CHAPTER 7 - CUMULATIVE EFFECTS

What’s in Chapter 7?

Chapter 7 identifies possible cumulative effects of the Bored Tunnel Alternative when combined with other ongoing or expected plans and projects. The first portion of this chapter describes how the transportation system would work when the Bored Tunnel Alternative is combined with other elements of the Alaskan Way Viaduct and Seawall Replacement Program. The second portion of this chapter describes effects of the Bored Tunnel Alternative and the Program combined with other plans and projects.

1 What are cumulative effects, and why do we study them?

Cumulative effects would result from the total effect of the proposed Alaskan Way Viaduct Replacement Project (Project) when added to other past, present, and reasonably foreseeable future projects or actions. Cumulative effects may be partly caused by this Project, but they also would include the effects of other projects (past, present, and future) on the particular resource. Cumulative effects are studied to evaluate the public, decision-makers, and project proponents to consider the “big picture” effects of a project on the community and the environment.

The Alaskan Way Viaduct Replacement Project complements a number of other projects with independent utility that improve safety and mobility along SR 99 and the Seattle central waterfront from the area south of downtown to Seattle Center. These improvements include the Moving Forward projects identified in 2007 and the improvements recommended as part of the Partnership Process. Collectively, these individual projects are referred to as the Alaskan Way Viaduct and Seawall Replacement Program (Program).

The 2004 Draft EIS and 2006 Supplemental Draft EIS did not refer to the Alaskan Way Viaduct and Seawall Replacement Program. The distinction between the Alaskan Way Viaduct Project and the Program came after the Moving Forward projects were announced in 2007.

This Supplemental Draft EIS evaluates the short- and long-term environmental effects of the Alaskan Way Viaduct Replacement Project and the cumulative effects of the Program. Analyzing the combined effects of the Project and the Program helps the public and decision-makers understand how our transportation system would function in the future when the planned improvements are completed. The detailed environmental effects of the independent projects would be examined through separate environmental processes. After considering the combined effects of the Project and the Program, this EIS then considers their effects combined with other ongoing or expected plans or projects.

2 How were cumulative effects assessed?

The project team assessed cumulative effects following the eight-step process established in the Washington State Department of Transportation’s (WSDOT’s) guidance for performing a cumulative impact analysis.² The steps of this process are outlined in Exhibit 7-1.

All resources evaluated for permanent and short-term construction-related effects were considered in the cumulative effects analysis for this Supplemental Draft Environmental Impact Statement (EIS).

3 How were study areas and timeframes determined for this cumulative effects analysis?

The study areas vary depending on the resource evaluated. The project team determined the study area for cumulative effects on each resource by:

1. The distribution of the resource
2. The area within that distribution where the resource could be affected by the project in combination with other past, present, and reasonable foreseeable future actions.

The timeframe for the cumulative effects analysis for each resource begins when past actions began to change the status of the resource from its original condition, setting the long-term trend currently evident and likely to continue into the reasonably foreseeable future. For most

Exhibit 7-1

<table>
<thead>
<tr>
<th>Step</th>
<th>Approach</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Identify resources to consider</td>
</tr>
<tr>
<td>2</td>
<td>Define the study area for each resource</td>
</tr>
<tr>
<td>3</td>
<td>Describe current status, utility, and historical context for each resource</td>
</tr>
<tr>
<td>4</td>
<td>Identify direct and indirect project effects that might contribute to a cumulative effect</td>
</tr>
<tr>
<td>5</td>
<td>Identify other current and reasonable foreseeable actions</td>
</tr>
<tr>
<td>6</td>
<td>Identify and assess cumulative effects</td>
</tr>
<tr>
<td>7</td>
<td>Document the results</td>
</tr>
<tr>
<td>8</td>
<td>Assess the need for mitigation</td>
</tr>
</tbody>
</table>


Where can I see the results of the cumulative effects analysis for each resource?

Chapter 7 and an attachment of Appendices D through I and K through R provide the detailed work performed to assess potential cumulative effects for each resource evaluated in this Supplemental Draft EIS. Appendix C, Transportation Discipline Report, Chapter 7, contains the traffic analysis completed to evaluate cumulative effects. The cumulative effect discussion in this chapter of the Supplemental Draft EIS summarizes possible adverse and beneficial cumulative effects identified in the technical appendices.

What is the Alaskan Way Viaduct and Seawall Replacement Program?

The term “Program” refers to a number of independent but complementary projects that will improve safety and mobility along SR 99 and the Seattle waterfront from the SODO area south of downtown to Seattle Center. These individual projects include the Moving Forward projects identified in 2007, as well as improvements recommended as part of the Partnership Process.

² WSDOT et al. 2008.
resources evaluated, the timeframe for assessing cumulative effects begins in the mid-nineteenth century, when the central Puget Sound region began to be altered by non-Native American settlers, and ends in 2030, the design year for the Project.

The study areas for each resource are listed in Exhibit 7-2.

### Exhibit 7-2
### Study Areas for Cumulative Effects

<table>
<thead>
<tr>
<th>Resource</th>
<th>Study Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>Four-county area (King, Snohomish, Pierce, and Kitsap) and Seattle Center City</td>
</tr>
<tr>
<td>Visual Quality</td>
<td>Viewshed of the proposed project</td>
</tr>
<tr>
<td>Land Use</td>
<td>Approximately two blocks on either side of SR 99 from the vicinity of S. Royal Brougham Way to Roy Street.</td>
</tr>
<tr>
<td>Social</td>
<td>Approximately free blocks from the project corridor</td>
</tr>
<tr>
<td>Historic and Archaeological</td>
<td>One block on either side of the proposed alignment from approximately King Street to Roy Street.</td>
</tr>
<tr>
<td>Public Service and Utilities¹</td>
<td>Approximately three to five blocks of proposed improvements from S. Atlantic Street to Roy Street.</td>
</tr>
<tr>
<td>Economics</td>
<td>Regional effects – Puget Sound region states; local effects – approximately one block either side of proposed improvements.</td>
</tr>
<tr>
<td>Air Quality¹</td>
<td>Center City area of Seattle, as well as on a regional scale (King, Pierce, Snohomish, and Kitsap Counties).</td>
</tr>
<tr>
<td>Wildlife, Fish and Vegetation¹</td>
<td>Upland habitat in the vicinity of the proposed improvements and nearby shoreline and open water habitats of Elliott Bay and Lake Union.</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Elliott Bay, Lake Union, central Puget Sound, and associated surface water draining into these water bodies.</td>
</tr>
<tr>
<td>Earth¹</td>
<td>One block on either side of the proposed alignment from approximately King Street to Roy Street.</td>
</tr>
<tr>
<td>Hazardous Materials¹</td>
<td>Two blocks on either side of the proposed alignment from approximately King Street to Roy Street.</td>
</tr>
<tr>
<td>Energy¹</td>
<td>Washington State</td>
</tr>
</tbody>
</table>

