



APPENDIX O

SNOHOMISH COUNTY CODE DENSITY FRINGE REQUIREMENTS

Snohomish County Code Density Fringe Requirements

- Density Fringe requirements are found in Snohomish County Code (SCC) Chapter 30.
- SCC has different requirements for each of the two proposed fill projects:
 - Runway/Taxiway
 - 1) 30.65.250 Density fringe area: maximum allowable density... “2%”
 - 2) 30.65.255 Density fringe area: maximum allowable obstruction... “15%”
 - Relocating Airport Way
 - 3) 30.65.260 Density fringe area: exceptions to maximum allowable density and obstruction limitations... “BFE impact”

SCC RE: RUNWAY/TAXIWAY:

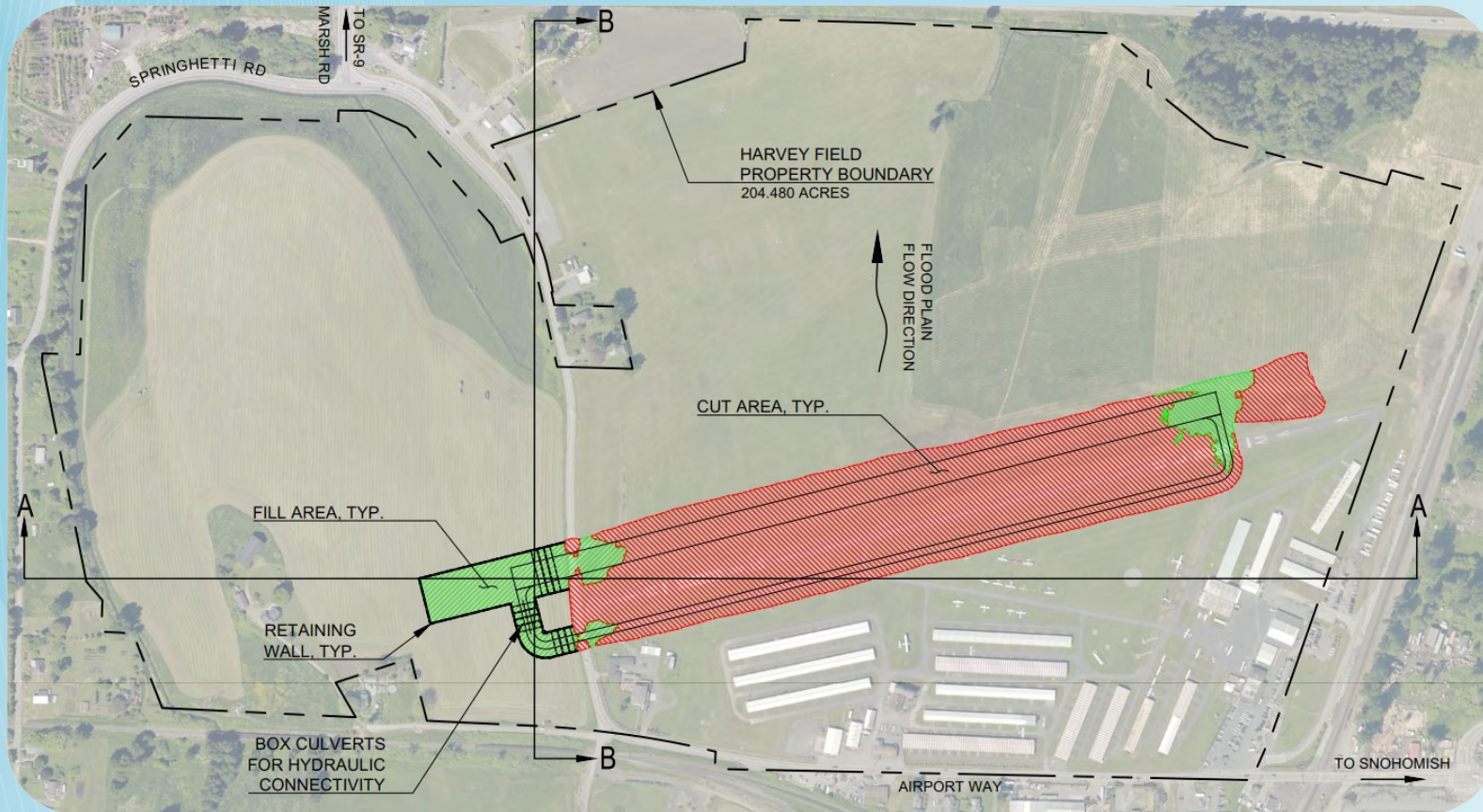
First, Limit fill footprint to 2% or less

30.65.250 DENSITY FRINGE AREA: MAXIMUM ALLOWABLE DENSITY.

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.

