CHAPTER 2 - SUMMARY AND COMPARISON OF ALTERNATIVES

1 What is the purpose of this chapter?

The primary function of an environmental impact statement (EIS) is to help the lead agencies (the City of Seattle, WSDOT, and FHWA) make informed choices between reasonable alternatives. This chapter brings together key information from other chapters in this Draft EIS to show how the alternatives compare to each other and what tradeoffs will have to be made. Key tradeoffs are highlighted in special boxes. As the lead agencies consider these choices, it is important that you, the public, see the same information and understand how the project could affect our community and environment.

This chapter also gives a brief summary of the project purpose, alternatives being considered, and areas of controversy. This chapter does not give much detail on any particular subject. That's what the rest of the Draft EIS and supporting studies are for. However, this is the only chapter that compares the alternatives to each other. All the information contained in this chapter can also be found elsewhere in this Draft EIS.

2 Where is the project located?

The Alaskan Way Viaduct and Seawall are located in downtown Seattle, Washington. The project area is 4 miles long, extending from approximately S. Spokane Street in the south to Ward Street north of the Battery Street Tunnel. The Alaskan Way Seawall is within these boundaries, extending from S. Washington Street to Bay Street.

Because the project area is large, it has been divided into four sections for discussion in this Draft EIS, as shown in Exhibit 2-1:

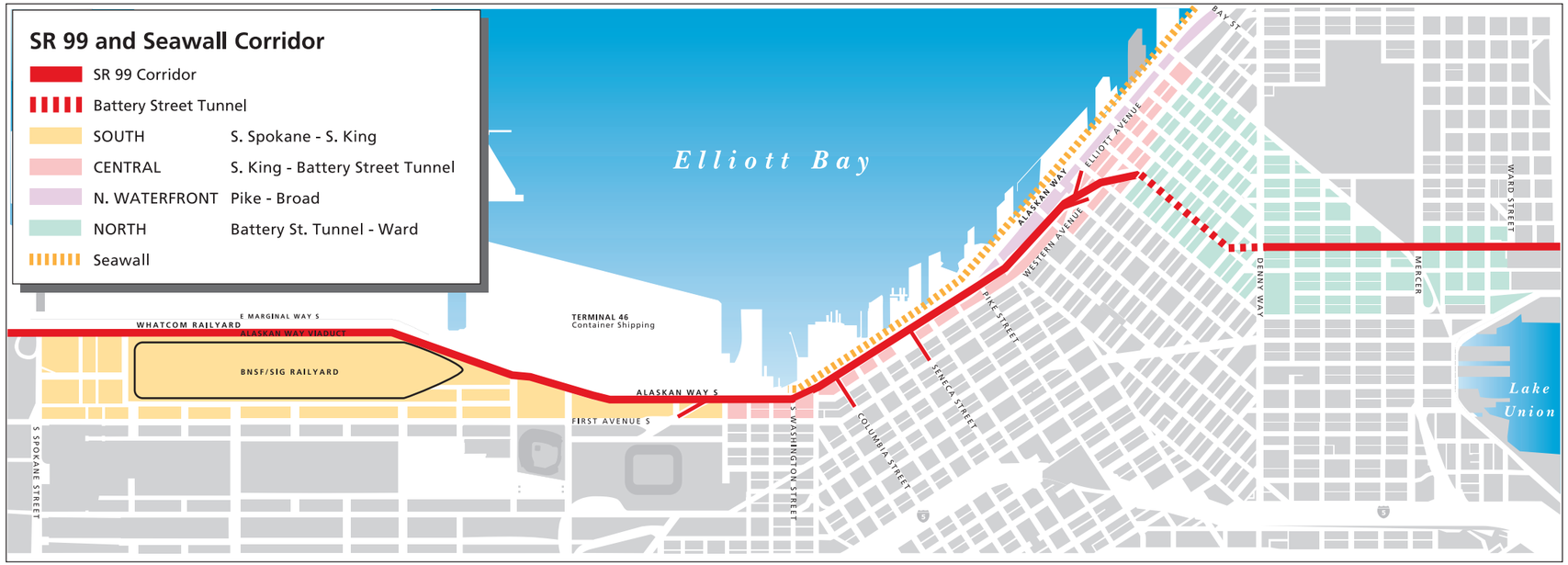


Exhibit 2-1

- South - S. Spokane Street to S. King Street.
- Central - S. King Street to the Battery Street Tunnel. The central section includes the seawall, Alaskan Way surface street, and the viaduct structure curving up to the Battery Street Tunnel.
- North Waterfront - Pike Street to Broad Street. The north waterfront section includes the Alaskan Way surface street and seawall from the point where the viaduct begins to veer off to the Battery Street Tunnel around Pike Street.
- North - Battery Street Tunnel to Ward Street.

3 What alternatives are evaluated in this Draft EIS?

There are five alternatives evaluated in this Draft EIS in addition to the No Build Alternative. The five alternatives all rebuild or replace the existing Alaskan Way Viaduct and the Alaskan Way Seawall. Each alternative is named according to the type of roadway proposed through the central section. Improvements in the south and north sections can mostly be mixed and matched with the central section. A preferred alternative has not been identified.

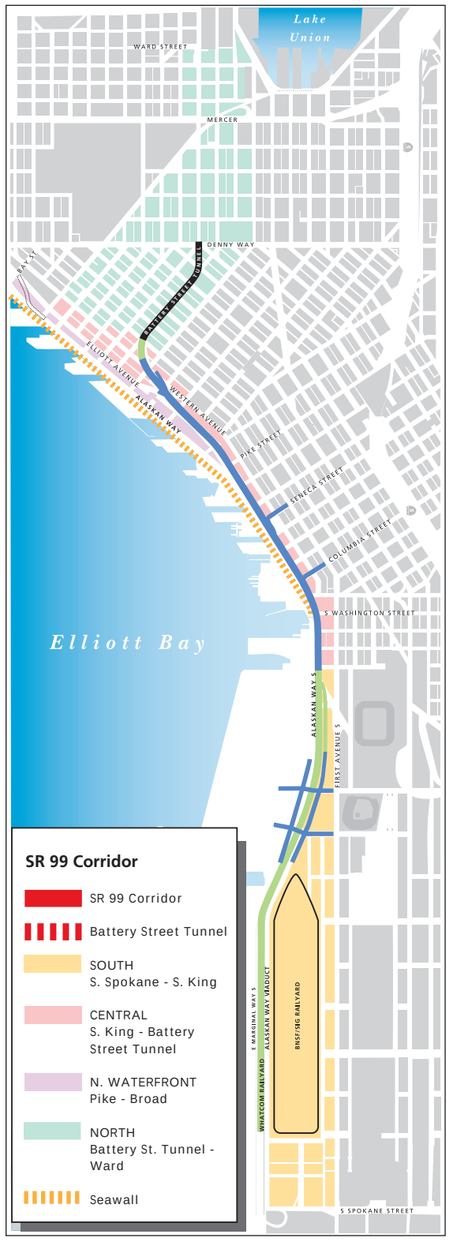
The alternatives are shown in Exhibit 2-2 and described on the next page:

Project Purpose

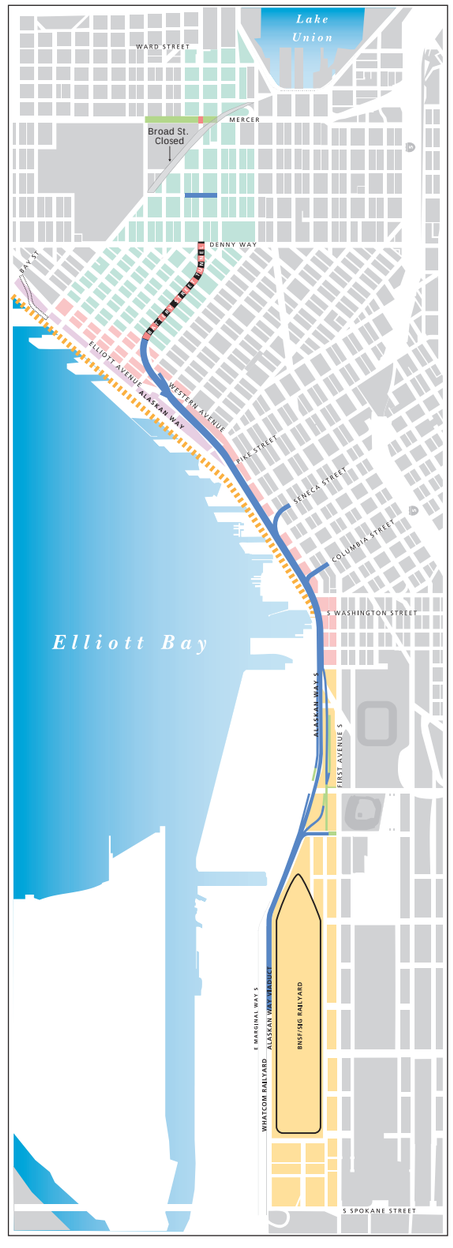
The purpose of the proposed action is to provide a transportation facility and seawall with improved earthquake resistance that maintains or improves mobility and accessibility for people and goods along the existing Alaskan Way Viaduct Corridor.

The Alternatives

Rebuild



Aerial



Tunnel

Bypass Tunnel

Surface

Exhibit 2-2

Rebuild - Replace the viaduct in its existing location with a structure similar to what is there now, including ramps into downtown at Seneca and Columbia Streets. In the south, replace the viaduct with an at-grade roadway and an interchange connecting to S. Atlantic Street and S. Royal Brougham Way (also called SR 519). No improvements would be made to the Battery Street Tunnel, and nothing would be changed in the north from the Battery Street Tunnel to Ward Street.

Aerial - Replace the viaduct in its existing location with an aerial structure, including new ramps into downtown at Seneca and Columbia Streets. The aerial structure would be about 20 feet wider than the existing viaduct, which allows for larger lanes and shoulders. In the south, the viaduct would be replaced with an aerial structure (similar to what is there now, but also 20 feet wider). An interchange would connect the aerial SR 99 structure to SR 519 at-grade. The Battery Street Tunnel would be improved by adding emergency exits, upgrading the electrical system, building a fire suppression system, and improving the ventilation system. Mercer Street would be widened from four lanes to a seven-lane, two-way roadway between Fifth and Ninth Avenues. Broad Street would be closed between Fifth and Ninth Avenues, and the ramps at Broad Street and Mercer Street would be closed. A new two-lane bridge would be built over Aurora Avenue/SR 99 at Thomas Street.

Tunnel - Replace the viaduct with a tunnel in the central section. The tunnel would have three lanes in each direction. It would also have emergency exits, a fire suppression system, and a ventilation system. Ramps into downtown would be provided at S. King Street. Additional ramps would be built connecting to the Alaskan Way surface street near Stewart Street. An aerial structure would connect the tunnel from the waterfront to the Battery Street Tunnel. In the south, the viaduct would be replaced with an at-grade roadway and interchange, similar to what was described above for the Rebuild Alternative. In the north, Battery Street Tunnel, Mercer Street, and Thomas Street would be improved as described for the Aerial Alternative. Also, Broad Street and the Broad and Mercer ramps would be closed as described for the Aerial Alternative.

Alternatives and Options Chart

At-Grade *Aerial* *Tunnel* *Seawall*

	SOUTH S. Spokane - S. King	CENTRAL S. King - Battery St. Tunnel	N. WATERFRONT Pike - Broad	NORTH Battery St. Tunnel - Ward	Seawall S. Washington - Bay Street Seawall at Pier 66 /Cruise Ship Terminal not included
Rebuild	**At-Grade** SR 519 elevated	**Rebuild** Retrofit approaching Battery St. Tunnel	**Surface Street Improvements**	**No Improvements**	**Rebuild**
Aerial	**Stacked Aerial** SR 519 at-grade *Or*	**Stacked Aerial** Side-by-side Aerial approaching Battery St. Tunnel	**Surface Street Improvements**	**Widened Mercer Underpass** *Or*	**Rebuild** *Or*
Options	***At-Grade*** *SR 519 elevated*			***Lowered Aurora/SR 99*** *with overpasses connecting 5 streets*	***Frame***
Tunnel	**At-Grade** SR 519 elevated *Or*	**Tunnel - 6 Lanes** Side-by-side Aerial approaching Battery St. Tunnel	**Surface Street Improvements**	**Widened Mercer Underpass**	**Tunnel Wall and Rebuild** Seawall north and south of tunnel
Options	***Side-By-Side Aerial*** *SR 519 at-grade*	***Ramps to Elliott/Western*** *for Ballard /Interbay connection*			
Bypass Tunnel	**At-Grade** SR 519 elevated	**Bypass Tunnel - 4 Lanes** Side-by-side Aerial approaching Battery St. Tunnel with	**Surface Street Improvements**	**Widened Mercer Underpass**	**Tunnel Wall and Rebuild** Seawall north and south of tunnel
Options		***Roadway to Elliott/Western*** *for Ballard/Interbay connection*			
Surface	**At-Grade** SR 519 elevated *Or*	**At-Grade** Side-by-side Aerial approaching Battery St. Tunnel	**Surface Street Improvements**	**Widened Mercer Underpass** *Or*	**Rebuild**
Options	***At-Grade*** *SR 519 at-grade*			***Existing Aurora/SR 99*** *with signals at Roy, Republican and Harrison*	

Exhibit 2-3

Bypass Tunnel - Replace the viaduct with a tunnel in the central section. The tunnel would have two lanes in each direction. It would also have emergency exits, a fire suppression system, and a ventilation system. Ramps into downtown would be provided at S. King Street. Since the Bypass Tunnel Alternative has fewer lanes on SR 99 than the Rebuild, Aerial, or Tunnel Alternatives, the Alaskan Way surface street would be expanded from four lanes to six lanes through downtown. In the south, the viaduct would be replaced with an at-grade roadway and interchange as described for the Rebuild and Tunnel Alternatives. In the north, the Battery Street Tunnel, Mercer

Street, and Thomas Street would be improved as described for the Aerial and Tunnel Alternatives. Also, Broad Street and the Broad and Mercer ramps would be closed as described for the Aerial and Tunnel Alternatives.

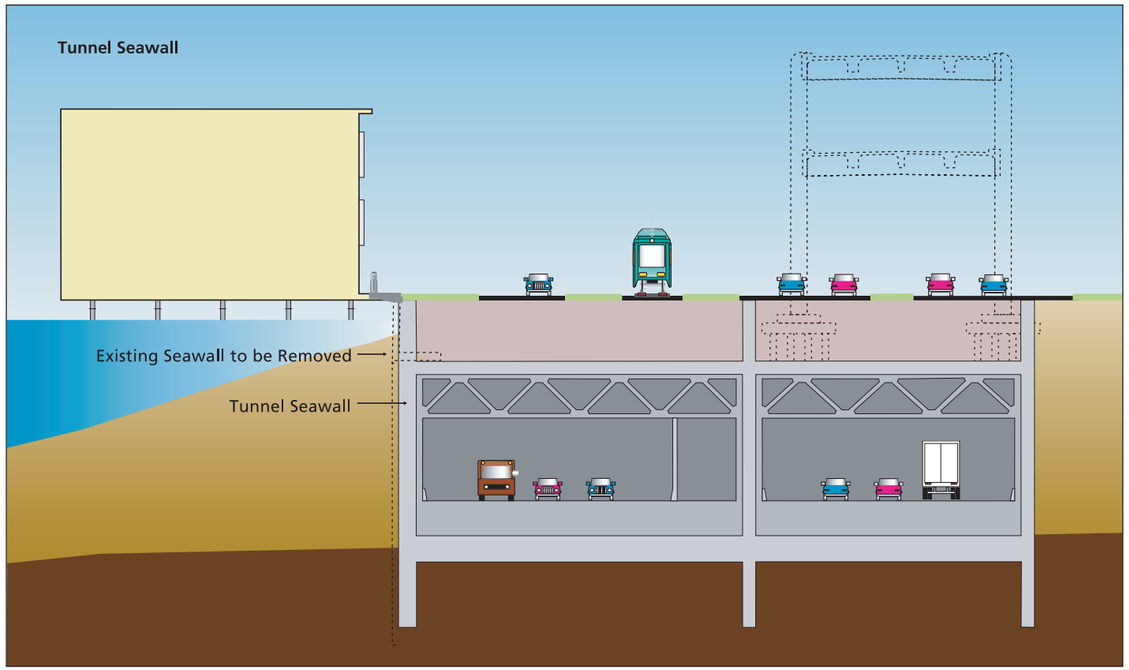
Surface - Replace the viaduct with an at-grade roadway. The roadway would have three lanes in each direction with turn pockets between Yesler Way and Pike Street. North of Pike Street, the Alaskan Way surface street would have two lanes in each direction. Two new overpasses would be built in the central 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. 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.

In the south, between S. Royal Brougham Way and Yesler Way, SR 99 would have four lanes in each direction. An interchange would connect SR 99 and SR 519, similar to what was described for the Rebuild, Tunnel, and Bypass Tunnel Alternatives. In the north, the Battery Street Tunnel, Mercer Street, and Thomas Street would be improved as described for the Aerial, Tunnel, and Bypass Tunnel Alternatives. Also, Broad Street and the Broad and Mercer ramps would be closed as described for the Aerial, Tunnel, and Bypass Tunnel Alternatives.

Options - In addition to the alternatives described above, several options can be mixed and matched with the proposed alternatives. Exhibit 2-3 shows the proposed alternatives and options. Both alternatives and options are evaluated in this Draft EIS; however, this chapter focuses more on the alternatives. For more information on the possible options, please see Chapters 5 through 9.