¹ No net cumulative effects

### 4 How was the baseline condition established for each resource?

For each resource, the project team established the baseline condition by describing its existing condition. Chapter 4 of this Supplemental Draft EIS identifies existing conditions for each resource evaluated. The project team developed a brief summary identifying long-term trends affecting the condition of each resource.

### 5 What current and future actions were identified and considered?

The project team identified projects that are currently underway as well as past and reasonably foreseeable future actions by compiling information from local and state agencies, past environmental analyses, and comments received during the scoping process for this EIS. Reasonably foreseeable future actions were defined as actions or projects with a reasonable expectation of actually happening, as opposed to potential development expected on the basis of speculation. The reasonably foreseeable future actions that were identified met the following criteria:

- The project is included in a financially constrained plan (e.g., a capital improvement program).
- The project is permitted or a permit application has been submitted.
- The project was identified as reasonably foreseeable by agency personnel (agency personnel include City of Seattle [City] and WSDOT staff).

Based on these criteria, the following projects were identified as being reasonably foreseeable and were included in this cumulative effects analysis:

- Independent projects included as part of the Alaskan Way Viaduct and Seawall Replacement Program (Program)
- Twenty-eight projects that may be built within a similar timeframe or in a nearby location, are currently under construction, or have recently been completed. These projects are listed in Question 16 of this chapter.

### Projects Included in the Alaskan Way Viaduct and Seawall Replacement Program

The Alaskan Way Viaduct Replacement Program (Project) complements a number of projects with independent utility that improve safety and mobility along State Route 99 (SR 99) and the Seattle central waterfront from the South of Downtown (SODO) area to Seattle Center. Collectively, these individual projects (listed below and shown in Exhibit 7-3) are often referred to as the Alaskan Way Viaduct & Seawall Replacement Program Elements:
Way Viaduct and Seawall Replacement Program (Program). Descriptions of these individual projects are provided in Chapter 1, Question 7, of this Supplemental Draft EIS. In addition to these projects, 28 other projects listed in Question 16 of this chapter were identified as recently completed, underway, or planned in or near the project area for the Alaskan Way Viaduct Replacement Project.

**Roadway Elements in the Program**
- Alaskan Way Surface Street Improvements³
- Elliott/Western Connector⁴
- Mercer West Project

**Non-Roadway Elements in the Program**
- Elliott Bay Seawall Project⁵
- Alaskan Way Promenade/Public Space⁶
- Transit Enhancements
- First Avenue Streetcar Evaluation

**Projects Under Construction**
- S. Holgate Street to S. King Street Viaduct Replacement Project
- Transportation Improvements to Minimize Traffic Effects During Construction

**Completed Projects**
- SR 99 Vesey Way Vicinity Foundation Stabilization
- S. Massachusetts Street to Railroad Way S.
  Electrical Line Relocation Project

6 How were cumulative effects of the Project, the Program, and other projects evaluated? The cumulative effects discussion in this chapter evaluates the potential combined effects of (1) the Project when combined with the Program, and (2) the Project when combined with the Program and other projects in the area. Cumulative effects were assessed in these two groups to show the public and decision-makers how the regional and local transportation system would function with both the Project and the independent projects associated with the Program and with other planned local and regional projects.

The text below explains the conclusions of the cumulative effects analysis using the following organization:

**Cumulative Effects of the Project When Combined with the Program**
- The in-depth traffic analysis performed to predict how travel patterns would change with the Project and Program is described.
- Long-term cumulative benefits of the Project and Program are discussed.
- Temporary, adverse effects from construction of the Project and Program are discussed.

**Cumulative Effects of the Project When Combined with the Program and Other Planned Projects**
- Long-term cumulative benefits of the Project combined with the Program and other projects are discussed.
- Temporary adverse effects from construction of the Project combined with the Program and other projects are discussed.

The Project would replace an existing transportation facility with a new one that would provide similar capacity. Because this Project would replace an existing facility in a densely developed urban area, it generally maintains and supports existing conditions. Other planned projects have been developed assuming the existing transportation facility would be replaced with a new facility with similar capacity. As a result, the Project is not expected to cause many long-term adverse cumulative effects on the area. However, several projects are likely to be underway during the same timeframe as construction for the Project. Consequently, there is a potential for short-term cumulative effects due to the construction activities.

**Cumulative Effects of the Project When Combined with the Program**
- The 2015 Project represents traffic conditions resulting from the Bored Tunnel Alternative in 2015. This information is presented in Chapter 5 and is included in this chapter to help the public and decision-makers understand how the regional and local transportation system would function with both the Project and the independent projects associated with the Program in 2015.
- The 2030 Project represents traffic conditions resulting from the Bored Tunnel Alternative and all of the Program elements except for the First Avenue streetcar and the proposed transit enhancements. These transit elements were excluded because they would likely be phased in later, but well before 2030. The other Program elements would likely come several years after the Bored Tunnel is completed in 2015. However, the year 2015 was used to make it easier to understand changes from the existing facility and because the underlying transportation demand would not substantially change in only a few years.

7 What traffic analysis was completed to evaluate potential cumulative effects of the Project when combined with the Program? A traffic analysis was performed to determine how the Bored Tunnel Alternative, other projects included in the Program, and other reasonably foreseeable projects would cumulatively affect traffic on SR 99 and adjacent city streets if they are constructed. The traffic analysis assessed the following:

- 2015 Project – The 2015 Project represents traffic conditions resulting from the Bored Tunnel Alternative in 2015. This information is presented in Chapter 5 and is included in this chapter to help the public and decision-makers understand how the regional and local transportation system would function with both the Project and the independent projects associated with the Program in 2015.
- 2030 Project – The 2030 Project represents traffic conditions resulting from the Bored Tunnel Alternative and all of the Program elements except for the First Avenue streetcar and the proposed transit enhancements. These transit elements were excluded because they would likely be phased in later, but well before 2030. The other Program elements would likely come several years after the Bored Tunnel is completed in 2015. However, the year 2015 was used to make it easier to understand changes from the existing facility and because the underlying transportation demand would not substantially change in only a few years.

