

## Washington State Department of Transportation Cost Estimate Validation Process (CEVP®)



### Sticker shock: Cost estimates for highway projects skyrocket

#### COMMUNICATING RESULTS

Each project's CEVP® summary reflects the unique features of a separate project. But all of the summaries share the following points:

- Project cost estimates are stated in dollar ranges, not as single numbers. This reflects the limits of estimating precision at the planning stage when crucial decisions are yet to be made and the specific risks cannot be exactly costed.
- Risk considerations specific to each project are identified and described so that specific risk issues can be foreseen, discussed, and evaluated by the public as the project moves forward.
- Likelihood of project construction schedules have been taken into account and schedule-based adjustments made to the estimates to reflect the smaller purchasing power of dollars to be spent on construction several years in the future.
- Changes from previous CEVP® releases are included in the one page summaries for projects that have gone through an updated CEVP® review.

#### MEDIA RESPONDED POSITIVELY

*"The Transportation Department developed its new numbers through a new process called "cost estimate validation" or CEVP®, which features another layer of review by outside experts...The agency's Urban Corridors Administrators, characterized it as **an effort to deal more openly and honestly with risks and uncertainties.**"*

Seattle Times  
June 2002

*"Giving citizens a range of costs, including full disclosure of the variables, **is not only politically smart, but it's common sense.**"...*

Seattle Post-Intelligencer  
June 2002

Washington State Department of Transportation (WSDOT) wants the public and decision makers to have the best possible information about the probable cost ranges of major transportation projects. The word "range" is important and fundamental to the CEVP®. We cannot completely and accurately predict the future, but we can, using recognized risk and uncertainty techniques, better forecast the range of costs and time a project will require. And then, we can more realistically plan for and manage the best – and the worst – possibilities

WSDOT decided to open the "black box" of estimating and present a candid assessment of the range of potential project costs, including acknowledgement of the uncertainty of eventual project scope, the inevitable consequence of cost escalation due to inflation, and other major risks.

WSDOT's strategy, and commitment, was to deal openly with the process of public infrastructure estimating so that the public would better understand and be better informed as they, and elected officials, make critical project funding decisions. The challenge was to develop a valid procedure to do this.

With the encouragement and support of Secretary Douglas MacDonald, WSDOT developed a specific management-cost-risk assessment tool called the Cost Estimate Validation Process (CEVP®).

#### WHAT IS CEVP®?

CEVP® is an intense workshop where transportation projects are examined by a team of top engineers and risk managers from local and national private firms and public agencies reviewing project details with WSDOT engineers. Many of the participants have had extensive first-hand experience with large project programming and delivery.

The CEVP® workshop team uses systematic project review and risk assessment methods to evaluate the quality of the information at hand and to identify and describe cost and schedule risks. Importantly, the process examines, from the very beginning, how risks can be lowered and cost vulnerabilities managed or reduced. In other words, a dividend of CEVP® is to promote the activities that will improve final cost and schedule results.

#### PURPOSE OF CEVP®

1. To Validate/Evaluate an estimate of probable cost early in the development and decision process for a project, in order to identify a reasonable target cost, and
2. To identify cost and schedule risk associated with the project, and
3. To provide risk management tools and processes, and
4. To thereby deliver the promised projects in accordance with the established target cost and planned schedule.

#### ESTIMATING METHODS

Conventional	CEVP®
Estimate is a NUMBER	Estimate is a RANGE
Risk in contingencies	Risk is explicit
Risk management can be ad-hoc	Risk management is formal and explicit, significant risks (and opportunities) are quantified
	Relies on judgment from experience



Washington State  
Department of Transportation



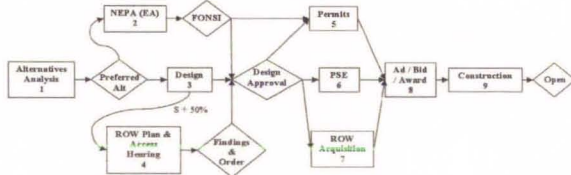
**A Cost-Risk Assessment (CRA) will accomplish the following:**

- Validate/Evaluate the cost estimate, in terms of quantities and unit costs, to the extent possible based on the project information available (estimate QA/QC)
- Review/validate the markups
- Review/validate schedule estimate
- Reduce reliance on general contingency by identifying project specific risk associated with both cost and schedule.
- Consider and quantify risk and opportunity
- Produce a probabilistic cost and schedule range for the identified scope.

