Chapter Five: AIRPORT DEVELOPMENT ALTERNATIVES

Airport Master Plan Update

Aurora State Airport

The preceding chapter identified shortfalls of the Aurora State Airport (Airport) with respect to existing and anticipated aeronautical demand, which are consistent with current Federal Aviation Administration (FAA) design standards, along with industry and State of Oregon development guidelines. This chapter presents three development alternatives that focus on meeting the Airport's facility needs for the long-term future, along with the No Build Alternative.

The purpose of the build alternatives is to provide variations of how to meet forecasted demand, while the No Build Alternative serves as a baseline for comparison. The Oregon Department of Aviation (ODA) – with input from the FAA, Planning Advisory Committee (PAC), and public – will select a Preferred Alternative that will serve as the foundation for the Airport Layout Plan (Chapter 6). The Preferred Alternative will likely be a combination of elements from the alternatives.

The alternatives should be evaluated using the Master Plan Goals and Issues identified in Chapter 1, which were produced with PAC and public input.

SUMMARY OF FACILITY REQUIREMENTS

The following section summarizes the development recommendations given in Chapter 4, *Facility Requirements*, needed to accommodate forecasted aeronautical activity.

Airfield Requirements

- The Airport currently meets design standards for an Airport Reference Code (ARC) of B-II and C-II, with approach criteria minimums not lower than 1 statute mile (sm). As depicted in Table 4C, many design standards are deficient for ARC C-II, which represents the current and future critical aircraft. Table 4C also shows deficiencies if the Airport's instrument approach capability is improved (approach minimums are lowered).

- The runway length analysis demonstrated it is prudent to plan[1] for a runway extension now, based on aircraft currently operating and forecasted to operate at the Airport. Accordingly, two of the build alternatives show a runway extension, to a total length of 5,604 or 6,004 feet.

- The current runway strength of 45,000 pounds (dual-wheel gear) is adequate for the existing runway length, as several of the heavier aircraft operating at the Airport are constrained (*i.e.*, reduced fuel load or payload). However, with a runway extension it is recommended the pavement strength be increased to 60,000 pounds (dual-wheel gear), which is the same pavement strength as the parallel taxiway.

- If the instrument approach capability were improved to lower than ¾ sm visibility, then the parallel taxiway would need to be relocated another 100 feet east of the runway to satisfy design standards.

- It is recommended the approach lighting system be upgraded to a precision approach path indicator (PAPI).

- An upgraded instrument approach lighting system is recommended if an approach with minima lower than ¾ sm visibility is selected.

- ODA should establish departure procedures for Runway 35, to avoid flight over noise-sensitive areas, and change the altitude limit on left turns when departing Runway 35. (Note: ODA is working with FAA to create these procedures and they should be published in the fall of 2011.)

Landside Requirements

- To meet 2030 hangar demand, approximately 23.0 acres will be needed.

- 25 aircraft parking positions, or approximately 6.5 acres, will be needed for aprons and aircraft parking by 2030.

- A cargo apron is recommended, which requires approximately one acre of land.

- Expansion of a current fixed base operator (FBO) or establishment of a new FBO will likely be needed.

- Fuel tanks owned by Aurora Aviation should be relocated once they have exceeded their useful life, as the current location could better be used for aircraft-related uses. Off-airport operators may want to consider impacts of current fuel tank location and their impacts from future demand

[1] *Planning for a runway extension does not give justification for federal funding. Based on the number of aircraft operations constrained by runway length projected into the future, justification for funding should occur within the 20-year planning period, although not within the next five years.*

- Approximately 2 acres of land should be reserved for the air traffic control tower (ATCT), parking and security requirements.

- A suitable location for the facility the Aurora Rural Fire Protection District wants to locate at the airport should be identified.

- It is recommended that ODA work with and support Marion County and the City of Aurora as improvements to Airport Road are considered. The question of funding these improvements should be part of the discussions.

AIRPORT DEVELOPMENT ALTERNATIVES

Four alternatives for the long-term future of the Airport are presented in this chapter. Generally speaking, the alternatives can be described as such:

- The No Build Alternative assumes maintenance of existing facilities and no expansion of airfield or landside facilities on State-owned property. The Airport would remain designed to ARC B-II standards (approach minima to remain at visual and greater than 1 sm). Adjacent, through-the-fence operators would still have the option to develop their property as the market demands.

- Build Alternative 1 includes a 600-foot extension to the north end of the runway and an instrument approach with visibility greater than 1 sm. The ARC would remain B-II in this alternative.

- Build Alternative 2 incorporates a 1,000 feet extension to the south end of the runway and improved instrument approach capability (visibility greater than ¾ sm). This alternative reflects improvements to meet the design standards for ARC C-II.

- Build Alternative 3 depicts ARC C-II and instrument approaches with visibility minima lower than ¾ sm (precision approaches). No runway extension is shown on this alternative. However, in order to meet ARC C-II standards, with the lower instrument approach, the parallel taxiway would be relocated 100 feet to the east and multiple buildings would need to be removed or altered.

In addition to these components, the three development alternatives depict additional hangar and apron expansions, area for helicopter operations on State-owned property, future fuel tank locations, and ATCT locations, among other items. As stated previously, there is an approximate need of 40 developable-acres to meet forecasted demand. Currently, ODA only has approximately nine acres of developable land. The build alternatives focus on building aircraft storage and parking, ATCT, and the Fire District's facility.

The remaining demand will likely be met by private property owners and developers. Development of the Southend Airpark is shown on all build alternatives, based on the current site plan provided to the consulting team. However, actual development of Southend Airpark is dependent upon market

demand, and is subject to change as needed. Including Southend Airpark, there are approximately 26 acres of privately-held developable land.

Combining nine acres of undeveloped State-owned property and 26 acres of undeveloped private property currently zoned for airport use, there is a shortfall of approximately 5 acres needed for airport-related development over the next 20 years. In all of the build alternatives, adjacent property is shown to be suitable for airport-related development. This area incorporates approximately 16 acres. This land, now used as a church camp, is not currently zoned Public in the Marion County Zoning Code; however, its location is immediately adjacent to existing airport development and the new Helicopter Transport Services (HTS) development.

Following is a discussion relative to each alternative.

No Build Alternative

Exhibit 5A illustrates the No Build Alternative. By showing the consequences of not developing the Airport, ODA – along with the FAA, PAC and public – can assess the advantages and disadvantages of the development alternatives.

As shown in Chapter 3, *Aeronautical Activity Forecast*, the Airport is expected to experience increased demand. If no development were to occur, the Airport would not be able to support forecasted aeronautical uses and demands. PAPIs, a cargo apron, helicopter parking, vehicle transportation scheme and additional hangars would not be built on State-owned property. The safety enhancements of an ATCT and a building for the Fire District to house emergency response vehicles would not occur. As such, the No Build Alternative would not optimize the Airport's potential.

While the No Build alternative is essentially a do-nothing option, it does not mean that there would be no financial impact to the Airport. Most prominently, there would still be a cost associated with maintaining the current pavements and facilities.

Development of private property, adjacent to the Airport, would be permitted – consistent with local and State regulations.

Build Alternative 1

Build Alternative 1 includes a 600-foot runway extension to the north. Instrument approach capability does not change (not lower than 1 sm visibility minima). **Exhibit 5B** illustrates this alternative. The change to the Airport's footprint would be a slightly larger area for easement acquisition to control building height west of the runway extension, in addition to identifying 16 acres of adjacent land suitable for airport-related development. The Runway 35 RPZ extends south of Keil Road and an avigation easement would be sought; however, this is no different from the existing condition.

Airfield. Airfield developments for Alternative 1 are outlined below.

- Runway 17 and parallel taxiway extension of 600 feet.
- Pavement would be strengthened to 60,000 pounds (dual-wheel gear).