**What transportation improvements were included in the transportation analysis comparing the 2030 Project and the 2030 Program?**

- S. Holgate Street to S. King Street Viaduct Replacement Project
- SR 519 Intermodal Access Project, Phase 2
- S. Spokane Street Viaduct Widening Project
- Mercer East Project from Dexter Avenue N. to I-5
- Third Avenue Transit Exclusivity
- Sound Transit Phase 1 and 2 including Sounder Commuter Rail, ST Express Bus, First Hill Streetcar, and South Link, University Link, North Link, and East Link Light Rail
- Existing transit services and new services proposed in agencies’ 6-year plans
- King County Transit Now

³ Both the Cut-and-Cover Tunnel and Elevated Structure Alternatives include improvements to Alaskan Way as part of the alternative.

⁴ The transportation function provided by the Elliott/Western Connector is provided by both the Cut-and-Cover Tunnel and Elevated Structure Alternatives.

⁵ Both the Cut-and-Cover Tunnel and Elevated Structure Alternatives include replacing the Elliott Bay Seawall as part of the alternative.

⁶ Both the Cut-and-Cover Tunnel and Elevated Structure Alternatives include improvements to the Alaskan Way Promenade as part of the alternative.
function with both the Project and the independent projects associated with the Program in 2030.

- **2030 Program** – The 2030 Program represents traffic conditions in 2030 if the Bored Tunnel Alternative and all of the Program elements are constructed. The 2030 Program includes the First Avenue Streetcar and other transit enhancements, including (1) Delridge RapidRide, (2) additional service hours on West Seattle and Ballard RapidRide, (3) peak-hour express routes added to South Lake Union and Lower Queen Anne, and (4) local bus changes (such as realignments and a few additions) to several West Seattle and northwest Seattle routes.

Exhibit 7-4 summarizes which project or Program component is included for each of the modeled conditions described above.

### Exhibit 7-4

<table>
<thead>
<tr>
<th>PROJECT OR PROGRAM COMPONENT</th>
<th>2015 Project</th>
<th>2015 Program</th>
<th>2030 Project</th>
<th>2030 Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaskan Way Surface Street Improvements</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Elliott/Western Connector</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Alaskan West Project</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Elliott Bay Seawall Project</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Alaskan Way Promenade/Public Space</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>First Avenue Streetcar Evaluation</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>S. Holgate Street to S. King Street</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Viaduct Replacement Project</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Transportation Improvements to Minimize Traffic Effects During Construction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SR 99 Viaduct Replacement Foundation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stabilization Project</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>S. Massachusetts Street to Railroad Way S. Electrical Line Relocation Project</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

8 How would regional traffic conditions change when the Project and the Program are combined?

Regional traffic conditions were assessed to evaluate conditions resulting from the Project and the Program when they open and in 2030. The systemwide traffic analysis evaluated vehicle volumes, total person throughput, vehicle miles traveled (VMT), vehicle hours traveled (VHT), and vehicle hours of delay (VHD). The results of these analyses are summarized below.

**Vehicle Volumes Throughout the Transportation Network**

Vehicle volumes were evaluated at four screenline locations for the Project and the Program when they open and in 2030. A screenline captures combined vehicle volumes that cross a particular location in the transportation system. The screenline data provided in Exhibit 7-5 includes combined vehicle volumes on Interstate 5 (I-5), SR 99, and local streets at specific locations in the south, central, and north sections of the project area.

The key findings for vehicle volumes at screenlines are as follows:

- **There are no meaningful differences in vehicle volumes across the south and central screenlines for the 2015 and 2030 time periods.**

- **For the north screenline, vehicle volumes for the 2015 and 2030 Program are about 2 percent less than the volumes for the 2015 and 2030 Project. This slight change in vehicle volume across this screenline is likely due to the Elliott/Western Connector, which is expected to draw Ballard and Interbay traffic away from the bored tunnel and onto Alaskan Way, which in turn would reduce**

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**What are VMT, VHT, and VHD?**

- Vehicle miles traveled (VMT) measures how many miles vehicles travel on the roadway network.
- Vehicle hours traveled (VHT) indicates the total number of hours travelers spend on the roadway network.
- Vehicle hours delay (VHD) measures the number of hours that travelers spend traveling on roadways at less than optimum speeds. VHD is often used as an indicator of congestion.
vehicle volumes on east-west streets like Mercer Street in the north.

- Growth in screenline volumes between the 2015 and 2030 Project and Program is small because streets and highways in the area are already congested for many hours a day, and more trips are expected to be accommodated by transit than single-occupant vehicles in the future.

- Trends in total person throughput are similar to those discussed above for vehicle volumes.

**Miles and Hours of Travel and Vehicle Delay**

The traffic analysis shows no meaningful differences between the Project and the Program in terms of VMT and VHT. For VMT and VHT, the differences between the Project and the Program in 2015 and 2030 were less than 1 percent. In the four-county transportation system (King, Snohomish, Pierce, and Kitsap), VHD with the Project and the Program in 2015 and 2030 is nearly the same. Within the Seattle Center City area, VHD is estimated to be about 3 percent higher for the 2030 Project than the 2030 Program. The decrease in SR 99 vehicle volumes with the 2030 Program can be attributed to the Alaskan Way Surface Street Improvements and the Elliott/Western Connector, which are expected to draw Ballard and Interbay traffic away from the bored tunnel and onto Alaskan Way. In the north, increases in SR 99 volumes for the 2030 Program can be attributed to improvements that are part of the Mercer West Project.

