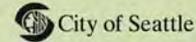
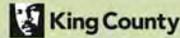
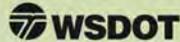
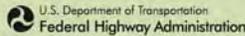


## Alaskan Way Viaduct Replacement Program



# 2012 Financial Plan Update

## SR 99 Alaskan Way Viaduct Replacement Project (Including the Bored Tunnel)

**June 2012**

Federal Project Numbers: SAFETEA-LU PNRS-0099(096)  
SAFETEA-LU PNRS-0099(097)

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<sup>1</sup> There is also a Final EIS for the Replacement Project, however, construction mitigation discussion is best captured in the SDEIS language identified in this Appendix.

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<sup>2</sup> WSDOT is currently negotiating an updated funding agreement and anticipates completion in November 2012.

<sup>3</sup> Please note that the Washington State Legislative Toll Authority is listed as SB 6444 in Appendix T. This similar numbering to the GCA is a coincidence.

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## Letter of Certification

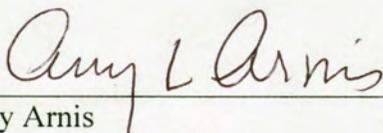
The Washington State Department of Transportation (WSDOT) has developed the first annual update of the 2011 Initial Financial Plan for the *SR 99 Alaskan Way Viaduct Replacement Project* (Replacement Project) that includes the Bored Tunnel. The plan is in accordance with the requirements of US Code Section 106, Title 23, and the Financial Plan guidance issued by the Federal Highway Administration.

The cost data in this Annual Update provides an accurate accounting of costs incurred to date and includes a realistic estimate of future costs based on cost risk estimates,<sup>4</sup> engineers' estimates, currently planned activities, and expected construction cost escalation factors.

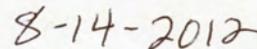
The Replacement Project contains a mix of funding that includes direct sources as well as toll revenues. While the estimates of financial resources rely upon assumptions regarding future economic conditions and demographic variables, they represent our best current estimates of available monies to fully fund the Replacement Project.

We believe that this first Annual Update of the Initial Financial Plan provides an accurate basis upon which to schedule and fund the Replacement Project.

To the best of WSDOT's knowledge and belief, this Annual Update fairly and accurately presents the financial position of the Replacement Project, cash flows and expected conditions for design and construction of the project. The financial forecasts in this update are based on our judgment of the expected project conditions and our expected course of action. We believe that the assumptions underlying this update are reasonable and appropriate. Further, we have made available all significant information that we believe is relevant to the update and to the best of our knowledge and belief, the documents and records supporting the assumptions are appropriate.



Amy Arnis  
Chief Financial Officer  
Assistant Secretary, Strategic Planning and Finance  
Washington State Department of Transportation



Date

<sup>4</sup> WSDOT targets a 60 percent risk range for projects. See Appendix G, IL 4071.01 for more detailed guidelines.

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## 1. Executive Summary

This document is the First Annual Update for the *State Route (SR) 99 Alaskan Way Viaduct Replacement Project* (Replacement Project) Federal Highway Administration (FHWA) Financial Plan. This financial plan is required by the FHWA because the total project size, including design, right of way, and construction, exceeds \$500 million and the Washington State Department of Transportation (WSDOT) is using federal funds in construction.

This project is part of a larger *SR 99 Alaskan Way Viaduct Replacement Program* (AWV Program) comprised of multiple projects within the corridor. The corridor needs to be replaced for safety purposes because it is seismically unsound. For a background and history of the AWV Program see Appendix W.

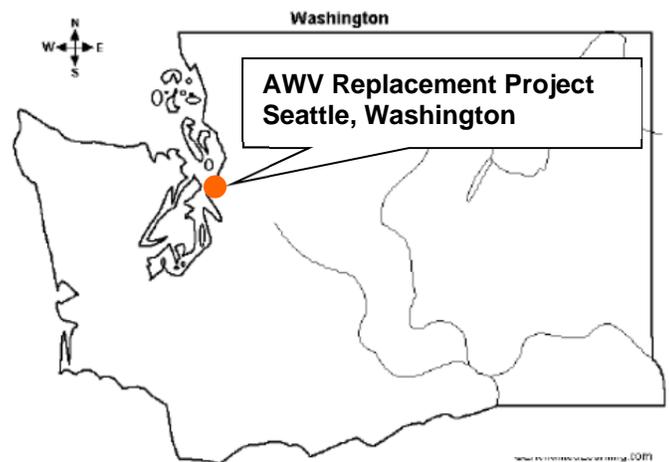
Located in Seattle, Washington (Figure 1), the Replacement Project is comprised of seven components that will connect with the other projects within the AWV Program. Together, the projects form a connected roadway system through the west side of downtown Seattle. These components include the following (Figure 6 in Section 3 provides additional details and graphics):

1. Bored Tunnel Design-Build
2. North Access
3. North Surface Streets
4. South Access
5. Viaduct Demolition (Removal)
6. Battery Street Tunnel Decommissioning
7. Mercer Street West (this component to be overseen and funded by the City of Seattle)<sup>5</sup>

Much has happened since the Replacement Project Initial Finance Plan was submitted to FHWA in August 2011.

Voters in the City of Seattle affirmed their support for the AWV Program in a September 2011 advisory vote. The Bored Tunnel design-build contractor ordered the tunnel boring machine (Figure 2) and began work to excavate the tunnel launch pit (Figure 3). The AWV Program has made significant progress on the acquisition of all necessary rights of way.

**Figure 1: AWW Replacement Project**



**Figure 2: TBM Bearing Fabrication**



<sup>5</sup> Planning and implementation of the Mercer West project is the responsibility of the City of Seattle, of which the Dexter to 5<sup>th</sup> Avenue portion is described in the WSDOT FEIS and thus included in this federal financial plan (update).

**Cost**

Between 2011 and 2012, there have been some minor changes in project cost, with the 2011 cost estimated at \$2.161 billion and the 2012 cost estimated at \$2.184 billion. This is an increase of approximately 1 percent, mainly due to a recalculation in sales tax for the Bored Tunnel. However, despite all of the activity, the cost of the Replacement Project has remained relatively stable and the plan for delivering the tunnel by the end of 2015 remains the same.

**Funding and Toll Authority**

There have been several changes in the way that WSDOT plans to pay for the Bored Tunnel. These modifications are due to an increase in availability of some fund sources and a decrease in others.

In 2012, the Washington State Legislature enacted authority to toll the Bored Tunnel that replaces the current SR 99. Preparation for this legislation revealed a potential shortfall in the funding capacity of tolls on the Bored Tunnel due to diversion of traffic onto City of Seattle surface streets. The 2012 Legislature allocated additional unprogrammed federal funding as a result.

**Figure 3: Secant Pile Construction at TBM Launch Pit Area**



The funding breakout currently projected is as follows:<sup>6</sup>

<u>2011</u>	<u>2012</u>	<u>Change</u>	<u>Source</u>
61.6 %	63.4 %	+1.8 %	State motor vehicle fuel tax
10.6 %	18.2 %	+7.6 %	Federal funding
18.5 %	9.2 %	-9.4 %	State tolling
6.9 %	6.9 %	--	Port of Seattle and others (Mercer Street West)
2.3 %	2.3 %	--	Local (City of Seattle)

Through February 2012, the project has expended \$430.3 million of the total \$2.184 billion budget (\$2.034 billion for the Central Waterfront component of the project and \$150 million additional components described in the scope of the Replacement Project Environmental Impact Statement).

WSDOT’s budget for the Replacement Project includes a contingency amount for potential cost overruns.

<sup>6</sup> See Figure 19 for full detail.

## 2. Introduction and Requirements

This document is the First Annual Update for the *State Route (SR) 99 Alaskan Way Viaduct Replacement Project* (Replacement Project) Federal Highway Administration (FHWA) Financial Plan. This financial plan is required by the FHWA because the total project size, including design, right of way and construction, exceeds \$500 million and the Washington State Department of Transportation (WSDOT) is using federal funds for construction.

Located in Seattle, Washington (Figure 4), the Replacement Project is part of a larger *SR 99 Alaskan Way Viaduct Replacement Program* (AWV Program) comprised of multiple projects that form a connected roadway system through the west side of downtown Seattle.

The corridor needs to be replaced for safety purposes because it is seismically unsound. For a background and history of the AWV Program, refer to Appendix W.

The purpose of FHWA financial plans and annual updates is to provide a comprehensive document that reports a snapshot of a project's cost estimate and revenue structure, and to provide an assurance that there will be sufficient financial resources available to implement and complete a project as planned.

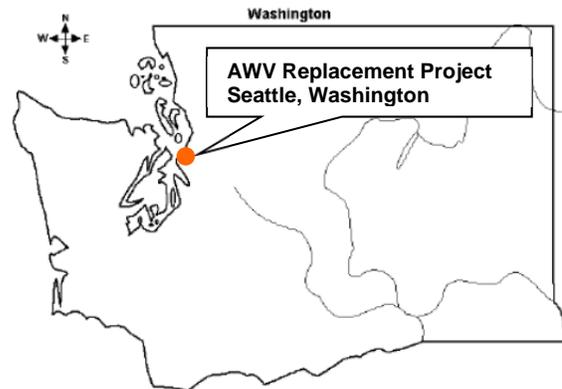
This Annual Update for the Replacement Project Financial Plan describes the following:

- Cost estimates
- Delivery schedule
- Funding, revenues, and financing
- Projected cash flow needs
- Risk/mitigation management measures

### Requirements

The requirement for Major Project financial plans was established in 2005 via Section 1904(a)(2) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users (SAFETEA-LU) amended 23USC106(h). SAFETEA-LU identified that projects over \$500 million in total project cost shall develop financial plans and submit them for approval to the FHWA. Requirements are detailed in the *FHWA Financial Plan Guidance, January 2007*.

**Figure 4: AWV Replacement Project**



## Methodology

This Annual Update for the Replacement Project was prepared in accordance with the Financial Plans Guidelines established by FHWA. The Financial Plans Guidance presents an outline for the “Initial Financial Plan” and for “Annual Updates.” SAFETEA-LU requires that the Initial Financial Plan be based on detailed annual estimates of the cost to complete the remaining elements of the project and on reasonable assumptions of future increases in the cost to complete the project. The Initial Financial Plan provides information on the immediate and longer-term financial implications at the time of project initiation. The annual updates of the Initial Financial Plan provide information on actual expenditures in comparison to initial estimates, as well as updated estimates of future year's obligations and expenditures.

## FHWA Financial Plan Review and Approval

The Replacement Project is over \$500 million in total project cost, thus the Annual Update will be submitted to the FHWA Washington State Division Office for review and approval. The Division Office will coordinate with the FHWA headquarters Major Projects Team for review and concurrence. Review will include such items as the reasonableness of the cost projections, the viability of the identified funding sources including whether they are contained in the fiscally constrained Statewide Transportation Improvement Program (STIP)/Transportation Improvement Plan (TIP)/Long Range Plan, and the likelihood that the funding commitments will provide sufficient resources to complete the Project as planned. The FHWA review and a determination of acceptability are anticipated within 30 to 60 days from the date that the document is received by the FHWA Division Office.

## FHWA Annual Update Timing

The Annual Update will be based on data collected from March to February over the course of a year and submitted to FHWA by June 1st of each construction year starting in 2012. Each update will reflect any changes in scope, risk, total and remaining project cost, and/or available funding. The last annual report in 2019 will cover completion of the contract.

Data for the annual updates will specifically cover the following time periods:

- Initial Financial Plan, project start – summer 2011, report on August 26, 2011 (complete)
- First Annual Update, August<sup>7</sup> – February 2012, report on June 1, 2012 (this document)
- Second Annual Update Report, March 2012 – February 2013, report on June 1, 2013
- Third Annual Update Report, March 2013 – February 2014, report on June 1, 2014
- Fourth Annual Update Report, March 2014 – February 2015, report on June 1, 2015
- Fifth Annual Update Report, March 2015 – February 2016, report on June 1, 2016 (*Tunnel Operational*)
- Sixth Annual Update Report, March 2016 – February 2017, report on June 1, 2017

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<sup>7</sup> Data for the First Annual Updated started in August instead of March because the Initial Financial Plan was approved in August of the prior year. Thus, the First Annual Update does not actually span an entire year.

