Appendix F4.9
Impervious Areas and Stormwater Facilities

TABLE F4.9-1
Existing and Proposed Impervious Area for Alternatives

Major Downstream Waterbody	Drainage Basin	Area (acres)	Existing and Proposed Impervious Area (IA) by Indicated Segment and Project Alternative (acres)																																	
			A		B										C										D								E					
			A1		B1		B2-A		B2-E		B3		B7		C1-T		C2-T		C3-T		C4-A		C7-E		C8-E		D2-A		D2-E		D3		D5		E1		E2		E4	
			Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.
Lake Washington	Lk. Washington		17.7	17.7																																
	Mercer Island		10.1	10.1																																
	Beaux Arts	418.7			0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7																						
Mercer Slough	Mercer Slough	1327.0			17.1	22.5	16.1	21.3	10.0	13.5	14.0	17.8	12.1	15.7							0.1	0.1																
	Maydenbauer Ck	927.4			3.7	4.5									5.9	6.3	2.3	2.4	0.7	0.7	2.8	2.8																
	Sturtevant Ck	773.0					0.3	0.5	0.0	0.2	0.3	1.5	0.1	0.1	3.8	4.0	4.1	4.6	1.7	2.5	9.0	11.7	4.2	5.7	4.9	6.8	1.9	2.4	1.9	2.4	2.1	2.6	0.5	0.9						
Kelsey Creek	Kelsey Creek	2822.4											0.5	0.7													2.1	2.4	0.7	0.9	2.1	2.4	0.0	0.2						
	West Tributary	1005.8																									2.4	2.6	2.5	2.6	2.2	2.4	2.0	3.3						
	Goff Creek	674.4																									4.9	5.4	3.7	4.2	4.7	5.2	0.1	0.9						
	Valley Creek	1390.9																									1.1	2.7	0.7	2.3	4.3	4.7	0.3	3.3						
	Sears Creek	577.5																									3.0	3.8	2.9	3.6	12.0	14.4	3.5	4.8						
Sammamish River	W. Lake Sammamish	1180.9																									2.1	7.6	2.1	7.5	2.1	7.7	2.1	7.6	0.5	0.7	0.5	0.7	0.5	0.7
	E. Lake Sammamish	667.1																																	0.3	0.5	0.0	0.0	0.1	0.4
	Westside	1224.7																																	3.3	9.0	2.6	7.6	3.2	8.2
	Marymoor	414.8																																	8.2	4.6	8.8	7.9	7.0	4.2
	City Center	594.4																																	2.3	3.4	3.7	4.2	1.4	2.4
	Bear Creek	2836.0																																	2.4	3.0	2.6	3.5	3.4	4.8
Total		16834.8	27.8	27.8	21.5	27.7	17.1	22.6	10.8	14.5	15.0	20.0	13.4	17.3	9.7	10.2	6.5	7.0	2.4	3.2	11.9	14.6	4.2	5.7	4.9	6.8	17.6	26.8	14.5	23.4	29.6	39.4	8.5	21.0	16.9	21.1	18.1	23.9	15.5	20.8
Total Increase in IA (acres) [3]			**0.0**		6.2		5.5		**3.7**		5.0		3.9		**0.5**		**0.5**		0.7		2.7		1.5		1.9		9.3		**8.9**		9.8		12.5		**4.2**		5.8		5.3	
Total % Increase in IA			0%		29%		32%		35%		33%		29%		6%		8%		31%		23%		35%		38%		53%		62%		33%		148%		25%		32%		34%	

Notes:

Note: In the Total Increase row, **bold** numbers are **minimums** and underlined numbers are maximums.