Ramp volumes for the 2030 Project and Program mirror the results for vehicle volumes on the SR 99 mainline as shown in Exhibit 7-7. The 2030 Program shows slightly higher vehicle volumes on the Alaskan Way S. ramps than the volumes with the 2030 Project due to higher expected vehicle volumes on Alaskan Way. The 2030 Program shows a lower volume of traffic on the Republican Street ramps, which can also be attributed to the Alaskan Way Surface Street Improvements and the Elliott/Western Connector. Finally, the 2030 Program shows a higher volume of traffic on ramps and the SR 99 mainline north of Denny Way. These higher volumes can likely be attributed to improvements in the Mercer corridor as part of the Program, which are expected to improve circulation and access.

**SR 99 Peak Hour Speeds and Travel Times**

Peak hour speeds and travel times on SR 99 are similar between the Project and the Program in both 2015 and 2030. As shown in Exhibit 7-8, for nearly all of the trips studied, differences between the Project and Program are 2 minutes or less. The one exception is for the northbound S. Spokane Street to Ballard trip (via Alaskan Way) in the 2015 AM peak hour. For this trip, the travel time is expected to decrease by about 3 minutes. This decreased travel time is likely due to the Alaskan Way Surface Street Improvements and the Elliott/Western Connector, which would be constructed as part of the Program and would provide drivers with more direct access between the waterfront (Alaskan Way) and the Elliott/Western Avenue corridor.

**Vehicle Volumes on SR 99**

As shown in Exhibit 7-6, daily vehicle volumes on SR 99 for the 2030 Project and the 2030 Program are similar, with slight increases for the 2030 Program south of downtown and north of downtown. In the central section of the project area, daily SR 99 vehicle volumes in the bored tunnel are expected to be slightly lower for the 2030 Program than the 2030 Project. The decrease in SR 99 vehicle volumes with the 2030 Program can be attributed to the Alaskan Way Surface Street Improvements and the Elliott/Western Connector, which are expected to draw the traffic away from the bored tunnel and onto Alaskan Way.

**Vehicle Volumes on SR 99**

As previously discussed, vehicle volumes in the transportation system would be similar for the Project and Program across the south, central and north screenlines. VMT, VHT, and VHD would also be similar between the Project and Program. As shown in Exhibits 7-6 and 7-7,
Travel Time Comparison for the Project and Program
there are slight differences between the Project and the Program related to vehicle volumes on SR 99 and the associated ramps. So, the final question to ask in this analysis is how do traffic conditions and volumes compare on I-5 and area streets?

As shown in Exhibit 7-9, vehicle volumes on I-5 are essentially the same for the Project and Program. For example, I-5 volumes north of Seneca Street are expected to decrease by about 700 trips per day with the 2030 Program than with the 2030 Project. This change in volumes is negligible, since I-5 is forecasted to carry nearly 270,000 vehicles per day in 2030.

11 How would traffic conditions on area streets change? Exhibit 7-10 presents projected vehicle volumes on area streets for the 2030 Project and the 2030 Program. As shown in Exhibit 7-10, vehicle volumes on local streets, particularly Alaskan Way, downtown city streets between Alaskan Way and I-5, and streets west of SR 99 north of Harrison Street, are expected to vary between the 2030 Project and 2030 Program for the reasons provided below.

Vehicle Volumes on Alaskan Way and Central Downtown
Because it would be widened and improved as part of the Program, Alaskan Way is expected to carry more traffic with the 2030 Program than with the 2030 Project. These improvements would draw some traffic away from downtown city streets west of I-5 and would make the route more efficient for drivers traveling to and from the Ballard/Interbay area. Specifically, vehicle volumes on Alaskan Way are expected to increase by the following:

- 9,100 vehicles per day near S. King Street
- 8,600 vehicles per day north of Seneca Street
- 9,600 vehicles per day north of Pine Street

Despite these increases in vehicle volumes, overall congestion on Alaskan Way is expected to improve with the Program as compared to the Project, because the Program improves Alaskan Way to accommodate the added vehicle volumes by adding a lane in each
direction between approximately S. King Street and Madison Street.

Vehicle Volumes on Streets West of SR 99 and North of Harrison Street

Vehicle volumes on streets west of SR 99 and north of Harrison Street are expected to decrease by about 10,000 vehicles per day with the 2030 Program as compared to the 2030 Project. This difference can be attributed to improvements that are part of the Mercer West Project, which converts Mercer and Roy Streets to two-way operations, offering a more direct westbound route between SR 99 and Elliott Avenue. With the 2030 Program, drivers would be able to travel westbound on Mercer Street, as compared to the 2030 Project in which westbound trips would be made by traveling southbound to Denny and then northwest to the desired destinations.

12 How would intersection operations change?

Intersection delays are expected to be similar between the Project and the Program. In general, intersection operations are likely to be similar or would improve with the Program as compared to the Project for the reasons provided below.

South

In the south end, the roadway network is the same for the Project and Program. Therefore, traffic conditions on area streets are expected to be similar between the Project and Program. These conditions are described in Chapter 5, Question 8. In brief, despite about 4,300 more trips per day on north-south arterials such as First and Fourth Avenues, the number of congested intersections is not expected to change.

Central

The Alaskan Way Surface Street Improvements and the Elliott/Western Connector are expected to draw additional traffic to Alaskan Way and Elliott and Western Avenues compared to Project conditions. Despite increased vehicle volumes on Alaskan Way, congestion levels are projected to improve with the Program due to improvements on Alaskan Way. Vehicle volumes are expected to increase somewhat on Elliott and Western Avenues with the Program due to the addition of the Elliott/Western Connector. However, with either the Project or the Project combined with the Program, vehicle volumes on these streets would improve compared to existing conditions, since these streets would carry fewer vehicles than they do with Elliott and Western Avenue ramps today.

The First Avenue streetcar is currently in the early planning stages of development, so its effects are unknown. However, the First Avenue streetcar would likely be located in the existing First Avenue right-of-way. The combination of the streetcar and projected increases in vehicle volumes on First Avenue with the Bored Tunnel Alternative could result in a cumulative adverse effect on traffic operations on First Avenue.

North

Program improvements associated with the Mercer West Project are not expected to affect intersection delays much as the Project would. However, the Elliott/Western Connector may draw some traffic away from the South Lake Union and Uptown neighborhoods, potentially reducing intersection delays at locations near or west of the SR 99 mainline.

13 How would conditions change for specific transportation modes?

Construction of the full Program would improve conditions for all transportation modes compared to construction of the Project alone, as discussed below.