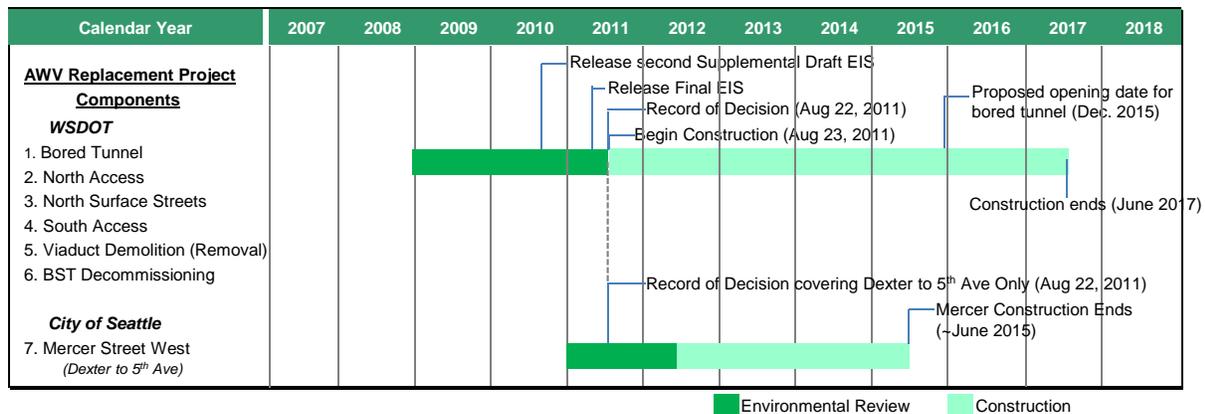
- Seventh Annual Update Report, March 2017 – February 2018, report on June 1, 2018
- Eighth Annual Update Report, March 2018 through completion of Battery Street Tunnel Decommissioning and close of contracts, report on or before June 1, 2019

### 3. Project Description

The Replacement Project is comprised of seven components that will connect with the other projects within the AWV Program described in Appendix W to form a connected roadway system through downtown Seattle, Washington. The seven components include the following (Figures 5 and 6 below provides additional detail):

1. Bored Tunnel Design-Build
2. North Access
3. North Surface Streets
4. South Access
5. Viaduct Demolition (Removal)
6. Battery Street Tunnel Decommissioning
7. Mercer Street West (this component to be overseen and funded by the City of Seattle<sup>8</sup>)

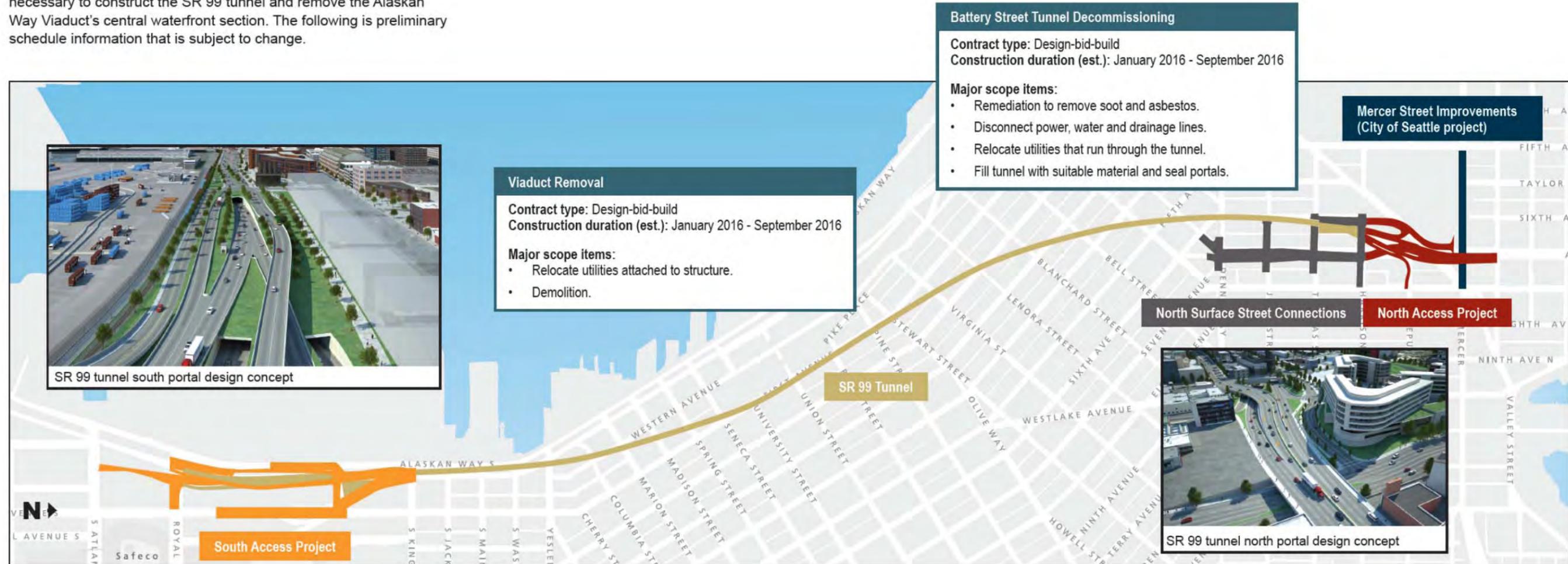
Figure 5: Anticipated Project Timeline<sup>9</sup>



<sup>8</sup> Planning and implementation of the Mercer West project is the responsibility of the City of Seattle, of which the Dexter to 5<sup>th</sup> Avenue portion is described in the WSDOT FEIS and thus included in this federal financial plan (update).

<sup>9</sup> Note that in the 2011 Initial Financial Plan the project was scheduled to end in 2018 with the demolition of the Battery Street Tunnel coming last in the series of components. Due to updated scheduling, construction activities will end in mid-2017 with completion of the North Surface Streets in this 2012 Annual Update.

The contract packages shown below represent the work that will be necessary to construct the SR 99 tunnel and remove the Alaskan Way Viaduct's central waterfront section. The following is preliminary schedule information that is subject to change.



**South Access Project**

**Contract type:** Design-bid-build  
**Contract advertisement date:** April 2014  
**Construction duration (est.):** June 2014 – January 2017

**Major scope items:**

- Connecting the S. Holgate Street to S. King Street project with the tunnel.
- SR 99 on- and off-ramps connecting the tunnel's south portal to city streets.
- Remove SR 99 bypass.
- Surface streets between S. Atlantic Street and S. King Street.
- Landscaping, sidewalks, signage, stormwater control and roadway restoration.

**SR 99 Tunnel**

**Contract type:** Design-build  
**Construction duration (est.):** August 2011 – December 2015  
**Contract amount:** \$1.35 billion

**Major scope items:**

- Tunnel boring machine.
- Bored tunnel and interior stacked roadway with two lanes in each direction.
- Fire, life and safety systems.
- Tunnel operations buildings at the tunnel's north and south ends.
- Traffic management systems: Overhead signage and electronic tolling equipment.

**North Surface Street Connections**

**Contract type:** Design-bid-build  
**Contract advertisement date:** October 2015  
**Construction duration (est.):** October 2015 – June 2017

**Major scope items:**

- Re-building John, Thomas and Harrison streets between Dexter and Taylor avenues and re-building a small section of Denny Way and Wall Street.
- Improvements to Aurora Avenue N. between Denny Way and Harrison Street.
- Restoration work such as landscaping and sidewalks.

**North Access Project**

**Contract type:** Design-bid-build  
**Contract advertisement date:** October 2013  
**Construction duration (est.):** January 2014 – February 2016

**Major scope items:**

- Connection between the tunnel's north portal and Aurora Avenue N.
- SR 99 on- and off-ramps at Republican Street.
- Stormwater control, signage and roadway restoration.
- Extension of Sixth Avenue N. between Harrison and Mercer streets.
- Utility relocation.

The Replacement Project scope of work has been finalized through the completion of its Final Environmental Impact Statement (FEIS) in August 2011. The Bored Tunnel will replace SR 99 between South Royal Brougham Way and Roy Street. The tunnel will have two lanes in each direction. Access to and from the tunnel will be provided via ramp connections at the southern end, located north of South Royal Brougham Way and at the north portal near Harrison Street. Different from the existing structure, mid-town ramps were not considered in the alternatives that were analyzed. In addition, the Project includes the removal of the viaduct along the Seattle waterfront and the decommissioning of the Battery Street Tunnel after the Bored Tunnel has been constructed and is open to traffic in late 2015.

## Bored Tunnel Design-Build

This single contract design-build (D-B) procurement effort consists of cut-and-cover structures at the north and south portals; a large diameter (interior diameter 52 feet) bored tunnel; an interior concrete structure with stacked roadways for northbound and southbound traffic; two tunnel operations and ventilation buildings; and tunnel and traffic systems. The southern limit of the civil work will match with the South Access on SR 99 near South Royal Brougham Way, and the northern limit of the civil work will match with the North Access component, east of Sixth Avenue near Harrison Street.

The Bored Tunnel will have two lanes in each direction. The southbound lanes will be located on the top portion of the tunnel and the northbound lanes will be located on the bottom (Figure 7). The basic configuration for the design-build contract requires a minimum 32-foot roadway width and a minimum vertical clearance of 15.5 feet within the traveled way. Travel lanes will be 11 feet wide, with a 2-foot-wide shoulder on the east side and an 8-foot-wide shoulder on the west side. The wider shoulder will provide emergency vehicle and maintenance access.

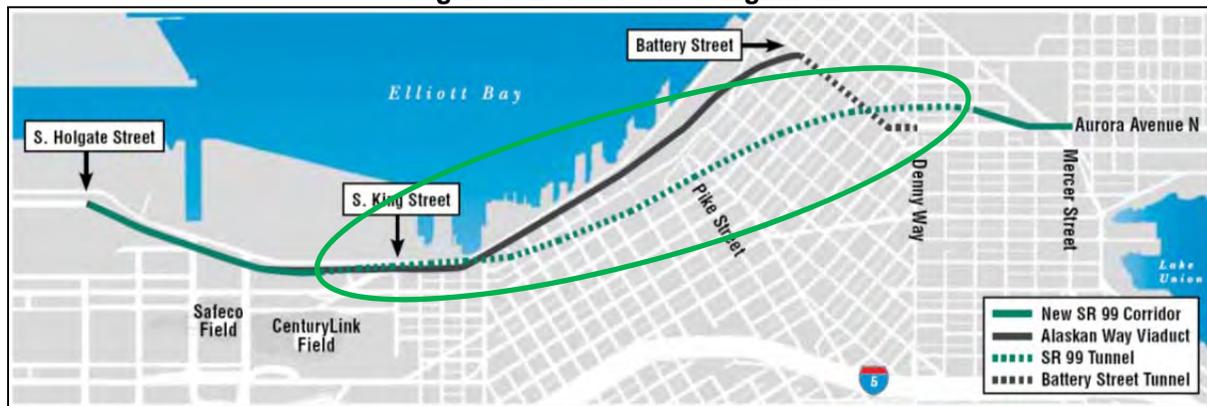
**Figure 7: Bored Tunnel Cross-Section**



The wider shoulder will also provide access to emergency tunnel exits, which will be provided at least every 650 feet. In an emergency, travelers would walk along the shoulders to reach a doorway that will lead into a secure waiting area called a refuge area, located between the tunnel's levels. Staircases inside the refuge area will provide access between the roadway levels. Signs will point travelers to the nearest exit where they would either wait for assistance or walk out of the tunnel. Refuge areas will contain emergency telephones.

The tunnel will be equipped with ventilation, fire detection/suppression systems and drainage. Video cameras will provide real-time information to the operators at WSDOT's 24-hour tunnel control center and allow them to respond quickly to changing conditions and emergencies. The main tunnel control/operations center will likely be located with WSDOT's Northwest Region Traffic Management Center.<sup>10</sup> The backup tunnel control/operations center will be incorporated into the tunnel ventilation building at the north tunnel portal between Thomas and Harrison Streets on the east side of Sixth Avenue North.

Figure 8: Bored Tunnel Alignment



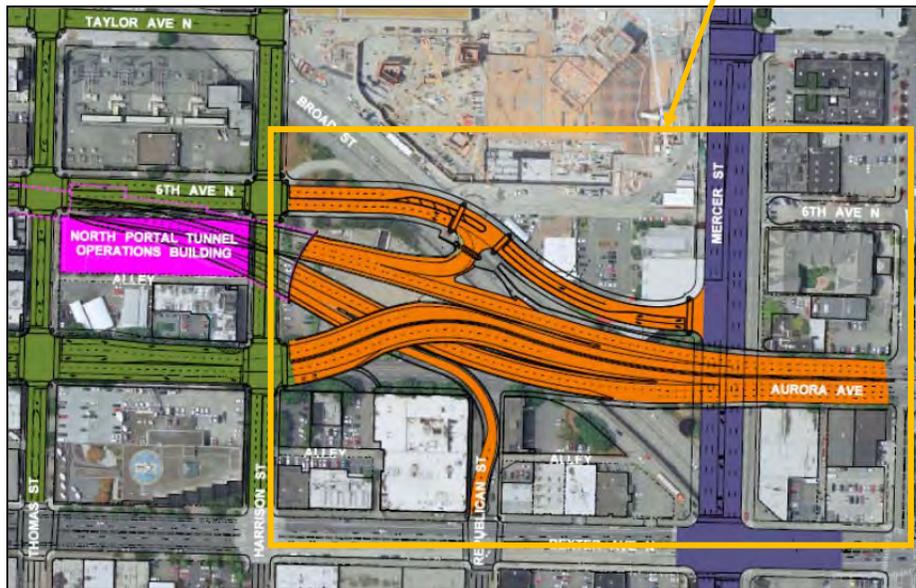
Note: Bored Tunnel Alignment indicated by green oval.

## North Access

This design-bid-build contract will construct the SR 99 mainline and ramps starting at the North Tunnel Portal area in the vicinity of Harrison Street, extending north to where it joins Aurora Avenue at Mercer Street. This contract includes on- and off-ramps in the vicinity of Republican Street that connect the mainline to the city streets, and an extension of Sixth Avenue from Harrison Street to Mercer Street. Other items of work include stormwater controls, an Intelligent Transportation System (ITS), signing, structures, retaining walls, traffic control and roadside restoration. The installation of the advance signing and ITS extends north of Mercer Street.

