

**Table ES-6**  
**Potential Impacts and Mitigation Measures**

This table summarizes the potential construction and operation impacts from each of the alternatives. Alternative 1 is the alternative selected by King County and Seattle. Construction impacts are temporary, short-term impacts. If an impact is specific to one subbasin, then the subbasin is identified with “SLU” for South Lake Union and “EB” for Elliott Bay. Chapter 5 provides a complete description of the construction impacts in the South Lake Union Subbasin and Chapter 7 for the Elliott Bay Subbasin. Chapter 6 provides a complete description of operation impacts in the South Lake Union Subbasin and Chapter 8 for Elliott Bay Subbasin. The mitigation measures, which reduce the impact to not significant, are summarized in the last column and identified by number for each impact. Chapter 10 provides a detailed description of each mitigation measure.

<b>RESOURCE</b>	<b>ALTERNATIVE 1 - CSO STORAGE &amp; TREATMENT (the Preferred Alternative)</b>	<b>ALTERNATIVE 2 - PARTIAL SEPARATION &amp; STORAGE</b>	<b>ALTERNATIVE 3 - NO ACTION</b>	<b>SUMMARY OF MITIGATION MEASURES</b>
<p><b>Earth</b></p> <p>Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Excavation of about 205,000 CY</li> <li>• Erosion of soils</li> <li>• Increase in runoff turbidity</li> <li>• Erosion of steep slopes and sensitive soils</li> </ul> <p><i>• Discharge events, which can contaminate off-shore sediments, reduced to one event per year</i></p>	<p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• Excavation of about 308,000 CY (about 50 percent more spoils excavated)</li> </ul> <p><i>• Storm water discharge events can contaminate off-shore sediments</i></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <p><i>• Continued contamination of offshore sediments at current rate</i></p>	<ul style="list-style-type: none"> <li>• Implementation of erosion controls (ER-1, ER-2, WR-2)</li> <li>• Temporary shoring in sensitive areas (intertidal areas) (ER-4, ER(1)-2)</li> <li>• Dispose of excavated materials properly (ER-3)</li> </ul>
<p><b>Air</b></p> <p>Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Fugitive dust</li> <li>• Vehicle emissions</li> <li>• Odor generation</li> </ul> <p><i>• Odor generation during or after CSO events</i></p>	<p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• Greater impact due to more pipelines</li> </ul> <p><u>Similar to Alt. 1</u></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <p><i>• Odors from CSO discharges would remain same as present and could increase if CSOs increase</i></p>	<ul style="list-style-type: none"> <li>• Implementation of federal, state, and local emission controls (AR-1)</li> <li>• Compliance with PSAPCA permitting requirements (AR-2)</li> <li>• Design odor control or provide for future installation (AR-3)</li> </ul>