Freight

The Alaskan Way Surface Street Improvements, the Elliott/Western Connector, and the Mercer West Project would improve access and travel routes for freight. These projects would improve connections and provide two possible routes for drivers traveling to and from the Ballard/Interbay area. Specifically, the Elliott/Western Connector would eliminate conflicts between vehicles and trains that would occur with the Project at Alaskan Way and Broad Street. In addition, the Alaskan Way Surface Street Improvements and the Elliott/Western Connector would improve the route for truck drivers who are carrying combustible or hazardous materials, since they would no longer be able to use SR 99.

Transit Ridership and Mode Share

The number of transit trips in the south, central, and north sections of the project area are expected to increase slightly (about 1 percent) with the Program as compared to the Project. This increase in transit use can likely be attributed to transit improvements associated with the Program. Estimated transit mode share is expected to be comparable between the Project and the Program in 2015 and 2030.

Ferry Access

The improvements to Alaskan Way associated with the Program would improve access to the ferry and support improvements at Colman Dock, because Alaskan Way would be widened and improved.

Pedestrians and Bicyclists

A number of improvements associated with the Program would benefit pedestrians and bicyclists, providing improved connections to and through Seattle along E. Marginal Way to Alaskan Way as part of the S. Holgate Street to S. King Street Viaduct Replacement Project, the Alaskan Way Surface Street Improvements, and the Alaskan Way Promenade/Public Space. The improvements for pedestrians and bicycles associated with these two projects would complement improvements proposed as part of the Alaskan Way Viaduct Replacement Project to provide a well-connected system and improved environment for travel on foot or by bicycle.

14 What are the other long-term cumulative benefits of the Project when combined with the Program?

The cumulative long-term benefits of the Program are as follows:

• The projects would improve and protect public safety by replacing at-risk infrastructure that is critical to Seattle, the region, and the state.
• The transportation system would be improved for all users, including vehicles, freight, transit, bicyclists, and pedestrians. Specific benefits to the transportation system are discussed in Questions 7 through 13 of this chapter.
• Seattle’s infrastructure, amenities, and accessibility would all be improved, which would enhance the quality of life for Seattle residents and people who visit Seattle for business or pleasure.
• The Program would support adjacent land uses with improved infrastructure.
• Many of the proposed projects require excavation, removal, and proper disposal of contaminated soils. The removal of these soils would improve the quality of the environment by lowering potential exposure risk for people and animals.
• Water quality may be improved in cases where systems are provided to treat runoff that currently does not receive treatment.

15 What are the temporary adverse effects of the Project when combined with the Program?
Construction of the projects discussed below may overlap with construction of the Bored Tunnel Alternative and could exacerbate the following localized construction effects:

• Congestion caused by lane restrictions and detours
• Increased emergency response times
• Parking restrictions
• Increased noise and dust
• Utility relocations and the potential for unplanned service disruptions
• Exposure of contaminated soils

Specific short-term construction-related effects for each project are discussed below.

S. Holgate Street to S. King Street Viaduct Replacement Project
The construction schedules and location for the Alaskan Way Viaduct Replacement Project and the S. Holgate Street to S. King Street Viaduct Replacement Project overlap. Construction of the two projects is being closely coordinated by the lead agencies to ensure that potential construction impacts are avoided, mitigated, and mitigated as appropriate. Construction activities for the two projects would overlap from about S. Royal Brougham Way to S. King Street. Construction of the S. Holgate Street to S. King Street Viaduct Replacement Project is underway and is expected to be completed by early 2014. Construction of the Bored Tunnel Alternative is expected to begin in July 2011, which means that the two projects would have adjacent construction activities for about 2.5 years. Potential short-term cumulative construction effects from the two projects are discussed below.

Traffic Restrictions
The S. Holgate Street to S. King Street Viaduct Replacement Project will begin to construct the Washington-Oregon Shippers Association (WOSCA) detour beginning in about November 2010. Traffic on the SR 99 mainline would be restricted to two lanes in each direction in this area and would begin to use the WOSCA detour in about December 2011. The S. Holgate Street to S. King Street Viaduct Replacement Project would require a 1-week closure of SR 99 between S. Spokane and S. King Streets around May 2012 to demolish a short section of the viaduct that crosses the WOSCA detour and to connect the southbound WOSCA detour lanes to SR 99 near S. Royal Brougham Way. This closure would occur during the construction of the Bored Tunnel Alternative. The Bored Tunnel would continue to use the WOSCA detour for SR 99 traffic after that portion of the S. Holgate to S. King Street Viaduct Replacement Project is complete.

Prior to construction of the Bored Tunnel Alternative, the S. Holgate Street to S. King Street Viaduct Replacement Project would require the following:
• Closing the Railroad Avenue S. ramps to First Avenue S. for about 6 weeks.
• Reducing First Avenue S. from S. Royal Brougham Way to Railroad Avenue S. to one lane in each direction for about 5.5 months, in addition to evening closures and periodic weekend closures.
• Closing First Avenue S. between S. Royal Brougham Way and Railroad Avenue S. during the evening for about 5 months.

Parking Restrictions
Construction of the Bored Tunnel Alternative near the south portal would temporarily affect about 250 on-street and 50 off-street parking spaces during construction. The S. Holgate Street to S. King Street Viaduct Replacement Project would temporarily remove nearly 60 on-street spaces near the same area. The cumulative effects of temporarily removing these parking spaces is not expected to substantially affect available parking in the area because there are several pay lots in the stadium area that are underutilized on non-event days. During events such as Seahawks, Mariners, and Sounders games, parking is highly utilized, and private lots charge a premium for event parking. The two projects would cumulatively remove about 50 of these off-street/pay spaces. However, the loss of these spaces is not expected to noticeably affect the parking supply because there are approximately 6,900 off-street parking spaces available in parking facilities near the stadiums.

Increased Noise and Dust
Noise and dust are likely to increase in the immediate vicinity of the two projects. Effects on nearby businesses and residents would be minimized by implementing mitigation measures identified in required construction permits for the two projects.

Utility Relocations
Both projects would require relocating utilities. The lead agencies would closely coordinate the utility relocations to
ensure minimal, if any, noticeable impacts on utility customers in the affected areas.

