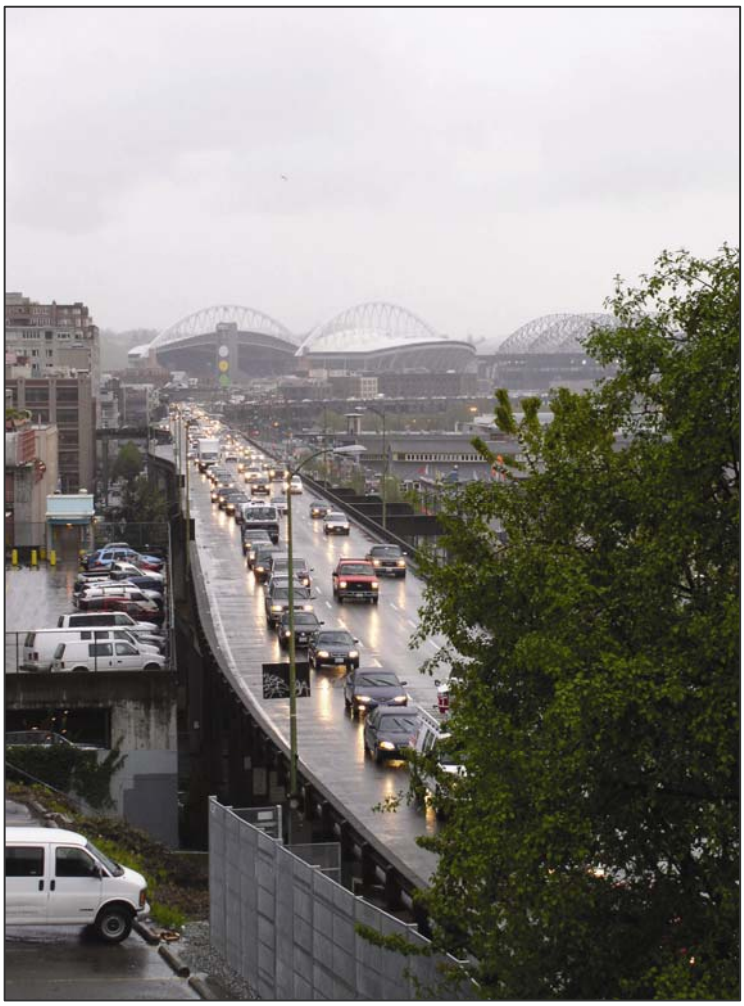
Lessons Learned on the use of:

Earned Value Management Systems - Alaskan Way Viaduct and Seawall Replacement Program



Submitted To:

U.S. Department of Transportation
Federal Highway Administration

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Executive Summary

This report provides lessons learned related to the Earned Value Management System (EVMS) now in place on the Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) being delivered by the Washington State Department of Transportation (WSDOT). This program has a current budget of $2.4 billion and has been segregated into seven subordinate projects. The State-required program completion date is November 2020. As of the writing of this report, one project of very small construction scope has been completed. The remaining projects are in design.

The majority of the engineering deliverables are being provided by consultants working under agreements, with definitive work scope and Earned Value (EV) reporting requirements as set forth under subordinate task orders. In early 2006, an existing Program Management Group of three staff members was augmented by a Project Management Assistance Consultant contract that has played a key role in furthering the implementation of the existing EVMS on the program. The software application at the core of the EVMS is PRISM, using information from a number of other software packages including State financial systems.

The functioning of the current EVMS results in reports and the conduct of project-internal "Confidence Meetings". In all reporting modes and forums, EV methodologies play a prominent role; data is reported upon, and root causes of significant cost and schedule performance variances are discussed along with actions for mitigating associated impacts.

The implementation of EVMS is in furtherance of a goal of improved accountability on projects set forth in an executive order issued by then Secretary of Transportation Douglas MacDonald in July 2005. The implementation of EVMS on the AWVSRP has been largely successful, but it has been hindered by changing project scope and changes in program management structures directed by WSDOT. This is a key lesson-learned from the AWVSRP experience; that EV should be implemented only at such time that project scope is known and a project plan is in place. Other key lessons learned include:

- That the EVMS must have full management support and the need for it must be clearly communicated to the project community.
- That various project management factors (further detailed herein) must be favorable to ensure EVMS success.
- That the EVM system requires the presence of a motivated and trained project controls staff who is experienced in its functioning.
- That other project controls capabilities (estimating; scheduling; and cost reporting/commitment forecasting) be present before implementing an EVM system.
- Procedures must be established early.
- Appropriate software systems must be selected after business needs are understood
- Contract language promulgated to consultants and contractor must be consistent with EVMS needs
- Methods of measuring progress must result in reliable percent complete metrics
- EV methods should be used only when appropriate. This report lists several considerations sourced from industry.

WSDOT plans to continue usage of EV into construction where its application should prove to be straightforward.

1.0 Introduction and Purpose of Report

This report is submitted to the Federal Highway Administration (FHWA) in response to Purchase Order DTFH61-07-P-00259.

This report provides lessons learned related to the Earned Value Management System (EVMS) now in place on the Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) being delivered by the Washington State Department of Transportation (WSDOT). This submittal covers the initial EVMS implementation period (April 2006 through April 2008) wherein the AWVSRP was focused on design.

Contained herein is the first report submittal covering the time period April 2006 through April 2008, during which the AWVSRP was in design (designated as "Preliminary Engineering", or "PE" in WSDOT management procedures). This report will:

- Provide an overview of WSDOT earned value practices.
- Provide an overview of the original purpose, philosophy and vision for how earned value would work at WSDOT's Urban Corridors Office (UCO), and on the project.
- Discuss the practical implications in using earned value during the design phase.
- Discuss the pros and cons of using earned value during design.
- Discuss significant refinements and improvements in procedures, the size of tasks measured and any revisions in philosophy for effectively using earned value. This discussion will include addressing any revisions as to the level of detail to which earned value performance is tracked within the project.
- Discuss any training conducted for the project team members including monitoring implemented to assess the success of such training.
- Discuss current project plans for the utilization of earned value during the construction phase of the AWVSRP.

2.0 AWVSRP Background

The Alaskan Way Viaduct, a two-tier elevated concrete highway with a number of on and off-ramps, is a portion of State Route (SR) 99 located on the downtown waterfront within the city of Seattle, Washington. It was constructed in phases; the first stage of construction was completed in April 1953[1], with the final phase being completed in September 1959[2]. SR 99 continues to be a main north-south route through Seattle, carrying 20 to 25 percent of the traffic traveling through downtown.[3]

Studies conducted in the mid-1990s revealed that the viaduct structure was then vulnerable as evidenced by crumbling and cracking concrete, exposed reinforcing steel, weakening column connections, and deteriorating railings. On February 28, 2001, even as replacement feasibility studies of the viaduct were underway, the 6.8 magnitude Nisqually Earthquake shook the Puget Sound region, causing damage to the viaduct structure. It was temporarily closed by the Washington State Department of Transportation (WSDOT) and closely inspected to determine its post-earthquake condition. The Department concluded that seismic retrofit would not be cost-effective, and decided then to either rebuild the structure within its existing footprint, or replace it with an entirely different alternative.

It was during this same period that questions arose concerning the integrity of the Alaskan Way Seawall, which was constructed during the time period 1916-1936[4]. Shortly after the Nisqually Earthquake, a 100-foot-long by 10-foot-wide section of the Alaskan Way surface street settled, raising concerns about the seawall's condition. The seawall holds the soil, the Alaskan Way surface street, and many utilities in place along Seattle's waterfront. The Alaskan Way Viaduct foundations, embedded as they are in that same retained soil, are also dependent on the seawall to avoid failure. Further investigations on the seawall have revealed its poor condition, worsened by its supporting timbers having been eaten away by marine organisms called gribbles. Related investigations conducted along the Seattle waterfront have further shown that soils underneath the roadway liquefied (when soils transform from a solid state to having the consistency of a heavy liquid similar to quicksand) during the Nisqually Earthquake.[5]

In 2002, WSDOT and the City of Seattle commenced with studies concerning viaduct replacement alternatives, narrowing an initial set of 76 alternatives to a "short list" of five options. In 2004, the Draft Environmental Impact Statement (DEIS) was issued, and WSDOT, the City of Seattle, and the Federal Highways Administration (FHWA) selected the cut-and-cover tunnel as the preferred alternative. An additional alternative to re-build a new elevated viaduct was also retained in the event that the tunnel option could not be implemented within available funding levels. In 2006, an Expert Review Panel commissioned by the Washington State Legislature to review the feasibility of both alternatives, also undertook a review of the project cost estimates. This resulted in WSDOT updating both the tunnel and elevated viaduct alternatives to account for inflation. The substantial increases in the estimates of both options highlighted a growing disagreement between the City of Seattle, which preferred the tunnel, and the State, which was in favor of the elevated structure given its lower cost. In December 2006, Washington Governor Christine Gregoire called for a vote by the citizens of Seattle to resolve this issue and to

[1] MacIntosh, Heather M. "First stage of Seattle's Alaskan Way Viaduct is completed on April 4, 1953." History Link.Org; the Online Encyclopedia of Washington State History. 2007, History Ink. May 10, 2008. < http://www.historylink.org/essays/output.cfm?file_id=1691>

[2] Dougherty, Phil. "Final phase of Seattle's Alaskan Way Viaduct opens to traffic on September 3, 1959." History Link.Org; the Online Encyclopedia of Washington State History. 2007, History Ink. May 10, 2008. < http://www.historylink.org/essays/output.cfm?file_id=8127>

[3] Federal Highway Administration, Washington State Department of Transportation, and the City of Seattle. "SR99: Alaskan Way Viaduct & Seawall Replacement Project Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation." July 2006. p. 1.

[4] Seattle, City of. "The Alaskan Way Seawall; The Facts." Seattle.gov. 2008, Seattle Department of Transportation. May 10, 2008. < http://www.seattle.gov/transportation/seawall.htm>

[5] FHWA, WSDOT, and City of Seattle. "SR99: Alaskan Way Viaduct & Seawall Replacement Project Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation." July 2006. p. 2.

arrive at the selection of a final preferred alternative. An advisory vote was held in Seattle in March 2007, wherein voters could choose either "yes" or "no" on each alternative put forward on the ballot; a surface-tunnel hybrid and an elevated structure. Both measures received a majority "no" vote. In response to the vote results, and to continue progress on the program, WSDOT and the City proceeded with six "Moving Forward" projects that are neutral to the tunnel or elevated alternative choice, and which will provide for critical safety and mobility improvements to the Alaskan Way Viaduct. These projects will repair or replace more than half of the viaduct, and were then roughly estimated at $915 million in cost.

Meanwhile, WSDOT began a collaborative process with City and King County officials to determine the replacement for the Central Waterfront portion of the viaduct. The goal of this effort is to recommend a preferred alternative by the end of 2008 to decision makers for their approval in early 2009. In late 2007, the State, County, and City decided that they will approach the problem of viaduct replacement by looking beyond the SR99 corridor only, and instead consider the entire system of streets, transit service, and freeways within Seattle. These agencies further decided that the recommended alternative will be chosen in accordance with a set of these six guiding principles:

- Improving public safety.
- Providing efficient movement of people and goods.
- Maintaining or improving the economies of downtown Seattle, the port, the region, and the state.
- Enhancing Seattle's waterfront, downtown and adjacent neighborhoods as a place for people.
- Creating solutions that are fiscally responsible.
- Improving the health of the environment.[6]

In consideration of the announced goal of delivering six Moving Forward projects plus eventually a seventh project involving a replacement for the viaduct on the downtown Central Waterfront, in October 2007 WSDOT management directed the AWVSRP team to proceed to internally monitor, manage, and report on these projects as separate entities, instead of as a single program in its entirety. The AWVSRP Program Management Group commenced to revise the structure of its program management information systems and underlying databases and to revise its reporting and accounting procedures as needed to comply with this requirement.

In March 2008, the Washington State Legislature adopted a $2.4 billion budget for the AWVSRP, reflecting a combination of Federal earmark, Federal emergency, State gasoline tax, and various other local funds. The final completion date for the program associated with the 2008 Legislated Budget was November 2020.

[6] Washington State Department of Transportation. "SR 99 - Alaskan Way Viaduct and Seawall Replacement." May 10, 2008. < http://www.wsdot.wa.gov/Projects/Viaduct/default.htm>.

3.1 Accounting Structure

Given that one of the three fundamental measures contained and tracked within any EV management system is actual costs, it is necessary to understand the structure of the WSDOT financial system that captures that data.

Within its financial systems, WSDOT uses a hierarchical accounting structure for budgeting, the assignment of committed contract amounts, and the collection of actual costs. As illustrated below through indentation, this structure is:

Budget Item Number

Project Identification Number

Work Item Number

Work Order Authorization

Group Code

Work Operation Code

These levels are further explained below:

Budget Item Number (BIN): A 7-alphnumeric identifier structured similar to a Project Identification Number (defined below), and which provides for corridor-level and grouped/related project level budgeting wherein several program items constitute a logical solution to address a highway deficiency. Examples include improving an overall corridor in lieu of budgeting by individual projects or the pooling of projects of a particular improvement type. The use of BINs allows for "funding flexibility between program items within the corridor or project group."[7] Within the State transportation budgeting systems, the budget level for the BIN is established as the sum of all the Project Identification Numbers within that Budget Item and is reported to the legislature at the rolled up amount.

The AWVSRP is officially designated within the state's Transportation Executive Information System (TEIS) as "SR99/Alaskan Way Viaduct – Replacement," with the assigned BIN 809936Z.

Project Identification Number (PIN): An alternate term is Program Item Number. The 7-alphanumeric PIN identifier is a unique seven character number which identifies a Project / Program Item. The Project / Program Item carries the project funding and contains the information used to present the project to the Legislature. The various embedded fields within the PIN are organized as follows:

- Position 1: Number of region responsible for work (0 = Headquarters; 1 = Northwest; 2 = North Central; 3 = Olympic; 4 = Southwest; 5 = South Central; 6 = Eastern; 8 = Urban Corridors; 9 = Marine (Washington State Ferries; WSF)
- Position 2-4: Number of the State Route where work is located (except WSF and "bucket" projects)
- Position 5-7: Two numbers + one letter assigned by the WSDOT region

[7] Project Control and Reporting Office, Engineering and Regional Operations Division, Washington State Department of Transportation. Project Control and Reporting Manual: M3026.01. February 2008. p. 4-4.

Within TEIS, the subordinate projects within the AWVSRP and their assigned PINs are:

- SR99/Alaskan way Viaduct and Seawall – Replacement EIS: 809936K (note that this is a "prior project" that existed before the establishment of the Moving Forward projects).
- SR99/Alaskan Way Viaduct and Seawall – Replacement Right of Way: 809936L (note that this is a "prior project" that existed before the establishment of the Moving Forward projects).
- SR99/Alaskan Way Viaduct and Seawall – Replacement Corridor Design: 809936M (note that this is a "prior project" that existed before the establishment of the Moving Forward projects).
- SR99/S Massachusetts St. to Union St. – Electrical Line Relocation: 809936A. This is one of the Moving Forward projects.
- SR99/Lenora St. to Battery St. Tunnel – Earthquake Upgrade: 809936B. This is one of the Moving Forward projects.
- SR99/Battery St. Tunnel – Fire and Safety Improvement: 809936C. This is one of the Moving Forward projects.
- SR99/S. Holgate St. to S. King St. – Viaduct Replacement: 809936D. This is one of the Moving Forward projects.
- SR99/S. King St. to Lenora St. – Central Waterfront Replacement: 809936E. As this PIN deals with the previously discussed Central Waterfront which is the focus of a State/County/City collaborative alternative-selection process, this is not one of the Moving Forward projects.
- SR99/Viaduct Project – Transit Enhancements and Local Improvements: 809936F. This is one of the Moving Forward projects.
- SR99/Alaskan Way Viaduct Yesler Way Vicinity – Stabilize Foundation: 809936P. This is one of the Moving Forward projects.

Work Item Number (WIN): A 7-alphanumeric unique value. One or more WINs are assigned to each project by Region Program Management. Practice statewide varies; in some cases one WIN can have one or multiple PINs associated with it, but typically the WIN is subordinate to the PIN, and many projects are assigned one WIN.

On the AWVSRP, the structure of the WIN is identical to the PIN with two exceptions:

- In the first character, the leading numeric is dropped and is replaced by a letter which indicates the Region. In the case of Urban Corridors, the first character is "U".
- The final character is a letter which is typically the same letter as the parent PIN, but would be different if more than one WIN is assigned to a PIN. An example on the AWVSRP is the SR99/S Massachusetts St. to Union St. – Electrical Line Relocation Project, where there are two WINs have been assigned to differentiate two separate stages of work:
    - For the Stage 1 work, the assigned WIN is U09936A
    - For the Stage 2 work, the assigned WIN is U09936H.

If a project plans to execute multiple construction contracts, the work scope against which preliminary engineering, right-of-way, and construction phase effort will be expended will be assigned a unique WIN. So, in the case of a project contemplating three separate construction contracts, the PIN associated with the project will be assigned three unique subordinate WINs.

Work Order Authorization (WOA): The WOA is subordinate to the WIN, and provides for separable planning, budgeting, and cost collection for the three work "phases" used by WSDOT. These phases are Preliminary Engineering (PE); Right-of-Way (RW); and Construction (CN). WSDOT uses a WOA process to authorize work as a means to control the actual expenditure of funds. All WSDOT expenditures must be first approved through this process associated with the WOA.

On the AWVSRP, the WOA number is a 6-alphanumeric identifier.

- The first two characters are letters designating the phase of work:
    - For PE, including Environmental: XL
    - For RW: RW
    - For CN: Either "MS" for miscellaneous construction support costs, or the WSDOT construction contract number covering the cost of the core construction contract assigned to the WIN.
- For PE, RW, and CN/MS work orders, the final four characters are numeric and are unique

For example, on the previously mentioned SR99/S Massachusetts St. to Union St. – Electrical Line Relocation Project (PIN 800936A) Stage 1 (WIN U09936A), the WOA's currently assigned include:

- For PE: XL3233
- For RW: RW5039
- For CN: Yet to be assigned; CN phase WOA's are opened upon the award of the construction contract.

Group Code: One or more 2-alphanumeric codes are assigned by the project team to the parent WOA as needed to segregate costs associated with different contracts, state organizations, third-party agencies, direct expense types, etc. that represent work within the defined scope of the WOA. Group Code assignments are generally flexible, and any number of new group codes within a WOA can be opened as needed.

Work Operation Code: This is a 4-digit "work operation number" used for reporting expenditure transactions. Work Operation Codes are organized into the major work phases of PE, RW, and CN, and they define the actual task being performed. The Work Operation Code is the lowest level of detail against which expenditures are reported within WSDOT systems. A sampling of Work Operation Codes is shown below:

- 0101: PE General Project Management
- 0158: PE Railroad Agreements
- 0203: RW Training
- 0224: RW Appraisal Review

- 0321: CN Progress, Final Estimates, and Records
- 0404: CN Payments to Contractors

3.2 Control Accounts

The use of Control Accounts is external to the WSDOT financial accounting system, but is an element of Consultant contract cost control and a vital numeric entity in EV management of a Consultant contract. The Control Account is the lowest-level division of work within a given Consultant contract (summary WSDOT contract structures are further explained below). Specific packages of scope are assigned to the responsible individual(s) on the contract team, with the Control Account being the entity that facilitates EV management as further explained below. The methodology for assigning Control Accounts is flexible and at the discretion of the WSDOT staff member who is the proponent of the work being performed. Typically these individuals are designated as the "Task Order Manager."

The Control Account itself is an 18-alphanumeric field. An example of a Control Account and an explanation of the various embedded codes are shown below:

Control Account: SBP37.9715SB009.0000

- Position 1-2: Last two digits of the "Segment" group code. "Segment" is synonymous with Project.
- Position 3: First alpha of the phase (P for PE; R for RW; C for CN)
- Position 4-5: Last two digits of the work order number
- Position 6-12: Agreement numeric identity followed by Task Order/Amendment (Agreements, Task Orders, and Amendments are explained in further detail below)
- Position 13-14: Individual account numbers. These numbers are typically assigned in accordance with "subtask" numbers assigned to specific types of work in the State Master Deliverable List (MDL) further described below.
- Position 15-18: Used as necessary (i.e. "temp" for temporary accounts); otherwise four 0's are used

In the WSDOT EV system, the Control Account acts as a management control point at which detailed project performance plans are defined through the combination of task estimates, schedules, and performance curves (i.e., level, front-end loaded, back-end loaded, "S" curve, etc.); where performance is measured; and where actual costs are accumulated. In this way, the Control Account is the focal point for the integration of scope, cost, and schedule. From the level of the Control Account, performance data can be rolled-up to successively higher levels in the project structure for reporting to more senior members of management.

