STATE ROUTE 520 Bridge Replacement and HOV Project

Supporting Information

Washington State Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

108th Avenue NE Interchange Area

Bellevue Way NE Interchange Area

Draft for discussion: 12/8/2004

92nd Avenue NE Interchange Area

Draft for discussion: 12/8/2004

84th Avenue NE Interchange Area

Draft for discussion: 12/8/2004

Montlake Boulevard Interchange Area

Draft for discussion: 12/8/2004

NE 45th Street Interchange Area

Draft for discussion: 12/8/2004

Roanoke Street Interchange Area

Draft for discussion: 12/8/2004

Mercer Street Interchange Area

Draft for discussion: 12/8/2004

Stewart Street Interchange Area

Draft for discussion: 12/8/2004

Wetland Effects

	4-Lane Alternative				6-Lane Alternative			
	Wetland		Buffer		Wetland		Buffer	
	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade
Permanent Effects	3.4	4.5	7.5	2.3	6.7	6.7	15.4	2.2
Temporary Effects	0	3.6	0	1.3	0	2.9	0	0.8
Wetland Mitigation*	22-35 acres				35-55 acres			

* Regulations are changing; more acreage likely to be required.

P:\SR520 Project Files\11.0 Alt Development-DEIS-Task AG\11.3 Project Meetings\11.3.4 Technical and Executive Committee Meetings\Summary of Wetland Effects 12-22-04.ppt

Pollutant Loads to Seattle Water Bodies

Basins	Mean Pollutant Loads per Rain Event (pounds/event)			Annual Pollutant Loads (pounds/year)		
	Copper	Zinc	TSS	Copper	Zinc	TSS
No Build Alternative – Continued Operation Scenario (No Stormwater Treatment)						
Lake Union	0.007	0.042	30.7	0.620	3.663	2660.0
Portage Bay West	0.005	0.029	21.2	0.429	2.536	1841.5
Portage Bay East	0.008	0.044	32.3	0.652	3.851	2796.4
Union Bay 1	0.014	0.083	60.6	1.224	7.232	5251.8
Union Bay 2	0.005	0.031	22.8	0.461	2.724	1977.9
4-Lane Alternative (BMP Removal Efficiencies Applied)						
Lake Union						
Portage Bay West	0.006	0.033		0.483	2.855	
Portage Bay East						
Union Bay 1						
Union Bay 2						
6-Lane Alternative (BMP Removal Efficiencies Applied)						
Lake Union						
Portage Bay West						
Portage Bay East		0.046			3.945	
Union Bay 1						
Union Bay 2						

Pollutant loads are same or less than No Build Alternative

Pollutant Loads in Lake Washington

	TSS	Oil/Grease	Cadmium	Copper	Lead	Zinc
Annual Mass Loading (pounds/year)						
No Build	95.9	10.8	0.010	0.03	0.02	0.17
4-Lane Alternative						
6-Lane Alternative		17.0				0.20

Pollutant loads are same or less than No Build Alternative

Pollutant Loads in Eastside Water Bodies

Basins	Mean Pollutant Mass Loading per Rain Event (pounds/event)			Annual Mass Loading (pounds/year)		
	Copper	Zinc	TSS	Copper	Zinc	TSS
No Build Alternative – Continued Operation Scenario (No Stormwater Treatment)						
Fairweather Bay West	0.009	0.052	37.8	0.763	4.508	3273.8
Fairweather Bay East	0.009	0.054	39.3	0.795	4.696	3410.3
Cozy Cove	0.011	0.066	48.0	0.970	5.730	4160.5
Yarrow Bay Wetland	0.004	0.025	18.1	0.366	2.160	1568.7
Yarrow Creek	0.008	0.047	33.8	0.683	4.039	2932.8
West Tributary of Kelsey Creek	0.003	0.015	11.0	0.223	1.315	954.9
4-Lane Alternative (BMP Removal Efficiencies Applied)						
Fairweather Bay West	0.010	0.056		0.827	4.884	
Fairweather Bay East						
Cozy Cove						
Yarrow Creek – Wetland						
Yarrow Creek						
6-Lane Alternative (BMP Removal Efficiencies Applied)						
Fairweather Bay West	0.015	0.087		1.272	7.514	
Fairweather Bay East						
Cozy Cove						
Yarrow Creek – Wetland						
Yarrow Creek	0.013	0.077		1.132	6.688	
West Tributary of Kelsey Creek						