Jan 18, 2011

N

SCALE

300 0 150 300

(FEET)

1 INCH = 300 FT.

Legend

- Property Line
- BRL — 35' Building Restriction Line
- RSA — Runway Safety Area
- ROFA — Runway Object Free Area
- TOFA — Taxiway Object Free Area
- Existing Buildings
- Future Buildings
- Existing Building Removal

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Aurora, OR

Exhibit 5A
No Build Alternative

034317-AIRP-EX5A.DWG

01/19/11

N

SCALE
300 0 150 300
(FEET)
1 INCH = 300 FT.

Legend

- Property Line
- Future Property Line
- BRL — 35' Building Restriction Line
- RSA — Runway Safety Area
- RROFA — Runway Object Free Area
- TROFA — Taxiway Object Free Area
- Future Paved
- Existing Buildings
- Future Buildings
- Air Traffic Control Tower (ATCT)
- Aurora Rural Fire Protection District
- Future Apron Area
- Vehicular Parking
- Hangar Development
- Fuel Station
- Helicopter Parking
- Precision Approach Path Indicator (PAPI)
- Existing Building Removal

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Exhibit 5B
Build Alternative 1

034317-AIRP-EX5B.DWG

- Instrument approach minimums not lower than 1 sm. This approach would be no change from the current design standards for ARC B-II, which includes the runway protection zone (RPZ).
- Designation of helicopter operations area in the northwest section of State-owned property.
- Installation of PAPIs.
- Hold area located off the parallel taxiway at the Runway 17 end.

Landside. The landside development features proposed in Alternative 1 include:

- ATCT located midfield on the east side.
- Majority of State-owned property to be developed as hangars.[2]
- Fire District's response building located near the ATCT.
- Fuel tank relocation shown south of Aurora Aviation.
- Adjacent land identified as suitable for airport-related development under private ownership, approximately 16 acres.

Build Alternative 1 has the potential to meet the forecasted demand for the Airport, with rezoning and development of the additional 16 acres of privately owned land east of the Airport.

Build Alternative 2

Build Alternative 2 includes upgrading to ARC C-II standards, extending the runway 1,000 feet to the south, and improving the instrument approach capability to visibility minimums lower than 1 sm but greater than 3/4 sm (see **Exhibit 5C**).

Airfield. Airfield development in Alternative 2 includes:

- Runway and parallel taxiway extension to the south of 1,000 feet, which would require the closure of Keil Road.
- The larger RPZs would require additional avigation easements or land acquisition.
- Pavement would be strengthened to 60,000 pounds (dual-wheel gear).
- Implementation of instrument approaches with minimums greater lower than ¾ sm and installation of approach lighting systems, as recommended by the FAA
- Designation of helicopter operations area, situated where the fuel tanks are currently located.
- Installation of PAPIs.

The runway extension would accommodate nearly all business jets with ARC C-II and below that could potentially operate at the Airport. Keil Road would be dead-ended, with no access to Highway 551.

Landside. Alternative 2 consists of the following landside developments:

- Designation of a cargo apron facility, north of Aurora Aviation.

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[2] *Detailed vehicular access/traffic schemes for hangar development areas are not shown on the individual alternatives. A detailed plan will be developed for the Preferred Alternative.*

Feb 9, 2011

SCALE
400 0 200 400
(FEET)
1 INCH = 400 FT.

Legend

- Property Line
- Future Property Line
- BRL — 35' Building Restriction Line
- RSA — Runway Safety Area
- RROFA — Runway Object Free Area
- TROFA — Taxiway Object Free Area
- Service Road
- Existing Buildings
- Future Buildings
- Future Paved
- Air Traffic Control Tower (ATCT)
- Aurora Rural Fire Protection District
- Future Apron Area
- Cargo Apron
- Vehicular Parking
- Hangar Development
- Fuel Station
- Helicopter Parking
- Precision Approach Path Indicator (PAPI)
- Existing Building Removal
- Existing Road Removal

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Exhibit 5C
Build Alternative 2

03437-AIRP-EX5C.DWG

- Internal service road.
- ATCT centrally located within State-owned property, but north of the location in Alternative 1.
- Fuel tanks relocated northeast of Aurora Aviation.
- Fire District's response building located adjacent to the water suppression system.
- Development of hangar area and apron area on State-owned property.
- Adjacent land identified as suitable for airport-related development under private ownership, approximately 16 acres.

Build Alternative 2 has the potential to meet the forecasted demand for the Airport, with rezoning and development of the additional 16 acres of privately owned land east of the Airport.

Build Alternative 3

Development Alternative 3 depicts precision approaches (minimums lower than ¾ sm), with ARC C-II. No runway extension is shown for Build Alternative 3. However, relocation of the parallel taxiway is necessary, along with the removal and alteration of several buildings, to meet design standards. Build Alternative 3 is illustrated by **Exhibit 5D**. With a precision approach, the building restriction line[3] moves 250 feet farther from the runway than where it is located with the other alternatives.

Airfield. Alternative 3 has the following airfield features:

- Parallel taxiway relocation 100 feet to the east.
- Implementation of an instrument approach with minimums lower than ¾ sm.
- The larger RPZs would require additional avigation easements or land acquisition.
- Closure of Keil Road, due to increased design standard requirements.
- The building restriction line would extend to include many airport buildings, as well as private residences west of Highway 551.
- Installation of approach lighting, as required by the FAA.
- Designation of helicopter operations area, north of the current apron.

Landside. Significant landside developments within Alternative 3 are:

- ATCT located closer to the north end and farther from the runway than in the other two build alternatives.
- On State-owned land, more focus on apron areas than on any of the other alternatives.
- The Fire District's response building located east of the fire suppression system.
- The cargo apron centrally located on State-owned property Future fuel tanks located at the south end of State-owned property.

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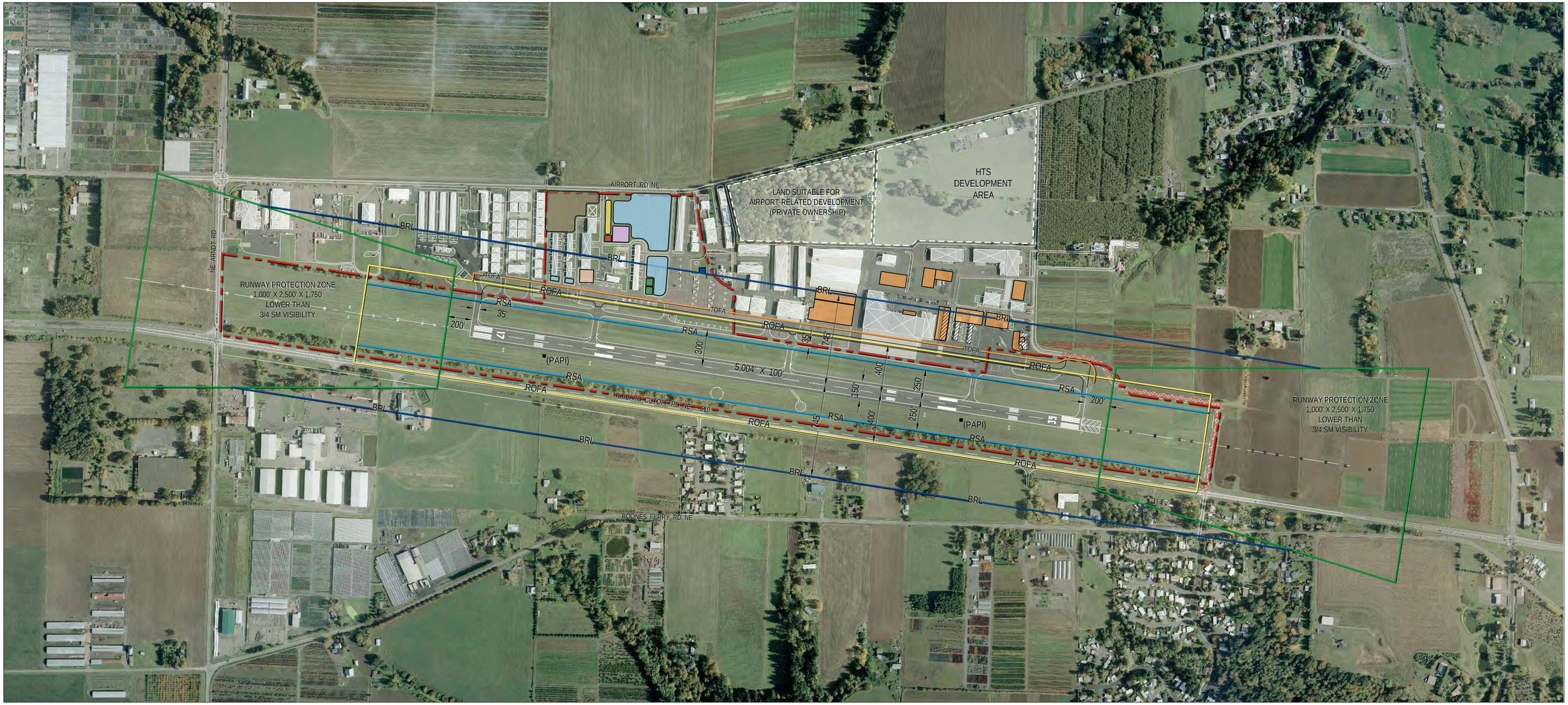
[3] *The building restriction line parallel to the runway is the point where the imaginary transitional surface is 35 feet higher than the runway. The transitional surface slopes up at 7:1 from the edge of the imaginary primary surface. The primary surface is centered on the runway and is 1,000 feet wide if the runway has a precision approach. The source of information for these imaginary surfaces is Title 14 of the Code of Federal Regulations, Part 77, Safe, Efficient Use, and Protection of Navigable Airspace.*



