA) – The height of the published minimum descent altitude (MDA) above the published airport elevation. This is normally published in conjunction with circling minimums.

High Intensity Runway Lights (HIRL) - High intensity (i.e., very bright) lights are used on instrument runways to help pilots to see the runway when visibility is poor.

High Speed (Taxiway) Exit – An acute-angled exit taxiway extending from a runway to an adjacent parallel taxiway which allows landing aircraft to exit the runway at a higher rate of speed than is possible with standard (90-degree) exit taxiways.

Hold Line (Aircraft Hold Line) – Pavement markings located on taxiways that connect to runways, indicating where aircraft should stop before entering runway environment. At controlled

airports, air traffic control clearance is required to proceed beyond a hold line. At uncontrolled airports, pilots are responsible for ensuring that a runway is clear prior to accessing for takeoff.

Hold/Holding Procedure – A defined maneuver in controlled airspace that allows aircraft to circle above a fixed point (often over a navigational aid or GPS waypoint) and altitude while awaiting further clearance from air traffic control.

Home Built Aircraft - An aircraft built by an amateur from a kit or specific design (not an FAA certified factory built aircraft). The aircraft built under the supervision of an FAA-licensed mechanic and are certified by FAA as “Experimental.”

Horizontal Surface - One of the FAR Part 77 Imaginary (invisible) Surfaces. The horizontal surface is an imaginary flat surface 150 feet above the established airport elevation (typically the highest point on the airfield). Its perimeter is constructed by swinging arcs (circles) from each runway end and connecting the arcs with straight lines. The oval-shaped horizontal surface connects to other Part 77 surfaces extending upward from the runway and also beyond its perimeter.

Initial Approach Point/Fix (IAP/IAF) – For instrument approaches, a designated point where an aircraft may begin the approach procedure.

Instrument Approach Procedure (IAP) – A series of defined maneuvers designed to enable the safe transition between enroute instrument flight and landing under instrument flight conditions at a particular airport or heliport. IAPs define specific requirements for aircraft altitude, course, and missed approach procedures. See precision or non-precision instrument approach.

Instrument Flight Rules (IFR) - IFR refers to the set of rules pilots must follow when they are flying in bad weather. Pilots are required to follow these rules when operating in controlled airspace with visibility (ability to see in front of themselves) of less than three miles and/or ceiling (a layer of clouds) lower than 1,000 feet.

Instrument Landing System (ILS) - An ILS is an electronic navigational aid system that guides aircraft for a landing in bad weather. Classified as a precision instrument approach, it is designed to provide a precise approach path for course alignment and vertical descent of aircraft. Generally consists of a localizer, glide slope, outer marker, and middle marker. ILS runways are generally equipped with an approach lighting system (ALS) to maximize approach capabilities. A Category I ILS allows aircraft to descend as low as 200 feet above runway elevation with ½ mile visibility.

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Instrument Meteorological Conditions (IMC) - Meteorological conditions expressed in terms of visibility, distance from clouds, and ceiling less than minima specified for visual meteorological conditions.

Instrument Runway - A runway equipped with electronic navigational aids that accommodate straight-in precision or non-precision instrument approaches.

Itinerant Operation - All aircraft operations at an airport other than local, i.e., flights that come in from another airport.

Jet Fuel – Highly refined grade of kerosene used by turbine engine aircraft. Jet-A is currently the common commercial grade of jet fuel.

Knot (Nautical Mile) – one nautical mile = 1.152 statute miles.

Landing Area - That part of the movement area intended for the landing and takeoff of aircraft.

Landing Distance Available (LDA) – The length of runway which is available and suitable for the ground run of an airplane landing.

Landside – The portion of an airport that includes aircraft parking areas, fueling, hangars, airport terminal area facilities, vehicle parking and other associated facilities.

Larger than Utility Runway – As defined under FAR Part 77, a runway designed and constructed to serve large planes (aircraft with maximum takeoff weights greater than 12,500 pounds).