Pollutant loads are same or less than No Build Alternative

Summary of Wetland Effects

Wetland Category[a]	No Build Alternative		4-Lane Alternative				6-Lane Alternative			
			Wetland		Buffer		Wetland		Buffer	
	Wetland	Buffer	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade
Permanent Effects										
I	No fill or shading in wetlands or buffers.		0.3	4.5	3.2	2.3	0.3	6.7	3.8	2.2
II			0	0	0	0	0.7	0	1.3	0
III			3.1	0	4.1	0	5.7	0	10.1	0
IV			<0.1	0	0.1	0	<0.1	0	0.1	0
Total			~3.4	~4.5	~7.5	~2.3	~6.7	~6.7	~15.4	~2.2
Construction Effects[b]										
I	No fill, clearing, or shading in wetlands or buffers.		0	3.6	0	1.3	0	2.9	0	0.8
II			0	0	0	0	0	0	0	0
III			0	0	0	0	0	0	0	0
IV			0	0	0	0	0	0	0	0
Total			0	3.6	0	1.3	0	2.9	0	0.8

Note: Affected areas were calculated using GPS data gathered in the field, aerial photography, National Wetland Inventory maps, and local wetland inventories. Affected area estimates based on preliminary design information and subject to change. Totals may not add up due to rounding.

[a] Ecology (1993).
[b] Construction effects include clearing and shading.

Wetland Mitigation

Ecology Rating	Approximate Mitigation Ratio[a]	4-Lane Alternative			6-Lane Alternative		
		Affected Area (acres)	Required Mitigation (acres)		Affected Area (acres)	Required Mitigation (acres)	
			Create Category II	Create Category III		Create Category II	Create Category III
I	4-6:1	4.8	19.2	28.8	6.9	27.6	41.4
II	2-3:1	-	-	-	0.7	1.4	2.1
III	1-2:1	3.1	3.1-4.65	4.65-6.2	5.7	5.7-8.55	8.55-11.4
IV	0.75-1.25:1	<0.1	<0.1	<0.1	<0.1	-	-
Total		7.9	22.3-23.85	33.45-35.0	13.3	34.7-37.55	52.05-54.54

Note: The ratios shown in this table reflect restoration or creation of replacement wetlands based on current guidance. Actual ratios may be slightly higher or lower, depending on the regulations in effect at the time of permitting. Mitigation ratios for wetland enhancement would be approximately twice those shown for restoration or creation. This does not include replacement of lacustrine wetlands. Preservation of existing wetlands may be used reduce the creation/restoration ratio to a minimum of 1:1. Enhancement of existing wetlands may be used reduce the creation/restoration ratio to a minimum of 2:1.

[a] WSDOT (1993).

Culvert Replacements

Stream Name	Station Location (4-Lane)	Fish Passage Barrier?	4-Lane Alternative: Lineal Feet of Pipe Extension Required	4-Lane Alternative: Proposed Actions[2]	6-Lane Alternative: Lineal Feet of Pipe Extension Required	6-Lane Alternative: Proposed Actions[2]
Fairweather Creek	265+50	Partial[1]	27	Replace or retrofit culvert to be fully fish passable[3]	41	Replace or retrofit culvert to be fully fish passable[3]
Cozy Cove Creek	284+00	Potential[1]	20	Replace or retrofit culvert to be fully fish passable[3]	40	Replace or retrofit culvert to be fully fish passable[3]
Tributary to Yarrow Bay	318+20	Total[1,3]	None	Ameliorate erosion problem at outlet as project mitigation	None	Ameliorate erosion problem at outlet as project mitigation
West Tributary to Yarrow Creek	328+50	No stream is present upstream of SR 520	None	None	None	None
East Tributary to Yarrow Creek	337+50	Total[1,3]	None	Replace or retrofit culvert to be fully fish passable[3] as project mitigation	40	Replace or retrofit culvert to be fully fish passable[3]
Mainstem Yarrow Creek	None	Potential[1]	None, but stormwater discharge site	None (possible project mitigation site)	None, but stormwater discharge site	None (possible project mitigation site)
Mainstem Yarrow Creek	180 feet above PGT northwest ramp	Potential[1]	None	NA (outside alternative alignment)	None	Replace or retrofit culvert to be fully fish passable[3]
Mainstem Yarrow Creek	354+50 (northwest ramp)	Potential[1]	None	NA (outside alternative alignment)	None	Replace or retrofit culvert to be fully fish passable[3] as project mitigation
Mainstem Yarrow Creek	354+50	Partial[1]	None	NA (outside alternative alignment)	25	Replace or retrofit culvert to be fully fish passable[3]
Mainstem Yarrow Creek	360+00 (southeast ramp)	Potential[1]	None	NA (outside alternative alignment)	None	Replace or retrofit culvert to be fully fish passable[3] as project mitigation
Mainstem Yarrow Creek	365+50	Partial[1]	None	NA (outside alternative alignment)	None	Replace or retrofit culvert to be fully fish passable[3] as project mitigation

[1] Classified by WSDOT and WDFW (2003).
[2] Classified based on site reconnaissance.
[3] Culverts will be designed to be fully fish passable according to WDFW (2003).