4 How would the alternatives replace the seawall?

All of the alternatives will replace the seawall. The proposed seawall replacement structures are shown in Exhibit 2-4. For the Rebuild, Aerial, and Surface



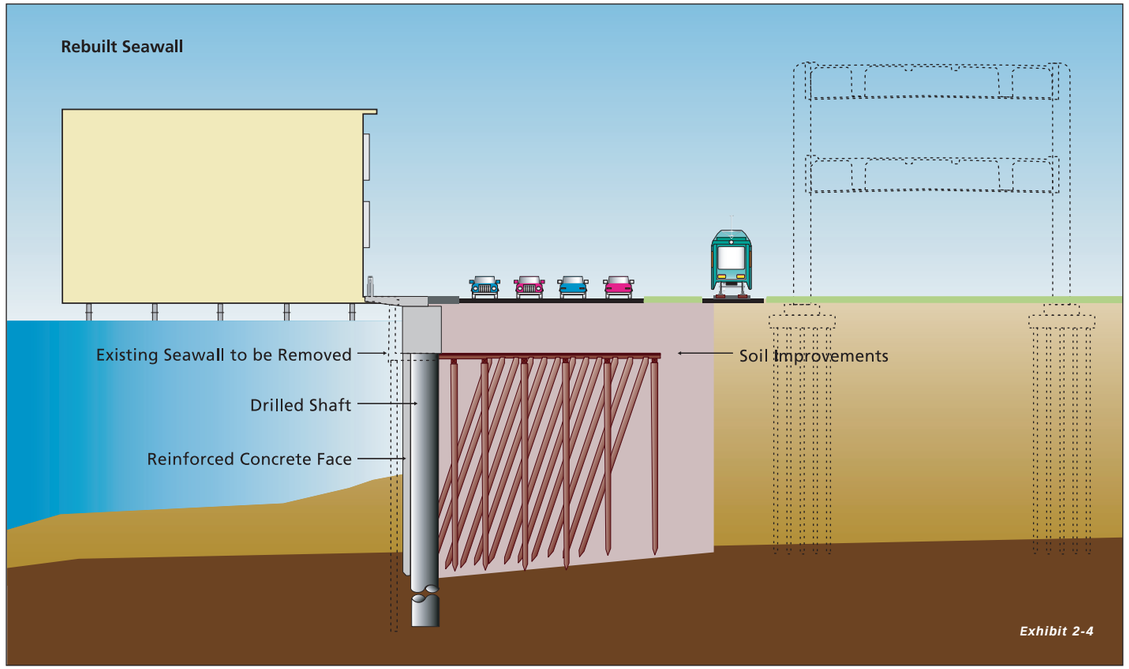


Exhibit 2-4

What is the No Build Alternative and why is it evaluated?

The No Build Alternative (often called "no action") is required by state and federal regulations to be evaluated in an EIS. The No Build Alternative provides a baseline for comparison of the other alternatives.

For this project, three No Build scenarios were evaluated:

Scenario 1

Continued operation of the viaduct and seawall with continued maintenance.

Scenario 2

Sudden unplanned loss of the viaduct and/or seawall but without major collapse or injury.

Scenario 3

Catastrophic failure and collapse of the viaduct and/or seawall.

For more detailed information on the No Build Alternative, please review the technical memoranda and discipline reports located in the appendices.

Preferred Alternative

The preferred alternative will be based on the alternatives and options described in this Draft EIS. The preferred alternative could combine and refine ideas from the current alternatives and possibly the options. The preferred alternative will also have more details on how it could be built and refinements on how the street landscaping and amenities could be designed.

Alternatives, the seawall will be replaced by rebuilding it, which involves strengthening soils and adding drilled shafts behind the existing seawall.

The Tunnel and Bypass Tunnel Alternatives will replace the seawall with the outer wall of the tunnel. In most areas, the new tunnel wall would be built behind the existing seawall. There is a small section near S. Washington Street where the tunnel wall will extend out into Elliott Bay. In areas where a tunnel is not proposed, the seawall would be rebuilt.

Instead of rebuilding the seawall, it is possible to replace the seawall with the Seawall Frame option as described in Chapter 6.

5 Are the estimated[1] costs comparable between the alternatives?

The Tunnel Alternative is the most expensive ($3.8 to $4.1 billion) and the Surface Alternative is the least expensive ($2.5 to $2.8 billion) as shown in Exhibit 2-5. The Rebuild and Aerial Alternatives cost the same ($3.2 to $3.5 billion), and the Bypass Tunnel Alternative is close ($3.1 to 3.4 billion). These costs include inflation and take possible construction risks into account. The range of cost for each alternative is because of uncertainties inherent in any large project.

6 How do the views and noise compare along the central waterfront?

The Rebuild and Aerial Alternatives are most similar to the existing viaduct in the central waterfront area. They give drivers and passengers similar views and keep the same kinds of noise and visual barriers along the central waterfront. The Aerial Alternative is wider and a bit taller than the Rebuild Alternative, while the Rebuild Alternative's support columns are closer together.

The Tunnel Alternative puts the most traffic underground and creates the most open space on the central waterfront. Drivers and passengers would not have views of downtown, Elliott Bay, and the Olympic Mountains like they do today; however, new views from downtown and along the waterfront will be created. The Tunnel Alternative reduces noise along the central waterfront more than any of the other alternatives.

The Bypass Tunnel Alternative puts through traffic underground but also adds two lanes and more traffic to the central waterfront. It still creates new open space and improves views. Noise would be reduced compared to existing conditions, but the reduction is less than what would be expected with the Tunnel Alternative.

The Surface Alternative creates the same new open space and views as the Bypass Tunnel Alternative but puts more traffic on the central waterfront or through downtown. Compared to today, noise is lower next to the piers, but higher on the city side.

7 How do the alternatives compare south of S. King Street?

Near the south end of the project area, S. Atlantic Street and S. Royal Brougham Way provide important connections to I-90 and arterials like First Avenue and Fourth Avenue. This connection is called SR 519, and it's an important way for traffic to get to and from the stadiums, south downtown, and central downtown. The connection from SR 99 to SR 519 at S. Atlantic Street and S. Royal Brougham Way could be above, below, or at the same level as SR 99.

If the connection is above SR 99, through traffic will be on the surface and ramps will lead up to traffic signals. Going up ramps and over SR 99 could be difficult for trucks entering or leaving Terminal 46. If SR 99 is built at-grade, the Whatcom Rail Yard and a track needed for the rail yards in this area would be relocated. If the SR 519 interchange is elevated and railroad tracks are relocated, vehicle and rail operations would be separated. Currently these operations are not separated, and there are times when trains block the roadway at S. Atlantic Street.

This roadway layout can be flipped, and SR 99 would be elevated with ramps leading down to traffic signals on S. Atlantic Street and S. Royal Brougham Way. With SR 99 elevated, connections to the stadiums and Pioneer Square area are more circuitous and less direct. Railroad tracks would not be relocated if SR 99 were elevated. Therefore, there would still be times when trains might block the connection at S. Atlantic Street.

The connection with S. Atlantic Street and S. Royal Brougham Way can be mixed and matched, but for the Draft EIS, the Rebuild, Tunnel, Bypass Tunnel, and Surface Alternatives have SR 99 on the surface and the SR 519 connection is elevated. For the Aerial Alternative, SR 99 would be elevated and the SR 519 connections would be made at-grade. The Surface Alternative also has an option where SR 99 and SR 519 would connect at the same level, with traffic signals controlling all traffic.

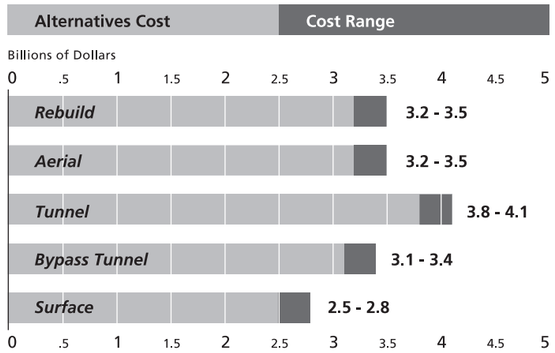
8 How do the alternatives compare north of Battery Street Tunnel?

The Rebuild Alternative proposes no improvements in the north. All of the other alternatives expand the Mercer Street underpass, build a new bridge over SR 99 at Thomas Street, close Broad Street from Fifth Avenue to Ninth Avenue, and close the ramps at Mercer and Broad Streets. In the long run, these improvements would benefit traffic circulating around the Uptown and South Lake Union neighborhoods. Pedestrians would also benefit. Different ways of making these connections can be mixed and matched with any alternative.

The Aerial Alternative includes an option to lower SR 99 and add overpasses at Thomas, Harrison, Republican, Mercer, and Roy Streets. Each new overpass would have four lanes. New ramps would connect SR 99 to Mercer and Roy Streets. Broad Street would be closed from Fifth Avenue to Ninth Avenue. This option connects east-west streets in the north end and maintains through traffic on SR 99.

The Surface Alternative includes an option to keep SR 99 as it is, with signals added at Harrison, Republican, and Roy Streets. In addition, this option would close Broad Street between Fifth and Ninth Avenues and the ramps to Mercer and Broad Streets. This option connects east-west streets in the north

Cost of the Alternatives



Note: These estimated cost ranges include inflation and take possible construction risks into account.

Exhibit 2-5

Tradeoffs

The Rebuild and Aerial Alternatives give drivers good views, but create a visual and noise barrier along the central waterfront. The Tunnel and Bypass Tunnel Alternatives remove this barrier and create new open space, but drivers lose the view. The Surface Alternative also opens up views, but has heavy traffic volumes.

[1] Costs are based on preliminary estimates from the Cost Estimate Validation Process (CEVP®) and assume construction begins in 2008.

end by making SR 99 an urban arterial rather than a limited access through route.

9 What will happen to the Battery Street Tunnel?

With the Rebuild Alternative, no changes will be made to Battery Street Tunnel. All other alternatives improve ventilation, fire suppression, and lighting and make it easier to get out of the tunnel in an emergency.

10 How do traffic speeds vary between the alternatives?

Traffic speeds[2] are shown in Exhibits 2-6 and 2-7. Traffic speeds will improve compared to the 2030 existing facility for the Rebuild, Aerial, and Tunnel Alternatives, particularly in the downtown area and Battery Street Tunnel. For these alternatives, the greatest increase in speeds will be realized in the Western/Elliott area. The Aerial and Tunnel Alternatives offer the greatest benefits to overall traffic flow. The improvement can be attributed to closing difficult ramp connections at Battery Street and improving ramp connections for Ballard/Interbay traffic with wider lanes and shoulders.

Most speeds for the Bypass Tunnel Alternative would also be comparable to the 2030 existing facility. However, in the south, northbound traffic would slow down to 27 miles per hour compared with 46 miles per hour for the 2030 existing facility because of congestion near on-ramps from S. Royal Brougham Way. With the Surface Alternative, travel speeds would be reduced in the south and central sections of the project area by as much as 36 miles per hour and 19 miles per hour, respectively. Travel speeds would be reduced in these areas because SR 99 would have stoplights at nearly every intersection and the roadway capacity in the corridor is reduced, increasing congestion. For traffic approaching Battery Street Tunnel and continuing north along SR 99, travel speeds would be comparable to the 2030 existing facility.

11 How do the alternatives carry different trips, and would travel times change?

How do travel times through downtown on SR 99 vary between the alternatives?

If the Rebuild, Aerial, Tunnel, or Bypass Tunnel Alternatives were built, travel times for trips through downtown would not change much compared with the 2030 existing facility, as shown in Exhibit 2-8. The Surface Alternative would noticeably increase travel times for drivers traveling through downtown. For the northbound trips between S. Spokane Street and the Aurora Bridge, travel times would more than double.

Exhibit 2-9

Daily Hours of Congested Operations on SR 99 Mainline

	2002 Existing	2030 Existing	Rebuild	Aerial	Tunnel	Bypass Tunnel	Surface
South bound	<1	3	3	3	3	5	9
North bound	<1	4	4	4	4	5	9

Exhibit 2-9 shows the number of hours each day that congested conditions are forecasted for the SR 99 mainline. In the case of the Surface Alternative, the source of congestion would be the downtown surface street segment, which would be congested for about 9 hours a day during a typical weekday. For other alternatives, congestion would form around the Battery Street Tunnel and last from 2 to 5 hours per day.

How do trips destined to and from downtown vary between the alternatives?

Travel times for trips destined to and from downtown are similar for the Rebuild, Aerial, Tunnel, and Bypass Tunnel Alternatives. Even though ramps at Columbia, Seneca, Elliott, and Western are not provided with the Tunnel and Bypass Tunnel Alternatives, travel times are not expected to change much. For the Surface Alternative, travel times will slightly increase for most trips, except for the northbound trips between S. Spokane Street and downtown, which will double.

Average Traffic Speeds *During the PM Peak*

2030 Existing Facility

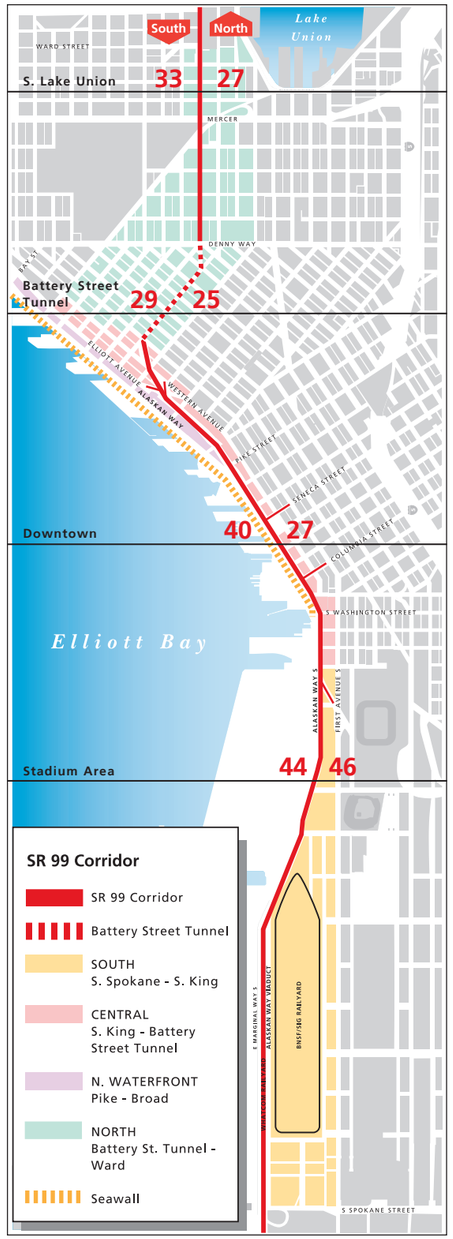


Exhibit 2-6

Southbound SR 99 Speeds During the PM Peak Hour

Shown as miles per hour

SR 99 Section	2002 Existing	2030 Existing	Rebuild	Aerial	Tunnel	Bypass Tunnel	Surface
South Lake Union Area	39	33	34	37	36	30	31
Battery Street Tunnel	34	29	32	37	39	31	29
Downtown	41	40	43	50	50	49	15
Stadium Area	44	44	44	47	47	47	36

Northbound SR 99 Speeds During the PM Peak Hour

Shown as miles per hour

SR 99 Section	2002 Existing	2030 Existing	Rebuild	Aerial	Tunnel	Bypass Tunnel	Surface
South Lake Union Area	33	27	30	28	26	25	26
Battery Street Tunnel	33	25	33	36	33	26	28
Downtown	39	27	46	50	46	32	8
Stadium Area	46	46	47	49	49	27	10

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.

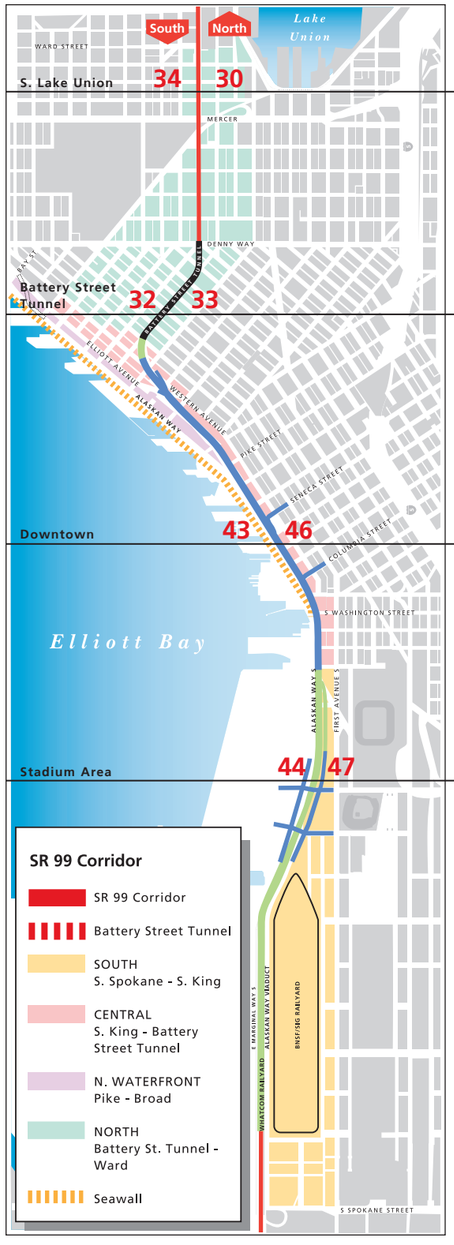
How are congested operations on SR 99 defined?

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.

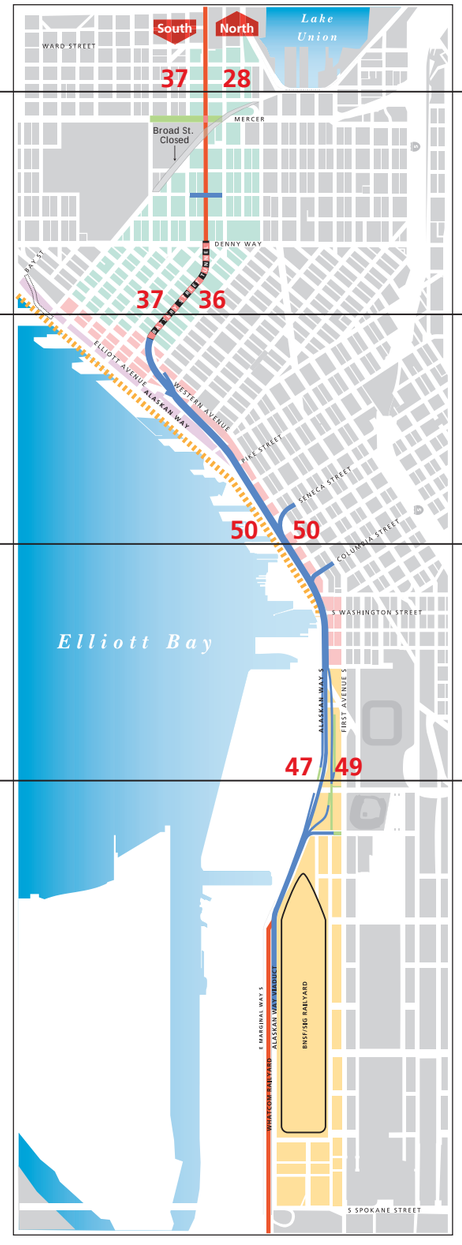
[2] Please note that all traffic information presented in this chapter is based on the PM Peak travel period. For this corridor, the PM Peak period typically occurs from 4:00 to 5:00 p.m.