<sup>10</sup> During the writing of this report, the Washington State Office of Financial Management (OFM) is conducting an evaluation to determine the final proposed location of the primary Traffic Management Center. The study includes an evaluation of two locations at WSDOT's Northwest Region in Shoreline, Washington and Washington State's new Wheeler Building data center in Olympia, Washington. Recommended results will be available in late May or early June 2012.

**Figure 9: North End Concept**  
(including Tunnel Operations Building, North Portal, North Access and Mercer Street)



*Note: This image shows detail of orange box inset on above map.*

Utility conflicts not associated with the north tunnel operations building and north cut-and-cover activities will be incorporated into the North Access design and construction. Relocation of utilities will be funded by the City of Seattle or private utility providers.

The depressed-to-at-grade roadway extending north from the tunnel portal at Harrison Street to the existing alignment of Aurora Avenue North will comprise the bulk of the North Access contract. There will also be surface roadway modifications to work with the new on- and off-ramps leading to and from the tunnel that connects to Sixth Avenue and Republican Street, as well as the mainline merge with Aurora Avenue North.

At the north portal area, Sixth Avenue North will be extended from Harrison Street to Mercer Street. The new on-ramp to southbound SR 99 will intersect with the new Sixth Avenue North alignment midway between Harrison Street and Mercer Street. The new off-ramp from northbound SR 99 will connect to the intersection of Republican Street and Dexter Avenue.

Northbound on-ramps and southbound off-ramps to and from the intersection of Aurora Avenue and Harrison Street will also be constructed.

WSDOT continues to develop the project design. This contract is anticipated to be advertised in July 2013 and awarded in October 2013.

## North Surface Streets

This design-bid-build contract includes roadway work at the conclusion of the construction of the main roadway. This contract includes the reconstruction of Sixth Avenue and Harrison Street over the north portal cut-and-cover constructed as part of the Bored Tunnel. It will backfill the north portal of the Battery Street Tunnel; reconnect John, Thomas and Harrison Streets across Aurora Avenue North; make improvements to the Aurora Avenue surface street between Denny Way and Harrison Street; and complete minor restoration work, landscaping and sidewalks.

WSDOT continues to develop the project design. This contract is anticipated to be advertised in August 2015 and awarded October 2015. Figure 10 shows the current design concept.

**Figure 10: North Design Concept**



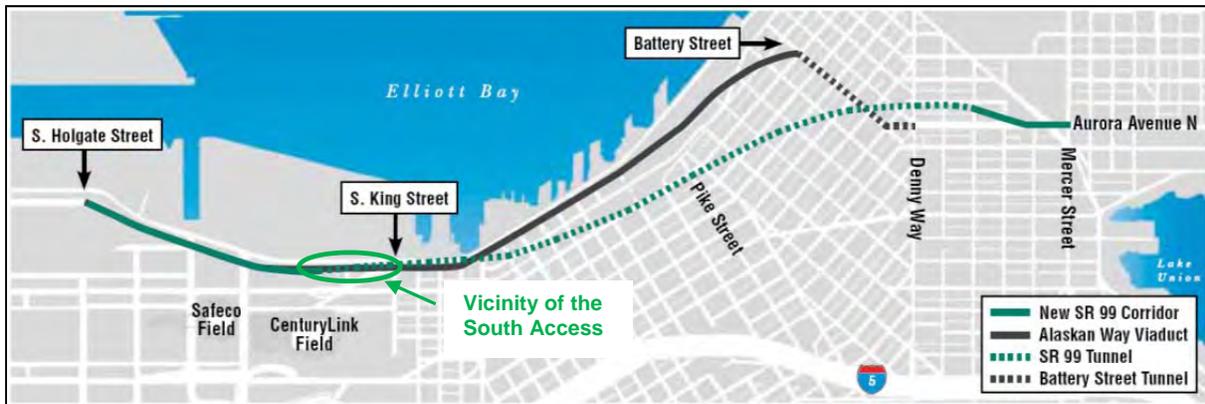
*Note: Partial North Access and Mercer Street are also shown.*

## South Access

This proposed design-bid-build contract provides the permanent connection of southbound SR 99 from the U-section of the bored tunnel on Alaskan Way in the vicinity of South Royal Brougham Way, to the Holgate to King Project, southerly of South Royal Brougham Way. The South Access contract will construct the southerly 300 feet of the southbound off-ramp to the

South Royal Brougham Way intersection. This contract will also construct the southbound on-ramp and the northbound off-ramp, which will include a bridge over the tunnel southbound off-ramp / northbound on-ramp construction. In Figure 11 below, the South Access contract starts around South Royal Brougham and ends at King Street South. Royal Brougham is just north of Safeco Field.<sup>11</sup>

Figure 11: South Access Area of the Replacement Project



This contract will remove the residual portions of the detour over the Washington-Oregon Shippers Cooperative Association (WOSCA) property not reconfigured and removed by the Bored Tunnel Design-Builder.

This contract includes the reconstruction of surface streets at both the Royal Brougham Way and Dearborn Street ramp terminals, and over the south portal cut-and-cover constructed by the Bored Tunnel Contractor. The surface street reconstruction includes Alaskan Way Boulevard, Dearborn Street, First Avenue South after the removal of the WOSCA detour structures and the East Frontage Road. This portion of the Replacement Project will construct the South Operations Building parking structure. It will also complete stormwater control, ITS, signing, structures, retaining walls, traffic control and roadside restoration.

WSDOT continues to develop the project design. This contract is anticipated to be advertised in January 2014 and awarded in April 2014. Figure 12 shows the current design concept.

<sup>11</sup> Safeco Field, located in South Seattle, is Washington’s professional baseball stadium for the Mariners.

Figure 12: South Access Design Concept



## Viaduct Demolition (Removal)

Demolition of the existing central and northern portions of the Alaskan Way Viaduct from just south of South King Street to the Battery Street Tunnel will start after the Bored Tunnel is open to traffic in late 2015. The removal process is anticipated to take nine months.

Viaduct Demolition will generate approximately 107,000 cubic yards of material, primarily broken concrete and reinforcing steel that would need to be hauled away and disposed. Utilities attached to the viaduct will be relocated before the viaduct is demolished. Utilities attached to the structure could be relocated underground, which will require excavation under the existing viaduct.

Most utilities buried beneath the viaduct are not expected to be affected by viaduct demolition or removal of the viaduct columns. Soil disturbances more than three feet below the existing grade have the potential to disturb deeper utilities. Mitigation measures, such as timber mats or gravel beds, would be used to ensure that utilities buried beneath the viaduct would not be damaged during viaduct demolition.

## Battery Street Tunnel Decommissioning

The Battery Street Tunnel connects the existing SR 99 / Aurora Boulevard in the north end of downtown Seattle to the existing Alaskan Way Viaduct.

The Battery Street Tunnel will be decommissioned and closed after the Bored Tunnel is open to traffic in late 2015. As part of the Battery Street Tunnel decommissioning process, the tunnel may require remediation to remove soot containing high levels of lead and to remove asbestos within the tunnel. Decommissioning will also include disconnecting power, water and drainage lines. The necessary utilities that run through the tunnel will be relocated, and materials such as lighting fixtures will be removed. Then the tunnel will be filled with suitable material (such as the concrete rubble from the viaduct demolition), and all street access vents and both portals will be sealed. The rubble will be solidified with a concrete mix. The Battery Street Tunnel portals will be sealed with concrete and or earth embankment.

Figure 13: Battery Street Tunnel



## Mercer Street West (City of Seattle Contract)

The entire Mercer West Project includes improvements on Mercer Street between Fifth Avenue North and Elliott Avenue West. The improvements include reconfiguring Mercer Street, west of Ninth Avenue North, to accommodate two-way traffic. Mercer Street will become a two-way street and will be widened from Ninth Avenue North to Fifth Avenue North. The rebuilt Mercer Street will have three lanes in each direction with left-hand turn pockets. Broad Street will be filled and closed between Ninth Avenue North and Taylor Avenue North.

The proposed project will improve access from SR 99 for drivers traveling to Uptown (Lower Queen Anne), Ballard, Interbay, and Magnolia neighborhoods. Although a piece of this component from Dexter to 5<sup>th</sup> Avenue is included in the WSDOT EIS for the Replacement Project, it will be entirely funded and administered by the City of Seattle as part of a larger package of surface street improvements by the City.

## Project Historical Timeline and Current Schedule

In response to several large earthquakes in other parts of the world, WSDOT began to study the viaduct in the mid-1990s. These studies showed that the 1950s-era viaduct was vulnerable to earthquakes and nearing the end of its useful life. In early 2001, a team of structural design and seismic experts began work to determine what to do about the viaduct. In the midst of this investigation, the 6.8-magnitude Nisqually earthquake shook the Puget Sound region on February 28, 2001. The viaduct was slightly damaged, forcing WSDOT to temporarily shut it down for repairs.

In 2002, conceptual engineering for the replacement of the viaduct began. Between 2002 and 2006, 176 alternatives were reduced down to a cut-and-cover tunnel and elevated structure alternative, however, neither of the two alternatives were accepted by the voters of Seattle as the correct solution to replace the viaduct. Ultimately, in 2009, a bored tunnel was selected as the

preferred alternative for the replacement of the Central Waterfront section as part of the Replacement Project.

Over a period of time, two Supplemental Draft Environmental Impact Statements (SDEISs) were released that studied the bored tunnel alternative. The Final Environmental Impact Statement was released in 2011. FHWA signed a Record of Decision (ROD) approving the project in August 2011. WSDOT executed a contract with Seattle Tunnel Partners (STP) to design and build the SR 99 tunnel, and directed the team to begin final design and construction shortly after the ROD. Seattle Tunnel Partners signed a contract with Hitachi Zosen on October 12, 2011 to design and build the tunnel boring machine (TBM). As of the writing of this report, construction of the TBM is underway and Hitachi Zosen's work is approximately 15 percent complete. The tunnel is scheduled to open to traffic in late 2015.

Figure 14 highlights important decisions and construction activity regarding the Bored Tunnel Design-Build Contract.

**Figure 14: Bored Tunnel Design-Build Contract Procurement Schedule**

Action	Dates Identified in the 2011 Initial Financial Plan	Updated Schedule for 2012	Notes
Request for Qualifications (RFQ) Issue Date	September 15, 2009	Same as 2011	---
RFQ Voluntary Meeting	October 7, 2009	Same as 2011	---
Statement of Qualifications (SOQ) Due Date Proposers	November 16, 2009	Same as 2011	---
Voluntary Proposers Meetings	March 1- September 15, 2010	Same as 2011	---
Issue Final Request for Proposals	May 26, 2010	Same as 2011	---
Alternative Technical Concept (ATC) Submittal Deadline	August 31, 2010	Same as 2011	---
Deadline for Submitting Proposer's Questions	September 15, 2010	Same as 2011	---
Deadline for WSDOT's Response to Proposer's Questions	September 30, 2010	Same as 2011	---
Proposals Date	October 28, 2010	Same as 2011	---
WSDOT Requests for Information (RFIs) to Proposers	November 12, 2010	Same as 2011	---
Proposer Presentations	November 15-19, 2010	Same as 2011	---
Announce Apparent Best Value Proposer	December 9, 2010	Same as 2011	---
Contract Award Date	January 6, 2011	December 20, 2010	Contract award was advanced
1 <sup>st</sup> Notice to Proceed (NTP 1) (start design-build contract, allowed planning and preliminary engineering only)(see Appendix U)	February 7, 2011	Same as 2011	---
FHWA Signed Record of Decision (ROD)	August 2011	August 22, 2011	ROD timing was finalized
2 <sup>nd</sup> Notice to Proceed (NTP 2) (Begin Construction)(see Appendix U)	August 17, 2011	August 23, 2011	2011 was anticipated date. NTP 2 was finalized
Tunnel Boring Machine Delivery	--	Spring 2013	Not available in 2011
Launch Tunnel Boring Machine	--	Summer 2013	Not available in 2011
South Approach Cut/Cover Complete	--	Fall 2014	Not available in 2011
Tunneling Complete	--	Winter 2014 – 2015	Not available in 2011
Tunnel Interior and Systems Complete	--	Fall 2015	Not available in 2011
Begin Battery Street Tunnel Decommissioning	--	Late 2015-early 2016	Not available in 2011
North Approach Cut/Cover Complete	--	Summer 2015	Not available in 2011
Substantial Completion	December 2015	December 29, 2015	More refined information
Facility Open to Traffic	January 2016	December 29, 2015	More refined information

Source: WSDOT AWV Program

## Federal NEPA Document and Decision Document

In compliance with the National Environmental Policy Act (NEPA), the Project filed a Notice of Intent (NOI) for studying the replacement in the Federal Register in July 2001. Preliminary engineering and the environmental process began soon after that time. The *Alaskan Way Viaduct and Seawall Replacement Project Draft Environmental Impact Statement* (Draft EIS) was signed by the lead agencies that included FHWA, WSDOT, and the City of Seattle in March 2004.