Jan 21, 2011

SCALE
400 0 200 400
(FEET)
1 INCH = 400 FT.

Legend

- Property Line
- BRL — 35' Building Restriction Line
- RSA — Runway Safety Area
- RROFA — Runway Object Free Area
- TROFA — Taxiway Object Free Area
- Future Paved
- Existing Buildings
- Future Buildings
- Air Traffic Control Tower (ATCT)
- Aurora Rural Fire Protection District
- Future Apron Area
- Cargo Apron
- V — Vehicular Parking
- Hangar Development
- F — Fuel Station
- H — Helicopter Parking
- ■ — Precision Approach Path Indicator (PAPI)
- Existing Building Removal
- Existing Road Removal

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Exhibit 5D
Build Alternative 3

03437-AIRP-EX5D.DWG

- Power lines along Arndt Road would need to be either relocated or buried, as they would be a hazard to air navigation.
- Adjacent land identified as suitable for airport-related development under private ownership, approximately 16 acres.
- Power lines located along Arndt Road relocated or buried, as they would be a hazard to air navigation.

While Build Alternative 3 shows the development of an additional 16 acres, it has less potential to meet the forecasted demand for the Airport. This is due to the loss of buildable land within the new building restriction line, which prohibits and/or limits development of facilities.

COMPARISON OF ALTERNATIVES

Detailed costs estimates were not prepared for each alternative; however, the alternatives are compared in order of magnitude costs. The No Build Alternative has the least cost associated with it, as costs only represent maintenance of existing facilities. Of the build alternatives, Alternative 1 is the least costly since its runway extension is less than what is shown in Alternative 2, and there is less land acquisition/easement required than with the other build alternatives. Alternative 2 has the mid-level financial cost of the build alternatives, due to the runway extension and additional requirements for land acquisition and easements. Alternative 3 is the most costly alternative, as it requires relocation of the parallel taxiway, the most land acquisition and easements, removal and relocation of businesses and residences, and relocation of the power lines located along Arndt Road.

Runway length would remain at 5,004 feet for the No Build Alternative and Build Alternative 3. The runway length would be 5,604 feet for Alternative 1 and 6,004 feet for Alternative 2. Land acquisition to the taxiway object free area (OFA) would be required for the extension shown in Alternative 1, while Alternative 2 would require acquisition to the extended runway OFA. Since they show no runway extensions, the No Build Alternative and Build Alternative 3 would keep the pavement strength rating at 45,000 pounds (dual wheel gear). On the other hand, Build Alternatives 1 and 2 would allow use by heavier aircraft (up to 60,000 pounds dual wheel gear).

Alternative 1 would keep the same approach minima – and therefore the same design standards – as what is currently at the Airport. Approach minima of greater than ¾ sm and lower than ¾ sm are included in Alternatives 2 and 3, respectively. Generally speaking, the better the instrument approach, the lower the visibility minima, and the larger the RPZ that ODA would need to control by means of acquisition or avigation easement. Additionally, the approach minima given for Build Alternative 3 would require reconstruction of the parallel taxiway 100 feet to the east, as well as removal and alteration of facilities penetrating the Airport's primary and transitional surfaces[4].

[4] *Primary and transitional surfaces are defined in FAR Part 77, Imaginary Surfaces. Further definition will be given in Chapter 6.*

Helicopter operations, which currently do not have a designated area on State-owned property, would be accommodated in all of the build alternatives near the Airport's mid-point.

As recommended, alternative sites for Aurora Aviation's fuel tanks were identified in each of the build alternatives. Relocation of the existing fuel tanks is only recommended once the tank's useful life has been exceeded.

All alternatives identify adjacent property that would be suitable for airport-related development. Prior to any development of the property, the appropriate land use approvals must be undertaken.

As development potential for the nine acres of State-owned land is limited, much of the development needed to meet forecasted demand will have to occur on privately-held lands. Consequently, it remains imperative that ODA administer through-the-fence agreements consistent with federal guidelines and state statutes, that not only promote development but that also protect the public investment. Chapter 7, *Capital Improvement Plan*, will further discuss this issue.

