Surface Alternative

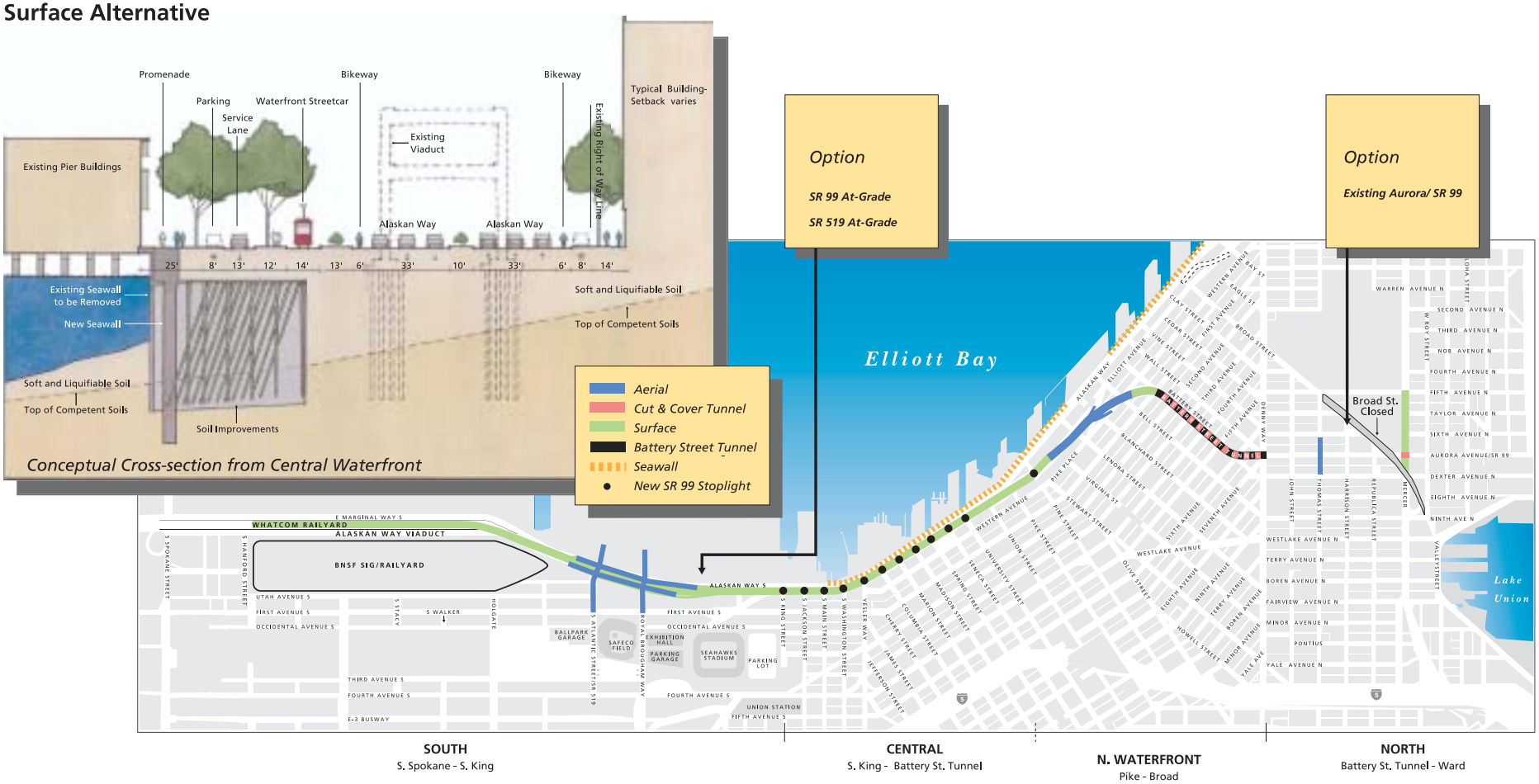


Exhibit 9-1

CHAPTER 9 - SURFACE ALTERNATIVE

1 What is the Surface Alternative?

How would it replace SR 99 and the viaduct?

The Surface Alternative includes replacing SR 99 with the following elements as shown in Exhibit 9-1:

- South - Replace the existing viaduct with an at-grade roadway. Replace ramps at First Avenue S. with an elevated interchange connecting SR 99 to SR 519 at S. Atlantic Street and S. Royal Brougham Way.
- Central - Replace the viaduct with a six-lane, at-grade roadway north of Yesler Way. The roadway would have three lanes in each direction with turn pockets. Two new overpasses would be built in the central section. One would be for ferry traffic only. It would be located along Columbia Street, connecting the Colman Dock Ferry Terminal to First Avenue. A second overpass would be aligned along Seneca Street connecting First Avenue to Alaskan Way. Build a new aerial connection between Pike Street and the Battery Street Tunnel. The new connection would have two lanes in each direction and it would be wider than the existing facility. New ramps would be built at Western and Elliott Avenues. Ramps at Battery Street would remain open for only emergency vehicle use. Also, in the Pioneer Square area, the number of lanes of traffic on First Avenue would be increased from one lane in each direction to two lanes in each direction.
- North Waterfront - Reconstruct the Alaskan Way surface street with four lanes.
- North - Improve the Battery Street Tunnel for fire and life safety by adding emergency exits, upgrading electrical systems, adding ventilation, and upgrading the fire suppression system. Widen the Mercer Underpass by expanding Mercer Street from four eastbound lanes to a seven-lane, two-way roadway with three lanes in each direction and a center turn lane. Build a new two-lane bridge over Aurora/SR 99 at Thomas Street, and close Broad Street from Fifth Avenue to Ninth Avenue.

The Surface Alternative includes two possible options:

- South - Replace the existing viaduct (SR 99) with an at-grade roadway and no elevated interchange at SR 519. Instead, access to SR 519 would be provided by signalized at-grade intersections.
- North - Add signals on Aurora Avenue at Harrison, Republican, and Roy Streets.

How would it replace the seawall?

The seawall replacement design is the same for the Surface Alternative as what was described for the Rebuild Alternative. The seawall would be replaced with drilled shafts and improved soils from S. Washington Street up to Bay Street as shown in Exhibit 9-1.[1] The liquefiable soils behind the seawall and under the relieving platform would be improved by strengthening them with cement grout. Similarly, a small section of existing sheet pile wall from near S. King Street to S. Washington Street would be removed and replaced with improved soils and drilled shafts. In some areas along the seawall, drilled shafts may not be needed and the soils would only be improved.

2 How would the Surface Alternative be built?

The construction steps described below are preliminary and they may change based on additional project design.

Construction of this alternative would begin by relocating utilities. Next, the seawall would be replaced and construction of the west half of the SR 519 overpass would begin. Improvements associated with the Widened Mercer Underpass would be built, and detours on Broad Street would be established.

Next, the southbound section of the viaduct connecting Pike Street to the Battery Street Tunnel would be torn down and a new aerial structure would be built. Improvements to the southbound half of the Battery Street Tunnel would be completed, and the west half of the SR 519 connection would be completed.

The northbound section of the viaduct connecting Pike Street to the Battery Street Tunnel would be torn down and a new aerial structure would be built. Improvements to the northbound half of the Battery Street Tunnel would be completed. In addition, the viaduct would be torn down, and the at-grade SR 99 roadway would be built from S. Holgate Street to Pike Street. The east half of the SR 519 connection would be built.

Finally, utilities would be placed in their final locations, the Alaskan Way surface street would be rebuilt, and traffic would be routed to its permanent locations. During construction, at least two lanes of SR 99 traffic would be maintained in each direction, and one lane of traffic in each direction would be maintained on the Alaskan Way surface street. Additional information about construction is provided in Chapter 10.

3 How would the Surface Alternative change access?

How would it change vehicle access in the south?

Appendix B contains additional information describing the Surface Alternative.

Appendix W contains preliminary engineering drawings of this alternative.

How can soils be improved or strengthened?

Soil can be strengthened by mixing it with cement grout. Construction methods that may be used to strengthen soil for this project are described in more detail in Chapter 10.

Appendix C contains additional details about transportation.

[1] No seawall work is required for any of the alternatives between Blanchard and Battery Streets adjacent to the Bell Harbor International Conference Center.

Currently in the south end, SR 99 has a southbound off-ramp and a northbound on-ramp connecting at First Avenue S. near Railroad Way S. The Surface Alternative would replace the First Avenue S. ramps with an elevated interchange over SR 99. The interchange would connect SR 99 to SR 519 at S. Atlantic Street and S. Royal Brougham Way. It would improve access in the south end by adding ramps that would provide connections to the stadiums and SR 519, which connects to I-90. The SR 519 interchange would also separate vehicles and rail operations. Currently these operations are not separated, and there are times when trains block roadway connections at S. Atlantic Street. Traffic movements provided by the new ramps would include:

- Northbound off from SR 99 near S. Holgate Street to S. Atlantic Street and S. Royal Brougham Way.
- Northbound on from S. Royal Brougham Way to SR 99.
- Southbound on from E. Marginal Way near S. Holgate Street to SR 99.
- Southbound off from SR 99 to S. Atlantic Street and S. Royal Brougham Way.

