



Western/Polson Buildings Looking Southwest from the Norton Building Towards Colman Curve

## CHAPTER 8 - MITIGATION

### What is in Chapter 8?

This chapter identifies WSDOT’s mitigation commitments as well as other possible mitigation measures that could be used for permanent and construction (temporary) project effects.

#### MITIGATION OVERVIEW

Mitigation commitments are project actions and performance standards, often established by regulation, that are used to address project effects. To meet these commitments, Washington State Department of Transportation (WSDOT) will implement best management practices (BMPs) during construction and carry out specific mitigation measures based on the project’s effects.

In this chapter, the word “will” is used to describe mitigation measures to which WSDOT is committed if a build alternative is selected. The word “could” generally precedes a suite of specific BMPs from which WSDOT could choose to achieve its mitigation commitments. If a mitigation measure is found to be ineffective, WSDOT will develop other appropriate mitigation with FHWA’s approval. If the Viaduct Closed (No Build Alternative) is selected, then the mitigation measures discussed here will not be implemented.

The project will not result in permanent adverse effects for all of the resources considered in this Final Environmental Impact Statement (EIS). For some resources, the project will result in beneficial permanent effects; for others, there are simply no permanent effects. For the resources with beneficial or no permanent effects, mitigation is not proposed. Exhibit 8-1 shows the resources for which

mitigation is proposed and for what type of effect (permanent and/or construction). If mitigation is not proposed for a resource, it is not discussed in this chapter.

**Exhibit 8-1  
Mitigation for Permanent and Construction Effects**

Resource	Permanent Effects	Construction Effects
Transportation	X	X
Noise	No mitigation proposed	X
Vibration	No mitigation proposed	X
Views	X	X
Land Use	No mitigation proposed	X
Economics	No mitigation proposed	X
Parking	No mitigation proposed	X
Historic Resources	X	X
Archaeological Resources	No mitigation proposed	X
Parks, Recreation, and Open Space	No mitigation proposed	X
Neighborhoods and Community Resources	X	X
Minorities and Low-Income Populations	X	X
Public Services	No mitigation proposed	X
Utilities	No mitigation proposed	X
Air Quality	No mitigation proposed	X
Energy and Greenhouse Gas Emissions	X	X
Water Resources	No mitigation proposed	X
Fish, Aquatic, and Wildlife Species and Habitat	X	X
Soils and Groundwater	X	X
Hazardous Materials	X	X

Note: No mitigation is proposed for resources that are not permanently affected or have a beneficial permanent effect.

#### Mitigation Commitment Tracking

WSDOT has an established department-wide program that identifies and manages commitments, including environmental mitigation measures. Projects assign a Commitment Lead who reviews project commitment documents, such as interagency agreements, requests for proposals, environmental documents, permits, and agency directives and concurrence letters. From these documents,

the Commitment Lead develops an inventory of commitments that are entered into an electronic Commitment Tracking System (CTS). The CTS allows the Commitment Lead to assign staff to commitments and to identify existing guidance documents that help them successfully comply with the commitment. Commitments that require monitoring are noted in this chapter, as appropriate.

The CTS also facilitates developing the contract during the Plans, Specifications, and Estimates process. It also allows the Design and Construction offices to manage the status of their commitments. The CTS provides compliance recording and reporting features that are consistent with existing program policy and permit requirements. Updating and tracking commitment status from project design to construction and closeout is coordinated via team meetings. Regular updates to the CTS are made in order to generate current commitment status reporting, reviewed during meetings by project and program management.

#### MITIGATION FOR PERMANENT EFFECTS

Proposed mitigation for the tolled and non-tolled build alternatives would be the same for elements of the environment discussed below, except as indicated for transportation and minority and low-income populations.

##### 1 What mitigation is proposed for permanent transportation effects?

Permanent transportation mitigation measures are not proposed for the build alternatives without tolls because there are no permanent adverse effects on the transportation network.

As discussed in Chapter 5, if the build alternatives are tolled, some traffic is expected to divert from SR 99 to avoid paying a toll. This diverted traffic would affect traffic, including freight and transit, on downtown surface streets as well as the SR 99 mainline due to queues exceeding off-ramp capacity. However, the transportation network would operate more effectively even with the diverted traffic than it would under the Viaduct Closed (No Build Alternative).

Nevertheless, WSDOT has acknowledged that an acceptable long-term tolling solution should be sought to minimize the amount of diverted traffic in order to optimize operation of the transportation network for all users. Strategies for optimization will be developed by the Tolling Advisory Committee (TAC), which will be established by WSDOT, as outlined in section 2.12 of Memorandum of Agreement GCA 6486. When the TAC completes the first phase of its work in 2012 and in further phases, WSDOT and the City will jointly review the recommendations developed by the TAC. For improvements on state facilities or requiring state funding, WSDOT will recommend strategies developed by the TAC (or other strategies as appropriate) to the State Transportation Commission and seek funding for such strategies. WSDOT will work with the State, City, Port of Seattle, and King County in order to implement TAC strategies or other tolling mitigation strategies. Subject to legislative appropriation, WSDOT will fund recommendations agreed to by WSDOT and the City. If needed, additional environmental analysis may be performed to evaluate the potential effects of proposed strategies before implementation. The TAC is expected to refine its analysis and recommendations through 2015 when toll implementation is expected to begin. The TAC will continue its work for up to one year after tolling begins to review the effects of the implemented tolling and diversion minimization strategies and to make further recommendations, if necessary.

#### Potential Strategies to Reduce Traffic Diversion

- Refine the tolling strategy; this may include modifying toll rates and times that tolls would be

charged as well as implementing regional tolling and/or tolls on other facilities.

- Reduce the level of toll revenue needed (and thereby lower the toll rate needed) by identifying alternative funding sources consistent with funding agreements among the parties.

#### Potential Strategies to Manage Diverted Traffic

- Set priorities for street use by time of day for various users (cars, trucks, bicycles, pedestrians, transit, parking) consistent with the City's Complete Streets policy goals
- Identify opportunities for traffic calming and other restrictions on certain modes of travel
- Create "transit first" policies through transit priority streets and other methods to improve transit speed and reliability
- Use other traffic demand management measures
- Fund enhanced transit services and vanpools

#### 2 What mitigation is proposed for permanent effects on views?

##### Bored Tunnel Alternative

In addition to the mitigation inherent with this alternative (construction of a bored tunnel avoids the visual effect of an above-grade or at-grade transportation facility), WSDOT has developed architectural (tunnel operations buildings) and portal design guidelines for the project to create a consistent visual palette and to match the character of the surrounding streetscape. The guidelines are appropriate for the urban environment in the project area and apply to the tunnel portals, ramps, connections to the urban street system, city streets, sidewalks, bicycle and pedestrian trails, and the urban landscape.

The design guidelines will include, but are not limited to, the following elements:

- Develop a design theme for structural elements
- Soften the appearance of roadway areas by using landscape materials and street trees and placing trees where they do not block view corridors
- Provide lighting that meets functional requirements and enhances the scenic qualities and night-time experience of the city
- Enhance intuitive wayfinding and a sense of orientation and destination
- Complement the context and qualities of adjacent neighborhoods with an appropriate scale, massing, and character of the structures

The Seattle Design Commission will review the design features of buildings and above-grade elements to be incorporated into the design for the project.

##### Cut-and-Cover Tunnel Alternative

Potential mitigation measures would be the same as described above for the Bored Tunnel Alternative.

##### Elevated Structure Alternative

Potential mitigation measures would be the same as described above for the Bored Tunnel Alternative, except for the measures related to the tunnel operations buildings at the south and north portals.

WSDOT would likely receive input from the Seattle Design Commission on architectural features that could be incorporated into the concrete columns, retaining walls, and other features to enhance the visual quality of this alternative.

#### 3 What mitigation is proposed for permanent effects on historic resources?

##### Bored Tunnel Alternative

WSDOT, FHWA, the State Historic Preservation Officer, the City Preservation Officer, and affected tribes have

#### What is the Tolling Advisory Committee?

The Tolling Advisory Committee (TAC) has 15 members who are appointed by the Mayor of Seattle, Seattle City Council, and WSDOT. The purpose of the TAC is to make advisory recommendations to the project lead agencies, Governor, Legislature, Transportation Commission, Seattle City Council, and Seattle Mayor on strategies for:

- Tolling
- Minimizing traffic diversion due to tolling
- Mitigating traffic diversion effects on city streets and I-5.