NOISE ANALYSIS

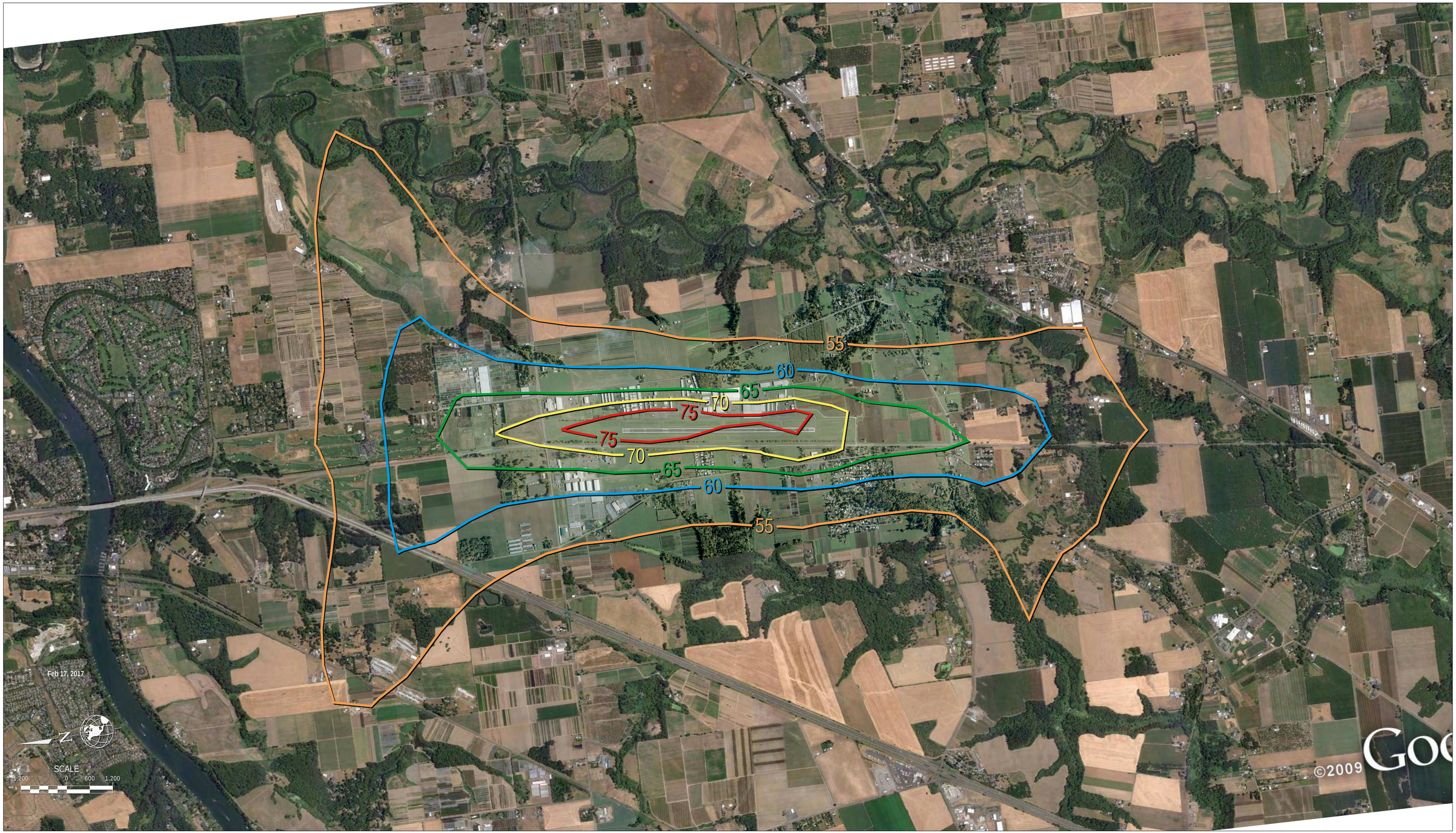
A noise analysis was completed for all alternatives. The study was performed in accordance with FAA regulations using the Integrated Noise Model (INM) version 7.0. All airport noise was assessed in terms of the yearly day-night average sound level (YDNL) contours. The FAA's INM is widely used by the civilian aviation community for evaluating aircraft noise impacts in the vicinity of airports. INM is an average-value model and is designed to estimate long-term effects using average annual input conditions. Under the FAA criteria, residential land use is not considered compatible with annual day-night noise levels that meet or exceed 65 dBA.

Five separate noise contour exhibits were prepared:

- Existing Noise Contours (2010) – **Exhibit 5E**
- No Build Alternative Noise Contours (2020) – **Exhibit 5F**
- Build Alternative 1 Noise Contours (2020) – **Exhibit 5G**
- Build Alternative 2 Noise Contours (2020) – **Exhibit 5H**

The existing noise contours are meant to be a baseline for comparison of all proposed alternatives. The remaining exhibits present the expected noise contours in 2020. A separate exhibit for Build Alternative 3 (2020) was not prepared, as it reflects the same physical layout of the No Build Alternative Nose Contours (Exhibit 5F).

Tables 5A and 5B present the assumptions used for the analysis for years 2010 and 2020, respectively. The aircraft fleet was determined by using the information provided by the Harris, Miller, Miller & Hanson (2002) noise study conducted for ODA. The aircraft shown are representative of aircraft within each sub-group. The data used for operations is from the information presented in Chapter Three,