CMP = Corrugated Metal Pipe
NA = Not Applicable

Vegetation Removal and Shading

Area, Cover Type, and Habitat Type[1]	4-Lane Alternative: Direct Removal	4-Lane Alternative: Shading[2]	4-Lane Alternative: Total	6-Lane Alternative: Direct Removal	6-Lane Alternative: Shading[2]	6-Lane Alternative: Total
Seattle						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	0.68	1.12	**1.80**	0.81	1.12	**1.93**
Shrub/Grass	1.60	1.09	**2.69**	2.89	0.33	**3.22**
Wetland	0.14	1.43	**1.57**	0.13	1.62	**1.75**
Total	**2.42**	**3.64**	**6.06**	**3.83**	**3.07**	**6.90**
Open Water[3]						
Wetland	**0.02**	**3.03**	**3.05**	0.11	4.60	4.71
Urban Matrix						
Deciduous and/or Coniferous Trees	2.5	0.74	**3.24**	3.93	0.82	**4.75**
Shrub/Grass	5.59	0.16	**5.75**	7.35	1.29	**8.64**
Wetland	0.02	0.04	**0.04**	0.02	0.44	**0.46**
Total	**8.11**	**0.94**	**9.05**	**11.30**	**2.55**	**13.85**
Seattle Total	**10.55**	**7.61**	**18.16**	**15.24**	**10.22**	**25.46**
Eastside						
Parks and Other Protected Areas						
Deciduous and/or Coniferous Trees	0.39	0	**0.39**	1.37	0	**1.37**
Shrub/Grass	0.52	0	**0.52**	1.20	0	**1.20**
Wetland	0.01	0	**0.01**	0.04	0	**0.04**
Total	**0.92**	0	**0.92**	**2.61**	0	**2.61**
Urban Matrix						
Deciduous and/or Coniferous Trees	13.45	0.73	**14.18**	17.89	1.26	**19.15**
Shrub/Grass	7.4	0	**7.4**	10.8	0	**10.8**
Wetland	3.04	0	**3.04**	6.3	0	**6.3**
Total	**23.89**	**0.73**	**24.62**	**34.99**	**1.26**	**36.25**
Eastside Total	**24.81**	**0.73**	**25.54**	**37.60**	**1.26**	**38.86**
Grand Total	**35.36**	**8.34**	**43.70**	**52.84**	**11.48**	**64.32**

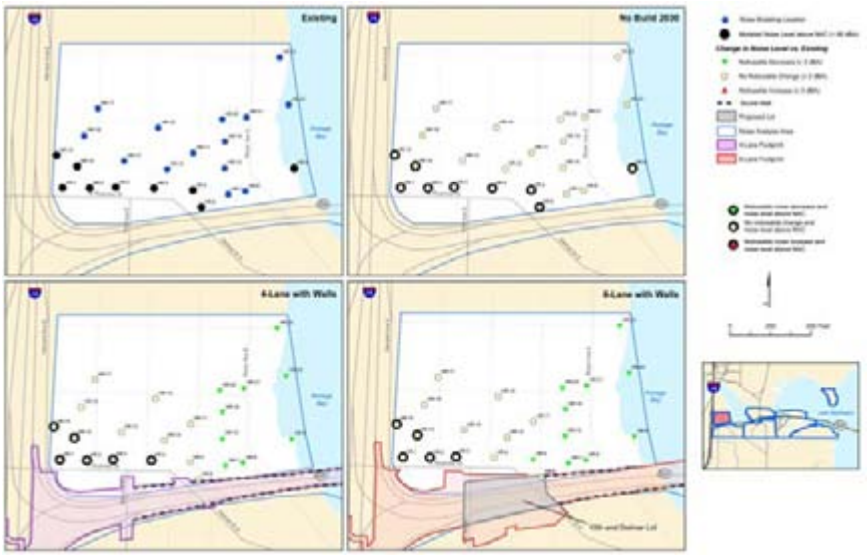
Note: No effects on vegetation would occur under the No Build Alternative. Affected areas were calculated using GPS data gathered in the field, aerial photography, National Wetland Inventory Maps, and local wetland inventories. Affected areas are based on preliminary design information and are subject to change.