The TAC was established by City of Seattle Ordinance 123542, passed February 7, 2011 ([http://clerk.ci.seattle.wa.us/~archives/Ordinances/Ord\\_123542.pdf](http://clerk.ci.seattle.wa.us/~archives/Ordinances/Ord_123542.pdf)).

completed a Memorandum of Agreement for the S. Holgate Street to S. King Street Viaduct Replacement Project that addresses mitigation for demolishing the viaduct and decommissioning the Battery Street Tunnel. Decommissioning the Battery Street Tunnel was included in the Memorandum of Agreement because it and the Alaskan Way Viaduct are considered one historic resource. Under that Memorandum of Agreement, implementation of mitigation measures is ongoing and includes commitments, such as a podcast and an interactive website about the history of the Alaskan Way Viaduct.

WSDOT also has completed and submitted a Historic American Engineering Record (HAER) report to the National Park Service.<sup>1</sup> The HAER includes photographs and narrative essays of the viaduct and Battery Street Tunnel.

WSDOT has outlined mitigation for adverse construction effects on other historic resources in a Memorandum of Agreement, which is discussed in Question 17 of this chapter.

#### **Cut-and-Cover Tunnel Alternative**

In addition to the mitigation measures described above for the demolition of the viaduct and decommissioning of the Battery Street Tunnel, WSDOT would mitigate the relocation of the Washington Street Boat Landing pergola through restoration and replacement of the pergola at the water's edge.

WSDOT would mitigate the Elliott Bay Seawall demolition through (1) HAER documentation of the seawall, and (2) preservation and appropriate replacement of the historical plaques and markers along the seawall.

#### **Elevated Structure Alternative**

Mitigation for effects associated with this alternative would be the same as those discussed above for the Cut-and-Cover Tunnel Alternative.

#### **4 What mitigation is proposed for permanent effects on neighborhoods and community services or resources?**

##### **Mitigation Common to All Build Alternatives**

Each year, WSDOT develops a comprehensive public outreach and communications plan, which incorporates the use of a variety of communication methods, such as websites, community e-mail updates, media relations, public meetings, interviews with social service providers, presentations to neighborhood groups, written materials, and information booths at community events to communicate project information and engage agencies, tribes, and the public. In an effort to minimize effects related to changes in travel patterns due to access changes, WSDOT will use these outreach activities to communicate with the public to help people learn about and adjust to the new facility. WSDOT will communicate with owners and operators of community facilities, park and recreation facilities, religious and cultural institutions, social and employment services, and government agencies. These efforts will occur before the new facility opens.

#### **5 What mitigation is proposed for permanent effects on minorities and low-income people?**

##### **Mitigation Common to All Build Alternatives**

As part of the public outreach and communications plan, as discussed in Question 4 above, WSDOT will communicate news about the new roadway facilities to disadvantaged populations, including low-income people, persons with limited English proficiency, accessibility or mobility disabilities, the elderly, and the transit-dependent. The outreach would use English and, when appropriate, materials would be translated into other languages such as Chinese, Spanish, Tagalog, and/or Vietnamese to accommodate the area's diverse population.

Other measures WSDOT will implement to help avoid, minimize, and mitigate potential effects on minority and low-income people are:

- Encourage mass transit agencies to conduct outreach activities to communicate transit

operations to persons who are low income and dependent on transit.

- Work with citizen participatory groups and service providers, such as committees, task forces, advisory bodies, housing authorities and social services to communicate and assist disadvantaged populations with transportation options.
- Work with homeless service providers, neighborhood groups, the City, and King County to ensure the safety and survival of nearby homeless people. Nearby homeless people include those living outdoors or in vehicles located under or near transportation facilities within the project area.

##### **Measures Specific to the Tolled Build Alternatives**

Tolling the build alternatives would not result in disproportionately high and adverse impacts to low-income or minority populations. However, WSDOT will employ the following measures to reduce the inconvenience of tolling, such as the requirement to purchase transponders, for low-income and minority populations:

- Establish customer service center storefronts in the travelshed. Find locations online at: <http://www.wsdot.wa.gov/goodtogo/contacts.htm>.
- Provide public service announcements in multiple languages, such as Chinese, Spanish, Tagalog, and/or Vietnamese, regarding the Good To Go!<sup>TM</sup> accounts and transponders.
- Sell Good To Go!<sup>TM</sup> transponders at convenient locations, such as grocery stores, convenience stores, or pharmacies throughout the travelshed and convenient to lower-income neighborhoods.
- Share information with and through other public service providers.

<sup>1</sup> Sheridan 2009.

- Promote rideshare opportunities such as those in Rideshareonline.com, carpoolworld.com, commuteseattle.com, and vanpool providers.
- Enable people without credit cards or checking accounts to obtain transponders by paying with cash or Electronic Benefit Transfer (Quest) cards issued by the Washington State Department of Social and Health Services.
- Provide social service agencies with tolling information and options to avoid the tolls.

The mitigation proposed in Question 1 would also benefit low-income drivers. These mitigation measures would result in improved traffic operation on SR 99, less diversion to city streets, and better management of diverted traffic. These measures are expected to improve travel times on alternate routes (streets other than SR 99) that low-income drivers likely would use if they choose not to pay the toll. This work will be evaluated by the Tolling Advisory Committee and may be the subject of recommendations by that body.

## 6 What is proposed to minimize long-term energy consumption?

### Mitigation Common to All Build Alternatives

Measures that WSDOT will implement to reduce operational energy consumption (reduced fuel or electricity use) include, but are not limited to, the following:

- Encourage use of carpools and transit to reduce vehicle miles of travel on roadways in accordance with Washington State’s Commute Trip Reduction Efficiency Act and WSDOT’s Commute Trip Reduction Program. The expected results of the Act and Program are fewer vehicle trips traveled, reduction in greenhouse gas emissions, and energy savings through use of less fuel.

- Build energy-efficient tunnel operations buildings. The buildings will be designed to LEED Silver standards, though certification may be unattainable due to current LEED definitions.
- Use energy-efficient ventilation equipment, lighting, signals, and signage.
- Use variable-message signs to help drivers avoid congested areas to reduce slow moving traffic and idling, which leads to extra fuel consumption. WSDOT will determine sign locations by using existing condition traffic counts in conjunction with the project’s maintenance of traffic (MOT) plan, both of which would identify the congested areas.

## 7 What mitigation is proposed for permanent effects on fish, aquatic, and wildlife species and habitat?

### Bored Tunnel Alternative

There are no proposed mitigation or habitat enhancement measures for the Bored Tunnel Alternative because there are no permanent effects on fish, aquatic, and wildlife species and habitat. The seawall would not be replaced with this alternative so there would be no aquatic habitat disturbance. This alternative is expected to either improve or maintain the water quality of stormwater runoff discharged from the study area by reducing or maintaining the overall amount of pollutant-generative impervious surface and/or discharging more stormwater to the combined sewer system. Improved water quality would be beneficial to fish, aquatic, and wildlife species and habitat.

However, the National Marine Fisheries Service (NMFS) Biological Opinion (BO) outlined terms and conditions related to stormwater management to avoid effects. They are:

- WSDOT will ensure compliance with the biological effects thresholds for dissolved copper and dissolved zinc at the established points of compliance in Elliott Bay and Lake Union. The thresholds are

2.0 µg/L over ambient levels not exceeding 3.0 µg/L for dissolved copper, and 5.6 µg/L over ambient levels between 3.0 µg/L and 13.0 µg/L for dissolved zinc.

- If the final stormwater design differs from the design evaluated in the BO, then WSDOT will evaluate pollutant loadings and concentrations for that design to determine if they differ significantly from those considered in the consultation. If the predicted pollutant loadings or concentrations exceed those addressed in the BO, WSDOT will provide to NMFS a description of the design change(s) and a revised stormwater analysis.
- WSDOT will implement the programmatic approach to stormwater monitoring, as outlined in the “Programmatic Monitoring Approach for Highway Stormwater Runoff in Support of Endangered Species Act (ESA) Section 7 Consultation,” dated June 2009.<sup>2</sup> WSDOT will notify NMFS immediately if the results of this program trigger any of the relevant reinitiation requirements.

### Cut-and-Cover Tunnel Alternative

WSDOT will mitigate the effects on fish, aquatic, and wildlife species and habitat that result from the replacement of the seawall. Specific mitigation and habitat enhancement measures will be identified through additional coordination with agencies and tribes, the evaluation of potential project effects, and development of the project design.

### Elevated Structure Alternative

WSDOT will mitigate the effects on fish, aquatic, and wildlife species and habitat that result from the replacement of the seawall. The coordination process to identify specific mitigation measures would be the same as described above for the Cut-and-Cover Tunnel Alternative.

<sup>2</sup> FHWA et al. 2009.