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Legend

- 75
- 70
- 65
- 60
- 55

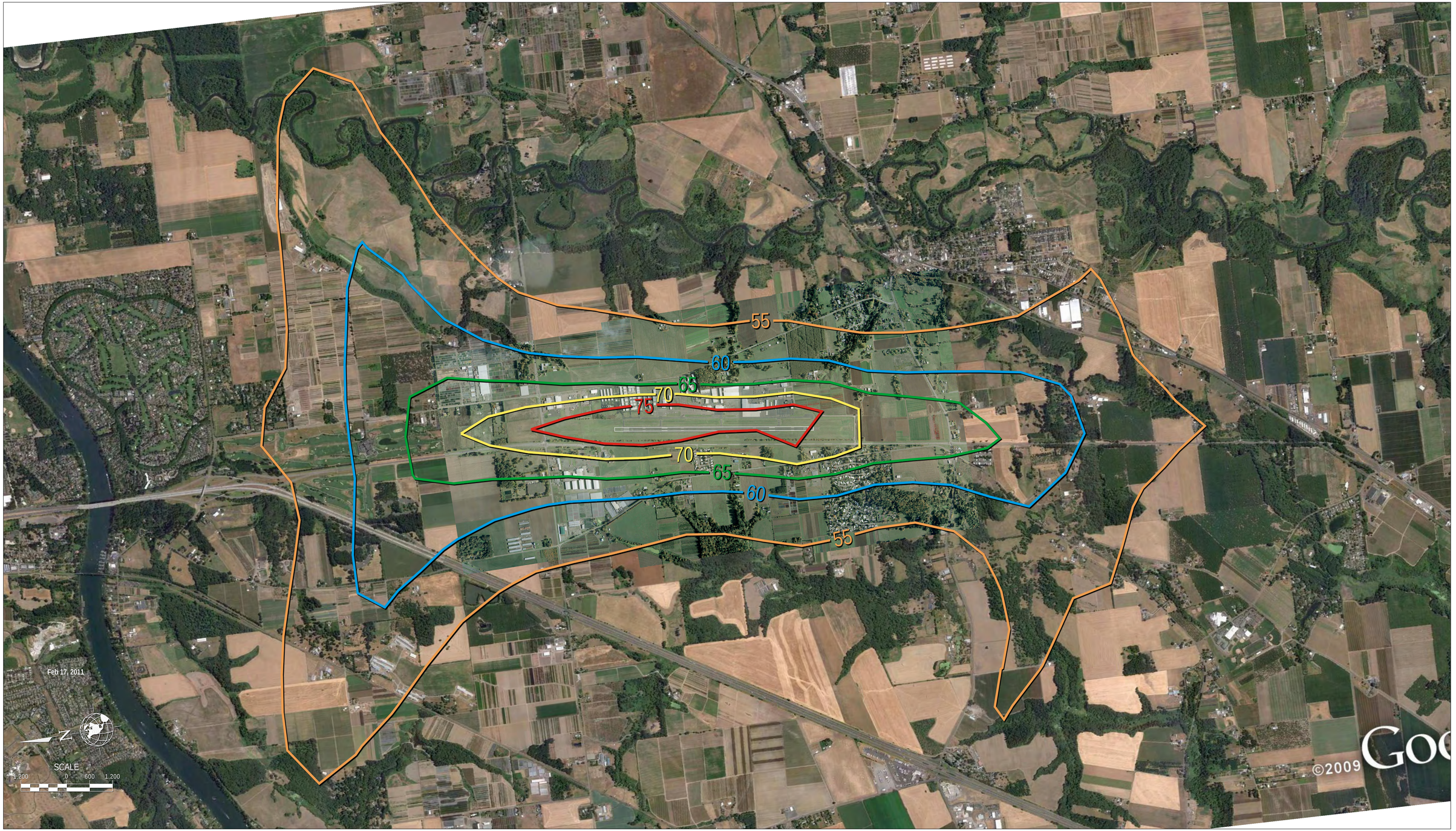
Aurora State Airport

Aurora, OR

Exhibit 5E - Noise Contours

Existing Conditions 2010

034317-AIRP-NOISE_MC.DWG



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Legend

- 75
- 70
- 65
- 60
- 55

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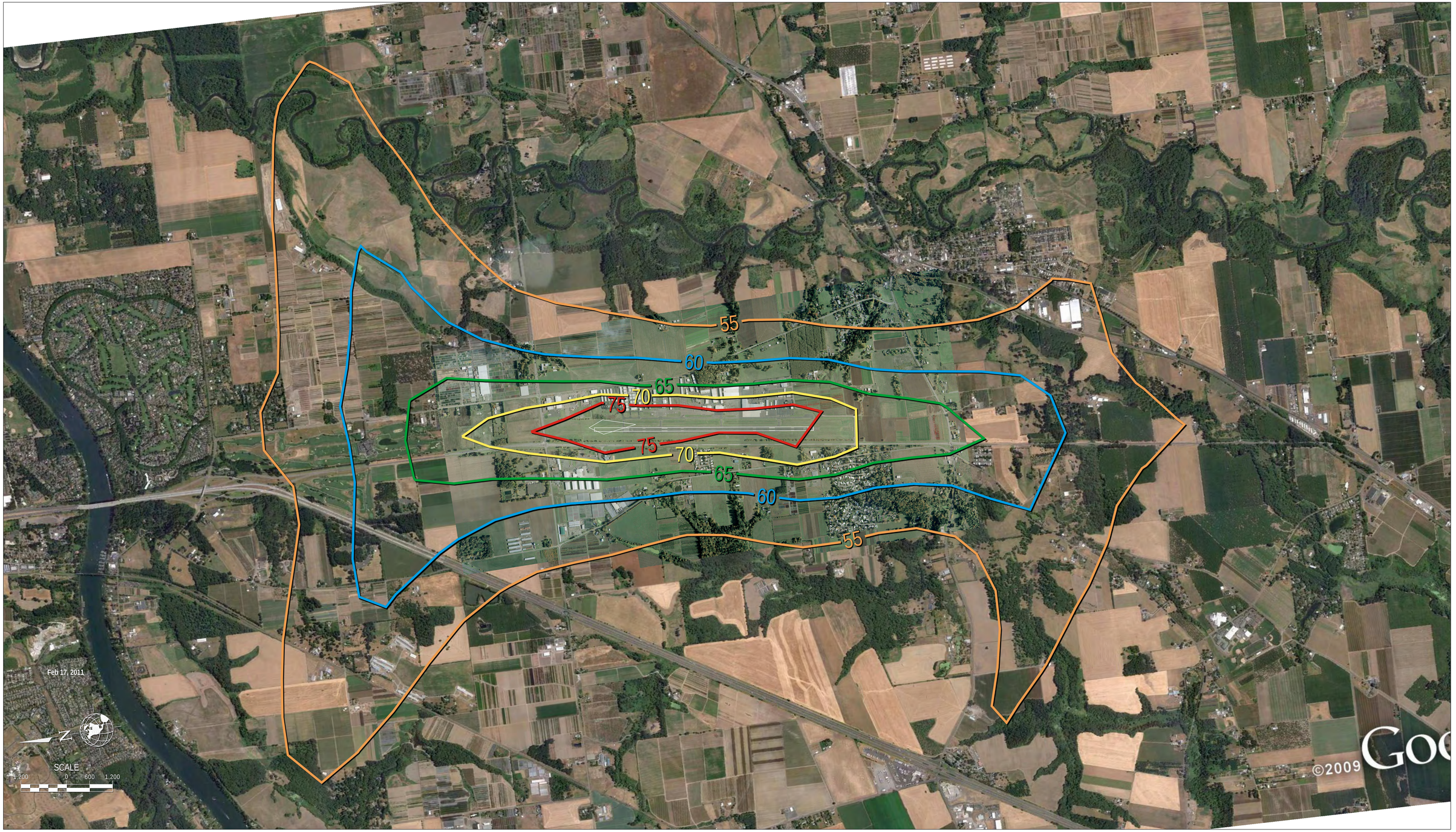
Aurora, OR

Exhibit 5F - Noise Contours

No Build Alternative 2020

034317-AIRP-NOISE_MC.DWG



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Legend

- 75
- 70
- 65
- 60
- 55

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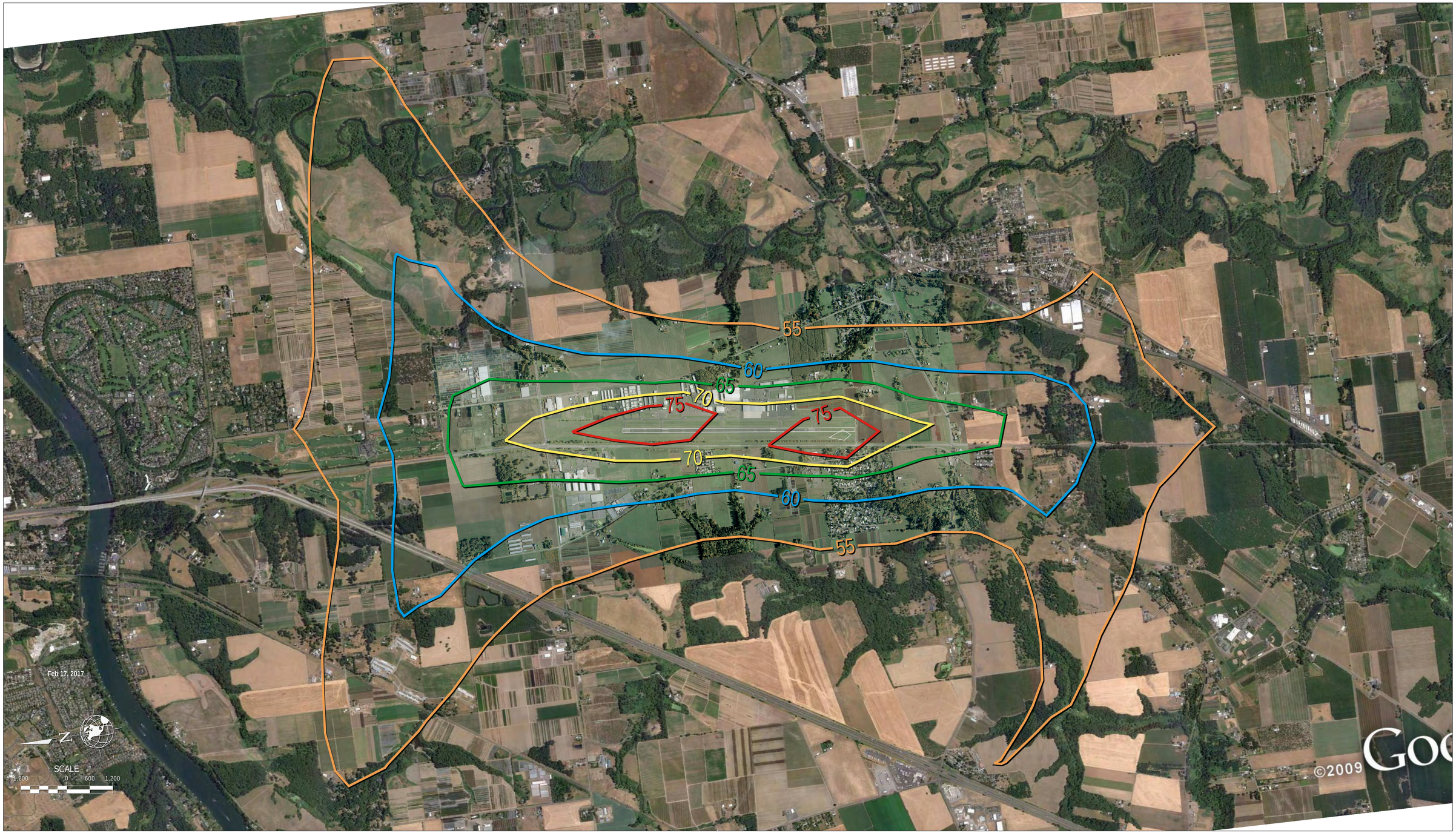
Exhibit 5G - Noise Contours

Build Alternative 1 ~ 2020

600' Runway Extension North

034317-AIRP-NOISE_MC.DWG



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Legend

- 75
- 70
- 65
- 60
- 55

Aurora State Airport

Aurora, OR

Exhibit 5H - Noise Contours

Build Alternative 2 ~ 2010

1,000' Runway Extension South

034317-AIRP-NOISE_MC.DWG

Aeronautical Activity Forecasts. Flight paths input in the INM reflect the procedures shown in Exhibit 4A, as well as the departure procedures shown in **Exhibit 5I**[5].

