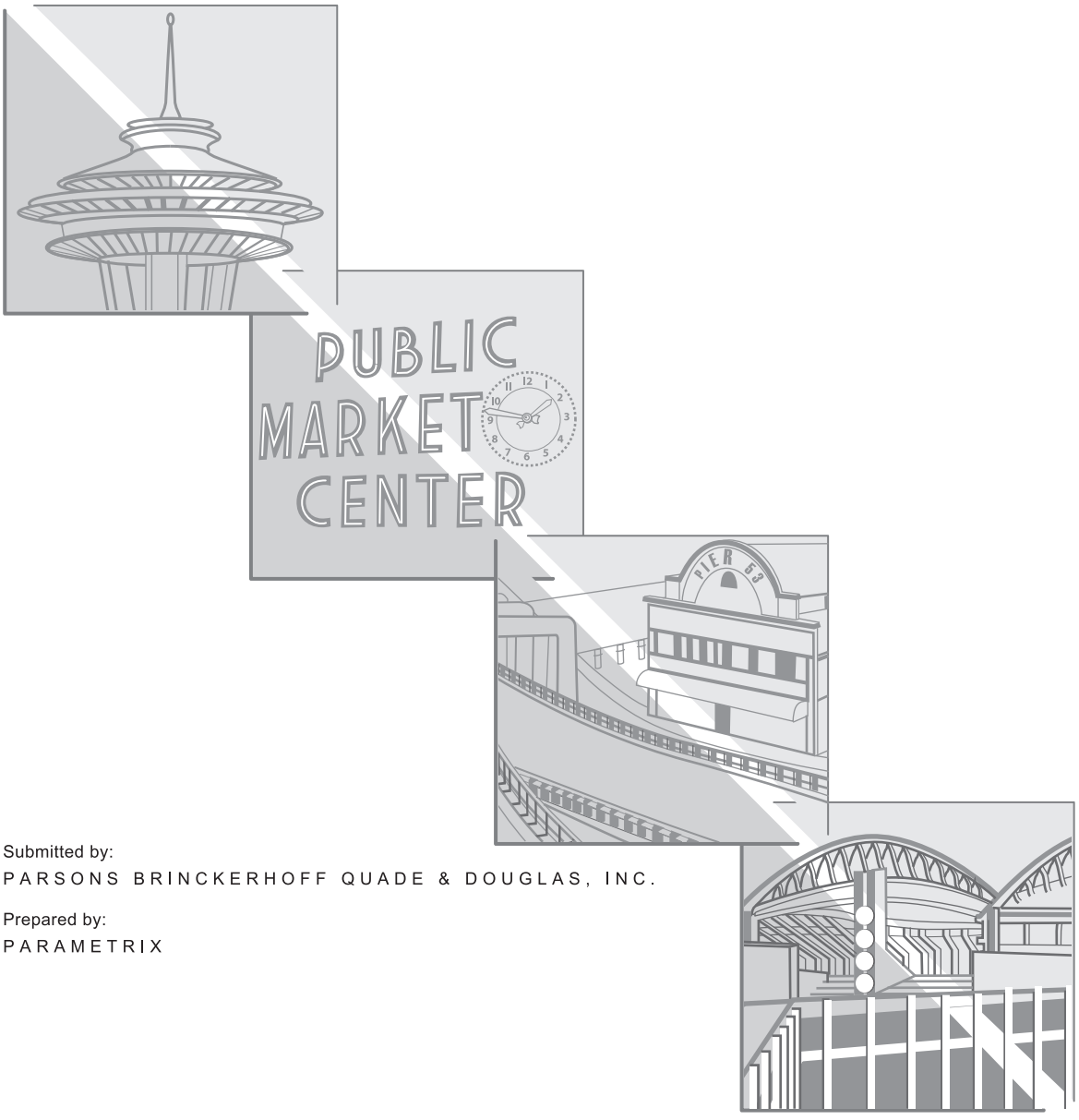
SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

Supplemental Draft Environmental Impact Statement

APPENDIX S

Water Resources Discipline Report



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U.S. Department of Transportation
Federal Highway Administration

Washington State
Department of Transportation

City of
Seattle

SR 99: ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

Supplemental Draft EIS
Water Resources Discipline Report

AGREEMENT NO. Y-7888

FHWA-WA-EIS-04-01-DS

Submitted to:

Washington State Department of Transportation
Alaskan Way Viaduct and Seawall Replacement Project Office
999 Third Avenue, Suite 2424
Seattle, WA 98104

The SR 99: Alaskan Way Viaduct & Seawall Replacement Project is a joint effort between the Washington State Department of Transportation (WSDOT), the City of Seattle, and the Federal Highway Administration (FHWA). To conduct this project, WSDOT contracted with:

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In association with:
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LIST OF EXHIBITS

ACRONYMS AND ABBREVIATIONS

AWV	Alaskan Way Viaduct
BMP	best management practice
City	City of Seattle
CSO	combined sewer outfall
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
NPDES	National Pollutant Discharge Elimination System
SPU	Seattle Public Utilities
SR	State Route
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

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PREFACE

The technical appendices present the detailed analyses of existing conditions and predicted effects of each alternative. The results of these analyses are summarized and presented in the main text of the Supplemental Draft Environmental Impact Statement (EIS).

