

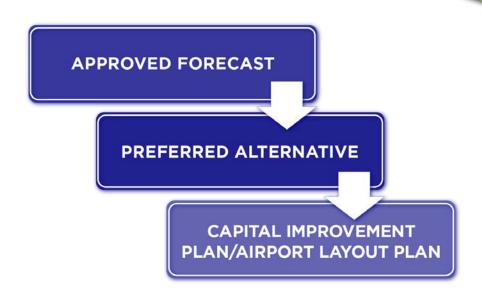
Airport Master Plan Update

June 15, 2017



Airport Master Planning

The Master Plan is a **20-year plan** to understand the needs of current and future users of the Airport. This is important to ensure that **safe and orderly development** of the Airport occurs in a manner that is **reflective of community values and goals**. This plan is developed through a **purposeful, inclusive, and educational process**.



Key Features

- Planning is not prejudicial or constrained no predetermined outcomes
- Plan must be based on current conditions, community input, FAA design standards, and forecasts



MASTER

PLAN

PROCESS

Master Plan Process

INVESTIGATION

Pre-Planning

Inventory

Forecasts and Planning Activity Levels

Facility Requirements

PREPARATION

SOLUTIONS

Alternatives Analysis

Contingency Scenario Development

Identification of Preferred Alternatives

EVALUATION

IMPLEMENTATION

Financial Planning

Improvement Plan (CIP)

Final Master Plan
Documentation

Airport Layout Plan (ALP)

DOCUMENTATION

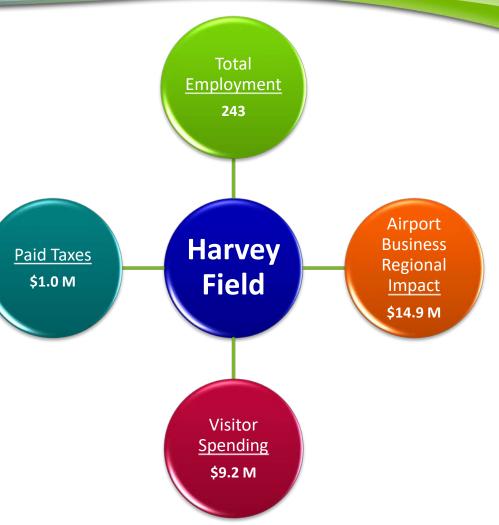




Airport Economic Impact – 2012 WSDOT Economic Impact Data

Multiplier Effect:

Initial economic impacts from Airport enter economy and recirculate which generate successive rounds of employment, taxes, spending, and output.



Note: All impacts are shown in 2010 dollars

SNOHOMISH, WA

Potential Project Funding Sources

FAA Grants

Airport Improvement Program

Airport Way, Runway, & Taxiway Improvements FAA Grants – provide 90% of the total cost of an eligible capital project

FAA Airport Improvement
 Program grants come from
 Aviation Trust Fund funded by aviation system
 user fees

Harvey Field Funds

Tie-down fees, land leases, fuel sales, nonaeronautical revenues, etc. State of Washington

Division of Aeronautics, State Infrastructure Bank, Fuel Tax

Outreach

- Planning Advisory Committee
- → Website
- Public Open Houses
- → Government Briefings
- Focus Groups (Stakeholders)
 - → Pilot Group
 - → Business Group
 - → Noise
 - → Floodplain/Hydrology



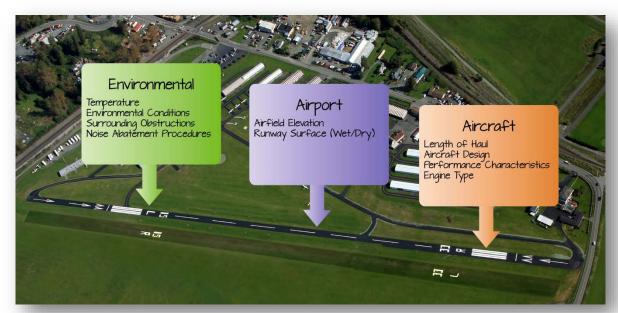
Airport Overview



Runway Length

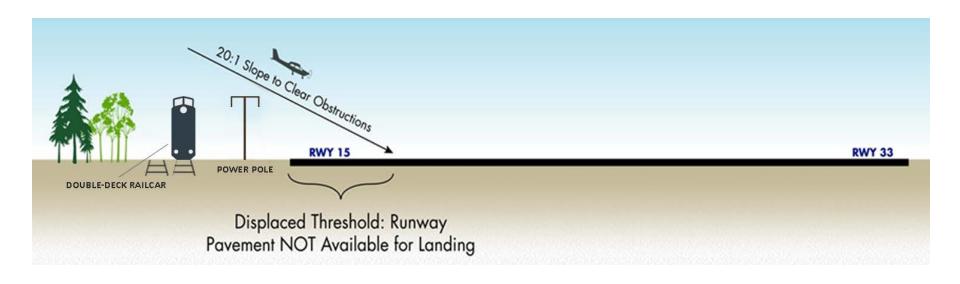
- **Current Runway Length, Width, & Orientation:**
- 15L/33R 2,671 feet x 36 feet
- Displaced Thresholds:
 - Runway 15 452' to south
 - Runway 33 241' to north