**Alaskan Way and Central Waterfront Improvements**

The following projects along Alaskan Way and the central waterfront coupled with the viaduct demolition associated with the Bored Tunnel Alternative may result in short-term cumulative effects due to construction:

- Alaskan Way Surface Street Improvements
- Elliott Bay Seawall Project
- Alaskan Way Promenade/Public Space
- Elliott/Western Connector

The Bored Tunnel Alternative would require demolishing the existing viaduct from S. King Street to the Battery Street Tunnel and decommissioning the Battery Street Tunnel. These activities are expected to take approximately 9 months and would occur in 2016 after the bored tunnel is open to traffic. The timeline for construction of the projects listed above has not been established, but construction of one or more of the projects would likely be underway when the viaduct is being demolished.

**Traffic Restrictions on Alaskan Way**

Demolition and removal of the viaduct would require narrowing Alaskan Way between S. King and Pike Streets. Various city streets between S. King Street and Battery Street would experience periodic street closures to allow for safe viaduct demolition. Possible traffic restrictions on Alaskan Way have not been determined for the central waterfront projects, but they would likely require lane closures on Alaskan Way, which could add to the effects of narrowing Alaskan Way while the viaduct is being demolished. In addition, construction activities and physical barriers created during construction could restrict the ability of occupants of the waterfront piers, particularly those at the fire station, to safely evacuate in an emergency.

**Parking Restrictions**

The Bored Tunnel Alternative would temporarily remove up to 560 on-street and 190 off-street parking spaces between S. King and Battery Streets. These spaces could be replaced once the viaduct is demolished. However, it is likely that most of the spaces would be permanently removed by the central waterfront projects, with a small percentage of them being replaced after construction of the central waterfront projects is completed. Possible mitigation measures for short-term parking losses associated with the viaduct demolition are discussed in Chapter 6, Question 37.

**Increased Noise and Dust**

Noise and dust are likely to increase in the immediate vicinity of these projects. Effects on nearby businesses and residents would be minimized by implementing mitigation measures.

**Other Program Elements**

Cumulative temporary effects are not expected from other Program elements, including the following:

- Mercer West Project
- Transit Enhancements

Improvements associated with these projects would occur outside of the immediate project area. They would also be built either before or after the construction of the Bored Tunnel Alternative.

Transportation Improvements to Minimize Traffic Effects During Construction would result in short-term cumulative benefits. The lead agencies have committed to these transportation improvements to minimize and mitigate possible cumulative effects on the transportation system during construction of the Program. Measures included as part of this mitigation package are discussed at the end of this chapter in Question 17.

**CUMULATIVE EFFECTS OF THE PROJECT WHEN COMBINED WITH THE PROGRAM AND OTHER PLANNED PROJECTS**

16 What are the cumulative effects by resource?

In addition to projects associated with the Program, there are projects underway or in the planning stages in the nearby area. The potential cumulative effects of these projects combined with the Project and Program were evaluated as part of the analysis performed for this Supplemental Draft EIS and shown in Exhibit 7-11. Similar to the combined effects of the Project and the Program, these projects are not expected to result in long-term adverse cumulative effects. Instead, these projects are expected to provide long-term cumulative environmental benefits to the surrounding area. Potential adverse effects are primarily limited to temporary construction-related impacts due to overlapping construction schedules for projects that would be built near the portals of the bored tunnel. The following 28 projects were included in this cumulative effects analysis:

- Gull Industries on First Avenue S.
- North Parking Lot Development at Qwest Field
- Seattle Center Master Plan (EIS)
- Bill and Melinda Gates Foundation Campus Master Plan
- South Lake Union Redevelopment
- U.S. Coast Guard Integrated Support Command
- Seattle Aquarium and Waterfront Park
- Seattle Combined Sewer System Upgrades
- Bridging the Gap Projects
- Washington State Ferries Seattle Terminal Improvements
- S. Spokane Street Viaduct Widening Project
- SR 99/East Marginal Way Grade Separation
- Mercer East Project from Dexter Avenue N. to I-5 (completed)
- I-5 Reconstruction
- SR 520 Bridge Replacement and HOV Program
- I-405 Corridor Program
• I-90 Two-Way Transit and HOV Operations, Stages 1 and 2
• Sound Transit, Phases 1 and 2, including First Hill Streetcar, Central Link (completed), University Link, North Link, and East Link Light Rail
• RapidRide
• HOV Definition Changes to 3+ Throughout the Puget Sound Region
• Other Transit Improvements
• South Lake Union Streetcar (completed)

Transportation
Growth and development in Seattle and the Puget Sound region have resulted in increased traffic volumes and congestions for many decades. Replacing the Alaskan Way Viaduct is part of the Puget Sound Regional Council’s (PSRC) adopted Regional Transportation Plan and a key link in maintaining regional mobility and transportation infrastructure. The combined improvements will facilitate the safe and efficient movement of passenger vehicles, transit, and freight to and through downtown Seattle.

Noise
Cities tend to be noisy places. Seattle has steadily developed as an urban center, with commercial, industrial, and port development in the south portal area; retail businesses, hotels, and office space in the downtown core; and retail businesses, hotels, and residential buildings in the Belltown and north portal area. Historically, noise would have come from construction activity, and transportation noises would have been associated with whistles on trains and ships and wheels on cobblestone streets. Today, traffic, especially along the central waterfront, is the main noise source; in many areas, the noise levels are high enough to interfere with outdoor activities. With the Project, Program, and other planned projects, the levels of traffic noise near the south portal would be similar to existing conditions, but along the central waterfront and north of Denny Way to Harrison Street, the noise levels would be greatly reduced compared to existing conditions.
Visual Quality
The visual character of the landscape has been dramatically transforming ever since the first Europeans settled in the area. The area was logged and cleared for farming and development; hills were moved; shoreline areas were filled; rivers were channelized; and other activities such as mining, shoreline development, and road building all contributed to changes in the landscape. The urban character of the project area has also changed over time as the architecture of the city has evolved and building materials have improved. Even though development has blocked some views of the landscape, Seattle is blessed with natural features such as Mount Rainier, Puget Sound, and the Olympic and Cascade Mountains that are so dominant that they can still be seen from many points.

The removal of the existing viaduct along with the development of a new Alaskan Way surface street and promenade would benefit the visual environment in the central waterfront area. The visual character of the north portal area will be improved by planned development near Aurora Avenue to about Harrison Street combined with wider sidewalks, street trees, and a planted median combined with continued redevelopment would create a more aesthetically pleasing urban environment in this area.