The Supplemental Draft EIS appendices are intended to add new information and updated analyses to those provided in the Draft EIS, published in March 2004. Information that has not changed since then is not repeated in these appendices. Therefore, to get a complete understanding of the project area conditions and projected effects, you may wish to refer to the appendices that were published with the Draft EIS. These are included on a CD in the Supplemental Draft EIS. To make it easier to understand where there is new information or analyses, the supplemental appendices present information in the same order as it was presented in the Draft EIS appendices.

The Supplemental Draft EIS and the technical appendices evaluate the effects of three construction plans: the shorter plan, the intermediate plan, and the longer plan. These plans vary in how long SR 99 would be completely closed, in how long the periodic closures may be, and in the total construction duration. For the purposes of the analyses in the technical appendices, two construction plans are evaluated with the Tunnel Alternative and one plan is evaluated with the Elevated Structure Alternative. However, each alternative could be built with any of the three plans. The construction durations and the sequencing would not be the same for a particular construction plan if paired with a different alternative; however, the effects would be within the ranges presented by the analyses.

There are several differences in how the information is presented between the main text of the Supplemental Draft EIS and how it is presented in these appendices. The Supplemental Draft EIS text refers to possible variations within the alternatives as "choices" while these appendices use the term "options." (For example, Reconfigured Whatcom Railyard versus Relocated Whatcom Railyard is referred to as a design choice in the Supplemental Draft EIS and as an option in the appendices.) In either case, the intent is to describe the various configurations that could be selected and the effects for each design.

One design choice in particular is handled very differently between the Supplemental Draft EIS text and the technical appendices. For the Tunnel Alternative in the central waterfront area, there is a choice between a stacked tunnel alignment and a side-by-side tunnel alignment. In the appendices, to simplify the discussion, these two alignments, as well as the Elevated

Structure Alternative, are each paired with a different set of options throughout the corridor and presented as complete sets that are evaluated separately. The Supplemental Draft EIS text communicates this information differently by describing one Tunnel Alternative and one Elevated Structure Alternative and evaluating the effects of the different design choices (or mix-and-match components) separately. While it may appear that there are three alternatives analyzed in the appendices and two in the Supplemental Draft EIS text, there are in fact only two alternatives. Each alternative has many potential components or design choices that can be made throughout the corridor.

The organization of the analysis of the alternatives is also a little different between the main body of the Supplemental Draft EIS and the appendices. In the Supplemental Draft EIS text, we identify two alternatives: a Tunnel Alternative and an Elevated Structure Alternative. The Supplemental Draft EIS text compares these alternatives directly by comparing effects (for example, the effects of both alternatives on water quality are presented together). The appendices present the effects of each alternative separately (for example, all of the effects of the Tunnel Alternative are presented first, followed by all of the effects of the Elevated Structure Alternative). The substance of both discussions is the same. The organization of the Supplemental Draft EIS technical appendices mirrors that of the Draft EIS appendices, allowing you to more easily find comparable information in the Draft EIS appendices.

Chapter 1 SUMMARY

The March 2004 Alaskan Way Viaduct and Seawall Replacement Project Draft Environmental Impact Statement (EIS) (WSDOT et al. 2004) evaluated five Build Alternatives and a No Build Alternative. In December 2004, the lead agencies narrowed the five alternatives down to two—Tunnel and Rebuild. The project proponents identified the Tunnel Alternative as the Preferred Alternative and carried the Rebuild Alternative forward for analysis as well. Since that time, engineering and design has been updated and refined for the Tunnel and Rebuild Alternatives. Due to the magnitude of the changes in the design of the Rebuild Alternative, it has been renamed the Elevated Structure Alternative. This document evaluates the changes to these alternatives for water resources. The key changes are summarized in the following sections.

The Affected Environment chapter has been updated to address the following information:

- The updated Washington State Department of Ecology (Ecology) 2002/2004 303(d) List was published after publication of the Draft EIS.
- The project area extends farther north than discussed in the Draft EIS; the existing sub-basins were expanded and a new sub-basin was added to cover the new project areas north of the Battery Street Tunnel.
- City of Seattle (City) estimated combined sewer outfall (CSO) discharge information was also published after the Draft EIS was issued (Seattle 2005a).

The updated Tunnel (Preferred) and Elevated Structure Alternatives differ slightly in their alignments and options when compared to those presented in the Draft EIS. Some options previously being considered are no longer included in the updated alternatives, and new options have been developed. The 2006 Supplemental Draft EIS Appendix B, Alternatives Description and Construction Methods Technical Memorandum, provides detailed information about the project alternatives.

In the south, two options are being considered for both the Tunnel and Elevated Structure Alternatives where State Route (SR) 99 crosses the Whatcom Railyard's lead track:

- The Reconfigured Whatcom Railyard Option (part of the preferred alignment) would retain the existing SR 99 in its current alignment between the Burlington Northern Santa Fe Railway Company (BNSF) Seattle International Gateway (SIG) Railyard on the east and the

Whatcom Railyard to the west. A short bridge would carry SR 99 over the new tail track and connection between the railyards.

- The Relocated Whatcom Railyard Option would place SR 99 at-grade adjacent to E. Marginal Way and relocate the tracks to the east.