2010 Existing Noise Contours

As presented in Exhibit 5E, the 65 dBA contour line extends off Airport Environs to the north, south and west. Some residential areas west of the Airport are included within this contour line, along with the 70 dBA line.

2020 No Build Alternative and Build Alternative 3 Noise Contours

The 2020 No Build Alternative and Build Alternative 3 contour exhibit represents the same physical layout as used in the 2010 existing noise contour exhibit. The only input variance is the increase in operations forecasted in Chapter Three. The increase in operations – and changes in aircraft fleet mix – cause the 65 dBA contour line to extend further off airport; however, the eastern 65 dBA noise contour line does remain nearly all within the Airport Environs. More residential homes would be impacted by noise exposures of 65 dBA, the FAA's threshold for compatibility.

2020 Build Alternative 1 Noise Contours

Exhibit 5G reflects the 600-foot runway extension to the north. Although the runway is extended to the north in this alternative, the noise profile is nearly identical to that in the 2020 No Build Alternative noise profile. The cause of this is the predominant use of Runway 17 during calm wind conditions (the Runway 17 threshold remains the same in Build Alternative 1).

2020 Build Alternative 2 Noise Contours

Build Alternative 2 proposes a 1,000-foot runway extension to the south, which is reflected in Exhibit 5H. As a result, the noise profile shifts to the south when compared to the previous profiles. Most notably, the 75 dBA contour line becomes two separate areas, because the aircraft noise exposure during the takeoff run is farther apart. Under this alternative, noise is shifted further away from Charbonneau, but closer to the City of Aurora and its surrounding communities. 65 dBA noise exposure west of the Airport is similar to the other 2020 contours.

Noise Analysis Summary

The noise profile is expected to increase by year 2020, regardless of development at the Airport. As shown in the noise contour exhibits, the 2020 noise profile for the No Build Alternative, Build Alternative 1, and Build Alternative 3 are nearly identical. In these noise profiles, some residential areas – mostly to the west – are within the 65 dBA noise contour. The noise profile associated with Build Alternative 2 displaces noise farther to the south of the Airport and reduces the noise impact to northern properties.

[5] *The FAA has not formally approved the departure procedures at this time; however, approval is expected in the fall of 2011.*

Feb 9, 2011

N

SCALE

1,200 0 600 1,200

SCALE: 1" = 1,200'

Legend

- Small Turbojet
- Large Turbojet
- Small Turboprop
- Large Turboprop
- Small Piston
- Large Piston

Note:
Departure Procedures are pending Federal Aviation Administration approval. Publication expected August, 2011.

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Exhibit 5I

Draft Departure Procedures

034317-AIRP-EXSE.DWG

Table 5A. Sub-group Division by Aircraft Type and Departure Procedures (2010[6])

Aircraft Type	Percentage of sub-group[7]	Annual		Daily		Arrival		Departure		Touch and Go	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Propeller-Driven Aircraft											
Single Engine											
Bonanza	30%	10,424	213	29	1	11	0	11	0	7	0
Cessna 172	45%	15,636	319	43	1	16	0	16	0	11	0
Cessna 206H	25%	8,686	177	24	0	9	0	9	0	6	0
Multi-engine											
Beech Baron 58P	100%	8,018	164	22	0	9	0	9	0	3	0
Turboprop											
Beech King Air 200	100%	8,909	182	24	0	12	0	12	0	1	0
Jet Aircraft											
Small Jet											
Cessna 500	5%	535	11	1	0	1	0	1	0	-	-
Lear 25	30%	3,207	65	9	0	4	0	4	0	-	-
Large Jet											
Cessna 550B	5%	535	11	1	0	1	0	1	0	-	-
Lear 35	30%	3,207	65	9	0	4	0	4	0	-	-
Astra 1125	30%	3,207	79	9	0	4	0	4	0	-	-
Helicopter											
Bell 206	55%	14,700	300	40	1	20	0	20	0	-	-
Bell 212	34%	9,087	185	25	1	12	0	12	0	-	-
Hughes 500	11%	2,940	60	8	0	4	0	4	0	-	-

[6] *Operations based on Chapter Three, Forecasts.*
[7] *Fleet based on Harris, Miller, Miller & Hanson report to ODA (2002, May 31).*

Table 5B. Sub-group Division by Aircraft Type and Departure Procedures (2020[8])

Aircraft Type	Percentage of sub-group[9]	Annual		Daily		Arrival		Departure		Touch and Go	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Propeller-Driven Aircraft											
Single Engine											
Bonanza	30%	10,942	223	30	1	11	0	11	0	7	0
Cessna 172	45%	16,413	335	45	1	17	0	17	0	11	0
Cessna 206H	25%	9,118	186	25	1	9	0	9	0	6	0
Multi-engine											
Beech Baron 58P	100%	7,295	149	20	0	9	0	9	0	3	0
Turboprop											
Beech King Air 200	100%	11,463	234	31	1	15	0	15	0	2	0
Jet Aircraft											
Small Jet											
Cessna 500	5%	782	16	2	0	1	0	1	0	-	-
Lear 25	30%	4,690	96	13	0	6	0	6	0	-	-
Large Jet											
Cessna 550B	5%	782	16	2	0	1	0	1	0	-	-
Lear 35	30%	4,690	96	13	0	6	0	6	0	-	-
Astra 1125	30%	4,690	96	13	0	6	0	6	0	-	-
Helicopter											
Bell 206	55%	18,341	374	50	1	25	1	25	1	-	-
Bell 212	34%	11,338	231	31	1	16	0	16	0	-	-
Hughes 500	11%	3,668	75	10	0	5	0	5	0	-	-

[8] *Operations based on Chapter Three, Forecasts.*
[9] *Fleet based on Harris, Miller, Miller & Hanson report to ODA (2002, May 31).*

ENVIRONMENTAL SCREENING OF ALTERNATIVES

Each alternative was analyzed to assess its relative environmental impact, as well as identify any environmental constraints that may prohibit development. The results of this analysis are presented in **Table 5C**.

Each alternative presents an array of environmental opportunities and constraints. The following discussion summarizes the potential environmental concerns associated with each alternative.

Table 5C. Environmental Constraints and Impacts[10]

Impact Categories[11]	No Build Alternative	Build Alternative 1	Build Alternative 2	Build Alternative 3
Air Quality	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Biotic Resources	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Land Use Impacts	No apparent issues. *1*	Perception of community character change. *2*	Perception of community character change. *3*	Perception of community character change. *4*
Construction Impacts	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Section 4(f) Resources	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Threatened and Endangered Species	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Energy Supplies, Natural Resources and Sustainability	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Environmental Justice	No apparent issues. *1*	Perception of runway extension impact on northwest residents. (Charbonneau has a concentration of elderly) *2*	Perception of runway extension impact on northwest residents. (Charbonneau has a concentration of elderly) *3*	No apparent issues. *1*
Farmlands	No apparent issues. *1*	No apparent issues. *1*	Loss of productive farmland in southern RPZ. *2*	Loss of productive farmland in both RPZs. *4*
Hazardous Materials	No apparent issues. *1*	Risk for spills is associated w/landside development. 2	Risk for spills is associated w/landside development. 2	Risk for spills is associated w/landside development. 2
Historical, Archaeological and Cultural Resources	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*

[10] *The small italic number in each cell represents the qualitative rank of each alternative for the specific category. Where all alternatives are approximately equal, a value of 2 was given. A value of 1 represents the least impacting alternative; a value of 4 represents the greatest impact. A summing of these values appears at the bottom of this table, which in turn provides a subjective ranking of the four alternatives.*

[11] *The analysis is divided into 21 impact categories and is examined per FAA Order 1050.1E and guidance from the Council on Environmental Quality.*