RESOURCE	ALTERNATIVE 1 - (the Preferred Alternative)	ALTERNATIVE 2 -	ALTERNATIVE 3 -	SUMMARY OF MITIGATION MEASURES
<p><b>Water</b></p> <p>Construction</p> <p>Operation</p>	<ul style="list-style-type: none"> <li>• Sediment/associated contaminants discharged into waterbodies</li> <li>• Contaminated groundwater may be encountered</li> <li>• Saltwater intrusion to groundwater from dewatering (EB)</li> <li>• Contaminated sediments from Denny Way Sediment Cap redistributed into water column during outfall construction (EB)</li> </ul> <ul style="list-style-type: none"> <li>• <i>Reduction of CSO frequency and volume into waterbodies contributing to long-term water quality improvement</i></li> <li>• <i>Reduction in risks to human health and aquatic life</i></li> </ul>	<p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• Greater impact from sediment deposition due to larger area disturbed for pipelines</li> <li>• Higher chance for contaminated groundwater due to large excavation for storage (SLU)</li> <li>• Less likelihood of encountering contaminated sediments due to no outfall through sediment cap</li> </ul> <p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• <i>Localized pollutant loading from increased discharge of stormwater and associated contaminants (i.e., metals, petroleum products)</i></li> </ul>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <ul style="list-style-type: none"> <li>• <i>CSO events would continue at current volumes and frequencies</i></li> <li>• <i>Increasing levels of contaminants in nearshore environment and suspended in water</i></li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with Seattle, Ecology and WDFW erosion control methods (WR-1, WR-2, WR(2)-1)</li> <li>• Develop dewatering plan to address potential for encountering and procedures for handling contaminated groundwater, and to monitor groundwater drawdown and its effects on adjacent structures (WR-5)</li> <li>• Compliance with all applicable agreements and laws during disturbance of sediment cap (WR(1)-1)</li> </ul>
<p><b>Biological</b></p> <p>Construction</p> <p>Operation</p>	<ul style="list-style-type: none"> <li>• Removal of habitat vegetation</li> <li>• Disturbance of 0.7 to 0.9 acres of bottom sediments (EB)</li> <li>• Disturbance and/or displacement of migratory and resident urban wildlife and habitat</li> <li>• Spawning habitat impacted by sediment-laden runoff (SLU)</li> <li>• Displacement of shellfish communities</li> </ul> <ul style="list-style-type: none"> <li>• <i>Improved water quality and habitat conditions</i></li> <li>• <i>Improved conditions for shellfish species in area of existing Denny outfall resulting from seaward relocation of outfall (EB)</i></li> <li>• <i>Localized risk to organisms near CSO outfalls from turbidity</i></li> <li>• <i>Reduced risks to water-dependent wildlife</i></li> </ul>	<p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• Disturbance of approximately 75 lineal feet of shoreline vegetation at location of new overflow (SLU)</li> <li>• Encouragement of pollutant tolerant species near stormwater outfalls</li> </ul> <p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• <i>Less overall benefit to habitat due to discharge of stormwater and associated contaminants</i></li> </ul>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <ul style="list-style-type: none"> <li>• <i>Ongoing pollutant levels at levels equal to or greater than current conditions could worsen biological conditions and reduce biological diversity near existing outfalls</i></li> </ul>	<ul style="list-style-type: none"> <li>• Replant disturbed sites with native and/or ornamental trees and shrubs and limit width of construction corridors (BR-1, BR(1)-1, BR(2)-1)</li> <li>• Minimize construction duration within Elliott Bay (BR(1)-3)</li> <li>• Follow WDFW permit requirements for in-water construction (BR-2, BR(1)-2)</li> <li>• Locate stormwater outfalls to minimize impacts to existing aquatic resources (BR(2)-1, BR-2)</li> </ul>