A displaced threshold is a runway threshold located at a point other than the physical beginning or end of the runway. The portion of the runway so displaced may be used for takeoff but not for landing.





Displaced Threshold

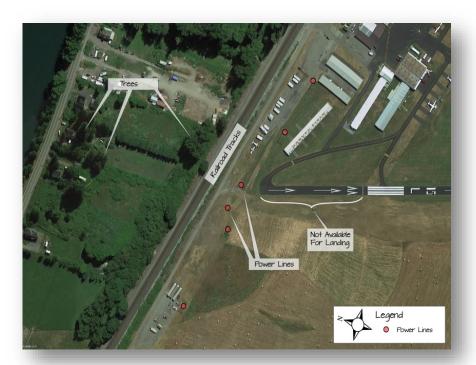




Obstructions - Reason for Displaced Thresholds

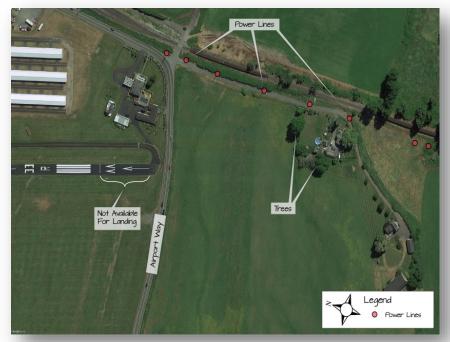
Runway 15L

- → Railroad tracks
- → Power Lines
- → Trees



Runway 33R

- Airport Way
- → Power Lines
- → Trees





Where We Are Today

- → Snohomish County Code (SCC) regarding Density Fringe have been a driving factor since we last met
- Priority has been to resolve safety issues of:
 - Runway Displaced Thresholds
 - → Current 2671' runway provides *useable* runway length of 2219' for landing to the south and 2430' for landing to the north
 - → Full runway length is available for departures
 - Airport Way
 - → Current roadway alignment is in the runway protection zone and FAA recognizes it as a safety concern

- → To meeting SCC regulations and meet FAA safety standards, our recommendation is a 2400' x 75' runway and a relocation of Airport Way
- → This solution serves Harvey Field's existing aircraft fleet mix, improves aviation safety and improves roadway safety
- > Now, how we got here and what it means....