Ldn – Noise measurement metric (see DNL).

Left Traffic – A term used to describe which side of a runway the airport traffic pattern is located. Left traffic indicates that the runway will be to the pilot's left when in the traffic pattern. Left traffic is standard unless otherwise noted in facility directories at a particular airport.

Large Aircraft - An aircraft with a maximum takeoff weight more than 12,500 lbs.

Light Sport Aircraft (LSA) – A basic aircraft certified by FAA that can be flown by pilots with limited flight training (Sport Pilot certificates), but also provide lower cost access to basic aircraft for all pilot levels. LSA design limits include maximum a gross takeoff weight of 1,320 pounds (land planes) and a maximum of two seats.

Local Area Augmentation System (LAAS) – GPS-based instrument approach that utilizes ground-based systems to augment satellite coverage to provide vertical (glideslope) and horizontal (course) guidance.

Local Operation - Aircraft operation in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.

Localizer – The component of an instrument landing system (ILS) that provides electronic lateral (course) guidance to aircraft. Also used to support non-precision localizer approaches.

LORAN C - A navigation system using land based radio signals, which indicates position and ground speed, but not elevation. (See GPS)

Localizer Performance with Vertical Guidance (LPV) – Satellite navigation (SATNAV) based GPS approaches providing “near category I” precision approach capabilities with course and vertical guidance. LPV approaches are expected to eventually replace traditional step-down, VOR and NDB procedures by providing a constant, ILS glideslope-like descent path. LPV approaches use high-accuracy WAAS signals, which allow narrower glideslope and approach centerline obstacle clearance areas.

Magnetic Declination – Also called magnetic variation, is the angle between magnetic north and true north. Declination is considered positive east of true north and negative when west. Magnetic declination changes over time and with location. Runway end numbers, which reflect the magnetic heading/alignment (within 5 degrees +/-) occasionally require change due to declination.

MALS - **Medium-intensity Approach Lighting System with Runway alignment indicator lights.** An approach lighting system (ALS) which provides visual guidance to landing aircraft.

Medevac - Fixed wing or rotor-wing aircraft used to transport critical medical patients. These aircraft are equipped to provide life support during transport.

Medium Intensity Runway Lights (MIRL) - Runway edge lights which are not as intense as HIRLs (high intensity runway lights). Typical at medium and smaller airports which do not have sophisticated instrument landing systems.

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Microwave Landing System (MLS) - An instrument landing system operating in the microwave spectrum, which provides lateral and vertical guidance to aircraft with compatible equipment. Originally developed as the "next-generation" replacement for the ILS, the FAA discontinued the MLS program in favor of GPS-based systems.

Minimum Descent Altitude (MDA) – The lowest altitude in a non-precision instrument approach that an aircraft may descend without establishing visual contact with the runway or airport environment.

Minimums - Weather condition requirements established for a particular operation or type of operation.

Missed Approach Procedure – A prescribed maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. Usually requires aircraft to climb from the airport environment to a specific holding location where another approach can be executed or the aircraft can divert to another airport.

Missed Approach Point (MAP) – The defined location in a non-precision instrument approach where the procedure must be terminated if the pilot has not visually established the runway or airport environment.

Movement Area - The runways, taxiways and other areas of the airport used for taxiing, takeoff and landing of aircraft, i.e., for aircraft movement.

MSL - Elevation above Mean Sea Level.

National Plan of Integrated Airport Systems (NPIAS). The NPIAS is the federal airport classification system that includes public use airports that meet specific eligibility and activity criteria. A "NPIAS designation" is required for an airport to be eligible to receive FAA funding for airport projects.

Navigational Aid (Navaid) - Any visual or electronic device that helps a pilot navigate. Can be for use to land at an airport or for traveling from point A to point B.

Noise Contours – Continuous lines of equal noise level usually drawn around a noise source, such as runway, highway or railway. The lines are generally plotted in 5-decibel increments, with higher noise levels located nearer the noise source, and lesser exposure levels extending away from the source.