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RESOURCE	ALTERNATIVE 1 - (the Preferred Alternative)	ALTERNATIVE 2 -	ALTERNATIVE 3 -	SUMMARY OF MITIGATION MEASURES
<b>Energy</b> Construction  <i>Operation</i>	<ul style="list-style-type: none"> <li>• Use of electrical energy and fossil fuels</li> </ul> <ul style="list-style-type: none"> <li>• <i>Use of electricity and fossil fuels</i></li> </ul>	<u>Same as Alt. 1</u>  <u>Same as Alt. 1</u>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <ul style="list-style-type: none"> <li>• <i>No operation impacts</i></li> </ul>	<ul style="list-style-type: none"> <li>• Utilize energy efficient equipment, when practical (EN-1)</li> </ul>
<b>Environmental Health</b> Construction  <i>Operation</i>	<ul style="list-style-type: none"> <li>• Potential for hazardous materials spills</li> <li>• Worker exposure to contaminated soils, sediments, or groundwater</li> <li>• Resuspension of contaminated sediments from sediment cap (EB)</li> </ul> <ul style="list-style-type: none"> <li>• <i>Elimination of risks from existing outfall on beach (SLU)</i></li> <li>• <i>Reduce risks because of decreased bacterial and viral loadings</i></li> <li>• <i>Minimize direct human contact with CSOs</i></li> <li>• <i>Pipe leaks and ruptures</i></li> <li>• <i>Buildup of methane gas in facilities (SLU)</i></li> </ul>	<u>Similar to Alternative 1 except:</u> <ul style="list-style-type: none"> <li>• Human exposure to metals and petroleum products from stormwater discharges</li> <li>• Greater potential for human contact with sewage or hazardous materials due to more in-street construction</li> </ul> <u>Similar to Alt. 1 except:</u> <ul style="list-style-type: none"> <li>• <i>overall risks higher due to stormwater discharges and associated contaminants</i></li> </ul>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <ul style="list-style-type: none"> <li>• <i>Continued or increased levels of risk from pathogens present in CSOs</i></li> </ul>	<ul style="list-style-type: none"> <li>• Develop Hazardous Material and Spill Prevention Plan (EH-1)</li> <li>• Develop Construction Contingency Plan and Health and Safety Plan to specify work procedures in areas where contamination or methane could be encountered (EH-3)</li> <li>• Design and site facilities to minimize potential for leaks or breaks (EH-2, EH(1)-1, EH(2)-1)</li> <li>• Disturbance of sediment cap will occur in compliance with existing regulatory requirements (WR(1)-1)</li> <li>• Equip stormwater collection and conveyance facilities with water quality control features to meet applicable standards (EH(2)-1)</li> </ul>
<b>Noise</b> Construction	<ul style="list-style-type: none"> <li>• Increase in noise levels</li> </ul> <ul style="list-style-type: none"> <li>• <i>Increase in noise levels</i></li> </ul>	<u>Similar to Alt 1 except:</u> <ul style="list-style-type: none"> <li>• Extensive pipeline construction in residential areas increases noise levels near sensitive receptors and for longer time</li> </ul> <u>Same as Alt. 1</u>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <ul style="list-style-type: none"> <li>• <i>No operation impacts</i></li> </ul>	<ul style="list-style-type: none"> <li>• Comply with City of Seattle noise code (NO-1)</li> <li>• Keep noisy construction equipment as far away from sensitive receptors as practical (NO-2)</li> <li>• Site tunnel vent fans in compliance with Seattle noise ordinances (NO(1)-1)</li> </ul>

<i>Operation</i>				
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RESOURCE	ALTERNATIVE 1 - (the Preferred Alternative)	ALTERNATIVE 2 -	ALTERNATIVE 3 -	SUMMARY OF MITIGATION MEASURES
<p><b>Land and Shoreline Use</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Construction in shoreline zone and intertidal areas</li> <li>• <i>Improved beach environment due to extension of existing outfall</i></li> </ul>	<ul style="list-style-type: none"> <li>• Construction of outfalls in shoreline zone and intertidal areas</li> </ul> <p><u>Similar to Alt 1</u></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> <li>• <i>No operation impacts</i></li> </ul>	None
<p><b>Recreation</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Disruption of bicycle/pedestrian paths</li> <li>• Disturbance of park areas</li> <li>• <i>Benefit to recreational enjoyment of waterbodies</i></li> </ul>	<p><u>Similar to Alt 1 except:</u></p> <ul style="list-style-type: none"> <li>• Additional bike routes disrupted from storm sewer construction</li> </ul> <p><u>Similar to Alt 1 except:</u></p> <ul style="list-style-type: none"> <li>• <i>less improvement as stormwater and associated contaminants would flow into waterbodies</i></li> </ul>	<ul style="list-style-type: none"> <li>• No construction impacts</li> <li>• <i>Continued potential for beach closings after CSO events</i></li> </ul>	<ul style="list-style-type: none"> <li>• Restrict construction activity during highly-attended public events (R-1)</li> <li>• Establish detour routes for bicycle/pedestrian pathways (R-2)</li> <li>• Restoration of impacted recreational facilities (R-3)</li> </ul>
<p><b>Aesthetics</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Disruption of aesthetic resources</li> <li>• <i>Aboveground facilities</i></li> </ul>	<p><u>Similar to Alt 1 except:</u></p> <ul style="list-style-type: none"> <li>• Greater due to additional pipeline and storage</li> </ul> <p><u>Same as Alt. 1</u></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> <li>• <i>Elliott West site remains undeveloped and unlandscaped (EB)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Add architectural treatment to all aboveground facilities (AT-2)</li> <li>• Take views into consideration during design (AT-1)</li> </ul>
<p><b>Historical and Cultural Preservation</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Potential to impact historic seven structures from vibration and/or ground settlement</li> <li>• Potential to impact undiscovered hunter-fisher-gatherer and/or historic archaeological deposits</li> <li>• Unrecorded shipwrecks in outfall alignments could be impacted</li> <li>• <i>No operation impacts</i></li> </ul>	<p><u>Similar to Alt 1 except:</u></p> <ul style="list-style-type: none"> <li>• Potential to impact 15 historic structures</li> <li>• Potential to impact more undiscovered or unrecorded hunter-fisher-gatherer sites and historic archaeological deposits due to additional trenching</li> <li>• <i>No operation impacts</i></li> </ul>	<ul style="list-style-type: none"> <li>• No construction impacts</li> <li>• <i>No operation impacts</i></li> </ul>	<ul style="list-style-type: none"> <li>• Consultation with local affected Indian Tribes regarding treatment of archaeological deposits (HC-1)</li> <li>• Preparation of construction monitoring plan (HC-2)</li> <li>• Implement construction techniques to minimize vibration and ground settlement, if necessary (HC-3)</li> </ul>