Environmental Inventory

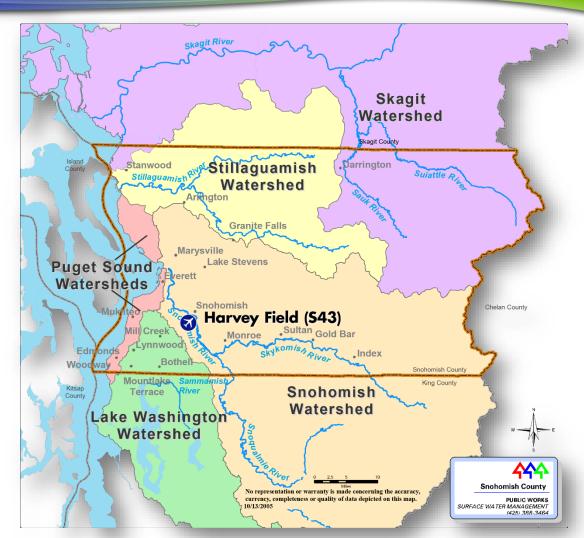


Environmental Categories Inventoried for Harvey Field

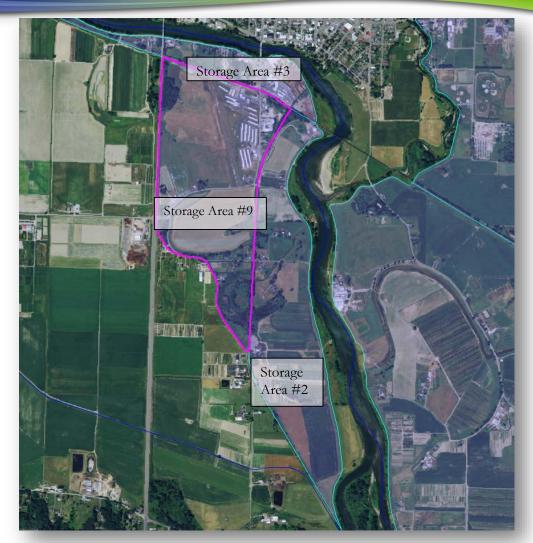
- Air Quality
- ✓ Coastal Resources
- ✓ Compatible Land Uses
- ✓ Construction Impacts
- Department of Transportation Act 4(f)
- ✓ Farmlands
- ✓ Fish, Wildlife, and Plants
- Floodplains
- ✓ Hazardous Material, Pollution Prevention, and Solid Waste
- ✓ Historical, Architectural, Archaeological, and Cultural Resources
- ✓ Light Emissions and Visual Impacts
- Noise
- Secondary (Induced) Impacts
- Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks
- ✓ Wetlands
- ✓ Wild and Scenic Rivers

Prior to the construction of any improvement, projects must undergo required local, state and/or federal environmental review and approval processes

Snohomish County Watersheds

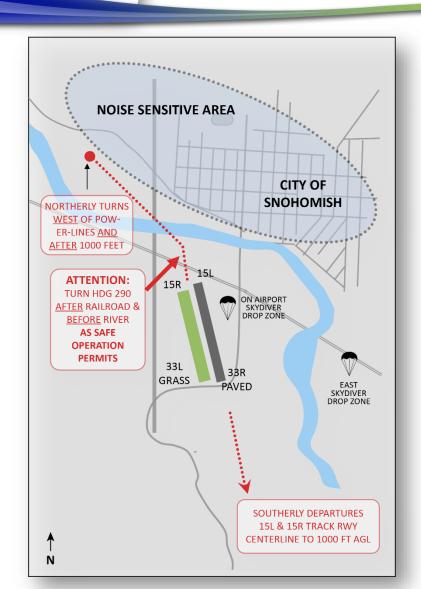


Snohomish River Storage Area Map



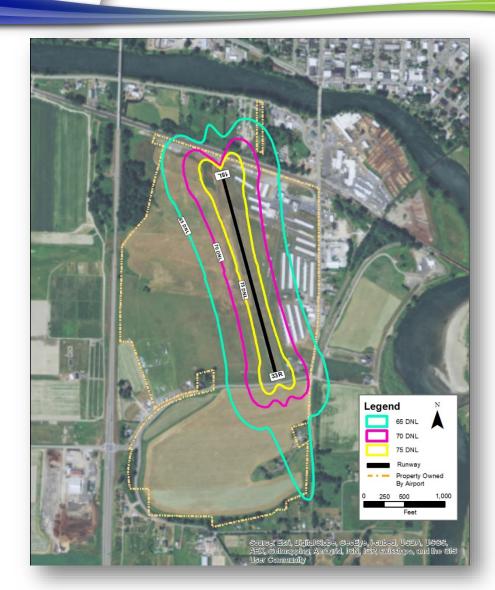
SNOHOMISH, WA

Noise Abatement Procedures



- Long-standing procedures in place at Harvey Field
- Ongoing pilot education
- Noise Hotline -
 - 360-568-1541, ext. 261
- Information at www.harveyfield.com

Existing Noise Contours





Alternatives Evaluation



Time to Find Workable Options

- Local & FAA standards and regulations
- Planning and engineering standards
- Environmental and floodplain regulations



FAA Safety Standards for Aircraft Currently at Harvey Field

RUNWAY DESIGN CODE (RDC)



FREQUENT FLYERS AT S43



Cessna Caravan 208B





DeHavilland Twin Otter (DHC-6)



TBM 700



Quest Kodiak



KingAir 200

Design Goals

→ Airport Way Road Improvement

- ✓ Build on Airport Property
- ✓ Build at safe distance from Runway
- ✓ Meet Density Fringe requirements
- Meet FEMA's requirement for base flood elevation (BFE) impact
- ✓ Meet Snohomish County Road Standards
- ✓ Improve substandard curves and shoulder widths
- ✓ Avoid wetlands

→ Runway

- Serve same aircraft as now
- Build at safe distance from Airport Way
- ✓ Meet Density Fringe and FEMA BFE requirements
- ✓ Clear approaches over BNSF, Airport Way, and power lines

Evaluation Criteria

SAFETY & OPERATIONAL FACTORS

Ability to safely accommodate future demand aircraft

Safety for vehicles on Airport Way

Evaluated based on anticipated improvements to address:

- Operational safety
- Capacity and delay
- Tenant convenience
- Ability to meet FAA design standards