The updated Tunnel Alternative has two potential tunnel alignments:

- The stacked tunnel alignment (the preferred alignment)
- The side-by-side tunnel alignment

In the central section, two options are being considered for the Tunnel Alternative at Elliott and Western Avenues:

- SR 99 would pass Under Elliott and Western Avenues (part of the preferred alignment), which would include the construction of a large cut on the slope below the existing viaduct.
- SR 99 would extend Over Elliott and Western Avenues.

The Alaskan Way Viaduct (AWV) project team combined elements of the Aerial and Rebuild Alternatives evaluated in the Draft EIS into the new Elevated Structure Alternative described and evaluated in the Supplemental Draft EIS and this report. In the central section, the Elevated Structure Alternative would be wider than the Rebuild Alternative evaluated in the Draft EIS, but not quite as wide as the Aerial Alternative. The Elevated Structure Alternative does not include the option to go under Elliott and Western Avenues.

The alternatives in the Draft EIS only considered a fire/life safety upgrade of the Battery Street Tunnel. The updated Tunnel and Elevated Structure Alternatives include lowering the roadway to provide 16.5 feet of vertical clearance throughout the Battery Street Tunnel. The Tunnel Alternative also includes an option to widen the curves at the north and south portals of the Battery Street Tunnel.

The revised project alignment now includes an extension of the northern limit of the project. The north area of the project now extends to about Comstock Street, about 0.8 mile north of the Battery Street Tunnel. With the Partially Lowered Aurora Option (part of the preferred alignment, but also paired with the Elevated Structure Alternative), Aurora Avenue N. would be lowered between the north portal of the Battery Street Tunnel to about Republican Street, with roadway improvements and widening up to Aloha Street. Thomas and Harrison Streets would be reconnected with bridges crossing over Aurora Avenue N., while Mercer Street would cross under Aurora Avenue N.

The Lowered Aurora Option was included in the Draft EIS Aerial Alternative. This option has been revised to further widen SR 99 and extend improvements

almost to Comstock Street. SR 99 would be lowered below grade with retaining walls on either side, allowing Thomas, Harrison, Republican, and Roy Streets to pass at grade over SR 99. Mercer Street would be widened more than was considered in the Draft EIS and would cross over SR 99 on a new bridge.

Two construction plans are evaluated for the Tunnel Alternative:

- The intermediate plan would close SR 99 to north-south traffic for no less than 18 months and up to 27 months (or longer). The intermediate plan assumes periods where either the northbound or southbound lanes would be closed. For the stacked tunnel alignment, the overall construction duration for the intermediate plan would be 8.75 years. The side-by-side tunnel alignment's approximate construction duration would be 8 years.
- The shorter plan would fully close SR 99 to north-south traffic for a minimum of 42 months (3.5 years). In the shorter plan, the majority of construction work would occur with the corridor closed, with the exception of the initial utility relocations. The duration of construction with the shorter plan would be approximately 7 years for either tunnel alignment.

Only one construction plan is being evaluated for the Elevated Structure Alternative:

- The longer plan would keep two lanes on SR 99 open in each direction except when SR 99 would be closed to all traffic for 3 months. The construction would last approximately 10 years.

Impacts under the updated Tunnel and Elevated Structure Alternatives are similar to those discussed under the Tunnel and Aerial Alternatives in the Draft EIS and the 2004 Draft EIS Appendix S, Water Resources Discipline Report.

Construction along the seawall and portions of the tunnel in the vicinity of Colman Dock may require installation of sheet pile to minimize impacts during construction. However, there will likely be temporary localized impacts to water quality, such as increased turbidity, during sheet pile installation and riprap removal. Construction closures for differing durations do not significantly change potential temporary impacts to water resources.

No new or revised operational mitigation is proposed. However, additional construction mitigation may include treating water from dewatered sediments and materials excavated during construction of the Partially Lowered Aurora or Lowered Aurora Options north of the Battery Street Tunnel.

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Chapter 2 METHODOLOGY

Please refer to Chapter 2 of the 2004 Draft EIS Appendix S, Water Resources Discipline Report, for methodology. There have been no changes in the methodology used for this Supplemental Draft EIS discipline report. Information characterizing the affected environment has been updated using studies and reports completed since the publication of the Draft EIS (March 2004). In addition, the updated Tunnel (Preferred) and Elevated Structure Alternatives have been evaluated using the same methods.

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Chapter 3 STUDIES AND COORDINATION

There has been ongoing coordination through meetings and presentations with the decision-making agencies and other interested groups. These meetings will continue as the project progresses. Washington State Department of Transportation (WSDOT) is working closely with Seattle Public Utilities (SPU) to find a stormwater management scenario that is acceptable to both agencies.

In August 2005, SPU produced a technical planning study, "Drainage and Wastewater Feasibility Study for the Alaskan Way Viaduct/Seawall Final Report" (Seattle 2005b). The study considered permanent replacements of the combined sewer and stormwater utilities along the Seattle waterfront, between S. Royal Brougham Way and Bay Street. The feasibility study included a planning level hydraulic analysis of the combined sewer system that tied the project area (approximately 90 acres) to the upstream area tributary to the major sewer interceptor (approximately 2,000 acres). The study identified that additional untreated combined sewer outfall (CSO) discharges were potentially occurring along the waterfront. The study recommended a combined sewer system treatment facility and associated conveyance and detention as the best apparent alternative.