## 8 What mitigation is proposed for permanent effects on soils and groundwater?

### Mitigation Common to All Build Alternatives

WSDOT will mitigate for effects on soils. A potential effect is groundwater mounding, which results in raised groundwater levels that could lead to flooding in buildings adjacent to the new facility. Groundwater mounding will be evaluated for all walls or soil improvement zones that are longer than 100 feet and may block groundwater flow. If the magnitude of the groundwater mounding is less than the current measured natural fluctuation of groundwater in the soil, then no mitigation measures would be necessary because the groundwater mounding levels would be consistent with existing water table levels in the study area so there would be no effect. If higher mounding is anticipated, WSDOT will implement appropriate mitigation measures into the design of the facility during final design. Such measures could consist of providing a path for groundwater via pipes, or drainage trenches, through the retaining walls or soil improvement zones to eliminate the potential for an adverse level of groundwater mounding.

### Bored Tunnel Alternative

In addition to the mitigation discussed above that would apply to all the build alternatives, the tunnel liner would be monitored on a long-term basis to determine whether openings are developing in the liner segments and whether groundwater seepage and soil migration are occurring through the openings. Maintenance would be performed as needed based on the monitoring results.

### Cut-and-Cover Tunnel Alternative

The mitigation measures would be those described above that are common to all the build alternatives.

### Elevated Structure Alternative

The mitigation measures would be those described above that are common to all the build alternatives.

## MITIGATION FOR CONSTRUCTION EFFECTS

Proposed mitigation for the tolled and non-tolled build alternatives would be the same for the elements of the environment discussed below.

## 9 What mitigation is proposed for transportation effects during construction?

### Mitigation Common to All Build Alternatives

WSDOT, King County, and the City have developed and are implementing transportation improvements to minimize traffic effects during construction to keep people and goods moving. These measures are designed to increase transit options, shift traffic away from construction areas, and provide drivers with the information they need to choose less congested routes.

These improvements, which are all completed except for the one noted as under construction, include the following:

- Installing and operating variable speed signs and travel time signs on I-5 to help maximize safety and traffic flow.
- Providing funding for the SR 519 Phase 2 Project to improve connections from I-5 and I 90 to the waterfront.
- Providing funding for the S. Spokane Street Viaduct Widening Project, which includes building a new Fourth Avenue S. off ramp for West Seattle commuters. This project is under construction.
- Providing funding for increased bus service in the West Seattle, Ballard/Uptown, and Aurora Avenue corridors for some of the construction period, as well as a bus travel time monitoring system. Increased bus service is currently provided for the S. Holgate Street to S. King Street Viaduct Replacement Project through 2014. Funding for this service may be extended as mitigation for this

project, but funding for this extension has not yet been secured.

- Installing new traffic technology on SR 99 and major routes leading to SR 99 to keep people and goods moving.
- Upgrading traffic signals and driver information signs for the Elliott Avenue W./15<sup>th</sup> Avenue W., West Seattle, and South of Downtown (SODO) corridors to support transit and traffic flow.
- Providing information about travel alternatives and incentives to encourage use of transit, carpool, and vanpool programs.

In addition, WSDOT will develop localized mitigation measures, as construction details are refined. Examples of localized measures are:

- Constructing temporary signals, where necessary
- Stationing flaggers at key intersections to facilitate freight and general-purpose traffic movements and expedite travel for emergency vehicles

Before construction begins, WSDOT will prepare a traffic management plan, to be approved by the City, to ensure that construction effects on local streets, property owners, and businesses are minimized. The traffic management plan will include the following measures:

- Descriptions of traffic phasing to accommodate construction staging. The phasing will include conceptual MOT plans, expected general-purpose traffic restrictions by construction phase and roadway, and transportation-mode-specific effects and mitigation for the effects.
- Descriptions of requirements for temporary roadways.

- Procedures for identifying and incorporating the needs of transit operators, utility owners, ferry traffic, Port of Seattle traffic, the Seattle Center, and business owners in the project area.
- Procedures for identifying and incorporating the needs of pedestrian and bicycle flow, including, for example, mitigation for sidewalk closures and requirements related to the Americans with Disabilities Act (ADA).
- Procedures for seeking concurrence of stakeholders and implementing road and lane closures.
- Procedures for identifying and incorporating the needs of local agencies affected by the work, specifically, but not limited to, the Port of Seattle and access to Terminal 46.
- Processes for signing transitions during construction from one stage to the next, and from interim to permanent signing.
- Procedures for identifying and incorporating the needs of emergency service providers, firefighters, law enforcement entities, and other related corridor users, as well as procedures for ensuring that all information required by these agencies to protect the public is made available.
- Provisions for incident and emergency response.
- Processes for identifying, producing, and obtaining acceptance of the designs of temporary traffic signals.
- Methods and frequency of inspection and maintenance of all traffic control throughout the project area.
- Descriptions of contact methods, personnel available to make decisions and ensure that issues are addressed in a timely and appropriate manner, and response times for any conditions requiring attention and response 24 hours a day.
- Identification of measurable limits for the repair and replacement of traffic control devices, including temporary and permanent pavement markings.
- Processes for determining the needs for revised traffic signal timings, and if revisions are required, detailing the procedures for the development, review and acceptance, implementation, testing, and maintenance of all affected signals.
- Provisions for maintaining existing access to properties, whenever possible.
- Provisions for providing continuous access to established hazardous material routes, transit routes, and school bus routes.
- Procedures for modifying the plans as needed to adapt to current project circumstances.
- Procedures for incorporating the needs of event traffic, including coordination with Seattle Center, Safeco Field, and Qwest Field.
- Procedures for determining detour routes.
- Procedures for communicating MOT information and issues for the project to public information personnel and the public.
- Procedures for accommodating MOT plans of adjacent projects, if applicable.
- Procedures for accommodating MOT plans when the staging schedule changes for the Alaskan Way Viaduct Replacement Project or any adjacent project.
- Identification of temporary access connections between facilities.

- Identification of haul routes.

#### **10 What can be done to minimize traffic effects when multiple projects are being constructed?**

Constructing multiple projects within the same area can compound transportation effects. Other projects that may be constructed during the same time as the Alaskan Way Viaduct Replacement Project and that would contribute to concurrent effects on transportation in the study area are:

- Mercer West Project
- S. Spokane Street Viaduct Widening Project
- S. Holgate Street to S. King Street Viaduct Replacement Project
- Elliott Bay Seawall Project (if the Bored Tunnel Alternative is selected)

WSDOT and the City communicate regularly regarding construction staging and coordination for these projects. Both lead agencies are striving to minimize construction-related disruptions. As mentioned above in Question 9, WSDOT, King County, and the City have developed and are implementing transportation improvements to minimize traffic effects on keep people and goods moving in and through Seattle.

#### **11 What mitigation is proposed for noise effects during construction?**

##### **Mitigation Common to All Build Alternatives**

Because of the magnitude of the project, WSDOT will obtain Major Public Project Construction Noise Variances, which involves the preparation of a Noise Management and Mitigation Plan. The noise variances will be obtained prior to the start of nighttime construction activities. To grant this type of noise variance, the City requires that the public have an opportunity to comment on the proposal. To date, two public meetings have already been held as part of the application process. WSDOT will implement the following mitigation measures to comply with the Major Public Project Construction Noise Variances (the variances could include more measures than listed

here) and the project's Noise Management and Mitigation Plan.

WSDOT will implement measures to minimize nighttime and weekend construction noise to prevent exceeding the noise variance levels (except in the case of emergency) during these hours: between 10:00 p.m. and 7:00 a.m. on weekdays, or between 10:00 p.m. and 9:00 a.m. on weekends and legal holidays. Measures implemented to minimize construction noise and comply with the noise-level limits established in the Major Public Project Construction Noise Variances are listed below:

- Ensure that all equipment meets the noise limits and is properly maintained and operated.
- Construct noise barrier walls or functionally equivalent materials at stationary construction sites. The length and height of the noise barrier walls will be confirmed during final design. WSDOT will confirm the length and height of the noise barrier walls prior to nighttime construction. For the Bored Tunnel Alternative, noise barrier walls are planned at both portal construction areas. The location(s) and dimensions of the noise barrier walls will be determined during final design.
- Construct gates and/or doors in noise barrier walls for sound containment. Edges of the gates and doors will overlap the fence to eliminate gaps; during nighttime hours, gates and doors will be kept closed, except to allow access to the construction site; and access doors (or man doors) will be incorporated into the gates to limit the need to open large gates at night.
- Use broadband or strobe backup warning devices or backup observers instead of backup warning devices that make noise for all equipment, except dump trucks, in compliance with Washington Administrative Code (WAC) Sections 296-155-610 and 296-155-615.