If the option were selected, the existing viaduct would be replaced with an at-grade roadway without an elevated interchange connecting SR 99 to SR 519 Instead, access to SR 519 would be provided by signalized at-grade intersections at S. Atlantic Street and S. Royal Brougham Way.

How would it change railroad access?

The Surface Alternative would change railroad access in the south end by shifting existing rail yards and by moving the tail track. The new at-grade SR 99 would be built west of the existing viaduct where the Whatcom Rail Yard is currently located. As a result, the Whatcom Rail Yard would be removed and the Burlington Northern Santa Fe (BNSF) Seattle International Gateway (SIG) Rail Yard would be expanded and reconfigured to include the relocated Whatcom Rail Yard tracks. The Whatcom Rail Yard is currently located on the west side of SR 99, and the BNSF SIG Rail Yard is east of SR 99.

In addition, the tail track would need to be moved from the west side of SR 99 to the east side of SR 99. It would also need to be shifted south from the S. King Street area to S. Royal Brougham Way. The combination of shifting the tail track south and incorporating the Whatcom Rail Yard into the BNSF SIG Rail Yard would result in the need to shift the entire BNSF SIG Rail Yard south from S. Hanford Street to S. Spokane Street. In addition, some minor track construction would be required south of S. Spokane Street near S. Dakota Street.

The Surface Alternatives does not require the tail track to be located at S. Royal Brougham Way. It is possible that the tail track could terminate near Railroad Way S., which would eliminate the need to shift portions of the BNSF SIG Rail Yard south to S. Spokane Street.

How would it change vehicle access for ferries?

People driving to the ferry get there via the Alaskan Way surface street, often by taking a left at Yesler Way. When Colman Dock is full, drivers wait for the ferry under the viaduct south of Railroad Way S. Drivers leaving Colman Dock use Marion Street or Alaskan Way.

The Surface Alternative would change where drivers would wait for the ferry when Colman Dock is full. It would also change the way drivers get to Colman Dock, and it would add a new way for drivers to exit Colman Dock.

With this alternative, the viaduct would be removed and replaced with an at-grade roadway south of Yesler Way. Therefore, the existing ferry holding area under the viaduct would need to be relocated west of SR 99 on part of Terminal 46, just south of S. King Street. With this ferry holding location, traffic flow would be improved for both Alaskan Way surface street traffic and ferry traffic by building a separate roadway connecting the holding area to Colman Dock. Improved traffic flow at Colman Dock could also make ferry loading and unloading operations more efficient.

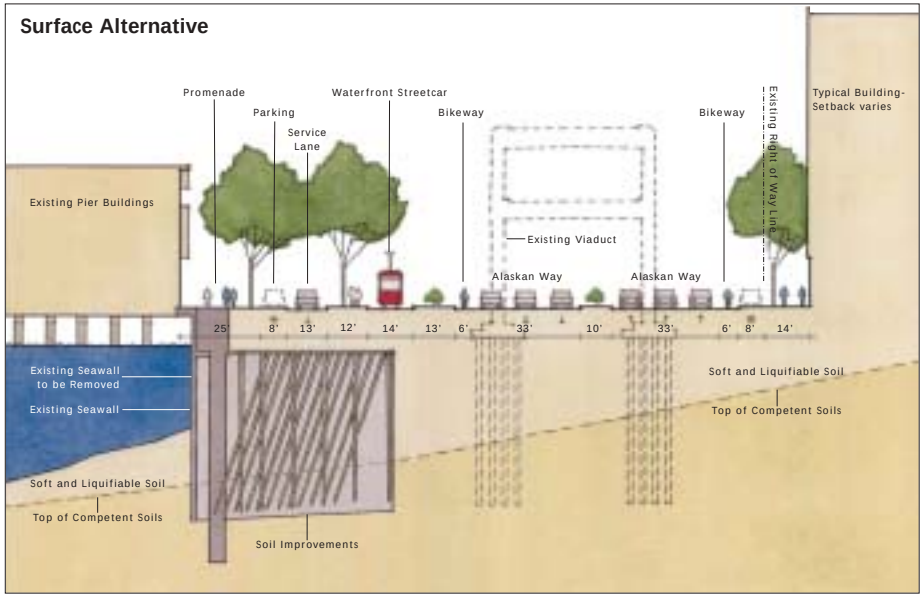


Exhibit 9-2

The separate ferry access roadway would be built on a new over-water pier between S. Washington Street and Yesler Way. Drivers would get to Colman Dock using S. King Street and the new ferry access roadway. Drivers leaving Colman Dock would be able to exit where they do now at Marion Street or Alaskan Way, or they could exit using the roadway to S. King Street.

The new ferry access roadway and over-water pier is needed for some additional reasons. The new pier would provide space to relocate the historic Washington Street Boat Landing, and it could provide new shoreline access to pedestrians and bicyclists. During construction, the roadway and pier are needed to maintain ferry access and egress. They could also accommodate construction staging activities.

What is the tail track?

The tail track is a single railroad track that connects the Burlington Northern Santa Fe (BNSF) Seattle International Gateway (SIG) Rail Yard on the east side of SR 99 to the Whatcom Rail Yard located west of SR 99..

The tail track is used to assemble and sort railcars for both the Whatcom and BNSF SIG Rail Yards.

How would it change vehicle access into or out of downtown?

For this alternative, an expanded Alaskan Way surface street would replace the viaduct. From Yesler Way up to Pike Street, a signalized roadway with three lanes in each direction would be constructed. Turn pockets would be provided in various locations. A one-lane southbound service roadway with parking would
be provided adjacent to the waterfront piers and businesses.

Drivers would access downtown directly from the Alaskan Way surface street at several signalized cross streets. New ramps would be built at S. King Street providing access to downtown. Drivers could also reach downtown by using the new SR 519 interchange at S. Atlantic Street and S. Royal Brougham Way.

An additional route out of downtown would be provided by a westbound extension of Seneca Street connecting First Avenue and Western Avenue to Alaskan Way.

From Pike Street, the at-grade roadway would transition to side-by-side aerial structures connecting to the Battery Street Tunnel. Ramps at Elliott and Western Avenues would be provided for traffic to and from the Ballard/Interbay and Belltown areas. Another possibility is that the northbound and southbound ramps would both end at Elliott Avenue, with a surface street connection for northbound traffic to reach Western Avenue. The existing ramps at Battery Street would be closed to general traffic and would remain open only for emergency vehicles.

How would it change the Alaskan Way surface street for vehicles?

With the Surface Alternative, the Alaskan Way surface street would be expanded to six lanes through downtown and it would become the SR 99 mainline through downtown. As a result, the number of vehicles traveling on Alaskan Way would increase substantially.

Since the viaduct would be removed, there are several possible ways the surface street could be configured. One possible surface street design for the Surface Alternative is shown in Exhibit 9-2. The surface street would have expanded pedestrian promenades, new bicycle lanes, one or two trolley tracks, on-street parking, and service roadways for piers and adjacent buildings.

How would the Battery Street Tunnel change?

Fire and life safety conditions in the Battery Street Tunnel would be improved by adding emergency exits, upgrading electrical systems, adding ventilation, and upgrading the fire suppression system.

How would it change vehicle access north of the Battery Street Tunnel?

Connections north of the Battery Street Tunnel are important for traffic detours during construction. For the Surface Alternative, the Battery Street Tunnel would be upgraded and a new aerial connection between Pike Street and the Battery Street Tunnel would be built. During construction of these improvements, traffic along this section of SR 99 would need to be detoured. Improvements to Mercer Street and other streets north of the Battery Street Tunnel would allow these streets to handle the additional traffic. After construction, these north end improvements would provide long-term benefits that are described below.

In the north end, Mercer Street would be widened from four eastbound lanes to a two-way, seven-lane street. Mercer would have three lanes in each direction and a center turn lane between Fifth and Dexter Avenues. In addition, a two-lane bridge would be built over Aurora/SR 99 at Thomas Street. During construction, the Mercer Street and Thomas Street im-provements would change traffic flow in the north end to allow southbound SR 99 traffic to be detoured onto Broad Street. Once construction was completed, existing ramps to Mercer and Broad Streets would be removed. After construction, the Mercer and Thomas Street upgrades would improve east-west circulation in the South Lake Union and Uptown neighborhoods. East-west connections for vehicles, bicyclists, and pedestrians are constrained by Aurora/SR 99 because it cuts off the street grid. Once construction was completed, Broad Street could be closed between Fifth and Ninth Avenues, allowing for more streets to be reconnected.

The other option is to leave the north end of the project area similar to its current condition; signals would be added to Aurora/SR 99 at Harrison, Republican, and Roy Streets. The signals would improve east-west traffic flow across Aurora/SR 99 by reconnecting part of the street grid. However, this option would impede traffic flow on Aurora Avenue.

How would it change bicycle access?