[1] The Lake Washington portion of the project area contains only open water habitats lacking wetland vegetation, and therefore effects on vegetation would not occur in these areas.

[2] Within the shaded areas there would be small pockets of vegetation removed at each of the column locations. This is in addition to the vegetation removal areas reported elsewhere in the table.

[3] The Open Water cover type contains wetlands as well as solely open water areas that lack wetland vegetation. Because vegetation removal is not relevant to these nonwetland open water areas, their acreages are not displayed in this exhibit.

Noise Levels in Portage Bay / Roanoke



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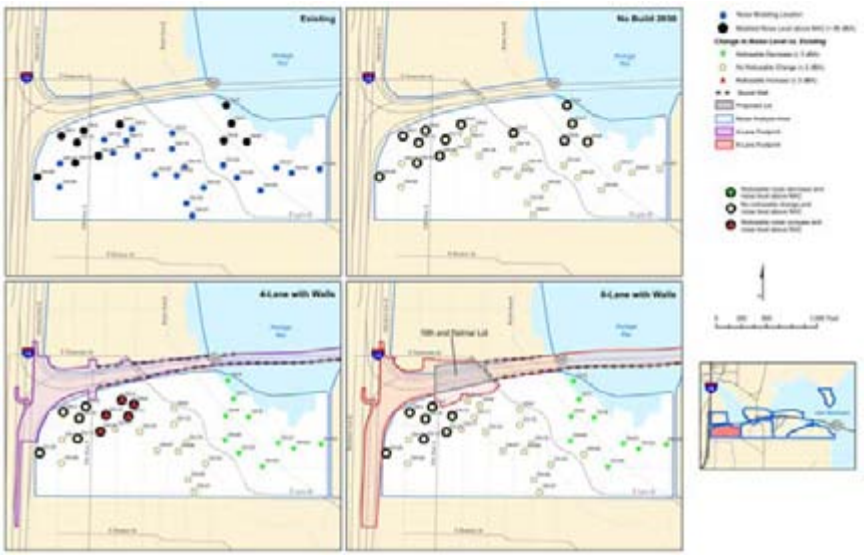
Noise Levels in North Capitol Hill



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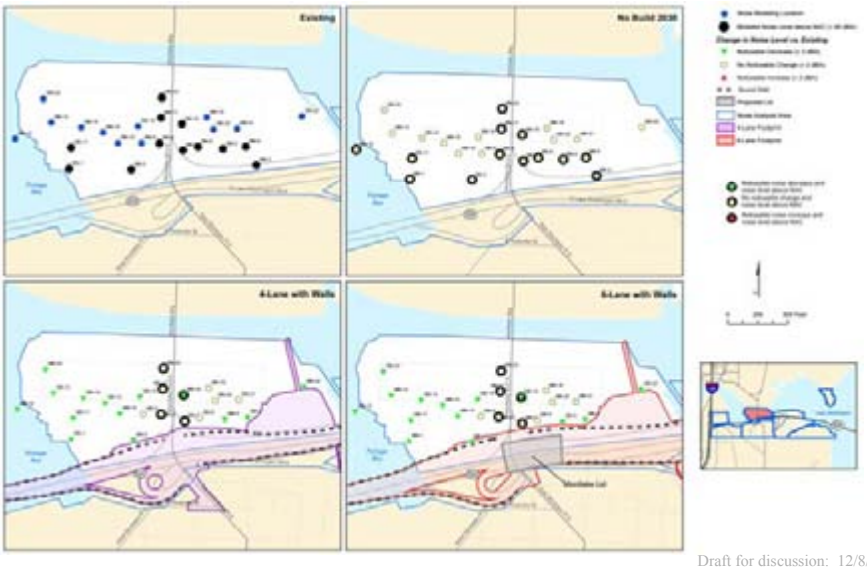
Noise Levels in Montlake North of SR 520