ENVIRONMENTAL FACTORS

FAA Order 1050.1E

Potential physical impacts to surrounding community

Ability to meet County planning and environmental standards

ECONOMIC CONSIDERATIONS

Historic infrastructure investment

Remaining useful life of existing facilities

Anticipated project costs

Property acquisition requirements

Cost-effectiveness evaluation

Economic impact

IMPLEMENTATION FEASIBILITY

Tangible factors

- •Practicality of implementation Intangible factors
- Community values
- Political environment

Density Fringe Area: Max Allowable Obstruction SCC 30.65.255

The maximum width (sum of widths) of all new construction, substantial improvements or other development **shall not exceed 15 percent** of the length of a line drawn perpendicular to the known floodwater flow direction at the point where the development(s) is located. The length of said line shall not extend beyond the property boundary or the edge of the density fringe area, whichever is less. The limitations of this section shall not apply to those uses listed in SCC 30.65.260.

- All of Harvey Field property is within the Density Fringe
- New construction is Fill anything that diverts or blocks Flood flows
- Sum of Fill widths / Total property width = 15% or less

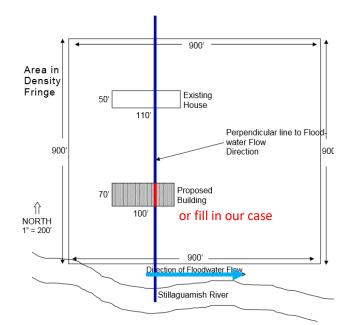


Density Fringe: Max Allowable Obstruction SCC 30.65.255

Example: Flow Obstruction and Blockage Calculations

Example from County Flood Permit Application:

- Determine the general floodplain flow direction
- Draw a line perpendicular to the flow direction
- Draw the line where it intersects the largest width of new construction as a percentage of property width.
- Sum of Fill widths/Total property width must be less than 15%



900' property width

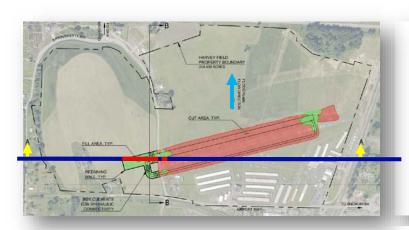
70' new obstruction width

70'/900' = 7.8% < 15 %

HARVEY FIELD AIRPORT

SNOHOMISH, WA

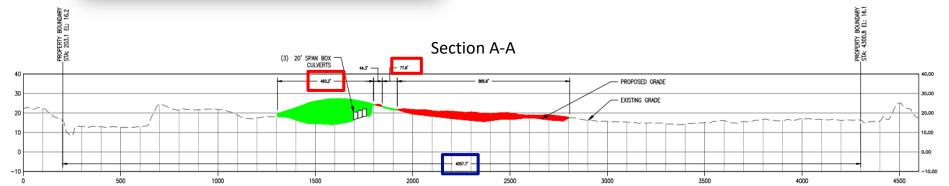
Flow Obstruction/Blockage Calculations



SECTION A-A				
FEATURE	WIDTH	% OF PROPERTY WIDTH		
PROPERTY WIDTH	4097.7	-		
NEW FILL	570.8'	13.9%		
NEW CUT	929.9'	22.7%		
CULVERT OPENINGS	60.0'	1.5%		
FILL - CULVERTS	510.8'	12.5%		

4098' property width

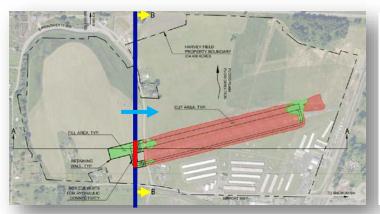
571' new obstruction width 571'/4098' = 13.9% < 15 %



HARVEY FIELD AIRPORT

SNOHOMISH, WA

Flow Obstruction/Blockage Calculations

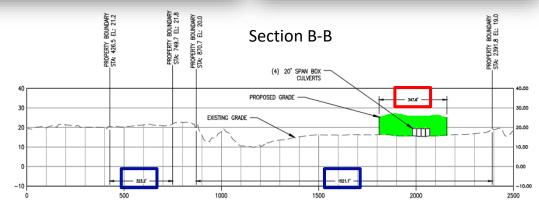


SECTION B-B				
FEATURE	WIDTH	% OF PROPERTY WIDTH		
PROPERTY WIDTH	1844.3'	-		
NEW FILL	347.6'	18.8%		
NEW CUT	0.0'	0.0%		
CULVERT OPENINGS	80.0'	4.3%		
FILL - CULVERTS	267.6'	14.5%		

1844' property width 348' new obstruction width less 80' culvert opening areas from new obstruction width = 268'

348'-80' = 268'