RESOURCE	ALTERNATIVE 1 - (the Preferred Alternative)	ALTERNATIVE 2 -	ALTERNATIVE 3 -	SUMMARY OF MITIGATION MEASURES
<p><b>Transportation</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Estimated 87,000 total roundtrips during construction</li> <li>• Increased traffic congestion due to lane and street closures</li> <li>• Displaced street parking</li> <li>• Disrupted vehicular access to adjacent properties</li> <li>• Closure/relocation of bicycle lanes</li> <li>• Disrupted marine anchorage and rail traffic</li> </ul> <p>• <i>17 roundtrips per month</i></p>	<p><u>Similar to Alt 1 except:</u></p> <ul style="list-style-type: none"> <li>• Estimated 209,000 roundtrips (almost 2.5 times more)</li> <li>• Greater impacts to residential streets</li> <li>• Less marine and rail traffic disruption</li> </ul> <p><u>Same as Alt. 1</u></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <p>• <i>No operation impacts</i></p>	<ul style="list-style-type: none"> <li>• Develop traffic plans before construction (TR-1)</li> <li>• Minimize disruption of access (TR-2)</li> <li>• Restrict truck traffic to designated routes (TR-3)</li> <li>• Provide advanced notification of access restrictions (TR-6)</li> <li>• Mark and light waterborne construction vessels in accordance with applicable USCG regulations (TR(1)-1)</li> <li>• Develop a barge operation plan (TR(1)-2)</li> <li>• Coordinate with affected railroads to minimize impacts (TR(1)-3)</li> </ul>
<p><b>Public Utilities and Services</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Accidental disruption of utilities</li> <li>• Relocation of utilities</li> </ul> <p>• <i>Seattle and King County wastewater systems work more effectively</i></p>	<p><u>Similar to Alt. 1 except:</u></p> <ul style="list-style-type: none"> <li>• Higher potential for utility disruptions due to more streets excavated</li> </ul> <p><u>Same as Alt. 1</u></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <p>• <i>Seattle and King County wastewater systems continue to overflow at current level</i></p>	<ul style="list-style-type: none"> <li>• Advanced notification of utility owners and building tenants affected by utility relocation or removal (PU-1)</li> <li>• Install new prior to removing existing utilities (PU-2)</li> <li>• Develop emergency procedures for unprogrammed utility disruptions (PU-3)</li> </ul>
<p><b>Socioeconomics</b> Construction</p> <p><i>Operation</i></p>	<ul style="list-style-type: none"> <li>• Positive employment impacts due to construction jobs</li> <li>• Disruption to business patronage</li> </ul> <p>• <i>Odor control and landscaping to minimize interference with adjacent businesses/residences</i></p>	<p><u>Same as Alt. 1</u></p> <p><u>Same as Alt. 1</u></p>	<ul style="list-style-type: none"> <li>• No construction impacts</li> </ul> <p>• <i>No operation impacts</i></p>	<ul style="list-style-type: none"> <li>• Work with adjacent property owners to minimize disruptions of business and access (SE-1, SE-2)</li> </ul>