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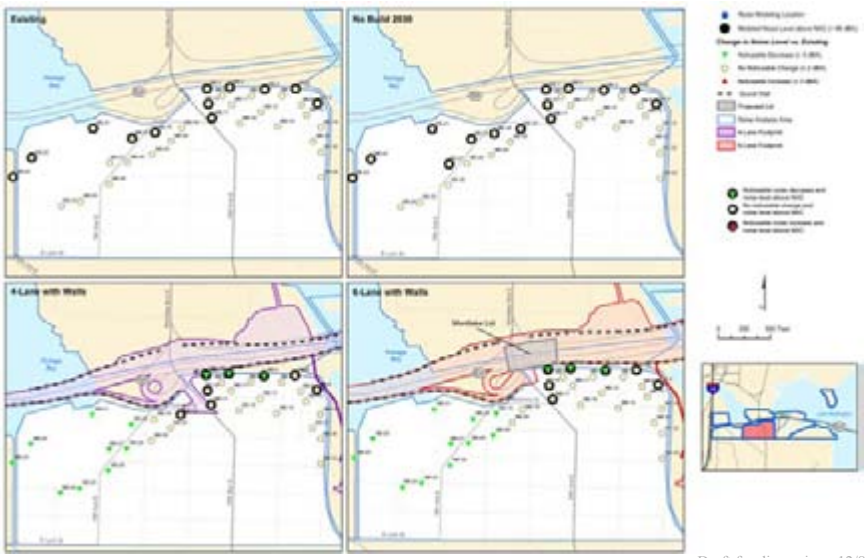
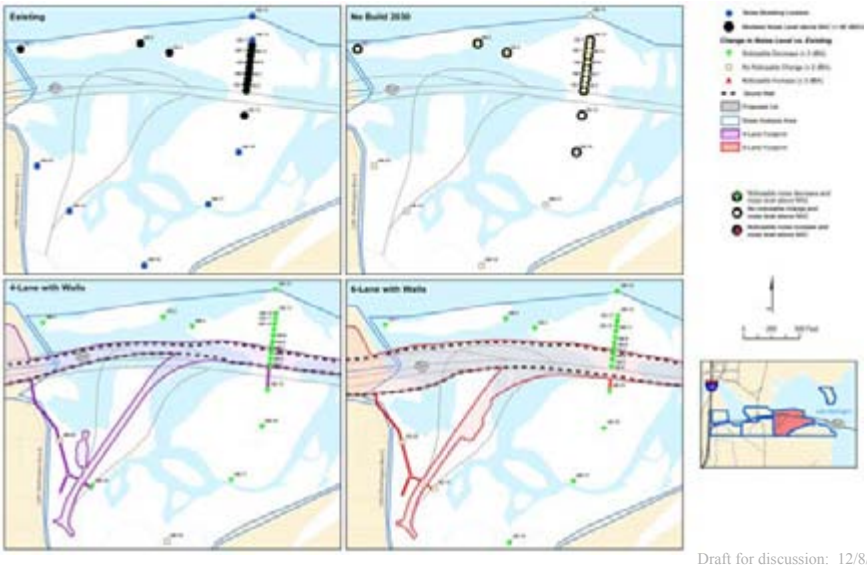
Noise Levels in Montlake South of SR 520



Draft for discussion: 12/8/2004

Noise Levels in Washington Park Arboretum



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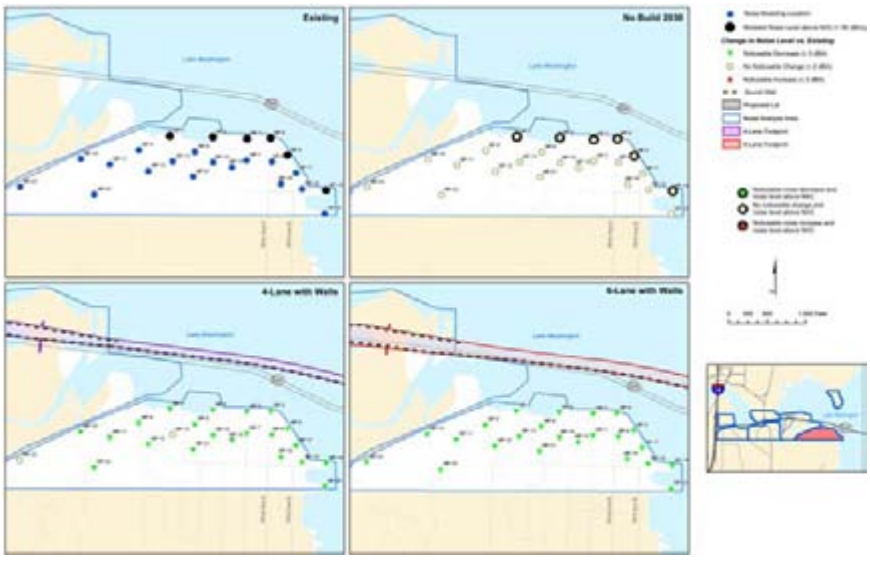
Noise Levels in Madison Park