Non-directional Beacon (NDB) - Non-Directional Beacon which transmits a signal on which a pilot may "home" using equipment installed in the aircraft.

Non-Precision Instrument (NPI) Approach - A non-precision instrument approach provides horizontal (course) guidance to pilots for landing. NPI approaches often involve a series of "step down" sequences where aircraft descend in increments (based on terrain clearance), rather than following a continuous glide path. The pilot is responsible for maintaining altitude control between approach segments since no "vertical" guidance is provided.

Obstacle Clearance Surface (OCS) – As defined by FAA, an approach surface that is used in conjunction with alternative threshold siting/clearing criteria to mitigate obstructions within runway approach surfaces. Dimensions, slope and placement depend on runway type and approach capabilities. Also known as Obstacle Clearance Approach (OCA).

Obstruction - An object (tree, house, road, phone pole, etc.) that penetrates an imaginary surface described in FAR Part 77.

Obstruction Chart (OC) - A chart that depicts surveyed obstructions that penetrate an FAR Part 77 imaginary surface surrounding an airport. OC charts are developed by the National Ocean Service (NOS) based on a comprehensive survey that provides detailed location (latitude/longitude coordinates) and elevation data in addition to critical airfield data.

Parallel Taxiway – A taxiway that is aligned parallel to a runway, with connecting taxiways to allow efficient movement of aircraft between the runway and taxiway. The parallel taxiway effectively separates taxiing aircraft from arriving and departing aircraft located on the runway. Used to increase runway capacity and improve safety.

Passenger Facility Charge (PFC) – A user fee charged by commercial service airports for enplaning passengers. Airports must apply to the FAA and meet certain requirements in order to impose a PFC.

Pavement Condition Index (PCI) – A scale of 0-100 that is used to rate airfield pavements ranging from failed to excellent based on visual inspection. Future PCIs can be predicted based on pavement type, age, condition and use as part of a pavement maintenance program.

Pavement Strength or Weight Bearing Capacity – The design limits of airfield pavement expressed in maximum aircraft weight for specific and landing gear configurations (i.e., single wheel, dual wheel, etc.) Small general aviation airport pavements are typically designed to accommodate aircraft weighing up to 12,500 pounds with a single-wheel landing gear.

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Portland Cement Concrete (PCC) – Rigid pavement used for airfield facilities (runways, taxiways, aircraft parking, helipads, etc.).

Precision Approach Path Indicator (PAPI) - A system of lights located by the approach end of a runway that provides visual approach slope guidance to aircraft during approach to landing. The lights typically show green if a pilot is on the correct flight path, and turn red if a pilot is too low.

Precision Instrument Runway (PIR) - A runway equipped with a "precision" instrument approach (descent and course guidance), which allows aircraft to land in bad weather.

Precision Instrument Approach – An instrument approach that provides electronic lateral (course) and vertical (descent) guidance to a runway end. A non-precision instrument approach typically provides only course guidance and the pilot is responsible for managing defined altitude assignments at designated points within the approach.

Primary Runway - That runway which provides the best wind coverage, etc., and receives the most usage at the airport.

Primary Surface - One of the FAR Part 77 Imaginary Surfaces, the primary surface is centered on top of the runway and extends 200 feet beyond each end. The width is from 250' to 1,000' wide depending upon the type of airplanes using the runway.

Principal Fire Extinguishing Agent – Fire extinguishing agents that provide permanent control of fire through a fire-smothering foam blanket. Examples include protein foam, aqueous film forming foam and fluoroprotein foam.

Procedure Turn (PT) - A maneuver in which a turn is made away from a designated track followed by a turn in an opposite direction to permit an aircraft to intercept the track in the opposite direction (usually inbound).

Area Navigation (RNAV) - is a method of instrument flight navigation that allows an aircraft to choose a course within a network of navigation beacons rather than navigating directly to and from the beacons. Originally developed in the 1960, RNAV elements are now being integrated into GPS-based navigation.