**WHAT IS SPECIAL ABOUT CEVP® ?**

CEVP® requires specific skills, personnel and resources. WSDOT has found that the process generally requires:

1. A knowledgeable and committed owner.
2. A well-shaped, complete project estimate and schedule
3. Available/involved team members:
  - a. Project Team Members
  - b. Internal and External Subject Matter Experts
  - c. Skilled cost and risk team leads
4. Sufficient expertise to "validate" base costs
5. Suitable Risk modeling technology
6. Ability to understand results (i.e., issues and limitations of a "first-order" analysis).
7. Sufficient time and available resources



**PROCEDURES TO CONDUCT CEVP®**

1. Project and Method Selection Phase and Preparation – select the right projects, prepare and educate the team, ensure appropriate timing, define scenarios to be assessed, gather data to explain project.
2. Workshop Initiation – Establish workshop goals, workshop scope and project alternatives to be explored; Project Team presentation of: 1) scope and assumptions for each alternative, 2) cost and schedule estimate, 3) major issues and concerns; Development of project flow chart (basis for the cost and schedule risk and uncertainty model)
3. Cost Analysis/Validation and Risk Identification – Cost Analysis/Validation Team breakout activities; Risk Team breakout activities; Environmental Costing Team breakout activities; Modeling Team breakout activities. This can occur simultaneously or in a linear fashion, depending on the structure most important for the project.
4. Integration and Model Construction – Breakout team reports and coordination; Reconciliation of breakout assumptions; Construction of cost/schedule risk and uncertainty model.
5. Presentation of Results – Oral presentation of workshop results; written report of workshop results, with possible beginning mitigation strategies identified.
6. Validation of Results & Generation of Risk Response Plan – Project Team validates workshop results. A risk response plan is created that explains how identified cost-risk is going to be managed. A decision, with management input, will be made as to what "target number" the project will be managed to, as well as how and when to communicate CEVP® results. A decision will be articulated that will express commitment to the CEVP® range, or whether further analysis is needed. This further analysis could include a VE study, or, if it is necessary to explore and evaluate cost on alternative project scenarios, cycling back to step 1 above.
7. Implementation and Performance Measurement – Integration of risk response plan into the project risk management plan. At appropriate periods, and/or by audits, tracking whether project costs have occurred, and if so, whether another CEVP® is warranted, tracking activities taken to reduce cost through management of risk, and ultimately tracking accuracy of the CEVP® by comparing CEVP® results with final costs of WSDOT projects.

Note: CEVP® continues to be developed. The CEVP® summaries are not a warranty that the estimates are perfect, for it is true that you only know the final costs of a project when the project is finally completed. CEVP® cannot change the fact that it is very early in the project development process for many of these major projects. There are still many unknowns. But risk areas that could drive up project costs can be communicated fairly to the public. In addition, the early identification of a risk area creates management opportunities to minimize the potential of project costs associated with some of those risk areas.

**USEFUL RESULTS**

**USEFUL RESULTS**

CEVP® results are presented as cost and schedule distributions. These distributions can describe the following:

- Current dollar versus year of expenditure cost
- Fully funded or partially funded scenarios
- Comparative design options
- Expected date of project completed
- Expected schedule to meet project milestones

Another key output from the CEVP® assessment is the ranked listing of those risk and opportunity factors contributing to the uncertainty in a particular estimate such as those illustrated in the Risk Event table. The ranked risk table presents the most important risk issues, along with a measure of their contribution to the total uncertainty in the estimate. The variety of risks, including technical risks, policy risks, environmental risks, construction risks, etc. can be treated in a consistent way using these data.

**SR 167, Tacoma to Puyallup New Freeway Construction** 10 Year Project to Full

**CEVP Results:** Distribution for cost to completion (future \$M)

Contribution To Risk Cost	Risk Event Criteria
26%	T12 Possible Changes to Seismic Design Criteria
21%	T2. Sound Transit Rail N Link Realignment
13%	T30. Project Delivery Method
10%	T31. Other (Low Risk) Items
10%	T22. Right of Way
7%	T3. Market Conditions (High Bids)
3%	T14. Constructability of I-405 I/C
2%	T26. Local Access Improvements
2%	T28. TDM
1%	T16. Construction Staging Areas

**Washington State Department of Transportation / A5T60**  
**“Cost Estimate Validation Process/Cost Risk Assessment”**  
**Working for You**

May 19 – 20<sup>th</sup>, 2004  
Crown Plaza Hotel, Seattle, WA

**DRAFT AGENDA**

**Objectives:**

1. To more clearly understand the CEVP and CRA processes and the application of risk.
2. To provide sufficient information that each DOT could accelerate the implementation of the concepts should they desire.
3. To identify other cost estimating systems that could help the DOTs improve estimating, scheduling, and risk.
4. To provide constructive information to the AASHTO Task Force on Cost Estimating.
5. To develop a potential research, technology, and training agenda.