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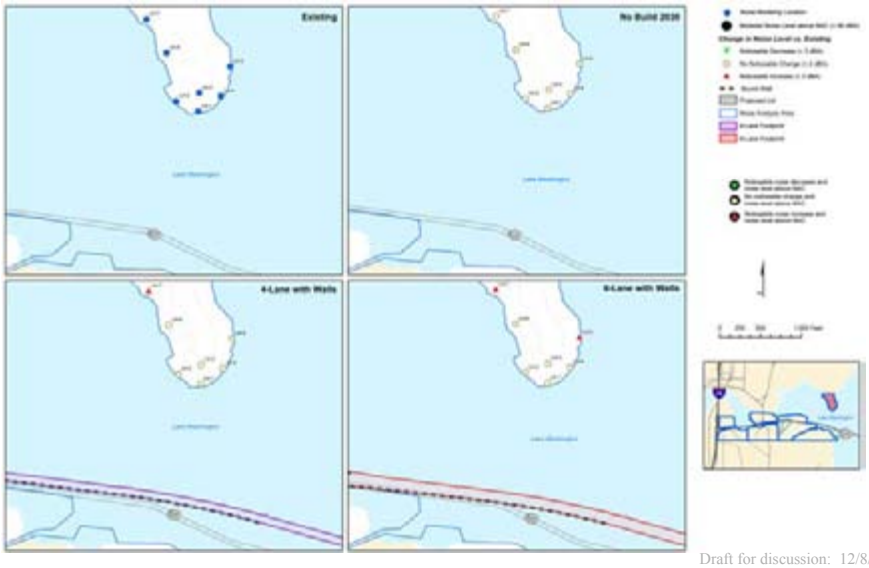
Noise Levels in Laurelhurst



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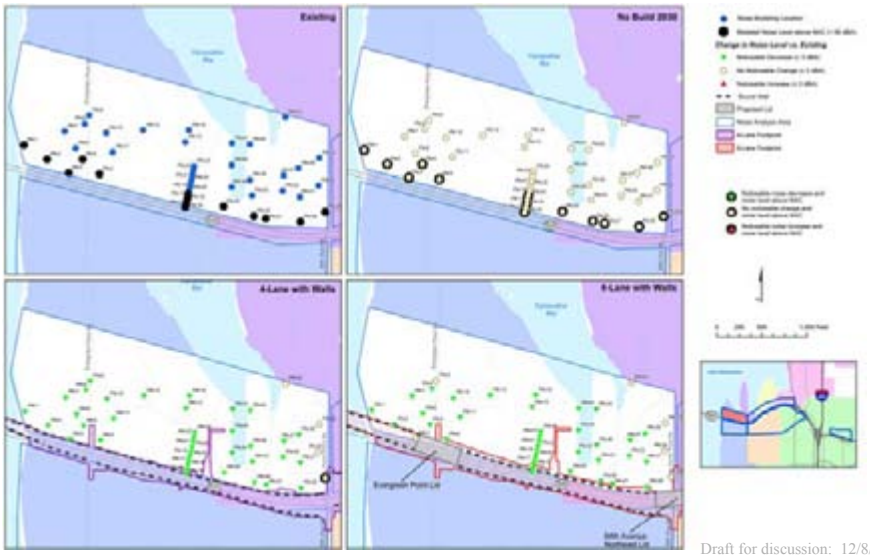
Noise Levels in Medina and Hunts Point North of SR 520



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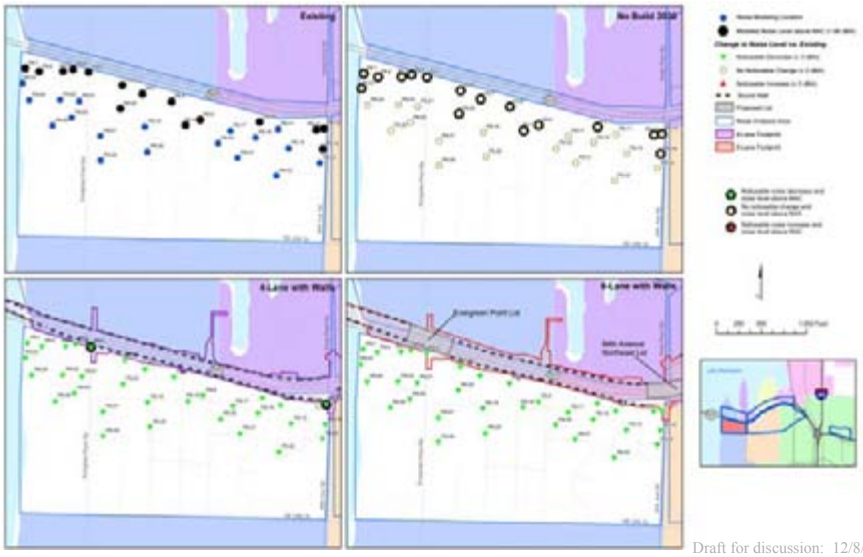
Noise Levels in Medina and Hunts Point South of SR 520