268'/1844' = 14.5% < 15%



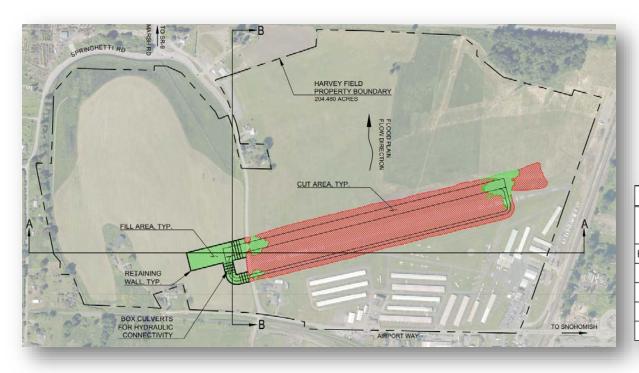
Density Fringe Area: Max Allowable Density SCC 30.65.250

The land area occupied by any use or development permitted by this chapter located in the density fringe area that will displace floodwaters shall not exceed **two percent** of the land area of that portion of the lot. The limitations of this section shall not apply to those uses listed in SCC 30.65.260.

What does 2% mean with regard to Harvey Field?

- All of Harvey Field is within the Density Fringe...so SCC applies everywhere
- 2% of 204.48 (Harvey Field property) = 4.090 acres

Fill & Cut Area Calculations



Green = Fill Area Red = Cut Area

CUT/FILL AREAS					
FEATURE	AREA (AC.)	% OF PROPERTY AREA	VOLUME (CU. YD.)		
HARVEY FIELD PROPERTY	204.480	_	-		
NEW FILL	3.927	1.92%	33,940		
NEW CUT	18.872	9.23%	57,760		
CULVERT OPENINGS	0.448	0.22%	2,890		
FILL - CULVERTS	3.479	1.70%	31,050		



Density Fringe Area: Exceptions to Max Allowable Density & Obstruction Limits SCC 30.65.260

The following uses shall **be exempt** from the maximum allowable density and obstruction limitations of SCC 30.65.250 and 30.65.255:

(1) Water-dependent utilities; (2) Dikes; (3) Utility facilities; and (4) **Public Works**, when the project proponent demonstrates that the floodwater displacement effects of the proposal when considered together with the maximum potential floodwater displacement allowed by SCC 30.65.250 and 30.65.255 shall not cause a cumulative increase in the base flood elevation of more than one foot.

Snohomish County confirmed "Public Works" includes Airport Way as a public road



HARVEY FIELD AIRPORT SNOHOMISH, WA

Density Fringe Area: Exceptions to Max Allowable Density & Obstruction Limits SCC 30.65.260

"...demonstrates that the floodwater displacement effects of the proposal when considered together with the maximum potential floodwater displacement allowed by SCC 30.65.250 and 30.65.255"

- Base Flood = the 100-year flood elevation, as shown on the current FEMA Flood Insurance Rate Maps (FIRMs)
- Floodwater displacement means that for every piece of material placed in construction of the road will take up some space that was previously available for water storage or conveyance during a flood.
- Road relocation floodwater displacement calculation assumes that the maximum 2% area and 15% blockages will eventually occur on all properties located in the floodplain.
- WEST Consultants ran the same model including all of the proposed improvements (Runway, Taxiway, and Airport Way).
- o SCC only requires BFE modeling for Public Works projects, i.e. Airport Way.
- o Our approach included road, runway, and taxiway improvements.
- The model shows an 0.00' rise in the base flood elevation.