These long-term plans are being considered as project design progresses to ensure that the project retains options for the future. However, it should be noted that full implementation of these long-term plans is independent of the AWV Project.

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Chapter 4 AFFECTED ENVIRONMENT

There have been no substantive changes to the Affected Environment chapter of the 2004 Draft EIS Appendix S, Water Resources Discipline Report, except as described in the following sections.

4.1 Updated 303(d) List

The Washington State Department of Ecology (Ecology) published the 2002/2004 303(d) List of Threatened and Impaired Waterbodies (Ecology 2005a). The characterization of the project receiving waters presented in the 2004 Draft EIS Appendix S, Water Resources Discipline Report, has been updated based on this new information (Exhibits 4-1 and 4-2).

Exhibit 4-1. 2002/2004 303(d) List for Project Receiving Waters

Waterbody	303(d) Listed Parameter[1]	
	1998	2002/2004
Duwamish River	None	None
Elliott Bay	Fecal coliform	Fecal coliform
Lake Union	None	Aldrin, fecal coliform, lead

[1] Does not include sediment listings.

Exhibit 4-2. 2004 303(d) Sediment List for Project Receiving Waters

Waterbody	2004 303(d) Listed Parameter (Sediments)
Duwamish River[1]	4-Methylphenol; Total PCBs
Elliott Bay[2]	N-nitrosodiphenylamine; 1,4-Dichlorobenzene; Hexachlorobenzene; Total PCBs; Butylbenzyl phthalate; Hexachlorobutadience; 1,2,4-Trichlorobenzene; Phenol; N-nitrosodiphenulamine; Fluoranthene
Lake Union	Sediment bioassay

[1] Location is at the very south end of the project near the Duwamish Head (24N-04E-18).

[2] Location is at the mouth of the Duwamish River (Grid 47122FJ4).

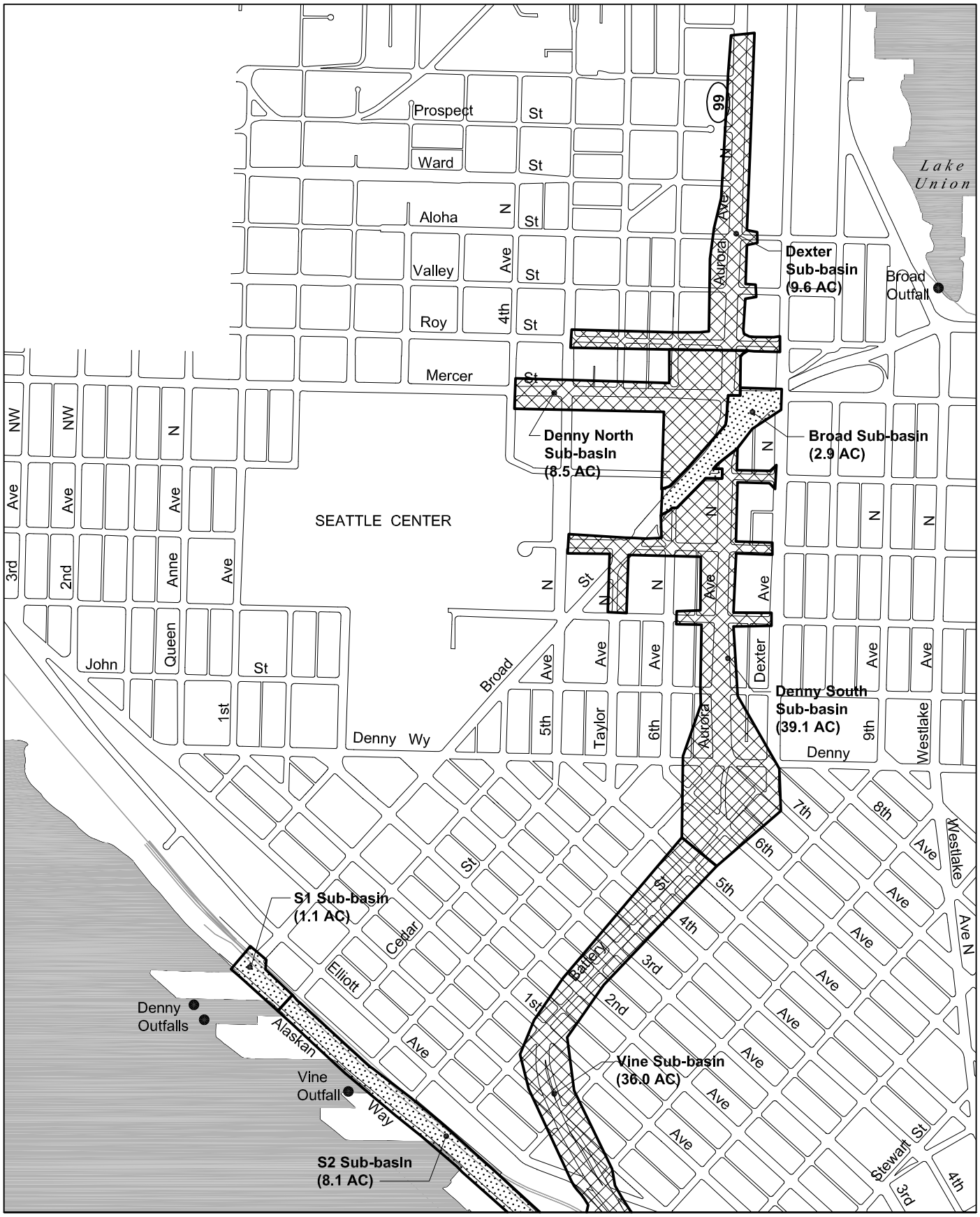
In addition, Ecology has updated the designated uses to be protected for each waterbody. Ecology has designated the following uses for protection in the Duwamish River: salmon and trout rearing, secondary contact recreational uses, water supply (industrial and agricultural), stock watering, wildlife habitat, sport fishing, boating, aesthetic enjoyment, and commerce and navigation (WAC 173-201A, Ecology 2005a). Ecology has designated Elliott Bay as an excellent marine waterbody that should be protected for the