Average Traffic Speeds for The Alternatives *During the PM Peak*

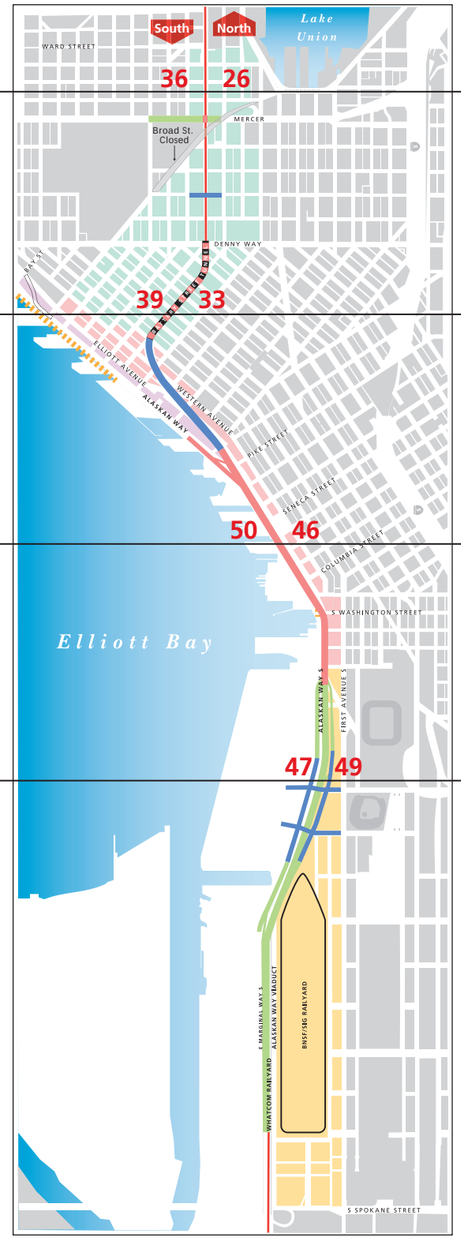
Rebuild



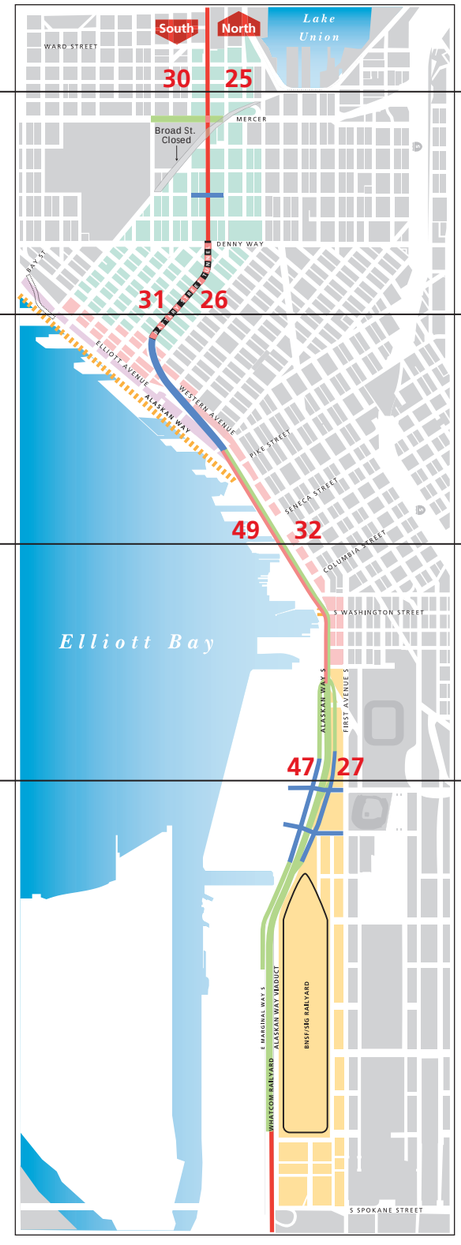
Aerial



Tunnel



Bypass Tunnel



Surface

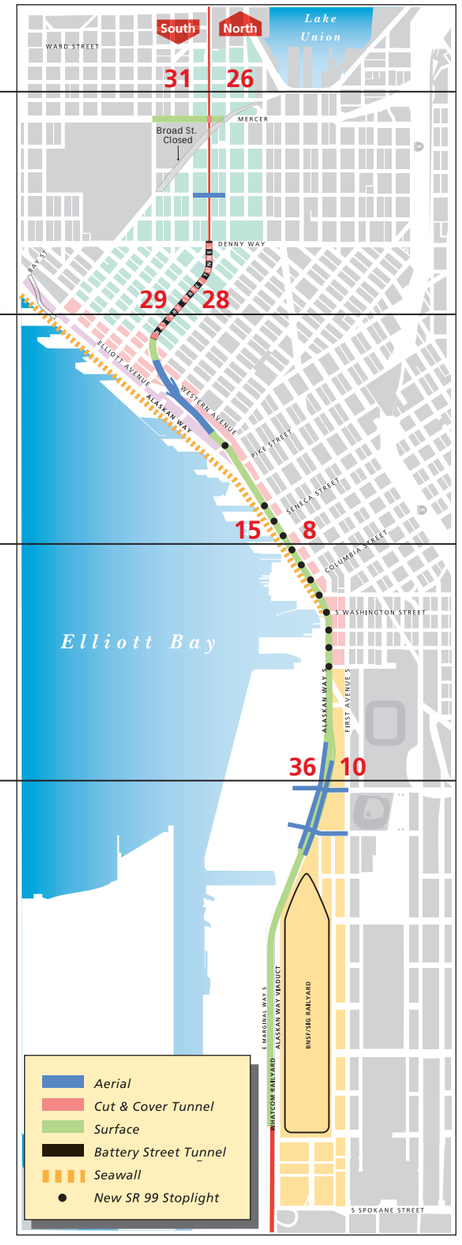


Exhibit 2-7

How do trips to the Ballard/Interbay area vary between the alternatives?

For the Rebuild and Aerial Alternatives, travel times and the route for trips to the Ballard/Interbay area are comparable to the 2030 existing facility. Travel times for the Tunnel Alternative are comparable to the 2030 existing facility, even though the route is different (instead of using ramps to Elliott and Western Avenues, Ballard/Interbay traffic would travel on the Alaskan Way surface street north of Pike Street).

For the Bypass Tunnel Alternative, travel times for the southbound trip between the Ballard Bridge and the stadium area would increase by 8 minutes. This trip would take longer because Ballard/Interbay traffic would be routed off of the SR 99 mainline to the Alaskan Way surface street. This would slow down drivers traveling between these destinations. Northbound travel times would improve slightly.

Travel times for trips to and from the Ballard/Interbay area would increase the most with the Surface Alternative. In the southbound direction, travel times would increase by 9 minutes. Northbound travel times would increase by 8 minutes.

12 How would the alternatives affect other roads?

How do traffic volumes for the alternatives compare on the Alaskan Way surface street?

Traffic volumes on SR 99 and the Alaskan Way surface street are shown in Exhibit 2-10. For the Rebuild and Aerial Alternatives, traffic volumes in the central waterfront area on the Alaskan Way surface street would be similar to the 2030 existing facility (about 11,000 vehicles per day). Traffic volumes on Alaskan Way would nearly double to about 21,000 trips per day for the Tunnel Alternative. For the Bypass Tunnel Alternative, daily traffic volumes on Alaskan Way would increase to 48,000 trips per day. For the Surface Alternative, Alaskan Way would become SR 99, so traffic would increase to about 74,000 trips per day.

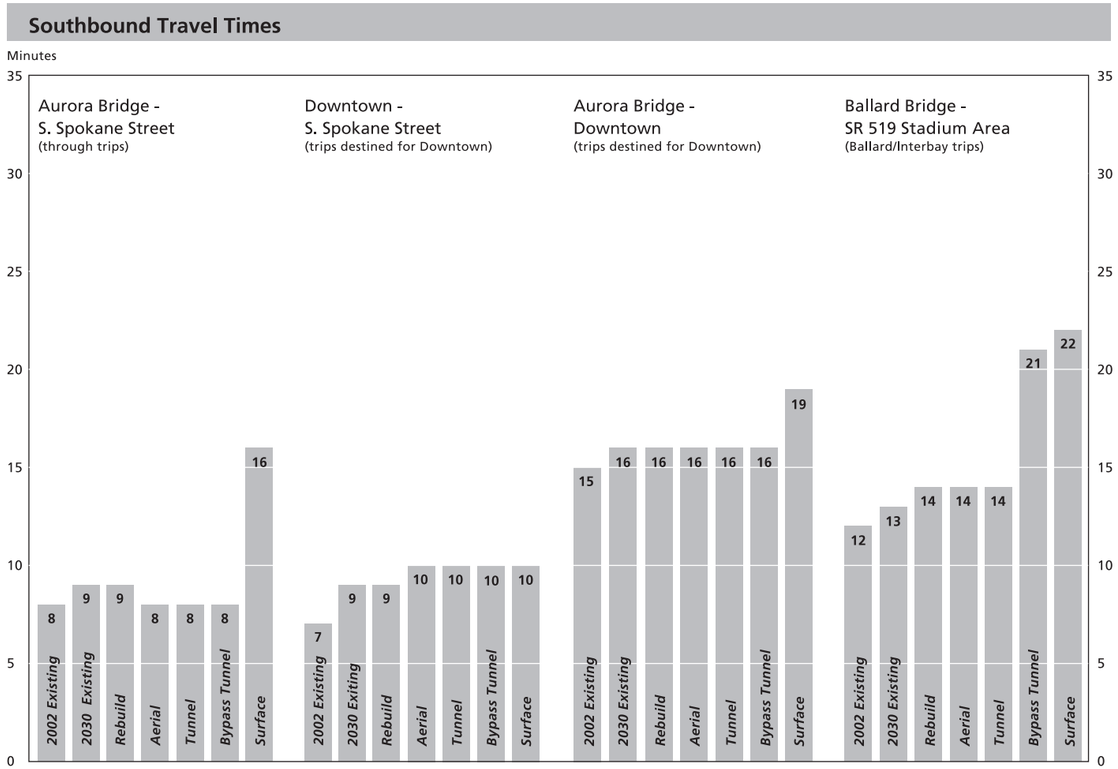
How do effects to intersections compare between the alternatives?

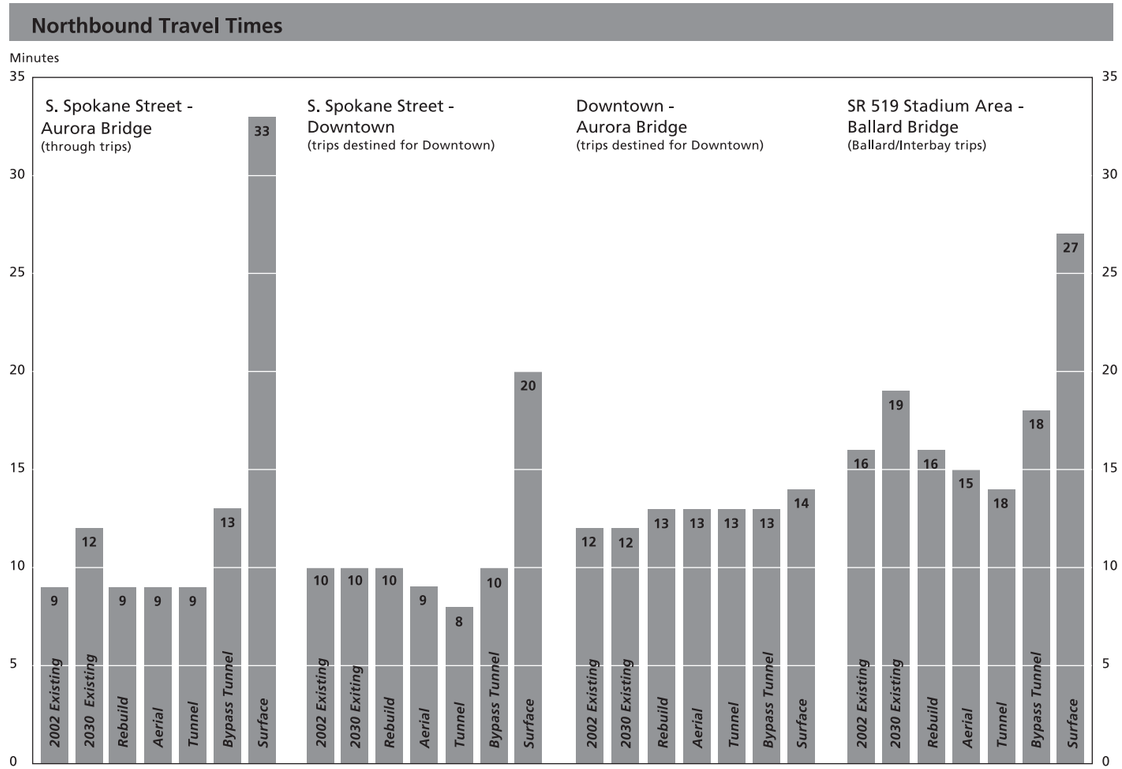
In the central section of the project area, the number of congested and highly congested intersections varies between alternatives, as shown in Exhibits 2-11 and 2-12.

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.

The Surface Alternative includes four through lanes on First Avenue in the Pioneer Square and stadiums area. If only two lanes were used, congestion on First Avenue would increase, as would traffic on other parallel streets.





SR 99 Travel Times *during the PM Peak (4:00 - 5:00)*

Exhibit 2-8

The Rebuild and Aerial Alternatives would have congestion similar to the 2030 existing facility in the south and central sections. The Tunnel Alternative results in the fewest congested intersections in the downtown area because traffic will be more evenly distributed on the downtown street grid. The Bypass Tunnel Alternative also decreases the number of congested intersections in downtown compared to the 2030 existing facility.

The Surface Alternative increases congestion on downtown city streets at several locations. With more signals and slower speeds on SR 99, more drivers would use parallel city arterials. This creates more congestion, especially on First and Second Avenues. The number of congested intersections in the downtown area would increase from 8 for the 2030 existing facility to 14 with the Surface Alternative.

North of the Battery Street Tunnel, congestion at Denny Way is expected to increase for all of the alternatives because the Battery Street ramps will be closed. This closure will cause more drivers to use the Denny Way ramps.

In the north, the number of congested intersections is comparable between the 2030 existing facility and the Rebuild Alternative. The number of congested intersections would increase for the Aerial, Tunnel, Bypass Tunnel and Surface Alternatives. The number of congested intersections increases with these alternatives because expanding Mercer Street is expected to cause congestion near the intersections where the two-way Mercer Street would transition back to a one-way street. However, congestion in this area could be reduced 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.

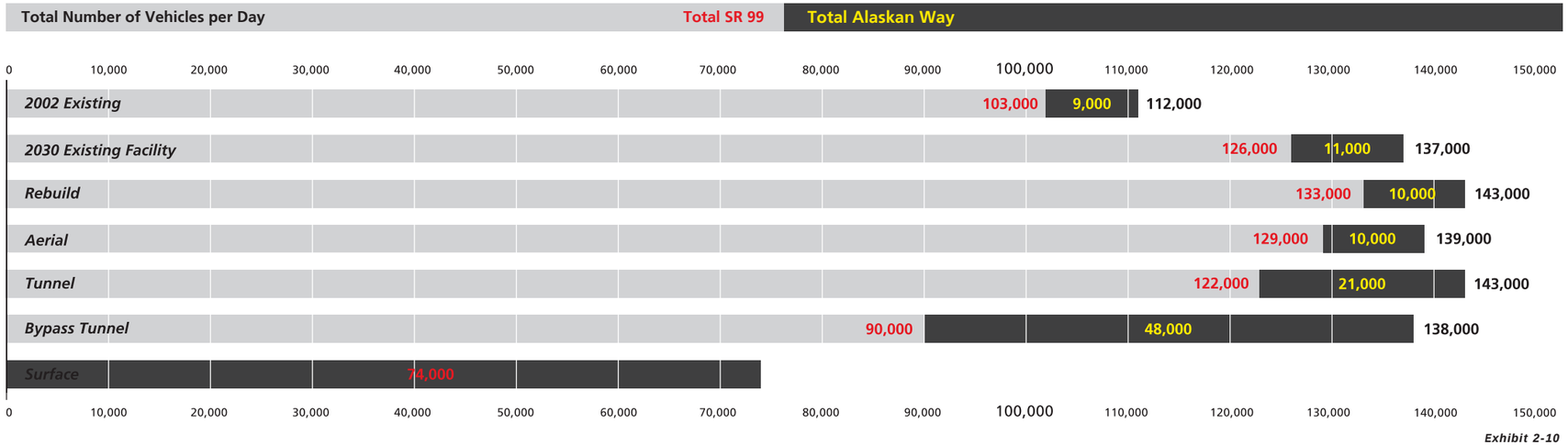


Exhibit 2-10

Would any of the alternatives affect traffic volumes on I-5 once construction is completed?

The Surface Alternative would add about 22,000 vehicles per day to I-5 through the downtown area. The Rebuild, Aerial, Tunnel, and Bypass Tunnel Alternatives would not have any effect on I-5.

13 Are some alternatives safer than others?

All alternatives would make SR 99 safer in an earthquake. Also, at the south end of the Battery Street Tunnel, both the on- and off-ramps will be closed. These ramps have poor sight lines and little distance for drivers to speed up or slow down (both ramps will be available for emergency vehicles). The Battery Street Tunnel will still have narrow lanes and shoulders under all alternatives.

The existing viaduct has narrow lanes, small shoulders, and several short and sharp entrance and exit ramps, so it's no surprise that years of data show several high-accident locations. The northbound off-ramp at Seneca Street currently has a lot of accidents. The Rebuild Alternative makes some improvements at this location, and the Aerial Alternative will make more. The Tunnel, Bypass Tunnel, and Surface Alternatives eliminate the ramp entirely.