The Surface Alternative would change bicycle access by modifying the location of the Waterfront Trail. The existing Waterfront Trail begins at S. Royal Brougham Way and runs along the east of side of E. Marginal Way/Alaskan Way to Bell Street. It is separated from the Alaskan Way surface street and is shared by bicyclists and pedestrians. The separated, shared path would be extended south from S. Royal Brougham Way to just south of S. Atlantic Street. From S. Atlantic Street to Yesler Way, the Waterfront Trail would be moved from the east side of E. Marginal Way/Alaskan Way to the west side. Additionally, it may be possible to develop a spur shared use trail that would lead diagonally from the north side of Seahawks Stadium (midway between S. Atlantic Street and S. Royal Brougham Way) to the southwest corner of the intersection of Alaskan Way and S. King Street. Between Yesler Way and Pine Street, the Waterfront Trail would be replaced with striped bicycle lanes along each side of the Alaskan Way surface street. North of Pine Street, cyclists would be routed back to the Waterfront Trail, which would be located in its present location on the east side of Alaskan Way. Additionally, striped bike lanes would be located on each side of the SR 99 roadway as it ascends to the Battery Street Tunnel. These lanes would connect to a single bike lane on the west side of Elliott Avenue that would run between Lenora and Bell Streets.

Other possible surface street design variations are shown in Appendix X, Design Variations for Surface Street Improvements.

How would it change pedestrian access?

As with bicycle access, the Surface Alternative would change pedestrian access by modifying the location of the Waterfront Trail. Additionally, sidewalks would be added in parts of the project corridor. The Waterfront Trail would begin south of S. Atlantic Street on the west side of the project corridor, and sidewalks would be located on the east side of E. Marginal Way/ Alaskan Way.

Between S. King Street and Yesler Way, the Waterfront Trail would be replaced with a sidewalk along each side of the Alaskan Way surface street. The separated, shared path would be extended south from S. Royal Brougham Way to just south of S. Atlantic Street. From S. Atlantic Street to Yesler Way, the Waterfront Trail would be moved from the east side of E. Marginal Way/Alaskan Way to the west side. Additionally, it may be possible to develop a shared use trail that would lead diagonally from the north side of Seahawks Stadium (midway between S. Atlantic Street and S. Royal Brougham Way) to the southwest corner of the intersection of Alaskan Way and S. King Street. North of Yesler Way pedestrians could walk on sidewalks on the east side of Alaskan Way or the waterfront promenade located on the west side of Alaskan Way. North of Pine Street, pedestrians could walk on either the waterfront promenade on the west side of Alaskan Way or the Waterfront Trail on the east side of Alaskan Way.

In the SR 519 area, pedestrian access would be maintained by continuing the sidewalks on Alaskan Way and associated local streets on the SR 519 interchange. Connections across SR 99 would be provided by sidewalks on S. Royal Brougham Way and S. Atlantic Street, which would cross over the SR 99 mainline.

All of the alternatives would add a new over-water pier connecting Pier 48 near the end of S. Washington Street with the Colman Dock Ferry Terminal. The pier would accommodate pedestrians on its waterside edge. In addition, for all alternatives, a pedestrian bridge may be added over the Alaskan Way surface street connecting the Colman Dock Ferry Terminal near Madison Street. The existing pedestrian bridge for people traveling to and from the Ferry Terminal at Marion Street would be rebuilt near its existing location.

North of the Battery Street Tunnel, a bridge would be added at Thomas Street across SR 99. This bridge would have sidewalks on both sides, which would add a new east-west route for pedestrians in the South Lake Union area. In addition, the existing sidewalks on both sides of Mercer Street would be widened in some areas, which would improve conditions for pedestrians.

4 How would the Surface Alternative affect travel times and traffic flow?

How would daily traffic patterns and volumes on SR 99 change with the Surface Alternative?

Mainline SR 99 traffic volumes are anticipated to be substantially lower in both directions in downtown Seattle than those forecasted for the existing facility in 2030. This is a result of a general decrease in capacity on SR 99 through the central section of the corridor. SR 99 and Alaskan Way surface street traffic would both be accommodated on the Alaskan Way surface street. In the central section of SR 99 where existing traffic volumes are the highest, daily traffic is expected to peak at 74,000 vehicles per day compared with 126,000 vehicles per day for year 2030 existing conditions.

With the Surface Alternative, the number of hours that the SR 99 mainline would be congested is higher than the year 2030 existing facility as shown in Exhibit 9-3.

Exhibit 9-3

Daily Hours of Congested Operations on the SR 99 Mainline

	2002 Existing	*2030 Existing*	*2030 Surface*
Southbound	<1	3	9
Northbound	<1	4	9

In the south end of the project area, mainline SR 99 traffic volumes and ramp volumes are expected to increase slightly due to improved access between SR 99 and SR 519. North of S. King Street, traffic volumes on the SR 99 mainline are reduced compared to the existing facility in 2030 due to reduced roadway capacity. Traffic volumes north of the Battery Street Tunnel are expected to increase compared with 2030 existing conditions

How would travel times and travel speeds change on SR 99 with the Surface Alternative

The Surface Alternative is expected to result in longer travel times and lower speeds than the existing facility in 2030 for most trips. Travel times would increase for all of the trips considered, as shown

Surface Alternative Travel Times

During the PM Peak

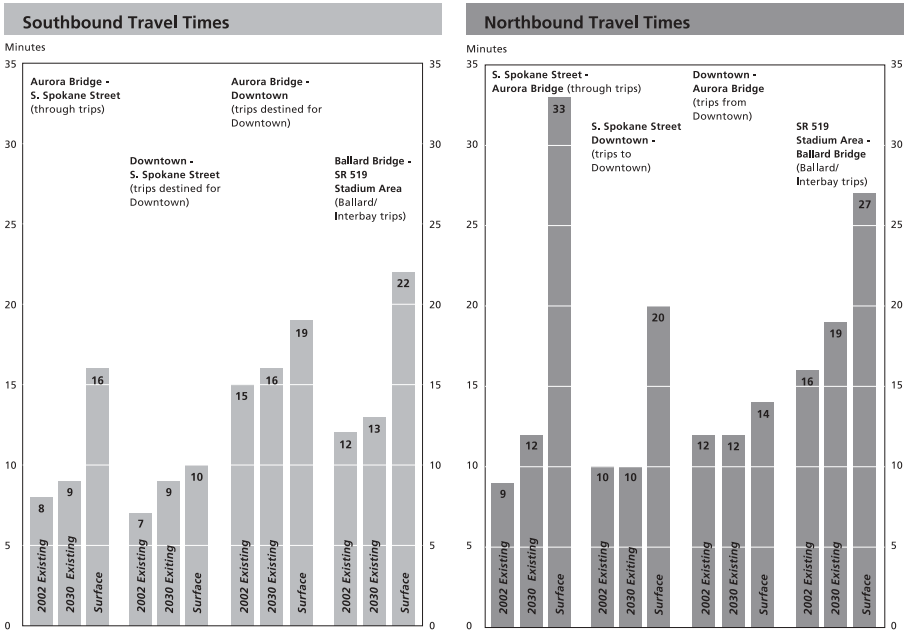


Exhibit 9-4

What is the "year 2030 existing facility" and why is it evaluated?

The year 2030 existing facility shows how much traffic is projected to use the existing SR 99 facility in the year 2030. It takes into account future population growth and other funded transportation projects such as Monorail and Link light rail. It assumes that the viaduct would remain in the year 2030 in its existing condition. We know it is unlikely that the viaduct will last until 2030. However, the information provides a baseline that can be compared with traffic conditions for the proposed alternatives.

below in Exhibit 9-4. Travel times for drivers traveling through downtown would increase more than trips destined for downtown. For example, northbound travel times during the PM Peak from S. Spokane Street to the Aurora Bridge would increase from 12 minutes for the 2030 existing facility to 33 minutes with the Surface Alternative. In the southbound direction, this same trip is expected to increase from 9 minutes to 16 minutes. Conversely, trips with downtown destinations, such as trips between downtown and the Aurora Bridge, would increase only slightly compared with the 2030 existing facility.

Average travel speeds would be reduced in most sections of the corridor with the Surface Alternative, as shown in Exhibit 9-5. Speeds would be reduced for three reasons:

1 Posted speeds would be reduced to 30 miles per hour for this alternative, which is lower than existing posted speeds for SR 99.
2 SR 99 traffic would be stopped periodically by traffic signals. Currently through downtown, SR 99 is a free-flowing limited access facility without traffic signals.
3 The corridor would be more congested than it is currently, which would also decrease travel speeds.

For the Surface Alternative, average traffic speeds through downtown would be reduced to range from 8 to 15 miles per hour during the PM Peak hour. This is lower than expected speeds, ranging from 27 to 40 miles per hour, for the existing facility in 2030. Speeds in most sections of the corridor would be reduced, with the exception of speeds in the Battery Street Tunnel, which are expected to slightly increase compared with the 2030 existing facility.