WSDOT will control nighttime construction noise levels through two methods: noise-level limits and noise-control measures. This approach provides the flexibility of either prohibiting certain noise-generating activities during nighttime hours or implementing noise-control measures (e.g., temporary noise barriers, noise curtains, noise tents, or the use of quieter equipment) to meet the noise limits (as outlined in the project's Noise Management and Mitigation Plan). WSDOT will use the following noise-control measures, as appropriate or necessary:

- Use temporary construction site noise barriers (both stationary and movable).
- Employ noise control curtains.
- Prohibit jack hammering and impact pile driving during nighttime hours; impact or impulse tools used from 5:00 p.m. to 10:00 p.m. would be subject to a noise-level limit of 5 dBA above the existing noise level.
- Use two-way radios for communication and prohibit the use of public address systems during nighttime hours, except for emergency notifications.
- Grade surface irregularities on construction sites to prevent impact noise and ground vibrations from passing vehicles.
- Use bed liners for trucks performing export haul. The bed liners may consist of but are not limited to aluminum, rubber, sand, or dirt.
- During pavement removal, remove material spilled on the roadway by hand or by sweeping, rather than scraping, during nighttime hours.

WSDOT will provide up-to-date information on construction activities and construction noise to project area neighbors and project stakeholders. WSDOT will provide a 24-hour hotline and project email, and an

answering service to respond to calls during nighttime hours.

## 12 What mitigation is proposed for vibration effects during construction?

### Mitigation Specific to the Bored Tunnel Alternative

Specific mitigation measures to address potential vibration effects during tunnel boring activities are outlined in the design-builder's proposal. These measures are discussed below. If the Bored Tunnel Alternative is not selected, WSDOT will develop specific vibration mitigation measures for the selected alternative.

WSDOT will measure, analyze, and mitigate ground vibration by and continuously gathering comprehensive vibration data during construction.

Before the start of construction, WSDOT will implement the following measures,;

- Develop a detailed Vibration Mitigation and Monitoring Plan according to WSDOT requirements.
- Identify and categorize potentially impacted receptors (building occupants), buildings (especially historic buildings in the Pioneer Square area), above ground structures (including the Seattle Monorail), and underground utilities.
- Determine appropriate vibration measurement and/or monitoring locations.
- Perform a baseline ambient vibration survey at selected locations.
- Identify expected sources of vibration during construction activities, including the TBM, muck conveyor system, pile driving, and demolition of the existing viaduct.



- Estimate ranges of expected vibration levels at potentially impacted receptors, buildings and underground utilities.

If determined to be necessary and practical for specific receptors, WSDOT will implement the following mitigation measures:

- Develop an empirical site-specific ground vibration propagation model to improve accuracy of predictions as necessary.
- Perform ground vibration propagation tests at selected locations along tunnel alignment in conjunction with a geotechnical consultant.
- Compare predictions with specified criteria, summarize expected impacts, and recommend vibration mitigation measures where needed.

During construction, WSDOT will implement the following mitigation measures, as necessary:

- Review vibration data according to the Vibration Mitigation and Monitoring Plan.
- Perform ongoing refinement of predictions of building vibration levels as directly measured ground vibration data become available, especially with regard to portal operations, as necessary.
- Support the public relations effort to ensure that outreach activities and materials address vibration.
- Respond to construction vibration issues and/or complaints quickly to re-assure the public that their concerns are being heard.

### 13 What mitigation is proposed for effects on views during construction?

#### Mitigation Common to All Build Alternatives

To mitigate effects on visual quality during construction, WSDOT will design and place construction screens or barriers to limit the visibility of work areas that would intrude on adjacent activities, such as pedestrians or those gathering for sports events. WSDOT will also direct temporary construction site lighting away from nearby residences and businesses.

### 14 What mitigation is proposed for land use effects during construction?

#### Mitigation Common to All Build Alternatives

Mitigation for potential effects on land use during construction activities will include providing advance notice to property owners in the project area regarding demolition and construction activities, utility disruptions, and detours. In addition, a construction website with a 24-hour project information line will be established and updated regularly.

There would be no adverse effects on the General Services Administration (GSA) Federal Office Building because the subsurface acquisition for this project would not interfere with potential future development opportunities.

WSDOT is coordinating with the Port of Seattle to address potential effects that would result from the use of Terminal 46 for construction staging. WSDOT will ensure that safety, access, security, and operations during the use of the terminal for project activities are not compromised.

Construction traffic, noise, and dust will be mitigated, as described in Questions 9, 11, and 24.

### 15 What mitigation is proposed for economic effects during construction?

#### Bored Tunnel Alternative

Mitigation measures for transportation are also important to mitigate effects on businesses and the economy. WSDOT will prepare a traffic management plan to ensure that construction effects on local streets, property owners, and businesses are minimized. For more information on the mitigation measures to be included in the plan, see Question 9.

The following mitigation measures are intended to counteract the diminished quality of the business environment for those businesses adjacent to construction activities. These measures would maintain access and the general setting for businesses and potential customers that existed before the project-related construction. WSDOT will implement the following mitigation measures:

- Minimize obstructions and/or delays along the routes to facilitate access to businesses, homes, cruise ships, ferry terminals, and waterfront attractions.
- Avoid all work in the City right-of-way from Thanksgiving Day through January 1 in the area bounded by Columbia Street, Second Avenue, S. King Street, and Alaskan Way unless a City-approved variance is obtained.
- Use signage and a communications plan to inform people about businesses open during construction.

Additional mitigation measures to reduce effects on economics would be related to communicating information and maintaining pedestrian access. WSDOT will continue to prepare a public outreach and communications plan each year during construction, which will include, among other things, outreach activities designed to provide notification about construction activities, pedestrian detours and parking changes during construction so that businesses can inform their clients,

customers, and vendors. Public outreach activities and communications will be ongoing during project construction.

#### **Cut-and-Cover Tunnel Alternative**

In addition to the mitigation measures discussed above for the Bored Tunnel Alternative, WSDOT could provide experts in business marketing to give technical assistance to affected businesses to help them operate during disruptive portions of the project. If implemented, this measure would be designed specifically for businesses abutting the project area along the waterfront and in the manufacturing and industrial centers.

#### **Elevated Structure Alternative**

Mitigation measures would be the same as discussed above for the Bored Tunnel and Cut-and-Cover Tunnel Alternatives.

#### **16 What mitigation is proposed for parking effects during construction?**

##### **Mitigation Common to All Build Alternatives**

The project has allocated \$30 million to mitigate parking effects during project construction, and specific strategies are being developed. The Seattle Department of Transportation (SDOT), in coordination with WSDOT, has conducted parking studies as part of the process to develop mitigation strategies and better manage the city's parking resources. Potential strategies to offset the loss of short-term parking in the central waterfront include providing new or leased parking and increased utilization of and access to existing parking. The City-led Central Waterfront Project is currently evaluating these strategies in the context of improved access to the central waterfront. The City will recommend strategies that could be implemented between 2011 and 2018. SDOT will implement the final parking mitigation strategies based on these recommendations.

WSDOT will identify appropriate parking options for construction workers, as necessary, and will discourage

their use of short-term visitor or customer parking in the project vicinity.

#### **17 What mitigation is proposed for effects on historic resources during construction?**

##### **Mitigation Common to All Build Alternatives**

Adverse effects due to traffic, noise levels, vibration, and air quality would impact historic resources adjacent to project construction. Therefore, the mitigation measures implemented to address those effects would also minimize effects on historic resources.

In addition, WSDOT will minimize effects on historic resources by implementing the following measures:

- Provide construction traffic mitigation, as described in Question 9
- Compliance with construction management plans, such as the Fugitive Dust Control Plan and Spill Prevention, Control, and Countermeasure (SPCC) Plan
- Ensure access to stores, offices, and residences in historic areas
- Minimize disruptions of utility service in historic areas and for historic buildings during construction
- Use newsletters, websites, posters, community e-mail updates, community events, and other methods of communication to keep property owners, residents, businesses and employees in historic districts and in other historic buildings informed about construction issues
- Provide parking mitigation, as described in Question 16

Specific mitigation measures to address adverse effects of the Bored Tunnel Alternative are outlined in a Memorandum of Agreement between WSDOT, Federal

Highway Administration (FHWA), State Historic Preservation Officer (SHPO), affected tribes, and other consulting parties. These measures are discussed in the section below. If one of the other build alternatives is selected, a Memorandum of Agreement will be developed to outline the mitigation needed for that alternative.