- “..land area occupied...that will displace floodwaters...”
 - The fill limitations apply to sites located beneath the 100-yr flood elevation i.e. 23’ (NGVD29) or 26.63’ (NAVD88) @ Harvey Field
 - Virtually all of Harvey Field is lower than 26.63’ ...so SCC applies everywhere.
 - Cut cannot be used to “offset” fill impacts, so....1 acre fill minus .25 acres cut ≠ 0.75 acres of fill
 - Earthwork volume does not matter, only the footprint or 2D area.
- “...shall not exceed two percent of the land area of that portion of the lot”:
 - $\text{Fill Footprint} / \text{Total Airport Land Area} = 2\%$ of total property area or less
 - Harvey Field Property = 204.48 acres
 - 2% of 204.48 = 4.090 acres
- “The limitations of this section shall not apply to those uses listed in SCC 30.65.260.
 - 2% Area limit does NOT apply to public uses, such as roads, specifically, Airport Way.

SCC RE: RUNWAY/TAXIWAY: 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

SCC RE: RUNWAY/TAXIWAY:

Second, Limit how much fill blocks the flow of floodwater to 15% or less

30.65.255 DENSITY FRINGE AREA: MAXIMUM ALLOWABLE OBSTRUCTION.

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.

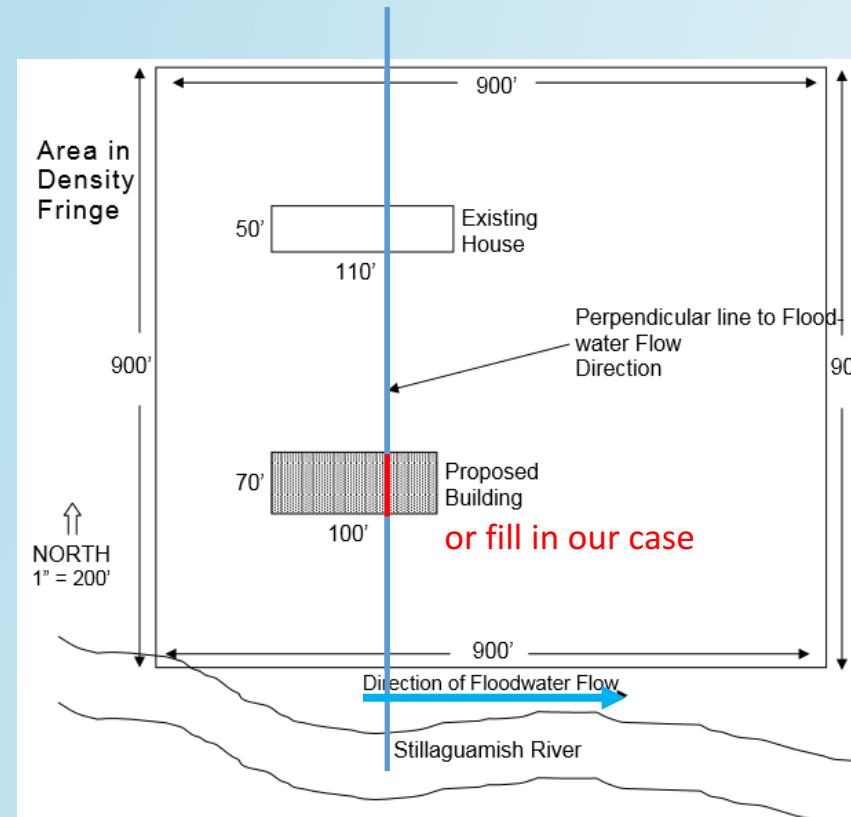
- “a line drawn perpendicular to the known floodwater flow direction at the point where the development(s) is located. ... length ... shall not extend beyond the property boundary or the edge of the density fringe area, whichever is less.”
 - All of Harvey Field property is within the Density Fringe
 - 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.
- “The maximum width (sum of widths) of all new construction, substantial improvements or other development...”
 - New construction is Fill - Anything that diverts or blocks Flood flows
- “...shall not exceed 15 percent of the length ...”
 - $\text{Sum of Fill widths} / \text{Total property width} = 15\% \text{ or less}$