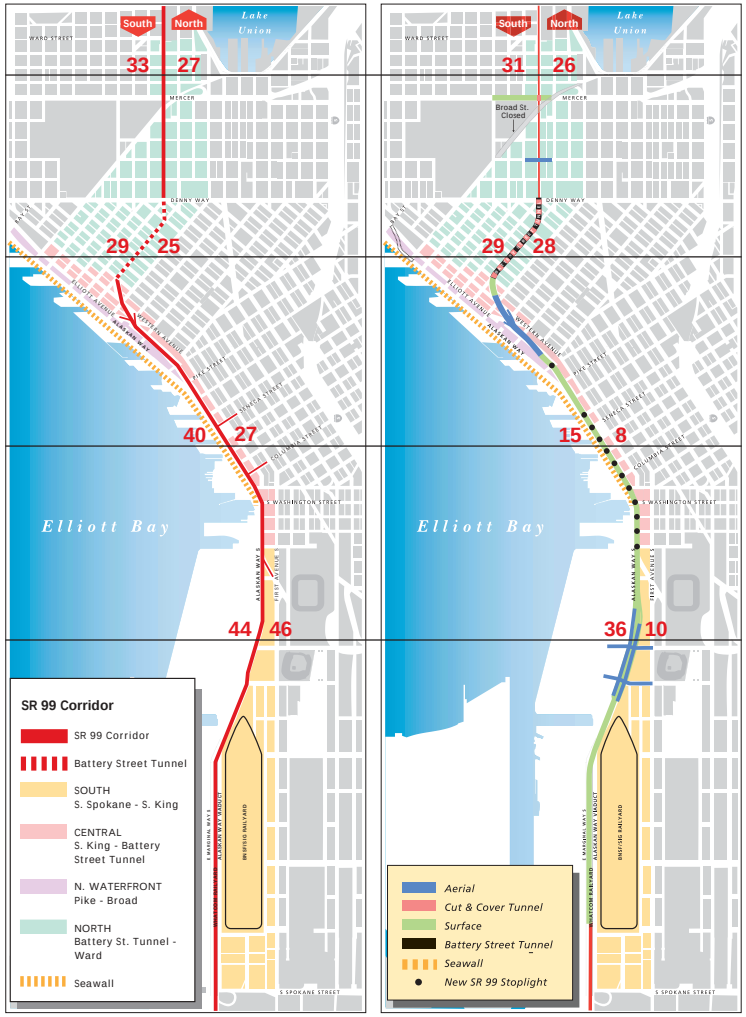
How would local streets and intersections operate?

Traffic on local streets and delay at intersections would not substantially change in the south and north waterfront areas as shown in Exhibit 9-6. Intersection delay would increase in downtown and the area north of the Battery Street Tunnel.

Average Traffic Speeds

During the PM Peak

2030 Existing Facility | Surface



Southbound SR 99 Speeds

During the PM Peak Hour

Shown as miles per hour

SR 99 Section	*2002 Existing*	*2030 Existing*	*Surface*
South Lake Union Area	39	33	31
Battery Street Tunnel	34	29	29
Downtown	41	40	15
Stadium Area	44	44	36

Northbound SR 99 Speeds

During the PM Peak Hour

Shown as miles per hour

SR 99 Section	*2002 Existing*	*2030 Existing*	*Surface*
South Lake Union Area	33	27	26
Battery Street Tunnel	33	25	28
Downtown	39	27	8
Stadium Area	46	46	10

How are congested operations on SR 99 defined?

The number of hours SR 99 would be congested was estimated by determining how long the busiest sections of SR 99 would be expected to have regular traffic slow downs or stop and go traffic.

What is the PM Peak Hour and why is traffic data analyzed for the PM Peak?

The PM Peak Hour is the time period when traffic is heaviest during the late afternoon commute. For SR 99, the PM Peak Hour occurs from 4:00 to 5:00 p.m. For this project, PM Peak data was evaluated because overall traffic conditions in and around the project area are the most congested during that time of day.

Exhibit 9-5

In the south, intersections at First Avenue S. and S. Royal Brougham Way and First Avenue S. and S. Atlantic Street would slightly improve from highly congested conditions to congested conditions. Conditions at these intersections would improve because fewer drivers would need to turn to connect with SR 519. Also, the new interchange would distribute traffic between two streets, compared with the existing facility that distributes traffic at only one street (First Avenue S).

In the downtown area, the number of congested intersections would increase from eight intersections to fourteen. The number of congested intersections would be increased because some drivers that currently use SR 99 would use surface streets instead. With the Surface Alternative, traffic on other city streets through downtown is expected to increase by 16 percent. Also, intersection delay at Alaskan Way and Yesler Way would be slightly reduced from 124 seconds for the year 2030 existing facility to 99 seconds with the Surface Alternative. Delay at Yesler Way would be reduced because ferry access to Colman Dock would be moved from Yesler Way to S. King Street. The tradeoff is that an intersection would be added at Alaskan Way and S. King Street. This intersection would have about 158 seconds of delay during the PM Peak.

In the north end, the Surface Alternative would have more congested intersections than the 2030 existing facility. The Surface Alternative proposes to widen Mercer Street and convert it to a two-way street between Fifth Avenue and Dexter Avenue. At the intersections of Mercer Street/Fifth Avenue and Mercer Street/Dexter Avenue, Mercer would transition back to a one-way street. Congestion is expected to increase near the areas where Mercer would convert from a two-way street to a one-way street (see Exhibit 9-6). Congestion projected in this area could get better if improvements beyond the limits of this project were made. The City of Seattle is currently studying several alternatives to improve the roadway network in the South Lake Union area as a separate project. Improvements to the roadway network in the South Lake Union area are not necessary for north end improvements proposed as part of the Alaskan Way Viaduct and Seawall Replacement Project.

At first glance, it may seem that the Mercer improvements would provide little benefit to the area since congestion would increase at a few north end intersections. However, what is not captured by the intersection analysis is the fact that the north end improvements would increase east-west mobility across SR 99, which is currently constrained. Also, the north end improvements could help reduce congestion during construction.

How would traffic volumes change on the Alaskan Way surface street?

Traffic volumes on the Alaskan Way surface street would increase substantially to 74,000 trips per day, compared with 11,000 trips per day estimated for the 2030 existing facility. Traffic volumes on Alaskan Way would increase because SR 99 and Alaskan Way surface street traffic would both be accommodated on Alaskan Way. Alaskan Way would be widened to help accommodate the additional trips. However, intersection delay would increase at several locations, travel times for several trips would increase, and travel speeds in most areas would be reduced. With the Surface Alternative, Alaskan Way could be congested for up to 9 hours a day.

Would traffic volumes on other parallel city streets change?

In the south end, the volume of traffic using parallel surface streets would decrease slightly due to improved ramp connections near the stadiums and SR 519.

In the central section of the project area, daily traffic volumes on parallel city streets would increase by 16 percent (approximately 13,000 vehicles a day). The volume of traffic on city streets is expected to increase because some drivers that currently use SR 99 would use downtown city streets instead. Because traffic volumes would increase on downtown streets, in-tersection delay would also increase as previously described.

Bypass Tunnel Alternative Congested Intersections

During the PM Peak

2030 Existing Facility | **Surface**

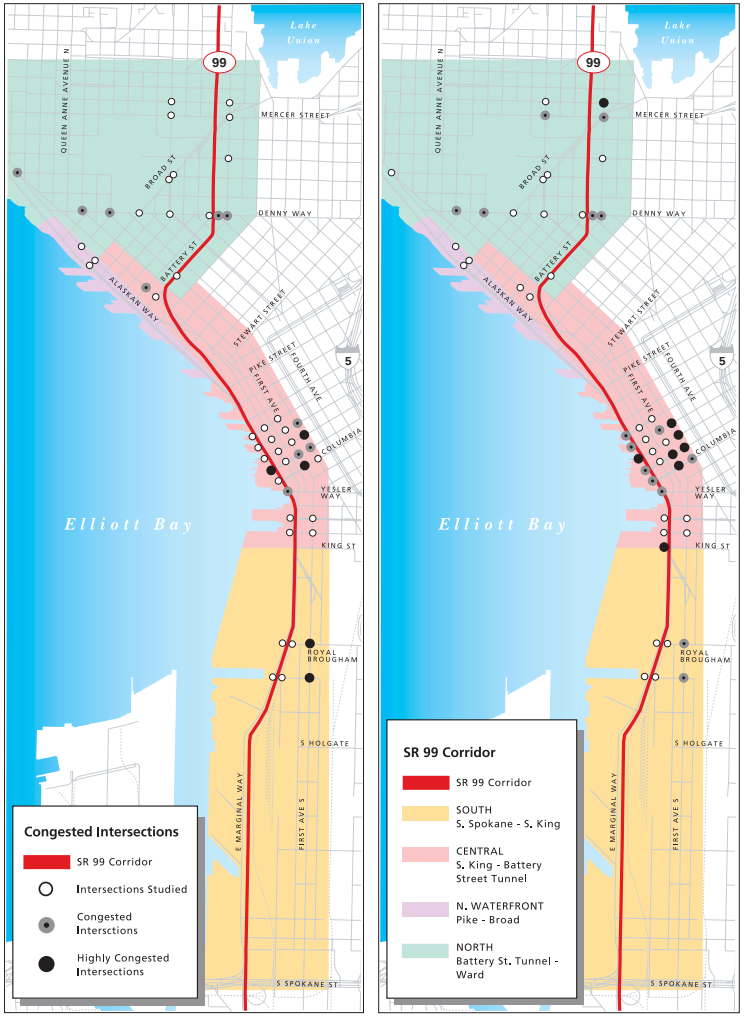


Exhibit 9-6

In the north end of the project area, the number of drivers using city streets would also increase. This shift would be partially due to improved city street connections at Thomas and Mercer Streets and also due to an increased number of drivers exiting SR 99 in this area to avoid the congested central waterfront.

Would the Surface Alternative affect traffic volumes on I-5?

Due to increased travel times, congestion, and reduced speeds, many drivers would choose to avoid using SR 99, particularly for trips through downtown. As a result, daily traffic volumes through downtown on the already congested I-5 facility would increase by about 6 percent (or 22,000 trips a day) in 2030 if the Surface Alternative is built.