##### **Mitigation Specific to the Bored Tunnel Alternative**

WSDOT has outlined mitigation for adverse effects on historic resources in a Memorandum of Agreement between WSDOT, FHWA, SHPO, affected tribes, and other consulting parties. The requirements of the Memorandum of Agreement include the following measures, to be implemented by WSDOT:

- Historic building monitoring and preparation of settlement management plans for each historic building prior to start of proposed tunneling.
- Establish a claims and repair process to repair any damage to buildings. The process will include:
  - The damage claim submittal process;
  - The process by which damage claims will be inspected and evaluated;
  - The process for and personnel involved in preparing damage evaluations, repair cost estimates, findings and recommendations;
  - The process for making and documenting repairs based on the reported cost estimates and recommendations; and
  - The process for making appeals.

A licensed architect with a background in historic architecture, who meets the professional qualifications outlined in the Memorandum of Agreement, will participate in the claims and review process involving any historic buildings within the Area of Potential Effects.

Damage caused by the project will be repaired in kind and in accordance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties and in compliance with the City of Seattle’s Municipal Code, as appropriate. As required, there will be review and approval by the Pioneer Square Preservation Board, the Seattle Landmarks Preservation Board, the Pike Place Market Historical Commission, or Washington State Department of Archaeological and Historic Preservation for National Register of Historic Places eligible, but not locally designated, buildings.

- In the unlikely event that any one of the historic buildings suffers significant structural damage, emergency measures will be implemented as outlined in the Memorandum of Agreement.

WSDOT has outlined mitigation for adverse effects on the Pioneer Square Historic District, in the Memorandum of Agreement. The requirements include:

- Development and implementation of a communications plan.
- Establishment of a project information center to provide information and educational opportunities to the public, residents, and businesses in Pioneer Square.
- Development and implementation of marketing activities to promote Pioneer Square.
- Development and implementation of a traffic management and construction coordination plan.

To minimize damage to the Western Building, WSDOT will implement a building protection solution. WSDOT has prepared a conceptual design for this which includes foundation stabilization, the stabilization of existing cracked structural elements, the installation of temporary shoring inside the building, the construction of a temporary exterior steel frame around the building,

and a stabilizing regime of compensation grouting into the soil for added stability.

Approximately 118 tenants of the Western Building would be permanently relocated. Most of the tenants of this building are artists who use the building for studio or workspace. The artists benefit from their proximity to each other and the associated opportunities to share ideas and inspiration. Because of this, WSDOT is actively working to support the efforts of the artists by finding replacement accommodations nearby, either in the Pioneer Square neighborhood, if feasible, or in other locations in the greater Seattle area where the individual artists may choose to relocate.

The Polson Building is a historic building adjacent to the Western Building. WSDOT will avoid settlement damage to the Polson Building by using compensation grouting to stabilize the surrounding soil.

For the Lake Union Sewer Tunnel, the project has already modified the design of the Republican Street off-ramp to raise it to minimize impacts to the manhole shaft. WSDOT will mitigate the adverse effect on the sewer tunnel by recording the structure and researching its history as part of a National Register nomination form. Mitigation measures for settlement effects on non-historic buildings are discussed in Question 28.

#### **18 What mitigation is proposed for effects on archaeological resources during construction?**

##### **Mitigation Common to All Build Alternatives**

WSDOT will develop an Archaeological Treatment Plan which will guide the actions of cultural resources professionals for archaeological investigations and data recovery. The Archaeological Treatment Plan also will include the protocol for handling unanticipated archaeological and human remains discoveries, and archaeological monitoring during project construction.

The purpose of these plans is to make sure that archaeological resources, if unearthed during construction,

are handled in compliance with applicable regulations. This plan will be developed before excavation begins and will remain in effect until construction is completed.

#### **19 What mitigation is proposed for effects on parks, recreation, and open space during construction?**

Adverse effects due to traffic, noise levels, vibration, and air quality would have effects on parks, recreation, and open space adjacent to project construction. The mitigation measures implemented to address those construction effects would also minimize effects on recreational facilities.

##### **Bored Tunnel Alternative**

WSDOT will implement the following mitigation measures to address potential adverse effects on parks, recreation, and open space:

- Provide ADA-compliant detour routes when trails, pedestrian bridges, or other pathways are closed temporarily. Detours would be within a reasonable distance of the closed facility.
- Coordinate regularly with park and recreation facility operators to ensure that changes in viaduct removal activities and associated changes in access points and corridors are known in advance.
- Continue public outreach through project construction to keep the community informed about temporary closures or rerouting of facilities, and other potential effects.

As appropriate, WSDOT would provide way-finding signage to indicate detour routes along the corridor and on streets surrounding the construction areas.

##### **Cut-and-Cover Tunnel Alternative**

Mitigation measures would include those discussed above for the Bored Tunnel Alternative and the measures discussed below.

To address disruption of existing and usual patterns of movement along the waterfront during construction, which has the potential of reducing the overall attractiveness of the waterfront as destination, WSDOT would implement the following strategies:

- Provide temporary overwater pedestrian connections to allow continuity between Piers 54 and 59 while the waterfront promenade is not in operation
- To the extent possible, schedule construction activities to quickly complete waterfront work and restore a continuous, if temporary, corridor as soon as possible, while work continues on related activities that do not directly disrupt movement along the corridor

In addition, WSDOT could implement the following measures, with the decision to be made later in project planning:

- Provide specific locations for charter bus parking with clear and convenient access to the waterfront to preserve and enhance group attendance
- Publicize alternative modes of access to the waterfront by public transit or by dedicated transit service on peak demand days from park-and-ride lots or other facilities

The effects of noise and vibration on passive recreation activities such as walking, picnicking, and viewing the aesthetic amenities of the area will be addressed by construction scheduling and any noise attenuation measures, as required by the Major Public Project Construction Noise Variances. See Questions 11 and 12 for discussions of potential noise and vibration mitigation.

If determined necessary during project final design or as construction progresses, access to Blake Island cruises (Pier 55) would be relocated to portions of the waterfront less affected by cut-and-cover tunnel construction or

seawall reconstruction. Potential locations may include portions of Terminal 46, Pier 66, or Pier 70 within the general area or the Pier 91 or Fauntleroy areas. Such relocation would be communicated through public information methods to ensure that potential users are aware of the change.

Because of disruptive construction along the waterfront, the public may perceive that the waterfront would not be a convenient or pleasant environment to visit. WSDOT could work with tourism groups, local businesses, existing stakeholder groups, the media, and others to ensure critical access to the waterfront is maintained and accurate information about current and long-term construction activities is shared.

To mitigate impacts on recreational resources that depend on admission fees, such as the Seattle Aquarium or Qwest Field, mitigation measures that address access and parking effects, as discussed in Questions 9 and 16 would help to alleviate the perceived hassle of visiting the waterfront.

#### **Elevated Structure Alternative**

Mitigation measures would be the same as discussed above for the Bored Tunnel and Cut-and-Cover Tunnel Alternatives.

#### **20 What mitigation is proposed for effects on neighborhoods and community services or resources during construction?**

##### **Mitigation Common to All Build Alternatives**

Adverse effects due to changes in traffic, parking, noise levels, and the relocation of businesses would have varying effects on the overall social environment that defines how neighborhood residents, workers, and visitors interact. Therefore, the proposed construction mitigation measures for other disciplines, such as transportation, visual quality, noise, public services and utilities, and economics would also reduce effects on neighborhoods.

Each year, WSDOT develops a comprehensive public outreach and communications plan, which incorporates

the use of a variety of communication methods, such as websites, community e-mail updates, media relations, public meetings, interviews with social service providers, presentations to neighborhood groups, written materials, and information booths at community events to communicate project information and engage agencies, tribes, and the public.

The purpose of the communications plan is to make sure that the public is informed about construction happenings, such as detours and road closures. An informed public will result in less confusion and frustration for the communities located near the project area, and better trip planning for those traveling near construction activities.

During construction, WSDOT will continue to hold community briefings, maintain a presence at community events, and provide project information to the public via communications, such as e-mails and folios.

WSDOT will also maintain a project 24-hour hotline and e-mail so that people can call to receive information about the project or express a concern. If a concern is expressed by a member of the public, WSDOT will respond in a timely manner and work to address the issue.

WSDOT will communicate with owners and operators of community facilities, park and recreation facilities, religious and cultural institutions, social and employment services, and government agencies, throughout construction of the project to ensure that current construction activities and project milestones are known and concerns are addressed when possible. In addition, WSDOT will implement the following mitigation measures to address potential effects on neighborhoods and community services or resources:

- Coordinate with community service or resource providers to determine whether additional or special mitigation measures are needed.
- Work with representatives of Seattle Center, Safeco Field, Qwest Field, and the Qwest Field Event Center

to develop specific mitigation measures to address vehicle and transit access and parking issues related to workers and attendees at large events, as needed.