A critical issue for Program Management is their decision on what level of the project should be selected for the establishment of Control Accounts, because it involves a trade-off of capabilities versus staff effort required. If Control Accounts are selected a level that is too summary, it compromises the ability to "drill down" to that level at which problems could be identified and solved in detail. On the other hand, if Control Accounts are consistently established at a very low level in the project, then the number of accounts will greatly increase, likewise causing additional effort to implement the EV system. The number of Control Accounts will determine the amount of detailed data to be handled for performance measurements, directly influencing the effort (and

supporting staffing levels) required. The appropriate level of detail must be carefully determined considering the project characteristics, the extent of management control desired, and the amount of staff available or budgeted to support the functioning of the EV system.

3.3 Work Breakdown Structure and Master Deliverable List

Work Breakdown Structure WBS: Given the wide diversity of projects statewide and even within the limits of UCO as a region, no attempt has been made to develop a common WBS. The AWVSRP has the intent to develop and utilize its own program-specific WBS within its EV management and reporting tools. However, this has been delayed by other budgeting and cost management priorities that have required the full attention of the Program Management staff since October 2007.

WSDOT's February 2008 Project Control and Reporting Manual indicates that the development of a standardized WBS is a WSDOT goal so as to facilitate "consistency in reports statewide and the generation of reports by region/mode or agency as a whole."[8]

Master Deliverable List (MDL): The MDL is a hierarchical listing of deliverables organized in project phases (PE, RW, and CN). Using general industry practice as a comparative standard, the MDL could be seen to be a lower extension of a higher-level WBS. Although WSDOT has developed a standardized MDL for use statewide, the unique nature of the projects comprising the AWVSRP led to the development of a variant of the MDL in early 2006 that met this program's specific needs.

The statewide goals for the use of the MDL are to simplify the development of Work Breakdown Structures for project managers and teams; and also, given that categories and deliverables are consistently named across the state to be able to track and monitor project delivery more easily.

MDL numbers prominently appear in Consultant contracts as a tool for the monitoring and control of contract work. The MDL currently in use on the AWVSRP is shown in Section 7.0 – Exhibits to this report.

3.4 Consultant Contracts

The majority of the AWVSRP staff is sourced from consulting firms, and their work is defined and controlled by a variety of contracts. The two core documents relevant to contract management and control are Agreements and Task Orders.

On the AWVSRP, Agreements are designated by a "Y" prefix, followed by four numerics; for example, "Y-9715" or "Y-9762". Agreements are the primary contracting documents, awarded through processes defined in WSDOT's "Consultant Services Procedures Manual" dated January 2002. An Agreement sets forth the commercial terms and conditions under which a consultant will provide services to WSDOT, and contains these major sections:

- General Description of Work.
- Scope of Work
- General Requirements

[8] Project Control and Reporting Manual, 2008, p.E-1.

- Time for Beginning and Completion
- Payment Provisions
- Sub-Contracting
- Employment
- Nondiscrimination
- Termination of Agreement
- Changes of Work
- Disputes
- Venue, Applicable Law, and Personal Jurisdiction
- Legal Relations
- Extra Work
- Endorsement of Plans
- Federal Review
- Certification of the Consultant and the State
- Complete Agreement
- Execution and Acceptance

Upon execution of the Agreement, specific work scope is authorized through the use of Task Orders, which are designated using two flexibly assigned alphas. For example, Task Order "SB" under contract Y-9715 is designated as "Y-9715SB." For each Task Order, a Task Order Manager is assigned. The Task Order Manager is the cognizant WSDOT person who is the proponent for the work, or who will be the primary individual to receive the deliverables defined under the Task Order scope. Task Orders, once established, may be amended. The designator for an Amendment is a sequential numeric with "1" representing Amendment 1, "2" representing Amendment 2, and so on. An example of a full numeric designator for a contract with an amended task order would be "Y-9762AA6."

Task Orders or Amendments are initiated by the Task Order Manager using a Request for Change Form that provides a description and justification for a given scope of work. The Business Group assigned to the AWVSRP is the primary organization that supports the Task Order Manager community within the program in facilitating the full execution of a Task Order or Amendment as appropriate. They, in turn, are supported by the Consultant Liaison section at WSDOT's Urban Corridors Office.

The summarized process that the AWVSRP Business Group / UCO Consultant Liaison section follows to execute Task Orders is:

- Receive a signed Request for Change Form from the Task Order Manager.
- Coordinate between the Task Order Manager and the Consultant to develop the scope of work in more detail for inclusion into the Task Order / Amendment. In this part of the Task Order development process:
    - The individual deliverables will be designated and organized through reference to the MDL.
    - The Consultant and the WSDOT Task Order Manager will develop scope language to the level of MDL level of detail appropriate for the specific Task Order or Amendment.
    - One or more scope negotiation meetings are held with WSDOT and the Consultant to agree upon details of the scope language. Cost is not discussed, so as to keep a focus on a common understanding of scope only.
- Develop the cost basis for the Task Order / Amendment. In this part of the Task Order development process:
    - The Consultant is directed to develop an estimate of direct labor hours and sub-consultant labor hours for the scope of work. This documents the Consultant's opinion of the level of effort needed to deliver the Task Order scope.
    - In parallel, WSDOT will develop its own Independent Cost Estimate (ICE) of hours without any knowledge of or reference to the Consultant cost estimate.
    - Both the Consultant cost estimate and the ICE are electronically delivered to the AWVSRP Business Group, which facilitates a negotiation focused on labor hours. A representative from the UCO Consultant Liaison section is in attendance to provide independent assurance of adherence to WSDOT contracting requirements.
    - Once hours are agreed upon by WSDOT and the Consultant, labor rates and Other Direct Costs (ODC's) are applied, and further negotiations based on cost are held as needed. The UCO Consultant Liaison section is again in attendance.
- Once all scope, effort, and cost details have been negotiated and finalized, the AWVSRP Business Group prepares a Task Order Amendment that summarizes the Task Order scope, and cost / schedule impacts organized by the prime Consultant and sub-consultants as appropriate. This document is forwarded to Urban Corridors Office for WSDOT execution. The Task Order is then entered into the State systems.

A Task Order / Amendment in its final form will contain these major sections:

- Summary
- Objective
- Approach (specifically the "Role of Consultants")

- Assumptions
- Deliverables. It is in this section that Control Accounts will be established. These Control Accounts will be the focus for the collection of Planned, Earned, and Actual cost data that will later support the functioning of the EV process for the Task Order.
- Cost Management. This section will either describe cost management and progress reporting requirements, or make reference to previously established language. These requirements, combined with the Control Accounts enable WSDOT's EV management of consultant contract effort.
- Consultant Cost Computations
- List of Attachments and Exhibits, which typically include:
    - Prime Consultant's Cost Computations
    - Sub Consultant's Cost Computations

A key part of implementing an EV system on the AWVSRP is to enable its functioning through Task Order language. Important clauses that enforce EV methodologies by the Consultant include:

- That work products will be identified in accordance with the applicable work breakdown structure coding taken from the State's Master Deliverable List (MDL). An MDL identifier will be assigned for the control of Task Order level budget and scheduling.
- That Task Order budgets are developed at an appropriate lower level of the MDL, so itemized to aid in tracking and reporting project cost and budget trends.
- A listing of MDL identifiers that defines the deliverables in a standardized way.
- A listing of activities and Control Accounts that directly correlate to the MDL tasks.
- Schedule requirements including completion dates for work and other program-level schedule date information that will influence the Consultant's work plan.
- Specific language that supports EV management in a section entitled, "Project Management." This is referenced as a deliverable under MDL item PC-09. The full text of an example "PC-09 Project Management" section that would appear in a Task Order is provided in Section 7.0 – Exhibits of this report.

Figure 1 below illustrates the hierarchy of Consultant contract structure, to include Control Accounts used by WSDOT and the AWVSRP team:

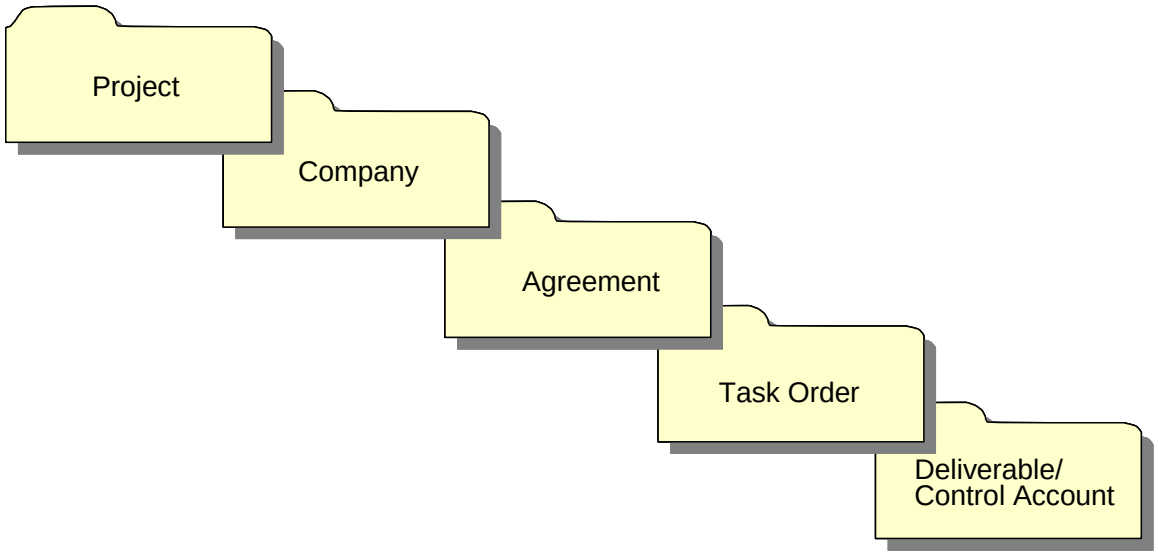


Figure 1: Hierarchy of Consultant Contract Structure – Alaskan Way Viaduct and Seawall Replacement Program

3.5 Schedule Milestones

As scheduling is a vital project controls discipline that supports EV implementation, it is important to understand the highlights of WSDOT scheduling practices.

As of the date of this report, WSDOT had selected six major project milestones for reporting performance on projects using Nickel (2003 Transportation Funding Package; collected as a gasoline tax) and TPA (Transportation Partnership Account; also collected as a gasoline tax) funding. These milestones measure significant events in the delivery of a project. The Washington State Legislature sets milestones as commitment dates as part of biennial or supplemental budget development. Accomplishment of all milestones is measured against those milestone commitment dates as set forth in the latest Legislative Budget.

AWVSRP also includes five secondary milestones in its schedule development, monitoring and reporting that were also traditionally used on WSDOT projects. The combined major project and secondary milestones are defined below:

- Milestone 1, Project Definition Complete (a major project milestone): This is the date of the completion of the official document (the Project Summary) that states the purpose and need for the project and the solution of the deficiency. For reporting purposes, the Project Definition Milestone is considered complete on the date the Regional Administrator (RA) or the RA's designee signs the Project Summary document.

- Milestone 2, Begin Preliminary Engineering (PE; a major project milestone): This milestone marks the start of the project design process. It is usually the first capital spending activity in the project delivery process and considered accomplished on the date the PE Work Order is authorized.

- Milestone 3, Environmental Documentation Complete (a major project milestone): For reporting purposes, the environmental documentation is considered complete on the date that all necessary National and State Environmental Policy Act (NEPA/SEPA) documentation has been submitted by WSDOT to the appropriate regulatory agency for approval after being processed through WSDOT Headquarters.

- Milestone 4, Right of Way Certification (a major project milestone): This marks the point in time that the right of way acquisition requirements are met such that the project can be approved for advertisement. The milestone has been met on the date the Right of Way Certification is signed by the region Real Estate Services Manager.

- Milestone 5, Advertisement Date (a major project milestone): This is the date that WSDOT publicly solicits bids from contractors to construct the project. When a project is advertised, it has a completed set of plans and specifications, along with a construction cost estimate.

- Milestone 6, Bid Opening (a secondary milestone): This is the date when the competitive bids for a project are received and publicly read. Typically advertisement periods range from 6 to 8 weeks, depending on the size and complexity of the project. If addenda are necessary for the contract late in the advertisement phase, the bid opening may be delayed in order to give potential bidders adequate time to incorporate the changes into their bid.

- Milestone 7, Award (a secondary milestone): This is the date when the contract is awarded to the lowest responsible bidder. The Department typically can award the contract within a week of the bid opening, but has up to 45 days for review before awarding the contract. Once the contract is awarded, the contractor has an additional 20 days to obtain the insurance policies, bonds, and return the signed contract. This milestone marks the end of the PE phase and the beginning of the CN phase of the project.

- Milestone 8, Execution (a secondary milestone): This is the date when the Department signs the actual contract with the contractor. This typically occurs within 21 days following contract award.

- Milestone 9, Construction Start (a secondary milestone): This is the date when work actually starts on building the project and activity might be seen on the site. Each contract specifies the number of working days the contract has to complete the work. The working day clock starts on the tenth calendar day after execution by the Department. Work beginning on the site will depend on the weather and the nature of the work that needs to be performed.

- Milestone 10, Operationally Complete Date (a major project milestone): This is the date when the public has free and unobstructed use of the facility. In some cases, the facility will be open, but minor work items may remain to be completed.[9]

- Milestone 11, Final Contract Completion (a secondary milestone): This is the date when the contract is finalized. All contractual work will have been completed and all payments to contractors will have been disbursed.

[9] Project Control and Reporting Manual, p. 4-6 to 4-7.

The AWVSRP also includes these milestones on its schedules for internal reporting during the development of Plans, Specifications, and Estimate (PS&E) design deliverables:

- 30% PS&E Submittal.
- 60% PS&E Submittal.
- 90% PS&E Submittal.
- 100% PS&E Submittal.

3.6 Computerized Systems that Support EV

State-level agencies such as WSDOT that support large-scale capital programs such as AWVSRP need robust computerized tools that support EV processes. Any set of computerized tools must have the capability to support the program team in establishing baseline performance data (the "Planned" component of EV); documenting and quantifying physical progress (the "Earned" component); and recording expended costs (the "Actual" component).

The EV-supporting tools currently in use by WSDOT on the AWVSRP include the following. Their actual operation in current EV practices is described in additional detail in section 3.7 to this report:

- Transportation Accounting and Reporting System (TRAINS): TRAINS accounts for all WSDOT revenues, expenditures, receipts, disbursements, resources, and obligations. It is a highly customized version of an American Management Systems (AMS) software package. The system includes WSDOT's in-house budget tracking system, TRACS. TRAINS is WSDOT's core project accounting system for storing and managing expenditures. It is a ledger-based accounting system that was installed in 1991.[10]

- Financial Information and Reporting System (FIRS): FIRS is an interface to TRAINS. Through FIRS, users can track expenditures through the importation of TRAINS data. The level of detail for data inquiry is flexible; users can monitor spending at any level from the overall program down to the Group Code level. Most data can also be downloaded to a personal computer for use in producing customized reports, charts, and graphs. Data retrieved through FIRS is how users populate EV systems with actual costs.[11]

- Transportation Executive Information System (TEIS): TEIS is used for legislative budget planning and oversight. It supports budget preparation and provides summary information about transportation activities to Transportation Committee staff from both the house and senate. Per State practice, budgets are developed covering two-year blocks ("biennia", which are defined from July 1st of an odd-numbered year through June 30th of the next odd numbered year). For users of EV systems at the project level, TEIS data provides not-to-exceed funding-level data that is combined with true EV performance data in reports.[12]

- Primavera P6 (P6): P6 is a critical-path-method (CPM) scheduling tool that provides for the development of integrated schedules at various levels. If no other software was available, P6 could allow for users of EV systems to enter baseline (Planned) and progress performance (Earned) data. P6's capability, in itself, to handle Actual cost data in a robust manner is limited.

[10] Project Control and Reporting Manual, p. 5-4.
[11] Project Control and Reporting Manual, p. 3-6 and 5-8.
[12] Project Control and Reporting Manual, p. 5-5.

- PRISM Enterprise Cost Package (PRISM): PRISM, as a software tool, is at the heart of the EV management effort on the AWVSRP. PRISM is an EV / Cost Control software package that provides the capability to perform budgeting, performance measurement, earned value forecasting and EV-based reporting. It allows the user to analyze data for variances (where project performance, either from a cost or schedule perspective, differs from the established project plan) thereby aiding in advanced problem identification and resolution before those issues have an unrecoverable impact on the project.[13]

3.7 Summary of Current EV Practices

EV practices currently in use on the AWVSRP are summarized below. In addition to having a project controls staff that is knowledgeable of EV methodologies, the implementation of EV on this program is based on the prior establishment of these supporting items:

- An accounting structure.
- Scope definition documents to include the Project Summary and the individual agreement Task Orders / Amendments.
- Procedures that control the authorization of work.
- A WBS as represented by the MDL.
- A system of Control Accounts that supports Consultant contract management and control.
- A project schedule.
- A set of software tools that aids in consistent data management and mining, analysis, and reporting.

Current EV practices will be presented in line with the three major data elements of an EV system (Planned, Earned, and Actual data), to be followed by analysis and reporting methods. Note that not every individual process step that the Program Management staff takes within its systems to meet various management requirements is mentioned below in the interest of report space / level of detail, and to maintain a focus on EV-specific actions.

EV Practices – Planned Data: As in any EV system, the AWVSRP Program Management staff gives consideration to these characteristics of work in quantifying the performance baseline, leading to the entry of numeric plan data into the system.

- The general nature of the work; will the effort associated with work scope result in specific and defined deliverables that will be associated with progress measurement (called “discrete work” in EV systems), or will the effort be expended strictly as a function of time (called “level-of-effort” in EV systems)? The best example of the former is engineering and design work that results in deliverables that lead to a progressively better developed PS&E package for eventual award to a construction contractor. An example of level-of-effort scope is Program Management staff which will oversee the delivery of the program over time; its activities are more of a day-to-day variety than deliverable-oriented, and their work is completed when the program is itself finalized. In the current PE phase of the work on the AWVSRP,

[13] Washington State Department of Transportation, Project Management and Reporting System (PMRS) Steering Team. “Description of the PMRS Software Products (Draft)”. October 2007. p. 4.

State forces are typically level-of-effort in nature. The work of Consultant staff is as set forth by Task Orders and could be either discrete or level-of-effort.

- The schedule for the work scope. What are the start and completion dates that are to be established to support the overall program schedule?

- The estimated cost for the work.

- The "profile" of the work effort within the start and completion dates. For level of effort work, the profile is typically level; i.e., during each reporting period (month), the amount of effort expressed as dollars is the same. For other types of work, the effort could be greater in early periods (front-loaded), or greater in later periods (back-loaded), or perhaps more characteristic of an "S"-shaped progress curve.

When establishing the planned data for State forces on the program, the Program Management staff typically establishes that as level-of-effort work.

Establishing the planned data for Consultants is more involved given the variety of types of work that will be accomplished by the Consultant staff and the need to define and control that work through the Task Order processes described above. To fully define and enter planned data for Consultant Task Orders into project systems, the Program Management staff will:

- Develop the various Control Accounts for a given Task Order. These will be included in the Task Order language and also prepared for entry into PRISM.

- Upon Task Order execution, budget/planned data will be entered into PRISM, with various data fields populated at the Control Account level of detail. Important among these are cost, schedule, method of progress measurement, and the progress curve to be applied.

- State staff will likewise enter updated information as needed into financial systems.

Note that the cost of the individual Control Accounts will sum and roll-up to the Task Order level as the Task Order / Amendment "amount." The summation of Task Order / Amendment amounts will in turn sum and roll-up to the overall committed value for a given contract.