SCC RE: RUNWAY/TAXIWAY: Flow Obstruction/Blockage Calculations

30.65.255 DENSITY FRINGE AREA: MAXIMUM ALLOWABLE OBSTRUCTION.

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%

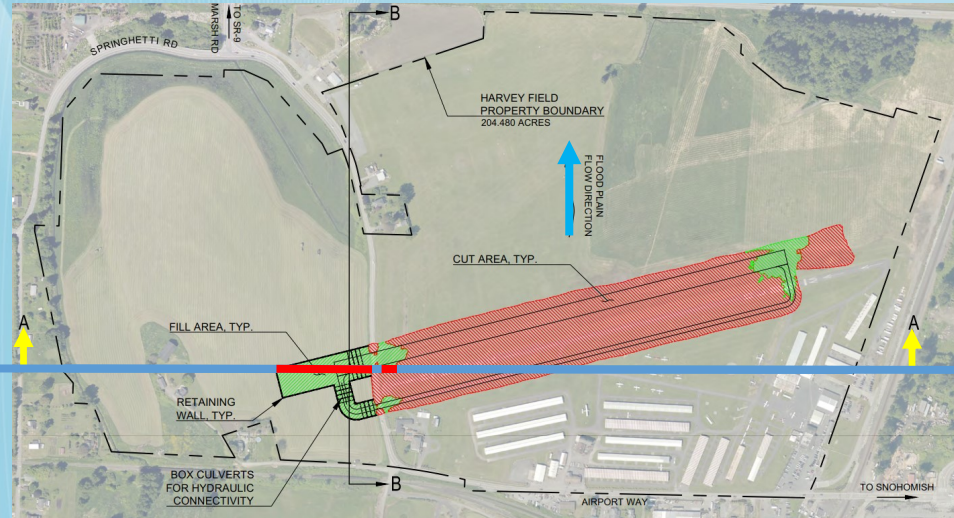


900' property width

70' new obstruction width

$70'/900' = 7.8\% < 15\%$

SCC RE: RUNWAY/TAXIWAY: Flow Obstruction/Blockage Calculations

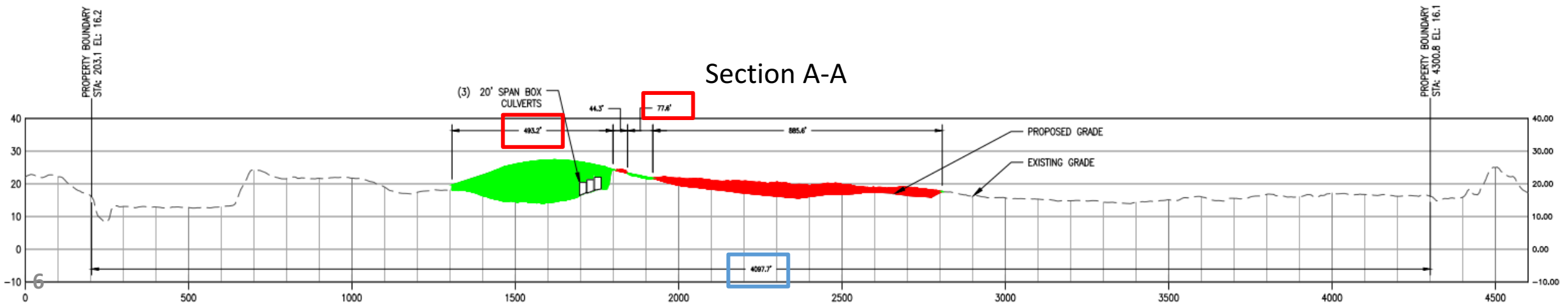


SECTION A-A		
FEATURE	WIDTH	% OF PROPERTY WIDTH
PROPERTY WIDTH	4097.7'	-
NEW FILL	570.8'	13.9%
NEW CUT	929.9'	22.7%
CULVERT OPENINGS	60.0'	1.5%
FILL - CULVERTS	510.8'	12.5%