- Work with representatives of religious institutions close to construction zones to develop mitigation measures to address potential noise that could adversely affect services, meditation sessions, or other events, as needed.
- Include government agencies located near the project construction areas on distribution lists to notify them about planned construction activities.

#### **Mitigation Specific to the Bored Tunnel Alternative**

Approximately 118 tenants of the Western Building would be permanently relocated. Most of the tenants of this building are artists who use the building for studio or workspace. WSDOT is actively working to support the efforts of the artists by finding replacement accommodations.

#### **21 What mitigation is proposed for effects on minorities and low-income people during construction?**

##### **Mitigation Common to All Build Alternatives**

In addition to the public outreach and communication plan outlined above in Question 20, Mitigation Common to All Build Alternatives, WSDOT will implement the following measures to address effects on specific adjacent providers of services to minority and/or low-income people:

- Identify a safe and ADA-compliant pedestrian route between Pioneer Square/downtown and the St. Martin de Porres shelter to allow movement of people to and from the shelter throughout the construction period. Information about the route would be distributed to social service providers, placed in proper notification areas, and marked with directional signs.

- Work with The Compass Housing Alliance (formerly The Compass Center), Heritage House, Bread of Life Mission, Pike Market Senior Center, Plymouth Housing Group, Catholic Seamen’s Club, and Rose of Lima House to identify concerns and solutions for potential construction-related effects.

WSDOT will implement these measures to address general effects on minority and/or low-income populations:

- Ensure access to buildings, properties, and loading areas used by social service providers during construction.
- Hold briefings and interviews with social service providers to keep them up to date on the project and to gather feedback as the project progresses from design through construction.
- Work with citizen participatory groups and service providers, such as committees, task forces, advisory bodies, housing authorities and social services to identify, communicate and assist disadvantaged populations with transportation options.
- Cooperate with social service providers on emergent issues that affect minority and low-income populations.
- Ensure continuous utility service during construction to the extent feasible. If periodic outages are unavoidable, provide ample notice.
- Work with homeless service providers, neighborhood groups, the City, and King County to ensure the safety and survival of nearby homeless people during construction of the new transportation facilities. Nearby homeless people include those living outdoors or in vehicles located under or near transportation facilities in the project area.

- Secure construction sites to prevent entry and injuries (especially by homeless persons). Light construction areas during the night and conduct security sweeps to look for unauthorized people seeking shelter within construction sites.

- Train construction workers on appropriate interactions with homeless persons they may encounter at construction sites.

- Maintain regular communication with minority-owned businesses, if identified, affected by construction-related traffic congestion.

- Distribute flyers to service providers, ethnic media, and local businesses and place flyers on windshields of cars parked in long-term parking areas; these flyers should specify when vehicles should be moved. List other long-term parking alternatives in the area, if any exist.

#### **22 What mitigation is proposed for effects on public services during construction?**

##### **Mitigation Common to All Build Alternatives**

WSDOT will coordinate with public service providers throughout project design and construction to ensure that project effects are understood in advance, planned for, and minimized. The purpose of this coordination is to eliminate or reduce disruptions to public services that may occur during project construction.

WSDOT will coordinate with the City and Port of Seattle police and fire departments, regional transportation agencies, and other related agencies during the final design of the selected alternative. This coordination will make sure that reliable emergency access and alternative plans or routes to avoid preventable delays in response times are developed, and to ensure that general emergency management services are not compromised. Providers of emergency and nonemergency public services will be notified early on of detours and lane restrictions.

When water lines and fire hydrants are being relocated, WSDOT will coordinate in advance and provide schedule notifications to the affected fire stations to allow advanced planning and to reduce the effects associated with service interruptions.

WSDOT will coordinate with construction personnel and, if necessary, with the City and Port of Seattle police departments to ensure that adequate staffing is available during construction for traffic and pedestrian movement control and other necessary policing efforts.

WSDOT will implement the following mitigation measures to address effects on specific public services:

- **School Buses** – The Seattle School District has established rerouting plans for use when the existing viaduct is unusable. It is anticipated that these rerouting plans would be implemented when SR 99 is closed.
- **Solid Waste Collection, Disposal, and Recycling** – Waste processing haulers and facilities will be informed that additional loads would be delivered during construction. The area transfer stations and regional landfills have sufficient capacity to accommodate the construction waste and debris generated from construction activities associated with any of the build alternatives.

WSDOT would also implement the following mitigation measures to address effects on these public services, if such measures are found necessary to adequately address construction effects:

- **Law Enforcement Services** – The need for additional police support services could be addressed by providing additional permanent or temporary law enforcement officers and/or stations.
- **Fire and Emergency Medical Services** – Response times for fire and emergency medical services could be affected, particularly during construction.

Intelligent traffic signal controls at signalized intersections would be used as a partial mitigation measure. If intelligent traffic signals cannot adequately mitigate the effects on emergency response, then additional staff, equipment, and facilities may be proposed.

### 23 What mitigation is proposed for effects on utilities during construction?

#### Mitigation Common to All Build Alternatives

WSDOT will coordinate with utility providers on utility relocation plans that identify impacts and temporary and final locations. WSDOT will develop construction sequence plans and coordinate schedules for utility work to minimize service disruptions and provide ample advance notice when service disruptions are unavoidable, consistent with utility owner policies. Affected utility providers will review and approve relocation plans and service disruptions before construction begins.

Specific mitigation measures for effects on utilities will be developed during the ongoing coordination process between WSDOT, Seattle Public Utilities, Seattle City Light, and other providers. Some of the potential mitigation measures for effects on utilities during construction are:

- Assemble a multidisciplinary task force to monitor settlement during construction (Bored Tunnel Alternative only).
- Ensure all utilities are accessible during construction.
- Expose critical utilities before beginning construction in the vicinity.
- Coordinate utility relocation plans with utility owners and customers to minimize the impacts of service disruptions.
- Require contractors to comply with utility owner notice requirements for planned outages.

- Coordinate with utility owners to ensure that owner contingency plans for management of any potential utility service disruptions are accommodated.
- Provide backup on-site electrical generation, as needed, to minimize or eliminate power outages to customers as determined by Seattle City Light on a case-by-case basis.
- Coordinate construction-related mitigation with other construction projects in the vicinity to minimize utility and traffic disruptions.

In addition to the above potential mitigation measures, Washington State law and standard specifications require adherence to additional measures during construction:

- If inadvertent damage to utilities occurs during construction, the appropriate utility provider would be contacted immediately to restore service. WSDOT will also be required to take immediate measures to ensure public safety and protect property.
- Traffic revision equipment and personnel would be provided as required during utility relocations.
- Construction activities in the street right-of-way would be conducted during off-peak hours whenever possible to lessen traffic effects.
- All utilities determined to need protection in place would require a protective measure, such as pipe and conduit support systems, trench sheeting, and shoring.
- Construction techniques to avoid or minimize vibration effects on utilities would be used where needed. Such techniques may include using drilled shafts in lieu of driven piles.
- A safety watch would be provided through coordination with Seattle City Light. The safety

watch would minimize the interruption of power to customers and to speed up power restoration in the event of accidental interruption of power caused by project construction. Critical utilities, such as transmission ducting, may need to be exposed during construction to lessen the chance of damage that could result in unplanned outages.

#### 24 What mitigation is proposed for air quality effects during construction?

##### Mitigation Common to All Build Alternatives

A Memorandum of Agreement between WSDOT and Puget Sound Clean Air Agency is in place to identify appropriate mitigation to help eliminate, confine, or reduce construction-related emissions, in the form of fugitive dust, for WSDOT projects. The Memorandum of Agreement will apply to this project.

Per the MOA, WSDOT will create a plan for controlling fugitive dust during construction. This fugitive dust control plan will reduce air pollutant emissions near the construction site, including residences located along Battery Street adjacent to the open street grates. Some measures that will be included in the plan are:

- Cover trucks transporting materials to reduce particulate emissions during transportation on paved public roads
- When feasible and where practicable, route construction trucks away from residential and business areas to minimize annoyance from dust
- Coordinate construction activities between WSDOT and the Seattle Department of Transportation with respect to other projects in the area to reduce the cumulative effects of concurrent construction projects

In addition to the strategies detailed above, other measures for reducing air quality effects during construction include:

- Spray exposed soil with water or other dust palliatives to reduce emissions and deposition of particulate matter
- Remove particulate matter deposited on paved public roads to reduce mud and windblown dust on area roadways
- Enclose conveyor systems used to transport dirt from the tunnel excavation sites to the waterfront, if barges are used

WSDOT's traffic management plan will include best management practices to reduce activities such as idling and traffic congestion, which produce concentrated vehicle emissions. Implementation of this plan will also mitigate the effects of vehicle emissions on air quality.