The time-phased contract committed values for Consultant work, when combined with the time-phased budget for State Forces, will result in the overall program performance budget, and in turn, the Planned curve in the AWVSRP EV system for a specific phase of work in the current biennium. At this point in the AWVSRP delivery cycle, the vast majority of work is contained in the PE and RW phases. Any differences between overall funding amounts by phase for the current biennium and the summation of budgets for that phase are captured in "Management Buckets." Management Buckets therefore represented funded but uncommitted and unplanned amounts in the AWVSRP EV system.

EV Practices – Earned Data: Much of the success of an EV system during project delivery will depend on reliable measurement and quantification of physical progress. The result of this is the Earned data within the EV database. In the current phase of AWVSRP delivery, the major entities contributing to Earned progress are State Forces and Consultants.

As State Forces typically represent level-of-effort work, their Earned amount by reporting period (month) is equal to the Planned amount for that same month. This results in a "zero" value for schedule variance (note that schedule variance, or SV = Earned – Planned expressed as dollars), this being in accordance with industry standard practice. This same approach is taken with level-of-effort Control Accounts contained within Consultant Task Orders / Amendments.

Quantification of Consultant-performed discrete work in the EV system is a more complex task, and depends not only on reliable quantification at the Control Account level, but also on the progress reporting provisions that were incorporated into the various Consultant Task Orders / Amendments. On the AWVSRP, an important set of monthly input of Earned data required by contract is delivered to the Program Management Group in the form of reports provided by the Consultant firms for each Consultant contract. These reports are submitted in electronic spreadsheet form, due by the seventh day of each month and provide this information

- WSDOT and Consultant Control Account numbers
- Control Account description
- Actual hours expended for the period and to-date through the previous month's end. Note that the timing of this report results in this information being reported in advance of invoice submittal dates. Thus, the actual hours being reported are a combination of true actual hours and estimated hours that will be expended through the invoicing end date.
- Actual costs expended for the period and to-date through the previous month's end. Note that the timing of this report results in this information being reported in advance of invoice submittal dates. Thus, the actual costs being reported are a combination of true actual costs and estimated costs that will be expended through the invoicing end date.
- Physical percent complete to-date through the previous month's end.
- Early start and finish dates
- Late start and finish dates.

An example of a Consultant monthly Earned Value report is provided in Section 7.0 – Exhibits of this report.

The data, when received by the Cost Engineering section of the Program Management Group, undergoes a manual data validation review, and then is migrated electronically at the Control Account level of detail into PRISM. With the Earned data populated at this lowest level of detail, it can subsequently be summarized to whatever level of detail is appropriate for analysis and reporting.

Percent-complete metrics on discretely delivered major engineering deliverables are as estimated by the engineering Consultants using their own methodologies. This data is reviewed by specific WSDOT staff member who is designated as the Task Order Manager or Project Engineer for the work in question and percent complete information becomes a focus of discussion between that individual and the Consultant in subsequent joint meetings. Any percent-complete estimates that are judged to be incorrect by the cognizant WSDOT staff member are raised as issues to the Consultant and discussed in detail. Percent-complete figures are then revised accordingly and data within the EVM system also changed.

EV Practices – Actual Data: As with Earned data, the processing of State Force-sourced information is different from how this data is processed for Consultant contracts.

State Force actual cost information consists of State employee labor costs and State-sourced expenses of all types. This data is entered into the State's TRAINS system as information becomes available; State employee timesheets are submitted twice per month, while other expenses are processed into that system as payment vouchers are submitted.

The AWVSRP Program Management Cost Engineering section accesses State actual cost data from TRAINS using the FIRS reporting software application. Actual cost information for all cost types except for Consultant contracts is downloaded using FIRS, and then migrated electronically into PRISM, again at the Control Account level of detail.

Consultant contract actual cost data is not taken from TRAINS / FIRS because of the long processing time typically experienced from the time that Consultant invoices are presented for payment to the time that this data is resident in TRAINS. Normally, this is six or more weeks after the end of a given month when Consultant work was performed, resulting in data not being available for analysis during this period of time. Given that the WSDOT's goal on the AWVSRP to gain data as quickly as possible for analysis and reporting, thereby providing the project team with a better opportunity to take proactive measures in the event of problems, a different approach was developed for getting reasonably accurate Consultant invoice actual cost data.

As mentioned in the previous discussion concerning the gathering of Earned data, Consultant firms are required to submit a performance report by the seventh day of each month reflecting data through the previous month's end. Note that two of the data elements reported are actual hours and actual costs expended. In fact, given the timesheet and ODC reporting cycles of most Consultant firms, this information is, in fact, a combination of actually incurred costs plus about one week of estimated cost information. Thus, AWVSRP Program Management considers this data to be "estimated" actual costs. Although not true actual costs, experience has shown that the difference between the two figures is typically within 2%. The advantage in this approach is the improved responsiveness in gaining cost data in a shorter period of time for analysis and reporting.

Figure 2 below provides a comparison of the time difference when actual cost data is recognized for EV analysis and reporting purposes on the AWVSRP versus a typical project. The AWVSRP approach results in this data being available four to six weeks earlier than is normally the case.

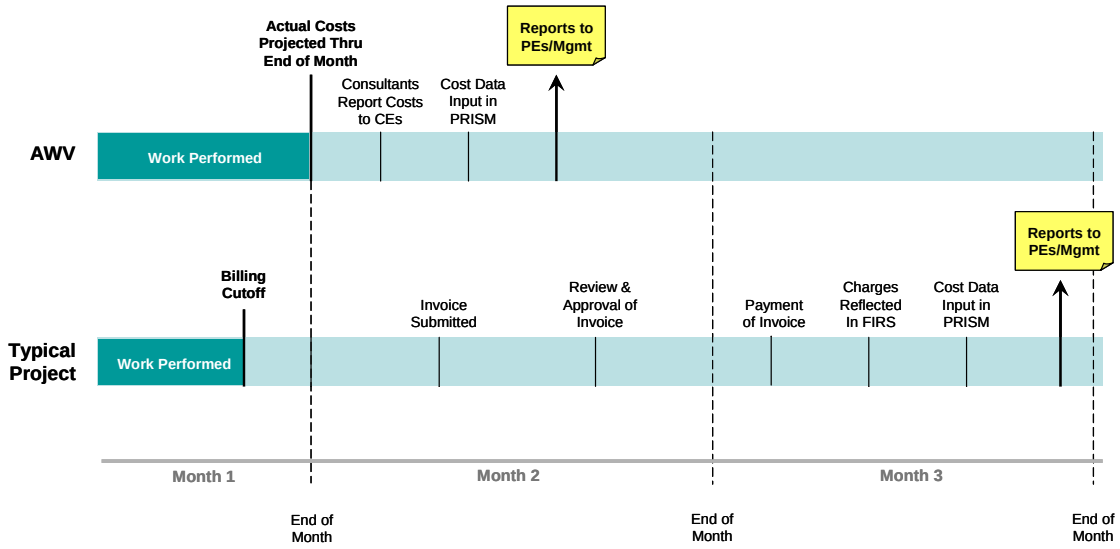


Figure 2: AWV vs. Typical Project Process for Receiving Consultant Actual Cost Data for EV System Use

EV Practices – Analysis and Internal Review: With Planned, Earned, and Actual data residing in the PRISM system, EV data can then be analyzed and reviewed internally with the Task Order Managers and / or Project Engineers. These individuals are the customers for the deliverables being provided through the various Consultant contracts, and they are held responsible by senior AWVSRP management for delivering their respective projects within the State's specified budget and no later than the schedule deadlines. The PRISM system as a robust analysis and reporting tool is central to completing this important step in the overall EV management process.

Prior to late 2007 when the program was managed as a single entity, it was organized along disciplinary (Environmental, Utilities, Seawall, etc.) lines. All Consultant contract Task Orders were assigned to a discipline, and the key mid-level managers executing the design work were the Task Order Managers. The Program Management Group used PRISM output to provide each of them with a Task Order Manager Report monthly. An example of such a report is shown in Section 7.0 – Exhibits, and consisted of:

- A tabular EV performance report with this data for the Task Order:
    - Planned, Earned, and Actual data for the reporting period (month).
    - Schedule and Cost Variance metrics for the reporting period.
    - Planned, Earned, and Actual data to-date.
    - Schedule and Cost Variance metrics to-date.
    - Total Task Order Budget (committed Task Order value).
    - Estimate of the Task Order cost at its completion.
    - The Variance (difference) between the Task Order Budget and Estimate-at-Completion.
- A graphic time-phased EV performance report that plotted monthly cumulative values for Planned, Earned, and Actual data, as well as a tabular data section that also included Schedule Performance Index and Cost Performance Index values to-date and for the period only for each month.
- A graphic time-phased EV performance report that plotted monthly Schedule Performance Index and Cost Performance Index values, comparing them to an index value of 1.0. In this system, index values of 1.0 or greater are favorable and indicate ahead-of-schedule or under-budget performance; values of less than 1.0 indicate behind-schedule or over-budget performance. Tabular data is also displayed on the graph.

These reports were regularly provided monthly to each Task Order Manager, and the Program Management Group invited questions and made its staff available for discussion. However, no standing meetings were held that focused on discussing this information at the Task Order Manager level.

Beginning in mid-2007, the structure of the AWVSRP changed from a singular program organized into disciplines into one that was organized into multiple projects. Although Task Order Managers were still assigned to individual Task Orders, the focus shifted from them as being the primary stakeholders in individual project delivery to Project Engineers (PE's); a PE was assigned to each Moving Forward project. In this environment, the reporting approach likewise shifted from disciplinary-based to individual project-based. Also, EV analysis results were an important agenda item discussed in monthly "Confidence Meetings" that started at the same time.

The purpose of Confidence Meetings is for the PE to highlight project issues based on "exception reporting" (i.e., focus attention on those areas of the project that are not performing when compared to the cost/schedule baseline, and then determine those issues that made this the case) and communicate to the assembled program management team the proposed corrective action plan. The ensuing discussion would be of value in vetting the corrective action plan, and in attendees proposing other approaches that might be preferable. In the time period leading up to the monthly Confidence Meeting, the Cost Engineering section of the Program Management Group is key in preparing the PE to present his/her project's EV performance, analysis of reasons for adverse trends, and corrective action plans.

An example of EV data presented in Confidence Meetings is provided in Section 7.0 – Exhibits. Typical EV material consists of:

- A graphic time-phased EV performance report that plotted monthly cumulative values for Planned, Earned, and Actual data, as well as a tabular data section.
- Two rolling six-month (three months prior to the reporting status date + three months after the status date) graphics of cumulative EV performance per month. Each was identical, however, on one was displayed a highlight of the current period and to-date cost variance with a projection as to final cost performance; and on the other graphic was a highlight of the current period and to-date schedule variance with a projection as to final schedule performance.
- A rolling six-month graphic of to-date Cost Performance Index and Schedule Performance Index values per month, and also showing a graphic comparison to a "1.0" index value. On this graphic are displayed prominent highlights of the current month's to-date Cost Performance Index and Schedule Performance Index values.
- A text Variance Analysis slide containing individual areas for discussions of:
    - Problem Analysis
    - Corrective Action Plan
    - Estimate-at-Completion

<u>EV Practices – Reporting External to the Program:</u> The AWVSRP Program Management Group produces monthly and quarterly reports to WSDOT management personnel who are external to the program. EV-based data and analysis is prominent in each type report. An example of a monthly report and an accompanying EV analysis discussion document is provided in Section 7.0 – Exhibits.

Monthly Progress Reports are submitted to the Urban Corridors Office headquarters, and they are discussed in detail at monthly Project Controls & Reporting / Program Management (PC&R/PM) meetings. The written EV analysis narrative that accompanies each report is also given to each meeting attendee and is also discussed, along with any project issues that are the root cause of significant cost and / or schedule variances.

From the inception of the Monthly Progress Reports through the report issued for November 2007, the AWVSRP was reported as a single entity. Beginning with the report for December 2007, individual project segregation began to appear with one of the Moving Forward projects, the SR99/S Massachusetts St. to Union St. – Electrical Line Relocation Project, being the subject of separate EV data reporting. The significant effort to segregate the overall program EV database into separable project elements (further discussed below) plus technical issues encountered with an upgrade to the PRISM software application in early 2008 resulted in no individual project-segregated EV data reported for the combined months of February-March 2008. Such data would be available for all individual projects starting with the April 2008 Monthly Progress Report. Given that the scope of the Central Waterfront portion of the program had not yet been defined, no separate report was provided for that segment, nor is it planned for such reporting until its scope is determined and a performance measurement baseline established.

Monthly Progress Reports consist of these individual elements:

- Cover page with a program highlight progress photograph.
- Summary EV graphic with other text information covering performance in the current biennium. The three key EV data elements (Planned, Earned, and Actual) are included on the graph.
- One page for each project that summarizes project accomplishments, challenges, and opportunities fro the reporting month. This page consists of text, and is without graphic or numerically displayed data.
- An EV graphic-numeric table page displaying time phased data covering the previous biennium plus the current biennium. The three key EV data elements (Planned, Earned, and Actual) are included on the graph.
- A similar EV graphic-numeric table page as described above, but which covers the entire time period of the program or project.
- A time spread data table page that displays Original Budget, Earned, Actual/Future Estimated, and Approved Budget (essentially the Original Budget plus approved revisions) data by biennia. This data is provided in individual table segments for the PE, RW, and CN phases of the program or project.
- A “trend analysis” table that displays Actual Cost, Estimate-to-Completion, trended Estimate-at-Completion (an estimate based on the application of Cost Performance Index values to actual costs-to-date), Budget, Budget-versus-Estimate Variance, and physical percent complete data. This data is provided in individual table segments for each project (identified by PIN), and within each PIN, data is summarized for the PE, RW, and CN phases of the program or project.
- A summary schedule for the program or project that provides baseline and forecast start / finish dates for a combination of activity “bars” and significant schedule milestones.

Each Monthly Progress Report is accompanied by an EV analysis document that discusses these items:

- Schedule performance to-date.
- Schedule performance for the reporting month.
- Cost performance to-date.

- Cost performance for the reporting month.
- Internal and External Influences on Schedule and Cost Performance.
- Master Schedule Status.

Quarterly Progress Reports are also provided to WSDOT management external to the program. Given that it is essentially a summary of the Monthly Progress Reports for the quarter, no separate example is provided in Section 7.0 – Exhibits. Quarterly Progress Reports consist of these items:

- Cover page with an overall graphic of the program geographic limits, a program description, and a summary of issues and concerns.
- A quarterly update page that contains project title and location; project description; recent progress; design and construction impacts; environmental impacts / compliance issues; impacts to traffic; a summary of status on the primary reportable schedule milestones; tabular cost summary data; and a planned versus actual expenditures graphic.
- A summary accomplishments, challenges, and opportunities page.
- An EV graphic-numeric table page displaying time phased data covering the entire time period of the program or project.
- Significant program issues that will appear / have appeared previously in the "Beige Pages" of the "Gray Notebook." WSDOT's Gray Notebook is a formal reporting tool, the "Beige Pages" of which deal with line-item budgeted projects (funded with Nickel/TPA funds) in particular. This report and these pages is where WSDOT tracks and reports the status of all line-item budgeted projects from start to completion, with early notification of potential changes as well as accounting for actual project adjustments.[14]

Late 2007 Allocation of Program-wide Costs to Projects: As mentioned previously, in October 2007 the AWVSRP staff was directed by WSDOT management to internally monitor, manage, and report on its Moving Forward projects plus the Central Waterfront scope as separate entities, instead of as a single program in its entirety. Among other reporting system and database issues to be addressed to comply with this requirement, one issue concerned how to handle and report on those costs that were not specific to projects. Such costs, designated as "program-wide" included, among others, program management staff and consultants; creation and maintenance of software applications that had utility across the entire program and which benefited all projects; public outreach; and corridor-level transportation planning. A recommendation to create a separate project entity (PIN), on the same level of the program WBS as the Moving Forward projects that would directly receive these costs was rejected by UCO management, requiring Program Management staff to develop a methodology for identifying and allocating these costs in a rational way among all of the subordinate projects in the program.

[14] Project Control and Reporting Manual, 2008, p. xxi.

After extensive discussion, these steps were planned for and then implemented to allocate program-wide costs that were incurred since July 1, 2007 (the start of the 07-09 biennium, and coincident with the start of significant work on the Moving Forward scope) to subordinate projects, and which would continue to be incurred into the future. Costs prior to that date were for the 05-07 biennium and earlier biennia, and were considered to be related to the "legacy" part of the program when it was managed as a single entity:

- Important reference information was the budgets that were determined for each project (PIN), both in the overall amount, and also budgeted amounts for the current biennium (07-09).

- All program-wide types of costs, both from State Forces and Consultants, were identified.

- The budgets for State Forces and committed values for each contract Task Order were assigned to each of the subordinate projects on a percentage basis in proportion to the separate PIN budgets for the 07-09 biennium.

- Allocating Actuals:

    - The 07-09 PIN budgets were the basis for the percentages of program-wide costs that would be assigned to each subordinate project.

    - The resulting percentages determined above would be communicated to those Consultant firms identified as having program-wide scope. Personnel preparing company invoices would use these percentages to divide their charges to each of the identified projects. This was done by each Consultant for all charges invoiced since July 1, 2007, and would continue to be done for all future charges within each monthly invoice. Note that this division of charges occurred at the Task Order level only; for the sake of simplicity, Consultants did not perform this division of costs at the Control Account level of detail.

    - Because each project has a separate timeline, as projects complete, or if another significant event occurs that would affect overall subordinate project schedules, the percentage values across projects would be re-calculated and a new directive would be issued to the consultants as needed.

- In parallel with the above steps, documentation was prepared to authorize new PE and RW phase Work Orders that would be specific to the individual projects. As discussed previously, each subordinate project would be identified numerically as PIN's; one or more WIN's would be assigned to each PIN; each WIN would have assigned to it Work Orders, one each specific to the PE, RW, and CN phase.

- As documentation was received from each consultant showing the new division of charges invoiced since July 1, 2007 to the subordinate projects, journal voucher documentation was prepared to transfer those costs from the legacy PE Work Order to the new project-specific Work Orders within the State financial systems. For future costs, the new project-specific Work Orders will directly receive new charges invoiced.

- Exceptions to the above:
    - No budget or actual charges were allocated to the SR99/Alaskan Way Viaduct Yesler Way Vicinity – Stabilize Foundation Project, since that project was already in construction with a pre-established budget.
    - No budget or actual charges were allocated to the Viaduct Transit Enhancements and Local Improvements Project to comply with AWVSRP management direction indicating that this project's budget must be preserved solely the delivery of traffic mitigation measures in the field.
- The above steps were applied to costs assigned to the PE phase of the program. A similar methodology specific to RW costs was applied to that phase. The Program Management Group took the action to revisit the above methodology in the future as the CN phase of the program drew near to determine what changes, if any, would be needed to accommodate WSDOT's requirements for cost accounting in construction.
- Note that all of the above steps initially corrected and populated the State financial system (TRAINS) with charges since July 1, 2007 that were now individual project-specific as opposed to being assigned only to the overall program level. The Program's PRISM system received this re-allocated financial data through the FIRS interface. These were large scale downloads of data that occurred in two instances; once for PE costs and once for RW.

The schedule used to track progress in allocating these program-wide costs to individual projects displays all of the steps followed in this effort in greater detail, and is provided in Section 7.0 – Exhibits in this report.

Graphic Depiction of Overall EV Process on AWVSRP: Figure 3 below is a schematic flow diagram summarizing the various steps followed by the AWVSRP staff in processing, analyzing, and reporting EV data.