**May 19**

1:30 pm	Welcome, Overview	Jennifer Brown, WSDOT Ted Ferragut, A5T60
	<i>We will have self-introductions, review the purpose and objectives of the workshop, update the agenda, and find a way to keep the easterners awake.</i>	
1:45 pm	Roundtable Discussion	All
	<i>In Washington, each DOT discussed issues related to project cost estimating, scheduling, and the inherent challenges. We will continue on from our DC discussions and attempt to isolate the issues with a little more clarity. What challenges does my state face regarding cost and schedule estimates? How is my state currently addressing / managing project risk? What do I want to get out of this workshop?</i>	
3:00 pm	Break	
3:15 pm	Background	John Reilly
	<i>John will explain factors which led WSDOT to develop CEVP.</i>	
3:30 p.m.	How WSDOT got started	Cliff Mansfield, PTG
	<i>Cliff Mansfield recently retired from WSDOT after 30 years of service and leadership. He was the original manager of CEVP, and currently assists other agencies conduct CEVP-like workshops. Cliff will talk about the steps and strategies WSDOT used as they developed the original CEVP pilot program. He will highlight some of the benefits and challenges realized early on at WSDOT.</i>	
4:00 p.m.	From CEVP to CRA	Jennifer Brown
	<i>Jennifer will provide an overview of the components of CEVP and will explain the distinction between CEVP and CRA, while continuing the story of the evolution of CEVP at WSDOT.</i>	
4:30 pm	Open Discussion	All



4:45 pm	Food for Tomorrow - "Lead State" Concept	Ted Ferragut
	<i>Participants think about whether/ how on-going discussions will be helpful after this workshop</i>	
5:00 pm	Adjourn	
6:30 pm	Group Dinner – Location TBD	
<b>May 20</b>		
7:00 am	Coffee and Continental Breakfast	
7:30 am	Agenda Overview	Jennifer Brown
	<i>We will review the day's agenda, introduce the consultants, and review any burning administrative issues</i>	
7:45 am	Things to expect when establishing a CEVP / CRA program	Monica Bielenberg, WSDOT
	<i>Monica Bielenberg, current CEVP Manager, will provide some tips on what program managers might encounter (based on WSDOT experience) as they introduce the new tool/business process in their organizations. Monica will describe what to expect in terms of positive benefits, such as workshop results, and business improvements; as well as what to expect in terms of challenges, including resource investment, appropriate/adequate sponsorship, the CEVP / CRA learning curve, and challenges that accompany business as "not usual." She will also describe some recommended strategies to get the program launched well, including who needs to be involved in the beginning, and what types of critical conversations should be started. Monica will also describe some of the current questions/issues DOT is addressing, as well as goals for where the program will grow over time.</i>	
8:45 am	A Project Director's perspective <i>TBD – perspective a manager who has used CEVP several times could be helpful – Maureen Sullivan (?) to complete the perspective picture</i>	Maureen Sullivan (?) Alaskan Way Viaduct & Seattle Sea Wall Project
9:15 am	Break	
9:30 a.m.	Introducing CEVP Applications – Consultant perspective	Dwight Sangrey, Golder Associates; Keith Sabol, Parsons Transportation Group
	<i>Dwight Sangrey of Golder Associates, and Keith Sabol of Parsons Transportation Group have been instrumental in WSDOT's application of CEVP and CRA. They have also been involved with implementation of CEVP-like tools with other agencies around the country. Dwight and Keith will share their perspectives on what has been working well (and not) with other agencies around the country as they begin to use the tool. They will then discuss specific critical considerations regarding the cost (Keith) component and the risk (Dwight) component of a CEVP or CRA that any agency should be thinking about as they develop and implement their own CRA program.</i>	
10:15 a.m.	Step by Step Implement Strategy	Monica Bielenberg

Monica will outline a series of steps that could help implement the program. She will discuss appropriate sponsorship; determine admin/technical resource needs' understand, document, and communicate the process. She will explain the decision as to whether to apply CEVP / CRA. She will then discuss ways to developing the team, prepare for the workshop, address the risk management structure and planning. She will close by addressing the Audit/Masurement of Results. She will address training for executives, managers, subject matter experts, cost and risk leads, the modelers, and the overall project teams. While describing the possible steps toward implementation, Monica will weave in a WSDOT case study to demonstrate how this has worked with a CRA.

12:00 p.m. Lunch (catered)

1:00 p.m.