Draft for discussion: 12/8/2004

Noise Levels in Hunts Point, Clyde Hill, Yarrow Point and Kirkland North of SR 520

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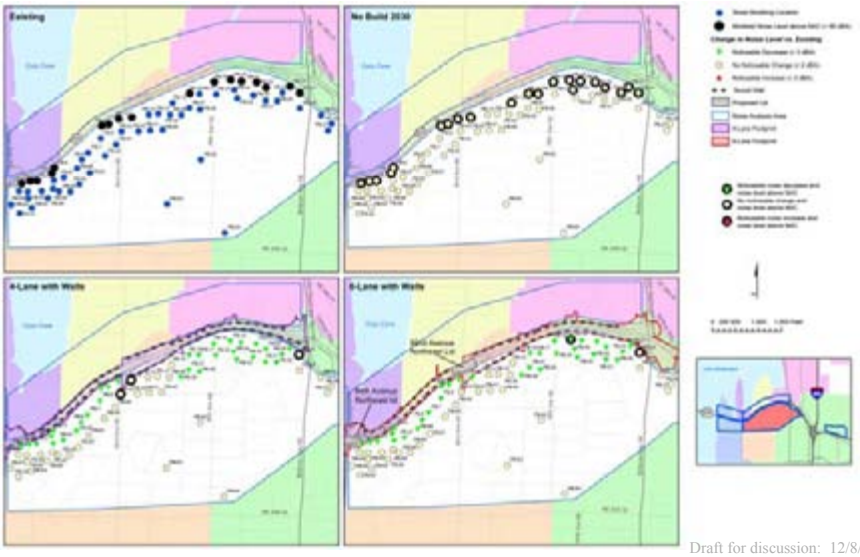
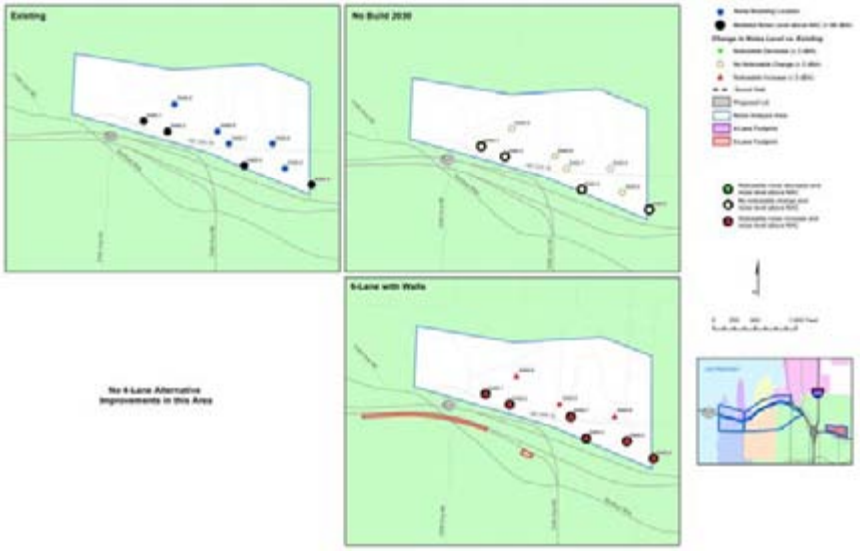
Noise Levels in Hunts Point, Clyde Hill, Yarrow Point and Bellevue South of SR 520



Noise Levels in Bellevue East of I-405



Regional Air Quality

Daily Projected Emissions (tons per day)

Alternative	CO	VOC	NO_x
2030 No Build	1,391	49.4	42.2
2030 4-Lane	1,378	48.9	41.8
2030 6-Lane	1,378	48.9	41.8

Note: Emissions were calculated using the MOBILE6.2 emission factor for 30 mph and the daily VMT from the *Transportation Discipline Report*, which is available in Appendix R of this EIS.