The waterfront is a popular pedestrian destination, and to reach it, people mostly need to cross the Alaskan Way surface street. Pedestrians are safer when they are separated from high volumes of traffic. The Rebuild, Aerial, and Tunnel Alternatives generally keep traffic separate from pedestrians. The Bypass Tunnel and Surface Alternatives increase traffic volumes in the central waterfront area. This additional traffic would increase the overall number of vehicle and pedestrian accidents and the potential for injuries. The Surface Alternative would have the highest number of injury accidents between vehicles and pedestrians.

The Surface Alternative is a different kind of roadway than the other alternatives when it comes to safety. With this alternative, SR 99 along the waterfront would change from a limited access highway to a large arterial with signalized intersections. There is a potential for accidents to occur in areas on the north and south ends of the corridor where SR 99 would transition from a lower speed, signalized arterial to a higher speed limited access roadway. The overall accident rate for the project corridor would increase substantially and would be higher than for the other alternatives being evaluated.

14 What happens to parking?

Parking will be reduced for all of the alternatives as shown in Exhibit 2-13 on the next page. The Surface Alternative requires removing the most parking spaces (720 parking spaces would be removed), followed closely by the Bypass Tunnel, in which 710 spaces would be removed. The Rebuild Alternative results in the fewest number of parking spaces taken; approximately 270 spaces would be removed.

Exhibit 2-13

Comparison of Parking Spaces Removed

Alternative	Short-Term[1]	Long-Term[2]	Off-Street[3]	Total
Rebuild	+36	-256	-50	-270
Aerial	-84	-226	-50	-360
Tunnel	-324	-276	-70	-670
Bypass Tunnel	-394	-256	-60	-710
Surface	-364	-236	-120	-720

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

For all of the alternatives, many of the free, long-term parking spaces south of S. King Street would be removed. The effects of losing long-term parking in the south would be relatively minor, since there is a lot of available long-term parking in the 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, parking utilization in the south end is 46.6 percent. There are more than five parking facilities in this area providing more than 6,000 parking spaces. Using the estimated parking utilization in this area, approximately 2,800 spaces would be available on a normal business day.

For all of the alternatives except the Rebuild Alternative, short-term, metered parking would be lost throughout the project area. Most of these short-term parking spaces would be removed in the Pioneer Square and central waterfront areas. Many businesses in these areas rely on short-term parking for customer and user access. Some parking mitigation options have been identified to help offset losses of short-term parking:

- 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 parking mitigation strategy for short-term parking losses in the Pioneer Square and the central waterfront areas will be developed and presented in the Final EIS.

In addition, 40 short-term metered spaces would be removed north of the Battery Street Tunnel for all alternatives other than the Rebuild Alternative. In this area, there are several places where people can park, so effects would be minor and mitigation is not proposed.

15 How would the alternatives affect the character and views along the central waterfront?

Because the Rebuild Alternative would be similar to the existing viaduct and surface roadway, the look and feel of the waterfront in this alternative would be about the same as it is presently. With the Aerial Alternative, the waterfront would experience several notable changes. For instance, because the Aerial Alternative would be about 50 percent wider and about 7 feet taller than the existing viaduct, it would shade a larger area and block scenic views more than the existing viaduct does. Because of its increased width, the aerial structure would extend closer to the waterfront than the existing viaduct and might appear to be a more prominent part of the view up and down the surface street.

Both the Rebuild and Aerial Alternatives would have fewer vertical support columns than the existing viaduct, and views beneath the proposed elevated structures would seem a little more open if these alternatives were constructed. In the Aerial Alternative, the Alaskan Way surface street corridor would be reconfigured, with northbound surface lanes running near the east side of the corridor (beneath the new aerial structure) in the part of the corridor where parking spaces and the street that

Congested Intersections *During the PM Peak (4:00 - 5:00)*

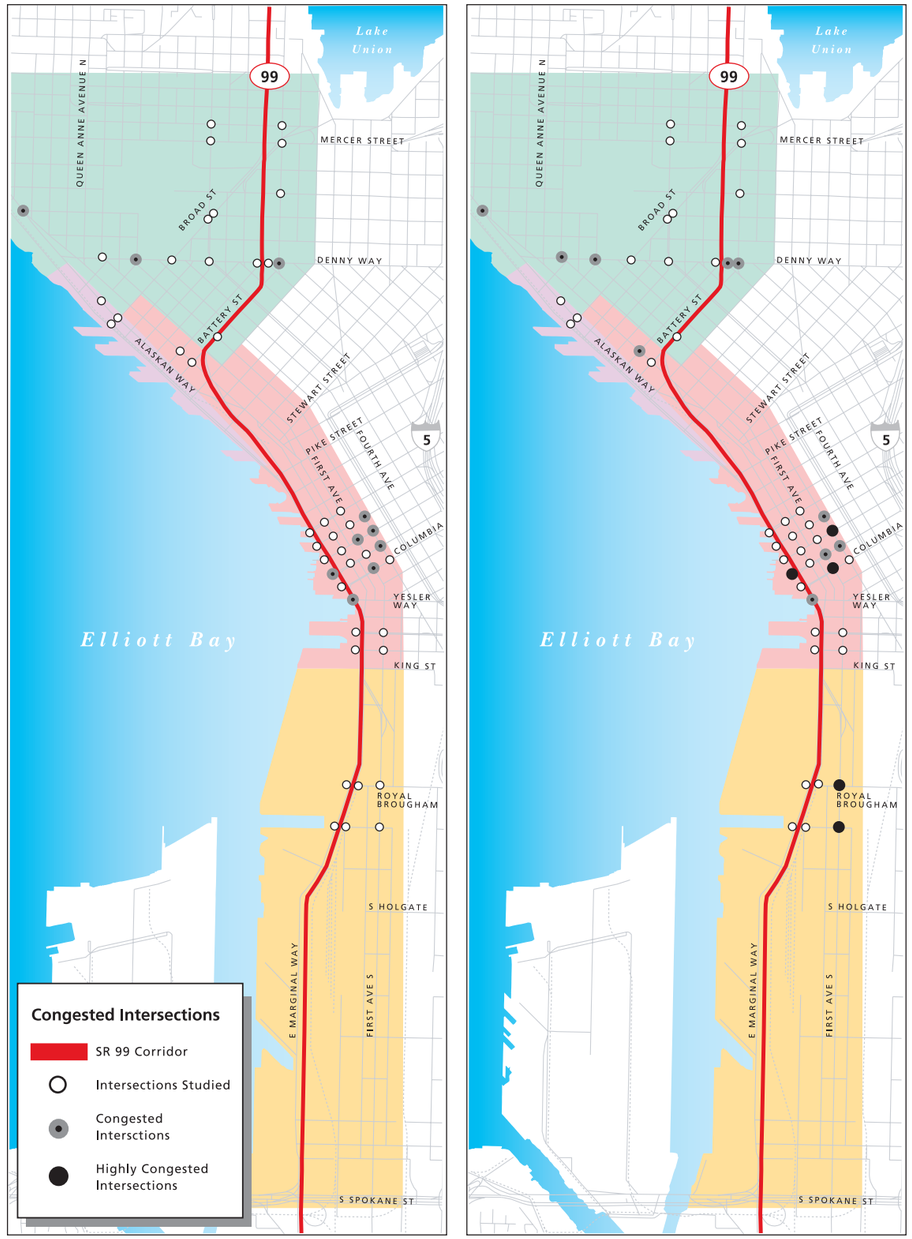
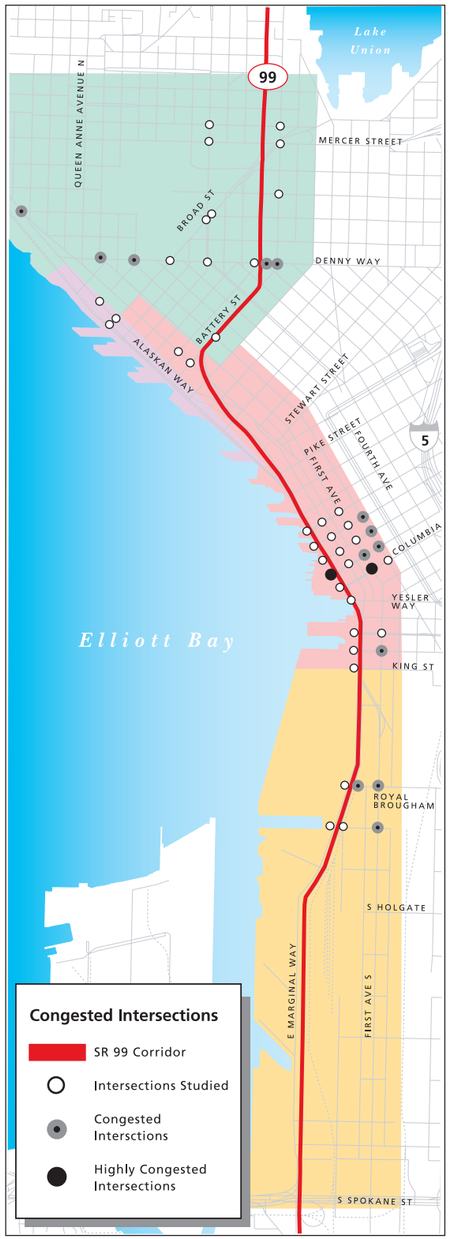


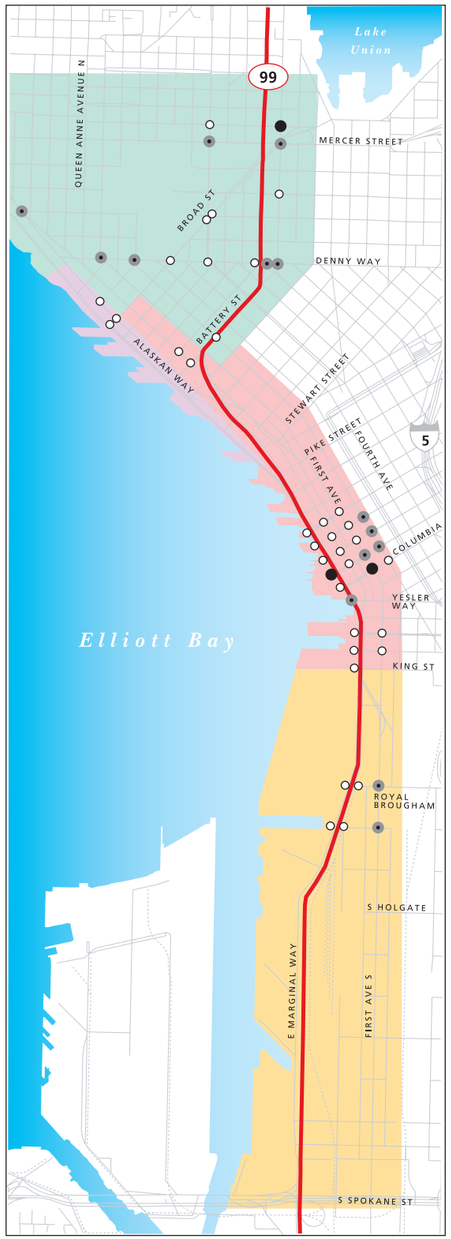
Exhibit 2-11

Congested Intersections for Each Alternative *During the PM Peak (4:00 - 5:00)*

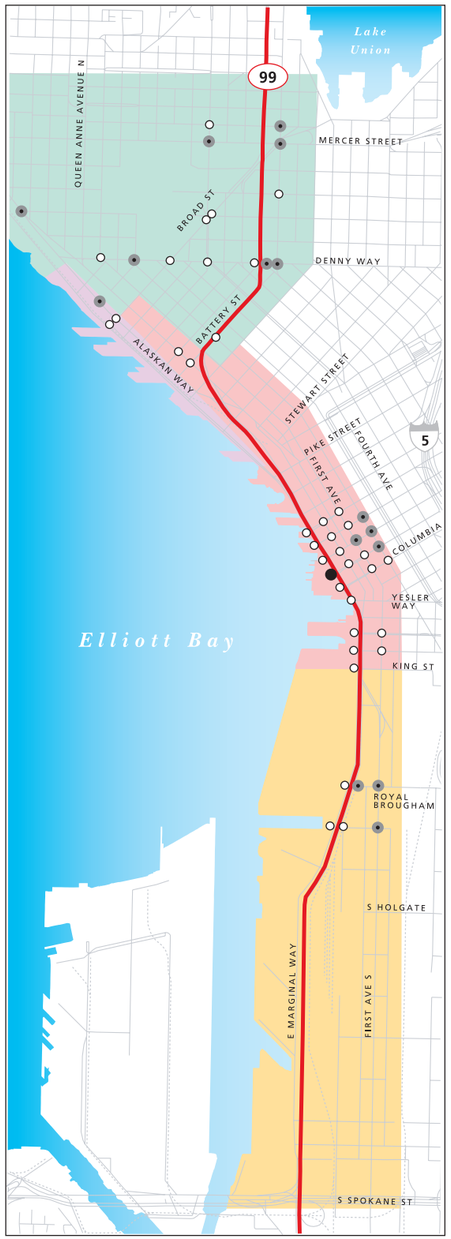
Rebuild



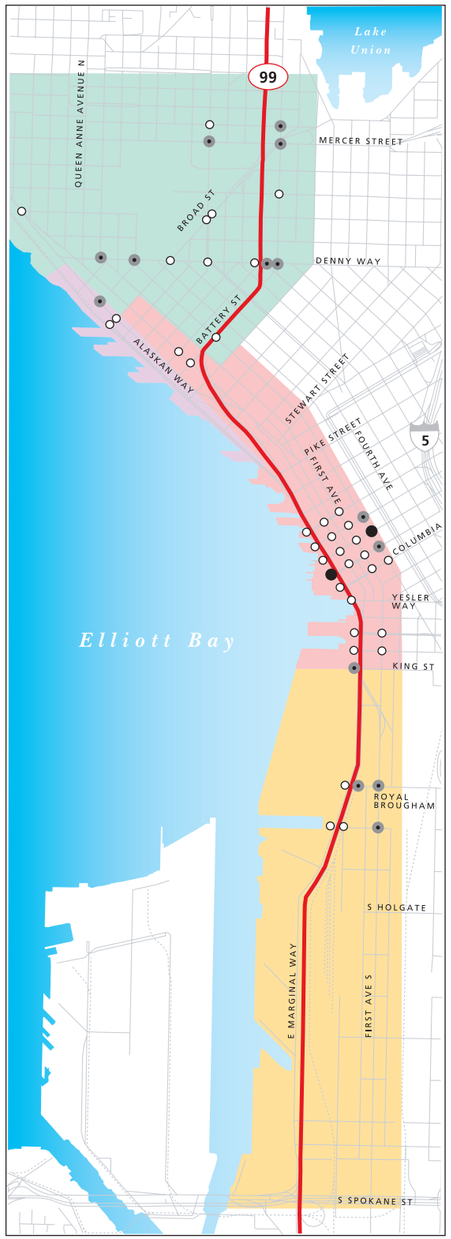
Aerial



Tunnel



Bypass Tunnel



Surface

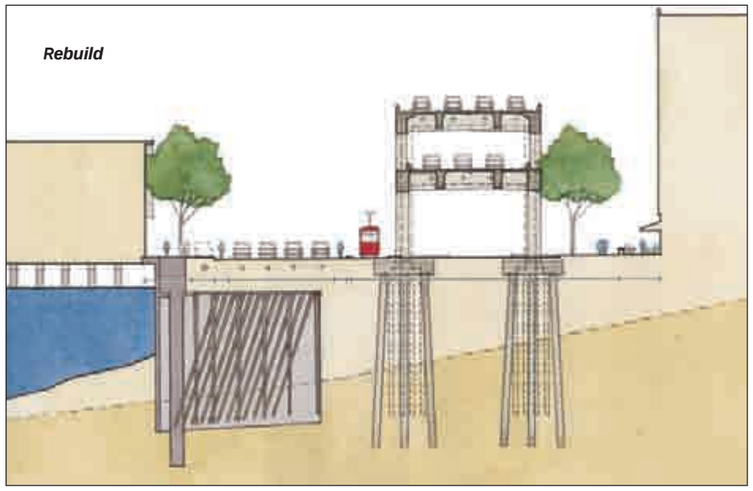
Exhibit 2-12

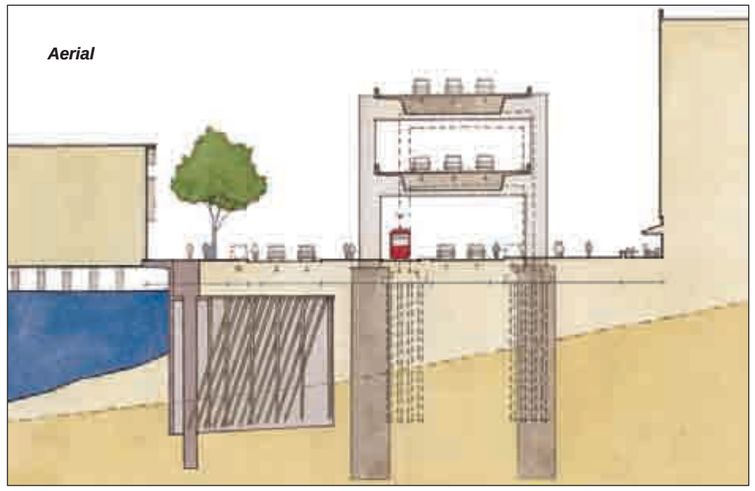
accesses them are currently located. The corridor would also include a landscaped median, a landscaped trolley corridor (beneath the aerial structure), bike lanes, a broadened sidewalk on the east side of the Alaskan Way surface street, and a broader waterfront promenade. Together, Aerial Alternative amenities could make the surface street corridor appear to be more visually integrated than it currently does. Motorists traveling on the aerial structure would continue to experience scenic waterfront and city views.

Between S. King Street and Pike Street, the Tunnel and Bypass Tunnel Alternatives would replace the existing viaduct with tunnels, opening up scenic views of piers, Elliott Bay, Puget Sound, and the Olympic Mountains to the west, and views of the Seattle skyline to the east. Views along the central waterfront and the Alaskan Way surface street would benefit from the absence of the viaduct's scale and mass. The central waterfront and the city would seem more clearly connected than they currently do.