Land Use
Large earthmoving projects over the past 100 years and development of multiple modes of transportation infrastructure has shaped the land use patterns in the Seattle area. Many of the land use patterns that were established by 1900 are still in effect today, with commercial, industrial, and port development in the south portal area; retail businesses, hotels, and office space in the downtown core; and retail businesses, hotels, and residential uses in the Belltown and north portal area.

There is a new emphasis on increasing livability in Seattle by bringing people closer to jobs and amenities. The City has also been studying development plans for the SODO area that are intended to stimulate housing and development in the area. In the north, recent zoning changes encourage housing and job opportunities in the South Lake Union neighborhood, with residential uses and also commercial and manufacturing uses. The provision for commercial uses was intended in part to support biotechnology uses and biotechnology research and development laboratories.

The Project and the Program would complement the numerous ongoing improvements in Seattle and, in particular, the downtown area. Over the past decades, land use plans in Seattle have successfully fostered a healthy, growing urban environment in the downtown area with a mixture of land uses. Because the Project and the Program would replace and enhance existing facilities, rather than expand or build new routes, they are expected to support currently planned land uses and densities. The City is currently engaged in efforts to develop a new central waterfront plan, which will be the primary guide for determining the types and areas of future land uses along the waterfront.

Neighborhoods located north and south of downtown—such as Ballard, Fremont, Greenwood, West Seattle, White Center, and Georgetown—that use SR 99 as an alternative route to access downtown and other parts of Seattle would benefit from the various improvements expected to occur: Enhancements to existing facilities and transit service, such as the new public transit RapidRide projects, would make access to current land uses easier and more desirable for individuals from surrounding neighborhoods.

Economics
Historically, the economy of the Puget Sound region has fluctuated greatly because of the strong dependence on natural resource-based industries such as logging, fishing, and agriculture and, more recently (in the second half of the 20th century), aerospace. With the growth of high-technology industries, tourism, clean technology, medical care, and other trade and service-sector businesses, the economy has become more diversified and the fluctuations are less severe. However, the region’s continued economic prosperity is challenged by the increasingly competitive global economy. Washington depends on foreign trade more than any other state, and the Puget Sound region is vital to this trade, with companies such as Boeing, Costco, Microsoft, Amazon, Paccar, Starbucks, and Weyerhaeuser based in the region.

By maintaining local and regional mobility, the Project, Program, and transportation improvements shown on Exhibit 7-11 would help maintain businesses that depend on the efficient movements of goods and freight and support a core part of the local economy. On Seattle’s central waterfront, the Project and the Program could help facilitate more pedestrian activity along the alignment and a less inhibited environment for reinvestment. Improvements to the Seattle Ferry Terminal at Colman Dock would also contribute to making the area more attractive. The economic benefits would occur in the form of increased investment, revitalization, and development opportunities. Revitalization and reinvestment could increase property values, stimulate more economic activity, allow opportunities for new or expanded business and employment, and generate more tax revenues. This revitalization and redevelopment could increase economic activity as compared to existing conditions.

Historic, Cultural, and Archaeological Resources
Some of Seattle’s history has been lost to development, fire, or gradual decay. Regulations now in place help protect these resources. The Project and other foreseeable actions would have both adverse and beneficial effects on these resources. Historic resources that would have adverse effects include the following:

- Removal of the Alaskan Way Viaduct
- Decommissioning of the Battery Street Tunnel
- Replacement of the Elliott Bay Seawall
Construction may adversely impact the following historic resources:

- Polson Building
- Western Building
- Dearborn South Tideland Site (45KI924)

The beneficial effects are the elimination of the noise and visual effects of the existing viaduct on two National Historic Districts and multiple buildings listed on or eligible for the National Register of Historic Places. Cumulatively, elements of the Program and other foreseeable projects are not expected to have additional effects.

**Social and Neighborhood Resources**

Historically, social conditions in the project area have changed over time due to the development and redevelopment of the downtown core and surrounding neighborhoods and due to major events such as the Great Seattle Fire of 1889, which destroyed the downtown area. As the population grew, social services and community facilities, including parks and recreational spaces, also increased to serve the growing population. A variety of community facilities and social services are now provided by the City, as well as numerous private and nonprofit organizations. The cumulative effects of the Project, the Program, and other transportation and urban development projects are expected to benefit social resources in downtown Seattle neighborhoods. Together, these projects would invigorate community life and strengthen neighborhood identity. The continued development of office buildings and relocation of major employers to the area would sustain economic growth and job opportunities for downtown residents. Proposals for planned residential development, including low- and moderate-income housing, would enhance and diversify community life and provide improved opportunities for people to live closer to their work. This effect would especially occur in the Denny Triangle, South Lake Union, and Pioneer Square neighborhoods.

The many planned transportation projects would reduce dependence on personal vehicles for downtown mobility and improve access to community facilities, cultural venues, park and recreation amenities, social services, and government offices. Some of these projects may remove on-street parking in some areas, but the location and extent of any parking reductions are not known at this time. Enhanced transit and extension of the City’s streetcar network along First Avenue and S. Jackson Street would substantially improve downtown access to affordable, convenient, and reliable transportation, which would be especially beneficial to low-income and transit-dependent populations in the downtown area.

**Water Quality**

From 1850 through the 1950s, water bodies such as Puget Sound and the Duwamish River provided convenient locations for discharging municipal sewage, stormwater runoff, and other industrial wastes. Logging and land clearing resulted in sedimentation in streams, lakes, and marine water bodies. Pesticides and fertilizers used on landscaped areas and contaminated runoff from impervious surfaces made their way into surface water via stormwater runoff.

These past and ongoing actions have resulted in poor water quality in the project area. Elliott Bay, the Duwamish River, and Lake Union all have water quality problems. Current regulations target point discharge sources, and new development or redevelopment is required to control and treat stormwater runoff. However, water quality problems persist, particularly temperature and bacterial contamination. Going forward, small improvements in water quality are expected to occur over time.

Over the long term, the Project, the Program, and other actions would improve water quality in Elliott Bay and Lake Union by retrofitting currently untreated stormwater discharges with basic water quality treatment, reducing peak flows and the frequency of combined sewer overflows through the use of detention facilities, reducing the amount of pollutant-generating impervious surfaces, and removing contaminated sediments that may be leaching pollutants into Elliott Bay.