TABLE F4.9-2

Existing and Proposed Impervious Area for Maintenance Facilities

Drainage Basin	Area (acres)	Existing and Proposed Impervious Area (IA) by Indicated Segment and Project Alternative (acres)																							
		MF1						MF2						MF3						MF5					
		D2		D3		D5		D2		D3		D5		D2		D3		D5		E1		E2		E4	
		Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.	Exist	Prop.
Sturtevant Creek	773.0	2.4	3.5	2.4	3.5	2.4	3.3					0.7	1.1												
Kelsey Creek	2822.4													2.4	0.4	1.6	0.7	1.6	0.4						
West Tributary	1005.8	5.6	8.2	5.6	8.2	6.8	8.5	11.5	11.1	11.5	11.1	15.7	11.6												
Goff Creek	674.4													11.9	10.2	11.9	10.7	11.9	11.0						
Valley Creek	1390.9													0.2	2.2	0.7	1.4	0.4	1.4						
Marymoor	414.8																			11.2	13.5	13.6	15.5	13.1	14.9
Total	21535.8	8.0	11.7	8.0	11.7	9.2	11.7	11.5	11.1	11.5	11.1	16.4	12.7	14.5	12.8	14.1	12.8	13.8	12.8	11.2	13.5	13.6	15.5	13.1	14.9
Total Increase in IA		3.7		3.7		2.6		-0.3		-0.3		-3.7		-1.7		-1.3		-1.0		2.3		1.9		1.8	
Total % Increase in IA		46%		46%		28%		-3%		-3%		-23%		-12%		-9%		-7%		20%		14%		14%	

East Link Project
Stormwater Management for East Link Project

TO: Sound Transit

FROM: Pete Sturtevant/CH2M HILL

DATE: November 5, 2007

This memorandum summarizes the stormwater management proposed within each segment of the East Link Project. The numbers of water quality and detention vaults and the surface areas of detention ponds and constructed stormwater wetlands are summarized in Table 1 for each segment. The size and locations of these facilities will change as more detailed engineering is performed in future project phases.

Segment A

Segment A (see Section 4.9, Exhibit 4.9-1) passes through the Cities of Seattle and Mercer Island and stays within the Washington State Department of Transportation (WSDOT) right-of-way along Interstate 90 (I-90) for the entire length of the segment. An existing highway drainage system serves the entire segment. No detention or water quality treatment facilities would be required for this segment because the project would create little or no new or reconstructed pavement areas.

Segment B

Segment B (see Exhibit 4.9-2) falls within the City of Bellevue. The City of Bellevue has a fully separated stormwater system that drains to local streams, Mercer Slough, or Lake Washington. The runoff from large portions of Segment B alternatives could be routed directly to Mercer Slough, a detention-exempt water body, and would therefore require no detention. This is particularly true for Alternative B7, which would only require a single detention vault. Conversely, Alternative B1 is isolated from Mercer Slough and this alternative would require seven vaults. Detention would be required for the northern portion of Segment B, however.

Segment C

Segment C (Exhibit 4.9-3) also falls within the City of Bellevue. Most of this segment lies within the Sturtevant Creek Basin that drains much of downtown Bellevue and would require stormwater detention. Portions of the western alternatives (Bellevue Way Tunnel Alternative (C1T), 106th NE Tunnel Alternative (C2T), 108th NE Tunnel Alternative (C3T), and the west leg of the Couplet Alternative (C4A)) lie within the downtown Bellevue stormwater service area. Runoff collected in this service area is conveyed directly to Lake Washington (a water body exempt from detention requirements) and would therefore not require detention. Runoff from pollution-generating impervious surfaces (PGISs) would be treated prior to discharge to this system.

This is the only segment with tunnel alternatives. The portions of the tunnel alternatives that do not disturb the overlying surface or that would be constructed with a landscaped surface cover would not require stormwater facilities. Alternative C1T would require In general, the tunnel and the elevated alternatives would require fewer detention vaults than the at-grade alternative. However, Alternative C1T has a substantial portion of its route at-grade and would therefore require a similar number of stormwater facilities as the at-grade alternative, C4A.

Segment D

Segment D (see Exhibit 4.9-4) passes through the cities of Bellevue and Redmond. The area drains to several small tributaries to Kelsey Creek: West Tributary Kelsey Creek, Goff Creek, and Sears Creek. There would be considerably more detention and water quality treatment facilities in this segment compared to the other

segments because there are no detention-exempt receiving waters. Alternatives D2A and D3 would require the largest number of detention vaults in this segment.