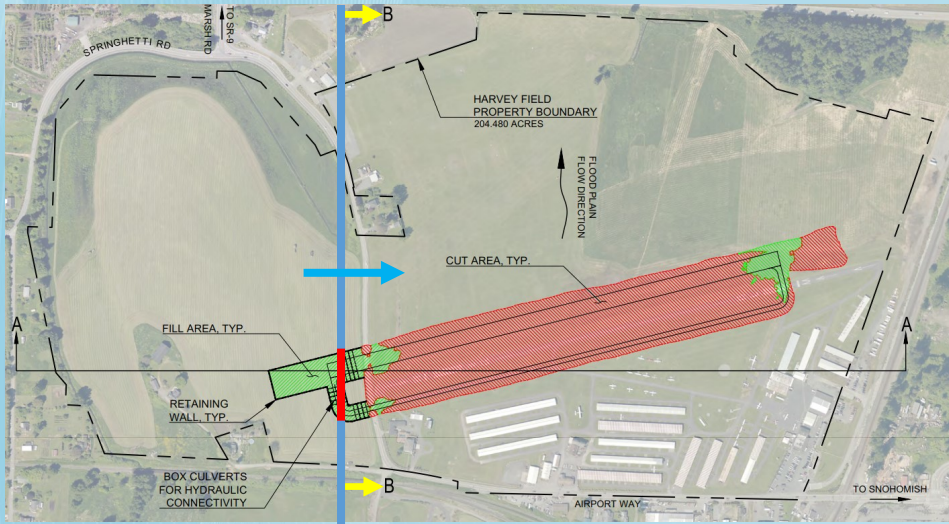
4098' property width

571' new obstruction width

$571' / 4098' = 13.9\% < 15\%$



SCC RE: RUNWAY/TAXIWAY: 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

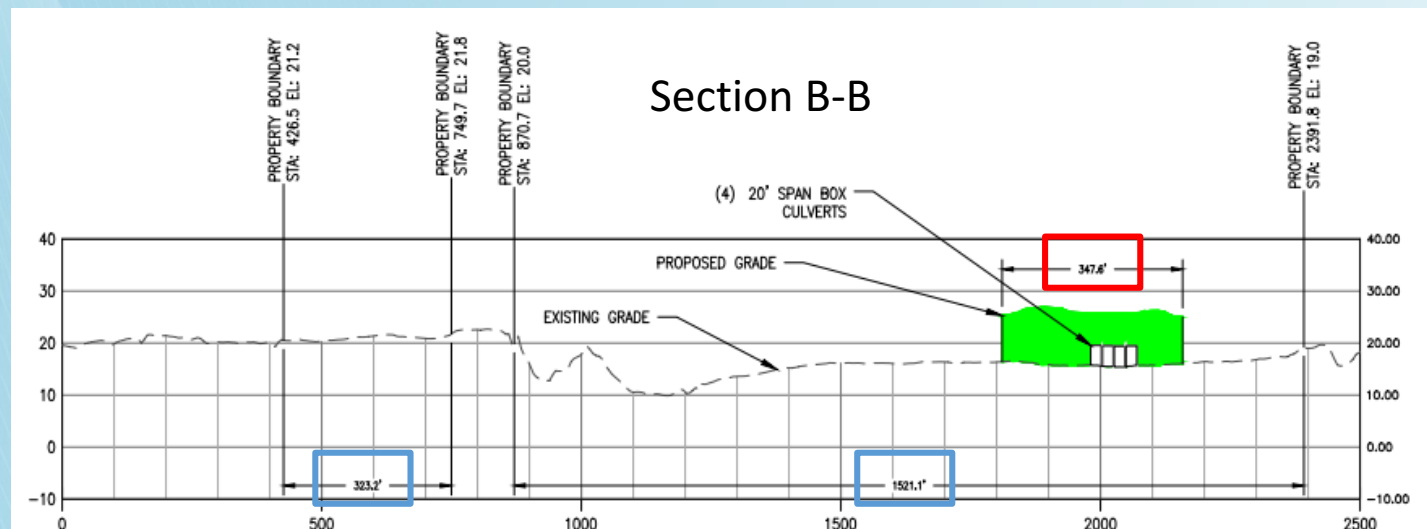
348' new obstruction width

$348' / 1844' = 18.8\% > 15\%$

Doesn't meet 15%, But if we deduct culvert opening areas from new obstruction width:

$348' - 80' = 268'$

$268' / 1844' = 14.5\% < 15\%$



SCC RE: AIRPORT WAY RELOCATION:

Road cannot increase Base Flood Elevation more than 1'

30.65.260 DENSITY FRINGE AREA: EXCEPTIONS TO MAXIMUM ALLOWABLE DENSITY AND OBSTRUCTION LIMITATIONS.

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. Floodwater displacement information shall be obtained and certified by a professional engineer.

Snohomish County confirmed “Public Works” includes public roads, including Airport Way.

SCC RE: AIRPORT WAY RELOCATION: Base Flood Elevation Impact Calculation

30.65.260 DENSITY FRINGE AREA: EXCEPTIONS TO MAXIMUM ALLOWABLE DENSITY AND OBSTRUCTION LIMITATIONS.

- “...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.
- “Floodwater displacement information shall be obtained and certified by a professional engineer.
 - Ray Walton of WEST Consultants created the original FEMA floodplain model in this area.
 - WEST Consultants ran the same model including all of the proposed improvements (Runway, Taxiway, and Airport Way). (See *Technical Memorandum, transmitted with SnoCo submittal*)
 - SCC only requires BFE modeling Public Works projects, i.e. Airport Way. Our approach is more comprehensive, and included road, runway, and taxiway improvements.
 - The model shows an 0.00' rise in the base flood elevation.