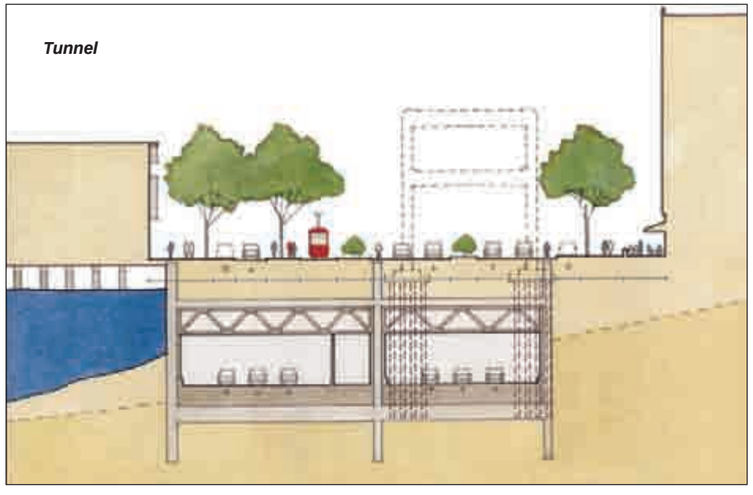
Because motorists on SR 99 would be routed through the proposed tunnels, they would no longer experience scenic waterfront and city views currently

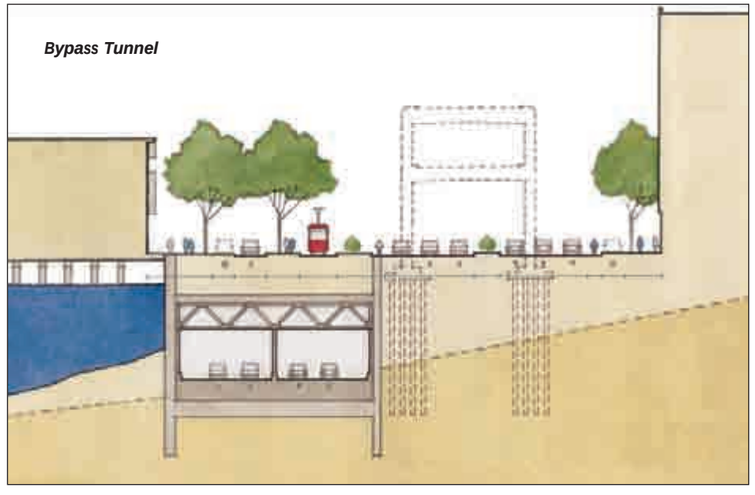
Conceptual Illustrations of the Alternatives





Cross-sections in the central waterfront





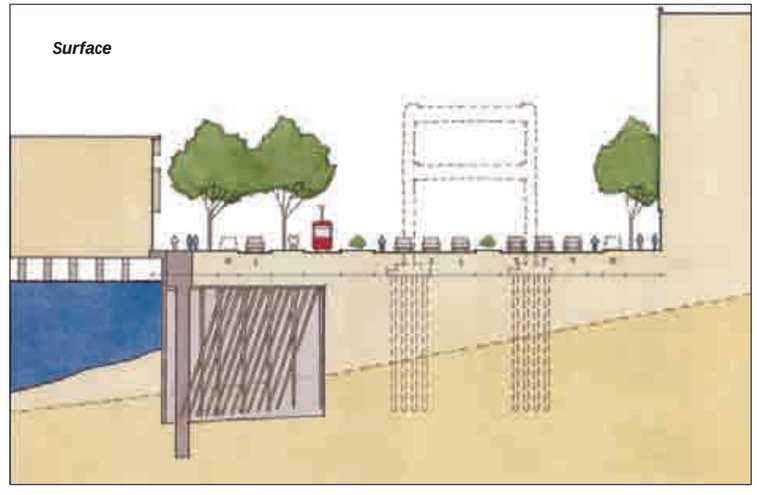


Exhibit 2-14

How would adjacent properties benefit from removing the viaduct?

Existing properties adjacent to the viaduct would likely benefit from the Tunnel, Bypass Tunnel, and Surface Alternatives because views would improve, which may encourage redevelopment of these buildings. Conditions for businesses would not change much from the existing conditions with the Rebuild and Aerial Alternatives.

Section 4(f)

When a project uses land protected by Section 4(f) - including any publicly owned land from parks and recreational resources including trails of national, States, or local significance, or any land from an historic site of national, State, or local significance - a Section 4(f) evaluation must be prepared. Additional information on 4(f) is provided in Appendix N.

available from the viaduct between S. King and Pike Streets.

As with the Aerial Alternative, the Alaskan Way surface street corridor would be reconfigured in the Tunnel and Bypass Tunnel Alternatives and would include a landscaped median, bike lanes, broadening of the waterfront promenade, and a landscaped trolley corridor. These additions would be beneficial to both the view and overall character of the waterfront.

The Bypass Tunnel Alternative would include six Alaskan Way surface lanes in the central waterfront (compared to four in the Rebuild, Aerial, and Tunnel Alternatives), resulting in greater overall roadway width. Traffic volumes would increase from 11,000 vehicles per day for the 2030 existing facility to 48,000 vehicles per day for the Bypass Tunnel Alternative. Compared with the Tunnel Alternative, it is possible that the effects of additional pavement and more vehicles would reduce the sense of connection gained by removal of the viaduct and lessen benefits of other proposed improvements.

Similar to the Tunnel and Bypass Tunnel Alternatives, removal of the viaduct in the Surface Alternative would generally benefit scenic east-west views in the project corridor, as well as views along the waterfront-in this case with a surface street that would combine SR 99 and the current Alaskan Way surface street. In the Surface Alternative, drivers traveling along SR 99/Alaskan Way surface street would have scenic views of the waterfront, but not the broad scenic views available from the existing viaduct. The Surface Alternative would include a landscaped median, sidewalks on the east side of the surface street corridor, bike lanes, a landscaped trolley corridor, and broadening of the waterfront promenade. Like the Bypass Tunnel Alternative, the Surface Alternative would have six surface lanes on Alaskan Way. However, combining the traffic of SR 99 and Alaskan Way would result in the highest traffic volumes of any of the alternatives. In the Surface Alternative, it is estimated that Alaskan Way surface street would accommodate approximately 74,000 vehicles per day, compared to about 11,000 vehicles per day for the 2030 existing facility. This additional through traffic would turn the central waterfront into a vehicle-oriented environment, possibly reducing the potential for visual and physical connection gained by removing the viaduct.

16 How do effects to parks, recreation, and open space compare between the alternatives?

By altering the character of the central waterfront, changes to the viaduct (primarily expanding or removing it) would affect recreational resources along the project corridor. In the Tunnel, Bypass Tunnel, and Surface Alternatives, the viaduct would be removed, opening up views and creating opportunities for connections between recreational resources and the city. However, more numerous surface lanes and high traffic volumes in the Surface Alternative-and to a lesser extent the Bypass Tunnel Alternative-might make recreational resources in the project corridor less desirable to visit or harder to get to. The Aerial Alternative-taller and wider than the existing viaduct-could also affect nearby recreational resources by affecting scenic views and taking up more space near the waterfront than the existing viaduct does.

Public open space would be created in several of the alternatives, both on Alaskan Way and elsewhere. In the Tunnel and Bypass Tunnel Alternatives, a public open space would be created east of the Seattle Aquarium on the east side of the Alaskan Way surface street. In the Surface Alternative, a similar public open space would be created east of the Aquarium on the west side of the surface street. In addition, the waterfront promenade would be broadened in all alternatives except the Rebuild Alternative.

For all of the alternatives, a new over-water pier would be built near the end of S. Washington Street connecting to Colman Dock. The pier would remove

Visual Simulations

Existing View at Union Street

Exhibit 2-15

Simulation of Rebuild at Union Street

Exhibit 2-16

Simulation of Aerial at Union Street

Exhibit 2-17

Simulation of Tunnel, Bypass Tunnel and Surface at Union Street

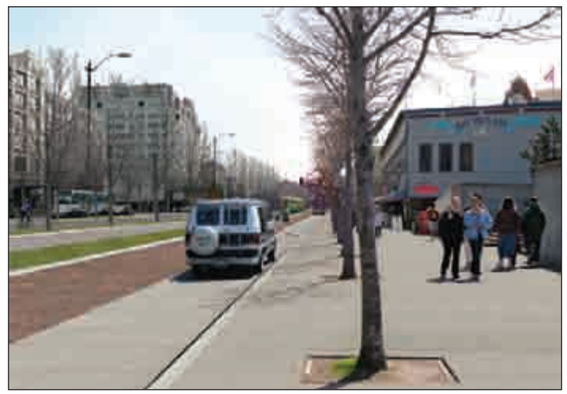


Exhibit 2-18

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. All of the alternatives would also require relocating the Washington Street Boat Landing from the foot of S. Washington Street about 125 feet west of its current location.

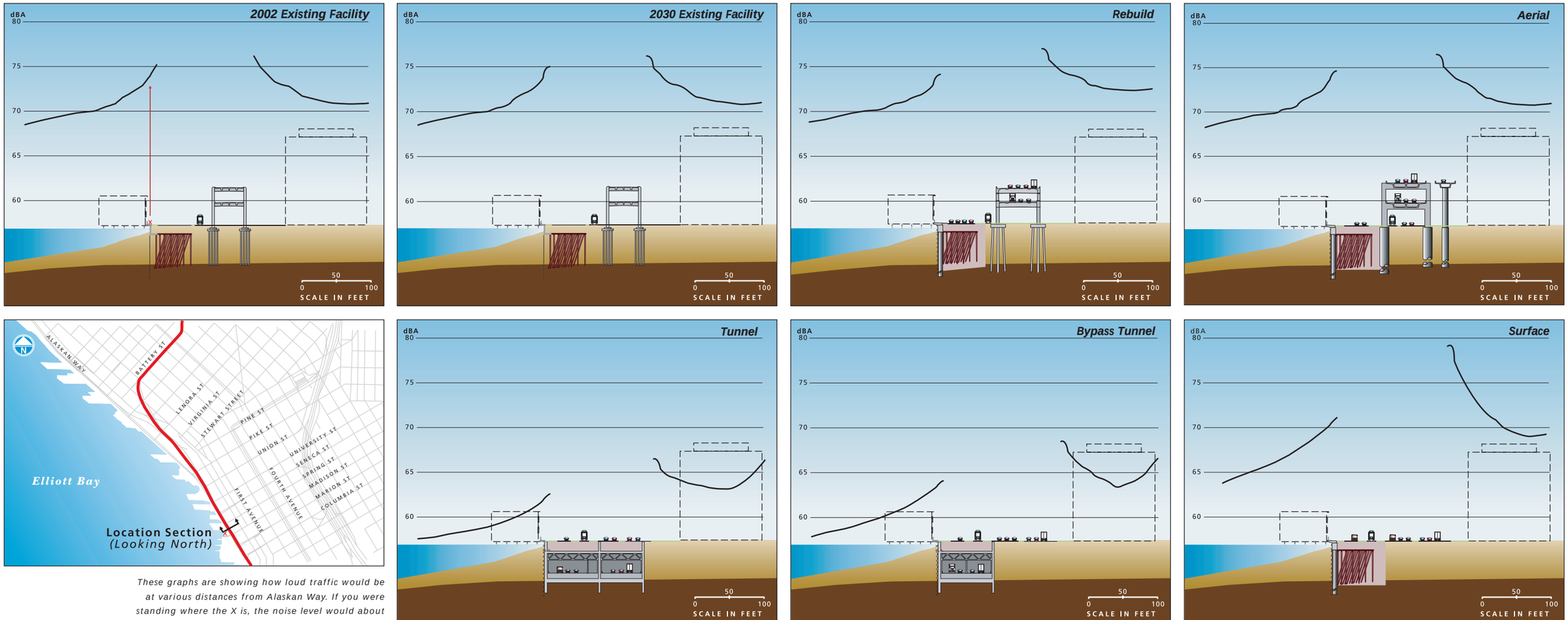
All of the alternatives would modify the Waterfront Trail, which is separated from the Alaskan Way surface street and shared by bicyclists and pedestrians. In all alternatives, the Waterfront Trail would be moved from the east side of E. Marginal Way/Alaskan Way to the west side from south of S. Atlantic Street up near Yesler Way. Also in all alternatives, the shared use Waterfront Trail in the central waterfront area would be replaced with sidewalks and striped bike lanes along the Alaskan Way surface street. North of Pine Street, the Waterfront Trail would not change for any of the alternatives except the Tunnel Alternative, which may narrow it slightly. In the Tunnel, Bypass Tunnel, and Surface Alternatives, a new mixed-use trail might be added-leading diagonally from the north side of Seahawks Stadium to the intersection of S. King Street and the Alaskan Way surface street.

17 How do changes to noise levels compare between the alternatives?

Walking along the central waterfront today, it's hard not to notice the noisy viaduct overhead. A decibel level of 55 dBA is typical for people talking at a distance of 10 feet, but near the Seattle Aquarium, the existing decibel level today is often around 73 dBA in the daytime. Near the viaduct, traffic noise from the viaduct is approximately 10 dBA greater (appears

Appendix F includes the detailed maps and tables of noise sites and levels measured for this Draft EIS.

Noise Levels for Each Alternative



These graphs are showing how loud traffic would be at various distances from Alaskan Way. If you were standing where the X is, the noise level would about 72 dBA. This is similar to the noise you would hear standing 3 feet from a blender.

Exhibit 2-19

twice as loud) than the noise from other sources. To the human ear, 65 dBA (a typical washing machine noise level from 3 feet away) is intrusive. Short-term noise level measurements taken at the Harbor Steps and Victor Steinbrueck Park during the daytime exceeded the FHWA traffic noise abatement criterion of 67 dBA.

The most noticeable change between the alternatives would be to noise levels for 2030 conditions in the central waterfront area. The Tunnel and Bypass Tunnel Alternatives are expected to have noticeably lower noise levels in the central waterfront compared to the No Build scenarios. For example, at Colman Dock, the No Build, Rebuild, Aerial, and Surface Alternatives would have 2030 peak traffic noise levels of 71 to 75 dBA, while the Tunnel and Bypass Tunnel Alternative noise levels would be 63 to 65 dBA. To the human ear, a 5-dBA change in noise is readily noticeable. A 10-dBA decrease would sound like the noise level has been cut in half.

The 2030 peak traffic noise levels at the Seattle Aquarium are 73 to 74 dBA for the No Build, Rebuild, and Aerial Alternatives. At these same locations, the Surface Alternative would lower noise levels by approximately 3 to 4 dBA (barely perceptible), and the noise level would drop noticeably by 9 to 10 dBA for the Tunnel and Bypass Tunnel Alternatives. At the Harbor Steps, the Tunnel and Bypass Tunnel Alternatives would lower noise levels by about 5 dBA compared to the No Build, Rebuild, Aerial, and Surface Alternatives. All of the alternatives may cause noise levels at Victor Steinbrueck Park to fluctuate by 1 dBA from the existing conditions, but this change would not be noticeable to people. Overall, the reduced 2030 noise levels in the central waterfront area under the Tunnel and Bypass Tunnel Alternatives would make the area more pleasant for pedestrians, residents, and nearby businesses compared to the other alternatives.

The 2030 peak traffic noise levels at residences north and south of the central downtown core would remain essentially the same as the 2030 existing facility for all of the alternatives. Forty-eight sites were modeled to see if they met the FHWA noise abatement criteria under 2030 conditions; the results are shown in Exhibit 2-20.

Exhibit 2-20

Summary of Modeled Sites in 2030 That Exceed FHWA Noise Abatement Criteria

		Modeled Sites Represent *(Approximately)*		
Alternative	Numbers of Modeled Sites*	Residential Units	Hotel Rooms	Shelter Beds
No Build	42	4,490	1,290	120
Rebuild	43	4,490	1,290	120
Aerial	43	4,490	1,290	120
Tunnel	29	4,250	1,290	120
Bypass Tunnel	31	4,360	1,290	120
Surface	38	4,490	1,290	120

*** that exceed FHWA noise abatement criteria**

All of the alternatives except the Rebuild Alternative will install jet fans in the Battery Street Tunnel for emergency ventilation purposes. The jet fans will produce noise near the tunnel portals. They will be designed not to exceed 57 dBA at the nearest residential property line. If the fans are to be operated regularly during nighttime hours, they will be designed not to exceed 47 dBA during those hours.

The Rebuild and Aerial Alternatives may include sound-absorptive materials to reduce noise that is reflected off the bottom of the elevated structure. Similarly, the sound-absorptive material could be used around the tunnel portals to reduce the traffic and ventilation system noise levels coming out at the tunnel.

The Surface Alternative puts more traffic on Alaskan Way and will divert some traffic to city streets; this could cause traffic noise levels to increase on other adjacent streets.

18. How do effects to fish and wildlife vary between the alternatives?

The dense and highly urban project area does not provide any notable natural habitat for wildlife on the land. Where the alternatives vary is in regard to the aquatic habitat along the shoreline. However, the existing aquatic habitat is already highly modified by the urban environment, and no natural shoreline remains. The existing stormwater facilities are old and will be replaced with new facilities using current design standards and technology, improving the quality of water discharged. Once the new seawall is complete, all of the alternatives would have habitat conditions similar to those currently seen along the shoreline, including a vertical concrete seawall.

Between S. Washington Street and Myrtle Edwards Park, all of the alternatives will construct the new seawall landward of the existing seawall. In addition, all of the alternatives will remove and replace a small section of existing sheet pile wall from near S. King to S. Washington Streets. The only place where the alternatives vary is between Pier 48 (located near S. Washington Street) and Colman Dock (located near Yesler Way), as shown in Exhibit 2-21 on the next page. For the Rebuild, Aerial, and Surface Alternatives, construction of the new seawall will remain landward of the existing seawall between Pier 48 and Colman Dock. Because the new seawall would be entirely constructed landward, when the existing seawall is removed, the volume of aquatic habitat in the immediate area would increase slightly as shown in Exhibit 2-22.