A portion of the elevated route of the State Route (SR) 520 Alternative (D5) runs along an open, vegetated area paralleling the south side of SR 520. This situation provides the opportunity for route runoff to be dispersed beneath the guideway, eliminating the need for stormwater facilities. A similar stretch of elevated rail using this dispersal technique has been recently constructed for the Central Link in Tukwila.

Segment E

Segment E (see Exhibit 4.9-5) lies within the City of Redmond. This segment would require the fewest stormwater facilities of any segment except Segment A. Nearly all of the runoff from the southern portion of Segment E would be routed directly to the Sammamish River (a water body exempt from detention requirements) and would therefore not require detention. Project runoff within downtown Redmond lies within the city's downtown stormwater service area which also conveys collected stormwater directly to the Sammamish River. Stormwater treatment, prior to river discharge, is also provided within this stormwater service area. Therefore the portions of the project that lie within the downtown stormwater service area would not be required to provide either detention or treatment.

A portion of the Marymoor Alternative (E2) is proposed to be constructed along the south shoulder of SR 520. Plans for expansion of this highway call for conversion of this shoulder to an ecology embankment that would be used to infiltrate and treat highway runoff. The highway expansion would likely be completed before the East Link Project and would reduce the area available for the construction of Alternative E2. To accommodate the requirements of the highway, if E2 is selected, Sound Transit proposes to reconstruct the highway shoulder to a more compact median application of the Ecology embankment that would provide the required treatment of highway runoff using less land area. An underdrain would be installed to collect infiltrated highway runoff.

In the eastern portion of Segment E, a park-and-ride lot and a maintenance facility are proposed. This area has permeable soils, and onsite infiltration of runoff may be employed. This area lies within the Redmond Wellhead Protection Area, and infiltration of stormwater would require special measures so that groundwater quality would be not affected.

TABLE 1
Number of Vaults and Wetland/Pond Surface Area

Segments	Alternatives	Small[1] Detention and Water Quality Vaults (Quantity)	Medium[2] Detention and Water Qualtity Vaults (Quantity)	Large[3] Detention and Water Quality Vaults (Quantity)	Constructed Wetland Water Surface Area (acre-ft)	Detention Pond Water Surface (acre-ft)
Segment A	N/A	N/A	N/A	N/A	N/A	N/A
Segment B	B1	3	3	1	0	10
	B2A	1	1	2	0	10
	B2E	0	1	1	0	10
	B3	2	1	1	0	0
	B7	0	1	1	0	0
Segment C	C1T	3	4	0	0	0
	C2T-B2A	2	3	0	0	0
	C2T-B2E	4	2	1	0	0
	C2T-B3	4	2	1	0	0
	C2T-B7	4	2	1	0	0
	C3T-B2A	3	2	0	0	0
	C3T-B2E	4	2	0	0	0
	C3T-B3	5	1	0	0	0
	C3T-B7	3	2	0	0	0
	C4A-B2A	8	2	1	0	0
	C4A-B2E	8	2	0	0	0
	C4A-B3	8	3	0	0	0
	C4A-B7	8	3	0	0	0
	C7E-B2A	1	3	1	0	0
	C7E-B2E	1	3	0	0	0
	C7E-B3	1	3	0	0	0
	C7E-B7	1	3	0	0	0
	C8E-B2A	2	2	2	0	0
	C8E-B2E	2	2	1	0	0
	C8E-B3	2	1	2	0	0
	C8E-B7	2	1	2	0	0
Segment D	D2A 12TH	1	6	5	2.44	8.3
	D2A BNSF	1	6	5	2.44	8.3
	D2E 12TH	1	4	4	2.44	8.3
	D2E BNSF	1	4	4	2.44	8.3
	D3 12TH	0	4	12	2.44	8.3
	D3 BNSF	0	4	12	2.44	8.7
	D5 12TH	0	1	5	2.44	8.7
	D5 BNSF	0	1	5	2.44	8.7
Segment E	E1	0	0	0	5.3	6.7
	E2	2	0	0	5.2	6.7
	E4	0	0	0	5.1	6.7

NOTES:

1. A “small” vault has a storage capacity less than 0.6 acre-ft.

2. A “medium” vault has a storage capacity between 0.6 and 1.4 acre-ft

3. A “large” vault has a storage capacity greater than 1.4 acre-ft.