following uses: salmonid and other fish migration, rearing, and spawning, shellfish rearing and spawning, shellfish harvesting, primary contact recreation, wildlife habitat, harvesting, commerce and navigation, boating, and aesthetic values (WAC 173-201A, Ecology 2005b). Ecology has designated the following uses for protection in Lake Union: core salmon and trout spawning, core rearing and migration, excellent primary contact recreational uses, water supply (domestic, industrial, and agricultural), stock watering, wildlife habitat, harvesting, boating, aesthetic enjoyment, and commerce and navigation (WAC 173-201A, Ecology 2005b).

4.2 Revised Sub-basin Boundaries

The project area extends farther north than discussed in the Draft EIS. As a result, the sub-basins described in Chapter 3 of the 2004 Draft EIS Appendix S, Water Resources Discipline Report, have been expanded (Exhibit 4-3), and the sub-basins are larger than previously discussed.

North of the Broad Sub-basin, the new project area is located in the Dexter Sub-basin. This sub-basin was not identified in the 2004 Draft EIS Appendix S. Under existing conditions, stormwater runoff is collected in combined sewer pipes and conveyed north along Lake Union and then west to King County's West Point Treatment Plant (see Exhibit 4-3). During overflow conditions, the Dexter Sub-basin discharges to Lake Union.



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SCALE IN FEET

N

Drains to Storm Sewer or Directly to Receiving Water

Drains to Combined Sewer Systems

Sub-Basin Boundary

Major Outfall

Exhibit 4-3
Sub-basins North of Battery Street Tunnel

4.3 Updated Combined Sewer Overflow Information

The 2004 Draft EIS Appendix S, Water Resources Discipline Report, did not identify combined sewer overflows at the existing City-owned drainage system outfalls to Elliott Bay at Vine Street, University Street, and Madison Street. Seattle has reported overflows at all three outfall locations, and at the Washington Street outfall, during 2003 and 2004 (Exhibit 4-4) (Seattle 2003, 2005a).

Exhibit 4-4. Summary of Updated CSO Discharge Information

	Washington Outfall		Madison Outfall		University Outfall		Vine Outfall	
Study Period	Frequency (events/yr)	Volume (MG/yr)	Frequency (events/yr)	Volume (MG/yr)	Frequency (events/yr)	Volume (MG/yr)	Frequency (events/yr)	Volume (MG/yr)
2003	9	4.5	0	0	9	16.1	11	12.6
2004	6	40.5	2	0.8	7	16.8	5	52.0

MG/yr = million gallons per year.
Source: Seattle 2003, 2005a.

The remainder of CSOs discharging to Elliott Bay within the project area are owned and operated by King County. The information about these CSOs provided in Chapter 3 of the 2004 Draft EIS Appendix S has not changed.

Chapter 5 OPERATIONAL IMPACTS AND BENEFITS

There have been no substantive changes to the operational impacts and benefits described in the 2004 Draft EIS Appendix S, Water Resources Discipline Report. Please refer to Chapter 5 of the 2004 Draft EIS Appendix S for discussion of the project's operational impacts and benefits. Minor changes in operational impacts and benefits are described in the following sections.

In the 2004 Draft EIS Appendix S, potential operational impacts and benefits to water quality were characterized based on the results of a pollutant loading analysis. This analysis assumed that impervious surfaces replaced or created by the project would be treated with best management practices (BMPs). The quality of stormwater runoff from the project area would improve and overall pollutant loading to the receiving waters would decrease. Therefore, the area of impervious surface is directly related to the reduction in pollutant loading. Because the project impervious surface areas for the Tunnel (Preferred) and Elevated Structure Alternatives presented in this analysis are similar to those presented in the Draft EIS, the pollutant loading analysis was not redone. Instead, the impervious area for each alternative was used to estimate the benefit of each alternative relative to the benefits discussed in Chapter 5 of the 2004 Draft EIS Appendix S.

The convey and treat approach to stormwater management, which was included with the Bypass Tunnel and Surface Alternatives in the Draft EIS, is not included in this Supplemental Draft EIS but remains viable. For information on the convey and treat approach, see Chapter 4 of the 2004 Draft EIS Appendix S.