Relocated Threshold – A runway threshold (takeoff and landing point) that is located at a point other than the (original) runway end. Usually provided to mitigate nonstandard runway safety area (RSA) dimensions beyond a runway end. When a runway threshold is relocated, the published length of the runway is reduced and the pavement between the relocated threshold and to the original end of the

runway is not available for aircraft takeoff or landing. This pavement is typically marked as taxiway, marked as unusable, or is removed.

Required Navigation Performance (RNP) – A type of performance-based navigation system that allows an aircraft to fly a specific path between two 3-dimensionally defined points in space. RNP approaches require on-board performance monitoring and alerting. RNP also refers to the level of performance required for a specific procedure or a specific block of airspace. For example, an RNP of .3 means the aircraft navigation system must be able to calculate its position to within a circle with a radius of 3 tenths of a nautical mile. RNP approaches have been designed with RNP values down to .1, which allow aircraft to follow precise 3 dimensional curved flight paths through congested airspace, around noise sensitive areas, or through difficult terrain.

Rigid Pavement – Typically constructed of Portland cement concrete (PCC), consisting of a slab placed on a prepared layer of imported materials.

Rotorcraft - A helicopter.

Runway – A defined area intended to accommodate aircraft takeoff and landing. Runways may be paved (asphalt or concrete) or unpaved (gravel, turf, dirt, etc.), depending on use. Water runways are defined takeoff and landing areas for use by seaplanes.

Runway Bearing – The angle of a runway centerline expressed in degrees (east or west) relative to true north.

Runway Design Code (RDC) – The RDC is comprised of the AAC, ADG, and approach visibility minimums of a particular runway. The RDC provides the information needed to determine applicable design standards. The AAC is based on aircraft approach speed. The ADG is based on either the aircraft wingspan or tail height; (whichever is most restrictive) of the largest aircraft expected to operate on the runway and taxiways adjacent to the runway. The approach visibility minimums represent RVR values in feet of 1,200, 1,600, 2,400, 4,000, and 5,000 (corresponding to lower than 1/4 mile, lower than 1/2 mile but not lower than 1/4 mile, lower than 3/4 mile but not lower than 1/2 mile, lower than 1 mile but not lower than 3/4 mile, and not lower than 1 mile, respectively).

Runway Designation Numbers – Numbers painted on the ends of a runway indicating runway orientation (in degrees) relative to magnetic north. "20" = 200 degrees magnetic, which means that the final approach for Runway 20 is approximately 200 degrees (+/- 5 degrees).

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Runway End Identifier Lights (REILs) - Two high-intensity sequenced strobe lights that help pilots identify a runway end during landing in darkness or poor visibility.

Runway Object Free Area (OFA) – A defined area surrounding a runway that should be free of any obstructions that could interfere with aircraft operations. The dimensions for the OFA increase for runways accommodating larger or faster aircraft.

Runway Protection Zone (RPZ) – A trapezoid-shaped area located beyond the end of a runway that is intended to be clear of people or built items. The geometry of the RPZ often coincides with the inner portion of the runway approach surface. However, unlike the approach surface, the RPZ is a defined area on the ground that does not have a vertical slope component for obstruction clearance. The size of the RPZ increases as runway approach capabilities or aircraft approach speeds increase. Previously defined as “clear zone.”

Runway Safety Area (RSA) – A symmetrical ground area extending along the sides and beyond the ends of a runway that is intended to accommodate inadvertent aircraft passage without causing damage. The dimensions for the RSA increase for runways accommodating larger or faster aircraft. FAA standards include surface condition (compaction, etc.) and absence of obstructions. Any items that must be located within an RSA because of their function (runway lights, airfield signage, wind cones, etc.) must be frangible (breakable) to avoid significant aircraft damage.

Segmented Circle - A system of visual indicators designed to show a pilot in the air the direction of the traffic pattern at that airport.