**Other Cumulative Effects**

For several resources, there would be no net cumulative effects resulting from the Project, the Program, and other plans and projects:

- **Public Services and Utilities** – The Project is not expected to have any adverse effects on public services and utilities; therefore, it would not contribute to any cumulative effects on public services and utilities.
- **Air Quality** – The Project is not expected to result in or exacerbate a violation of air quality standards. The Project, the Program, and all transportation improvements considered in the cumulative effects analysis are part of the conforming Metropolitan Transportation Plan maintained by PSRC and are not expected to result in adverse cumulative effects on air quality.
- **Energy and Greenhouse Gas Emissions** – The Project, the Program, and other plans and projects are expected to maintain and, in some cases, improve traffic conditions in and around Seattle. To the extent that the combined transportation system improvements reduce congestion and increase travel speeds, fuel use and greenhouse gas emissions would decrease. The energy used for ventilating and lighting the tunnel and energy demands of other projects would not be significant in the regional context, and overall there would be no cumulative effect on energy use or greenhouse gas emissions. Also, the design of the Bored Tunnel Alternative would take into account expected changes in sea level over the life of the facility.
- **Wildlife, Fish, and Vegetation** – The Project is not expected to have any adverse effects on wildlife, fish, and vegetation, and it will improve water quality. Therefore it would not contribute to any cumulative
effects. Other elements of the Program, such as the Elliott Bay Seawall Project, would likely have long-term beneficial effects on habitat, although some short-term adverse effects are likely during construction. The Washington State Ferries Seattle Terminal Improvements have not been defined but are not expected to result in new long-term adverse effects.

- Earth and Groundwater – Soil improvements and other protective measures included in the Project would prevent impacts on earth resources; therefore, no permanent effects on groundwater are expected.
- Hazardous Materials – Transportation projects tend to remove hazardous materials from the environment, leaving sites cleaner than they were before; therefore, an analysis of adverse cumulative effects associated with hazardous materials is unnecessary.

Cumulative Effects of Concurrent Construction

Construction of the projects discussed below may overlap with construction of the Bored Tunnel Alternative and could exacerbate the following localized construction effects:

- Congestion caused by lane restrictions and detours
- Increased noise and dust
- Utility relocations and potential service disruptions

Overlapping Construction Projects Near the South Portal

Construction of the following projects may overlap with the construction of the south portal of the bored tunnel:

- Gull Industries on First Avenue S. – This project site is located west of First Avenue S., between S. Massachusetts Street and S. Atlantic Street. The project would redevelop the entire site to include a mix of office, retail, and restaurant uses. The construction timeline for this planned development is unknown, but it is possible that part of it could overlap with the south portal construction. This project may include excavation and dewatering at the same time that excavation and dewatering is occurring for the south portal. Therefore, there is a potential for the two projects to result in drawdown of the water table around the excavations due to dewatering, which could cause settlement of adjacent structures, utilities, and roadways. These potential impacts could be avoided or minimized by upfront planning and coordination to establish appropriate mitigation measures (such as recharge) to maintain the water table.

- North Parking Lot Development at Qwest Field – The construction timeline for this planned development is unknown, but it is possible that part of it could overlap with the south portal construction. The development would include the construction of a 20-story office tower and three residential towers of 10, 20, and 25 stories. Likely effects could be the temporary loss of parking adjacent to the stadiums and the Pioneer Square Historic District and effects from noise and dust for those located next to the site.

Overlapping Construction Projects Near the North Portal

Construction of the following projects may overlap with the construction of the north portal of the bored tunnel:

- Bill and Melinda Gates Foundation Campus Master Plan – Major construction related to the $500-million headquarters for the Bill and Melinda Gates Foundation is expected to be completed in spring 2011. A third building is expected to be built on the site between 2014 and 2017. Possible effects could be noise, dust, and truck traffic for those next to the site.

- South Lake Union Redevelopment – Several large-scale commercial, retail, and residential construction projects are planned in the South Lake Union area. Specific projects that may have timelines that coincide with the north portal construction are unknown. Possible effects could be noise, dust, and truck traffic.

**MITIGATION**

17 What mitigation is proposed?

WSDOF, King County, and the City of Seattle have developed Transportation Improvements to Minimize Traffic Effects During Construction to keep people and goods moving during construction of the Program. These enhancements and improvements are projects with independent utility that would benefit the transportation system during construction of all Program elements. They 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 plans include the following components:

- Variable speed signs and travel time signs on I-5 to help maximize safety and traffic flow.
- Providing funding for the SR 519 Intermodal Access Project Phase 2, which improved connections from I-5, I-90, and the waterfront. This project was completed in the summer of 2010.
- Providing funding for the S. Spokane Street Viaduct Widening Project, which included building a new Fourth Avenue S. off-ramp for West Seattle commuters. The Fourth Avenue S. off-ramp was opened in August 2010.
- Funding for increased bus service in the West Seattle, Ballard/Uptown, and Aurora Avenue corridors during construction, as well as a system for monitoring bus travel times.
- New traffic technology on SR 99 and major routes leading to SR 99 to keep people and goods moving.
- Upgraded traffic signals and driver information signs for the Elliott Avenue W./15th Avenue W.
south of downtown, and West Seattle corridors to support transit and traffic flow.

- Information about travel alternatives and incentives to encourage use of transit, carpool, and vanpool programs.

Many of these measures build upon projects already underway by King County and the City to fully fund critical projects and advance elements of Metro’s RapidRide services. Transit enhancements and improvements to the street system will play a major role in keeping people and goods moving during construction of the S. Holgate Street to S. King Street Viaduct Replacement Project, starting in 2010. These improvements will remain useful to travelers throughout the construction period for the Bored Tunnel Alternative.

In addition to the improvements described above, localized mitigation measures will be developed as construction details are refined. Localized construction mitigation measures could include the following components:

- Installation of temporary traffic signals.
- Provision of flaggers at certain intersections to manage traffic and expedite travel for emergency vehicles.

In addition, a traffic management plan will be prepared and implemented to ensure that construction effects on local streets, property owners, and businesses are minimized. The traffic management plan is discussed in Chapter 6, Question 37.