5.1 Tunnel Alternative (Preferred Alternative)

5.1.1 South – S. Spokane Street to S. Dearborn Street

The southern portion of this alternative is located in the Lander and Royal Brougham Sub-basins. This alternative would replace approximately 25.4 acres of impervious surface (Exhibit 5-1), which is approximately the same as in the 2004 Draft EIS Appendix S, Water Resources Discipline Report.

Under the BMP approach, stormwater in this area would be treated with BMPs and would improve the quality of stormwater discharged to the Duwamish River and Elliott Bay as compared to existing conditions. This would be a similar improvement in water quality compared to what was discussed under the Tunnel Alternative in Section 5.4 of the 2004 Draft EIS

Appendix S because a similar area of pavement would be retrofitted with BMPs.

Exhibit 5-1. Summary of Project Area Impervious Surfaces in the South Project Area (acres)

Sub-Basin	Type	Draft EIS Alternative		Updated Alternative		
		Rebuild	Tunnel	Elevated Structure[1]	Stacked Tunnel[1]	Side-by-Side Tunnel[2]
Lander	Diversion Structure[3]	7.5	7.5	1.0	1.0	12.8
Royal Brougham-South	Diversion Structure[3]	13.0	13.0	14.9	14.9	16.9
Royal Brougham - North	Diversion Structure[3]	6.7	6.7	9.0	9.5	9.5
Total		**27.2**	**27.2**	**24.9**	**25.4**	**39.2**

Note: Exhibit B-2 in the 2004 Appendix S summarized all of the areas (acres) of impervious surface by sub-basin for the Draft EIS Alternatives.

[1] Reconfigured Whatcom Railyard

[2] Relocated Whatcom Railyard

[3] Low-flow diversion structures are structures constructed within the drainage system that divert a volume of runoff equivalent to the first flush to the combined sewer system and divert the remaining volume to an outfall for direct discharge to Elliott Bay.

5.1.2 Central – S. Dearborn Street to Battery Street Tunnel and North Waterfront – Pine Street to Broad Street

The central and north waterfront portions of this alternative are located in the King, Madison, Pine, S1, S2, S3, S4, S5, Seneca, T-46, University, Vine, Pike, and Washington Sub-basins. The preferred stacked tunnel alignment would replace approximately 34.4 acres and the optional side-by-side tunnel alignment would replace about 41.2 acres of impervious surface in the central and north waterfront project areas (Exhibit 5-2). The stacked tunnel alignment would be located west of the existing seawall between Pier 48 and Colman Dock, filling approximately 0.23 acre of Elliott Bay. The optional side-by-side tunnel alignment would fill approximately 0.32 acre of Elliott Bay in this location. This is approximately the same amount of impervious surface that was discussed in the 2004 Draft EIS Appendix S.

The project area located within stormwater sub-basins would be treated with water quality treatment BMPs and would likely provide benefits to Elliott Bay similar to those discussed under the Tunnel Alternative in Section 5.4 of the 2004 Draft EIS Appendix S.

Exhibit 5-2. Summary of Project Area Impervious Surfaces in the Central and North Waterfront Project Areas (acres)

		Draft EIS Alternative		Updated Alternative		
Sub-Basin	Type	Rebuild	Tunnel	Elevated Structure	Stacked Tunnel	Side-by-Side Tunnel
Washington	Storm	3.9	4.2	4.0	5.5	5.5
T46	Storm	11.1	10.8	2.6	2.5	2.5
S1	Storm	1.7	1.5	0.6	0.6	0.6
S2	Storm	4.2	3.3	4.1	4.1	4.1
S3	Storm	2.1	1.9	2.9	2.9	2.9
S4	Storm	0.8	0.6	1.2	1.2	1.2
S5	Storm	0.8	0.7	1.4	1.4	1.4
Pine	Storm	2.4	2.1	2.1	0.0	2.3
Seneca	Storm	0.3	0.5	0.5	0.6	0.6
University	Storm	1.7	1.7	1.8	2.6	2.6
Madison	Storm	3.3	3.8	4.5	5.3	5.3
	Sub-Total	***32.3***	***31.0***	***25.7***	***26.7***	***29.0***
King	Combined	4.5	4.5	4.8	4.5	4.5
Pike	Combined	0.6	0.6	1.1	1.1	1.3
Vine	Combined	3.4	4.1	6.4	2.1	6.4
	Sub-Total	***8.5***	***9.3***	***12.3***	***7.7***	***12.2***
Total		**40.8**	**40.3**	**38.0**	**34.4**	**41.2**

Note: Exhibit B-2 in the 2004 Appendix S summarized all of the areas (acres) of impervious surface by sub-basin for the Draft EIS Alternatives.

5.1.3 North – Battery Street Tunnel to Comstock Street

The northern portion of this alternative is located in the Broad, Denny, and Dexter Sub-basins. This alternative would replace approximately 21.3 acres of impervious surface (Exhibit 5-3), which is more than was discussed in the 2004 Draft EIS Appendix S.

A larger area would be retrofitted with detention BMPs than discussed in the 2004 Draft EIS Appendix S. However, because most of the areas drain to the combined sewer system and would continue to be treated at King County's West Point Treatment Plant, the benefits to water quality would be similar to those discussed under the Tunnel Alternative in Section 5.4 the 2004 Draft EIS Appendix S.