How would the options affect traffic conditions if they were built instead of the alternative?

The Surface Alternative includes options in the south and north sections. These could become part of the preferred alternative in the Final EIS. In brief, here's how they would affect traffic:

- In the south end - If the connections to SR 519 are made at-grade with signalized intersections at S. Atlantic Street and S. Royal Brougham Way, traffic delay would increase over what is expected for the Surface Alternative.
- In the north end - Traffic flow on SR 99 in the north end would likely be degraded compared with existing conditions if signals were placed along Aurora/SR 99. Congested conditions would be expected at these intersections, and overall speed through this area would likely be decreased. The tradeoff is that east-west mobility would be improved by adding connections across Aurora/SR 99 at Thomas, Harrison, and Republican Streets.

5 How would the Surface Alternative change conditions for freight and transit?

How would the Surface Alternative change conditions for freight?

The Surface Alternative is expected to result in longer travel times and lower speeds than the existing facility in 2030 for most trips, which would affect freight. For the most part, conditions for freight would be degraded compared with conditions for the 2030 existing facility.

Travel times for several common freight trips through downtown would increase with the Surface Alternative. For example, northbound travel times during the PM Peak from the Ballard Bridge to the SR 519 ramps would increase from 19 minutes for the 2030 existing facility to 27 minutes with the Surface Alternative. In the southbound direction, this same trip would increase from 13 minutes to 22 minutes.

The Surface Alternative would reduce travel speeds in several locations. In the stadium area, average travel speeds during the PM Peak hour would range from 10 to 36 miles per hour for the Surface Alternative, compared with 44 to 46 miles per hour for the 2030 existing facility.

Even though travel times and travel speeds would be degraded, there are elements of the project that would benefit freight. Freight connections would be improved compared with the existing facility because a new interchange would be built at S. Atlantic Street and S. Royal Brougham Way. This interchange would improve freight connections between the Duwamish industrial area, Harbor Island, SR 519, and I-90.

How would the Surface Alternative change transit conditions?

Travel times for transit would change with the Surface Alternative. However, transit does not use SR 99 as a through route, so travel times would be less affected for buses than for freight and other vehicles using
SR 99 as a through route.

Bus routes that currently reach downtown from Columbia and Seneca Streets would be changed since the Columbia and Seneca ramps would be replaced. Buses could reach downtown using several possible access points; however, transit would most likely use ramps to S. King Street or the SR 519 ramps. In either case, travel times to the downtown area would increase. This increase would be due in part to the change in route because buses could access the entire Fourth Avenue corridor, thereby expanding services to growing employment centers in the International District and Pioneer Square area. The other reason is that congestion is expected to increase in the corri-

What are congested and highly congested intersections?

Congested intersections are intersections that cause drivers considerable delay. A driver might wait between one and two minutes to get through a traffic signal at a congested intersection. At a highly congested intersection, a driver might wait two minutes or more to get through the traffic signal.

Chapter 10 and Appendix B contain additional details about tools proposed for the Flexible Transportation Package.

dor. The effects of congestion on transit travel times could be reduced through implementation of transit priority measures. The City of Seattle's policy is to give transit priority in the downtown area, and measures to maintain transit speed and reliability would likely be implemented if downtown streets became more congested. Please note, if buses were routed to the SR 519 ramps, transit would be subject to traffic congestion in the stadium area during events unless alternate routes were developed.

The degree to which travel times would increase would depend on the bus route and the time of the trip. For example, during the PM Peak, travel times for buses headed southbound from between downtown and S. Spokane Street would likely be similar to those for the 2030 existing facility. However, buses headed northbound would likely experience longer travel times, since this trip would increase from 10 minutes to 20 minutes.

On the north end, buses would continue to access downtown from the Denny Way ramps. Travel times for buses using the Denny Way ramps would also increase slightly with the 2030 existing facility. For example, northbound trips leaving from downtown would increase from 12 minutes for the 2030 existing facility to 14 minutes for the Surface Alternative.

The lead agencies are committed to improving other transportation options in the corridor as part of this project, particularly as part of construction. A Flexible Transportation Package has been developed that includes several different programs and tools to respond to varying needs in the corridor. Most of the tools are designed to decrease reliance on single-occupancy vehicles and increase other modes of transportation during construction of the project, though some investments would provide long-term benefits. The range of programs that could be implemented to provide long-term benefits once the project is completed include implementing parking strategies to decrease long-term parking in the area and installing traffic management and transit priority systems. A more defined Flexible Transportation Package will be presented in the Final EIS as part of the preferred alternative.

6 How would the Surface Alternative improve roadway safety?

The Surface Alternative would replace the deteriorating structure with a new roadway, reducing seismic risks. However, putting SR 99 traffic on the surface and through intersections would increase the accident rate for both vehicles and pedestrians along much of the corridor.

In the south end, the viaduct would be removed and replaced with a new at-grade roadway from S. Holgate Street up to near S. King Street. The ramps at First Avenue S. would be removed and replaced with improved ramps with wider shoulders in the S. Atlantic Street and S. Royal Brougham Way area. If the south end option were constructed with the Surface Alternative, ramps to S. Atlantic Street and S. Royal Brougham Way would not be provided; instead, these connections would remain at-grade and would be controlled by traffic signals. The option would introduce cross-street access on SR 99, which would increase the likelihood of intersection and congestion-related accidents.

With the Surface Alternative, the character of SR 99 along the waterfront changes from a limited access highway to a large arterial with signalized intersections. From about S. King Street north to Broad Street, traffic on the Alaskan Way surface street would increase substantially, particularly up to Pike Street. This additional traffic would increase the overall number of vehicle and pedestrian accidents and the potential for injuries.

North of Pike Street, SR 99 would transition to an aerial structure that would connect to the Battery Street Tunnel. Ramps to Elliott and Western Avenues would be provided and would be improved over existing conditions. In addition, there is the option of connecting both ramps to Elliott Avenue, which would not be expected to compromise traffic safety. The Battery Street ramps would remain open to only emergency vehicles, which would improve roadway safety.

In the south section, if the option with signals at S. Atlantic Street and S. Royal Brougham Way were constructed, the number of injury accident rates would be expected to increase. North of the Battery Street Tunnel, the Widened Mercer Underpass and new Thomas Street bridge would provide new pathways for pedestrians to safely cross this section of SR 99. If the option were constructed, signals would be added where SR 99 intersects with Thomas, Harrison, and Roy Streets. These signals would add cross-street traffic, which can increase the likelihood of intersection and congestion-related injury accidents for vehicles and pedestrians. Also, if northbound traffic backs up into the Battery Street Tunnel, more accidents would be expected. Emergency access to accidents would be more difficult in the tunnel than at other locations.

7 How would the Surface Alternative affect parking?

There are 2,038 parking spaces located in the project area. As shown in Exhibit 9-7, a total of about 720 parking spaces would be removed with the Surface Alternative between the south end and the north waterfront area. An additional 40 spaces would be removed in the north end due to the improvements associated with the Widened Mercer Underpass.

Exhibit 9-7

Parking Changes for the Surface Alternative

	Short-Term[1]	Long Term[2]	Off-Street[3]	Total
Existing Parking Spaces	814	276	900	2,038
South End	+37	-221	-57	-241
Pioneer Square	-135	-15	+2	-148
Central Waterfront	-268	0	-69	-337
North Waterfront	+2	0	+4	+6
Net Change	**-364**	**-236**	**-120**	**-720**
Parking Spaces with the Surface Alternative	**450**	**40**	**780**	**1,318**

[1] Short-term metered parking spaces
[2] Free, long-term parking spaces
[3] Pay parking and tenant only parking

The majority of parking spaces that would be removed are free, long-term spaces located in the south section of the project area. Approximately seven short-term spaces and three off-street spaces would be gained. This project does not currently propose to replace these long-term parking spaces

because there is enough long-term parking available in the project area. People currently parking for free would need to pay to park, or they would need to use transit. According to the Puget Sound Regional Council's 2002 parking inventory study, 46.6 percent of parking spaces in the south end are utilized. There are more than five parking facilities in this area providing more than 6,000 parking spaces. Using the estimated parking utilization rate in this area, approximately 2,800 spaces are available in this area on a normal business day.

In the Pioneer Square area, 135 short-term parking spaces would be removed. An additional 268 short-term spaces would be removed along the central waterfront area. Many businesses in these areas, particularly retail shops, restaurants, and tourist destinations, rely on short-term parking for customer and user access. Some parking mitigation options have been identified:

- Increase utilization of other existing parking facilities in the area.
- Lease an existing parking facility and convert it to short-term parking.
- Purchase property and build new short-term parking.

A formal parking mitigation plan for short-term parking losses in the Pioneer Square area and along the central waterfront will be developed and presented in the Final EIS. In the north end, parking lots in the area have available capacity to help offset the loss of 40 parking spaces, so mitigation is not proposed.

Finally, if the options in either the north or south end were constructed as part of the Surface Alternative, the total number of spaces removed would not be expected to change compared with the numbers discussed above.