WSDOT Wrap-up

All

Group Discussion, Q & A period – panel format,  
Monica, Jennifer, Cliff, Dwight, Keith

2:00 p.m.

**Other State Cost Estimating Programs**

*We will hear from UT, FL, and VA about elements of their new programs and how they might dovetail with a CEVP and CRA process*

Group Discussion

All

*After hearing what I've heard yesterday/today, what next steps am I going to take to introduce CEVP/CRA in my agency? What do I think my biggest challenges will be, and what can I start to do about them? What do I want (if anything) from this collective group after we leave today?*

Lead State Program

Ted Ferragut

*In this session, we will look at ways that we can stay together to work on possible implementing CEVP/CRA or other state practices, what resources we have available, and how we might work with the AASHTO TIG and Task Force on Cost Estimating.*

Evaluation, Wrap, up, and Closing

Jennifer Brown  
Ted Ferragut

Adjourn

# SR 520 Bridge Replacement & HOV Project

CEVP Meeting

April 12<sup>th</sup> – 15<sup>th</sup>

The Point Conference Room

414 Olive Way, Suite 400

Seattle, WA 98101

(206) 381-6400

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## **Monday, April 12<sup>th</sup>**

**8:00am - 5:00pm**

- Project Update
- Cost & Schedule Assumptions
- Flow Charts
- Breakout Groups
  - Universal Risks
  - Base cost review & validation

## **Tuesday, April 13<sup>th</sup>**

**1:00pm - 5:00pm**

- 4 lane full

## **Wednesday, April 14<sup>th</sup>**

**8:00am – 5:00pm**

- 4 lane Phase I
- 6 lane Full

## **Thursday, April 15<sup>th</sup>**

**8:00am – 5:00pm**

- 6 lane Phase I
- Out brief



## Himes, Dale

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**From:** Martin, Jennifer A.  
**Sent:** Thursday, March 18, 2004 11:39 AM  
**To:** Himes, Dale  
**Cc:** Williamson, Alec; Mike Rigsby (E-mail); Madden, Tom; Ferguson, Sarah; Sarah Herr (E-mail)  
**Subject:** FW: Upcoming UCO CEVPs

**Importance:** High

Dale, per Maureen's request, please note the dates below for the Alaskan Way Viaduct & Seawall Project CEVP sessions. We will make sure to include you when the meeting locations and agendas are sent out.

Please call/email me if you have any questions. Thank you!

### **Jennifer A. Martin**

Secretary Administrative to Maureen Sullivan  
WSDOT - Urban Corridors Office  
TEL: (206) 382-5286  
FAX: (206) 382-5291  
Mail Stop: NB82-230  
Email: martija@wsdot.wa.gov

-----Original Message-----

**From:** Bielenberg, Monica  
**Sent:** Wednesday, March 10, 2004 10:58 AM  
**To:** Madden, Tom; Hunter, Carol; Cieri, Denise; White, John (UCO); Trussler, Stacy; Everett, Susan; Wornell, Greg; Martin, Jennifer A.; Meredith, Julie  
**Cc:** Stone, Craig; Sullivan, Maureen; Brown, Jennifer; Ng, Sio M.; Smith, Helena Kennedy; Price, Jami; Beshaler, Nancy; Alan Keizur (E-mail); Bill Roberds (E-mail); Dwight Sangrey (E-mail); Travis McGrath (E-mail)  
**Subject:** Upcoming UCO CEVPs  
**Importance:** High

As a follow-up to Monday's UCO staff meeting . . . The schedule for UCO CEVPs was set. Here are the workshop dates:

#### **SR 167:**

Prep session March 15 (8:00 - 5:00)  
Workshop March 24-26 (8:00 - 5:00)

#### **I 405:**

Prep session March 18 (8:00 - 5:00)  
Workshop March 29-April 2 & April 5-6 (8:00 - 5:00)

#### **SR 520:**

Prep session March 25 (10:00 - 5:00)  
Workshop April 12-15 (8:00- - 5:00)

NOTE: The workshop dates have changed since the staff meeting.

#### **AWV:**

Prep session March 24 (10:00 - 5:00) - Project Office, 999 - 3rd Ave., Suite 2424, Seattle - Main Conf. Room  
Workshop March 29-April 2 (8:00- - 5:00)

#### **SR 509:**

Prep session March 17 (10:00 - 5:00)  
Workshop April 7-9 (8:00- - 5:00)

NOTE: The original scheduled dates were slightly shifted in the staff meeting.