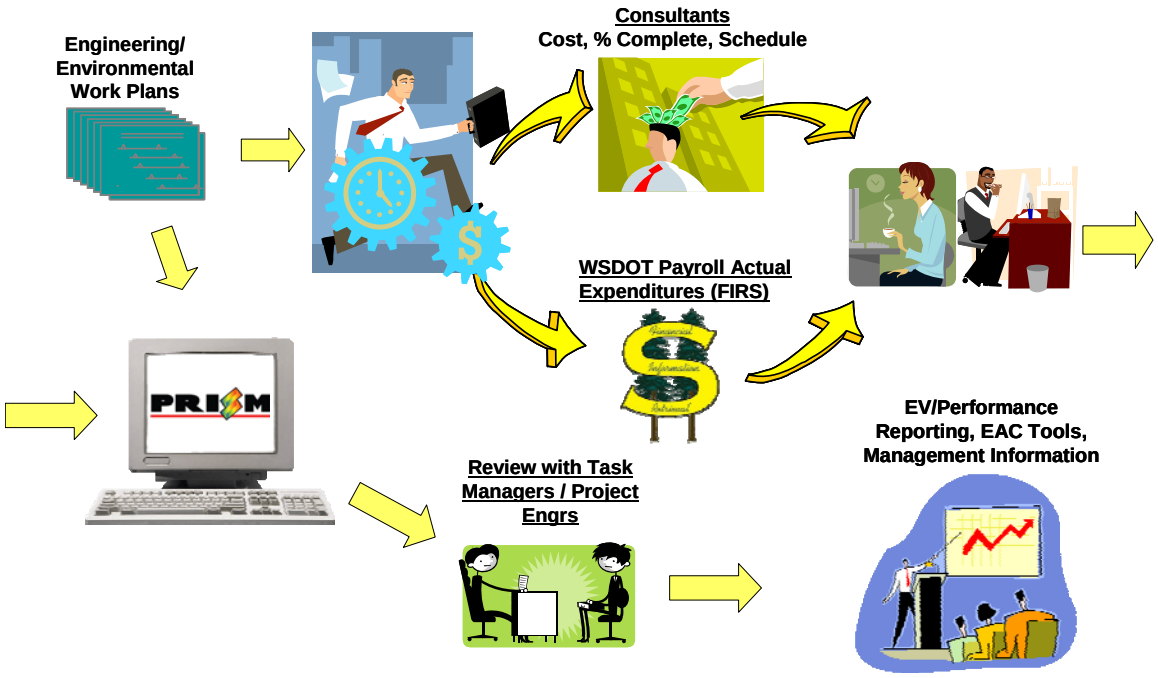


Figure 3: Summary of the AWVSRP Earned Value Data Receipt – Analysis – Reporting Process

4.1 Overview of EV Implementation at WSDOT's Urban Corridors Office (UCO) and on AWVSRP

Original purpose, philosophy, and vision: The original impetus for developing and implementing an Earned value Management System (EVMS) was to provide accountability to the Washington State Legislature and to the taxpayers per Executive Order E1032, issued by then Secretary of Transportation Douglas MacDonald on July 1, 2005. Notable provisions within that document that related to the use of a project performance measurement methodology such as EV include:

- We shall manage the resources taxpayers and the legislature entrust to us for the highest possible return of value. We shall be disciplined in our use of both time and money. We shall account for our achievements, our shortcomings, and our challenges to citizens, to elected officials, and to other public agencies.
- Executives and Senior Managers shall know the status of all of the projects assigned to them.
- Project Managers shall:
    - Report on Scope, Schedule and Budget as defined in the Project Control & Reporting Guide.
    - Ensure that all project status reports shall include at a minimum the status of the "total" project budget, costs, and forecasted cost-to-complete.
- Specialty Groups that support a given project shall provide the project manager with a schedule and estimate for the tasks assigned.[15]

Although not a final step in improving project / program management practices and the use of EV to measure project performance, it in itself represented a culmination of a series of events:

- In 1997, WSDOT's Olympic Region commenced to improve its project delivery effectiveness. This effort evolved into a search for a more robust scheduling software tool that could handle multiple project schedules, be networked with other project support teams to share schedule information, and have the ability to compile schedule, budget, and resource data and "roll it up" at the team, office, and region levels.
- In early 2000, WSDOT developed the Managing Project Delivery (MPD) process, defined as the "standard practice to manage projects, and provides a method to meet the WSDOT Management Principles." The MPD was developed by WSDOT based on industry standards for project management. Shortly after development, training in MPD began.
- In mid-2001, WSDOT began training in project scheduling and began use of the PS8 scheduling software application.

[15] MacDonald, Douglas. "Project Management; Executive Order E1032.00." July 1, 2005. Washington State Department of Transportation.

- In early 2003, WSDOT developed the Project Delivery Information System (PDIS) and initiated its continued development and implementation. PDIS is now described as a tool that is based on a customized version of PS8 that provides for project planning; WBS development; schedule building; resource assignments and management; cost to complete estimates; project analysis and tracking; individual or multiple project analysis; and project performance measurement.[16]

- In January 2005, the State of Washington Transportation Performance Audit Board reported to the House, Senate, and Legislative Transportation Committees on their review of WSDOT highways and ferries performance measures. In its report, it notes that WSDOT has made substantial progress in implementing improved reporting and accountability in the area of project delivery. It goes on to note that "WSDOT recognizes the limitations their systems place on the performance management process and has requested assistance in upgrading and replacing them."[17]

- On May 9, 2005, the Governor of the State of Washington signed into law the "2005 Transportation Partnership Funding Package" that included $7.2 billion to be expended for highways, ferries, and other multi-modal transportation projects. These would be funded by an incremental 9.5 cent gas tax, in addition to the previously enacted 5 cent gas tax known as the "Nickel" program.

- In May 2005, WSDOT issued to the industry-at-large a "Notice to Consultants – Request for Ideas." The goal for this specific Request for Ideas effort was for WSDOT to hear from industry partners on ideas for program management, project delivery, and reporting. WSDOT further stated its intent to "maintain its core expertise, technical capabilities, and grow future project managers and team leaders through 'on the job' training and challenging projects. WSDOT also believes that a strong owner role is necessary under any program delivery model."[18] The Request for Ideas document provided an overview of the WSDOT's status of its project and program management practices at the time. Part of its project / program management overview included these items:

    - A description of PDIS, and further stating that "another shortcoming of PDIS is that it cannot provide individual project mangers with real-time expenditure information, nor can it automatically determine the earned value of a project. An objective of this system should be to provide project managers with an early warning of potential schedule and budget problems."

    - A statement that individual project managers are "expected to communicate the delivery status of their projects. This status reporting includes schedule, cost, and forecasted cost to complete."

    - A statement that both the UCO and Washington State Ferries (WSF) had started use of Primavera Project Planner – Enterprise (P3e), which gave project managers the capability to report schedule performance, cost, performance, and earned value. This system was described as a pilot program that had met with "some success."

    - Various statements to the effect that existing systems made it difficult to produce and maintain reporting information on the status of individual projects and programs.

[16] Washington State Department of Transportation. "Project Delivery Information System (PDIS)." May 24, 2008. < http://www.wsdot.wa.gov/Projects/ProjectMgmt/pdis.htm>.

[17] Hurley, Doug. "Final Report – Department of Transportation Highways and Ferries Programs Performance Measure Review." January 27, 2005. Washington State Transportation Performance Audit Board.

[18] Washington State Department of Transportation. "Notice to Consultants – Request for Ideas". May 2005. p 1.

- In mid-June 2005, WSDOT senior management received presentations concerning project / program management and delivery practices over a three-day time period from over 20 consultant teams who responded to the Request for Ideas solicitation.

- During mid- 2005, WSDOT management visited the South Carolina and Louisiana Departments of Transportation to discuss their project controls practices and systems as part of a benchmark research effort. Visitation of "mega-projects" to gather lessons learned would become a normal practice going forward.

The Urban Corridors Office – EV Proponent Organization: The proponent organization of the use of EV on the AWVSRP as well as other projects in the Seattle area is the Project Controls and Reporting Office of WSDOT's Urban Corridors Office (UCO PC&R). UCO was created in 2001 with an overall purpose to develop, design, and deliver a multi-billion dollar program of Seattle-metropolitan area mega-projects.

UCO PC&R's goals and objectives, stated below, are many. Although the phrase "Earned Value" is not specifically mentioned, that methodology is considered a fundamental tool in supporting project delivery within the UCO area of responsibility:

- Goals & Objectives: To support the mission, the UCO PC&R developed goals and objectives to support program delivery for the elements of planning, accountability, efficiency, effectiveness, and documentation (these goals and objectives are not necessarily in order of priority):

- Goal 1. Support strategic delivery by developing and maintaining the UCO strategic delivery plan; objectives;

    - Develop the UCO strategic delivery plan

    - Periodically update the UCO strategic delivery plan

    - Monitor and report performance of the delivery strategy

- Goal 2. Support project planning and delivery by developing and maintaining guidance for UCO project management plans and ensuring that UCO Project Management Plans (PMPs) meet regional, state, and federal requirements; objectives;

    - Determine the collective requirements for PMPs

    - Develop PMP requirements for UCO projects that meet requirements

    - Update and maintain PMP requirements for UCO projects by size category

    - Audit PMPs and report on consistency with requirements

- Goal 3. Support accountability by developing, maintaining, and implementing reporting systems that meet UCO and statewide project control and reporting requirements; objectives:

    - Develop and maintain project centric reporting requirements

    - Develop and maintain internal reporting requirements

- Develop and maintain external reporting requirements
- Maintain consistency between PC&R and Statewide reporting requirements
- Provide program rollups, rollups across deliverables, and rollup reports with analysis
- Monitor and report performance against requirements

- Goal 4. Support the delivery of the UCO program by developing, implementing, maintaining, and supporting project and program management tools that meet industry standards for quality, efficiency, and accountability; objectives:
  - Review recommendations of Statewide Program Management (SPM) Phase 1 Report and subsequent reports
  - Participate in the statewide procurement process
  - Participate in the statewide implementation process
  - Customize tools to meet UCO specific requirements
  - Train staff in the practical application of the tools
  - Participate in the statewide review of the efficacy of tools and the implementation process
  - Periodically review UCO tools and their use against industry best practices
- Goal 5. Increase efficiency and reduce delivery costs by recruiting and retaining a highly qualified and productive UCO PC&R workforce; objectives:
  - Establish position descriptions that meet or exceed industry standard
  - Search within WSDOT and, if necessary, outside or WSDOT for qualified staff
  - Work with statewide training efforts to integrate UCO training needs into statewide training programs
  - Provide training in the underlying disciplines of scheduling, cost control, change management, earned value, scoping, scope control, and document control
  - Plan and track UCO staffing requirements against budgets and Direct Project Support.
- Goal 6. Support increased efficiency and effectiveness by establishing, maintaining, and utilizing risk management, change management, and configuration management principles across the UCO program; objectives:
  - Develop UCO risk management standards to track and report on risk management to industry standard
  - Measure and report on risk management performance at the project, program, and regional level

- Coordinate the Cost Estimate Validation Process (CEVP) for all of UCO including the application of risk management principles
- Issue standard guidance for UCO CEVP risk related efforts, track and report UCO CEVP performance with regard to risk
- Develop and implement change management practices across UCO
- Develop and implement configuration management practices across UCO

- Goal 7. Support accountability by establishing and maintaining a cost estimating system that facilitates the development of accurate and timely project and program cost estimates and schedules to complete; objectives:
  - Coordinate UCO CEVP efforts
  - Measure and report on CEVP facilitator, workshop, and documentation performance
  - Develop and issue guidance for UCO CEVP and Cost Risk Assessment (CRA) efforts, and periodically update
  - Measure and report on UCO CEVP/CRA performance
- Goal 8. Support project delivery and accountability by performing efficient and effective quality control and quality assurance of project control and reporting systems, analysis, and reports; objectives:
  - Develop standards for project control and reporting for cost, schedule, and analysis
  - Monitor performance of reporting and reporting systems
  - Implement the use of sophisticated analysis and early warning systems
  - Provide quality assurance of cost and schedule management efforts
  - Provide quality assurance of analysis efforts, including cost and schedule at complete
- Goal 9. Reduce liability and support program delivery by developing, implementing, and maintaining document control systems that facilitate decision making and documentation; objectives:
  - Provide system support and maintenance of document control system software
  - Train users in the effective use of system software
  - Develop and provide document control guidance to projects
  - Measure and report on document control performance

- Provide support for small project document control efforts[19]

Early Implementation of EV; the Urban Corridors Office Experience: The Administrator of UCO when it commenced to implement EV was a highly experienced capital project and program delivery professional who participated in the Request for Ideas panel, and also the benchmarking visits to various other projects and state departments of transportation. Through these efforts and combined with his own personal experience, he possessed considerable insight into what improvements were needed in project performance measurement, which would lead to improved reporting and delivery. He provided the management support to UCO PC&R in their assignment to implement EVMS methodologies across the various projects within the UCO area of responsibility.

The following are the highlights of UCO PC&R's early implementation of EVMS on projects.

- Assessment of the status-quo in EV usage: An early step in EV implementation was to understand current practices, compare them to the ideal case where an experienced project team supported by a robust project controls group could use EVMS to its full potential, and then to determine gaps that must be addressed. Individuals interviewed at UCO had these observations:

  - That there was a lack of standardized metrics for project performance measurement.
  - That staff members with project controls responsibilities assigned to projects had little or no knowledge of EVMS theory, and certainly had little, if any, experience in using it.
  - That there was a lack of consistency in business rules. This included inconsistency in using the PIN as a higher level in the accounting structure, or as subordinate to the WIN in accounting.
  - That the performance measurement rules used on projects were not verifiable.
  - That there was a high priority placed on control of expenditures to the exclusion of measuring whether work was being accomplished on schedule, and if it was truly being accomplished within budgets.
  - That there was a lack of sophisticated EV measurement software tools on the projects. UCO staff interviewed shared the assessment stated in the Request for Ideas document about the EV shortcomings of the existing PDIS set of tools.[20]

  Individuals interviewed with first-hand experience in EVMS implementation within UCO noted that UCO management especially, and WSDOT management in general, was very interested in the implementation of EV-supporting tools. However, they felt that WSDOT management did not philosophically correlate the use of EV to capital project accountability compliance as being analogous to Sarbanes-Oxley accountability compliance in the corporate environment.

[19] Washington State Department of Transportation. "UCO Project Control and Reporting." May 10, 2008. < http://www.wsdot.wa.gov/UCO/ProjectControls.htm>.

[20] Baillie, Geoff and Sullivan, Michael. Interview with Harry Jarnagan. March 13, 2008.

- Promulgation of EV usage to projects and communication of the need: To many individuals in the capital project/program management profession, EVMS is an advanced concept with which they may not be familiar or experienced. Typically, these same individuals have heard anecdotally that it is a cumbersome and time-consuming methodology that yields questionable benefits. It is often incumbent on those who are assigned the task of implementing it as a new practice in an organization to clearly and persuasively communicate the need for it. This was the experience of UCO PC&R. Acceptance of the concept project-by-project was very mixed. UCO PC&R staff felt the need to "sell" it to every individual project they encountered. In their opinion, not all of the Project Engineers accepted using it.

- Early procedures: EVMS Procedures were developed by UCO PC&R along well established industry-accepted practices. These items specific to WSDOT merit highlighting:

    - The data structure within the EV system would mirror the WSDOT accounting structure.

    - The concept of Control Accounts had been introduced to WSDOT by CH2M-Hill in 2003. This concept was adopted by UCO PC&R, and as described above in Section 3.0 – Overview of WSDOT EV Practices, it is an important part of the EV structure within software tools.

    - The Central Artery Project in Boston was considered a source of lessons learned for UCO. Based on the experience of that project, UCO PC&R resolved to measure project performance based on deliverables. Given that most UCO projects at that time were in the PE phase which deals with design, a primary tool for defining and structuring PE deliverables especially was the previously mentioned Master Deliverable List (MDL). Its use became a part of standard EVMS procedures.

    - UCO PC&R enforced monthly reporting to supplement the Quarterly Progress Reports already required by WSDOT. In February 2007, UCO PC&R held meetings with individual program managers and other invitees to issue expectations for EV analysis reporting that would be required during monthly meetings held to discuss the monthly progress reports.

- EV software tools: As mentioned above, P3e had been in use at UCO starting in 2004, and had been used to some effect in the EVMS area. However, UCO PC&R identified a need for an "off-the-shelf" cost management system (as opposed to a locally developed, highly customized software application), and issued a Request for Proposals (RFP) for such. Through a competitive RFP process, Ares Corporation's PRISM system was chosen as the "mainline" cost management and EVMS tool. The standard reports, both tabular and graphic, available from PRISM became the format basis for the Monthly Progress Reports required by UCO.

- Initial training provided: CH2M-Hill provided an initial orientation to EVMS. This was followed by another consultant to UCO, Baillie and Associates, providing EVMS training, and an orientation to PRISM. This training went well, in the opinion of UCO PC&R staff, but staff attendance was low.

- Personnel supporting EV implementation: The most fundamental factor to successfully implementing EVMS on a project is the presence of trained personnel in adequate numbers who can use this methodology to its full benefit. UCO PC&R realized this and made an early and high priority effort to find those staff members who could learn and use EVMS on each project. UCO PC&R subsequently formed an EVMS users group. Staffing resources who can implement EV have typically remained very light, and this shortage has been further aggravated by personnel turnover. UCO PC&R staff interviewed felt that the lack of appropriate staffing on individual projects continues to be an issue.

Early Implementation of EV; the Alaskan Way Viaduct and Seawall Replacement Program Experience: The Program Management Group of the AWVSRP (AWVSRP PMG) was the organization assigned responsibility for implementation of EVMS within that program. Although it is subordinate to UCO regarding EV implementation and looks to UCO PC&R for overall direction, it has developed a partnership and a productive working relationship with them leading to a successful program-level EVMS.

The following are the highlights of the AWVSRP PMG experience in its early implementation of EVMS on this program. Certain aspects representing implementation improvements or refinements will be further discussed in other report sections as noted:

- Personnel and organization: In its early program phases, the EV system was supported by a very small staff on the AWVSRP. Only one individual with no EV experience was charged with EVMS implementation for the program, and he was assigned other business management responsibilities as well. Eventually, two other individuals were assigned to Program Management with the responsibility for EVMS among other duties, neither of whom were deeply experienced in that discipline; they learned "on the job" under UCO PC&R's guidance. In early 2006, a Program Manager was assigned to AWVSRP, and in April 2006 the PMG was further augmented with the staff of a Project Management Assistance Consultant (PMAC) providing services under contract awarded through a competitive process. This is further discussed in Section 4.2 below.

- Effect of AWVSRP scope and plan of execution: Setup and maintenance of the AWVSRP EV system was affected by changeable program scope and accompanying plans for delivering it. This is further discussed in Section 4.2 below.

- Contract management procedures: Agreements and associated Task Orders, even if intended to be for long-term support of the program, typically never extend for a longer period of performance than the current biennium, and are often shorter that that in duration. This is a function of the biennial-based system of budget development and subsequent enactment by the Legislature every two years. Such Task Orders, as packages of work to be scoped, negotiated, scheduled, and planned for delivery, must likewise be replicated at the Control Account level of detail in the EV system.

- AWVSRP early use of PRISM: The AWVSRP PMG, under UCO's guidance, realized the value of a tool such as PRISM in support EVMS on the program. The following highlights early experience and other factors affecting the use of this software application:

    - Level of detail: Control Accounts in the early PRISM database represented very detailed elements of work, set at a low level within the MDL. One individual using PRISM day-to-day in the Cost Engineering section of the AWVSRP PMG estimated that the program had 1,000 or more Control Accounts residing within the PRISM database. Level of detail impacts were addressed as further discussed in Section 4.2 below.

    - Tracking funding sources ("colors of money"): PRISM was and is used as a tool for tracking fund sources assigned to scopes of work. This influences the functioning of the EV system, and is further discussed in Section 4.2 below.

- Method of measuring physical progress: Given early lack of familiarity with EVMS methods, the AWVSRP PMG did not at first have experience in the best means to measure progress against the many reports, white papers, and other design deliverables associated with the individual Control Accounts. In many cases, no succinctly defined progress method (such as Level of Effort; Supervisor's Subjective Opinion; Milestone; etc.) was used at all against a given package of scope, and percent complete metrics were determined subjectively in a group setting of the project team. This was an aspect of EV management that was also addressed as an improvement and is discussed in Section 4.2.

4.2 Refinements and Improvements in Procedures and Factors Affecting Initial Implementation

As is the case with any aspect of program management and delivery, the EV system on AWVSRP was affected by various factors internal and external to the project that affected its functioning. Significant factors are discussed below:

External factors impacting initial EV implementation:

- Scope definition: As mentioned earlier, in 2004 the State and the City of Seattle selected a stacked, six-lane tunnel (three lanes in each direction) as the preferred alternative for the replacement of the viaduct, with a separate elevated structure alternative held as a contingency plan. As of April 2006, this was the basis of the Planned data within the AWVSRP EV system, and the level of design was conceptual only; no portion of the scope of work had yet reached 30% design. In March 2007, with the Seattle advisory vote resulting in a decision of "no" to each of the offered alternatives, the plan of execution was revised to deliver six Moving Forward projects plus the Central Waterfront project that concerned a viaduct replacement alternative yet to be determined. In October 2007, the EV system was again fundamentally revised to reflect the formal (albeit internal to WSDOT) segregation of the various individual projects and the previously described need to allocate program-wide committed and actual costs to the subordinate projects.