The mitigation measures to reduce energy consumption and greenhouse gas emissions (discussed below) also will mitigate air quality effects.

#### 25 What is proposed to minimize energy consumption and greenhouse gas emissions during construction?

##### Mitigation Common to All Build Alternatives

The traffic management plan that WSDOT will develop for the project includes detours and strategic construction planning to continue moving traffic through the area and reduce backups to the extent possible. Construction areas, staging areas, and material transfer sites will be set up in a way that reduce standing wait times for equipment, engine idling, and the need to block the movement of other activities on the site. This traffic management plan will help minimize energy consumption through the promotion of reduced vehicle and equipment idling, which leads to reduced fuel consumption. Because fuel consumption is directly related to greenhouse gas emissions, any steps taken to minimize fuel consumption will reduce greenhouse gas emissions as well.

In addition to the traffic management plan, WSDOT will implement the following other measures to reduce energy consumption during construction:

- Use electrical equipment where feasible
- Use relatively new, well-maintained equipment
- Promote ridesharing and other efforts, such as WSDOT's Commute Trip Reduction program, to reduce commute trips for employees working on the project
- Coordinate construction activities with other projects in the area to reduce the cumulative effect of concurrent construction projects

#### 26 What mitigation is proposed for effects on water resources during construction?

##### Bored Tunnel Alternative

WSDOT will incorporate water quality BMPs into the project design to ensure that the proposed project will comply with the applicable federal, state, and local regulations to protect water resources. WSDOT may be required to obtain a National Pollutant Discharge Elimination System (NPDES) construction permit from the Washington State Department of Ecology (Ecology) if the extent of exposed soils and anticipated discharge locations require one.

Construction-related runoff and dewatering water will be discharged to the combined sewer system for treatment at the West Point Wastewater Treatment Plant. WSDOT will treat stormwater runoff from active construction areas and any dewatering water that reaches contaminant thresholds as necessary to meet the requirements of King County before discharge to either the combined sewer or the separated storm drain. If required, WSDOT will obtain a wastewater discharge permit or authorization from King County before discharging construction stormwater or dewatering water to the combined sewer. Depending on the volumes and timing, if discharging dewatering flows to

the stormwater or combined sewer system is not feasible, WSDOT will use off-site disposal.

WSDOT will avoid, minimize, and mitigate construction effects on water resources by developing, implementing, and updating as site conditions change throughout the duration of project construction, the following plans:

- Temporary Erosion and Sediment Control Plan
- Spill Prevention, Control, and Countermeasures Plan
- Concrete Containment and Disposal Plan

Each of these plans include performance standards based on state regulations, such as turbidity and total suspended solids levels in stormwater discharged from construction staging and work areas, which are established to eliminate or reduce pollutants entering bodies of water.

#### **Cut-and-Cover Tunnel Alternative**

The mitigation measures would be the same as those discussed above for the Bored Tunnel Alternative.

In addition, WSDOT will implement mitigation measures to minimize or prevent construction-related pollutants from entering Elliott Bay during the seawall replacement: a containment system would be installed on the waterward side of the existing seawall.<sup>3</sup> The following steps would be followed for construction of the containment system:

- 1 The existing seawall will be surveyed for size and location of cracks and other potential leakage points.
- 2 Temporary repairs will be made to the existing seawall to retain upland grout when it is placed.
- 3 A turbidity curtain will be installed to minimize turbidity in the construction area and prevent water quality impacts outside the work area.
- 4 A movable containment panel will be installed adjacent to the existing seawall, including impervious matting to be placed over the riprap adjacent to the seawall. The size and location of

the panel-mat system would be determined by the secant pile installation and grouting operations.

If spoils from jet grouting were dewatered on site, a temporary treatment facility will likely be required to treat the water before discharge.

If the removal of riprap were necessary, WSDOT will install a turbidity curtain before starting this task.

Outfalls that require replacement will be constructed at the same time as the seawall construction activities, using similar BMPs. WSDOT would implement measures to continue drainage service during construction during the replacement of stormwater outfalls and combined sewer overflow structures.

#### **Elevated Structure Alternative**

Potential mitigation measures would be the same as described above for the Bored Tunnel and Cut-and-Cover Tunnel Alternatives.

### **27 What mitigation is proposed for effects on fish, aquatic, and wildlife species and habitat during construction?**

#### **Bored Tunnel Alternative**

The primary activity that could affect fish and other aquatic species is the operation of a barge landing facility along Terminal 46. This operation would use existing facilities, and no in-water construction would be required.

WSDOT will implement construction BMPs to minimize or eliminate effects on species or their habitat. Standard construction BMPs will minimize short-term construction effects, including the discharge of sediment from the disturbed construction areas into Elliott Bay.

WSDOT will handle all pollutants to avoid contaminating surface water in the study area. Materials that modify pH, such as cement, cement grindings, and cement saw cutting, will be managed or isolated to minimize the spread of these materials by surface water runoff or other means of entering the area waterways; see Question 26 for details

about measures to avoid and minimize effects on water resources. WSDOT will ensure that all work activities comply with the necessary water quality requirements.

Unlike the other build alternatives, the Bored Tunnel Alternative would not include the replacement of the Elliott Bay Seawall, so no in-water construction activities would take place. Since there would be no effects on fish and aquatic resources as a result of in-water work, mitigation for such effects is not proposed.

#### **Cut-and-Cover Tunnel Alternative**

Mitigation measures would be similar to those described above for the Bored Tunnel Alternative.

However, because the Cut-and-Cover Tunnel Alternative includes replacing the seawall, WSDOT would implement standard in water construction BMPs, such as silt curtains, sound attenuation measures, and cofferdams to reduce or eliminate the potential effects of in-water construction activities on aquatic species and habitat. WSDOT will replace any habitat loss or reduction in function with appropriate mitigation measures, as required by applicable federal, state, and local regulations that govern fish, aquatic resources, wildlife species and habitat. Specific mitigation measures to replace habitat loss and function would be established if this alternative is selected.

WSDOT will mitigate for the effects of the temporary access bridge to the Colman Ferry dock and the pedestrian access walkways with the eventual removal of these structures and the permanent increase in aquatic habitat provided by moving the Elliott Bay seawall landward of the existing position.

#### **Elevated Structure Alternative**

Potential mitigation measures would be similar to those described above for the Cut-and-Cover Tunnel Alternative.

<sup>3</sup> Parsons Brinckerhoff 2006.



## 28 What mitigation is proposed for effects on soils and groundwater during construction?

### Mitigation Common to All Build Alternatives

Many of the effects on soils and groundwater during construction can be mitigated with BMPs, proper techniques, and good workmanship. Project construction will be observed by experienced engineers or technicians to ensure compliance with WSDOT standards.

### Settlement

To mitigate for effects related to settlement, WSDOT will:

- Perform soil improvement in areas where existing structures need to be protected from settlement; to be determined during final design.
- Use reinjection wells near the excavation area, supplied by water from the dewatering operation, to minimize settlement that may result from dewatering activities.
- Establish a claims and repair process by which owners of buildings, including historic buildings, can file claims for damages to their properties that result from the project; see Question 17 for more details about the claims and repair process.
- Use structural fill material appropriate for site conditions to construct fills.
- Perform construction sequencing so that project structures that could be sensitive to settlement are installed after most of the fill settlement has occurred, if necessary.
- Avoid placing stockpiles directly over utilities or pavements without appropriate subsurface support to prevent potential damage. In areas where this is not possible, stockpile heights could be limited to avoid damage to underlying utilities or pavement.

- If necessary, shore temporary excavations to mitigate potential sloughing of soils and lateral movement or settlement of nearby existing roadways, railways, structures, and utilities.

In addition to the measures described above, WSDOT would use these measures to address settlement, if needed:

- Preload the site as needed in areas where site availability and time schedules allow.
- Perform soil improvement or alternative construction methods (e.g., use of compressible foundation material over hard spots or installation of structural elements) to mitigate for potential differential settlement.
- Relocate existing utilities located beneath or near proposed fill embankments if loads and settlements would cause damage to the utilities. Alternatively, monitor utilities to determine if settlement tolerances are being exceeded.
- Use lightweight fill materials in areas where settlements must be minimized and alternative measures are not feasible.