Exhibit 2-22

Comparison of Changes to the Volume of Aquatic Habitat in Elliott Bay

	Rebuild	*Aerial*	*Tunnel*	*Bypass Tunnel*	*Surface*
Changes to Habitat	+8,000 y^3	+8,000 y^3	+8,000 y^3	-5,000 y^3	+8,000 y^3

y^3 *is an abbreviation for cubic yards.*

In comparison, the Tunnel Alternative will extend out into Elliott Bay up to 21 feet between Pier 48 and Colman Dock, filling about 4,000 square feet. However, there will be a small net increase in the volume of Elliott Bay and the shoreline habitat area because some habitat will be gained when the existing seawall is removed in other locations. The Bypass Tunnel Alternative would extend up to 58 feet into Elliott Bay between Pier 48 and Colman Dock, filling about 15,000 square feet and resulting in a small net decrease in the volume of Elliott Bay and the shoreline habitat area. The fill placed for both the Tunnel

Chapters 5 through 9 contain information describing why the over-water pier is needed as part of the project. This information is located in Question 3 under the sub-heading “How would it change vehicle access for ferries.”

and Bypass Tunnel Alternatives will cause the outfall at Washington Street to be extended further out in Elliott Bay.

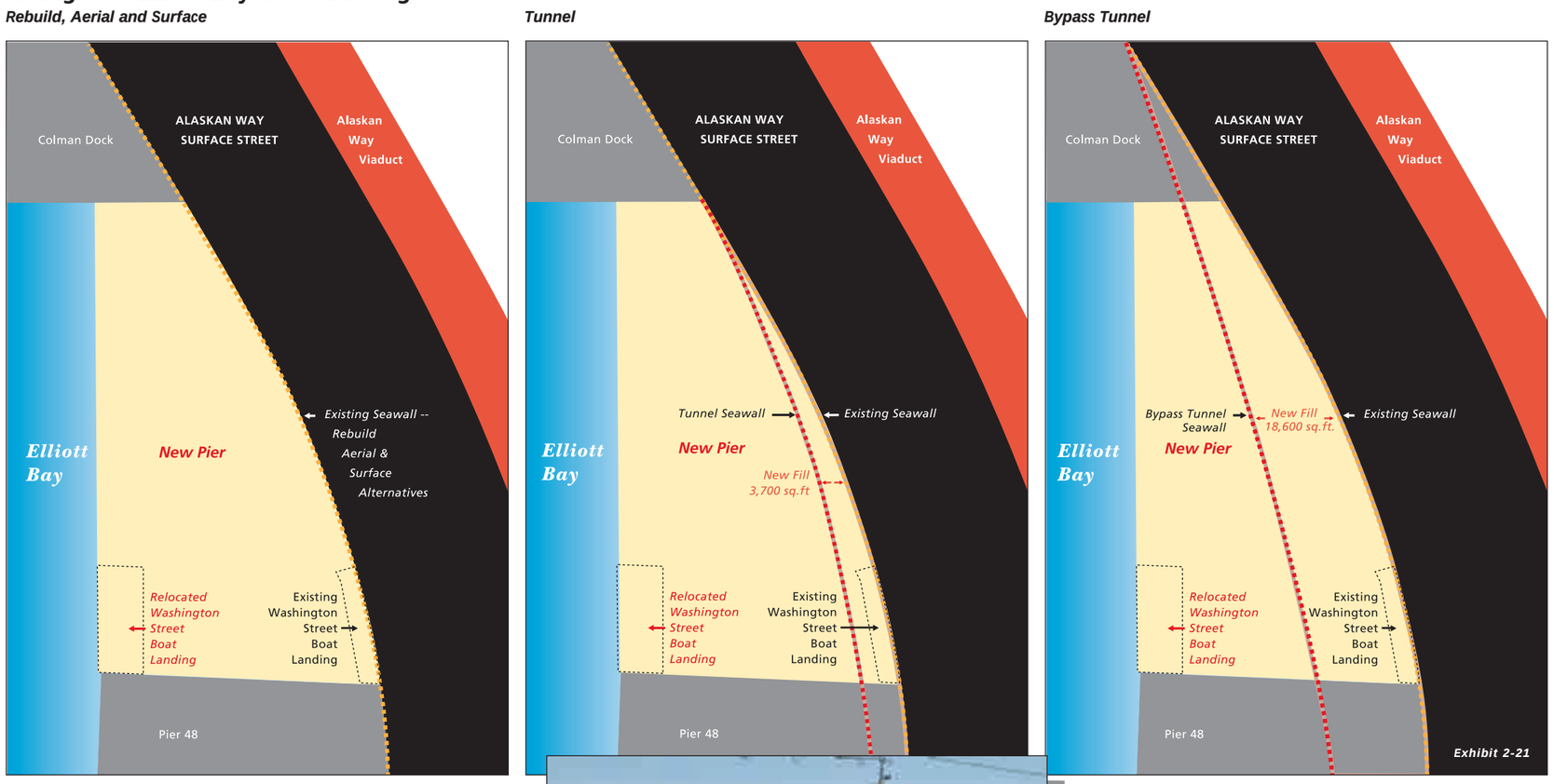
All of the alternatives include building an over-water pier between Pier 48 and the existing Colman Dock to provide vehicle access to the Colman Dock Ferry Terminal. The new pier will increase over-water shading by 33,000 square feet for the Rebuild, Aerial, and Surface Alternatives. For the Tunnel Alternative, the new pier would shade about 29,000 square feet in addition to the 4,000 square feet of new fill at this location, altering a total of 33,000 square feet. Likewise, the Bypass Tunnel Alternative would alter 33,000 square feet, with about 18,000 square feet of new shading and 15,000 square feet of new fill. Opportunities to restore habitat functions at various locations along the Seattle shoreline are being identified for all alternatives to mitigate the effects between Pier 48 and Colman Dock. Enhancements beyond those required for mitigation might also be undertaken to restore some of the habitat functions that no longer exist along this urban shoreline as shown in Exhibit 2-23.

19 How do the alternatives affect water quality?

For more than 100 years, the development and use of buildings and roadways in Seattle has altered the natural patterns of stormwater runoff and added contaminants to stormwater flows. As a result, stormwater from the project area, discharged from 19 major and many smaller outfalls, contributes to water quality de-gradation in nearby waters, including Elliott Bay and other parts of Puget Sound, the Duwamish River, and Lake Union.

The project area, approximately 98 acres, is less then 5 percent of the total surface area of the drainage basin. Because the project area contributes a very small portion of the total stormwater flow within the drainage basin, the overall effect of the project on water quality will not be substantial. Nevertheless, all opportunities to minimize water pollution effects from the project area are important beneficial changes in stormwater control and management.

Changes to Elliott Bay at S. Washington Street



Two approaches were developed, as part of this Draft EIS, to improve stormwater performance within the project area. Each approach, or more likely a combination of both, can be utilized with any of the alternatives. The two stormwater approaches for the project are:

- Best Management Practice (BMP)
- Convey and Treat

Both stormwater approaches will help improve water quality because they will reduce the total amount of pollutants from the project area at discharge locations as compared to existing conditions. The overall quantity of pollutant reduction is about the same under either approach. Either approach will require coordination and cooperation with Seattle Public Utilities and King County, the responsible jurisdictions for drainage and sewage facilities serving the project area.

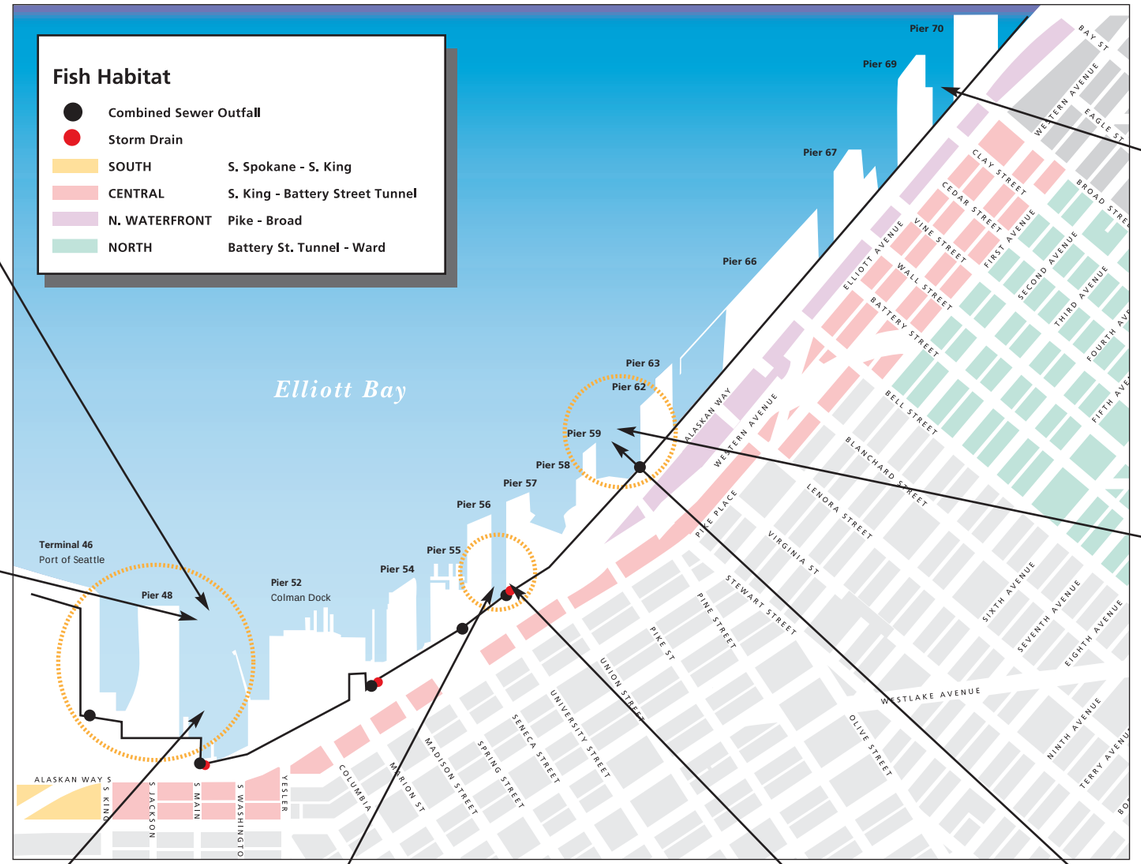
What is a BMP?

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

What is a Combined Sewer Overflow (CSO)?

Combined sewers carry sewage from homes and businesses in the same pipe with stormwater. Combined sewer overflows (CSOs) occur when the rainfall volumes exceed the pipe capacity. When a combined sewer overflows, water is discharged directly to the Puget Sound without being treated at a treatment plant.

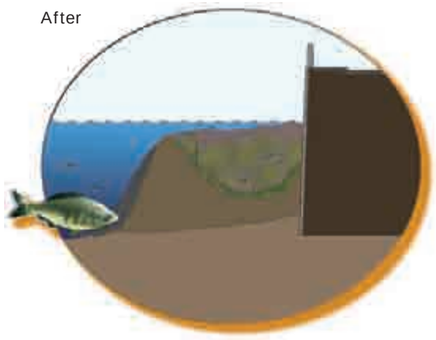
Habitat Change for Fish and Aquatic Life



Today

Pier 48 shading limits habitat value.

After

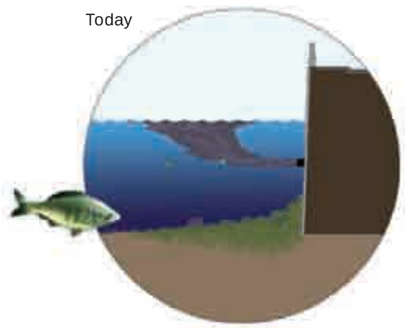


Pier 48 may be removed and habitat could be enhanced.

After

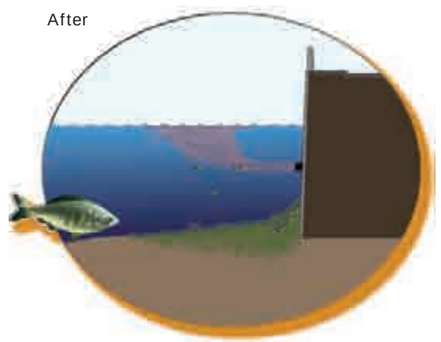
A new pier will shade the water and limit habitat value.

Today



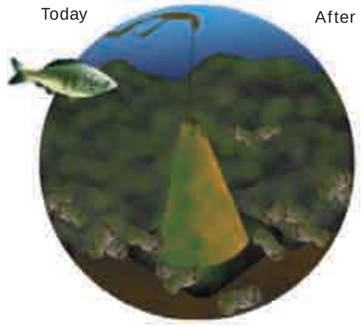
Stormwater enters Elliott Bay without being treated.

After



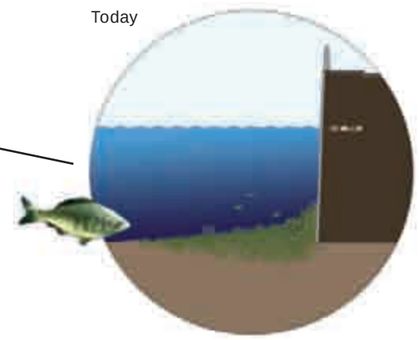
New stormwater treatment will be added.

Today



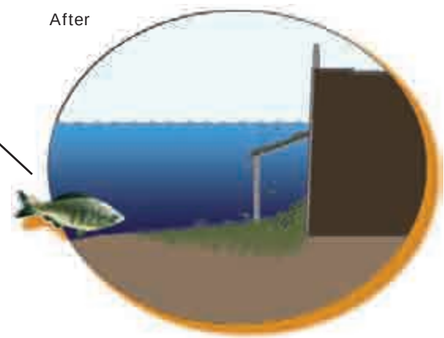
Most waterfront habitat is degraded and there is a lot of trash.

Today



Vertical seawall provides little habitat.

After



Shelf could attract new aquatic life along the new seawall

Exhibit 2-23

BMP Approach

The BMP Approach would collect runoff and treat it and/or detain it based on current WSDOT and City of Seattle stormwater manuals. Stormwater that is separated in pipes will use treatment BMPs. Stormwater that is discharged into the combined sewer system will use detention BMPs.

Convey and Treat Approach

The Convey and Treat Approach would integrate the project's stormwater runoff strategies with systemwide improvements in Seattle's combined sewer system. This would be achieved by collecting stormwater in the central waterfront area and conveying it to a reconfigured combined sewer system. Combined sewage would then be conveyed to the West Point Sewage Treatment Plant for secondary treatment. This would occur during dry weather or small storms. However, during larger storms, some of the stormwater will move to the Denny Way Combined Sewer Overflow (CSO) Treatment Facility near the northwest end of the project area. Combined stormwater and wastewater south of Columbia Street would be conveyed to a new CSO storage and primary treatment plant proposed by King County, near S. Royal Brougham Way. The Convey and Treat Approach assumes a greater volume of stormwater would be discharged at the Royal Brougham and West Point outfalls than under existing conditions. The Convey and Treat Approach will reduce the volume of untreated stormwater, resulting in a higher quality discharge. See Exhibit 2-24.

Major use of the Convey and Treat Approach in the project's stormwater strategies would require the construction of the Royal Brougham CSO Treatment Facility at an earlier date. It would also require this new facility to be larger than initially thought to accommodate flows from the project corridor. This approach also affects the West Point Sewage Treatment Plant and will require close integration with King County's wet weather operations.

North and south of the central waterfront area, both approaches would use the same methods. Stormwater BMPs for treatment and detention are likely to be used south of S. Royal Brougham Way and north of Vine Street. For the section of Broad Street to be closed under all but the Rebuild Alternative, stormwater will likely be conveyed to the combined sewer system rather than to direct discharge at Lake Union.

Final outfall configurations for stormwater outfalls and discharge points will be considered after selection of a preferred alternative and the final choice of stormwater management strategies. The stormwater outfalls serve a larger vicinity than just the project area, so most existing major outfalls will likely be maintained or replaced at their existing locations along the seawall. However, the Tunnel and Bypass Tunnel Alternatives will require the Washington Street outfall to be extended further into Elliott Bay.

Improvements to the Battery Street Tunnel will include a fire suppression system for all alternatives except the Rebuild Alternative. The Tunnel and Bypass Tunnel Alternatives will also include a fire suppression system in the new tunnel structures in the central waterfront area. In an emergency, it is possible that runoff from this system could discharge directly into Elliott Bay. Such a discharge could result in temporary and localized decreases in dissolved oxygen that would be allowable under state water quality regulations.

Exhibit 2-25

Summary of Water Quality Benefits
(Pounds per Year)

Annual Pollutant Load	Existing Conditions[1]	BMP Approach			Convey and Treat Approach	
		Rebuild	Aerial	Tunnel	Bypass Tunnel	Surface
Total Suspended Solids	87,300	45,700	59,100	47,500	50,500	52,500
Zinc	131	81	98	83	86	88
Copper	26	17	20	17	17	17

[1] *The No Build Alternative is the same as Existing Conditions.*

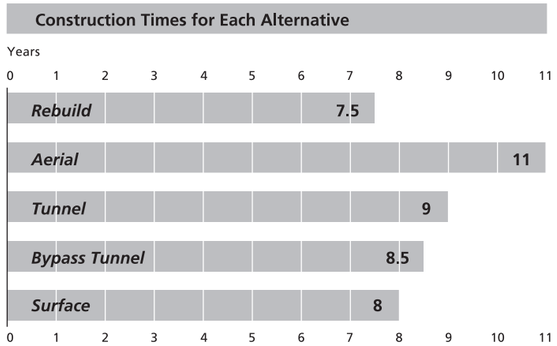
Stormwater Distribution

Exhibit 2-24

20 What other issues were considered in this Draft EIS and how do they compare between the alternatives?

How many buildings would need to be acquired to build the alternatives?

None of the alternatives would acquire any residential buildings. As shown in Exhibit 2-26, the Surface Alternative requires relocating the most businesses and employees, and it requires the largest area of property acquisitions. The Surface Alternative needs more property because of the relocated railroad tail track south of the Burlington Northern Santa Fe (BNSF) Seattle International Gateway (SIG) Rail Yard. If the tail track were relocated to Railroad Way S. instead of S. Royal Brougham Way, the Surface Alternative would have a similar number of acquisitions and displacements as the Tunnel or Bypass Tunnel Alternatives.



Note: These numbers represent the 90th percentile of construction time estimated for the project. This means there is a 90% chance the actual construction time would be equal to less than this estimate.