The environmental review process for the Bored Tunnel Alternative built on the five alternatives evaluated in the 2004 Draft EIS and cut-and-cover tunnel and elevated structure alternatives in the 2006 SDEIS. In June 2009, an updated NOI was published informing the public that an additional SDEIS would be prepared to evaluate the Bored Tunnel Alternative as a solution from the Partnership Process for replacing the viaduct along the Seattle waterfront.

The SDEIS for the Bored Tunnel Alternative was published for public review in October 2010. After publication and the opportunity for the public, agencies and tribes to comment on the 2010 SDEIS, FHWA, WSDOT and the City of Seattle prepared and published the Final EIS. After the Final EIS was published in July 2011, FHWA issued the ROD in August 2011, which is the NEPA decision document for the Replacement Project.

## Tolling

The Washington State Legislature has identified that tolling can “provide a source of transportation funding and to encourage effective use of the transportation system”.<sup>12</sup> In this dual role, it can be a means of revenue generation, it can be part of a facility-specific or regional demand management program, or it can be used for a combination of both. In the case of the Replacement Project, tolling would be implemented to both manage traffic and generate revenue.

On a typical tolling project, to optimize toll revenues, traffic diversion needs to be minimized. The SR 99 corridor has multiple parallel routes (city streets) in proximity of the facility that can serve as alternate routes for the tolled facility. Given the complexities and concerns with diversion and downtown Seattle traffic congestion, the State entered into an agreement with the City of Seattle (GCA 6486, Appendix Q) which included a provision to form the Advisory Committee on Tolling and Traffic Management (ACTT).<sup>13</sup> This Committee has been charged with three specific priorities which it will continue to explore through 2012:

1. Tolling the SR 99 Bored Tunnel
2. Minimizing traffic diversion due to tolling
3. Mitigating traffic diversion effects on city streets and Interstate 5

To view the complete language in the City of Seattle ACTT resolution, see Appendix S.

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<sup>12</sup> 47.56.805 RCW, Title 47 RCW page 195 discussing “Toll Facilities Created After July 1, 2008.”

<sup>13</sup> Formation of the ACTT was identified in the EIS and as a City of Seattle Resolution (Appendix S).

In the 2012 Washington State legislative session, which occurred between the Initial Financial Plan and this update, the Washington State Legislature enacted tolling authorization of the Bored Tunnel.<sup>14</sup> Toll authorization is an important step toward meeting the financial commitments of the federal financial plan. In a future legislative session WSDOT intends to seek the authority to sell bonds backed by these tolls. Bonding authority represents the final authority required to secure toll financing for this project.

In preparation for the 2012 Washington State Legislative session, and in consideration of an October 2011 bond sale for a nearby toll facility, this program revisited some of the key assumptions that supported the original estimate of \$400 million in toll bond funding. In order of significance, these updated assumptions were:

- New driver value of time estimates based on 2011 economic surveys;
- Removing the assumption that toll rates would escalate at 2.5 percent per year; and
- Updated population and employment forecasts.

Informed by these changed assumptions the AWV Program revised its goal for project funding from tolling to \$200 million. In preparation for toll bond authorization and in conjunction with on-going recommendations from the ACTT, the AWV Program will analyze several tolling scenarios during the summer and fall of 2012. As stated above, the goal of these scenarios is to find solutions that balance the \$200 million funding assumption with the diversionary impacts of tolling a facility located in a major metropolitan area. For more on toll funding please refer to the section in chapter six on toll funding.

## Transportation Improvement Program (TIP/STIP) and Regional Transportation Plan

Project approval in the Regional TIP by the Puget Sound Regional Council (PSRC) was one of the approvals previously needed to move forward toward construction authorization for the Replacement Project in 2011. The Replacement Project was included in the Metropolitan Transportation Plan (Transportation 2040) on June 23, 2011 (Appendix M). It was administratively updated in the TIP and STIP in July 2011, with the ROD issued in August 2011.

## Public Outreach and Involvement

To gain input and to keep interested parties up to date with project development, the WSDOT project team developed and implemented a comprehensive, ongoing public involvement program at the onset of the decision-making and environmental analysis process. The public involvement effort identified specific goals and activities for outreach to the general public and elected officials, and incorporated outreach to minority and low-income populations. Public involvement is an ongoing effort that will continue throughout the life of the Project.

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<sup>14</sup> Substitute Senate Bill 6444, Chapter 83, Laws for 2012, Appendix T.

WSDOT received comments from the public through a range of outreach activities and tools that encourage public participation, including the following:

- Community, agency, and neighborhood briefings
- Multi-agency traffic coordination meetings
- Stakeholder groups
- Door-to-door outreach to business and project neighbors
- Project and overall Program websites
- Handouts and brochures in multiple languages
- Informational posters and signage
- Informational displays and booths at community fairs and festivals
- Electronic newsletters
- Social media, such as blogs and Twitter
- Media outreach
- Public meetings
- Briefings to local organizations, such as business, labor, and environmental groups

These tools were used most extensively leading up to a week-long closure of SR 99 in October 2011 to begin demolition of the viaduct's south end and implement a construction bypass. The communications team led an intensive effort to inform the public about the closure and its anticipated impacts to traffic in the area. More than 200 neighborhood groups, social service providers and businesses were contacted, two public meetings were held, and new materials and a simulated drive-through of the bypass were created. During the closure, the project team also held daily briefings for media outlets to spread the word about traffic conditions and the progress of bypass construction.

Demolition of the viaduct's south end heralded an historic milestone. The program team used the week-long closure as an opportunity to engage the public in a celebration of the viaduct replacement's progress, with a public walk on the remaining viaduct as demolition progressed and a contest offering a once-in-a-lifetime viaduct memory. Approximately 3,200 people took part in the walk on October 22, 2011, which included remarks by Governor Christine Gregoire and state and local elected officials. There were nearly 600 submitted entries for the contest. The two contest winners – Rat City Rollergirls (a female roller derby team) and motorcycle team Seattle Cossacks – helped kick-off the demolition event by speed skating and performing stunts on the viaduct.

Input from agencies and the public play an important role in the decision-making and evaluation process for this Project. It influenced the Project's scope, design choices and range of alternatives that were advanced for further study in the environmental review process.

WSDOT will provide future public involvement opportunities as the project moves into construction. WSDOT will maintain the Project website and hotline to enable the public to easily get the most current information about the status of the project. Individuals can also sign up on the website for e-mail updates. The public can continue to submit comments and questions to

WSDOT via the project hotline, e-mail or mail. WSDOT will continue to inform the public about employment opportunities and construction activities through outreach activities such as community open houses. WSDOT will continue to respond to public questions, concerns and information requests for the duration of the Project.

In December 2011, as part of the Replacement Project, WSDOT opened an information center in Pioneer Square, just north of the Holgate to King Project called “Milepost 31.” This center focuses on the Replacement Project and the history of transportation in Pioneer Square, and also provides an opportunity for the public to connect with WSDOT staff and to ask questions about the project construction, traffic impacts, transportation in and around Pioneer Square and related topics.

These and other methods have enabled the project team to reach thousands of users of the SR 99 corridor, as well as businesses and residents impacted by the project. Public involvement and outreach will continue to be emphasized as the project moves forward. The public will continue to be invited to celebrate project milestones, receive frequent construction updates, and provide feedback that will be used to help WSDOT and its partners keep people and goods moving during construction.

## Transportation Demand Management (TDM) / Transit

The Replacement Project is anticipated to have a considerable effect on local roadway traffic in King County and WSDOT has developed a specific TDM plan for the area under the Moving Forward Program utilizing Active Traffic Management on Interstate 5 (I-5) in the Downtown Seattle vicinity. WSDOT, King County Metro, and the Seattle Department of Transportation (SDOT) are working together to keep traffic and freight moving during construction of the Alaskan Way Viaduct replacement. Several Intelligent Transportation System (ITS) projects around the city will provide real time traffic information to drivers. Drivers will see benefits from new traffic cameras and overhead electronic message signs when backups and incidents occur along SR 99 and I-5.

With the tolled Bored Tunnel, the Columbia and Seneca Street ramps on SR 99 would be removed, and all transit vehicles currently operating on SR 99 would need to exit and enter SR 99 in the stadium area. This change in transit service coverage would increase the number of buses traveling through south downtown Seattle by approximately 520 buses per day. Northbound buses traveling on SR 99 from West Seattle and South King County would instead use the new ramps located in the stadium area, and then travel on arterials in Pioneer Square to Third and Fourth Avenues to access downtown Seattle.

While added transit travel time would be incurred with the new stadium area ramps, transit vehicles traveling on SR 99 to the south end of downtown Seattle would have improved access to locations in SODO, Pioneer Square and other locations.<sup>15</sup> These markets traditionally have had transit access only via local streets.

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<sup>15</sup> SODO and Pioneer Square are City of Seattle neighborhoods affected by south end construction projects of the AWV Program.

A measurable shift to transit by users avoiding tolls on SR 99 is not expected. Both transit users and general-purpose travel would experience higher travel times but not necessarily in equal amounts. However, any resulting variations in travel times would not result in measurable shifts from general-purpose travel to transit. Also, since transit service is oriented to users traveling to and from downtown, no transit service is expected to operate in the bored tunnel.

## Relationship of Financial Plan to Program/Project Management Plan

Program/project management plans (PMPs) and financial plans have some overlapping areas of interest. Both plan types describe timing, anticipated risk, and estimated costs. However, PMPs have a greater focus on project scope and schedule, while financial plans have a greater focus on balancing project funding/budget and cash flows. Also, PMPs are updated when needed for a project, whereas financial plans are updated annually.

In relation to the Replacement Project, in December 2010 WSDOT developed a “program” management plan based on Washington State and FHWA guidelines for major projects that described the entire AWV corridor. The Replacement Project was covered by several major sections of that PMP. At that time WSDOT determined that the AWV PMP and the Replacement Project Financial Plan was consistent and compatible.

Since the award of the Bored Tunnel Design-Build Contract the Replacement Program has focused its attention primarily on construction and has not yet updated the PMP.

## 4. Implementation Plan

This section is a summary of the information provided in the Project Management Plan and discusses how WSDOT will deliver the \$2.034 billion Central Waterfront as a component of the Replacement Project. The following topics were discussed:

- WSDOT Directives
- Project Delivery Methodology for the Alaskan Way Viaduct Replacement (applicable to the Central Waterfront)
- Pre-Construction Requirements (Environmental, Right-of-Way, Regional Transportation Planning)
- FHWA Annual Update Schedule and Project Management Plan Guidance Consistency

This section does not provide detail on the implementation plan for the Mercer West, Battery Street Decommissioning, or Viaduct Demolition components of the Replacement Project because the planning is still underway<sup>16</sup> and the work occurs in later years of the project. WSDOT will provide greater detail on these three components in future annual updates.

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<sup>16</sup> Planning and implementation of the Mercer West project is the responsibility of the City of Seattle, of which the Dexter to 5<sup>th</sup> Avenue portion is described in the WSDOT FEIS.

## Management Tools to Monitor and Manage Risk

On July 1, 2008 (and reconfirmed in 2010), the Washington State Secretary of Transportation issued Executive Orders 1032.01 and 1042.00 (Appendices E and F, respectively). In addition to the Executive Orders, Instructional Letter IL4071.01 (Appendix G) provides guidance for developing risk-based estimating and how to manage risk reserves. These executive orders provide guidance to project offices on managing projects and using Project Management and Reporting Systems (PMRS). The PMRS includes the project Electronic Content Management (ECM) system to manage and report the status of transportation projects. The PMRS integrates schedule, contract management, ECM, cost control/earned value, and cost estimating with existing WSDOT legacy systems to better support management and delivery of capital projects.

Currently, the AWV Program Office uses Primavera Scheduler (contract and schedule management), PRISM (earned value/cost control) and tracking workbooks with bottom-up cost estimates. The Bored Tunnel Design-Builder provides price-loaded schedules. An analysis of those schedules is being used as the basis for progress payments to the design-builder.

## Project Delivery Methodology for the Alaskan Way Viaduct Replacement

### WSDOT Delivery Methods<sup>17</sup>

WSDOT traditionally uses the design-bid-build method of delivering transportation improvement projects when development and project construction timing is less constrained. Design-bid-build entails completing all of the design and right of way procurement before a construction project is advertised for bid. However, projects that are complex, with more constrained timeframes, are evaluated for the best method to deliver a successful project, considering both design-bid-build and design-build. WSDOT chose the design-build method for the largest component of the Replacement Project (the bored tunnel).

The key benefits for employing the design-build methodology include:

- Increasing the speed of delivering the project, and
- Capturing innovative design approaches to complex construction involving the bored tunnel.

For additional detail, the design-build process is described in WSDOT's *Guidebook for Design-Build Highway Project Development*:

[http://www.wsdot.wa.gov/NR/rdonlyres/46196EB8-F9D0-4290-8F55-68786B1DA556/0/DesignBuild\\_GuidebookJun2004.pdf](http://www.wsdot.wa.gov/NR/rdonlyres/46196EB8-F9D0-4290-8F55-68786B1DA556/0/DesignBuild_GuidebookJun2004.pdf)

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<sup>17</sup> For additional background on design-build and design-bid-build methodologies, see Appendices N and O, respectively.