Local Air Quality

Maximum 8-Hour Carbon Monoxide Concentrations (ppm)

Scenario	Mercer/I-5 Ramps	Montlake/Lake Washington Boulevard	108th Avenue North-east/Northup Way
2000 Existing Conditions	15.6	14.1	11.4
2016 – No Build	8.5	8.1	6.0
2016 – 4 Lane	8.3	8.1	6.0
2016 – 6 Lane	8.5	8.0	6.1
2030 – No Build	7.2	7.4	5.2
2030 – 4 Lane	7.2	7.2	5.1
2030 – 6 Lane	7.3	7.2	5.2
CO NAAQS		**9 ppm**	

Effects on Eastside Cultural Resources – 4-Lane Alternative

Draft for discussion: 12/8/2004

Effects on Eastside Cultural Resources – 6-Lane Alternative

Draft for discussion: 12/8/2004


NOAA Northwest Fisheries
Science Center


Museum of History
and Industry

Evergreen Point Bridge

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Historic House in Medina

38

Bellevue Christian School

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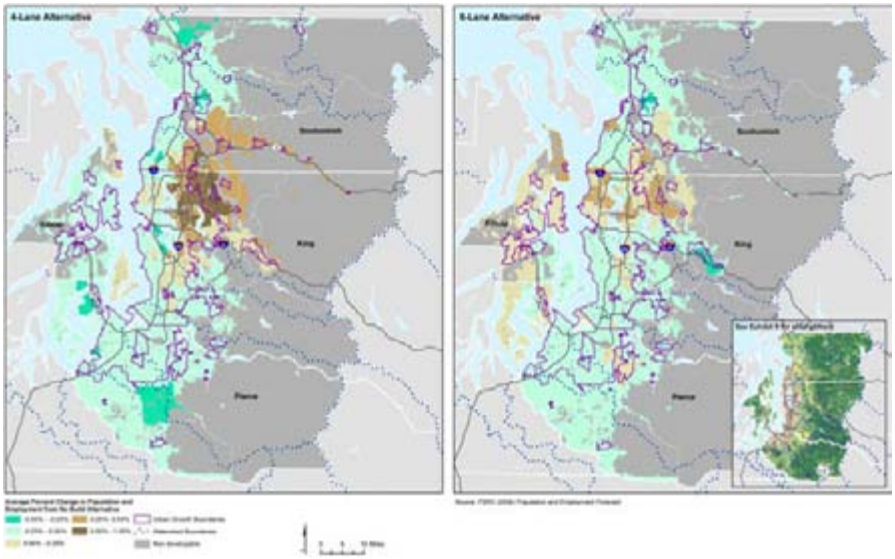
Indirect Effects to Land Use



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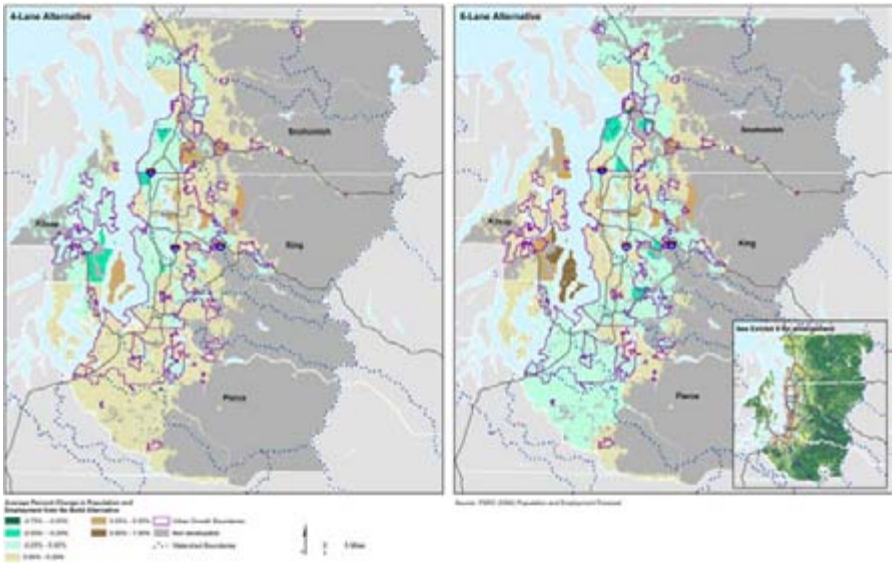
Cumulative Effects to Land Use



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Indirect Effects – Key Findings

- Changes in distribution of population and employment are very small -- increasing at most 1% in some areas and decreasing 0.5% in other areas compared to No Build in 2030
- 4-Lane - growth in less developed areas northeast and east of Lake Washington
- 6-Lane - growth in north Seattle and Kitsap County and western Pierce County
- **Changes are so small that there is no discernable environmental difference between alternatives**

Cumulative Effects – Key Findings

- Changes in distribution of population and employment are very small -- increasing at most 1% in some areas and decreasing 0.75% in other areas compared to No Build in 2030
- 4-Lane - growth in north-south pattern into Snohomish, eastern King County, and Pierce County
- 6-Lane - growth towards center of the four-county region
- **Changes are so small that there is no discernable environmental difference between alternatives**