- Funds management issues and requirements: UCO directed that PRISM be the primary tool for project-level tracking of funds sources and usage. Fund sources are assigned at the Control Account level of detail, and there are often multiple sources of funds associated with a single Control Account. In the event that funds availability issues identified by WSDOT headquarters or UCO require a change of funding source underlying a given scope of work, this data likewise requires revision to every affected Control Account in PRISM. This requirement has added to system complexity and, in turn, the labor effort needed to manage data and stay abreast with / respond to any issues relevant to funding.

- The Statewide Program Management Group (SPMG): In recognition of the significant size of oncoming capital projects and programs, WSDOT realized that improved processes and systems would be required statewide. To assist in this and other related effort, WSDOT retained the Statewide Program Management Group (SPMG), a consortium of consulting firms, whose staff are recognized leaders in the implementation of best management practices to support delivery of large-size programs. In its June 2006 strategic plan, the SPMG stated that it planned to adopt the national standard for Earned Value Management Systems (ANSI/EIA-748-A), and to advocate adoption of EVMS as a statewide standard practice. In that document it goes on to detail several intended actions to achieve this goal. Pursuant to these goals, the SPMG is developing an improved project management set of software tools entitled the "Project Management and Reporting System" (PMRS), with the stated objectives to "provide WSDOT

with the tools, business processes and training to deliver construction projects on-time, on-budget, within scope and to establish accountability." In the area of EVMS, the PMRS will include a Cost Control / Earned Value tool that will "report the budget and budget changes, actual expenditures and commitments and capture the forecasted cost to complete. This information will be used in conjunction with the scheduling information and physical percent complete to generate the earned value. Earned value is a method for management to use to forecast the cost and schedule outcomes of a project, and thereby make adjustments earlier than would otherwise be possible."[21] These tools have not yet been introduced to the AWVSRP, however, the SPMG has already indirectly helped in the advancement of project controls and EV as a project management discipline in that it has convinced WSDOT to advocate project controls as a career path, and to open this opportunity to business school and CM program graduates as well as engineers.

Internal factors impacting EV implementation.

- Mobilization of the Project Management Assistance Consultant (PMAC) and growth of the AWVSRP Program Management Group: The PMAC mobilized in April 2006, bringing with it pre-existing project controls and EVMS experience. Since that time, both WSDOT and PMAC staffing has increased, with many of the recently acquired personnel either directly implementing the EV system, or supporting it indirectly. At the writing of this report, the AWVSRP PMG had become a multi-disciplinary management support organization consisting of over 30 staff. The organization charts for the AWVSRP PMG (included in the larger Programs and Services Organization, which includes AWVSRP Environmental Services) and for the overall program are included in Section 7.0 – Exhibits to this report.

- EVMS "missions" of the AWVSRP PMG: In its delivery of program management services in general, and specifically in the areas of project controls and EVMS, the AWVSRP PMG has adopted these bullets collectively as its "missions:"

    - To establish Program baselines; scope, cost, and schedule
    - To monitor performance against the baselines; detect any deviations
    - To take early corrective actions
    - To proactively manage and retire risk issues
    - To continuously forecast performance and results
    - To manage the future instead of reacting to the past.

[21] Washington State Department of Transportation. "Project Management and Reporting System". Folio, March 2004.

- Creation of a Program Management "Center of Excellence": The AWVSRP PMG adopted a philosophy of creating from the "bottoms up" a Center of Excellence to support the program. This has had a direct influence on EVMS implementation. In order of importance, this calls for, first, the creation of an organization of trained individuals; second, the establishment of industry-standard practices and procedures; and finally, the deployment of robust software tools that will improve responsiveness and productivity. The pyramid in Figure 4 illustrates this concept.

Figure 4: Creating a Center of Program Management Excellence

- Professional qualifications and training: The AWVSRP PMG has added individuals to the staff who are project controls professionals with especially deep EV experience and who are certified in project controls through AACE International (a professional/educational project controls association) or in project management through the Project Management Institute. These individuals have coordinated the delivery of a training program to all AWVSRP PMG staff as further discussed below. Also, the prime consultant within the PMAC contract, Hatch Mott MacDonald (HMM), is a corporate sponsor of AACE International, and all of its project controls staff corporate-wide hold individual memberships in that organization. HMM's experience has demonstrated that such membership has a positive effect on the professional development and expertise of its project controls staff, and this has been leveraged to the benefit of the EVMS on the AWVSRP.

Revisions / improvements in procedures: The implementation of EV within the UCO area of responsibility and on the AWVSRP specifically has been a process that has spanned years. These improvements and the benefit of lessons learned / input of users have been implemented over time:

- Level of detail in the EV system: The MDL has been a key tool in structuring and identifying deliverables. In the early phases of EV implementation on AWVSRP, the level of the MDL at which Control Accounts were taken was very low, resulting in over 1,000 Control Accounts residing in the PRISM system. Given the resulting proliferation of data and the small staff available to support EV analysis, the AWVSRP PMG decided to create Control Accounts at a more summary level of detail, typically at level 2 of the MDL, but possibly at lower levels only if the nature of the work being measured justifies it. This has reduced the number of Control Accounts within PRISM, making the level of data to be managed more meaningful; and making the effort required to perform such data entry and management work more in alignment with the available staff.

- Physical progress measurement rules: With the addition of experienced project controls professionals on the AWVSRP PMG staff, a greater level of understanding and appreciation of the best means to measure progress on deliverables was likewise realized. Standard rules of measurement have been implemented for deliverables, depending on their nature. For example, management and support staff are subjected to "level of effort" measurement rules. Short duration reports will be measured using a "0 / 100%" rule, or perhaps a "50/50%" rule. This has resulted in more objective measurements of progress and less confusion as to physical percent complete.

- Confidence reporting: The submittal of "Confidence Reports" and the convening of meetings to discuss them are not unique to AWVSRP; they are standard in a number of regions within WSDOT. However, the inclusion of EV measures and the requirement for Project Engineers to report on those metrics during Confidence Report Meetings is not typical within WSDOT. It has been of value in the implementation of EV on this program in that it becomes incumbent on the individual PE's to understand their project performance measurement baselines; become engaged in progress measurement; understand their project performance data and identify cost and schedule performance variances; to correlate those variances to root cause; and finally, to develop corrective action plans for those issues threatening cost and schedule targets.

4.3 Training Provided to Staff

Although the use of EVM methods may seem intuitive to those who have used them habitually in their careers, the "level of penetration" of these concepts within the capital project / program management industry is not extensive, so there is widespread lack of understanding of them. Training in not just EV, but also all aspects of project controls (project planning; cost estimating; cost control and reporting; scheduling; contracts management; change management) is absolutely essential to ensure that staff charged with EV-related responsibilities truly know how to create and manage such a system that will benefit the project. The training that was provided to the Program Management Group and also planned to be given to the design staff is discussed below:

Training provided to Program Management Group staff: In early 2007, the AWVSRP Program Manager authorized the acquisition of training materials and the expenditure of on-the-job time to allow the Program Management Group to undergo training in various project controls subjects. The purpose of such training was to increase the level of understanding in applied project management as a critical aspect of capital project and program delivery; to improve the Program Management Group's skills overall; and to ensure cross training among the various specialists in the organization.

The basis of this training program was AACE International's Skills and Knowledge of Cost Engineering, 5th Edition (S&K5). This publication is a product of AACE International's Education Board, its first edition having been released in 1987.

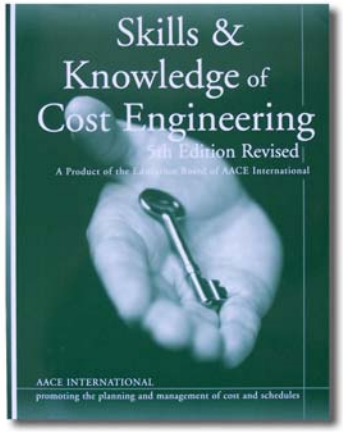


Figure 5: AACE International's Skills and Knowledge of Cost Engineering, 5th Edition.

Note that the term "Cost Engineering" arose from the petrochemical industry in the 1950's, and is synonymous with the more widely used term "Project Controls" today. The concepts discussed in S&K5 are parts of the larger practice of "Total Cost Management," further defined in the preface of S&K5 as stated below:

"Total Cost Management is the effective application of professional and technical expertise to plan and control resources, costs, profitability and risk. Simply stated, it is a systematic approach to managing cost throughout the life cycle of any enterprise, program, facility, project, product or service. This is accomplished through the application of cost engineering and cost management principles, proven methodologies and the latest technology in support of the management process.

Total Cost Management is that area of engineering practice where engineering judgment and experience are utilized in the application of scientific principles and techniques to problems of business and program planning; cost estimating; economic and financial analysis; cost engineering; program and project management; planning and scheduling; and cost and schedule performance measurement and change control."[22]

The AWVSRP PMG purchased hardcopies of this publication for every individual on its staff; this included Assistant Project Engineers provided by the PMAC who were actually members of the AWVSRP Design organization, and who had a combination of design management and independent technical oversight responsibilities. The training program commenced on March 22, 2007, and was held through September 20, 2007, consisting of weekly classes delivered to the staff by subject matter experts within the AWVSRP PMG and from UCO PC&R. The individual class topics included:

- Course Overview
- Project Planning
- Elements of Cost / Costing & Pricing / Estimating Introduction

[22] AACE International. Skills and Knowledge of Cost Engineering, 5th Edition. 2007. p. 6.

- Cost Estimating: Preparing Check Estimates During Project Design
- Cost Estimating: Detailed Construction Cost Estimates
- Introduction to Scheduling
- Scheduling (continued)
- Earned Value, Cost Control, Forecasting & Trending
- Earned Value, Cost Control, Forecasting & Trending (continued)
- Cost and Schedule Reporting
- WSDOT Program Management
- Project Management Systems
- Invoice Administration
- Delivery Methods for Construction
- Construction Contracts and Change Orders
- Reviewing Contractor Schedules and Change Orders: Time Impact Evaluations

An additional training reference used for the two EV classes shown above was Earned Value Project Management, 3rd Edition, by Quentin Fleming and Joel Koppelman.

Note also the logic of the sequence of the course topics. The course was structured along the capital delivery life cycle of a project beginning with its planning; estimating its cost and, in parallel, developing the project schedule; the integration of the estimate and schedule leads to the basis of an EV performance measurement baseline (Planned values), where Earned values are subsequently compared against both that baseline and against Actual costs; this leads to project reporting observing WSDOT program management procedures and using robust project controls tools; once the project is designed, then it goes into construction where an understanding of contract management principles is an absolutely essential part of construction management; as the project is constructed, the Owner staff will encounter changed conditions or other issues appropriate for resolution via change order, which will require that contractor Requests for Change be analyzed prior to negotiations.

Training provided to Design staff: The AWVSRP has purchased over 30 copies of Fleming and Koppelman's Earned Value Project Management as a basis for training to be provided to all key members of the AWVSRP Design organization. The designated instructor for these classes is the AWVSRP PMG Project Controls Manager. As of the date of this report, this training has not yet been provided, because of budget development and PS&E delivery priorities requiring the full attention of both the instructor and students. This instruction is targeted for delivery to the Design staff by September 2008 and is envisioned to consist of four "brown bag" classes to be provided during lunch hours.

Notwithstanding that this formal instruction has not yet been provided, ad-hoc training and the mentoring of the Design staff in EV principles has been continuous and is on-going. This occurs whenever EV data is discussed with the individual PE's, in sessions where they are prepared to present their EV status in Confidence Meetings, and in the Confidence Meetings themselves. The acknowledged subject matter experts in EV is the AWVSRP PMG, and they have become a valuable knowledge resource to Design organization management.

Training success indicators: Although quantifiable metrics of training effectiveness have not been developed, these indications of the success of the formalized training provided to AWVSRP PMG and the "on-the-job" training given to the Design staff have been noted:

- Greater involvement by the project controls staff in development of language of design Task Orders that impact EV implementation specific to the scope and deliverables.
- Improved communication between the cost engineering and scheduling sections of the AWVSRP project controls organization in integrating cost and scheduling data to arrive at the EV performance measurement baseline.
- Improved understanding of the nuances of industry-standard practices for EV management today; for example, knowing that level-of-effort work should not drive schedule variances within a project, and focusing on discrete-work Task Orders only when performing schedule-oriented EV analysis
- Improved abilities on the part of less experienced project controls staff in detecting EV data anomalies and taking independent corrective action.
- Improved skills in detecting notable cost and schedule variances and then assisting the PE's in understanding the reason for those trends.
- Better understanding and fluency on the part of the PE's in presenting EV data in Confidence Meetings and correlating the data to issues on the project and vice versa; they now understand what cost / schedule variances and what cost / schedule performance indices are and what that data tells them.
- An adoption on the project of the concept of "management by exception" and an improved appreciation of the role of the EVMS in supporting its implementation.
- Increased input being received from junior-level staff in recommending process or system improvements; these staff members have also taken the role of co-equal partners with more senior system experts in troubleshooting system or data issues instead of merely implementing "fixes" in accordance with detailed directions.
- Across the program, the entire Program Management and Design Management staff can "tell a story" around the EV data in ways that did not exist before.

4.4 Use of EV During the Design Phase – Notes from Industry

This section summarizes several concepts drawn from a variety of industry sources concerning use of EVM methodologies during the design phase of a project.

The Need for Engineering Project Control: As with any other phase of a capital project or program, the design/ engineering phase of the project can benefit from an effective project control system, of which an EVM component is an important part. The benefits of an effective project control system in design/engineering are many and should be considered to be a vital tool in ensuring project delivery success.

- It documents the project plan and actual performance.
- It identifies problem areas and unfavorable trends.
- It is a communication tool.
- It allows project managers and other project participants to monitor the work.
- It feeds the historical database so future planning of comparable work can be done more accurately.[23]

Given that the project controls function serves as the eyes and ears of management at all levels and the source of project status information for the client. It is also an information center for every professional on the staff. Accordingly, it should be organizationally placed so that it responds directly to the project manager. It must not be treated as another accounting function, nor should its activity be decentralized among the function groups. It must be recognized as an integral part of management, not a "police force".[24] In the context of a EVMS deployed on the project, the project controls function must also be staffed with individuals who are first trained in EV theory and applications, and then trained in the specific software applications in use on the project. It is incumbent on project management to receive the information provided from the EVMS, and then take the necessary steps to implement any action needed.

As with projects in general, the use of EVM methodologies in design/engineering requires that the project have a defined scope and an accompanying schedule and budget, in addition to having standard ways of measuring progress supported by trained personnel and tools to implement the overall system.

Challenges Inherent in EV in Design and Engineering: Control of engineering activity is generally more difficult than control of construction activity because engineering tasks and their associated deliverables are more difficult to quantify and track between start and completion. Instead of easily identifiable units of production that can be counted once they are emplaced and then correlated against the total units to be incorporated into a project to derive a percent complete measure, the products of engineering work instead usually include specifications, drawings, bid packages, and estimates. Because of the difficulty in quantifying progress for such deliverables, the methods of measurement used are widely variable, ranging from the completely subjective estimate of the design engineer to the use of a highly proscribed set of objective incremental milestones. The total completion percentages claimed by the engineering Consultant can thus become a point of contention on the part of the Owner.[25]

[23] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[24] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[25] Chen, Mark T. "Applying Earned Value Procedures to Engineering Management." 1991 AACE Transactions. O.4. AACE International.

Adding to the challenge is that the tasks associated with producing engineering deliverables are more parallel and overlapping, and the responsibility for a given design is often shared among various disciplines and sometimes across multiple companies. The challenge is particularly great on those projects where engineering overlaps procurement and construction.[26]

Given that design/engineering is the first phase of a project (ahead of procurement, construction and turnover), this will be the phase where the design will start as being conceptual with alternatives being considered and design details almost non-existent. Because of this, the baseline for this phase of the project is difficult to establish.

General Methods for EV in Design and Engineering: Invariably across a wide variety of projects, the labor force on which the design phase EVMS is focused is an engineering group generally organized around technical disciplines (civil, structural, electrical, mechanical, etc.) or specialty services (procurement, environmental, traffic modeling, etc.). These are the production units of the organization which are supported by various administrative and management services functions.[27]

In conceptual design with the difficulties in establishing a definitive performance measurement baseline mentioned above, the EVM system should be organized at a summary level, with a comparatively smaller number of Control Accounts and the work planned and measured as level-of-effort where the physical progress measured as Earned work-hours should be set equal to the Planned; doing so results in no schedule variance. In this early phase of design, a sophisticated EVM system would not be needed, and fewer personnel would be required to implement the functioning of it.

As projects approach 30% design, the design basis will become better established with a greatly reduced likelihood of large scale changes. These projects will have better defined scopes, budgets and schedules, and the use of a more robust EVM system will be beneficial. The elements of work at which Control Accounts can be assigned will be at a level such that, when cost or schedule variances occur, a properly established EVM system will allow for a straightforward process to determine where the issues are occurring. Note that many of the larger and more sophisticated engineering and design consultants will already have an engineering-oriented EV system pre-established. The adequacy of such systems should be confirmed or validated by the Owner to ensure that they are fit-for-use.

In the design/engineering phase of the work, the unit of measure for the various tasks should be the work-hour for all of the major elements of EV data (Planned; Earned; and Actual). The tasks within the project that are "discrete" (those tasks that will result in a specific deliverable), should be measured separately from level-of-effort tasks to derive a measurement of cost and schedule variances truly relevant to the core of this engineering effort. The administrative and management support tasks should be categorized as level of effort where, period-by-period, the Earned work should be set equal to the Planned, thereby resulting in only a cost variance to take action upon, if appropriate.

Absolutely critical in design/engineering-related EVM methodologies are reliable methods for determining the percent complete for each task, and that they are applied uniformly across the program.[28] The EVM system, especially in the engineering phase, is only as good as the reliability of the measurement of progress toward the completion of deliverables.

[26] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[27] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[28] General Memorandum from Under Secretary of Defense; EVMS Use in Department of Defense; July 3, 2007

Methods available to measure engineering progress typically include:

- Units completed: suitable when the total scope of an activity consists of a number of equal or nearly equal parts and status is logically determined by counting parts completed and then comparing to the total number of parts in the total activity. Each unit is typically of a relatively short duration. This method has limited use during engineering. A possible application is in the writing of a number of specifications of a given type where all specifications are considered to have essentially equal weight.

- Start/Finish Percentages: This method is applicable to those activities which lack readily definable intermediate milestones and/or the effort/time required is very difficult to estimate. For these tasks, 20% to 50% credit can be assigned when the activity is started, and 100% when finished. The reason that a percentage credit value is assigned for starting is that this compensates for the long period between start and finish when no credit is being given. This method is appropriate for work such as planning, designing, model building and studies. It can also be used for specification writing.[29]

- Incremental Milestone: This method is appropriate for activities of significant duration which are composed of easily recognized, sequential sub-activities. Percentage completion values are established based on the effort estimated to be required at each milestone point relative to the total for the activity. This method is ideal for control of drawings.[30] By using an incremental milestone completion earned value procedure, it serves as an objective measurement of a single engineering task. It removes the element and inherent vagueness of subjectivity. It also provides a standard by which to determine engineering task progress.[31] A generic example using drawings as the unit of production would be:

    - Determine design approach: Cumulative percent complete = 5%
    - Owner approval of concept: Cumulative percent complete = 20%
    - Start drafting: Cumulative percent complete = 30%
    - Submitted for internal project review: Cumulative percent complete = 60%
    - Submitted for Owner approval: Cumulative percent complete = 85%
    - Issue for advertisement: Cumulative percent complete = 100%[32]

Obviously, as the engineering effort commences, a variety of EV-related cost and schedule variances will be captured by the EVM system. Not all of these should be acted upon; only those that exceed a prescribed percentage or work-hour value predetermined by management. These thresholds will serve as "triggers" to support exception-based reporting.[33]

[29] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[30] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[31] Chen, Mark T. "Applying Earned Value Procedures to Engineering Management." 1991 AACE Transactions. O.4. AACE International.
[32] Horwitz, Michael E. "Progress Measurement in Engineering and Construction." 1986 AACE Transactions. A.4. AACE International.
[33] Federal Register (Volume 73, Number 79); Department of Defense – Rules and Regulations on EVMS Use and Thresholds; April 23, 2008

Integration of Earned Value Metrics with CPM schedule: For ascertaining the schedule status of the engineering phase of the project the Schedule Performance Index (SPI) is a valuable indicator, but it should not be the sole performance metric. The engineering phase of the project should also be the subject of a CPM schedule with completion milestones using imposed finish dates that can be used to calculate within the schedule the total float value (that amount of time that an activity's completion date can be delayed and not jeopardize the on-time attainment of a goal milestone) against individual activities. Using this methodology, a string of engineering activities leading up to a milestone can be assessed as to their overall schedule status by reviewing the total float values against the culminating milestone in question. If the total float value is positive, then the chain of predecessor activities is ahead of schedule. If the total float value is zero, then those activities are exactly on schedule. If the total float value is negative, then that chain of activities are behind schedule by the indicated number of negative days of total float.