Small Aircraft - An aircraft that weighs 12,500 lbs. or less.

Straight-In Approach – An instrument approach that directs aircraft to a specific runway end.

Statute Mile – 5,280 feet (a nautical mile = 6,080 feet).

Stop and Go – An aircraft operation where the aircraft lands and comes to a full stop on the runway before takeoff is initiated.

T-Hangar – A rectangular aircraft storage hangar with several interlocking "T" units that minimize building per storage unit. Usually two-sided with either bi-fold or sliding doors.

Takeoff Distance Available (TODA) – the length of the takeoff run available plus the length of clearway, if available.

Takeoff Run Available (TORA) – the length of runway available and suitable for the ground run of aircraft when taking off.

Taxilane – A defined path used by aircraft to move within aircraft parking apron, hangar areas and other landside facilities.

Taxiway – A defined path used by aircraft to move from one point to another on an airport.

Threshold – The beginning of that portion of a runway that is useable for landing.

Taxiway Design Group (TDG) – The TDG is based on the undercarriage dimensions of the aircraft. TDG is used to determine taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements.

Threshold Lights – Components of runway edge lighting system located at the ends of runways and at displaced thresholds. Threshold lights typically have split lenses (green/red) that identify the beginning and ends of usable runway.

Through-the-Fence – Term used to describe how off-airport aviation users (private airparks, hangars, etc.) access an airport “through-the-fence,” rather than having facilities located on airport property.

Tiedown - A place where an aircraft is parked and "tied down." Surface can be grass, gravel or paved. Tiedown anchors may be permanently installed or temporary.

Touch and Go – An aircraft operation involving a landing followed by a takeoff without the aircraft coming to a full stop or exiting the runway.

Traffic Pattern - The flow of traffic that is prescribed for aircraft landing and taking off from an airport. Traffic patterns are typically rectangular in shape, with upwind, crosswind, base and downwind legs and a final approach surrounding a runway.

Traffic Pattern Altitude - The established altitude for a runway traffic pattern, typically 800 to 1,000 feet above ground level (AGL).

Transitional Surfaces - One of the FAR Part 77 Imaginary Surfaces, the transitional surface extend outward and upward at right angles to the runway centerline and the extended runway centerline at a slope of 7:1 from the sides of the primary surface and from the sides of the approach surfaces.

Universal Communications (UNICOM) is an air-ground communication facility operated by a private agency to provide advisory service at uncontrolled airports.

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Utility Runway – As defined under FAR Part 77, a runway designed and constructed to serve small planes (aircraft with maximum takeoff weights of 12,500 pounds or less).

Vertical Navigation (VNAV) – Vertical navigation descent data or descent path, typically associated with published GPS instrument approaches. The use of any VNAV approach technique requires operator approval, certified VNAV-capable avionics, and flight crew training.

VOR - Very High Frequency Omnidirectional Range – A ground based electronic navigational aid that transmits radials in all directions in the VHF frequency spectrum. The VOR provides azimuth guidance to aircraft by reception of radio signals.

VORTAC – VOR collocated with ultra-high frequency tactical air navigation (TACAN).

Visual Approach Slope Indicator (VASI) - A system of lights located by the approach end of a runway which provides visual approach slope guidance to aircraft during approach to landing. The lights typically show some combination of green and white if a pilot is on the correct flight path, and turn red if a pilot is too low.

Visual Flight Rules (VFR) - Rules that govern the procedures to conducting flight under visual conditions. The term is also used in the US to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Visual Guidance Indicator (VGI) – Equipment designed to provide visual guidance for pilots for landing through the use of different color light beams. Visual Approach Slope Indicators (VASI) and Precision Approach Path Indicators (PAPI) defined above are examples.

Waypoint – A specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.

Wide Area Augmentation System (WAAS) – GPS-based instrument approach that can provide both vertical (glideslope) and horizontal (course) guidance. WAAS-GPS approaches are able to provide approach minimums nearly comparable to a Category I Instrument Landing System (ILS).