Each of the project teams need to fill out the following form (all portions in yellow) and return it to me as soon as possible:



CRA Request  
form.xls

I will need to talk with each of the teams about workshop details. **Please identify a contact person that I can work with on items such as the following:**

- Attendees
- Task Orders
- Conference rooms & other logistics

Thanks - Monica

***Monica Bielenberg, P. E.***

*Cost Risk Estimating & Management*

*WSDOT - Design Office*

*(360) 705-7457 office*

*(360) 790-7690 cell*

*bielenm@wsdot.wa.gov*



## Himes, Dale

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**From:** Ferguson, Sarah  
**Sent:** Wednesday, March 24, 2004 12:58 PM  
**To:** Bielenberg, Monica; Allen, Archie; Vanantwerp, J Scott; Salter, Jim; Bandy, Mark; Kapur, Jugesh; Sowers, David; Ray, Allison; Milton, John; Brecto, Barry (FHWA); Gray, Mary (FHWA); Hall, Megan (FHWA); Zeldenrust, Richard; East, Russ; King, Tim; Anderson, Mark - UCO; Himes, Dale  
**Cc:** Madden, Tom; Williamson, Alec; Martin, Jennifer A.; 'herr@pbworld.com'; 'Bob Chandler (E-mail)'  
**Subject:** RE: Proposed Schedule for AWW CEVP

Hi all,  
This has all have happened so fast, I forgot to include a "minor" detail; the location of the CEVP Sessions:

Wells Fargo Bldg.  
999 3rd Avenue; Suite 2424 (24th floor)  
Seattle  
In the Large Conference Room

Sorry about that, let me know if you have any other questions.

~Sarah Ferguson  
206-382-5287

-----Original Message-----

**From:** Ferguson, Sarah  
**Sent:** Tuesday, March 23, 2004 12:59 PM  
**To:** Bielenberg, Monica; Allen, Archie; Vanantwerp, J Scott; Salter, Jim; Bandy, Mark; Kapur, Jugesh; Sowers, David; Ray, Allison; Milton, John; Brecto, Barry (FHWA); Gray, Mary (FHWA); Hall, Megan (FHWA); Zeldenrust, Richard; East, Russ; King, Tim; Anderson, Mark - UCO; Himes, Dale  
**Cc:** Madden, Tom; Williamson, Alec; Martin, Jennifer A.; 'herr@pbworld.com'; 'Bob Chandler (E-mail)'; 'steve.pearce@seattle.gov'  
**Subject:** Proposed Schedule for AWW CEVP

Attached is the proposed schedule for the upcoming AWWSP CEVP. Our goal is to have as many as possible attend the **March 24th 9am - 10am session** so everyone is up to speed on the 10 CEVP alternatives we are working with. Please see the outline below for the CEVP which will be held next week. We are having a planning session this Wednesday, March 24th at which we will go over the 10 CEVP alternatives and discuss all of the assumptions that will be going into the workshop. At the least it would be useful for you to attend the first part of Wednesday so that you can get a feel for what the 10 alternatives are about.

We ask that you are available on an "on-call" basis when your input is required on particular topics throughout the week. If you plan to be away from your office, please forward me your cell phone# (if you have one), so that you can be contacted as needed.

April 2nd at 1:00pm we will hold the outbrief session here and go over the results, so we invite you to attend then to see the results of this huge effort come together.

We really appreciate in advance your help and expertise in this important endeavor.

### **March 24th**

- \* 9:00 - 10:00 Project Update and Description of CEVP Alternatives (10)
- \* 10:00 - 11:00 Cost Estimate Assumptions
- \* 11:00 - 11:30 Schedule Assumptions
- \* 11:30 - 12:00 Risk Assumptions
- \* 1:00 - 3:00 Universal Risk Review (Breakout)  
Unit Costs and Constructability Review (Breakout)

- \* 3:00 - 4:00 Report Back & Final Planning for CEVP Week

**March 29th**

- \* Tunnel Plan 3 & Tunnel Plan 4

**March 30th**

- \* Tunnel Plan 1, Tunnel Plan 2 & Tunnel Plan 5

**March 31st**

- \* Rebuild Plan 1, Rebuild Plan 2, & Aerial Plan

**April 1st**

- \* Bypass Plan & Surface Plan

**April 2nd**

- \* AM CEVP Team Working Session
- \* PM Outbrief

**Sorry for the short notice, please contact me if you have any questions/concerns.**

**Thank You,**

Sarah L. Ferguson, Secretary Senior  
WSDOT-Urban Corridors Office  
999 3rd Ave. Suite 2424  
Seattle, WA. 98104  
Ph: 206-382-5287  
Fx: 206-382-5291