8 If the Surface Alternative were built, what would it look like?

In the Surface Alternative, Alaskan Way Viaduct would be replaced with a six-lane surface roadway that would combine SR 99 with the Alaskan Way surface street. Starting at S. King Street, SR 99 would merge with Alaskan Way, splitting off again near Pine Street to climb toward the Battery Street Tunnel. This alternative would change the corridor in several important ways.

With the viaduct gone, views to and from the waterfront, currently obstructed by the viaduct, would be opened up for the first time since the early 1950s. From the Pioneer Square Historic District and from the commercial core, views to the west that are currently dominated by the viaduct would instead focus on pier buildings along the waterfront, and then past those buildings to the Kitsap Peninsula, Bainbridge Island, and the Olympic Mountains. Exhibit 9-8 shows a simulation of the Surface Alternative looking north near Yesler Way.

Looking back to downtown from the waterfront, views of the city's skyline would no longer be interrupted by the viaduct's two elevated lanes and numerous support columns. As a result, the waterfront would appear far more connected with the city than it does presently.

The area currently beneath the viaduct is visually cluttered with parking and vertical support columns, always in shadow, and dominated by the elevated structure above. With the Tunnel Alternative, the Alaskan Way surface street would be changed to improve the surface street and to improve the look and feel of this waterfront area for the public. Improvements could include landscaping, a broadened waterfront promenade, sidewalks on the east side of Alaskan Way, a landscaped trolley corridor, a parking and access lane along the waterfront, and bike lanes. Gone would be existing effects from the viaduct's height, scale, bulk, and its industrial concrete design, which contrast with the visual character of Pioneer Square Historic District, the central waterfront, and parts of the commercial core.

Views south from Pike Place Market and Victor Steinbrueck Park to the waterfront would probably be dominated by the roadway and traffic of SR 99 as it climbs from the waterfront to Battery Street Tunnel. In Belltown and on SR 99 north of Battery Street Tunnel, the overall character of the area would not be affected much by this alternative.

Surface Alternative Simulation
at Jackson Street

Exhibit 9-8

Because this alternative would have neither a tunnel nor an elevated structure between S. King and Pike Streets, the combined Alaskan Way surface street/SR 99 would carry far more traffic than the Alaskan Way surface street does presently and more than the surface street would in any other alternative. Additional traffic along with the overall width of the six-lane roadway might reduce the potential for reestablishing a visual connection between the waterfront and the city and contrast with the visual character of the central waterfront by making the corridor appear heavily automobile oriented.

Appendices D and E contains additional information about views.

Appendix F contains additional noise and vibration information.

South of S. King Street, two lanes, one in each direction, would be added to accommodate additional traffic. Additionally, an overpass about half the height of the existing viaduct would connect SR 99 with S. Atlantic Street and S. Royal Brougham Way. These changes would probably not alter the character of this area, which is dominated by Seattle's sports stadiums, industrial buildings, and Port of Seattle container facilities.

Drivers traveling north and south along the waterfront would no longer have the scenic views currently available from the viaduct roadway. Many pleasant views would be available along the waterfront, including waterfront buildings and activities. Views stretching from Elliott Bay to the Olympics and newly revealed views of the Seattle skyline would be available for those not in vehicles.

9 How would noise or vibration levels change?

The Surface Alternative's noise levels would be the loudest during the early-morning, midday, and evening periods when drivers could travel near the speed limit. Traffic noise would decrease by up to 4 dBA in some locations compared to existing levels. In a couple of other locations, traffic noise would increase up to 5 dBA compared to existing 2002 levels. To the human ear, a 2- to 3-dBA increase is barely noticeable. A 5-dBA increase in traffic noise is readily noticeable

The noise abatement criterion is 67 dBA for noise-sensitive outdoor uses at locations such as parks, hotels, and residences. Existing traffic noise approaches or exceeds the FHWA traffic noise abatement criteria at 43 of the 48 sites modeled. Traffic noise levels with the Surface Alternative would approach or exceed the traffic noise abatement criteria at 42 sites. These sites include approximately 4,490 residential units, 1,290 hotel rooms, and 120 shelter beds. Nine of the sites are park or public open spaces, two are educational or childcare sites, and five sites are commercial or other less noise-sensitive uses. Modeled noise levels at specific locations may be found in Exhibits 5-1 and 5-2 of Appendix F. Six sites that are severely affected by noise for the year 2030 existing facility would continue to be severely affected by the Surface Alternative.

Total noise levels at many of the sites would be greater than the predicted traffic noise level because non-traffic sound sources contribute substantially to the total noise level in much of the corridor. Noise from other sources, such as aircraft, restaurants and other businesses, the bustle of sidewalks, construction, mechanical systems in buildings, alarms, and sirens, also contributes to the total noise environment.

Improvements to the Battery Street Tunnel would include the extension of the tunnel portals and installation of jet fans to provide emergency and supplemental ventilation. There are several residential uses near the south portal of the Battery Street Tunnel. The jet fans will be designed not to exceed 57 dBA at the nearest residential property line during normal daytime operations. A level of 57 dBA is typical of people talking from 10 feet apart. If the fans are to be operated regularly during nighttime hours, they will be designed not to exceed 47 dBA during those hours.

The following mitigation measures were evaluated for their potential to reduce noise impacts from the Surface Alternative: traffic management measures, acquiring land as buffer zones or for construction of noise barriers or berms, realigning the roadway, and installing noise insulation for public use or nonprofit institutional structures. It is not feasible to mitigate traffic noise impacts that would occur under the Surface Alternative because they are largely caused by traffic operating on the city street system rather than an individual limited-access facility.

The Surface Alternative would cause lower maximum vibration levels than the current viaduct, which focuses vibrations from the elevated structure into areas around the bases of support piers.

10 How would the Surface Alternative change character and land use in the project area?

Currently the viaduct blocks views between the waterfront and neighborhoods to the east and restricts options for land use and development-both under and adjacent to the elevated structure.

The Surface Alternative could affect land uses in the corridor in several important ways. The current layout of the central waterfront's streets, sidewalks, and open space would be reconfigured in this alternative, possibly adding part of the area that's currently under the viaduct to the surrounding public open space (compatible with the City of Seattle's central waterfront planning efforts). Additions might include features such as landscaping, bike lanes, planted traffic and trolley medians, and broadening the waterfront promenade.

Replacing the central portion of the viaduct with a combined SR 99/Alaskan Way surface street could affect land uses away from the waterfront as well. Without the viaduct, a scenic view would stretch from the edge of the commercial core to the Olympic Mountains. A clear visual connection could be established between the waterfront and the city, and the way to the waterfront and back could be enhanced with unobstructed sight lines, improved street crossings, and an extension of the City of Seattle's Green Streets efforts to the waterfront on east-west streets.

In the Surface Alternative, Alaskan Way surface street would have three lanes in each direction-two more than the Tunnel Alternative and the same number as the Bypass Tunnel Alternative. Additionally, the amount of traffic on Alaskan Way would be far greater in this alternative than in any other, owing to the combining of Alaskan Way and SR 99. Together, the roadway width and increased traffic might limit the sense of connection between the waterfront and the city. Nevertheless, overall changes resulting from this alternative could make nearby buildings and land more desirable for land uses that benefit from views, proximity to public open space, and foot traffic-possibly leading to new kinds of development in the project corridor.

Because the combined Alaskan Way/SR 99 in the Surface Alternative would accommodate far less traffic than the two roads do separately, the waterfront would experience heavier congestion than it does

Historic Washington Street Boat Landing

The Land Use and Shorelines Technical Memorandum found in Appendix G discusses this topic more extensively and looks at the alternatives with an eye toward their consistency with current local land use plans and policies.

Appendices H and N contain additional information about parks and recreation.

now. Many motorists would probably try to escape this traffic by detouring to other nearby streets. On First Avenue, on-street parking would be replaced with two additional travel lanes to accommodate extra traffic, potentially affecting sidewalk cafes and other businesses that rely on a pleasant pedestrian environment (especially Pioneer Square). In general, the extra traffic, noise, exhaust, and congestion would make First Avenue a less desirable place to visit and do business, possibly making businesses less competitive.

About 720 parking spaces in the corridor would be removed. South of S. King Street, new ramps would connect SR 99 to S. Atlantic Street and S. Royal Brougham Way. These would be partially located in the Port of Seattle's container cargo facilities, reducing the area used for container delivery, storage, and pickup. However, the ramps would also make it easier for trucks to move between the Port's facilities and both SR 99 and I-5.

Added congestion on Alaskan Way surface street would also lengthen travel times on the north-south route between the industrial area south of downtown Seattle and the Ballard/Interbay industrial area to the north. In the northbound direction, travel times would increase during the PM Peak from 19 minutes for the 2030 existing facility to 27 minutes. Increased travel times for trips between these two industrial areas makes this alternative less supportive of their industrial land uses than other alternatives, which do not reduce travel times.

11 How would the Surface Alternative affect parks, recreation, and open space facilities?

With the viaduct removed from the central waterfront, views between the waterfront and the city would no longer be blocked by the elevated structure; however, the width of the six-lane surface street along with the large volumes of traffic it would generate (by far and away the most surface traffic of any alternative) might reduce the potential for enhancing visual and physical connections between the waterfront and the city.

One of the benefits of this alternative to parks and recreational facilities is that a broad public open space would be created where SR 99 turns northeast to climb to Battery Street Tunnel and the Alaskan Way surface street turns west toward the waterfront. Located directly adjacent to the Seattle Aquarium and Waterfront Park and across Alaskan Way from the Pike Street Hillclimb, this space could be developed as a waterfront park or plaza.

