

Section 10: Cost Estimates

How Were the SR 167 Cost Estimates Done?

Cost estimation at the planning level is a challenging task. Many assumptions must be made to produce a planning level cost estimate. This is because detailed design plans and field information do not exist. For the SR 167 Corridor Report, planning level estimates were produced based on information gathered during development of the various build alternatives.

To the greatest extent possible, a planning level estimate is done based on the proposed expansion of the existing roadway prism, the ramps and structures that will need to be adjusted or reconstructed as a result, how much right-of-way must be purchased and the apparent environmental mitigation that will be required. The most up-to-date costs for standard construction materials such as asphalt and gravel borrow are used in the planning level estimate and a base cost in current year dollars is determined.

WSDOT's Cost Estimate Validation Process (CEVP[®]) was used to refine the planning level estimates. The CEVP[®] involves a team of transportation specialists in different discipline areas (such as drainage and structures) to estimate the cost to design, purchase right-of-way, and build in the current year. The process then expands that estimate based upon the probability of a variety of factors, including inflation, to develop a probable range of costs during the forecast year of construction, or year of expenditure. The CEVP[®] is a statistical model that attempts to reflect the probability of increased costs for various items in the estimate based on the level of supporting information and the timing of the improvement. These estimates are then given a percentage of probability.

By utilizing the CEVP[®] for refinement of the cost estimates, WSDOT gained a better understanding of the items that will have significant influence on the cost of improvements. While it was expected that right-of-way expenditures as well as wetland and stormwater mitigation costs would be major factors, it also came to light that soil liquefaction issues will be a significant cost issue.

What is the Cost Estimate Validation Process (CEVP[®])?

WSDOT has implemented a process, CEVP[®], to better estimate the probable cost and schedule (as well as cash flow) of their planned mega-projects, including risk, opportunity, and other uncertainties. This process was designed to provide:

- More realistic projections of probable cost and schedule, including the effects of inflation.
- Better decision-making and risk management for individual projects, and for the entire program of projects.

To address Washington Law requirement in RCW 47.06.130 "**Special planning studies — Cost-benefit analysis**" a cost/benefit analysis was prepared for the long-term options and is presented in Appendix B.

Exhibit 10-1
**SR 167 CEVP® Cost Estimate
 Segments Map**



It is unusual to use the CEVP® in a planning study. However, because components of the SR 167 corridor were targeted for improvement in the November 2007 Roads and Transit (Proposition 1) ballot measure, the Department expended extra effort to refine the SR 167 cost estimates. Complicating the estimate process during development of the ballot measure was an industry wide increase in construction costs primarily due to increased costs for raw materials, particularly those that are petroleum based.

How Much Could Improvements to the SR 167 Corridor Cost?

The SR 167 corridor underwent three CEVP® procedures. The final procedure occurred in January 2007 (updated in 2008) and resulted in a cost range of \$1.4 to \$2.0 billion to add one additional lane through-out the corridor without major interchange improvements. The estimate was done so that the bottleneck/segment projects discussed in Section 9 could be separated out. A CEVP® for two new lanes in each direction was not done. Exhibit 10-1 illustrates the way the corridor was segmented so the bottleneck/segment projects could be isolated. Exhibit 10-2 provides the range of costs based on the CEVP® analysis for each segment of the corridor.

Costs associated with improvements between I-405 and S 180th Street have been accounted for in the I-405 Corridor program.

The probability of public funding for the two billion dollars needed for SR 167 improvements is not likely in the immediate future. A series of potential options to specific congestion bottlenecks were developed. These smaller bottleneck/segment improvement projects are designed to be part of the overall long-term solution, and are easier to secure funding for. Exhibit 10-3 tabulates the possible range of costs for interchange improvements that can be further considered for funding programs. This list is not prioritized in this table. For a more detailed discussion of the improvements proposed, refer to Section 9.