Table 5B. Environmental Constraints and Impacts, *Continued*

Impact Categories	No Build Alternative	Alternative 1	Alternative 2	Alternative 3
Induced Socioeconomic Impacts	Potential loss of jobs and rent revenue. *3*	Development of landside improvements would create jobs and rent revenue. RW construction would create jobs. *2*	Development of landside improvements would create jobs and rent revenue. RW construction would create jobs. *1*	Development of off-airport landside improvements would create job, however businesses and revenue would be lost on-airport for BRL. *4*
Light Emissions and Visual Effects	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	Increased approach lighting for precision approach. *3*
Energy Supply & Natural Resources	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Noise	No apparent issues. *1*	Runway extension and aircraft types expand airport noise footprint. *3*	Runway extension and aircraft types expand airport noise footprint. *4*	Potential change in aircraft types expand airport noise footprint. *1*
Social Impacts	No apparent issues. *1*	Increased development could increase surface traffic demand. Perception of change in community structure. *2*	Increased development could increase surface traffic demand. Perception of change in community structure. *3*	Increased development could increase surface traffic demand. Perception of change in community structure, due to loss of homes and on-airport businesses. 4
Solid Waste	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	Demolition for BRL compliance would create large amounts of debris. *3*
Water Quality	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Wetlands	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*
Cumulative Impact	No apparent issues. *2*	No apparent issues. *2*	No apparent issues. *2*	Community change due to loss of residential areas could be significant. *3*
Controversy	No apparent issues. *1*	Some issues. *2*	More issues. *3*	Many issues. *4*
Total ranking	36	42	47	53

No Build Alternative

The No Build Alternative does not propose any new use designations on the airport. It includes only maintenance for the next 20 years. The No Build Alternative does not present land use compatibility concerns, noise concerns, changes to the social environment, or direct threats to plant and animal communities. In terms of overall impact, **this alternative has the least impact to the existing natural and built environments.**

Build Alternative 1

This alternative includes development plans (primarily hangars and aprons) for approximately nine acres of State-owned land along Airport Road, and an ATCT. Airside improvements include a 600-foot extension of the runway and taxiway on the north end, and RPZs consistent with an airport designated for ARC B-II with approaches not lower than 1 sm visibility.

The RPZ dimensions would be 500 feet at the runway end, 700 feet at the outer end, and 1,000 feet in length. The southern end would include Keil Road and a strip of land outside of the existing airport property. FAA typically discourages roads in RPZs, but FAA advisory circulars do not prohibit them. An easement, rather than acquisition, is proposed for the small area south of Keil Road. Additionally, an easement would be proposed for the small portion of the northern RPZ extending off State-owned property. This would, however, not be a change to the current condition at the Airport.

Development of the vacant land in State ownership, along with the runway/taxiway extension, would increase impervious surface. The airport underwent a revision to on-airport drainage as part of the runway relocation project in 2005. The current system, with minor modifications, should be able to accommodate increased stormwater from new impervious surface.

The increase in hangar development, as well as new on-airport commercial and employment uses may also be perceived as a change in character by local residents. Development of the landside areas may also increase surface transportation demand, contributing to peak period congestion, or the appearance thereof for area residents.

The extension area appears to have been previously disturbed and likely does not constitute prime habitat.

Even with the northern runway extension, the noise contour of the Airport does not extend farther to the north, because the predominant runway use is Runway 17 (the preferential calm wind runway). In this alternative, the Runway 17 threshold does not change.

Additional development proposed in the airport environs, including privately held land in the Southend Airpark and land owned by HTS, is outside of the control of ODA. The size and complexity of these development projects would likely be identical under Alternatives 1 and 2, but may be denser with the No Build Alternative, due to the lack of development on State-owned land. Since Alternative 3 changes the building restriction line, there may also be more development on privately owned land. These

developments would likely contribute to the cumulative impact of airport-area development in terms of impervious surface/stormwater, community character, noise and traffic.

This alternative has the least amount of environmental impact of the three build alternatives.

Build Alternative 2

This alternative is similar to Build Alternative 1 in the allocation of future airside uses. This alternative would include a runway and taxiway extension of 1,000 feet to the south. The RPZs would be consistent with an airport designated ARC C-II with visual approaches greater than ¾ sm visibility.

The RPZ dimensions would be 1,000 feet at the runway end, 1,510 feet at the outer end, and 1,700 feet in length. The southern end would include Keil Road and Highway 551, as well as residential and farm properties on the west, south and east areas of the RPZ. FAA typically discourages roads in RPZs, but FAA advisory circulars do not prohibit them. Avigation easements would be sought from the residential property owners, and the areas within the RPZ currently in agricultural uses would be acquired.

Development of the vacant land in State ownership would be similar to Build Alternative 1. Because this alternative has the longest runway extension, the impervious surface increase would be larger than in Alternative 1. The existing stormwater collection system, with minor modifications, should be able to accommodate increased stormwater from new impervious surface.

The increase in hangar development, as well as new on-airport commercial and employment uses may also be perceived as a change in character by local residents. Development of the landside areas may also increase surface transportation demand, contributing to peak period congestion, or the appearance thereof for area residents.

This alternative would accommodate a greater variety of aircraft, due to the increased runway length. As stated above, the noise profile would extend farther south, but improve noise conditions to the north of the Airport. This alternative has the greatest impact in relation to noise of any of the alternatives.

Additional development proposed in the airport environs, including privately held land in the Southend Airpark and land owned by HTS, is outside of the control of ODA. The size and complexity of these development projects would likely be identical under Alternatives 1 and 2, but may be denser with the No Build Alternative, due to the lack of development on State-owned land. Since Alternative 3 changes the building restriction line, there may also be more development on privately owned land. These developments would likely contribute to the cumulative impact of airport-area development in terms of impervious surface/stormwater, community character, noise and traffic.

This alternative is has the mid-level environmental impact of the build alternatives.

Build Alternative 3

Due to the increased building restriction line, there is less development potential than in Build Alternatives 1 and 2. There is no runway extension proposed in this alternative. The RPZs would be consistent with an airport designated for aircraft design group C-II with visual approaches lower than ¾ sm visibility.

The RPZ dimensions would be 1,000 feet at the runway end, 1,750 feet at the outer end, and 2,500 feet in length. The 35-foot building restriction line would extend 745 feet perpendicular from the runway centerline. The northern RPZ would include Arndt Road and the electric transmission lines just north of the road. The southern end would include Keil Road and Highway 551, as well as residential and farm properties on the west, south and east areas of the RPZ. A variance from FAA would be sought for the roads within the RPZ. The power lines would need to be relocated. Avigation easements would be sought from the residential property owners who are outside of the building restriction line, and the areas within the RPZ currently in agricultural uses would be acquired. Structures within the building restriction line, regardless of whether they are on- or off-airport would be acquired and removed. Acquisition and relocation would follow the federal guidelines. Depending on the type of commodity produced, the FAA may allow continuation of agricultural practices within the RPZ.

Development of the vacant land in State ownership would be similar to Build Alternatives 1 and 2; however, it may be more dense due to restrictions from the building restriction line. Because this alternative has no runway extension, the impervious surface increase would be less than in Alternatives 1 and 2. The existing stormwater collection system, with minor modifications, should be able to accommodate increased stormwater from new impervious surface.

The increase in hangar development, as well as new on-airport commercial and employment uses may also be perceived as a change in character by local residents. Development of the landside areas may also increase surface transportation demand, contributing to peak period congestion, or the appearance thereof for area residents. It is likely that the loss of trips associated with properties removed to comply with the building restriction line requirements would offset any trips related to new development, for a likely net loss in area wide travel demand.

Land to the south of the airport is currently zoned Exclusive Farm Use (EFU) under Marion County's Zoning Code. The land is considered High Value Farmland, and has been described as Foundation in a categorization of viable farmland that is worth protection, but it is not a legal classification, as EFU is. Airport development on EFU land is restricted, and it is difficult to rezone EFU land to other classifications, such as Public. Changing zoning would require an exception to Oregon Planning Goal 3. If FAA funding is used, the project would also require review under the federal Farmland Protection Policy Act (FPPA). Both processes are rigorous and the justification for the proposed change may not meet the tests to allow the change.