Wind Rose - A diagram that depicts observed wind data direction and speed on a 360-degree compass rose. Existing or planned proposed runway alignments are overlain to determine wind coverage levels based on the crosswind limits of the design aircraft.

Wind Cone – A device located near landing areas used by pilots to verify wind direction and velocity. Usually manufactured with brightly colored fabric and may be lighted for nighttime visibility. Also referred to as “wind sock.”

LIST OF ABBREVIATIONS

AC – Advisory Circular	MALS – Medium Intensity Approach Lighting System (MALS) with Runway Alignment Indicator Lights (RAIL)
AC – Asphaltic Concrete	MIRL – Medium Intensity Runway Lighting
ACM – Airport Certification Manual	MITL – Medium Intensity Taxiway Lighting
ADG – Airplane Design Group	MTOW – Maximum Takeoff Weight
ADO – Airport District Office	NAVAID – Navigation Aid
AGL – Above Ground Level	NDB – Non-Directional Beacon
AIP – Airport Improvement Program	NEPA – National Environmental Policy Act
ALP – Airport Layout Plan	NGS – National Geodetic Survey
ALS – Approach Lighting System	NPIAS – National Plan of Integrated Airport Systems
AOA – Airport Operations Area	OCS – Obstacle Clearance Surface
APL – Aircraft Parking Line	ODALS – Omnidirectional Airport Lighting System
APRC – Approach Reference Code	OFA – Object Free Area
ARC – Airport Reference Code	OFZ – Obstacle Free Zone
ARFF – Aircraft Rescue and Fire Fighting	PAPI – Precision Approach Path Indicator
ARP – Airport Reference Point	PCC – Portland Cement Concrete
ASDA – Accelerate-Stop Distance Available	PCI – Pavement Condition Index
ASV – Annual Service Volume	PCN – Pavement Condition Number
ATC – Air Traffic Control	POFZ – Precision Obstacle Free Zone
ATCT – Airport Traffic Control Tower	RAIL – Runway Alignment Indicator Lights
ASOS – Automated Surface Observation System	RDC – Runway Design Code
AWOS – Automated Weather Observation System	REIL – Runway End Identifier Lights
BRL – Building Restriction Line	RNAV – Area Navigation
CFR – Code of Federal Regulations	ROFA – Runway Object Free Area
CTAF – Common Traffic Advisory Frequency	ROFZ – Runway Obstacle Free Zone
DPRC – Departure Reference Code	RPZ – Runway Protection Zone
DME – Distance Measuring Equipment	RSA – Runway Safety Area
FAA – Federal Aviation Administration	RVR – Runway Visual Range
FAR – Federal Air Regulation	RVZ – Runway Visibility Zone
FBO – Fixed Base Operator	TDG – Taxiway Design Group
GIS – Geographic Information System	TSA – Taxiway Safety Area
GS – Glide Slope	TSA – Transportation Security Administration
GPS – Global Positioning System	TODA – Takeoff Distance Available
HIRL – High Intensity Runway Lighting	TOFA – Taxiway/Taxilane Object Free Area
IFR – Instrument Flight Rules	TORA – Takeoff Run Available
ILS – Instrument Landing System	TSS – Threshold Siting Surface
IMC – Instrument Meteorological Conditions	TVOR – Terminal Very High Frequency Omnidirectional Range
LDA – Landing Distance Available	UAS – Unmanned Aircraft Systems
LDA – Localizer Directional Aid	UGA – Urban Growth Area
LIRL – Low Intensity Runway Lighting	UGB – Urban Growth Boundary
LOC – Localizer	

LIST OF ABBREVIATIONS

UHF – Ultra-High Frequency
USDA – United States Department of Agriculture
USGS – U. S. Geological Survey
UNICOM – Universal Communications
VASI – Visual Approach Slope Indicator
VFR – Visual Flight Rules
VGI - Visual Guidance Indicators
VOR – Very High Frequency Omni-Directional Range



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