A new over-water pier would be built near the end of S. Washington Street connecting to Colman Dock. The pier would remove Alaska Square, a small public access and shoreline viewing area. Alaska Square is currently closed because the bulkhead supporting it is failing. Alaska Square could be replaced with sidewalks and shoreline viewing near its current location. The new over-water pier would also require relocating the Washington Street Boat Landing about 125 feet west of its current location.

The Surface Alternative would modify the Waterfront Trail, which is separated from the Alaskan Way surface street and shared by bicyclists and pedestrians. The separated, shared path would be extended south from S. Royal Brougham Way to just south of S. Atlantic Street. From S. Atlantic Street to Yesler Way, the Waterfront Trail would be moved from the east side of E. Marginal Way/Alaskan Way to the west side. Between Yesler Way and Pine Street, the trail would change from being a separated, shared bicycle and pedestrian pathway. Bicyclists would ride in striped lanes along the Alaskan Way surface street, and pedestrians could walk on sidewalks on the east side of Alaskan Way or the waterfront promenade located on the west side of Alaskan Way. From Pine Street north, the Waterfront Trail would not be affected. The Surface Alternative would result in the loss of parking spaces that are currently beneath the viaduct, possibly making parking somewhat more difficult for some people visiting the waterfront.

12 How would the Surface Alternative affect neighborhoods and the people who live there?

The Surface Alternative would dramatically change the character of the commercial core along the central waterfront. Removing the existing viaduct would take away the shadowy area that now separates the downtown portion of the neighborhood from the waterfront. However, there would be more traffic lanes, more vehicles, and increased congestion along Alaskan Way surface street. These conditions are not conducive for pedestrians and could substantially diminish the sense of connection created by the open views of Elliott Bay. It is possible that the open feel of the area could attract more people who would want to live and work in the area. However, it is also likely that increased congestion could make the area less appealing.

In the north end of the project area, Aurora/SR 99 is currently a barrier for people and traffic moving between neighborhoods to the east and west. The Widened Mercer improvements would benefit the Uptown and South Lake Union neighborhoods by widening the existing Mercer Street underpass and constructing a bridge over Aurora Avenue N. at Thomas Street. If the option to add traffic signals were built, some east-west connections across SR 99 might be improved; however, the signals would slow traffic traveling on the new intersecting local streets as well as Aurora/SR 99 and would generally increase congestion in the area.

13 Would the Surface Alternative affect community and social services?

The Surface Alternative would affect community and social services providers in the corridor in several ways. The CASA Latina Day Workers' Center (which dispatches jobs for casual day laborers) is located near the south portal of the Battery Street Tunnel and would be displaced. In the south, Alaskan Way surface street would generally have more traffic congestion than with the other alternatives. This would generally create more difficult driving conditions. In the downtown area, organizations providing social and community services would be hampered by overall congestion. For example, residents of the St. Martin de Porres homeless shelter are driven daily during peak travel times to another social service organization each morning and then picked up each

Appendices I and J contain additional information about neighborhoods.

Will the agencies help relocate properties that need to be purchased for the project?

The lead agencies will provide relocation assistance and compensation to the affected property owners and tenants as mitigation. Compensation will comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation assistance includes determining special needs and providing referrals to comparable properties.

Appendix K contains additional information about properties that would potentially be acquired.

Appendices L and N contain additional information about historic resources.

evening. Deliveries to service providers would be more difficult, and volunteers would find it more troublesome and time-consuming to provide support. Response times by emergency services would also be increased.

14 What residences, businesses, or other properties would need to be acquired?

No residences would be affected. Up to 33 parcels would be permanently acquired for the Surface Alternative. If these parcels are fully acquired, the total area obtained would be approximately 1,759,000 square feet (40 acres). Additionally, about 398,000 square feet along the eastern side of Terminal 46 may be acquired for right-of-way needs or ferry holding. Up to 20 buildings would be modified or displaced during construction, including 10 commercial buildings, 9 industrial buildings, and Fire Station No. 5. At this time, the number of businesses or employees that would need to be relocated is unknown; however, it is estimated that up to 581 employees in the 20 buildings could be affected. Specific information about the number of businesses and employees requiring relocation will be developed as part of the Final EIS.

Of the 33 parcels that would potentially be acquired, 23 are located in the southern section of the project, 9 are located in the central section, and 1 is located in the north section. Additional parcels or buildings would receive minor modifications, such as changes to driveways, parking, or fences, which would not alter their existing use. The lead agencies would work closely with the affected businesses and properties to minimize the level of disruption.

15 How would the Surface Alternative affect historic resources?

The Surface Alternative would replace the viaduct with a surface roadway that would combine Alaskan Way surface street and SR 99. Gone with the viaduct would be much of the blocked views to and from historic buildings and neighborhoods. As with all alternatives, old ramps connecting SR 99 with First Avenue would be removed, benefiting the surrounding area. However, new ramps would connect SR 99 to S. Royal Brougham Way and S. Atlantic Street (on the south edge of the Pioneer Square neighborhood). These could affect their surroundings with traffic noise and blocked views that could affect nearby historic buildings. Continuing into downtown, ramps at Columbia Street and Seneca Street would be removed, eliminating the existing effects to the historic buildings around them.

Along the waterfront, the Washington Street Boat Landing pergola would be relocated approximately 125 feet west of its current location to make way for the Colman Dock ferry access road. In the Pioneer Square Historic District, the One Yesler Way building would be in the way of a direct connection to Western Avenue, but it could be picked up and moved to an open site across the street. The Surface Alternative assumes two lanes are added on First Avenue through Pioneer Square. The additional lanes would require strengthening the areaways (spaces under sidewalks initially created when Pioneer Square streets were raised after the 1889 fire) under the sidewalks, which could affect their historic qualities. Finally, the Battery Street Tunnel, another structure eligible for historic listing, would be remodeled to make it safer. These updates might change the character of the tunnel portals. The tunnel already intrudes on the basement of the Catholic Seamen's Club, which may be altered for the tunnel improvements and is eligible for listing in the National Register of Historic Places.

The existing viaduct is eligible to be listed in the National Register of Historic Places. The Alaskan Way Seawall is also eligible. The potential historic status of these structures will be considered as part of the planning process but is not expected to prevent their replacement. Replacement of the seawall is not expected to affect any other historic resource in the corridor.

As part of the planning and design of the Surface Alternative, measures would be taken to lessen the effects it would have on historic buildings and neighborhoods. These measures might include designing new structures to blend in with their historic surroundings, moving historic buildings instead of tearing them down, and documenting buildings and structures that need to be removed (with photos, surveys, measurements, and notes) to help preserve the memory of Seattle's history for the future.

16 How would the Surface Alternative affect public services (such as police and fire)?

Public services would mostly be affected by changes in traffic patterns within the corridor. The Surface Alternative would cause many changes to travel patterns. The south and central portions of the corridor would be congested, and travel times would increase substantially both on SR 99 and on adjacent city streets. This would cause delays for all vehicles, including public service providers. The reliability of the corridor for emergency services would be worst during peak travel times (during the morning and afternoon commute) and events at the stadiums. The overall congestion caused by the Surface Alternative would cause delays for Fire Stations Nos. 5 and 10 and for the West Precinct and East Precinct police stations. Other services like mail and garbage pickup would also be delayed.

A couple of changes proposed for the Surface Alternative would improve emergency vehicle access and response to the Battery Street Tunnel. The Battery Street ramps would be closed to all traffic except for emergency vehicles, which would provide them direct access to the Battery Street Tunnel. In addition, improvements to the Battery Street Tunnel would enhance the ability to fight fires in the tunnel, and additional exits from the tunnel would improve overall safety.

North of the Battery Street Tunnel, effects to public service providers would be mixed. Mercer Street would be widened and would become a two-way street, and a bridge would connect Thomas Street over the top of SR 99. The bridge at Thomas Street and expanded Mercer would provide additional east-west traffic movements in this section of the corridor. However, additional congestion and delay is expected at a couple of additional intersections due to the

Appendix O contains additional information about public services.

Appendix P contains additional information about Economics.

Appendix Q contains additional information about air quality.

roadway changes. Therefore, traffic conditions in the north end would have improved street grid connections, although more congestion is anticipated with a two-way Mercer Street.

17 How would the Surface Alternative affect the local and regional economy?

The Surface Alternative would combine traffic from SR 99 and Alaskan Way surface street on a waterfront surface road. With more vehicles on fewer lanes, traffic would slow down, and it would take longer to get through the corridor than it would if the existing system were left in place.

The Surface Alternative would permanently displace up to 20 buildings with approximately 581 employees. If these businesses are not relocated within the city, local sales, business and occupation (B&O), and property tax revenue might be lost. However, if displaced businesses leave Seattle but stay in the region, the new location would continue to collect B&O taxes and support the regional economy.

Under the Surface Alternative, approximately 720 parking spaces would be removed. About 221 of these spaces are free long-term spaces underneath the viaduct south of S. King Street. Therefore, people currently parking for free would need to pay for long-term parking, use public transit, or find other places to park. Most of the other spaces that would be removed, about 403, are short-term spaces in Pioneer Square and the central waterfront project area. This short-term parking is used by customers and tourists in the AWV Corridor. Without mitigation, the property displacements and loss of parking spaces could affect the economic viability of businesses in these areas.