### Soil Improvement

WSDOT will implement soil improvement measures, such as jet grouting and compensation grouting, to stabilize soft soils where necessary (except between S. Main Street and S. Washington Street to avoid potential archaeological deposits).

### Erosion and Sediment Control

WSDOT will implement BMPs for erosion and sediment control. Erosion and sediment control measures suitable to specific site conditions will be used. Site conditions will dictate the possible BMPs used, which include using construction staging barrier berms, covering loads during transport, filter fabric fences, temporary sediment detention basins, and slope coverings to contain sediment on site.

Temporary erosion and sediment control plans will be prepared for approval in accordance with BMPs included in the current Seattle Municipal Stormwater Code (Ordinance 123105) and the Seattle Municipal Grading Code (Ordinance 123107), as appropriate, and the WSDOT *Highway Runoff Manual*.<sup>4</sup>

Proposed mitigation measures will be consistent with stormwater design and treatment procedures in the current version of the WSDOT *Highway Runoff Manual* and also will follow the permits necessary for this project.

### Bored Tunnel Alternative

In addition to the mitigation measures common to all the build alternatives, the following measures are proposed for the Bored Tunnel Alternative:

- Dewatering systems will be designed to minimize the drawdown of the water table outside of the excavation in areas where adjacent structures may be affected. Potential mitigation measures include the use of groundwater recharge wells, dewatering in small sections, or use of barriers (e.g., sheet piles) to isolate the water table within the excavation.
- Use soil improvement, such as jet grouting and deep soil mixing, along the bored tunnel alignment to stabilize soft soils and reduce the potential for settlement.
- Control and monitor the tunnel boring machine to minimize ground loss and settlement during tunnel boring.
- Inspect critical structures and utilities likely to be affected by tunneling-induced settlement prior to construction to evaluate their existing condition and potential for damage.
- Instrumentation may be installed to monitor ground movements on and below the ground surface during tunnel boring; see Question 12 for more

<sup>4</sup> WSDOT 2010.

information on vibration monitoring during tunnel boring.

#### **Cut-and-Cover Tunnel Alternative**

The mitigation measures discussed above for the Bored Tunnel Alternative would apply for this alternative, except for measures directly related to the tunnel boring machine used for the Bored Tunnel Alternative.

#### **Elevated Structure Alternative**

The mitigation measures common to all build alternatives would apply for this alternative.

#### **29 What mitigation is proposed for effects related to hazardous materials during construction?**

For all build alternatives, WSDOT will prepare a Spill Prevention, Control, and Countermeasures Plan, which outlines procedures to be used if a spill of hazardous materials occurs; a fugitive dust plan to control dust-generating activities; a water quality monitoring plan; and a Soil and Groundwater Management Plan that addresses handling and disposal of known and unanticipated contamination.

For contamination already identified by WSDOT, additional investigations and characterization may be performed to determine whether the project would disturb contaminants present, and appropriate necessary mitigation. For instance, if WSDOT's final construction plans are unable to avoid previously identified site contamination, additional investigations, characterizations, and surveys would be performed to support appropriate management and disposal of the contaminated materials. These investigations may include environmental site assessments, contamination delineations, asbestos surveys, lead surveys, and/or geophysical surveys.

WSDOT will manage and dispose of contaminated soil in accordance with applicable permits and regulations and will implement construction techniques that minimize disturbance, release, and migration of contaminants in the project area. Construction activities will be selected in order to reduce the spread of contamination; specific

construction methods, such as use of special drilling method or dewatering wells that minimize drawdown, may be necessary to prevent cross-contamination and to minimize the migration of contaminated groundwater during construction.

Groundwater that is encountered during project construction dewatering will be handled in accordance with applicable permits and regulations. Shallow groundwater is more likely to contain contaminants than groundwater from deeper soil. Water quality treatment for shallow dewatering could consist of storing the water to allow particles to settle or reducing suspended particles by adding chemical flocculants. If required, WSDOT will treat contaminated dewatering water to acceptable standards according to the Washington State Surface Water Quality Standards prior to discharging to waters of the state or King County, or WSDOT will dispose of it offsite at a facility permitted to accept contaminated water.

To reduce the effect of odors due to contaminants that could become airborne during construction or demolition activities, engineering controls would also be implemented, such as ventilation with fans to dissipate volatile contaminants and air filtration methods to remove particulates and volatile compounds.

#### **INDIRECT EFFECTS**

#### **30 Are mitigation measures proposed for indirect effects?**

Indirect effects, such as people changing where they shop, where they eat out, or what services they use as they adjust travel patterns during project construction are possible. In addition, if the Bored Tunnel Alternative or Cut-and-Cover Tunnel Alternative is selected, a new tunnel facility may support renovation and revitalization of existing urban land uses in some areas because the viaduct structure would be removed and new development on vacant or under-used property or redevelopment may take place around the new Alaskan Way surface street. However, project indirect effects are not expected to be significant;

mitigation beyond what would be implemented to address direct effects is not proposed.

#### **EFFECTS NOT MITIGATED**

#### **31 What permanent project effects would not be mitigated?**

In general, WSDOT avoids, minimizes, or mitigates permanent effects associated with the project. However, the permanent effects discussed below will not be mitigated.

#### **Transportation Changes**

The tolled and non-tolled Bored Tunnel and Cut-and-Cover Tunnel Alternatives would permanently change travel patterns compared to the existing viaduct. The Elevated Structure Alternative would maintain access similar to the existing viaduct. Changes to travel patterns may permanently increase travel times for some routes. However, changes to travel patterns, increased travel times, and/or changes to access will not be mitigated.

#### **Parking Losses**

All three of the build alternatives are expected to result in a reduction in parking facilities relative to existing conditions, but there are no proposed mitigation measures for permanent parking losses. No mitigation is proposed because the parking removals are consistent with Seattle's Comprehensive Plan:<sup>5</sup> Goal TG18 indicates that in making decisions about on-street parking, transportation is the primary purpose of the city's street system.

#### **Noise**

Compared to 2015 existing conditions, the number of modeled sites that exceed the noise abatement criteria in 2030 would be:

- Reduced by 12 sites with the Tolled Bored Tunnel
- Reduced by 13 sites with the Non-Tolled Bored Tunnel
- Reduced by 10 sites with the Tolled Cut-and-Cover Tunnel

<sup>5</sup> City of Seattle 2005.

- Reduced by 13 sites with the Non-Tolled Cut-and-Cover Tunnel
- Increased by 4 sites with the Tolled Elevated Structure
- Increased by 4 sites with the Non-Tolled Elevated Structure

Measures for noise abatement as required by federal regulations (23 CFR 772) were evaluated for each alternative to determine what measures are feasible and reasonable. These measures include the following:

- **Traffic management** – measures include time restrictions, traffic control devices, signing for prohibition of certain vehicle types (e.g., motorcycles and heavy trucks), modified speed limits, and exclusive lane designations. For example, speed limits could be reduced, but a reduction of 10 to 15 miles per hour would be required to decrease traffic noise by 5 dBA. Implementation of these measures for the sole purpose of noise mitigation would not be reasonable.
- **Land acquisition for noise buffers or barriers** – in an urban area such as the study area, this would require relocating numerous residents and businesses and would not be reasonable for the purpose of noise mitigation.
- **Realigning the roadway** – the alignment is defined by available right-of-way and the design features of the project. The cost of realigning the roadway would not be reasonable exclusively as an operational noise mitigation consideration.
- **Noise insulation of buildings** – this measure does not apply to commercial and residential structures and is not eligible for federal funding.
- **Noise barriers** – to be effective, noise barriers would have to block access to the surface streets. There are no feasible mitigation measures to reduce traffic noise levels because the surface streets

provide local access to downtown and the waterfront throughout the central waterfront.

None of these measures were identified to be feasible and/or reasonable for any of the build alternatives.

### **32 What temporary construction effects would not be mitigated?**

WSDOT will implement mitigation measures to avoid or minimize effects during construction for all build alternatives. However, it will not be possible to prevent some effects, even with mitigation. For many of the effects described in this chapter, some residual temporary construction effects would remain. For example, mitigation measures will be in place during construction to minimize noise impacts, but people near the construction area will still hear construction activities. Another example is pedestrian access. Mitigation will be in place to maintain access for pedestrians, but there likely will be periods when a favored pedestrian route is temporary closed. Similarly, access to the stadiums and waterfront attractions will be maintained, but the convenience of visiting these attractions will likely be diminished. Such residual effects are not expected to be substantial and will be temporary as the project moves along the corridor.