Exhibit 10-2

Cost to Add One Additional Lane in Each Direction

Segment	Estimated Year of Opening	Southbound Range of Cost	Northbound Range of Cost	TOTAL Range of Cost
A S. 212th St. to S. 180th St.	2020	\$107 - \$161	\$137 - \$204	\$244 - \$365
B 84th Ave. S. to S. 212th St.	2019	\$48 - \$77	\$35 - \$54	\$84 - \$131
C SR 516 to 84th Ave. S.	2025	\$107 - \$184	\$108 - \$178	\$215 - \$362
D S 277th St. to SR 516	2016	\$60 - \$96	\$42 - \$63	\$102 - \$159
E 15th St. NW to S. 277th St.	2025	\$82 - \$128	\$89 - \$140	\$171 - \$268
F 15th St. SW to 15th St. NW	2012	\$36 **	n/a *	\$36
G Ellingson Rd. to 15th St. SW	2012	\$26 **	\$67 - \$95	\$93 - \$121
H 8th St. E. to Ellingson Rd.	2012	\$19 **	\$69 - \$94	\$88 - \$113
I 24th St. E. to 8th St. E.	2018	\$42 - \$58	\$43 - \$60	\$84 - \$118
J SR 410 to 24th St. E.	2020	\$104 - \$165	\$117 - \$178	\$221 - \$343
TOTAL		\$631 - \$950	\$707 - \$1,065	\$1,338 - \$2,015

All cost ranges are in millions; year of expenditure; 60th to 90th percentile 2006 CEVP®

* Segment F northbound HOV/HOT lane constructed in 2007

** Segments F, G, and H southbound HOV/HOT lane funded to start construction by 2011

Source: WSDOT, Golder, Petteet 2006, 2007, 2008

Exhibit 10-3

Cost to Reconstruct Major Interchanges

Interchange	Estimated Year of Opening	Range of Cost
S 180th Street Interchange Project	2035	\$294 - \$439
SR 18 Interchange Project	2035	\$590 - \$900
SR 410 / SR 512 Interchange Project	2040	\$315 - \$488

All cost ranges are in millions; year of expenditure; 2006 estimate

Four lanes in each direction can be accommodated under all bridge structures that currently cross over SR 167, with slight modifications to lane and/or shoulder widths just in these short segments. Once the decision is made to add a fifth lane in each direction, then nearly every bridge structure over SR 167 will need to be torn down and a new structure built – adding significantly to the project costs.

What is the Anticipated Cost of the Remaining Four Long-Term Options?

The planning level cost estimates for each of the four remaining long-term improvement options were partially derived from the CEVP[®] estimate (one additional lane in each direction), plus additional engineering interpolations for expanding to additional lanes for each specific option considered. These costs are illustrated in Exhibit 10-4.

Exhibit 10-4
Cost of Options

Option	Range of Cost
2	\$3,500 - \$4,300
2A	\$2,200 - \$2,700
4	\$8,300 - \$10,200
4A	\$5,100 - \$6,200

All cost ranges are in millions; year of expenditure; 2006 estimate

Expanding the SR 167 Valley Freeway to 10 lanes would provide the greatest flexibility for travel in the future, allow better freight flow, and would help to reduce future peak congestion periods. Estimating the cost to expand to 10 lanes was not undertaken in this study, however, based on the costs to build one additional lane in each direction, it is expected that the 10-lane facility could cost between \$8 and \$10 billion dollars to design, purchase right-of-way, and construct.

Key Findings of This Section

Cost Estimating

WSDOT used CEVP[®] to prepare realistic planning-level cost estimates for improvements identified in Sections 8 and 9 of this document. These estimates take into account inflation, risks, and schedule (year of construction). Also included in the estimate are design, right-of-way purchase, and construction costs.

- To add one additional lane in each direction throughout the corridor: \$1.4 to \$2.0 billion.
- To complete five lanes in each direction throughout the corridor with upgraded interchanges: \$8 to \$10 billion.

The estimates for related issues representing the greatest unknowns in terms of cost are:

- Right-of-way
- Wetland mitigation
- Stormwater mitigation
- Soil liquefaction

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