As engineering work progresses, the SPI will be calculated, but it should be compared against the total float value against a given milestone, for example, 100% Complete PS&E. So doing can give a project manager a complete picture of how the engineering work is progressing as a total volume of effort versus the forecast of time of completion. The below table that compares total float (TF) to SPI values provides details:

When TF > 0,

- SPI > 1.0 means ahead of schedule on critical path; more work being done than planned
- SPI = 1.0 means ahead of schedule on critical path; some shortfall in work on non-critical activities
- SPI < 1.0 means ahead of schedule on critical path; significant shortfall in work on non-critical activities

When TF = 0,

- SPI > 1.0 means critical path on schedule; more work being done on non-critical activities
- SPI = 1.0 means critical path on schedule; total work volume is as planned
- SPI < 1.0 means critical path on schedule; shortfall in work on non-critical activities

When TF < 0,

- SPI > 1.0 means critical path activities behind schedule; total work more than planned indicating excess attention to non-critical activities
- SPI = 1.0 means critical path activities behind schedule; total work volume as planned meaning too much attention to non-critical activities
- SPI < 1.0 means critical path activities behind schedule; total work less than planned; need more overall effort[34]

[34] AACE International. Skills and Knowledge of Cost Engineering, 5th Edition. 2007. p. 16.8

When implementing an EVMS for design/engineering, the full professional staff of the engineering organization must be committed to its functioning. If this important prerequisite is met, then a properly designed and supported EVM system should provide the control needs of management while also providing essential feedback to individual professional personnel.[35]

Cautionary Notes on EVM Methods in Engineering: If progress measurement methods in the EVM system are reliable, then any SPI or CPI values that are excessively favorable should be flagged for further review. Values that are much over 1.5 should be checked to ensure that the original budgets for the subject tasks were a reasonable basis to begin with when the Planned values were set within the system.

Also note that any changes that occur during engineering must be subjected to a change control process to document scope changes, design changes, etc. When a change request is approved, the Planned figures are adjusted and it then becomes the revised plan for future tracking. Monthly reports of engineering effort should include the original Planned work-hours plus changes approved during the course of the project.[36]

Especially given that quantifying progress toward completion of engineering deliverables is difficult, the setup and implementation of an EV system to control engineering will have advantages and disadvantages:

- Advantages:
    - The EV system will provide the project manager the overall team with the information needed for control of the project. Data generated from the system is continually analyzed for the purposes of identifying trouble spots or unfavorable trends. If the system has been property designed, timely reports will be available so that corrective actions can be taken when and where needed.
    - Planning of future projects relies heavily on experience on past projects. Data sets within the system should be designed to summarize and accumulate experience data in a format directly usable in future planning.[37]
- Disadvantages:
    - Establishment of an effective project control system will cost money and require the establishment of a formal project controls organization. Research has shown that roughly 8% or more of the costs budgeted for an engineering project should be allocated for project control if it is to be effective.[38]
    - A properly designed system of incremental milestone measurements for engineering deliverables will need to be in-place prior to the start of the project so that it can be implemented quickly and when appropriate in the design/engineering phase. Determining such a set of incremental milestones most appropriately deals with drawing production and should be customized for each major discipline (civil, structural, architectural, etc.) given the differences in drawing content. Having such a system pre-existing should be considered as a criteria by the Owner when for selecting a general engineering consultant.

[35] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[36] Chen, Mark T. "Applying Earned Value Procedures to Engineering Management." 1991 AACE Transactions. O.4. AACE International.
[37] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.
[38] Neil, James M. "Project Control for Engineering." 1989 AACE Transactions. S.7. AACE International.

- In lieu of an incremental milestone method of measurement for PS&E-oriented deliverables, the only other method is a subjective opinion of percent complete. This method, although not labor intensive to administer, is an easy system under which design engineers can manipulate their percent complete metrics to mask cost and/or schedule variances.

5.1 Management Support and Communicating the Business Need

EVMS concepts are not intuitive among most members of the capital project industry, largely because they have never had to implement or comply with the requirements of such a system before. Their experience is typically limited to the separable parts of the EV system (the cost estimate and the schedule), and have never formally integrated such data together. The level of project controls formality with such staff is often limited to "back of the envelope" concepts of handling project management data.

Those individuals, typically project controls professionals with extensive EVMS experience on prior assignments, who are tasked with EVMS implementation in environments where it has not before existed face the challenge of "selling" the concept. Many others outside of project controls must do their part in supporting EVMS functioning "down the road," yet the question always asked is, "Where's the value?" Inexperienced project staffs typically look upon EVMS as just another reporting requirement, or worse, as a system that will generate relentless measurement statistics that they must somehow resist.

An absolutely vital part of EVMS implementation is the presence of top down management support in communicating the business need to the staff. Senior management should stand along side EVMS implementers in making these important points to project staff:

- That EV is a powerful tool that can help manage a project. It can actually make life easier by offering better visibility to what's happening.
- That EV tells all management what "bang for the buck" the project is receiving. The need to know that value is being received for the expenditure of the dollar is a visceral one to everyone, both on and off the job.
- That EV is a system that ensures accountability to decision makers. If a project staff can implement such a system and can show that it's faithfully taking action on the performance issues that the data is revealing, it improves credibility.
- That EV will reveal cost and schedule performance issues is a fact, but the real project management "sin" is not that such issues will arise on a project; they certainly will and have done so on all projects since recorded time. True management failure occurs when performance issues are not recognized at all, or worse, when they are recognized but untimely, inadequate, or inappropriate actions are taken. EV represents an important "instrument panel" that can help the project manager guide his or her project to successful delivery by helping them pinpoint issues and their source.
- That understanding EV concepts and knowing how to work within such a system represents taking management skills "to the next level." This is an enhancement of personal skills and can be a resume builder.

Senior management can do much in the way of "ground breaking" and making life much easier for EVMS implementers if they demonstrate their personal support and involvement and in communicating these points, among others, on "Day One" of the implementation effort.

5.2 Project Management Factors

Implementation of EVMS on a project requires that other fundamental aspects of project management be already addressed. A framework must be already in place, otherwise EVMS implementation is premature and could likely fail.

Scope definition and project plan: EV can work if project scope is well defined and a project management plan has been developed. As was noted above, project direction on the AWVSRP was changeable, and the scope was uncertain at best, yet EV methodologies were put into place nonetheless and EV reporting requirements were followed. Experienced project management professionals can and should successfully communicate to decision makers when a project is not yet ready for EV implementation, just as they should be able to make the persuasive business case for it when conditions are right.

Freezing project scope for development of EV baseline: As an adjunct to the scope definition point made above, project scope must not only be defined, it must be frozen so that the project team can estimate labor hours and costs and can develop a schedule against a known scope target. A good EVM system has reached a milestone in usefulness on a project when the performance measurement baseline (representing the Planned values) is defined. This is impossible to achieve when the scope may be generally defined, but changing to the point where estimates and schedules are constantly in flux and not suitable for the integration needed to arrive at the Planned EV data.

Pre-existence of the project estimate and schedule: Implementation of EVM methodologies are premature if there does not yet exist a project estimate and corresponding schedule. As already pointed out, only when scope is known and frozen can the project staff develop a suitable estimate and schedule, and these should ideally be prepared in an atmosphere of constant communication and sharing of data between the estimators and schedulers. Planned EV data is ready to be prepared when these two complimentary documents have been completed and approved by management. Using schedule terminology, the estimate and schedule are prepared in parallel, and are predecessors to the development of the Planned EV data. This is clearly a “finish-to-start” work relationship and Planned EV data development work cannot be justifiably expedited to begin much earlier.

EV plans must be developed and applied to the entire project to completion: The data residing in an EV system must depict the delivery of the entire project, from EV inception to final project delivery. Thus, it must reflect all work; near-term, mid-term, and distant future. In the WSDOT culture of project delivery, a great deal of emphasis is placed on planning for and delivering a two-year (biennium) “slice” of the project, and that becomes the focus of effort and the EV system. Just as the project scope and project management plans should discuss delivering the project to its Operationally Complete milestone, so should the EV system have a reliable basis for determining the performance measurement baseline to project completion. Certainly, near term work will have greater clarity and will be the subject of current Task Orders and construction contracts. However, the work to be accomplished in future biennia leading to project completion must be accounted for in the form of “planning packages” that are defined to the extent possible and planned using best judgment and rough-order-of-magnitude (ROM) estimate and schedule data. These can be captured within the EV system, and then, as these planning packages enter into a rolling window (say, one-year or six-months from the present) they can be subjected to detailed definition and improved estimates and scheduling, leading to refinements of the Planned EV data. In this way, the EV system can become a living document just as are other scope definition and management documents on the project.

Do not implement EV methodologies too early on the project. This relates to the definition of scope mentioned above, but it further speaks to the issue of how well defined is that scope. Even with a project plan, estimate and schedule, project management should consider the level of scope definition when deciding on implementing EVM methodologies. If the project is still in conceptual design, some consideration should be made to subjecting the project to a level of control that uses the project CPM schedule as the primary tool for schedule performance assessment, and use EV only to the extent that all work efforts are treated as level of effort to determine cost performance. Once design definition has reached a pre-defined milestone, then this would likewise signal the start of the use of more detailed EVM methods that would result in all of the resulting data and analysis that could be expected on a more mature project. This is a matter of management judgment based on the input of an experienced project controls staff and conditions specific to a given project.

The importance of change control in the EVM system: That change occurs on a project is a given fact of life, and the ability to manage change is at the core of project management competencies. Just as the result of approved projects changes will become reflected in design documents and estimates and schedules, so should the baseline data within the EV system be revised to show these updates in scope and cost/schedule targets. In fact, robust EVM systems should contain a family of baselines, from "Revision 0" that reflected the initial project plan, up to the latest revision that reflects the last approved change.

EVM systems must be supported by a change control process. In the summer of 2007, the AWVSRP initiated a change control methodology called the "Trend Program." In summary terms, the objectives of the Trend Program are:

- To provide internal control tool to help the project team be alert for and identify changes to:
  - Scope
  - Cost
  - Schedule
- To formally document changes to build an issues and decision history file.
- To facilitate an assessment of the impacts of changes.
- To focus management attention on change issues and get timely decisions.
- To provide a framework for updating of project baselines and controlled implementation of changes.
- To support WSDOT's Project Change Request Form (PCRF) process.

A process flow diagram that summarizes the Trend Program's functioning is provided in Section 7.0 – Exhibits to this report.

5.3 Personnel & Training

Successful implementation of EVM systems is absolutely dependent on experienced personnel who are trained in project controls and the principles of EV and who can mentor other team members in the use of this management tool. Experience gained on many other projects and on AWVSRP in particular continues to point to the importance of qualified and trained staff. Additionally, an emphasis must be placed on the staff understanding concepts before knowing how to use the computerized tools. A well-trained project controls staff should be able to perform all of its functions using only calculators, pencils, and paper. Computerized tools are merely productivity and time-of-response enhancers which can be powerfully used in the hands of an otherwise trained staff, but downright counterproductive in the hands of novices. The project controls staff should be viewed as professionals and partners in the project delivery process; not merely as "software jockeys."

General project controls skills: An EVM system is, after all, a representation of a synthesis of many skill sets that all belong to the project controls discipline. In fact, as will be mentioned again elsewhere in this report, EV is a higher level discipline that could be considered to be the "roof" of a home that can only work if supported by the foundation, floor slab, and walls that are the disciplines of planning, scheduling, estimating, and cost control on the project. All personnel in any project or program management organization must first be well founded in these supporting disciplines, or at least various subject matter experts in specific skills must be present on staff before an organization can be considered ready to take the next step to EVMS implementation.

EV concepts: Once the organization is trained or experienced in the previously mentioned supporting disciplines, they are ready for training in those concepts specific to EV. A good example of general EV training is AACE International's S&K5, on which the AWVSRP project controls training was based. Training in EV concepts should include these specific subjects:

- Progress measurement and earned value
    - Measuring work progress.
    - Earned value for fixed budgets
    - Cost and schedule performance
    - Productivity
- Earned value for variable budgets
    - Variable budget concepts
    - Selection of fixed versus variable budget methodologies
- Tracking cost and schedule performance
    - Baselines
    - Statusing
    - Analysis, trending, and forecasting using variance and index metrics
    - Translating and explaining variance and performance metrics in words.

- Advanced Earned Value Analysis Methods

Training in use of tools: Only at such time as the project controls staff has reached a level of competence in project controls fundamentals and EVMS-specific subjects should they then receive training in the use of software tools that support EV methods. Being already proficient in project controls and EV disciplines will allow the individual cost engineer to critically analyze the reports being generated from the EV system to determine if there are any data issues that require resolution before deeper analysis can proceed. Pre-existing project controls and EV expertise will allow the project controls staff to "drive" the system, instead of the system driving them.

Providing general lessons-learned or guidance on software training is difficult, because it is so dependent on the system at hand. Suggestions to ensuring maximum benefit from software training itself include:

- Provide general system training to all project controls (or at least cost engineering) staff so that there is a wide base of users who can utilize the system to enter data, generate reports, and perform most analysis.

- Provide deeper training at the project level for those who are true EV subject matter experts and who will become designated as the advanced users of the system. This training must be redundant in that more than one person per project should receive it. This prevents the system's use being compromised in the event of one key individual being absent from the project.

- Ensure that a system resource person apart from the project staff is readily available to address the issues that always arise from the individual projects.

Training of Project Engineers: Within the WSDOT culture, the person bearing primary responsibility for successful project delivery is the Project Engineer (PE). This individual is analogous to the "project manager" in other organizations. As such, he/she is the primary customer of the information residing within and the reports forthcoming from the EVM system. On the AWVSRP, that same individual is expected to report on EV metrics and to correlate them to issues occurring on the project, so knowledge of EV concepts on their part is essential.

Project Engineers must not be neglected in any training program being devised by EVM system implementers. They should receive familiarization training in EV to include their completing example problems or practical exercises to reinforce teaching points; having them merely listen to lectures isn't enough. Such training should address where the EV data comes from (the project estimates, schedules, and financial systems); the significance of the Planned, Earned, and Actual data elements; rules for measuring progress; how to read EV graphs; how to calculate cost and schedule variances; how to calculate cost and schedule performance indices; and how to interpret the results of variance and performance index calculations. With a general understanding of these subjects, they will better appreciate the work of the project controls staff and the value of the EV system itself as one of their primary management tools.

Aside from the technical skills surrounding the use of an EVM system that must be imparted to the Project Engineers, an important objective of EV instruction should be to remove their mistrust or fear of such a system. Experience has shown that some Project Engineers will take away one unintended lesson from their instruction; that the EVM system exists to measure them personally, and that it is incumbent on them to "manage" that system to subvert the onset of adverse project performance statistics. They may well ask themselves, "What can I do to stop the EVM system from showing variances that say my job is over budget or behind schedule?" They often then focus on manipulating the progress metrics that are the basis for the Earned EV data to remove adverse cost or schedule variances. This is where senior management can become part of the instructional curriculum and voice their total support for not only the EVM system, but also for the Project Engineers themselves. Management should stand along side the EVM instructors to reiterate a point made in section 5.1 above; that EVM systems are tools to assist the Project Engineers in getting important performance metrics (in the form of

cost and schedule variances) delivered to them early to support proactive management approaches. Management should stress that, far from avoiding the onset of variances in their projects, the Project Engineers should actually welcome such data, because all projects will experience differences in cost and schedule performance versus the plan; no project progresses exactly according to the cost and schedule baseline. Management should communicate that they expect variances to be reported on projects, and that the simple existence of such variances will not be considered to be evidence of failure by the Project Engineers. Having said all of that, however, senior management should emphasize their expectation that the Project Engineers will seek out the root causes of adverse cost and schedule variances on their projects, and then develop work-around plans to mitigate or remove the impact. These simple messages of management support and philosophy, combined with effective technical instruction, will go far toward getting the personal "buy-in" of the Project Engineers that will be so critical to the success of the EVM system.

Personnel Issues: Aside from training in both processes and tools, there are personnel issues that must be addressed before an EVM system will be of value for the project:

- Staff size: EVM systems require adequate levels of staff to utilize it. In the early UCO and AWVSRP experience, there were clearly inadequate amounts of people to even begin to successfully deploy a sophisticated set of methodologies and tools such as EV. As noted above, only one person on AWVSRP was expected to implement EV on this large-scale program. No precise formula to determine EVMS staffing levels exists. The right-size of staff will depend on the experience and judgment of the project controls manager, and the level of detail of the data residing in the system. The greater the level of granularity of data in the system, the higher the data collection and analysis work load, resulting in a larger EV staff required to meet that demand. Program management personnel must perform an intelligent trade-off assessment of what value will be gained for a given level of detail in the EV system versus the associated staff costs that will be incurred. Management must also remember that greatly detailed data will not only influence the staffing level of the EV-specific staff, it could also result in the expenditure of more labor hours by a wide variety of people on the project who must, in their own way, maintain data to the detail required by the system.

- Staff motivation: The EVMS environment is, by its nature, comparatively much more "data rich" (some might say "data dense") than projects that operate without such tools. This requires personnel with quantitative reasoning and analysis skills, and who are comfortable with working with large amounts of figures. On a large capital program, the data handling load of an EV specialist can rival that of an accountant in a large auditing or manufacturing firm. Not everyone enjoys such work, and not everyone is inclined toward a position in project controls. EV staff must be motivated to function in that environment, or else data collection and analysis can greatly suffer. Any staff motivation issues must be addressed immediately; the individuals concerned should be reassigned to other functions and appropriate replacement personnel recruited immediately.

5.4 Prior Development of Other Supporting Project Controls Capabilities

The EVM system cannot operate "in a vacuum." Just as other skill sets must be held by the staff prior to the implementation of an EV system, so must other tools and capabilities be present on the project. These other project management disciplines and their associated tools should in some way integrate with the EVM system, whether through manual transcription of data, or via electronic interface.

Any projects considering implementing an EVMS without the below fundamental capabilities being first in place, should delay deployment of the EVM system until such capability gaps are addressed.

Estimating: Project estimators take a leading role in developing the cost estimates for the work to be delivered on the project. Although typically the term "estimator" is generally understood to be an individual who is expert in construction costs, the fully-capable cost estimator can be a valuable resource in documenting all of the costs inherent in the project scope of work, ranging from design and professional services, to right-of-way acquisition, to construction. The estimator should be as capable in knowing who to contact to gain quotes for all types of work as they are in independently determining costs themselves. The estimator must work in concert with the program scheduler, as the estimate and schedule should truly be inter-related to be correctly determined and complete. Estimating systems present on the project may or may not be a robust specialty software application; at the minimum estimates should reside in an electronic spreadsheet. The project estimate should be organized in a way that meets EV system needs (this will vary by project) and for every given work package on the project, will define quantities of work (which can be a guide to the progress measurement method to be used) and its overall estimated value. Failure to correctly estimate realistic values of work will result in invalid Planned values residing in the EVM system, thereby degrading system data integrity.

On the AWVSRP, the General Engineering Consultant (GEC) had provided the only estimating capabilities on the project until August 2007, when the Program Management Group added a Program Estimator to the staff. This individual developed and promulgated estimating guidelines to the GEC and also performed independent checks of the GEC's estimates. Tools used by the GEC estimators consisted of one estimating software package, supplemented by the use of electronic spreadsheets.