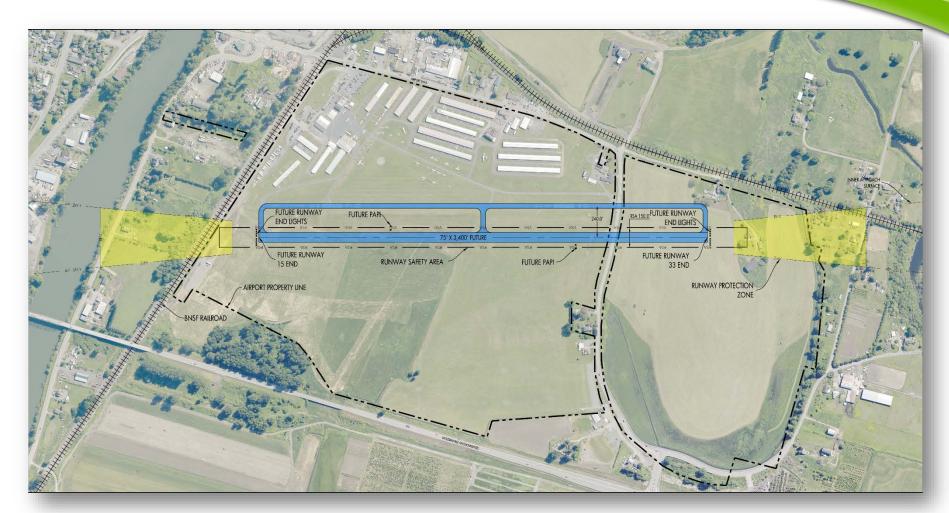
Alternatives

Airport Way Relocation Options



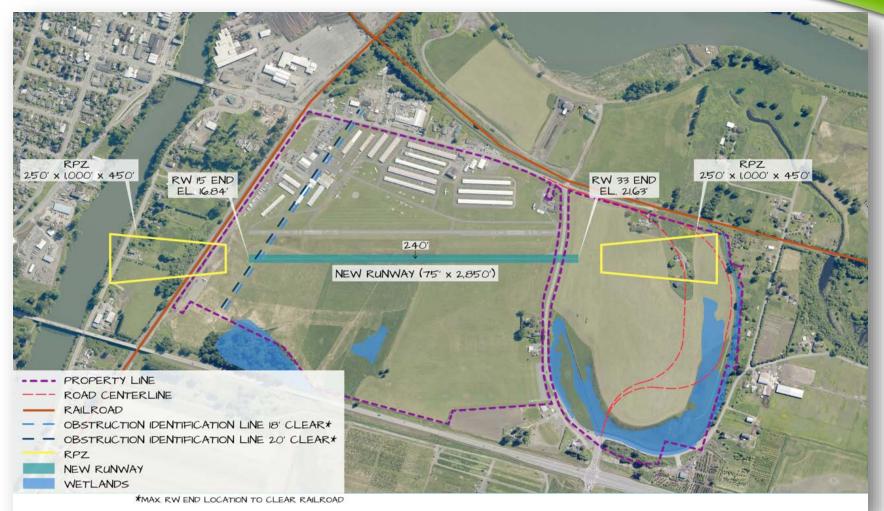


Alternative 1: New 3,400-foot Runway Using Existing Runway as Taxiway



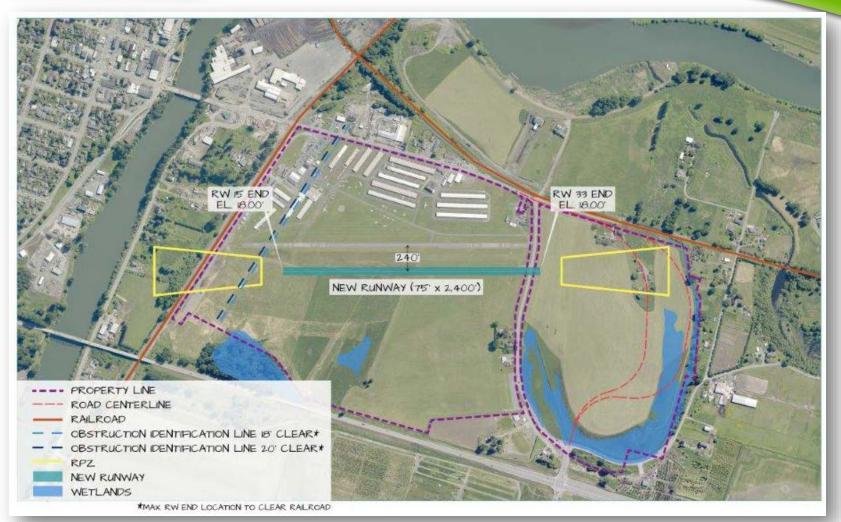
HARVEY FIELD AIRPORT SNOHOMISH, WA

Alternative 1A: New 2,850 Runway Using Existing Runway as Taxiway



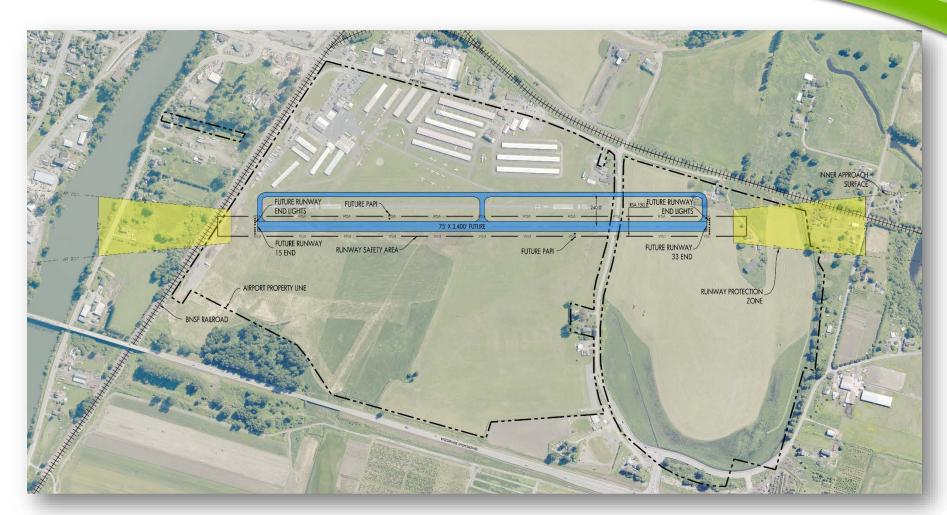
HARVEY FIELD AIRPORT SNOHOMISH, WA

Alternative 1B: New 2,400-foot Runway Using Existing Runway as Taxiway



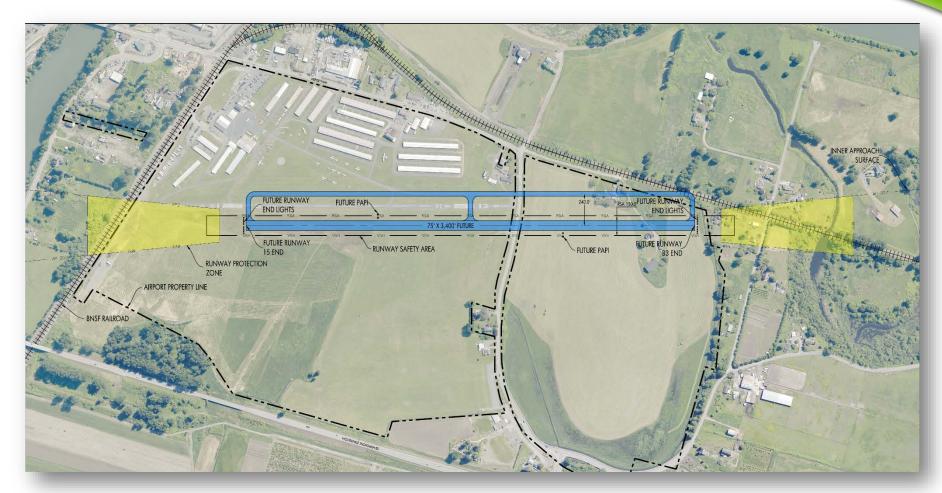


Alternative 2: New 3,400-foot Runway and Taxiway



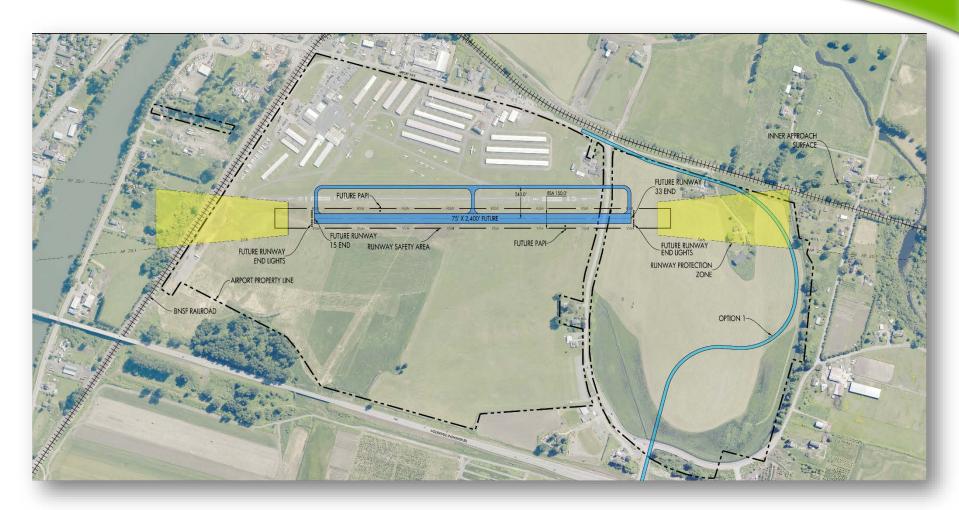


Alternative 3: New 3,400-foot Runway and Move Airport Way South

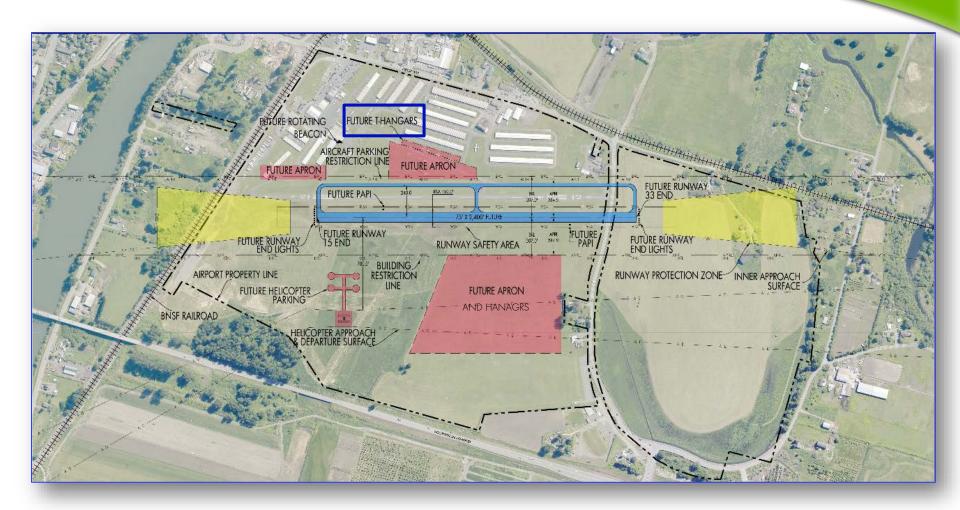




Alternative 4: New 2,400-foot Runway and Move Airport Way South



Conceptual Development Plan



Summary of Runway Alternatives

Option	No Action	Alternative 1: New 3,400-ft Rwy & Use Existing Rwy as Twy	Alternative 2: New 3,400-ft Rwy & New Twy	Alternative 3: New 3,400-ft Rwy & Move Airport Way South	Alternative 4: New 2,400-ft Rwy & Move Airport Way South
Description	Existing runway remains	New 3,400-ft Rwy 15/33 240' west of existing Rwy15L/33R	New 3,400-ft Rwy 15/33 240' west of existing partial parallel twy	New 3,400-ft Rwy 15/33 660' south of BNSF & relocated Airport Way	New 2,400-ft Rwy 15/33 & relocated Airport Way