This alternative maintains the same runway dimensions as the No Build Alternative. While the noise profile does not vary from the contours shown for the No Build Alternative, there may be a perception of a noise increase due to the use of aircraft during instrument conditions, since Build Alternative 3 improves the Airport's instrumentation capabilities.

Additional development proposed in the airport environs, including privately held land in the Southend Airpark and land proposed for development by HTS, is outside of the area governed by the Airport Master Plan. The size and complexity of these development projects would be identical under all of the Build Alternatives, as well as the No Build Alternative. These developments would likely contribute to

the cumulative impact of airport-area development in terms of impervious surface/stormwater, noise and traffic.

This alternative is has the greatest environmental impact of the Build Alternatives.

As shown in Table 5C, the No Build Alternative has the least impact, as it does not change the airport from its current configuration. Alternative 3 has the greatest impact of the build alternatives because of its on-airport actions and off-airport impacts to residences, businesses, and agriculture.

Alternative 1 is shown with the least amount of impact for the build alternatives, while Alternative 2 is shown as having the mid-level impact. While Alternative 3 lacks a runway extension, the need for a relocation of the taxiway and expansion of the building restriction line causes a large amount of off-airport property impact, including social and socioeconomic impacts. In addition, the restrictions on airport use of EFU land may make a zone change unfeasible. Additional research needs to be conducted on this issue.

EVALUTION OF ALTERNATIVES

Chapter 1 identified Goals and Issues for this Master Plan Update. The intent of identifying these early in the planning process was, in part, to help evaluate the alternatives once they were developed.

The following discussion is intended to be used as a means of comparison, and also a guideline for dialogue among interested parties, to aid in decision-making while developing the Preferred Alternative for the Airport.

Master Plan Goals

Enhance Safety.

All alternatives meet FAA design standards, which are developed to ensure the safety of people operating aircraft and of people on the ground.

The lack of an ATCT has been cited as a safety concern. All build alternatives show the construction of an ATCT and funding has been secured by ODA.

Discussions with ODOT, by ODA personnel, have identified the intersection of Keil Road and Highway 551 to be a safety hazard. Build Alternatives 2 and 3 would dead-end Keil Road, which would remove the intersection. Alternative 2 also includes a new service road that is intended to help separate vehicular traffic from taxiing aircraft. The goal of enhancing safety goes beyond airport safety to include vehicular and pedestrian safety. As such, Build Alternative 2 enhances safety in ways the other alternatives do not.

As the Airport Access analysis in Chapter Four reported, It is recommended that ODA continue to work with and support Marion County and the City of Aurora as improvements to Airport Road are

considered. It will be important that appropriate considerations be given to the entrances (gates) to the Airport and business along Airport Road.

Meet the current and projected needs of airport users, as feasible (feasibility includes financial, environmental, and political).

As far as meeting the needs of airport users, Alternative 2 is best at providing the runway length supported by airport users. Alternative 1 also lengthens the runway, but less than Alternative 2. Alternative 3 provides precision instrument approach capability that would reduce the time the airport is below minima. Alternative 2 provides some improvement of instrument approach capability, but not as much as Alternative 3. Alternatives 1 and 2 are the best at accommodating the landside development needs projected for the next 20 years.

Alternative 3 has the greatest capital cost, followed by Alternative 2, Alternative 1, and the No Build Alternative. In terms of revenue generation, Alternatives 1 and 2 are the highest, with runway extensions that allow more fuel sales and more landside development for hangar rental and aviation businesses.

As stated in the environmental section, changing land zoned as EFU to Public may be unfeasible; an exception to Oregon Planning Goal 3 would be required.

On the grounds of political feasibility, it has been expressed through the planning process that there is concern over expanding the Airport's footprint. Build Alternative 1 does not appreciably expand the footprint, so it may have the least political controversy of the build alternatives, although Alternative 1 strengthens and lengthens the runway. Both Alternatives 2 and 3 expand off-Airport. Alternative 3 would require a zoning change and two rigorous farmland protection reviews; all of which are likely to be controversial. In addition, Alternative 3 has impacts to residential properties, unlike Alternative 2, so it likely has the greatest cause for political controversy.

Consider all the off-airport impacts of Airport development; minimize negative impacts and maximize positive impacts.

This goal ranges from including surrounding communities in the planning process, to protecting farmland and livability, to maximizing economic benefit. The assessment of how well the alternatives meet this goal will be addressed after the PAC has met to evaluate the impacts of the alternatives.

Master Plan Issues

Runway Extension

Through the planning process, many users have expressed the need for an extended runway while concerned citizens have voiced an extension would disrupt their community's livability. Two of the build alternatives show runway extensions. Noise modeling was prepared for each of the alternatives, to help evaluate the impact of the runway extensions, as discussed previously.

Air Traffic Control Tower

In light of safety concerns, ODA has secured funding for an ATCT at the Airport. Three potential locations for the ATCT are shown on the build alternatives. These locations will be assessed by FAA in the spring of 2011 to determine their suitability in regards to FAA's siting criteria.

Impact of Airport Expansion on Surrounding Area

Concern has been voiced over the Airport's impact on Boone Bridge. After analysis, the Airport's impact to Boone Bridge equates to 1,800 AADT out of the 115,700 AADT as indicated by the ODOT. Even with growth projections, there would still be an insignificant impact from Airport-related activity.

Other concerns listed related to the Aurora Rural Fire District's ability to respond at the Airport, availability of utilities, and aircraft noise. All of the build alternatives show locations for the Fire District's response building. Utilities are an issue the Airport is facing, regardless of future development. New technologies may bring more efficient means of septic treatments to the Airport, or a sewer extension from the City of Aurora may need to occur in the future. Aircraft noise was addressed for all of the alternatives, to assess each alternative's impact to the surrounding communities; the results of this study are shown above.

Calm Wind Runway Change

ODA is working with the FAA to get approvals for new departure procedures that will lessen the Airport's disruption to surrounding communities. The calm wind runway, as recommended in the 2002 noise study, will remain with all alternatives. As shown in the noise contour exhibits, the Airport's noise profile will increase by 2020. Utilization of the Runway 17 calm wind runway reduces impacts to areas north of the Airport. However, in Build Alternative 2 the noise exposure shifts closer to the City of Aurora, as a result of the calm wind runway.

Precision Instrument Approach

Build Alternative 3 shows what would be required to implement a precision instrument approach. The process would be difficult financially and politically. The best minima possible would likely be ½ sm, which is the lowest achievable with a GPS-aided LPV approach or with a Category I instrument landing system. Given historical weather conditions at the Airport, visibility is below ½ mile 2.3% of the time, below ¾ sm 3.7% of the time, and below 1 sm 5.0% of the time.[12]. The worst month is November, when visibility is below ½ sm 6.8% of the time, below ¾ sm 10.2% of the time, and below 1 sm 13.6% of the time. In constrast, visibility exceeds 1 sm 98.8% of the time in July. The cost associated with Alternative 3 may outweigh the benefit gained from implementing a precision instrument approach.

Helicopter Operations

All three build alternatives show suggested locations for the helicopter operations area on state-owned property.

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[12] *National Oceanic and Atmospheric Administration (NOAA) weather data for 2000-2009.*

Other Airport Improvements

The other airport improvements listed were a run-up area for Runway 17, improved runway lighting, a restaurant, and radar/approach control coverage in the area. Build Alternative 1 shows a run-up area on the extended Runway 17 parallel taxiway. Build Alternative 2 also shows a run-up area that could be constructed if Runway 17 is not extended. Approach lighting would be upgraded, as needed, to implement new instrument approaches. A restaurant is not shown on State-owned property, but could be developed on private property. Radar is difficult to obtain, as the airway system is becoming more GPS-based. However, the ATCT will provide approach control at the Airport when the tower is open.