Exhibit 5-3. Summary of Project Area Impervious Surfaces North of the Battery Street Tunnel (acres)

		Draft EIS Alternative		Updated Alternative		
Sub-Basin	Type	Rebuild	Tunnel	Elevated Structure	Stacked Tunnel	Side-by-Side Tunnel
Denny	Combined	0.0	2.3	9.8	9.7	12.8
Broad	Storm	0.0	0.7	1.8	1.8	2.3
Lake Union West	Combined	0.0	4.0			
Dexter	Combined	N/A	N/A	9.8	9.8	12.8
Total		**0.0**	**7.0**	**21.4**	**21.3**	**27.9**

Note: Exhibit B-2 in the 2004 Appendix S summarized all of the areas (acres) of impervious surface by sub-basin for the Draft EIS Alternatives.

5.1.4 Seawall – S. Washington Street to Broad Street

Please refer to Section 5.4.2 of the 2004 Draft EIS Appendix S for operational impacts and benefits associated with the seawall. There have been no changes in the impacts or benefits for long-term operation of the seawall.

5.2 Elevated Structure Alternative

5.2.1 South – S. Spokane Street to S. Dearborn Street

Operational impacts and benefits would be the same as those discussed under the Tunnel Alternative in Section 5.1.1.

5.2.2 Central – S. Dearborn Street to Battery Street Tunnel and North Waterfront – Pine Street to Broad Street

Operational impacts and benefits would be similar to those discussed under the Tunnel Alternative in Section 5.1.2. Under the Elevated Structure Alternative, the project area would extend into Elliott Bay between Pier 48 and Colman Dock covering approximately 0.19 acre with new roadway and sidewalk surface. Of the 0.19 acre, 0.14 acre would be fill and 0.05 acre would be from sidewalk overhanging the water.

5.2.3 North – Battery Street Tunnel to Comstock Street

Impacts and benefits to water quality would be similar to those discussed under the Tunnel Alternative in Section 5.1.3.

5.2.4 Seawall – S. Washington Street to Broad Street

Please refer to Section 5.2.2 of the 2004 Draft EIS Appendix S for operational impacts and benefits associated with the seawall. There have been no changes in the impacts or benefits for long-term operation of the seawall.

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Chapter 6 CONSTRUCTION IMPACTS

6.1 Tunnel Alternative (Preferred Alternative)

There have been no substantive changes to the temporary construction impacts presented in Chapter 6 of the 2004 Draft EIS Appendix S, Water Resources Discipline Report, except as presented in the following sections.

6.1.1 Stacked Tunnel Alignment – Intermediate Plan

Temporary impacts to water quality during construction would be the same as those described in the 2004 Draft EIS Appendix S.

Potential temporary impacts to water quality due to in-water work and over-water staging between Pier 48 and Colman dock would be the same as discussed for the Tunnel Alternative in the 2004 Draft EIS Appendix S. These impacts could also occur at the new staging area. In addition, new in-water pilings would be constructed to support the new structure located at Pier 62/63. Pilings may also be constructed at staging areas at Piers 66 and 56/57. Construction could result in temporary turbidity if bottom sediments are disturbed. It is possible that these sediments may be contaminated, and additional measures may need to be taken. The location of contaminated sediments is provided in Chapter 6 of the 2004 Draft EIS Appendix S.

A new temporary over-water bridge between Pier 48 and Colman Dock would be constructed for ferry access. This would be considered pollutant-generating impervious surface. Stormwater runoff from the new temporary ferry access bridge would be collected and treated with temporary stormwater BMPs to minimize or prevent impacts to Elliott Bay.

In addition, a temporary sheet pile wall (or an equivalent BMP) would be constructed to isolate active work areas from Elliott Bay and prevent sediment and other debris from entering Elliott Bay and affecting water quality. During installation of the sheet pile wall and associated riprap removal, some sediment would likely be disturbed, resulting in localized temporary increases in turbidity. In some locations within the project area, this sediment may be contaminated.

Activities required to construct the northern portion of the project could also result in temporary construction-related impacts to water quality. Excavation of a trench would be required to construct the Partially Lowered Aurora Option. Based on preliminary investigations, only minor dewatering would be required during construction activities. However, it is likely that this water would contain pollutants in addition to sediment. Dewatering water could be

discharged to either Lake Union or the combined sewer system, depending on capacity. If the dewatering water were discharged to Lake Union, treatment would be provided in accordance with applicable regulations to protect water quality in the lake. A new temporary outfall may be constructed to convey this water from the dewatering facility to Lake Union. Impacts associated with construction of a temporary outfall include localized increases in turbidity.

6.1.2 Side-by-Side Tunnel Alignment – Intermediate Plan

Temporary impacts to water quality during construction would be the same as those described in Chapter 6 of the 2004 Draft EIS Appendix S and above in Section 6.1.1.

6.1.3 Stacked Tunnel Alignment – Shorter Plan

Temporary impacts to water quality during construction would be the same as those described in Chapter 6 of the 2004 Draft EIS Appendix S and above in Section 6.1.1.

6.1.4 Side-by-Side Tunnel Alignment – Shorter Plan

Temporary water quality impacts during construction would be similar to those described in Chapter 6 of the 2004 Draft EIS Appendix S and above in Section 6.1.1.