Advantages	 No cost Meets density fringe requirements 	 Meets runway length requirements for design category fleet Re-uses existing runway as parallel taxiway 	 Meets runway length requirements for design category fleet 	 Meets runway length requirements for design category fleet 	 Meets runway length requirements for existing and forecast aircraft Meets FAA design standards Meets SCC Density Fringe requirements Flood water storage capacity impact less than 0.00'. Flow blockage less than 15% limit. *
Disadvantages	Does not meet key FAA runway design standards (displaced threshold on both ends, obstructions)	Exceeds SCC limits for fill in Density Fringe.	Exceeds SSC limits for fill in Density Fringe	 Exceeds SCC limits for fill in Density Fringe Does not allow for relocated Airport Way on County ROW/Harvey property 	Does not re-use existing runway pavement as parallel taxiway
Feasibility	Displaced thresholds remain	Unlikely to receive permits from Snohomish County.	Unlikely to receive permits from Snohomish County	Unlikely to receive permits from Snohomish County.	SCC Density Fringe Fill permit feasible



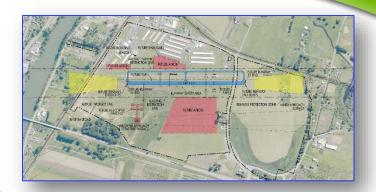
Recommendation