In design-build methodology, WSDOT focuses on describing performance rather than on how to obtain that performance. WSDOT identifies a conceptual plan and completes the preliminary design. This conceptual plan is put out for development of a design-build proposal. Each design-build team value engineers the preliminary plan and develops a cost estimate for their proposal. Each proposal reflects the product that the design-builder intends to deliver to meet WSDOT's objectives. WSDOT then chooses the design-builder with the best combination of elements, technical proposal, and price.

The contract is a single contract between WSDOT and the design-builder for design and construction services to provide a finished product. The design-builder completes the design, with WSDOT involvement in the design process. Because each bidder will have a different design proposal to address the identified project need, the Initial Financial Plan in 2011 did not discuss the cost of specific design components.

After selection of a design-builder and execution of the contract, WSDOT performs administrative functions and the design-builder performs design, construction, quality control (QC), and quality assurance (QA) functions. WSDOT's quality verification (QV) role during contract execution assures that the products being developed by the design-builder are in conformance with the contract requirements.

The QC/QA Program is a critical component of the design and construction of the Project. The focus of WSDOT's quality assurance program is on product compliance with contract documents, verification of the design-builder's quality control measures, and meeting Federal quality requirements. Quality assurance activities focus on monitoring contract execution with respect to a negotiated Quality Control Plan. WSDOT provides the quality verification and independent testing. The Contract Provisions require that the QC/QA Program submitted with the proposal be brought into conformance prior to execution of the contract.

## Project-Specific Delivery Methods

The project delivery methods applied to the Replacement Project include the one large Bored Tunnel Design-Build and the anticipated six smaller design-bid-build contracts. Refer to Appendices N and O for more information on design-build and design-bid-build methodologies.

By employing a design-build contract on the Bored Tunnel, the effort will benefit by:

- Relying on the contractor for innovation that could lead to a cost and time savings
- Experienced design-builders can handle more complex projects, which leads to better management of risks associated with Bored Tunnel construction

## Pre-Construction Requirements

The Replacement Project is defined as a mega project due to its size and cost to replace it. Before any construction can begin, the Federal NEPA process must be signed off by the FHWA. A

project must also acquire the impacted right of way before construction can occur. A project also has to meet regional transportation guidelines before construction funding can be approved for use. In 2011, WSDOT acquired both NEPA and right of way plan approvals prior to starting construction.

## **Environmental Process and History**

The environmental process for the replacement of the Alaskan Way Viaduct began in early 2001 after the Nisqually Earthquake damaged the aging structure. Over the next six years several alternatives were studied to replace the viaduct. During that period, the replacement of the entire Alaskan Way corridor was analyzed as one project in a draft EIS and one SDEIS. As the alternatives were narrowed down to two—a Cut-and-Cover Tunnel and Elevated Structure—the citizens of Seattle voted in early 2007 to select a preferred alternative. The vote by the citizens was no for both alternatives. As a result of the vote, the Governor, Mayor, and King County Executive unveiled the “Moving Forward Projects.” These projects could keep advancing the replacement of the southern mile of the viaduct, while the central waterfront section that is now part of the Replacement Project underwent further study.

The environmental process for the Central Waterfront component of the Replacement Project continued and changed in January 2009 when the Governor, Mayor, and King County Council Executive recommended the replacement of the Central Waterfront viaduct section with a bored tunnel.

The 2010 SDEIS identified the Bored Tunnel Alternative as the preferred alternative but did not state whether or not it would operate with tolls. Potential effects of the Bored Tunnel Alternative were compared to the updated Cut-and-Cover Tunnel and Elevated Structure Alternatives. Although the 2011 FEIS identified the Tolloed Bored Tunnel Alternative as the preferred alternative, potential effects of the Tolloed Cut-and-Cover Tunnel and Tolloed Elevated Structure Alternatives were also analyzed. Seattle Tunnel Partners continued working on the preliminary design effort from late January 2011 until the ROD was issued in August 2011. Construction began after the ROD was issued by FHWA. The timeline for the environmental approvals achieved is listed below:

- Publication of the 2010 SDEIS in October 2010
- Publication of the 2011 FEIS in July 2011
- Publication of the ROD in August 2011

## **Environmental Approvals (Permits, Approvals and Consultations)**

The AWW Program has obtained a significant number of permits, approvals, and consultations for this project. Please see Appendix V for a detailed listing.

## Right of Way

WSDOT is responsible for completing the purchase of needed properties for the Replacement Project. Major right of way (ROW) acquisition was completed in the south end of the project area as part of the S. Holgate Street to S. King Street Project. Property acquisition activities are underway for the design-build SR 99 S. King Street Vicinity to Roy Street – Central Waterfront Viaduct Replacement (Bored Tunnel) project. The acquisition schedule is divided into four ROW certification dates. Additional ROW certifications have been established for the North Access and South Access design-bid-build contracts. Figure 15 indicates the construction stage for each certification date.

**Figure 15: Right of Way Certification Schedule**

ROW Certification Phase <sup>(1)</sup>	Project Component Covered by Certification	Description	Estimated Date
1	Bored Tunnel	Terminal 46 temporary tieback easement; two staging area leases	08/31/12
2	Bored Tunnel	Tunnel Settlement Mitigation; 11 Temporary Easements	06/30/12
3	North Portal	Three full acquisitions of temporary access and tie-back easements	06/30/12 <sup>1</sup>
4	Bored Tunnel	55 Subsurface parcels	10/31/12
6	North Access	Three partial/full acquisitions; Limited Access rights from seven parcels	06/28/13
7	South Access	One partial acquisition	12/31/13

Source: WSDOT Real Estate Services office

Figure Note:

(1) ROW Certification Phase No. 5 was reserved but not used, and therefore, has been omitted from this table.

## 5. Current Cost Estimate

This section of the report outlines the Replacement Project cost estimate and the process for developing estimates. The sections that are discussed are:

- Project Costs
- WSDOT Cost Development and Risk Assessment
- Construction Cost Inflation Factors/Escalation
- Operating Period Costs (Bored Tunnel)
- Cost Estimate by Construction Segment

## Project Costs

The Replacement Project is anticipated to cost \$2.184 billion (\$2.034 billion for the Central Waterfront and \$150 million additional components in the Replacement Project EIS (see notes below). A summary of the Replacement Project cost estimate is shown in Figure 16. Additional subsections provide detail on the estimated costs broken out by phase, state biennia and fiscal years, as well as by construction contract. First, however, is a description of WSDOT's methodology for developing costs and risks as background on how WSDOT developed its cost estimate.

**Figure 16: Replacement Project Summary Costs**  
(\$ in millions, year of expenditure)

Expenditure Component	FHWA Financial Plan Estimates		Variance	Spent to Date <sup>(1)</sup>	% of 2012 Estimate	Notes
	2011	2012				
Preliminary Engineering	146.8	135.7	-11.1	124.0	91%	Realized savings in Bored Tunnel PE
Right of Way	126.9	136.0	+9.1	92.2	68%	Increase in parcel acquisition costs
Construction	1,737.0	1,762.6	+25.6	214.0	12%	Detail below
<i>Bored Tunnel</i>	1,633.5	1,656.2	+22.7	214.0	13%	<i>Recalculation in sales tax (\$18.5 M) &amp; Construction Engineering (~\$4 M)</i>
<i>North &amp; South Access, North Surface Streets</i>	103.5	102.5	-1.0	--	0%	<i>Contracts still under design</i>
<i>Yesler Street Widening<sup>(2)</sup></i>	--	0.8	+0.8	--	0%	<i>\$0.8 M Yesler St. widening contract</i>
<i>Management Reserve</i>	--	3.1	+3.1	--	0%	<i>\$3.1 M set aside from other projects.</i>
<b>Central Waterfront Subtotal</b>	<b>2,010.7</b>	<b>2,034.3</b>	<b>+23.6</b>	<b>430.2</b>	<b>21%</b>	
Viaduct Removal & Battery Street Tunnel Decommission <sup>(3)</sup>	50.0	50.0	--	--	0%	No significant changes
Mercer St. West (City of Seattle) <sup>(4)</sup>	100.0	100.0	--	--	0%	See figure note 4 below.
<b>Alaskan Way Viaduct Replacement Project Total</b>	<b>2,160.7</b>	<b>2,184.3</b>	<b>+23.6</b>	<b>430.2</b>	<b>20%</b>	

Source: 2011 = WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN; 2012 = WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN

Figure Notes:

- (1) Expenditures through February 29, 2012
- (2) New contract in 2011 to widen Alaskan Way to accommodate ferry traffic from Colman Dock through construction of the bored tunnel.
- (3) Viaduct Demolition and Battery Street Tunnel decommissioning are a subset of the \$290 million Surface Street Restoration effort. The figures shown here continue to be preliminary estimates that will be refined in subsequent financial plans.
- (4) The Mercer Street West component, work to be paid for and performed by the City of Seattle, has been included in this report because a piece of it from Dexter to 5<sup>th</sup> Avenue it is also cleared by WSDOT's final EIS. Although it is not reflected in this figure, in late spring 2012 the City of Seattle updated their overall Mercer Street West cost estimate downward from \$100 million to \$98 million. This updated amount will be discussed in the Second Annual Update.

## WSDOT Cost Development and Risk Assessment

The AWV Project followed the standard WSDOT design and construction procedures for all modes of project delivery, whether the Project is a design-build project or a traditional design-bid-build project. WSDOT conducts Value Engineering (VE) studies at appropriate stages of

design, as required by the FHWA, and incorporates the results of those studies in the design process. To lower risk for design choices and project costs, WSDOT employs a process called Cost Estimate Validation Process<sup>®</sup> (CEVP<sup>®</sup>) as part of its program and project level cost risk assessment. This process is identified in WSDOT project management and cost risk documents included as Appendices B through G.

WSDOT has conducted CEVP<sup>®</sup>, Cost Risk Assessment (CRA) and VE studies to document cost estimates for the AWV Program. The Bored Tunnel efforts have undergone these types of workshops in the past to estimate costs. Since the contract has been awarded, no further risk studies are planned for the Bored Tunnel. However, project components two through six will continue to undergo supplemental CRA evaluation through their design phases. Project component seven (Mercer West) is the responsibility of the City of Seattle.

## Construction Cost Inflation Factors / Escalation

### Background and History

Cost estimates for highway capital projects are developed based on current prices from recent bidding experience. This approach is used to estimate the various elements of the project. The project estimate is the sum of these individual elements or work items. The cost estimates are entered into the Capital Program Management System (CPMS) in current year dollars to support development of the capital budget. CPMS calculates year of expenditure dollars by applying inflation forecast assumptions to the estimates based on the project delivery schedule. The Replacement Project forecast is not inflated by CPMS, but instead went through the process listed below in the subsection for escalation. All forecasts are assumed to be year of expenditure values.

WSDOT's estimate basis for inflation rates are:

- Engineering (design) phase – Global Insight forecast for engineering, architectural, and surveying salaries;
- Right of Way phase – Economy.com's forecast of the Federal Housing and Finance Administration housing price index for the state of Washington; and
- Construction phase - Global Insight Forecast of the Construction Cost Index. Though once a contract is awarded, construction inflation is typically halted, with costs tied to the contract award amount.

Escalation for the Replacement Project used the following method:

The Escalation Input Assumptions were based upon WSDOT-mandated inflation tables in effect at the time of the CEVP<sup>®</sup>. These tables are based upon the cost indices in effect for preliminary engineering, right of way and construction phases and are then applied to the base estimates and risks developed for each of these phases in order to provide a year-of-expenditure (YOE) forecast. This risk-based estimating process then provides WSDOT a range of probability (from 10 percent to 90 percent) of costs. For contracts over \$10 million, it is WSDOT policy to use the 60<sup>th</sup> percentile as the high end of the probability range (Appendix G).

## Operating Period Costs

As a tolled section of roadway, once completed, the Replacement Project will be operated and maintained by WSDOT's standard processes and budget with funding coming from gross toll revenues. WSDOT takes full responsibility for the ownership, operation, and maintenance of the facility. The overall WSDOT budget, which includes provisions for operational and maintenance activities, is enacted biennially by the state legislature and the Governor. Interim year supplemental budgets may also be enacted. Per the *SR 99 Alaskan Way Viaduct Replacement updated Cost and Tolling Summary Report* (Appendix I), the tunnel annual operation and maintenance costs continue to be estimated at \$5 million.

## Cost Estimate by Construction Segment

The Replacement Project cost estimate information is detailed in this section. The \$2.034 billion cost to replace the Central Waterfront portion of the Replacement Project was established by holding CEVP<sup>®</sup> and Value Engineering (VE) workshops that focused on the Holgate to King Project and the Bored Tunnel section of the corridor. The workshops that were held in late October 2009 validated the cost estimates at that time. Since then there have been minor cost increases to additional scope and sales tax calculations. Since then, the team has worked on refining the cost estimates for both of the Holgate to King and Bored Tunnel efforts. Detailed estimates for the Holgate to King Project can be found in the 2011 Finance Plan update that was submitted to FHWA in January 2012. Figure 17 shows the \$2.034 billion Central Waterfront work by phase and section, as well as the full \$2.184 billion estimate that includes Viaduct Removal, Battery Street Decommissioning and Mercer Street West components.