Exhibit 2-27

How would neighborhoods be affected?

The Rebuild and Aerial Alternatives would not change neighborhood character along the central waterfront. The other alternatives would give these neighborhoods a stronger connection with the waterfront, although the Bypass Tunnel and Surface Alternatives add more lanes and more traffic on Alaskan Way. This would diminish some of the sense of connection. At the north end of the corridor all alternatives except the Rebuild Alternative would improve east-west connections between the Uptown and South Lake Union neighborhoods.

Do effects to historic resources vary between the alternatives?

The corridor contains two National Register historic districts (Pioneer Square and Pike Place Market) and numerous other National Register properties. The lead agencies have worked hard to avoid possible effects to resources eligible for listing in the National Register of Historic Places.

All of the alternatives will demolish two resources that are eligible for listing in the National Register: the Alaskan Way Viaduct, and portions of the Alaskan Way Seawall. All of the alternatives may potentially remove the Washington-Oregon Shippers Cooperative Association (WOSCA) freight house. The Battery Street Tunnel, which is eligible for listing in the National Register, would be modified under all of the Build Alternatives except the Rebuild Alternative. The Washington Street Boat Landing, which is also listed in the National Register, will be removed during construction and relocated west of its current site after construction.

The Tunnel, Bypass Tunnel, and Surface Alternatives will affect one additional building (the One Yesler Building) in the Pioneer Square Historic District. This building could be relocated to a parking lot across the street, or to a site just to the west of its current location. The Tunnel and Bypass Tunnel Alternatives also involve minor alterations to the Antique Importers/Snowboard Connection building, which is in the Pioneer Square Historic District, and the basement of the Catholic Seamen's Club, which is eligible for listing in the National Register.

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.

How would air quality differ between the alternatives?

Air pollution related to transportation would be similar under all of the alternatives. Future carbon monoxide and particulate matter concentrations were predicted to be below the National Ambient Air Quality Standards (NAAQS) for all alternatives. Daily pollutant emissions from traffic were predicted to be lower in 2030 than today for all of the alternatives, with only small differences between the alternatives.

Are effects to groundwater similar between the alternatives?

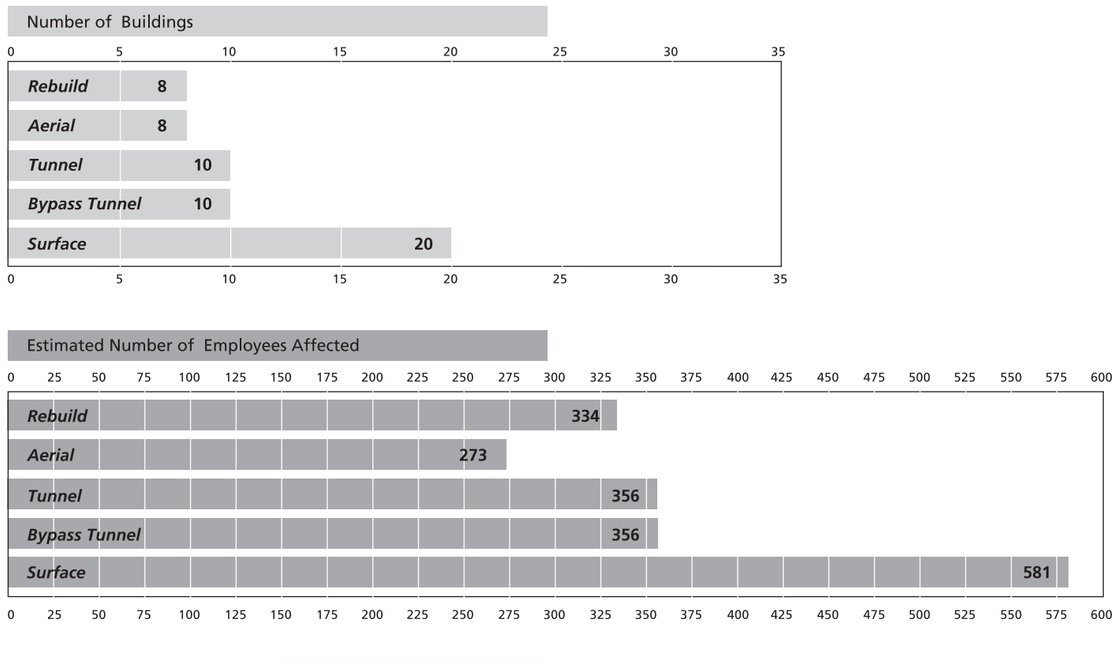
Groundwater flow would not be negatively affected by any of the alternatives. While groundwater levels may change slightly along the new seawall under all of the alternatives, the potential groundwater buildup (mounding) will be within the existing groundwater fluctuations resulting from tides in Elliott Bay. For the Tunnel and Bypass Tunnel Alternatives, groundwater flow in the vicinity of the tunnel will flow around, under, or over the tunnel structure.

21 What will happen during construction?

How do construction durations compare between the alternatives?

The Aerial Alternative would take the longest time to build, as shown in Exhibit 2-27. The Rebuild and Surface Alternatives would take the shortest amount of time to build.

Number of Buildings, Employees, and Acres Affected



Note: For the Surface Alternative, the number of buildings, employees affected, and total acres required would be similar to the Tunnel or Bypass Tunnel if the tail track extends north of S. Royal Brougham Way.

Exhibit 2-26

How do effects to roadway capacity compare during construction?

The project assumes SR 99 would not be completely closed and could be constructed in the estimated timeframe (7.5 to 11 years). However, partial roadway closures and detours would be required. Two lanes of traffic would be maintained in the AWV Corridor

during peak traffic hours, or a comparable detour would be provided. SR 99 could be closed during off-peak traffic hours, such as nights and weekends, and for up to 2-week periods. SR 99 between Pike Street and Denny Way (including the Battery Street Tunnel) could be closed during summer months for up to 10 weeks for all alternatives except the Rebuild Alternative.

Exhibit 2-28
Summary of Lost Roadway Capacity During Major Construction Activities
(Excluding Stages 1 and 5)

	Rebuild	*Aerial*	*Tunnel*	*Bypass Tunnel*	*Surface*
Average Percentage of Corridor Roadway Capacity Lost	49%	29%	28%	25%	48%
Duration of Major Construction Activities*	6.5 years	9.5 years	8 years	7 years	7.5 years

* (Excludes Site Preparation and Restoration stages)

Roadway closures during construction vary by alternative, location, and construction stage. Overall, the percentage of lost roadway capacity is the least for the Tunnel and Bypass Tunnel Alternatives, as shown in Exhibit 2-28. The Aerial Alternative has a similar lost roadway capacity during construction, but would take more time to build. The Rebuild and Surface Alternatives would have the highest loss of roadway capacity during construction, although they also take the least amount of time to build. Lower roadway capacity will affect freight traffic in the corridor as well as other travelers.

How does construction truck traffic compare between the alternatives?

For all alternatives and options, trucks will most likely be the primary mode for transporting materials either into or out of the project area, though rail cars or barges may also be used. All of the alternatives would increase truck traffic in the area, since equipment, soil, and materials would be trucked in and out of the area. Both tunnel alternatives require more trucks because a large volume of soil would need to be excavated. The Tunnel Alternative would require the most truck trips, followed by the Bypass Tunnel Alternative. Truck traffic volumes would be highest during the 2- to 4-year period when the tunnel is being constructed. Specific truck routes will be developed to help minimize possible effects to traffic in the area.

How would transit be affected during construction?

For all alternatives, the Waterfront Streetcar would be removed for the entire construction period. It would be replaced at the end of construction. A shuttle service could be provided through the construction area to mitigate this loss. Other transit services would be affected by route changes, and travel times may increase due to additional congestion in the area. As part of the project, the lead agencies will work with transit providers to discuss construction activities that would affect transit routes and work on finding acceptable alternate routes as needed. In addition, the lead agencies will provide funds to enhance transit during construction.

How do construction effects to rail yards compare between the alternatives?

The Aerial Alternative would affect rail yards in the project area less than the other alternatives. Effects to rail yards for the remaining alternatives would be similar.

For the Aerial Alternative, the Whatcom Rail Yard located at the south end of the project area would be closed for the entire construction period. No other changes would be needed to other rail yards for this alternative.

For all alternatives except the Aerial Alternative, the Whatcom Rail Yard would be relocated into the BNSF Seattle International Gateway (SIG) Rail Yard. The Whatcom Rail Yard would be closed while it was being relocated, and the BNSF SIG Rail Yard would remain open while it is being reconfigured. For these alternatives, the tail track would also be moved. The existing tail track would be maintained during relocation of the tail track. In the central and north waterfront areas, construction effects are similar between the alternatives. There will be times when construction would occur over the existing BNSF tracks; however, the rail line would remain open throughout the construction period.

The lead agencies will carefully coordinate construction activities with the BNSF and Union Pacific Railroads to maintain the functions of their tracks during project construction.

How do parking effects during construction compare between the alternatives?

The alternatives would remove a similar number of parking spaces. The Rebuild Alternative would remove slightly less parking than the other alternatives during construction because no work is proposed to occur north of the Battery Street Tunnel.

About 1,100 parking spaces in the project area will be removed during construction. These spaces include parking spaces under the existing Alaskan Way Viaduct and under the ramp on Railroad Avenue S. Most of these spaces are short-term, metered spaces, though there are many free, long-term parking spaces located under the viaduct south of S. King Street. Farther away from the project area, parking spaces may need to be removed to make room for diverted traffic and maintain smooth traffic flow.

Lost short-term parking could be mitigated by a combination of increasing utilization of other existing parking facilities, leasing an existing parking facility and converting it to short-term parking, and purchasing property and building new short-term parking. A parking mitigation strategy will be included in the Final EIS that will mitigate losses of short-term parking during and after construction of the preferred alternative.

What traffic detours are proposed during construction and what are the tradeoffs?

There are two proposed construction detours: the Broad Street Detour and the Battery Street Flyover Detour option.

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.

Exhibit 2-29 *Visual simulation of Broad Street Detour*

Exhibit 2-30

Visual simulation view to the north of the Battery Street Flyover Detour

Broad Street Detour

For this detour, the improvements associated with the Widened Mercer Underpass would need to be constructed north of the Battery Street Tunnel, prior to detouring traffic. The Widened Mercer Underpass improvements include constructing a new bridge across Thomas Street and widening Mercer Street between Fifth and Dexter Avenues.

With the Broad Street Detour, southbound SR 99 traffic would be diverted off of Aurora Avenue/SR99 at Broad Street. This would require widening the existing Aurora/SR 99 off-ramp to Broad Street from one lane to two lanes. Also, Broad Street would be reconfigured so traffic headed eastbound near Denny Way is diverted to the new bridge at Thomas Street. A two-lane temporary bridge would be built over the BNSF railroad tracks from approximately the intersection of the Alaskan Way surface street and Vine Street up to the intersection of Broad Street and Western Avenue. Traffic would be routed down Broad Street and over the BNSF railroad tracks to the Alaskan Way surface street. Southbound SR 99 traffic would continue to travel south on the Alaskan Way surface street until it would connect to either the temporary viaduct near Pike Street (for the Aerial Alternative), the existing viaduct, or the new tunnel (for the tunnel alternatives). The Broad Street Detour would increase traffic using Broad Street over existing conditions. Northbound traffic would continue to use the Battery Street Tunnel.

Other features of the Broad Street Detour include:

- Southbound traffic from the Ballard/Interbay area would travel under the railroad tracks at Broad Street by using an underpass. Northbound traffic would use ramps on Elliott and Western Avenues. Routes would frequently change throughout construction, but access would be provided.
- The Battery Street Tunnel would not need to be closed entirely throughout construction.

Battery Street Flyover Detour Option

The Battery Street Flyover Detour option could be used instead of the Broad Street Detour. This option involves constructing a temporary side-by-side aerial structure that would connect to the Battery Street Tunnel near First Avenue and Battery Street. It would rise over existing buildings between Western Avenue and the Alaskan Way surface street and touch down at street level. This detour would allow northbound and southbound traffic to travel on the temporary aerial flyover while the existing Battery Street Tunnel connection is torn down and rebuilt. A comparison between the two detours is shown in Exhibit 2-31.

Other features of the detour option include the following:

- Ramps would be provided on the structure connecting to Elliott and Western Avenues.
- No improvements would be required to SR 99 or other streets north of the Battery Street Tunnel.
- The Battery Street Tunnel may need to be closed for up to 10 weeks during one summer to upgrade the Battery Street Tunnel to add fire and life safety improvements.

22 How do effects to the character and views along the corridor compare during construction?

For any of the alternatives, construction equipment and materials would clutter views in the corridor, and nighttime lighting could affect some people within one or two blocks of construction and staging areas.

Overall, the Aerial Alternative would have the greatest effect on views and character of the area because a temporary aerial structure would stretch from S. Royal Brougham Way to near Pike Street for up to 7 years during construction. A picture of what the temporary structure would look like is shown in Exhibit 2-32. In the south end of the corridor, the temporary structure would have only minimal effects to the surrounding industrial landscape. Along the waterfront, the temporary aerial structure would tower above the pedestrian corridor, shade part of the area, and dominate views from the historic water-

Exhibit 2-31

Comparison of Potential Detours

	Broad Street Detour	*Battery Street Flyover Detour Option*
Views	Affects views from: • Pier 70 • Proposed Olympic Sculpture Park • Old Spaghetti Factory1	Affects views from: • Belltown Lofts • Austin Bell Building • Barnes Building • Seattle Art Institute Building • Marriott Hotel • Waterfront Landings • Pier 66 • World Trade Center West
Construction Travel Times	Travel time for southbound traffic will increase since drivers will be forced to travel on surface streets instead of a free-flowing highway.	SR 99 traffic could continue through the Battery Street Tunnel throughout most of the construction period, so travel times are expected to improve for southbound traffic with this option.
Other traffic Issues	Traffic volumes on Broad Street will increase substantially because southbound traffic would be routed there.	This option would result in improved traffic flow during construction compared to the Broad Street Detour.
Property Acquisition/ Relocation	No additional properties would be required.	A three-story office building and a two-story office building would need to be acquired. Also, one building would be modified.
Land use/ Neighborhood Character	Broad Street and Alaskan Way become harder to cross because of increased traffic.	Creates an island surrounded by SR 99 and detour route.
Construction Duration	Baseline[1].	Total project construction time could be reduced by 3 to 18 months compared to the baseline[1].

[1] **The baseline represents the construction durations estimated for this project, which are 11 years for the Aerial Alternative, 9 years for the Tunnel Alternative, and 8.5 years for the Bypass Tunnel Alternative.**

Temporary Aerial Structure Simulation

View to the south from Union (Waterfront Park) at the west side of Alaskan Way surface street.

Exhibit 2-32

front piers. It would also partially obstruct views from buildings located in the space between the Alaskan Way surface street and the viaduct. Also, effects to views depend on the detour selected, as shown in Exhibits 2-29 and 2-30. The temporary viaduct would be in place for about 7 years, along with the Broad Street Detour. If the Battery Street Flyover Detour option were built, the temporary viaduct would remain in place about 4 years.

In general, the most noticeable change to views with the Rebuild Alternative is that the viaduct would be braced during construction. The temporary bracing would make the viaduct look bulkier and would block some views through and under the viaduct.

For the Tunnel, Bypass Tunnel, and Surface Alternatives, the effects to views depend on the detour selected, as previously described. Also, for the Tunnel and Bypass Tunnel Alternatives, a lot of construction would be underground, which would minimize effects to views and surrounding areas compared with the other alternatives.

23 How does construction noise compare?

Noise during construction would be bothersome to nearby residents and businesses, particularly since construction activities would occur 24 hours a day. All of the alternatives would generate similar types of noise that would occur sporadically in different locations throughout the 7.5- to 11-year construction period. Common noise sources would include front-end loaders, pile-placement machinery, dump trucks, and generators. The loudest and most disruptive construction activities would be pile placement (including driving sheet pile), followed by work with jackhammers.

Existing outdoor noise levels in the project area range from 71 to 83 dBA, which is typical for major downtown metropolitan areas. Typical noise levels from construction equipment would range from 69 to 106 dBA 50 feet from the source; however, the majority of typical construction activities fall within the 75- to 85-dBA range at 50 feet. Peak noise from pile driving is about 106 dBA at 50 feet. Noise at 65 dBA is generally intrusive; 80 dBA is disruptive and requires people to shout to be heard. Hearing protection is recommended at noise levels above 90 dBA. Noise levels between 110 and 120 dBA are typical of a rock concert.

For all of the alternatives, noise for certain types of construction activities, like pile placement and viaduct demolition, could exceed City of Seattle noise regulations. Exceedances are expected to occur in the daytime and nighttime, which would require a noise variance from the City of Seattle. The Rebuild Alternative would have the greatest noise and vibration effect, followed by the Aerial Alternative, because construction of their structures through the central section would require a considerable amount of pile placement. The Rebuild Alternative would cause the most construction noise heard by the public, since it would require more pile placement near businesses and residences than other alternatives.

For all alternatives, reconstruction of the seawall and construction of the over-water pier could generate in-water noise and vibration levels that might disturb fish and marine life. These potential effects could be mitigated using alternate construction methods, such as constructing in-water improvements behind a cofferdam.

24 How would vibration effects during construction compare?

Demolishing the viaduct and pile placement would cause high vibration levels during construction, possibly affecting older historic buildings and areaways. During viaduct demolition, extremely fragile structures closer than 100 feet would be at risk of damage. For pile driving, extremely fragile structures closer than 400 feet would be at risk. To avoid damage, special precautions would be taken to limit damage to extremely fragile structures. This may include using pilings that do not need to be driven into the ground.

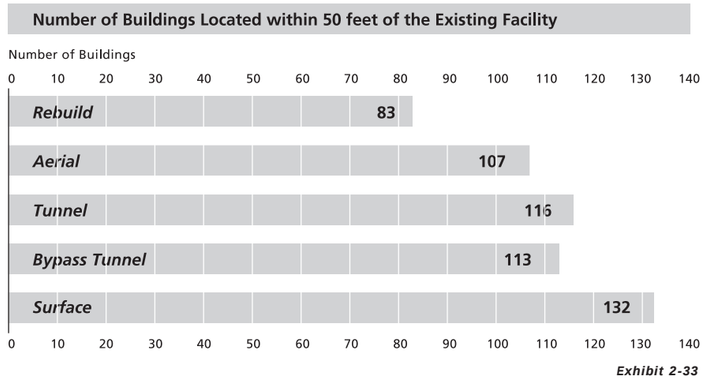


Exhibit 2-33

25 Do the construction effects to businesses and the local economy vary between the alternatives?

The project area contains a mix of commercial, retail, industrial, and service-related businesses that would each be affected by construction in different ways. This project is different from many others because of the many years needed for construction. Although the amount of disturbance will vary from place to place and from time to time while the project is built, the extended construction period will make it especially hard on some businesses.