Quick and efficient distribution of goods and services is an important part of the health of a vigorous local and regional economy. The Surface Alternative would improve connections to downtown Seattle at several major cross streets, but overall traffic congestion in the corridor would be worse. The Elliott and Western ramps that provide a connection for the Ballard / Interbay area would remain; however, it would take longer for freight trucks to travel to and from the Ballard / Interbay area because the primary truck route would be along the combined SR 99 / Alaskan Way surface arterial. The Surface Alternative would provide improved connections to the Duwamish area, Harbor Island, and SR 519. The new interchange at SR 519 would provide grade-separated access over the tail track, allowing vehicular access from the waterfront to SR 519 when freight trains are present.

The option to connect both ramps to Elliott Avenue would not make a significant difference to truck traffic. If the option to include signals at Thomas, Harrison, and Roy Streets is added in the north area, it could increase congestion and slowing, but might improve overall safety. Overall, future freight mobility would be degraded compared to the 2030 existing facility conditions. Associated freight operating and shipping costs would increase.

18 Would the Surface Alternative change air quality?

Under the Surface Alternative, concentrations of carbon monoxide and particulate matter (PM_{10}) were estimated under peak traffic conditions for study area intersections (Exhibits 6 1, 6 2, and 6 3 in Appendix Q). The highest carbon monoxide concentrations would occur under the Surface Alternative because of increased traffic congestion; however, the future pollutant concentrations would still be below (within) the National Ambient Air Quality Standards (NAAQS).

Daily pollutant emissions from traffic in the study area in 2030 were also estimated. Comparison between existing study area emissions and the various alternatives in 2030 demonstrates the trend towards cleaner operating vehicles for carbon monoxide, oxides of nitrogen, and hydrocarbons in 2030 (Exhibit 6-4 in Appendix Q).

19 How would the Surface Alternative affect fish and wildlife species and their habitat?

One way the Surface Alternative would affect wildlife habitat is by replacing the old seawall with a new one.

Changes to Elliott Bay at S. Washington Street

Bypass Tunnel

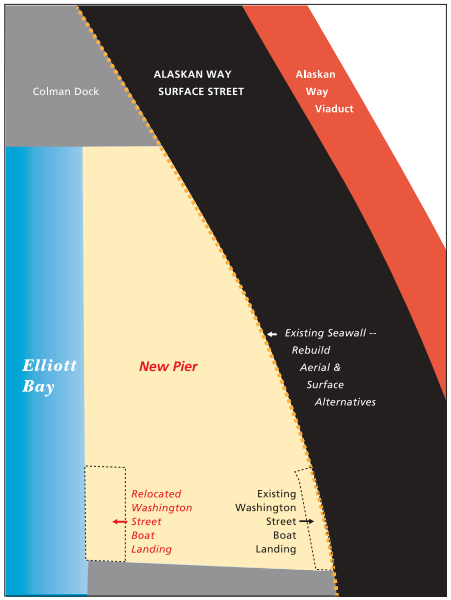


Exhibit 9-9

The new concrete seawall would be constructed slightly landward of the existing seawall along the majority of the corridor. In some areas, the existing seawall would be removed, increasing the water volume in the immediate area by an estimated 8,000 cubic yards. Like the old seawall, the basic structure in the aquatic habitat along the new seawall would consist of a vertical concrete wall with rock riprap placed at its base where needed to prevent erosion. Up above at street level, urban habitat-mostly street trees and shrubs-would remain much the same as it currently is. The existing stormwater facilities that collect and convey water from the viaduct are old and would be replaced with new facilities using current design standards and technology, improving the quality of water discharged.

Appendix R contains additional information about fish and wildlife.

What is a BMP?

A Best Management Practice (BMP) is an action or structure that reduces or prevents pollutants from entering the stormwater and degrading water quality.

The approaches for stormwater management are described in Chapter 2.

The vertical concrete seawall is poor intertidal habitat for many species, including ESA listed species such as Chinook salmon and bull trout. The Seattle waterfront is a migration corridor and rearing area for juvenile Chinook and other juvenile anadromous salmonids. Juvenile salmon are commonly present at various protected locations near the water's surface in the vicinity of the seawall during spring migration. Other fish species commonly observed in the shoreline area along the seawall include seaperch, bay pipefish, shiner perch, sculpins, greenling, various flatfishes, and a few lingcod. These fish would experience the same basic habitat as they do today when the new seawall is constructed. The habitat along the seawall is also occupied by a range of marine invertebrates, such as red crab, hairy crab, coon-striped shrimp, octopus, starfish, and anemones.

Between Pier 48 and Colman Dock, a new over-water pier would be built to provide vehicle access to the Colman Dock Ferry Terminal. The new pier would cover approximately 35,200 square feet of intertidal shoreline (areas that are exposed during low tides), including riprap, and shallow subtidal habitat (areas normally covered by water). Under other piers along the waterfront, marine biologists observed that macro algae (a kind of seaweed, important for food and habitat for aquatic animals) have a hard time growing in shade cast by the piers. The shade would probably keep macro algae and other aquatic vegetation from growing under the new pier.

Project planners and designers would work with resource agencies (like the Corps of Engineers) to address habitat that could be affected by shading from the construction of the pier. These efforts could include protecting an existing intertidal beach with an offshore berm or breakwater and creating new beaches in open areas along the waterfront that would provide much-needed aquatic habitat along Seattle's urban shoreline. This would give young salmon the protective shallow water habitat they need to grow and provide a corridor along the waterfront in which adult salmon could migrate on their way to and from the Pacific Ocean. Other possibilities for restoring more natural habitat characteristics where possible are also being studied.

20 Would the Surface Alternative change water quality?

The amount of impervious surface area would not increase under the Surface Alternative. Incorporation of Best Management Practices (BMPs) into the Surface Alternative would improve the water quality of runoff discharged from the project area compared with existing conditions. Rain running off the streets and highways collects pollutants like zinc and copper that reduce water quality and can be harmful to aquatic plants and wildlife. The Surface Alternative would provide an overall reduction in total suspended solids, zinc, and copper. The amount of pollutants would decrease in the Duwamish River, Elliott Bay, and Lake Union and increase in Puget Sound due to the greater volumes discharged at the West Point Treatment Plant.

Exhibit 9-10

Summary of Water Quality Benefits for the Surface Alternative Convey and Treat Approach

Annual Pollutant Load (lbs/yr)[1]	*Existing Conditions*	*Surface Alternative*	*Change (% Reduction)*[2]
Total Suspended Solids	87,300	52,400	40%
Zinc	132	88	33%
Copper	26	17	35%

[1] Annual pollutant load from project area pollutant-generating impervious surface (PGIS) after treatment with a convey and treat approach

[2] Pollutant reduction is an estimate based on a mass balance model developed for this project

The Battery Street Tunnel improvements include a fire suppression system. In an emergency, it is possible that runoff from this system could discharge directly into Elliott Bay, temporarily reducing dissolved oxygen needed by aquatic plants and wildlife. These short-term impacts are allowed under State of Washington laws.

The Convey and Treat Approach would decrease the volume of stormwater that goes directly to Elliott Bay and increase the volume discharged to Puget Sound. According to the current design plans, the locations of the outfalls would remain the same. The Surface Alternative could result in a net benefit to the environment compared to existing conditions.

21 How would the Surface Alternative change the soil conditions once the project is completed?

To meet earthquake standards, the soil would have to be strengthened to ensure that it would not liquefy in an earthquake. A large part of the Alaskan Way Viaduct project area is located on loose fill, soft sediment, sand, and gravel (described in Chapter 3 Question 2). The Surface Alternative's structures must be supported by soils that are stronger than these loose materials to withstand an earthquake. In the project area, piles or drilled shafts would need to be installed 60 to 150 feet deep to reach the dense glacial soils that would support the facility.

The soils would be strengthened to reduce the seismic hazards and meet the earthquake standards. Soils can be strengthened by using jet grouting or deep soil mixing techniques. These techniques inject, mix, or replace the existing soil with cement grout to strengthen the soils.

Soils would be strengthened around the new foundations of structures, under some proposed retaining walls, and behind the seawall. The soils would primarily be strengthened in the south section and along the waterfront. The soils between Pine Street and the Battery Street Tunnel have sufficient strength and do not need to be improved. In the north section of the Surface Alternative, the Battery Street Tunnel improvements may require some shallow foundations, which would displace a small amount of soil. The changes to the street grid would require soil excavation to widen Mercer Street and fill to be placed along Broad Street.

The extent of soil improvement behind the seawall depends upon the type of seawall and depth to glacial soils. Improvements behind the seawall are likely to use the jet grouting technique. From S. King Street to S. Washington Street, soil improvements behind the existing sheet pile wall would be made to a depth of about 40 feet and a width of about 35 feet. Along the Pile-Supported Gravity Wall from S. Washington Street to Madison Street, soil improvements would be made to a depth of about 40 feet and width of about 65 feet. The Type A and Type B Seawalls are located

Appendix S contains additional information about water quality.

Appendix T contains more information about geology, soils, and groundwater.

Appendix U contains additional information about contaminated materials.