6.2 Elevated Structure Alternative

There have been relatively few changes to the temporary construction impacts presented in Chapter 6 of the 2004 Draft EIS Appendix S for the Rebuild and Aerial Alternatives.

Potential temporary impacts to water quality due to in-water work and over-water staging between Pier 48 and Colman dock would be similar to those discussed under the Tunnel Alternative. In addition, the seawall would be constructed west of the existing seawall in the Colman dock area. In-water work activities and potential impacts would be similar to those described in Section 6.1.1; support columns for the aerial structure would be constructed landward of the new seawall.

Soil improvements, such as jet grouting, may be performed in front of Pier 66. This was not proposed in this area under the Rebuild Alternative in the Draft EIS. This could result in more spoils with high-pH being created at this location. Potential temporary impacts to water quality associated with soil improvements are described in Chapter 6 of the 2004 Draft EIS Appendix S and above in Section 6.1.1.

The Elevated Structure Alternative extends north to Aloha Street. Dewatering water could be discharged to either Lake Union or the combined sewer system, depending on capacity. If this water were discharged to Lake Union, treatment would be provided as needed to protect water quality. A new temporary outfall could be constructed to convey this water from the dewatering facility to Lake Union. Impacts would be similar to those discussed under the Tunnel Alternative.

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Chapter 7 SECONDARY AND CUMULATIVE IMPACTS

SPU recently completed a drainage and wastewater alternatives feasibility study for the downtown waterfront area to support planning for permanent replacement of drainage and wastewater utility infrastructure that will be necessary in relation to the Alaskan Way Viaduct and Seawall Replacement Project (Seattle 2005b).

In general, the alternatives evaluated by SPU as part of their long-term wastewater management plan include construction of a large conveyance pipe located along the AWV Corridor and new CSO reduction facilities. The City is continuing to evaluate CSO management alternatives.

Critical components of the existing Seattle drainage system, including regulators, outfalls, and conveyance pipes, are located within the project footprint. Therefore, it is likely that construction of the conveyance pipe, outfalls, and regulators that may be part of the City's selected alternative for drainage and wastewater systems would be coordinated with the AWV Project to minimize construction costs and disturbances. However, other than coordinating construction of the utilities within the footprint of the AWV Project, the City's infrastructure that may be needed for CSO control is separate from the AWV Project. Permitting and construction of utility infrastructure not directly associated with the AWV Project are independent of the AWV Project.

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Chapter 8 OPERATIONAL MITIGATION

There have been no substantive changes to the operational mitigation presented in Chapter 8 of the 2004 Draft EIS Appendix S, Water Resources Discipline Report.

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Chapter 9 CONSTRUCTION MITIGATION

There have been no substantive changes to the temporary construction mitigation presented in Chapter 9 of the 2004 Draft EIS Appendix S, Water Resources Discipline Report, except in the northern end associated with the Partially Lowered Aurora Option.

9.1 Tunnel Alternative (Preferred Alternative)

9.1.1 Stacked Tunnel Alignment – Intermediate Plan

Construction mitigation would be the same as described in Chapter 9 of the 2004 Draft EIS Appendix S. Water would be generated from construction dewatering activities in the northern end of the project site during construction of the Partially Lowered Aurora improvements. This water would be treated prior to discharge to Lake Union as necessary to comply with the requirements of the Washington Administrative Code (WAC) and/or construction National Pollutant Discharge Elimination System (NPDES) permit. Treatment of this water would likely be similar to that described in Section 6.3.2 of the 2004 Draft EIS Appendix S for dewatering along the central waterfront; however, the quality of dewatering water would be verified using data collected during construction.

In addition, a temporary sheet pile wall (or equivalent BMP) would be constructed along active work areas to protect water quality in Elliott Bay during construction. Installation of the temporary sheet pile wall may require riprap removal, which may have temporary short-term impacts as discussed in Chapter 6. Additional mitigation measures, such as construction techniques, silt curtain, and others, would be considered to minimize or prevent impacts during temporary sheet pile wall installation and riprap removal.

9.1.2 Side-by-Side Tunnel Alignment – Intermediate Plan

Construction mitigation would be the same as described in Chapter 9 of the 2004 Draft EIS Appendix S and above in Section 9.1.1.

9.1.3 Stacked Tunnel Alignment – Shorter Plan

Construction mitigation would be the same as described in Chapter 9 of the 2004 Draft EIS Appendix S and above in Section 9.1.1.

9.1.4 Side-by-Side Tunnel Alignment – Shorter Plan

Construction mitigation would be the same as described in Chapter 9 of the 2004 Draft EIS Appendix S and above in Section 9.1.1.

9.2 Elevated Structure Alternative

Construction mitigation would be similar to those described in Chapter 9 of the 2004 Draft EIS Appendix S for the Rebuild Alternative and above in Section 9.1.1.

Chapter 10 PERMITS AND APPROVALS

There have been no substantive changes to the permits and approvals presented in Chapter 10 of the 2004 Draft EIS Appendix S, Water Resources Discipline Report. Since the Draft EIS was published in March 2004, both the Ecology *Stormwater Management Manual for Western Washington* and the WSDOT *Highway Runoff Manual* have been updated (Ecology 2005b; WSDOT 2004). These manuals or an equivalent will be used to design BMPs to treat stormwater runoff from the project site.

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Chapter 11 REFERENCES

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