Scheduling / schedule reporting: Absolutely essential in supporting the EVM system is a program scheduler who will develop the CPM schedules for the entire work scope of the program, equipped with software that will aid in the building of the schedule model. The schedule activities residing in the CPM database should be organized as is the estimate, structured in a way that meets EV system needs. The resulting schedule will define not only the overall duration of every work package in the program, and the logical inter-relationships of the various work elements, but the individual activities contained within each package of work scope could provide insight as to the work effort that could be expected per incremental time period. This will aid in the determination of the shape of the Planned curve for every individual work package. Failure to correctly develop schedules will result in erroneous time phasing to be incorporated into the Planned data profile, thus adversely affecting system data integrity.

On the AWVSRP, schedulers were part of the GEC staff. Program level schedulers became part of the Program Management Group with the arrival of the PMAC in April 2006. As mentioned previously, Primavera's P6 is the software tool being used, in accordance with procedures promulgated by UCO PC&R.

Cost reporting and commitment forecasting: All projects need an easy-to-read cost report that provides in a tabular format, for each Task Order or other work package, its budget (original, changes, and current approved); committed value; actual costs expended during the reporting period and to-date; the forecast of costs at Task Order or work package completion; and a calculated variance (arithmetic difference) between the forecast-at-completion versus the current approved budget. A cost report is a fundamental tool that aids program and project management in budgeting; in understanding all of the Task Orders, work packages, and components of State Force effort that are placing cost demands on the project and their associated commitments; and it provides another perspective on the forecasted cost of the project. An important adjunct to cost reporting, and associated with scheduling, is commitment management and forecasting. This capability allows the program to understand what contracts or Task Orders must be executed in what amounts and at what time to support the program delivery schedule. An important resulting report from such a capability would be a graphic commitment curve that could compare cumulative actual amounts committed versus cumulative planned commitments and also versus available funding levels. This could instantly give the reader an indication as to whether the contracting effort was ahead, on, or behind schedule.

On the AWVSRP as of the writing of this report, no user-friendly cost reporting capability as described above is in place. This is a fundamental shortcoming in management tools that the AWVSRP PMG intends to resolve through the use of a database application that will retrieve data from PRISM and download information from other sources as needed, and then organize it into an intuitive tabular format.

5.5 Early Establishment of Procedures

Given the complexity of initiating and sustaining EVMS usage on any project, it is essential that procedures be established as early as possible to guide system implementation and to ensure consistent results. The first-issuance of such procedures need not be highly detailed, comprehensive documents that approximate a description of the perfect system. To ensure that the best guidance is promulgated to users as soon as possible, they can be developed in outline form to start, and then improved with additional detail or better practices or the results of lessons learned in time. Such procedures should also not endeavor to be an instructional manual; they should not try to be a training aid, but they should reference an accepted instructional text, if needed, to establish an assumed level of EV understanding on which the procedures are based.

As can be seen from Department of Energy (DOE) and Department of Defense (DOD) experience, EVMS procedures can become lengthy, and space does not allow a full description of what they should include here. Suffice it to say that there are a number of governmental and private organizations that have prior experience in developing such documents. Non-profit organizations such as AACE International, PMI, or the Performance Measurement Association are also resources for projects or agencies desiring to leverage prior experience in this.

Another consideration in developing EV procedures is to look to the ANSI/EIA-748 Standard for EVM Systems. According to the forward of EIA-748, these "earned value management system guidelines incorporate best business practices to provide strong benefits for program or enterprise planning and control. The processes include integration of program scope, schedule, and cost objectives, establishment of a baseline plan for accomplishment of program objectives, and use of earned value techniques for performance measurement during the execution of a program."[39]

In interviews with WSDOT and consultant personnel who were part of the early implementation of EVMS on the AWVSRP, these procedural-oriented observations were noted. Wherever possible, the exact wording of such statements made by the interviewees has been used:

- The rationale behind the EV processes was an on-going experience of self-enlightenment.
- Compounding the frustrations for cost engineers was the changing requirements. This is to be expected as the system evolves, but in an ideal world, all the systems, processes, requirements, etc. would be established up front and implemented across the Region with a strong UCO support team and those requirements wouldn't change.
- Develop a company wide coding system that is relevant to the business being conducted.
- Ensure that Control Accounts relate to defined deliverables with defined earned value triggers for earning. In the beginning of the AWV program, it was not understood that defining a progress methodology for deliverables was required. Initially major chunks of the AWV program where divided up with out any defined progressing methods.

[39] Electronic Industries Alliance. EIA Standard EIA-748-A; Earned Value Management Systems. January 2002. p. ii.

- Need to determine when to use and when not to use level-of-effort tasks for measuring and/or reporting on EV. May be beneficial at times to include it.

- The cost accounts did not have any type of progress method attached to them, which made it difficult to determine if we were over or under spending the planned budget.

5.6 Software Systems

Software applications for EV should be chosen after all business requirements are understood. Too often, in the rush to show progress in implementing a new business practice such as EVM, organizations quickly choose a software tool before this is the case.

The following is a summary of the recommended approach to choosing such a software tool, based on AWVSRP experience and lessons learned from other projects:

- Ensure complete understanding of all business needs that must be supported by the tool. This is best done in a group brainstorming session where all stakeholders are represented, to include the supporting Information Technology (IT) organization.

- Document the results of the brainstorming session and organize individual needs by functional area.

- Transform the individual business needs into performance statements, expanding the stated needs language as needed for clarity. For example, if a business need from the brainstorming session said, "Handle electronically downloaded costs," then a performance statement would say, "The EV system must accept actual costs downloaded from the financial system."

- Collate the system performance statements into a single system performance requirements document organized by functional area.

- Disseminate the performance requirement document to vendors of off-the-shelf candidate systems, or otherwise advertise that the organization is seeking to evaluate candidate software packages and invite expressions of interest from vendors.

- Invite vendors to demonstrate their system performance and evaluate them strictly based on the performance requirement document and using a system of weighted numeric grading. This could be a lengthy process per vendor, so adequate time should be allotted for the demonstration sessions. The vendors must perform how they would satisfy each requirement "on the spot." Any vendor who cannot meet a requirement during the demonstration, but instead says, "We'll have to address that requirement offline," should receive a "zero" score for that specific performance requirement.

- Select the best performing software system for a recommendation to procure. A "choose no alternative" option should be available. If no systems meet the minimum performance standards based on agreed upon business needs, then the decision should be made to choose no off-the-shelf alternative. The development of a customized tool should then be considered.

There are other considerations in selecting an EVM software tool. Among these are:

- Whether the in-house IT organization will support the tool. Sometimes this is not the case, and this issue must be resolved before selecting a software package.

- The tradeoff between off-the-shelf tools versus customized tools:

    - Off-the-shelf tools generally have been developed by larger software firms, and they have benefited by diverse experience gained from a wide range of projects. They have a tool-specific technical support staff, and with the strength of being an established firm, they should hopefully "be there down the road" for the customer. One primary disadvantage is that customizing their application to fit unique business needs can be time consuming or very expensive. In this area, off-the-shelf tools may not be responsive.

    - Customized tools have the advantage of the development consultant typically being responsive to unique business needs, but have the disadvantage of the consulting firm's durability and "staying power." They may not be available long-term if needed. Other problems have been encountered by organizations being held "hostage" by the software consultant who may escalate license costs above the norm. These issues can be mitigated through the use of Consultant contract language that protects the interest of the agency. Key among these is that the programming code should become the property of the Owner agency, and that it should remain "open" for Owner agency review. Any development of programming code that's paid for by the Owner should never be considered proprietary to the software developer.

- The chosen EV tool should be evaluated in consideration of its ability to integrate with other software applications (estimating; scheduling; cost control; financial systems). If a given system is not readily able to be integrated in this way, then its data should be open to the point that it can be exported to a data warehouse if necessary.

Input received in interviews with UCO PC&R and AWVSRP staff was to the effect that the off-the-shelf software application selected for EVMS use was not capable of handling all of WSDOT's business needs. This is true of the need to manage funding sources within the EV application, which has added complexity and additional labor effort to maintaining the EV data. An additional observation gained via interview was that the current EV application did not have adequate IT organization support.

5.7 Integration of Contract Language to EV Requirements

As a key program management tool, the EVM system will have certain requirements to ensure its optimal operation. On a program such as AWVSRP with extensive Consultant involvement via Task Orders, it is vital that Task Order language support those EV requirements.

Appropriate Task Order language should address these issues consistently with all consultants to ensure consistent EVM system functioning:

- The level of detail of the Control Accounts to be incorporated into the Task Order. Once that decision has been reached, deliverables to be provided should also clearly correlate with individual Control Accounts in the Task Order.

- The method of physical progress measurement for the deliverables associated with each Control Account must be clearly stated in industry-standard language so as to avoid confusion. To the maximum extent practicable, deliverables should be defined in discrete terms, allowing for the determination of progress (as opposed to their being treated as level-of-effort Control Accounts).

- The structure of invoices and the physical progress/estimated hours-costs reports should be identical to the Task Order Control Accounts and all consultants should submit them on the same schedule across the program. This ensures that all data received from Consultants is received with a consistent effective date.

Other observations gained during interview were to the effect that Consultants needed EVM system training as well as WSDOT management staff so as to ensure best results. The EVM system can also function more effectively if Consultants are "sold" on EV concepts and the need for EVM in a way similar to PE's and other WSDOT staff.

5.8 Measuring Progress

Several observations already noted above point to the absolute necessity of clear and consistent methods of progress measurement in an EVM system so as to quantify one of the three fundamental elements of EV data; the Earned value. Having reliable Earned values is especially important when one considers that all performance metrics to include cost / schedule variances and cost / schedule performance indices include the Earned value figure through a given reporting status date.

Measuring progress during design is especially difficult given that the work products are not as discrete as would be found in the construction environment. As noted above, every effort should be made to designate as much work as is reasonable as "discrete," and subject it to as much objectivity in progress measurement as possible. Level-of-effort methods or methods that allow for the use of a subjectively derived percent complete figure using "thumb in the air" assessments by the Consultant that are unchallenged by the Owner agency are wholly inadequate.

In measuring progress on pre-PS&E deliverables, such as white papers and reports, simplified progressing methods (such as "0/100" for short duration deliverables where 100% earned credit is awarded only upon a fully submitted report; or "50/50" used for deliverables planned to take two-months where 50% credit is awarded upon the passage of one month, and 100% is awarded upon full report submittal) could be applied, or cumulative percent complete milestones based on some pre-determined report development criteria might be appropriate.

For PS&E development work, many firms have developed measurement methods based on pre-determined cumulative percent complete "rules of credit" applied to individual drawings depending on what work has been accomplished to each drawing sheet. These rules of credit are furthermore customized for different types of design disciplines; civil plan/profile drawings will be measured using different rules than are applied to electrical drawings or structural drawings, for example. Progress measurement under this method requires a sheet-by-sheet assessment of percent complete, and then that figure as a fraction is multiplied to the labor hours budgeted for that sheet to arrive at an earned value expressed in hours for each individual sheet. The by-sheet earned values are then summed to arrive at a total amount of earned hours for the PS&E set, which is then correlated to an overall percent complete figure. This method of progress measurement, while very reliable, is labor intensive to establish and implement and requires an appropriate level of staffing to support it.

An example of AWVSRP requirements for PS&E progress reporting is as shown in the "Project Management & Reporting Language included in Task Orders" exhibit in Section 7.0 – Exhibits in this report, with an example of the resulting progress report due from the GEC in the "Example Consultant Monthly Percent Complete Report" also provided in Section 7.0. As mentioned earlier, percent complete metrics are as estimated by the engineering Consultants using their own methods; these are regularly reviewed by the WSDOT Task Order Manager or Project Engineer and subject to challenge, whereupon appropriate revisions to the percent-complete data are made.

5.9 Cautionary Notes about use of Earned Value from Industry

A recent survey of written and online literature about the general appropriateness of EVM as a management technique reveals these cautionary notes:

- EVM should be used only when appropriate as EVM is not a "one-size fits all" methodology. WSDOT should understand that certain projects are not as amenable to EVM, and should develop and apply a screening policy that precludes the use of EVM by exception. Projects with the following characteristics should not use EVM methods:[40]
    - When a project is in a "research and development" environment and scope is not yet defined. For capital projects, this would be any context where the project is only at the need-identification phase and has not yet started conceptual engineering.
    - When the project context is dynamic, i.e., when the project scope is defined, but, for whatever reason, the goals, objectives, scope and/or the design and/or construction delivery approaches keep changing.
    - When a project has undefined or poorly defined cost and/or schedule goals. Projects with an indefinite quantity of work or an indefinite time horizon should not use EVM methods.
    - When a project does not have a significant labor component. EVM has little benefit on projects that are primarily the procurement of materials.
    - Where a project uses a process that is well-known to the Owner agency such as a highly repetitive project where there is little risk of cost or schedule overrun. Such projects reflect a production environment as opposed to being of a unique capital project nature.
    - Where a project is of such a small size or short duration, that the Owner agency cannot economically justify the cost of using EVM. EVM systems require procedures, staff, training, and tools (costs and time) to implement and sustain them. Attempting to manage a project using EVM "on the cheap" will be disastrous because it will lead to poor systems generating false data that is misinterpreted by untrained people implementing inappropriate corrective action plans. EVM systems should be established according to the guidelines of EIA Standard 748-A; Earned Value Management Systems[41], considered to be the industry-standard EVM guidance document.
- EVM should not be used in inappropriate project environments: EVM is not a discipline that can be casually approached. The objective of EVM is the generation of reliable cost and schedule performance data, leading to identification of specific areas of the project (either a portion of the work or a unit within the project organization) where cost and schedule goals are in jeopardy, and then analyzing the EVM data more fully to determine the cause of lack of performance. This leads to the early development of mitigation or corrective action, which is the essence of "management by exception." Given that the

[40] Webb, Alan, Using Earned Value: A Project Manager's Guide, Gower Publishing, Ltd., 2003, p. 4.
[41] Electronic Industries Alliance, EIA-748-A; Earned Value Management Systems, January 2002.

generation of EVM data is as fully complex as the gathering and reporting of financial performance information in the corporate environment (where an experienced accounting staff and a CFO would be established), EVM should not be attempted if the following are not in place:

- An experienced Project Controls staff with:
  - At least one EVM subject matter expert. This usually is the Project Controls Manager who appreciates all aspects of EVM and who can lead the system setup, data collection, reporting, and analysis functions.
  - An Estimator.
  - A Scheduler.
  - A Cost Engineer.
  - Estimating, scheduling, cost reporting, and EVM integration software tools that allow for rapid response to project changes or requests for "what-if" analyses.
- Project Engineers and more senior management who are trained in EVM to the extent that they understand and embrace the purpose of an EVM-based system and who can fully understand the nature of the reports they receive. A good Project Manager should be able to read and interpret EVM reports just like a corporate executive can read a company balance sheet and profit/loss reports. Again, they should be supported by a trained Project Controls staff that can help make sense of the data.
- A financial reporting system that can provide data at a level of detail needed by the project. Financial data may be required at several levels below the Project Identification Number. This system must also deliver this information in a timely fashion. It is of no value to the project team to wait for financials for two months. Robust financial systems can deliver reliable data within one-to-two weeks after month-end financial closure.
- A Critical Path Method (CPM) schedule showing the entire scope of the project work consisting of individual activities with realistic durations that are linked together with correct work logic relationships.
- A well-defined management structure with lines of balanced responsibility and authority that can identify and implement the corrective actions indicated to be appropriate by the EVM data. Lack of such a structure where there is no responsibility for results or where the project manager does not have authority over a project team reduces the EVM system to being merely a collector of statistics.

- EVM system pitfalls:
  - EVM data: according Clinton Bass, an analyst of government organization and management at the Congressional Research Service's Government and Finance Division, "EVM data does not necessarily tell the whole story."[42] The pitfalls of relying solely on EVM data for project management include:
    - EVM schedule performance data measures the project's progress only as a total volume of work. A project can be falling behind schedule on the critical path, but highly favorable schedule progress on non-critical path items of work can mask that fact. EVM

[42] Walker, Richard W., "Report identifies benefits, limitations of EVM," internet address http://www.fcw.com/online/news/150961-1.html, November 30, 2007.

must be supported by a Critical Path Method (CPM) based schedule to get the complete project schedule performance status.

- EVM performance data as a whole must be careful to segregate the work surrounding specific deliverables ("discrete" work) from the work being performed by supporting staff strictly as a function of project duration (i.e., "level of effort" work where some staff are on-hand only because the project exists). Again, only a Project Controls staff trained in such nuances of EVM data would know to do this segregation of data.

- Incorrect measurement of work performed: a properly implemented EVM system will use appropriate methods to measure the value of work accomplished on the project. Procurement is not measured in the same way as engineering, which in turn is not measured in the same way as construction, and there are yet other types of project effort that are not measured in a way similar to any of these. An inexperienced project team could subject itself to incorrect methods of progress measurement, which could lead to false data. A support staff that is experienced in these principles will prevent this from happening.
- System over-expectations: senior management who are inexperienced in EVM often over-estimate the system's true capabilities. A common misperception is that EVM will prevent cost overruns. This is not true. The EVM system only provides a distant early warning mechanism of project issues. The system in and of itself will not prevent project failure.[43]
- Management inflexibility in revising project baselines: even when an appropriate project has implemented a suitable EVM system to support management, the system down-the-road can become useless if senior management does not recognize that there are sometimes good reasons to set a new cost and schedule baseline (new milestones and a revised estimate). Such reasons include whenever a project has been assigned a major change of scope (or cost or schedule) or if the project has been required to fundamentally revise its implementation approach. Management failure to recognize this fact and to authorize a new basis against which to measure performance will result in misleading data flowing from the EVM system.
- EVM systems do not measure the attainment of a prescribed level of quality. EVM is designed to measure cost and schedule performance only. Whether a given project is meeting quality goals, or whether the project end-user will be satisfied with the end result is completely outside the purview and capabilities of EVM systems.

[43] Fleming, Quentin, and Koppelman, Joel, Earned Value Project Management, 3rd Edition, Project Management Institute, 2005, pp. 9-10.

6.0 Plans for the Use of EV During Construction

WSDOT plans to continue use of EV on the AWVSRP during the construction phases of its individual projects. It is not anticipated that EV implementation in the field will require any additional input from the Contractor other than that typically required on WSDOT contracts.

Contractors will be required to submit a cost-loaded schedule reflecting the total bid amount, which will be the basis for the Planned values for the contract. Construction activities will follow the format of pay items as shown on the bid form.

Given that construction contracts will be unit price in nature, progress measurement rules will be straightforward and based on Contractor-emplaced quantities recorded by the WSDOT inspectors on the jobsite as of the end of each reporting period. This data will become the basis for both the Earned and Actual values for the contract in the EV system. EV reports will be generated from the correlation of Planned, Earned, and Actual data in a manner similar to what has already been accomplished to-date in the PE phase of the program.