→ Alternative 4 (2,400 Runway) with Option 1 for Airport Way South

- Airport Way
 - ✓ Build on Airport Property
 - ✓ Build at safe distance from Runway
 - ✓ Meet Density Fringe requirements
 - ✓ Meet Snohomish County Road Standards
 - ✓ Improve substandard curves and shoulder widths
 - ✓ Minimizes wetlands impact

Runway

- ✓ Serve same aircraft as now
- Build at safe distance from Airport Way
- ✓ Meet Density Fringe requirements
- ✓ Clear approach over BNSF and Airport Way
- ✓ Shorter runway with safety areas







Current Runway Length, Width, & Orientation

- 15L/33R 2,671 feet x 36 feet
- Displaced Thresholds:
 - Runway 15 452' to south
 - Runway 33 241' to north
- Recommended Alternative 4: Runway Length, Width, &
 Orientation
 - 15L/33R 2,400 feet x 75 feet
 - Clear approaches

Noise Contour Comparison



Per FAA guidance, residences within the 65 dnl are eligible for noise mitigation

Abatement procedures for south departures will be evaluated by Airport management and the Noise Abatement Committee



Schedule & Next Steps

Next Steps



- → Complete
 Implementation Plan
- Finalize Airport Layout
 Plan
- Submit documentation for County and FAA approval process

Questions, Comments?



Chapters are on website (www.harveyfield.com)





Thank You!

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