**Figure 17: Replacement Project Summary Cost Estimate by Segment**  
(\$ in millions, year of expenditure)

Phase / Component	Report	State Biennia					Amount
		Prior	2009-11	2011-13	2013-15	2015-17	
Preliminary Engineering	2011	23.7	107.3	15.1	0.7	--	146.8
	2012	23.7	98.4	9.7	3.9	--	135.7
Right of Way	2011	14.4	77.4	35.1	--	--	126.9
	2012	14.4	73.0	48.6	--	--	<sup>(4)</sup> 136.0
Construction	2011	--	110.0	696.0	795.0	136.0	1,737.0
	2012	--	89.3	700.8	776.9	195.5	<sup>(3)</sup> 1,762.5
Bored Tunnel	2011	--	110.0	696.0	707.0	120.5	1,633.5
	2012	--	89.3	699.8	701.6	165.5	<sup>(4)</sup> 1,656.2
North & South Access, North Surface Streets	2011	--	--	--	88.0	15.5	103.5
	2012	--	--	--	72.4	30.1	102.5
Yesler St. Widening	2011	--	--	--	--	--	--
	2012	--	--	0.8	--	--	0.8
Management Reserve	2011	--	--	--	--	--	--
	2012	--	--	0.2	2.9	--	3.1
Central Waterfront, Subtotal	2011	38.1	294.8	746.1	795.8	136.0	2,010.7
	2012	38.1	260.7	<sup>(3)</sup> 759.0	780.9	195.6	2,034.3
Viaduct Removal & Battery Street Tunnel Decommission <sup>(1)</sup>	2011	--	--	--	--	50.0	50.0
	2012	--	--	--	--	50.0	50.0
Mercer Street West (City of Seattle) <sup>(2)</sup>	2011	--	--	--	--	100.0	100.0
	2012	--	--	--	--	100.0	100.0
AWV Replacement Project Total	2011	38.1	294.8	746.1	795.8	286.0	2,160.7
	2012	38.1	260.7	<sup>(3)</sup> 759.0	780.9	345.6	2,184.3

Source: WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN and WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN

*Figure Notes:*

- (1) Viaduct Demolition and Battery Street Tunnel decommissioning are a subset of the \$290 million Surface Street Restoration effort. The figures shown here are preliminary estimates that will be refined in subsequent financial plans.
- (2) The Mercer Street West component, work to be paid for and performed by the City of Seattle, has been included in this report because a piece of it from Dexter to 5<sup>th</sup> Avenue it is also cleared by WSDOT's final EIS. Although it is not reflected in this figure, in late spring 2012 the City of Seattle updated their overall Mercer Street West cost estimate downward from \$100 million to \$98 million. This updated amount will be discussed in the Second Annual Update.
- (3) Rounding error between vertical and horizontal summations.
- (4) Cross-reference Figure 22, Note 2: WSDOT plans to reallocate \$21.8 million of unallocated risk held in the Bored Tunnel category to right of way because right of way increased from \$136 million to \$157.8 million due to updated real estate procurement costs. Changes in this category will also be included in the Second Annual Update because this change is outside of the data snapshot timing for this First Annual Update.

## Estimate by Major Project Element

The cost estimate information used in this report is the basis for the development of the 2012 Legislative Supplemental Budget. The total estimated cost to complete the Central Waterfront is \$2.034 billion, plus an additional \$150 million for the remaining components covered in the EIS.

The \$2.034 billion estimate is broken down into major project elements. A project element is a category of work which will be conducted on some or all of the segments (i.e., design, construction, etc.).

Figure 17 summarizes the Replacement Project costs aggregated together by project phase and biennium. This data is based on cost estimates developed for the recently passed transportation budget referred to as 12LEGFIN (Appendix L).

## Bored Tunnel Design-Build Contract

The bored tunnel segment includes the following major construction elements:

- Bored Tunnel, Cut/Cover Tunnels, Portal Buildings, Tunnel Boring Machine (TBM), and Tunnel Systems
- Site Preparations for the North and South Access
- Intelligent Transportation System (ITS) Integration Contract
- Miscellaneous Contracts (Landscaping and Utility Support)
- Relocation of utilities that are impacted by tunnel construction
- Construct tolling infrastructure

The following table, Figure 18, shows the Bored Tunnel design-build contract cost estimate comparison between the initial *FHWA Alaskan Way Viaduct Project Finance Plan* dated August 2011 and the cost estimate for this update. The changes include minor change orders and recalculations of sales tax, construction engineering and contingencies.

**Figure 18: Bored Tunnel Contract Construction Phase Engineering Cost Estimate**  
(\$ in millions, year of expenditure)

Items	2011 Ebase Init. Fin Plan	2011 Budget Estim. <sup>(2)</sup>	2012 Budget Estim.
<b>Construction Contract</b>	<b>1,089.7</b>	<b>1,089.7</b>	<b>1,090.5</b>
Sales Tax	36.0	20.0	38.5
Construction Engineering	50.5	50.5	54.7
Contingencies <sup>(1)</sup>	189.3	205.3	204.5
Bidder Stipend Payments	8.0	8.0	8.0
South U-Section	50.0	50.0	50.0
Escalation Fund	110.0	110.0	110.0
Bond and Insurance Allowance	100.0	100.0	100.0
<b>Total Construction Phase, Bored Tunnel Contract</b>	<b>1,633.5</b>	<b>1,633.5</b>	<b>1,656.2</b>

Source: 2011 = Ebase Construction Estimate, version 1. January 2011. 2012 = WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN.

*Figure Notes:*

(1) See Figure 22 in Section 8 for more detail on contingency and risk items.

(2) This column was added to this First Annual Update to provide a cross-walk in assumptions related to sales tax and contingency budgeting. Also please see the note in Figure 16, line 4 for the Bored Tunnel.

## North Access, South Access, and North Surface Streets Design-Bid-Build Contracts

The North Access segment includes the following major construction:

- North SR 99 Mainline and on-/off-ramps
- Extension of Sixth Avenue from Harrison Street to Mercer Street

The North Surface Streets segment includes the following major construction:

- Reconstruction of surface streets over the north portal cut-and-cover tunnel
- Backfill the north portal of the Battery Street Tunnel
- City Surface Streets improvements between Denny Way and Harrison Street

The South Access segment includes the following major construction:

- Provide Permanent Southern connection from the cut-and-cover tunnel provided by the Bored Tunnel segment to the Holgate to King Project at Royal Brougham Way
- Reconstruction of surface streets over the south portal cut-and-cover tunnel.

Combined, these contracts are anticipated to cost approximately \$102.5 million. The scope of work for these contracts is not fully developed, and therefore, detailed construction phase estimates are not available at this time. The detailed estimates will be included in future Replacement Project Financial Plan Annual Updates when they are available.

## 6. Project Funding, Revenues and Financing

The Replacement Project will rely on a variety of fund sources from state, federal and local participants. State-secured funding comes mainly from State motor vehicle gas tax and toll funds.

### State Funding — Transportation Partnership Account and Nickel funds

The Transportation Partnership Act (TPA) was a state funding package passed by the Washington State Legislature in 2005 to help finance specific projects and created the TPA. The account is primarily funded by a 9 ½ cent motor fuel tax with a minor amount coming from other vehicle-related fees. The TPA provides the majority of the state funding for the Replacement Project in the amount of \$1.135 billion.

In 2003 the Washington State Legislature authorized a 5 cent gas tax increase (Nickel) to help finance specific projects, including a minor amount coming from other vehicle-related fees. The Nickel provides \$112.6 million in funding for the Replacement Project.

Other State funding sources that are financing the Replacement Project come from the Multi-Modal Account and the Motor Vehicle Account. These amounts are \$103.1 million and \$34.7 million, respectively.

## Toll and Bond Authorization

### Toll Authorization - State

In early 2012 the Washington State Legislature authorized tolling on the tunnel that replaces SR 99. A copy of this law is available in Appendix T.

### Toll Authorization - Federal

On June 1, 2011, WSDOT provided FHWA with an expression of interest and draft toll agreement requesting FHWA authorization of tolling on SR 99 in downtown Seattle. That request was approved by FHWA in August 2011 (Appendix J).

### Bond Authorization

Authorization to generate construction funding secured by future toll revenue requires bonding authority from the Washington State Legislature. WSDOT does not anticipate the need for toll-backed bonds until late in the construction schedule, around calendar year 2015, and tolling will not start until 2016. Therefore, the final investment grade studies to support bond issuance will not be developed until closer to the time when funding will be required.<sup>18</sup>

The 2012 Washington State Legislative budget assumes that the Replacement Project is supported with an estimated \$200 million in toll funding. The risk for not receiving legislative bond authorization appears low since the legislature provided earlier direction in ESSB 5768<sup>19</sup> and the legislature more recently passed toll authority. However, if the authority to sell bonds paid by toll revenue is not granted, WSDOT will work with the legislature to find alternative sources of funding. Options may include a mix of the following: reducing or deferring other WSDOT projects within the state, pursuing other federal programs, revising use of other funding from the Port of Seattle or local sources, or using the capacity within WSDOT's federal program.

## Federal Funding

The state plans to use six different types of federal funding on the Replacement Project:

1. \$144 million of National Highway System funds
2. \$120 million in Federal bridge funds
3. \$ 77 million in Surface Transportation Program funds

<sup>18</sup> In addition, Washington State develops budgets on a two-year cycle approved by the legislature. Bond authority is typically granted during the same session that the budget is passed for the biennium when bonds will be sold.

<sup>19</sup> ESSB 5768, Chapter 458, Laws of 2009, for full text see Appendix R.

4. \$ 45 million in Emergency Relief funds
5. \$ 8 million in High Priority Program funds
6. \$ 4 million in Project of National and Regional Significance funds

Based on WSDOT's current budget and estimates, the Replacement Project expects to use approximately \$400 million of the corridor's federal funds for final design, right of way acquisition and construction. The Federal-Aid Highway Program is a reimbursable program with reimbursements processed through the Washington State Motor Vehicle fund. Total Federal funding for this project was \$229 million in the Initial Financial Plan. Most of the increase in federal funding can be attributed to an early recognition of the decreased funding capacity of tolls on this facility. WSDOT was able to add more federal funds to this program because:

1. Actual funding received has exceeded WSDOT's forecast;
2. Redistributed federal obligation authority WSDOT received was in addition to a larger than forecasted federal program; and
3. De-obligations from favorable bids, updated estimates, federal aid agreement adjustments and project closeouts added to WSDOT's capacity.

The Replacement Project did not receive any federal stimulus funding from the American Recovery and Reinvestment Act of 2009 (ARRA).

## Advance Construction

Advance Construction is a technique which allows a state to initiate a project using non-federal funds while preserving the eligibility for future federal-aid funds. Under this approach, the AWW Program is authorized by FHWA without the obligation of federal funds and with no commitment by FHWA that funds will be available in the future. WSDOT will use its own funds to pay project costs. As federal funds are available, WSDOT may decide to convert the project and request that federal funds be obligated. There is no obligation of federal funds until the advance construction is converted, at which time the AWW Program may be reimbursed for the federal share of costs incurred from the original date of authorization.

FHWA allows the incremental conversion of advance construction projects, providing WSDOT the opportunity to manage its limited federal funding while potentially accelerating the delivery of the AWW Program through the most efficient use of the project's various funding sources.

Within the AWW Program, certain projects may warrant the use of Advance Construction funds. However, the two federal agreements associated with the Replacement Project do not have AC authorized. As a result, an AC conversion plan is not provided in this Annual Update.

## City of Seattle Funds

The City of Seattle has committed up to \$50 million for utility relocations within the footprint of the Bored Tunnel. These utilities will be relocated by the Design-Builder and billed to the

WSDOT. WSDOT will then recoup these costs from the City of Seattle. An agreement has been executed between WSDOT and the City of Seattle for this work.

A small amount of local funding has been provided by local private utility providers for relocation work performed on their behalf.

## **Port of Seattle Funds**

As shown in the Memorandum of Agreement GCA 6444 in Appendix P, the State of Washington and the Port of Seattle are committed to a replacement for the viaduct that will improve transportation access to and through the waterfront, including access for over eight million annual ferry riders; ensure connectivity between the Interbay, Ballard and Duwamish industrial areas and Seattle-Tacoma International Airport, including a corridor for oversized vehicles; provide access to port cargo, fishing and cruise facilities; minimize construction disruption; and increase opportunities for the public and freight to access the shoreline and waterfront. In the fall of 2011, the Port of Seattle Commission adopted a plan of finance with \$281 million dedicated for the AWV Program. This dollar amount was later adopted by the Washington State Legislature in their 2012 Supplemental Transportation budget. As noted earlier in this report, a portion of the Port of Seattle funds will be used on the Replacement Project and the remainder will be used on other parts of the AWV Program.

## **7. Cash Flow**

The specific schedule of payments for the Replacement Project is a function of existing plans for design and right of way, along with the contractual commitments into which WSDOT entered when it signed the contract with Seattle Tunnel Partners (STP). Figure 19 shows the source of project funding by source and biennium.