Some businesses in the construction area may be periodically inconvenienced by noise from the construction, while other businesses, such as those located along the central waterfront, could be negatively affected by a decline in sales if people choose to avoid the area during construction. Businesses in the south, along the central waterfront, in Pioneer Square, and in the Pike Place Market area would also be affected by traffic detours, congestion, noise, dust, changes to access, and lost parking. Businesses in the north end of the project area would mostly be affected by noise, dust, traffic detours, and congestion.

The number of buildings located within 50 feet of the facility is shown in Exhibit 2-33. Overall, the Rebuild Alternative has the fewest buildings located within 50 feet, whereas the Surface Alternative has the most businesses located within this distance. Additionally, the Rebuild Alternative does not propose improvements north of the Battery Street Tunnel, so it would

have fewer overall effects than the other alternatives, which have effects from both construction and prolonged detours at Broad Street.

Specific mitigation measures for affected businesses will be provided in the Final EIS. Potential mitigation measures are identified in Chapter 10.

26 What other construction issues were considered?

Are any additional properties required for construction, and do the properties needed vary between the alternatives?

All of the alternatives require property acquisitions or leases for construction staging areas. In general, the number of properties needed for construction staging is similar between the alternatives. The fewest number of staging areas are required for the Rebuild Alternative, because no improvements are planned in or north of the Battery Street Tunnel. After construction, the properties could be leased to new tenants, redeveloped, or sold.

How do construction effects to parks and recreation compare between the alternatives?

For all alternatives, the Waterfront Trail located between S. Royal Brougham Way and Bell Street would be removed during construction. Bicycle and pedestrian routes during construction will be proposed once a preferred alternative has been selected.

Noise and dust would affect open spaces at Waterfront Park, Pier 62/63, and Victor Steinbrueck Park. Also, for the Aerial, Tunnel, Bypass Tunnel, and Surface Alternatives, temporary trestles for the Broad Street Detour would temporarily alter views and increase noise and traffic, which would affect people visiting Myrtle Edwards Park and the proposed Olympic Sculpture Park. If the Battery Street Flyover Detour were constructed, views to these two parks would not be affected, but views between Pike and Battery Streets would be affected.

In addition, all of the alternatives could affect recreational facilities that depend on admission fees if people avoided the waterfront due to construction. This could affect the economic viability of the facilities listed below:

- Tillicum Village at Blake Island Park - Private ferry service to Blake Island State Park is provided from Pier 56.
- The Seattle Aquarium is primarily funded by admissions. If admissions drop during construction, programs may be compromised and plans to upgrade the facility may be delayed. In addition, the animals at the Aquarium may be affected by construction noise.
- The summer concert series at the Pier 62/63 Park could be affected by construction noise.

Overall, the Aerial Alternative would increase proximity impacts, such as increased noise to parks and recreational areas along the waterfront, more than the other alternatives because a temporary aerial structure would be built directly adjacent to the waterfront between S. Royal Brougham Way and Pike Street.

Specific mitigation measures identifying possible pedestrian and bicycle routes and mitigation measures for parks and recreational facilities will be developed as part of the Final EIS.

How do construction effects compare for neighborhoods?

For people working or living right next to the worksite, construction will sometimes be inconvenient and at other times will be quite disruptive. For many people, construction sites seem like a barrier, even when temporary sidewalks or other routes are available. Because of this, construction activities could temporarily increase the perception of separation between parts of each of the neighborhoods in the project corridor. The Surface Alternative would have the least perceived separation. The Tunnel and Bypass Tunnel Alternatives have a lot of work below ground, which would lessen some of the perceived separation because it can be temporarily covered over. The Rebuild and Aerial Alternatives, with a lot of temporary aboveground structures, would have the most perceived separation.

Would the elderly, disabled, low-income, or minorities be affected during construction?

Construction effects to disadvantaged communities include increased congestion, reduced mobility, increased response time for emergency services, and increased noise. For all alternatives, temporary congestion during construction would affect low-income, homeless, elderly, or disabled people and the organizations that strive to serve them. Although construction effects to disadvantaged communities are probable, it appears they can be avoided, minimized, or mitigated. At this point, it is too early to develop a specific construction mitigation strategy for disadvantaged communities; however, continued outreach with service providers will be critical to minimizing and avoiding impacts where feasible. This mitigation will be developed for the preferred alternative and included in the Final EIS.

How do construction effects compare for utilities and public services?

An extensive network of utilities is located in the project area. For all of the alternatives, many of these utilities will need to be moved at least once during construction. Among the alternatives, the Tunnel Alternative will require the most effort to relocate utilities, followed by the Bypass Tunnel Alternative.

During construction, unplanned interruptions or accidental disconnections associated with utility relocations could occur. In addition, when utilities are relocated, there are times when reliability of the utility systems may be reduced. These risks can be reduced through advanced planning and coordination.

The Tunnel Alternative would have the most effect on utilities in the south (S. Spokane to S. King Streets). In the central section, the Tunnel Alternative requires the most utilities to be relocated, followed by the Bypass Tunnel Alternative. The Aerial Alternative would fall next in line, followed by the Rebuild and Surface Alternatives.

In the north waterfront section, the Bypass Tunnel Alternative would affect slightly more utilities than the Tunnel Alternative. The other alternatives would require less relocation and be relatively similar.

In the north, the Rebuild Alternative would require the fewest number of utilities to be relocated since no improvements are proposed. The remaining alternatives would have similar effects to utilities, though the Bypass Tunnel Alternative would not require relocating telephone or fiber-optic lines.

During construction, public services (including emergency services, school buses, and solid waste collectors) would be affected by traffic delays and detours. Specifically, Fire Station No. 5, located near Colman Dock on the waterfront, would be relocated during construction. The place where fire services would be temporarily relocated has not yet been determined, but the lead agencies would work with the Seattle Fire Department to make sure they are relocated to an adequate location.

How do air quality effects during construction compare?

Air quality effects between the alternatives would vary in the exact locations and timing of the construction activities, but overall, the alternatives would all have the same kinds of effects.

Do construction effects to fish and wildlife vary between the alternatives?

For all the alternatives, construction of the over-water pier between S. Washington Street and Yesler Way and seawall construction near S. King Street up to Pike Street will require some in-water work. In-water construction activities such as placing piles for the over-water pier or removing the existing seawall would disturb sediments along the shoreline.

All alternatives would strengthen soil with cement grout behind the sheet pile wall from S. King Street to near S. Washington Street. The sheet pile wall will be removed, which could require working in the water. Effects to fish and wildlife during sheet pile removal are similar between alternatives, and mitigation would also be similar.

The Rebuild, Aerial, and Surface Alternatives would replace the seawall from S. Washington Street up to about Pike Street using soil improvements and drilled shafts. Possible effects are the same as previously described. Potential noise impacts to fish, wildlife, or bald eagles from pile placement may be avoided or minimized by using Best Management Practices.

For the Tunnel and Bypass Tunnel Alternatives, the seawall would become the outer wall of the new tunnel, beginning at S. Washington Street and continuing to about Pike Street. A secant pile wall (similar to a row of continuous drilled shafts) would be constructed instead of soil improvements. In most places, the tunnel wall would be built behind the existing seawall, though between S. Washington Street and Yesler Way, the wall would extend between 21 and 58 feet out into Elliott Bay depending on which tunnel is constructed.

Do construction effects to water quality and groundwater vary between the alternatives?

Construction staging locations have the potential to have spills and stormwater runoff that contain contaminants, such as fuel or oil from machinery. In addition, pH can be altered if runoff comes in contact with concrete during the curing process. Best Management Practices would be in place to contain and treat runoff. The Best Management Practices used at construction staging areas would not vary between alternatives.

The spoils removed during soil improvements, drilled shafts, and slurry wall construction would be disposed of in a manner to protect water quality. The spoils contain a mix of soil, cement grout or bentonite (an absorbent clay), and a high percentage of water. The water could have a pH approaching 10 (which is too high-a pH of 7 is considered to be normal). This water will be treated as needed to reduce pH, total suspended solids (soil particles), and other pollutants. The way water in the spoils is treated would not vary between the alternatives, but the amount of spoils would vary somewhat.

What is pH?

pH is a measurement of the acidity or alkalinity in a substance. A pH level of 7 is considered normal. If runoff becomes too basic (too alkaline) or too acidic, it can harm aquatic life when discharged.

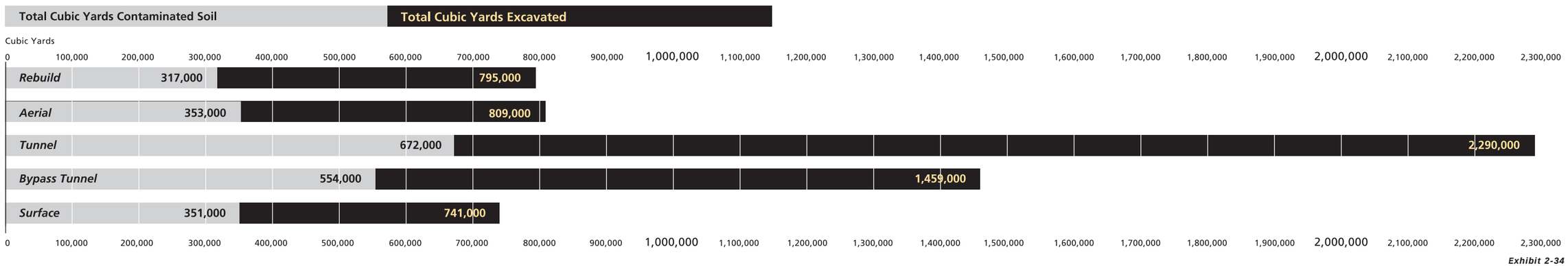


Exhibit 2-34

The amount of spoils anticipated for each alternative is:

- Rebuild 256,000 cubic yards
- Aerial 286,000 cubic yards
- Tunnel 241,000 cubic yards
- Bypass Tunnel 201,000 cubic yards
- Surface 178,000 cubic yards

Construction of the cut-and-cover tunnel structures for the Tunnel and Bypass Tunnel Alternatives would likely require continuous dewatering during construction. This water would be treated as necessary prior to discharge to reduce pH, total suspended solids, and other pollutants as needed and then discharged into Elliott Bay. The type of treatment will be determined during the permitting and design phases of the project. Dewatering also has the potential to cause settlement in the area if proper dewatering techniques are not used. Dewatering is not anticipated for drilled shafts associated with the Rebuild, Aerial, or Surface Alternatives.

Under the Tunnel and Bypass Tunnel Alternatives, the new seawall would be constructed on the waterside of the existing seawall in the vicinity of S. Washington Street. As a result, both the storm drain and combined sewer outfall at Washington Street would need to be extended further into Elliott Bay.

How much soil would be excavated and how much contaminated material would be removed by the alternatives?

Exhibit 2-34 compares the estimated volume of soils to be excavated and the portion expected to be contaminated for each alternative. The soil excavation volumes include construction spoils and potentially contaminated materials.

How do construction effects to potential cultural/archeological artifacts compare?

Soil excavation and improvement work could affect unknown archaeological deposits that may be located within parts of the project site.

In general, archaeological artifacts would be disturbed least by construction of the Rebuild Alternative, followed closely by the Surface and Aerial Alternatives. Construction of the Bypass Tunnel and Tunnel Alternatives has the potential to affect archaeological resources the most, because of the large volume of soil that would need to be excavated for these alternatives.

27 What are the cumulative effects of major projects underway or planned in Seattle?

Cumulative effects occur when the effects of separate projects combine to have more substantial combined effects. The Link light rail project and Monorail Green Line would both be nearing completion when major construction starts on the viaduct in 2008. If these projects overlap, traffic, noise, and utility effects would be intensified. Other transportation projects that may overlap with the viaduct are SR 519 phase II, Colman Dock Ferry Terminal Expansion, Mercer Street corridor improvements, Spokane Street Viaduct, and I-5 improvements. These projects are all being closely coordinated to minimize cumulative construction effects.

28 What issues are controversial?

The following four issues appear to be the most controversial at this time.

What type of structure should be built along the central waterfront?

An aerial structure, tunnel, or surface roadway has very different effects on the character of the surrounding area. People who have provided comments so far have expressed wide-ranging opinions on what type of viaduct replacement structure is preferred. There are many people who think the viaduct is a visual barrier between downtown and the waterfront, and they want to see the viaduct removed and replaced with a tunnel structure. An aerial structure is noisier than a tunnel or surface roadway, which makes the area less pleasant for pedestrians, residents, and businesses adjacent to the viaduct and people engaging in other activities along the waterfront. Conversely, there are many people who like the views from the viaduct as they are driving or who like the structure itself. In addition, some people prefer driving at or above ground as opposed to in an underground tunnel. Finally, some people are interested in returning Alaskan Way to a surface arterial or are interested in seeing the least expensive solution.

How much roadway capacity in the corridor can be provided by the alternatives?

The Rebuild, Aerial, and Tunnel Alternatives maintain or improve roadway capacity on SR 99 and maintain or improve travel times. The Bypass Tunnel Alternative reduces roadway capacity on SR 99, but it maintains overall capacity in the corridor because the Alaskan Way surface street would be expanded to six lanes to offset losses to SR 99 capacity. Even though SR 99 capacity is similar for the Bypass Tunnel Alternative, travel times for trips headed from the Ballard/Interbay area to the stadium area would increase. The Surface Alternative would reduce roadway capacity in the SR 99 corridor by as much as 60 percent in the downtown area. As a result, travel times through the corridor would increase, and some drivers are expected to avoid the corridor, adding to congestion on I-5 and other local city streets.

Is continuous construction (24 hours a day, 7 days a week) needed?

Obviously, continuous construction would directly affect people and businesses in the corridor more than a daytime construction schedule. There's no question construction can be noisy and disruptive. Even with continuous construction, the project would take from 7.5 to 11 years to build. If construction is stopped or slowed down at night or on weekends, the time lost has to be made up by extending the total construction time. That also increases costs because of inflation. The tradeoff is between intense, continuous construction that finishes as fast as possible but can be painful while it lasts, and a more moderate pace of construction with breaks and lulls that continues for many more years.

Can SR 99 be closed entirely for construction?

This Draft EIS evaluates effects assuming that SR 99 would not be completely closed during construction. Two lanes of traffic would be maintained in the AWV Corridor during peak traffic hours or detours would be provided. During non-peak periods, such as nighttime or weekends, lanes could be restricted or portions of the corridor could be closed. The section through Battery Street Tunnel (between Seneca Street and Denney Way) could be closed for as much as 10 weeks during one summer.

These are the minimum closures or restrictions. If SR 99 were closed for extended periods, the overall time needed (and cost) might be reduced. Extended closure would likely have effect on traffic over a larger area of the city and region. Some of these effects might be reduced by additional transit service and improvements to other roadways. Different ways to build the project, including long closures of SR 99 and a variety of construction techniques, could continue to be explored as the preferred alternative is developed and will be presented in the Final EIS.

29 What issues remain to be resolved?

The preferred alternative needs to be determined. It will be selected by the lead agencies (City of Seattle, WSDOT, and FHWA) in 2004. The preferred alternative will combine and refine ideas from the current alternatives and options. The preferred alternative will also have more details on how it could be built and refinements on how the street landscaping and amenities could be designed.

Information in the Draft EIS, available funding, and public comments received during the Draft EIS comment period will all be considered before a decision is made. When the preferred alternative is chosen, operational and construction effects for it will be further evaluated. This analysis will be included in the Final EIS.

In general, transit trips into downtown are projected to substantially increase by 2030 regardless of the alternative selected for this project. Currently, it is estimated that 23 percent of trips entering downtown enter via transit or other modes (bikes and pedestrians). That number is predicted to nearly double by the year 2030. Currently, funded transit service within the Puget Sound region for the year 2030 is not expected to meet the projected demand without additional investments in the region. Therefore, additional investments in transit are needed to meet regional 2030 transit goals. This overall transit gap is a regional transportation planning issue and beyond the scope of this project.

This project includes a variety of investments designed to decrease reliance on single-occupancy vehicles and increase other modes of transportation during construction of the project. Some of these investments could also provide long-term benefits once the project was completed. The investments proposed as part of constructing this project are identified in a Flexible Transportation Package, described in more detail in Chapter 10 and Appendix B, Section 3.1.8.

30 What adverse effects from the project would not be mitigated?

Once constructed and with reasonable mitigation, by and large, all alternatives improve conditions compared to today and do not have many adverse effects. However, there are some adverse effects that cannot be mitigated.

The Bypass Tunnel Alternative would increase travel times between the Duwamish and Ballard/Interbay industrial areas. This would adversely affect drivers traveling between these areas. This route is important for freight.

The Surface Alternative increases congestion at many intersections through the downtown area, increases traffic volumes on city streets and adds traffic to I-5. Combined with slower speeds, travel times for trips through downtown would substantially increase.

Along the central waterfront, the Aerial Alternative would increase the width, and therefore the shadow, of the structure. This would increase the visual effects of the structure on pedestrians and increase the barrier effect between the waterfront and downtown core.

During construction, all alternatives would have some adverse effects that cannot be mitigated. Construction activity and detours would be disruptive to all areas along the corridor at one time or another. While efforts would be made to keep traffic moving, overall congestion along the corridor and in the downtown area would increase during construction.

Along the central waterfront, access to the piers would be maintained, but would become more difficult when the construction activity is nearby. These periods would likely last for several months. Even with a dedicated public information campaign, parking shuttles, and other mitigation, there would likely be substantial adverse effects to some local businesses.

To reduce the total time needed for construction, work would go on almost continuously (24 hours a day, 7 days a week). Even by avoiding noisy activities during nighttime hours and using the quietest equipment and techniques available, there would be unavoidable disturbance to nearby areas.