**Figure 19: Replacement Project Cash Flow by Source**  
(\$ in millions, year of expenditure)

Funding Source	Fin Plan Yr	Prior	2009-11	2011-13	2013-15	2015-17	Total
<b>Federal Funding</b>	<b>2011</b>	<b>12.8</b>	<b>3.9</b>	<b>42.7</b>	<b>136.2</b>	<b>32.9</b>	<b>228.5</b>
	<b>2012</b>	<b>12.8</b>	<b>3.9</b>	<b>251.4</b>	<b>103.6</b>	<b>26.3</b>	<b>398.0</b>
National Highway System	2011	--	--	--	--	--	--
	2012	--	--	134.1	9.9	--	144.0
Bridge Replacement Funds <sup>(1)</sup>	2011	--	--	--	93.7	26.3	120.0
	2012	--	--	--	93.7	26.3	120.0
Surface Transportation Program	2011	--	--	14.7	30.0	6.6	51.3
	2012	--	--	76.8	--	--	76.8
Emergency Relief Funds	2011	3.0	1.5	28.0	12.5	--	45.0
	2012	3.0	1.5	40.5	--	--	45.0
Federal High Priority Funds	2011	5.6	2.4	--	--	--	8.0
	2012	5.6	2.4	--	--	--	8.0
Project of National & Regional Significances	2011	4.2	--	--	--	--	4.2
	2012	4.2	--	--	--	--	4.2
<b>State Funding (Non-Toll)</b>	<b>2011</b>	<b>24.9</b>	<b>290.9</b>	<b>663.4</b>	<b>295.2</b>	<b>57.4</b>	<b>1,331.8</b>
	<b>2012</b>	<b>24.9</b>	<b>256.8</b>	<b>467.6</b>	<b>549.0</b>	<b>87.4</b>	<b>1,385.9</b>
2003 Gas Tax (Nickel Funding)	2011	14.4	34.5	16.4	18.9	6.3	90.5
	2012	14.4	29.3	17.7	44.9	6.3	112.6
2005 Gas Tax (Partnership Funding)	2011	10.5	256.4	612.3	198.3	--	1,077.5
	2012	10.5	227.5	415.3	452.1	30.1	1,135.5
Other State Funding	2011	--	--	34.7	78.0	51.1	163.8
	2012	--	--	34.7	52.0	51.1	137.8
<b>Local Funding<sup>(2)</sup></b>	<b>2011</b>	<b>0.3</b>	<b>--</b>	<b>40.0</b>	<b>10.0</b>	<b>--</b>	<b>50.3</b>
	<b>2012</b>	<b>0.3</b>	<b>--</b>	<b>40.0</b>	<b>10.0</b>	<b>--</b>	<b>50.3</b>
<b>Toll Funding</b>	<b>2011</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>354.4</b>	<b>45.6</b>	<b>400.0</b>
	<b>2012</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>118.2</b>	<b>81.8</b>	<b>200.0</b>
<b>Central Waterfront Subtotal</b>	<b>2011</b>	<b>38.0</b>	<b>294.8</b>	<b>746.1</b>	<b>795.8</b>	<b>135.9</b>	<b>2,010.7</b>
	<b>2012</b>	<b>38.0</b>	<b>260.7</b>	<b>759.0</b>	<b>780.8</b>	<b>195.5</b>	<b>2,034.3</b>
<b>Port of Seattle &amp; Other Funding</b>	<b>2011</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>150.0</b>	<b>150.0</b>
	<b>2012</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>150.0</b>	<b>150.0</b>
Viaduct Demo and BST Decommissioning <sup>(3)</sup>	2011	--	--	--	--	50.0	50.0
	2012	--	--	--	--	50.0	50.0
Mercer Street West (City of Seattle) <sup>(4)</sup>	2011	--	--	--	--	100.0	100.0
	2012	--	--	--	--	100.0	100.0
<b>Total Replacement Project</b>	<b>2011</b>	<b>38.0</b>	<b>294.8</b>	<b>746.1</b>	<b>795.8</b>	<b>285.9</b>	<b>2,160.7</b>
	<b>2012</b>	<b>38.0</b>	<b>260.7</b>	<b>759.0</b>	<b>780.8</b>	<b>345.5</b>	<b>2,184.3</b>

Source: 2011 = Washington State Legislature approved 2011-13 budget, 11LEGFIN; 2012 = Washington State Legislatively approved 2012 budget, 12LEGFIN

Figure Notes:

- (1) Use of this funding is dependent on a future federal authorization act. If this funding is not found to be applicable, WSDOT will use other eligible federal funds available.
- (2) Local funding includes \$50 million in reimbursements from the City of Seattle for utilities work performed by the Project's design-builder.
- (3) Viaduct Demolition and Battery Street Tunnel decommissioning are a subset of the \$290 million Surface Street Restoration effort using Port of Seattle funding. The figures shown here are preliminary estimates that will be refined in subsequent financial plans.
- (4) The Mercer Street West component, work to be paid for and performed by the City of Seattle, has been included in this report because a piece of it from Dexter to 5<sup>th</sup> Avenue it is also cleared by WSDOT's final EIS. Although it is not reflected in this figure, in late spring 2012 the City of Seattle updated their overall Mercer Street West cost estimate downward from \$100 million to \$98 million. This updated amount will be discussed in the Second Annual Update.

## Spending Cap

The construction estimates for the Bored Tunnel described in Section 5 of this report reflect the base cost needed to deliver the Project. The base cost does not address risk and escalation. The development of the upset price for the Bored Tunnel Design-Build segment has a risk and escalation component added to the base cost.

Section 10.4.1 of the RFP Design-Build contract describes the maximum rate of payment to the Design-Builder. Due to the rate that funding will become available to the project, payments to the Design-Builder shall not exceed the payment schedule shown in Figure 20.

**Figure 20: Cap on Payments to the Design-Builder**  
(*\$ in millions, year of expenditure*)

Cumulative Payment Schedule Limits (through date)	Fiscal Year Maximum Payment	Cumulative Payable Amount
June 30, 2011	100	100
June 30, 2012	300	400
June 30, 2013	300	700
June 30, 2014	300	1,000
June 30, 2015	275	1,275
June 30, 2016	75	1,350
<b>Total</b>	<b>1,350</b>	<b>N/A</b>

*Data obtained from Section 10.4.1 of the RFP. These numbers are fixed in the Design-Build contract and are not anticipated to change with each Financial Plan Annual Update.*

The spending cap provisions described in Figure 20 only apply to the Bored Tunnel Design-Build contract. The projected use of funds by state fiscal year for the entire Central Waterfront component is described below in Figure 21.

**Figure 21: Estimated Project Expenditures by State Fiscal Year**  
(\$ in millions, year of expenditure)

State Biennial Reference	Program Expenditures by State Fiscal Year	Fin Plan Rpt Yr	Fiscal Year Estimate Amount	Cumulative Estimate Amount
2007-09	2008	2011	7.0	7.0
		2012	7.0	7.0
	2009	2011	31.0	38.0
		2012	31.0	38.0
2009-11	2010	2011	109.2	147.2
		2012	109.2	147.2
	2011	2011	<sup>(1)</sup> 185.6	<sup>(1)</sup> 332.8
		2012	151.6	298.8
2011-13	2012	2011	387.4	720.2
		2012	350.2	649.0
	2013	2011	<sup>(1)</sup> 358.7	<sup>(1)</sup> 1,078.9
		2012	408.8	1,057.8
2013-15	2014	2011	402.3	<sup>(1)</sup> 1,481.2
		2012	356.2	1,414.0
	2015	2011	<sup>(1)</sup> 393.5	<sup>(1)</sup> 1,874.7
		2012	424.6	1,838.6
2015-17	2016	2011	185.3	<sup>(1)</sup> 2,060.0
		2012	236.1	2,074.7
	2017	2011	<sup>(1)</sup> 100.6	<sup>(1)</sup> 2,160.6
		2012	<sup>(2)</sup> 109.5	<sup>(2)</sup> 2,184.3
<b>Total</b>		<b>2011</b>	<sup>(2)</sup> <b>2,160.6</b>	<sup>(1)(2)</sup> <b>2,160.6</b>
		<b>2012</b>	<sup>(2)</sup> <b>2,184.3</b>	<sup>(2)</sup> <b>2,184.3</b>

Source: 2011 = WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN;  
2012 = WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN

Figure Notes:

- (1) Amounts are different from 2011 Initial Financial Plan due to errors which have been corrected in this update.  
(2) Inconsistent with Figures 17 and 19 due to rounding.

## Contingency Fund

Section 11 of the RFP Design-Build contract governs changes in the contract. The Design-Builder is responsible for errors in the design documents, errors in the schedule, actions of a subcontractor, cost of materials, correction of nonconforming work and failure to comply with contract requirements. Change orders are submitted to and evaluated by WSDOT. For unforeseen requirements and increases in construction costs, the contingency for the design-build portion of the Replacement Project is 14 percent.

## 8. Risk Identification, Mitigation and Other Factors

WSDOT addresses risk through a systematic approach to project delivery, following the *WSDOT Project Risk Management Guidance for WSDOT Projects* guidance document. Project level risk

management plans are developed and managed throughout the life of the project. Development and tracking of risks occur via risk registers that detail and quantify risk items specific to the project. In addition to identifying and describing SMART (Strategic, Measureable, Attributable, Relevant, and Time bound) risks, the risk registers include pre- and post- response quantifications for cost and schedule impacts, and the response strategy that will be used to either avoid or mitigate the risk. These risk registers are then monitored and updated on a routine basis. The AWV Program has created specific risk registers for each of the active contracts within the program. These risk registers are monitored and updated on a monthly basis. The AWV Program-Wide Risk Management Plan is updated on an as-needed basis when milestones are achieved and/or when the program-wide risk management needs change.

As mentioned in Section 5 of this report, WSDOT employs a CRA-CEVP<sup>®</sup> process to identify, quantify and determine avoidance and mitigation measures that will lower risk for design choices and project costs. Starting with the CRA-CEVP<sup>®</sup> process early in design development, WSDOT identifies potentially challenging project issues so that when the design-build contract is awarded, there is less chance of surprise and subsequent cost overruns. WSDOT recognizes that not all risks can be avoided or mitigated. These types of risks are accepted and typically incorporated into the base cost or schedule of the project.

CEVP<sup>®</sup> is a workshop format, followed up with mathematical modeling, typically conducted at key stages of design on very large (\$100 million or more), very complex projects. These stages are triggered when costs or scope are completed during the preliminary design phase prior to release of the initial request for proposal for design-build projects. The Cost Risk Assessment (CRA) process follows the same format as the CEVP<sup>®</sup> process, but at a smaller scale. CRAs typically are performed on smaller (\$25 million to \$100 million), less complex projects.

The CRA-CEVP<sup>®</sup> process at WSDOT combines national and local area subject matter experts and experienced staff. Many of the participants have extensive first-hand experience in large project programming and delivery. The evaluation is enhanced by the application of computer modeling that applies risks identified by experts in the workshop and makes allowances for unknowns which are each assigned additional costs. The models then run Monte Carlo simulations, with hundreds of iterations to establish a robust probability curve. Each successive re-assessment allows for the development of a tighter cost range as previously identified risks are mitigated and more is known about the project. In depth details regarding the CRA-CEVP<sup>®</sup> process, as well as the Value Engineering (VE) process, may be found on the WSDOT website:

<http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/>

As required by Engrossed Substitute Senate Bill (ESSB) 5768<sup>20</sup> in November and December of 2009, the project team held a series of workshops that utilized VE to reduce cost and risk associated with the Holgate to King Project and the Central Waterfront portion of the Replacement Project. The focus of these workshops refined the base cost estimate and associated risks. In total, the VE team implemented several cost savings measures, for a total of \$310 million. The Holgate to King Project accounted for \$140 million of the savings and the

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<sup>20</sup>ESSB 5768, Chapter 458, Laws of 2009, for full text see Appendix R.

remaining \$170 million was associated with the Central Waterfront portion of the Replacement Project. These savings were used to adjust the base cost of the Central Waterfront that was used in the January 2010 CEVP<sup>®</sup> run.

The results of the January 2010 CEVP<sup>®</sup> showed that the overall cost of the Bored Tunnel was forecasted to be \$1.54 billion at the 10 percent probability; \$1.80 billion at the 50 percent probability; and \$2.25 billion at the 90 percent probability. WSDOT project management directed the team to use the 60<sup>th</sup> percentile estimate of \$1.96 billion, as identified in WSDOT Instructional Letter IL 4071.01. This estimate was \$60 million more than the previous CEVP<sup>®</sup> results. The net rise in the tunnel cost is due to moving the north and south portal locations to lessen the amount of curvature in the tunnel. This change added approximately 640 feet to the tunnel.

The savings gained from Holgate to King Project offset the increased cost of the Bored Tunnel and kept the overall cost of replacing the Alaskan Way Viaduct Program with the \$3.1 billion budget. No further CEVP<sup>®</sup> analysis was conducted for the Bored Tunnel after it was awarded in 2011.

Since that time, Cost Risk Assessments (CRA) were performed for the South and North End Design-Bid-Build components of the Replacement Project (excluding the City of Seattle Mercer Street Widening component) in June 2010. This series of CRAs resulted in establishing the 60<sup>th</sup> percentile base cost for the Central Waterfront portion of the Replacement Project outside the Bored Tunnel and established the risk registers and profiles for each effort.

Also in June 2010, “The Basis and Amounts for Allocation of Risk” for the Central Waterfront component of the Replacement Project was written to establish program guidelines for allocating risk to the Bored Tunnel and portals. This document discusses four categories (A through D) of risk, with the last category being escalation.

Cost and risks verification exercises were held in the fall of 2011 for the Holgate to King Stage 3 project, and the North Access project. In addition, a VE study was performed on the South Access project. These efforts were undertaken to ensure that the Design-Bid-Build Projects were tracking to fit within the overall AWW Program budget allocations for the 2012 Supplemental Budget.

**Category A** defines risk over which the Design-Builder has the most control. Typical risk items include: design of the Tunnel Boring Machine (TBM), jobsite accidents, constructability of the bored tunnel, control of traffic and the contract schedule.

**Category B** risk is shared between the Design-Builder and WSDOT. Typical risk elements that require collaborative management such as the protection of buildings and structures, TBM pressure head conditions, and safety would be covered under this category.

**Category C** risk is all items that are managed by WSDOT for the Central Waterfront portion of the Replacement Project. Typical risk elements that require WSDOT management such as the issuance of the ROD, third party agreements, right of way acquisitions, differing site conditions

and risks associated with the South and North Design-Build portions of the Replacement Project would fall under this category.

**Category D** is the risks associated with inflation. The inflation rates that were derived in Section 5 of this report would be consistent with the rates referenced in the August 2011 Initial Financial Plan.

The risk budgets associated with the Bored Tunnel are shown in Figure 22.

**Figure 22: Allocation of Risk / Inflation**  
(*\$ in millions, year of expenditure*)

<b>Risk Categories</b>	<b>2011 Amount</b>	<b>2012 Amount</b>	<b>Notes</b>
<b>Categories A+B: Risk Items (DB and WSDOT Shared Risks)<sup>(1)</sup></b>			Contracted amount, not anticipated to change
Work in Hyperbaric Conditions	40.0	40.0	
Building Settlement Mitigation	20.0	20.0	
Port of Seattle Lease Terminal 46	20.0	20.0	
Early Completion Incentive	25.0	25.0	
Bonding & Insurance	100.0	100.0	
<b>SUBTOTAL: Category A+B</b>	<b>205.0</b>	<b>205.0</b>	
<b>Category C: Unallocated Risk</b>	<b>100.0</b>	<sup>(2)</sup> <b>99.3</b>	Minor change order moved some funds to contract
<b>Category D: Inflation/Escalation</b>	<b>110.0</b>	<b>110.0</b>	Contracted amount, not anticipated to change
<b>TOTAL: Risk &amp; Inflation Budget</b>	<b>415.0</b>	<b>414.3</b>	

Source: 2011=WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFN; 2012 - WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFN.

Figure Notes:

- (1) In the 2011 Initial Financial Plan this table listed contaminated soils at \$50 million and utility reimbursements from the City of Seattle at -\$50 million. The two categories were misidentified as risk items in 2011. Contaminated soils were double-counted as part of base cost and utilities are a source of funding. Both have been removed in this 2012 Annual Update.
- (2) Cross-reference Figure 17, Note 4: WSDOT plans to reallocate \$21.8 million of unallocated risk held in the Bored Tunnel category to right of way because right of way increased from \$136 million to \$157.8 million due to updated real estate procurement costs. Changes in this category will also be included in the Second Annual Update because this change is outside of the data snapshot timing for this First Annual Update.

## Risk Budgeting

The bulk of the risk budget for the Replacement Project resides in the Bored Tunnel contract as shown above. These amounts are either built into the contract or, as is the case with the unallocated risk category, contain in the same work order (bucket) as the Bored Tunnel. As shown above, this project carries \$414.3 million in risk and escalation related budget in 2012. In addition to these project specific risk budgets, this project also contains a category for *management reserve* where the risk budget for the remainder of the AWV Program is stored. The 2012 supplemental budget, as approved by the Washington State Legislature, contained \$3.1 million for management reserve.

WSDOT typically uses a construction contingency factor of four percent of the awarded contract amount to address normal, historical unknowns during the construction phase of project delivery. These unknowns can include items such as minor additional work, quantity overruns, missing unit bid items and so forth. As the contingencies are exhausted, a funds request is typically submitted for additional funding. Since these unknown events cannot be identified in advance and there is no logical way to know if or when they will occur, contingencies are set aside to address these “unknown-unknowns.”

Risk reserves are meant to address the large impact that “known unknowns” might have on the cost or schedule of a construction project. These are risk register items that have been identified during the design or construction phase as construction risks with large cost or schedule impacts. Thus, these items can be managed and mitigation strategies developed to address the risk.

The AWV Program will treat risk reserves and contingencies as follows:

- For the design-bid-build construction contracts, include the standard four percent contingencies.
- For the Bored Tunnel design-build contract, which has already been awarded, \$99.3 million in unallocated contingency dollars are currently assigned to the contract. These contingency dollars are to be shared Program-wide, to fund allocated risks, as needed, to ensure successful delivery of the overall program.
- Program-wide WSDOT holds \$3.1 million in management reserves.
- Allocate risk reserves (amount set aside equals the expected value of the risk, as determined on the risk register) for specific risks on the risk register and follow the Configuration Change Management/Trend or Change Order approval processes to obtain funding if the risk occurs.
- Identify the specific risk from the risk register in Trends/Change Orders and retire the risk when the Trend/Change Order is approved and funded.
- When Risk Trend/Change Orders are approved, move an appropriate level of unused risk reserve dollars for retired individual risks (if any remains) back to the Program-wide risk reserve Work Item Number (WIN)<sup>21</sup>.
- If the risk Change Order exceeds the expected value of the risk, the difference shall be funded out of the construction contingency dollars.
- Meet monthly to review risk reserves, retired and remaining risks, risk mitigation strategies and the risk reserve cash flow.
- In addition to the contingency, allowances established for the Design-Build Contract use construction contingency dollars to fund items that are not included on the risk register and normal historical unknowns.

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<sup>21</sup> In Washington State, a WIN generally covers the funding for a single contract, however, for the Replacement Project WSDOT is treating this WIN as a resting place to hold risk dollars.

The risk reserve WIN<sup>22</sup> will comprise one risk reserve pool to be shared by all contracts/projects within the AWV Program. As allocated risks are retired, any surplus reserves associated with a specific risk will be transferred into the risk reserve WIN. As funds become available, the AWV Program senior management will assess the program risks to determine which unallocated risks are likely to need funding.

With regard to the design-build contract contingencies, each contract will need to justify funding allocations for risks specific to that contract. The majority of the contingency funds will be allocated to specific risks identified from each contract specific risk register. The remainder of the contingency funds will be “unallocated” and available for other risks or issues that are unforeseen within the AWV Program, as determined by AWV Replacement Program Senior Management.

The AWV Program employs formal processes called “Configuration Change Management” and “Trend Program Management” for developing and documenting major project decisions. The Configuration Change Management process is used to document changes in the overall configuration, or physical attributes of the project (essentially the scope of a project). The Trend Program Management process brings changes, above certain financial thresholds, to AWV Program senior management’s attention for review and adjudication. The Trend Program is an internal tool that identifies and formally documents changes to scope (when it does not involve a configuration change), budget, and schedule of the AWV Program. The response of AWV Program senior management formalizes the decisions on project changes. The Configuration Change Management and Trend Management processes also serve as a history and record of key project decisions for the AWV Program.

## Risk Monitoring

Continuous monitoring and control of risk is necessary to ensure that appropriate progress and advancement of the work are being made towards meeting the project’s ultimate goal. When properly administered, the risk monitoring and control process helps to ensure the proper execution of risk management plans, and evaluates their effectiveness in reducing risk. Risk monitoring and control is an ongoing process for the life of the project. A risk monitoring and control process is used to track identified risks; identify and monitor residual risks; and identify new risks.

Monitoring and control is the focus of components currently in design or construction phases. These components have already been through the formal CRA-CEVP<sup>®</sup> and VE Study processes and have well developed risk registers at this time. Thus, monitoring and control is essential to the success of these projects.

As project development continues, the project risk profile will change. Typically, as risks are successfully dispatched, and as knowledge of the project increases, the risk exposure diminishes.

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<sup>22</sup> Ibid (see footnote 1 on the previous page)

Risk reserves can be retired as risk events are successfully avoided or mitigated, or if the time has passed during which the risk is likely to occur.

## **Routine Risk Monitoring and Control**

Project offices include a standing risk agenda item at their project team meetings. Project Engineers are aware of their project risk registers and act in a manner to avoid those risks. Review occurs at least monthly until the risks are no longer active. The intent is to aggressively monitor the risks on a routine basis to ensure that post response strategies are being followed and new risks and/or opportunities are being identified. The Project Managers are aware and thoughtful about the ramifications of project level risks and opportunities on the overall program.

## **Monthly Monitoring and Control**

Monthly risk update meetings are conducted. The Risk Program Coordinator leads and facilitates the meetings which are designed to ensure that risk updates proposed by project teams have adequate justification and are consistently documented. Each of the Project Engineers are responsible for reporting on previously identified threats and opportunities to their projects. The Project Engineers are responsible for identifying new or emerging risks that are not on the project risk register.

Attendees of the meeting include project leadership such as the Engineering Manager and Project Engineer. Invitees will typically include at least one representative of the AWW Program executive management, selected environmental and Program support team members as available and applicable. A cross-section of the design team as well as outside technical experts will be invited as necessary.

The project risk threats are reported upon until the risk is either retired or its residual impact is accepted and accounted for in the Project Engineer's cost to complete estimate.

## **Quarterly Monitoring and Control**

There are two types of risk updates that will be performed on a quarterly basis. Due to the aggressive Program delivery schedule, the Holgate to King contracts and the Central Waterfront contract work will be overlapping, requiring aggressive risk management at the interface between contracts. There is also a need to review the contract risks, from a programmatic basis each quarter to ensure that the program is being delivered within budget.

## **Interface Risk Management**

Risks at the interface between contracts are evaluated on a quarterly basis. These Interface Risk Management meetings, chaired by the Risk Program Coordinator, will include Project Managers from each of the individual contracts and key support staff. The individual risk items that are shared across contracts will be reviewed and discussed during the meeting. Consensus is desired to ensure that the risk is correctly identified and the quantifications are consistent and response

strategies are acceptable across projects. The intent is to avoid double or triple counting the same risk when the risks are rolled up to the Program level and to be sure that the Project Managers are mindful of the abutting projects and how decisions on one project affect another project. This need is essential to the success to the overall program due to the significant risk that resides at the interface between contracts.

## Quarterly Cost-Risk Validation

On a quarterly basis, cost-risk validation exercises may be held on a project-by-project basis. The purpose of these exercises is to allow AWV Program senior management staff to comprehensively review the project risk register, and as appropriate, provide input regarding current risk status and response strategies. During the months in which these meetings are held, the regular monthly risk update meetings will not be held. The quarterly meeting will be an internal project cost and risk validation effort only, and thus, will not be a CRA or CEVP®.

The quarterly meeting is organized and facilitated by the Risk Program Coordinator. AWV Program senior management will decide whether or not to model the register again after the completion of the quarterly meeting. This decision depends on the significance of the changes and their timing. It is expected that the Program Estimator and Project Estimators will be available to discuss changes or potential changes to the base cost estimates as part of the quarterly meeting. This ensures that the assumptions of the lead estimators are aligned with the risks and response strategies identified by the project teams, and provides assurance that the project teams are actively responding to their project's threats and opportunities.

## 9. Conclusions and Summary

Much has happened since the Initial Financial Plan for the Replacement Project was submitted to FHWA in August 2011. The voters of Seattle affirmed their support for the AWV Program in a September 2011 advisory vote. The Bored Tunnel Design-Build Contractor has ordered the TBM and has begun work to excavate the tunnel launch pit. The AWV Program has made significant progress on the acquisition of all necessary right of way.

Between 2011 and 2012, there have been some minor changes in project cost, with the 2011 cost estimated at \$2.161 billion and the 2012 cost estimated at \$2.184 billion, with budget transferred from other parts of the AWV Program. This is an increase of approximately 1 percent, mainly due to a recalculation in sales tax for the Bored Tunnel. However, despite all of the activity, the cost of the Replacement Project has remained relatively stable with the cost increases and decreases balancing to the updated project budget and the plan for delivering the tunnel by the end of 2015 remaining essentially the same.

There have been several changes in the way WSDOT plans to pay for the Bored Tunnel. These modifications are due to an increase in the availability of some funds and a decrease in others.

Within the past year the legislature enacted authority to toll the Bored Tunnel. Preparation for this legislation revealed a potential shortfall in the funding capacity of tunnel tolls due to diversion of traffic onto City of Seattle surface streets. The funding shortfall was addressed by the 2012 Legislature providing the AWW Program additional unprogrammed federal funding.

The funding breakout is currently projected as follows:

<u>2011</u>	<u>2012</u>	<u>Change</u>	<u>Source</u>
61.6 %	63.4 %	+1.8 %	State motor vehicle fuel tax
10.6 %	18.2 %	+7.6 %	Federal funding
18.5 %	9.2 %	-9.4 %	State tolling
6.9 %	6.9 %	--	Port of Seattle and others (Mercer Street West)
2.3 %	2.3 %	--	Local (City of Seattle)

WSDOT's budget for the Replacement Project includes a contingency amount for potential cost overruns.

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