7.0 Exhibits

Master Deliverable List (MDL)

Project Management and Reporting Language included in Task Orders

Example Consultant Monthly Percent Complete Report

Example Task Order Manager Report

Example EV Data Presented in Monthly Confidence Meetings

Example Monthly Progress Report

Example Earned Value Analysis Accompanying the Monthly Progress Report

Tracking Schedule used for Allocation of Program-wide Costs to Individual Projects

AWVSRP Organization Charts

Trend Program Flow Diagrams

Master Deliverable List (MDL)

Outline Level	Task #	New WBS Code	Task Name	Task Description	Work Op
1	**1**	**PC**	**PreConstruction (Put Project Name Here)**		
2	**2**	**PC-01**	**Preliminary Estimates & Schedules**	**Estimates and schedules developed for programming.**	**0167**
3	3	PC-01.01	PE Estimate	The estimated cost and schedule to complete the design phase of a project. Developed for programming the project.	0167
3	4	PC-01.02	RW Estimate	The estimated cost and schedule to complete the right of way phase of a project. Includes all resource costs. Developed for programming the project.	0167
3	5	PC-01.03	CN Estimate	The estimated cost and schedule to complete the construction phase of a project. Developed for programming the project.	0167
2	**6**	**PC-02**	**Project Summary**	**A document which comprises the Project Definition, Design Decisions and the Environmental Review Summary for a project**	
3	7	PC-02.01	Project Definition	The official document that states the purpose and need for the project and the solution of the deficiency. This is a formal document that must have Region and HQ concurrence.	0168
3	8	PC-02.02	Design Decisions Summary	A document which is part of the Project Summary which illustrates design considerations and details about design aspects of the project.	0168
3	9	PC-02.03	Environmental Review Summary	A document which illustrates environmental permit needs and addresses the level of environmental approval and classification of the project.	0130
3	10	PC-02.04	Project Summary Region Approval	**MILESTONE** - Date that the Region Project Development Engineer approves the Project Summary	
3	11	PC-02.05	Project Definition Complete	***MAJOR MILESTONE*** - Date of concurrence of the Project Summary (Project Definition, ERS, DDS)	
2	**12**	**PC-03**	**Design-Build Assessment**	**A systematic process based on a balance of the anticipated benefits and allocated risks used in the selection of design-build contracting for a project.**	**0113**
3	13	PC-03.01	Design-Build Decision Document	A document used to make the final decision to proceed with design-build contracting on a project	0113
2	**14**	**PC-04**	**Emergency Project Documentation**	**Required documentation for projects with declared emergency. See Emergency Procedures Manual M3014 for details.**	**0101**
3	15	PC-04.01	Disaster Damage Inspection Report	An Inspection report completed in the field on a deficiency that can be associated with a natural disaster such as earthquakes, and floods and describes the damage which occurred, details relating to the restoration of the facility (both temporary and permanent activities), and is required in order to receive federal emergency relief funds. See the Emergency Procedures Manual, M3014 for details	0101
3	16	PC-04.02	Declaration of Emergency	A standard WSDOT form completed by the region on a deficiency that is associated with a natural disaster. This form is signed by the Regional Administrator and submitted to HQ Emergency Management Program Manager. See Emergency Procedures Manual, Chapter 4.	0101
3	17	PC-04.03	Change Management Form	A standard WSDOT Change Management form (CMF) completed for a deficiency associated with a declared emergency. The CMF is submitted to HQ Program Management.	0101
2	**18**	**PC-05**	**FHWA Project Management**	**Development of FHWA Project Management Plans and FHWA Financial Plans, for projects with an estimated total cost exceeding $1,000,000,000 (Major projects). Guidance and standards from the FHWA are at this web site: http://www.fhwa.dot.gov/programadmin/mega/**	

3	19	PC-05.01	FHWA Finance Plan	A Financial Plan is a comprehensive document that is required for Federally funded projects with an estimated total cost of $1,000,000,000 or more that reflects the cost (requirement) and revenue structure (capability) of a project and provides a reasonable assurance that there will be sufficient financial resources available to implement and complete the project as planned. Financial Plans are a requirement on Major projects per Section 1305 of the Transportation Equity Act for the 21st Century (TEA-21). The Initial Financial Plan and each Annual Update is submitted to the FHWA Division Administrator for review and acceptance. The FHWA memorandum giving direction on finance plans and other guidance can be found at the following web sites: http://www.fhwa.dot.gov/programadmin/contracts/fpgmemo.htm and http://www.fhwa.dot.gov/programadmin/mega/fplans.htm	0170
3	20	PC-05.02	FHWA Project Management Plan	Project Management Plans currently are strongly recommended from a best practices point of view, in order to effectively and efficiently manage the budget, schedule, and quality of Major projects. They are expected to be required by the new federal reauthorization act when is passes (replacing TEA-21). The FHWA memorandum giving direction on project management plans can be found at the following web site: http://www.fhwa.dot.gov/programadmin/mega/megaiii.htm	0106
2	**21**	**PC-06**	**Project Funding Approved**	**MILESTONE - Official funding approval by the Region or HQ's Program Management in order to begin the design phase of a project**	
2	**22**	**PC-07**	**Begin Preliminary Engineering**	***MAJOR MILESTONE*** **- Beginning the preliminary engineering marks the start of the project design. See Project Control & Reporting Manual for details.**	
2	**23**	**PC-08**	**Consultant Administration**	**The process concerning the authorization, selection, management, and oversight of consultants for Personal Service and Architect & Engineering (A&E) agreements and/or supplements. See Consultant Services Procedures Manual M27-50.**	**0107**
3	24	PC-08.01	Consultant RFP	Request for Proposal (RFP): A legal notice for solicitation of consulting services. Please see the Consultant Services Procedures Manual M 27-50, Chapter 1 for procedures.	0107
3	25	PC-08.02	Consultant Selection	The process of reviewing, scoring and selecting a Consultant. Please see the Consultant Services Procedures Manual M 27-50, Chapters 2, 3, and 4 for procedures.	0107
3	26	PC-08.03	Consultant Signed Contract	A legally binding contract between WSDOT and a Consultant for services rendered. Please see the Consultant Services Procedures Manual M 27-50, Chapters 5, 6, and 7 for procedures.	0107
3	27	PC-08.04	Consultant Management	The process for delivering a contracted product within the parameters of a legally binding contract. Please see the Consultant Services Procedures Manual M 27-50, Chapter 8, 9, 10, 11, 12, 13, and 14 for procedures.	0107
2	**28**	**PC-09**	**Project Management**	**See Project Management On-line Guide (PMOG) http://www.wsdot.wa.gov/Projects/ProjectMgmt/**	**0106**
3	29	PC-09.01	Managing the Project Hammock Task	Hammock task to assign and account for the resource needs and effort required to manage the project.	0106

3	30	PC-09.02	Project Management Plan	The Project Management Plan describes both the Project Performance Baseline for the project deliverables and the schedule and budget plans for delivering them, and the Project Management Methods that will be used by the Project Team during their delivery. See Project Management On-line Guide (PMOG) for details. http://www.wsdot.wa.gov/Projects/ProjectMgmt/	0106
3	31	PC-09.03	Endorsement	**MILESTONE** - Endorsement is the process of gaining the commitment of the Project Team then the endorsement of the Management entities responsible for the resources needed to successfully execute the Project Management Plan. The process is a formal one and culminates in documented commitment of support by the Team members, management and others - customers, team and sponsors as appropriate. See Project Management On-line Guide (PMOG) for details. http://www.wsdot.wa.gov/Projects/ProjectMgmt/	
2	**32**	**PC-10**	**Cost Risk Estimate & Management**	**Cost Risk Assessment, as an integral element of project risk management at WSDOT, quantifies, within a reasonable range, the cost and schedule to complete a project. This information is used by decision-makers to program projects and by project managers to monitor projects as they are being developed. WSDOT has developed CEVP® and CRA to identify, assess and evaluate risk that could impact cost and/or schedule during project delivery. See Cost Risk Estimate & Management website at: http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/**	**0166**
3	33	PC-10.01	CEVP®	Cost Estimate Validation Process (CEVP®), an intense workshop in which a team of top engineers and risk managers from local and/or national private firms and public agencies examine a transportation project and review project details with WSDOT engineers. A Cost Estimate Validation Process (CEVP®) is required for any project with an estimated cost of $100 million or more. See Cost Risk Estimate & Management website at: http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/	0166
3	34	PC-10.02	CRA Workshop	Cost Risk Assessment (CRA) is a workshop process similar but less intense CEVP®. A Cost Risk Assessment (CRA) is required for all projects with an estimated cost of $25 million or more. See Cost Risk Estimate & Management website at: http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/	0166
3		PC-10.03	Risk Analysis		0166
4		PC-10.03.01	Risk Analysis	Risk Assessment effort separate from CEVP or CRA	0166
4		PC-10.03.02	Expert Panel Reviews/Senior Advisors	Experts/Senior Advisors used to evaluate complex projects and ultimately make recommendations to reduce the overall project risks or reduce cost.	0166
2	**35**	**PC-11**	**Public and Agency Involvement**	**Local agencies and the public should be notified of projects in their jurisdiction or area. Contact the Communications office for details.**	**0110**
3	36	PC-11.01	Public Involvement Plan	The level of public involvement plan needed is determined by SEPA or NEPA requirements to be met and the amount of potential impact on people, the environment and the economy. Contact the Communications Office for details.	0110
3	36	PC-11.02	Design Visualization Graphics Development for Public Involvement Plan	Design graphics needed for by SEPA or NEPA requirements to be met and the amount of potential impact on people, the environment and the economy. Contact the Communications Office for details.	0110

2	**37**	**PC-12**	**Project Data**	**Collection and organization of project information to develop project base plans.**	
3	38	PC-12.01	Background Data	Information about the project	0116
3	39	PC-12.02	Aerial Photographs	Aerial photographs of the project site.	0116
3	40	PC-12.03	Clear Zone Inventory	The "Corrective Action" portion of Form 410-026 ensures roadside safety is addressed	0116
3	41	PC-12.04	Photogrammetry Data	A means of collecting topographical information for the project through Geographic Services	0116
3	42	PC-12.05	Surveying Data	All of the surveying required to complete the design of the project	0117
3	43	PC-12.06	As-Built Data Verified	Refer to the as-built data as necessary to compliment the survey data gathered. Research the current plan of record to verify the existing access regulation program.	0116
3	44	PC-12.07	Basemap	Development of the project basemap for Preliminary Engineering	0119
3	45	PC-12.08	Maintenance Review Documentation	An onsite review of the project with maintenance to look at existing situations and any concerns about the proposed design.	0116
2	**46**	**PC-13**	**Alternative Assessment**	**Includes identification of conceptual solutions, Transportation Demand Management (TDM), Transportation System Management (TSM), alternative modes, or capacity improvements and endorsement of selected alternatives.**	**0164**
3	47	PC-13.01	Preferred Alternative	Documentation of the preferred alternative selected for Preliminary Engineering.	0164
2	**48**	**PC-14**	**Design Hearing**	**Prepare for and deliver a Design Hearing. See Design Manual, Chapter 210.**	**0120**
3	49	PC-14.01	Design Hearing Packet	When it is determined that a hearing is to be held, the region prepares a pre-hearing packet. See Design manual Chapter 210 for details.	0120
3	50	PC-14.02	Design Hearing	A formal or informal hearing that presents the design alternatives to the public for review and comment before a commitment is made to any one alternative. See Design manual Chapter 210	0120
2	**51**	**PC-15**	**Value Engineering**	**A systematic process designed to focus on the major issues of a complex project or process.**	**0165**
3	52	PC-15.01	VE Study	A systematic process designed to focus on the major issues of a complex project or process. It uses a multi-disciplined team to develop recommendations for the decisions that must be made. The primary focus of a Value Engineering study is value improvement. See Design Manual Section 315 for details.	0165
3	53	PC-15.02	VE Recommendations Response	The Project Team's responses to the VE Team recommendations, which is provided to the Regional Managers for use in developing the Decision Document.	0165
3	54	PC-15.03	VE Decision Document	A document prepared by Regional managers that includes a specific response for each of the VE team recommendations and a summary statement with a schedule for implementation. It also includes estimated costs or savings associated with the recommendations and estimated costs of implementation.	0165
2	**55**	**PC-16**	**Access Point Evaluation**	**New or reconstructed access to Interstate highways. See Design Manual Chapter 1425.**	**0121**
3	56	PC-16.01	Access Point Decision Report	An access point decision report for FHWA approval is required for new/reconstruction of access on Interstate highways. An access point decision report is required to be submitted to the Access and Hearings Unit of the Headquarters Design Office for new/reconstruction of access on divided state highways. See Design Manual Chapter 1425, for completing an Access Point Decision Report.	0121
2	**57**	**PC-17**	**Access Management & Control**	**This is to determine if existing connections of abutting properties to the state highway will be eliminated, relocated, or consolidated. See Design Manual Chapters 1430 and 1435.**	

3	58	PC-17.01	Access Connection Permit	All new access connections and alterations and improvements to existing access connections to state highways require an access connection permit. See Design Manual Chapter 1435.	0129
3	59	PC-17.02	Access Report	If the project is to acquire additional limited access, an access report is required. The access report notifies the local agency how the limited access will impact their transportation system. The access report is worked with and submitted to the HQ Access and Hearings Unit.	0120
3	60	PC-17.03	Access Report Plans	See Design Manual, Chapter 1430 and the Plans Preparation Manual, Section 150	0120
3	61	PC-17.04	Access Hearing Plans	See Design Manual Chapter 1430 and Chapter 2, section 210.09(4). The Plans Preparation Manual, Section 160 shows how plan sheets should be prepared.	0120
3	62	PC-17.05	Access Hearing	A formal hearing that gives local public officials, owners of abutting property, and other interested citizens an opportunity to be heard concerning any plan that proposed the limitation of access to the highway system. See Design Manual Chapter 210.	0120
3	63	PC-17.06	Findings & Order Package	A document containing the findings and conclusions of a limited access hearing that is approved by the Assistant Secretary for the Environmental and Engineering Service Center. See Design Manual Chapter 210.	0120
3	64	PC-17.07	Findings & Order Adopted	**MILESTONE** - See Design Manual Chapter 210.	
2	**65**	**PC-18**	**Environmental Documentation**	**Federal and State regulations require WSDOT to document the environmental impacts of a transportation project. Where appropriate, other public and governmental agencies are involved in the decision making process. National Environmental Policy Act/State Environmental Policy Act (NEPA/SEPA) If project has a federal nexus, follow NEPA procedures and obtain review of proposed documentation level by FHWA. If state only funding, follow SEPA procedures. See Environmental Procedures Manual.**	
3	66	PC-18.01	Endangered Species Act Compliance	The Endangered Species Act requires that the Department of Transportation, on behalf of the Federal Highways Administration, must consult with Wildlife Services to determine the effects of project actions on threatened and endangered species. There are five categories of effect determinations.	0132
4	67	PC-18.01.01	Biological Assessment	A document required for all activities with a federal nexus that analyzes the potential affects of the project on listed species and critical habitat and justifies a particular "effect determination". Federal agencies are responsible for evaluating impacts to listed species from all federal actions, regardless of scope. For actions other than a "major construction activity", the agency must still evaluate the potential for adverse effects and consult with the service, if necessary.	0132
4	68	PC-18.01.02	Environmental Biological Assessment - NOAA Concurrence	Biological Assessment concurrence by the National Oceanic and Atmospheric Administration (NOAA) Fisheries.	0132
4	69	PC-18.01.03	Environmental Biological Assessment - USFW Concurrence	Biological Assessment concurrence by USFW	0132
4	70	PC-18.01.04	Environmental Biological Assessment - No Effect Letter Sent	Biological Assessment determines No Effect.	0132
3	71	PC-18.02	NEPA/SEPA Compliance	National Environmental Policy Act/State Environmental Policy Act (NEPA/SEPA) If project receives federal funding, follow NEPA requirements and obtain review of proposed documentation level by FHWA. If state only funding, follow SEPA requirements. See Environmental Procedures Manual.	0134
4	72	PC-18.02.01	NEPA/ C.E. (ERS)	National Environmental Policy Act Categorical Exclusion and programmatic C.E. (Environmental Review Summary) (NEPA C.E. (ERS))	0134

4	73	PC-18.02.02	NEPA Documented C.E. (ECS)	National Environmental Policy Act Documented Categorical Exclusion (Environmental Classification Summary).	0134
4	74	PC-18.02.03	NEPA Environmental Assessment	National Environmental Policy Act (NEPA) Environmental Assessment. See Environmental Procedures Manual.	0134
4	75	PC-18.02.04	FONSI Issued	**MILESTONE** - Finding of No Significant Impact (FONSI) issued. A federal lead agency document presenting the reasons why a proposal will not significantly affect the environment and therefore will not require EIS documents.	
4	76	PC-18.02.05	NEPA EIS or Supplement	National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) or Supplement. Required when actions are likely to have significant impact on the environment by altering land use, planned growth development patterns, traffic volumes, travel patterns, transportation services or natural resources, or by creating public controversy. Contact Region Environmental Manager.	0134
5	77	PC-18.02.05.01	NOI	Notice of Intent (NOI) is published in the he Federal Register to begin public NEPA process. Official start date of document production.	0134
5	78	PC-18.02.05.02	DEIS	Draft Environmental Impact Statement (DEIS) and commitment file circulated. The DEIS is the initial WSDOT project report. It identifies the alternative actions and presents an analysis of their impacts on the environment. It also summarizes the early coordination process, including scoping, and identifies the key issues and pertinent information received through these efforts.	0134
5	79	PC-18.02.05.03	Environmental Hearing	A formal or informal hearing that ensures that social, economical, and environmental impacts have been considered. See Design Manual Chapter 210.	0134
5	80	PC-18.02.05.04	FEIS	Final Environmental Impact Statement (FEIS) and Commitment File Circulated. Contains the final recommendation or preferred alternative, discusses substantive comments received on the DEIS, summarizes citizen involvement, and describes procedures required to ensure that mitigation measures are implemented.	0134
5	81	PC-18.02.05.05	ROD	Record of Decision Issued (ROD) - A document prepared by the federal lead agency after an EIS has been completed, outlining the final decisions on a proposal. It identifies the decision alternatives considered, measures to minimize harm, and a monitoring or enforcement program.	0134
4	82	PC-18.02.06	NEPA re-evaluation	Re-evaluation of Environmental Assessments and Environmental Impact Statements if no action is taken on the project for 3 years or substantial change to the scope results in a loss of validity of determinations.	0134
4	83	PC-18.02.07	SEPA C.E.	State Environmental Policy Act Categorical Exemption (SEPA C.E.) A type of action that does not significantly affect the environment.	0134
4	84	PC-18.02.08	SEPA Checklist/DNS	State Environmental Policy Act (SEPA) Checklist/Determination of Non-Significance (DNS) The written decision by the Region Administrator, or designee, that a proposal will not have a significant impact and no EIS is required.	0134
4	85	PC-18.02.09	SEPA EIS or Supplement	State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) or Supplement. Required when actions are likely to have significant impact on the environment by altering land use, planned growth development patterns, traffic volumes, travel patterns, transportation services or natural resources, or by creating public controversy. Contact Region Environmental Manager.	0134
4	86	PC-18.02.10	SEPA Adoption	State Environmental Policy Act (SEPA) Adoption. NEPA document adopted to meet the requirements of SEPA. See Environmental Procedures Manual.	0134

5	78	PC-18.02.05.11	Supplemental DEIS	Supplemental Draft Environmental Impact Statement (SDEIS) and commitment file circulated. The SDEIS is the initial WSDOT project report. It identifies the alternative actions and presents an analysis of their impacts on the environment. It also summarizes the early coordination process, including scoping, and identifies the key issues and pertinent information received through these efforts.	0134
3	87	PC-18.03	Discipline Reports - Earth (Geology & Soils)	Environmental Procedures Manual Section 420 Earth (Geology & Soils)	0136
4	88	PC-18.03.01	Geology & Soils Discipline Report Checklist	Refer to Environmental Procedures Manual Section 420.05 & Exhibit 420-1.	0136
4	89	PC-18.03.02	Geology & Soils Discipline Report	Refer to Environmental Procedures Manual Section 420.05(1)	0136
4	90	PC-18.03.03	Temporary Erosion & Control Plan	Refer to Environmental Procedures Manual Section 420.05(2) & Exhibit 431-7.	0136
4	91	PC-18.03.04	Soils Survey	Refer to Environmental Procedures Manual Section 420.05(3)	0136
3	92	PC-18.04	Discipline Report - Air	Environmental Procedures Manual Section 425 Air	
4	93	PC-18.04.01	Air Quality Discipline Report Checklist	Refer to Environmental Procedures Manual 425.05(3)(a) & Exhibit 425-4	0136
4	94	PC-18.04.02	Air Quality Discipline Report	Refer to Environmental Procedures Manual 425.05(3)(a)	0136
4	95	PC-18.04.03	Air Quality Analysis (for NEPA/SEPA)	Refer to Environmental Procedures Manual 425.05(5)(b)	0136
3	96	PC-18.05	Discipline Reports - Water Quality/Surface Water, Groundwater, & Coastal Areas /Shorelines	Environmental Procedures Manual Sections 431, 433, & 452 Water Quality/Surface Water, Groundwater, & Coastal Areas /Shorelines	0136
4	97	PC-18.05.01	Water Quality Discipline Report Checklist	Refer to Environmental Procedures Manual 431.05(1) & Exhibit 431-4	0136
4	98	PC-18.05.02	Water Quality Discipline Report	Refer to Environmental Procedures Manual 431.05(1) & Exhibit 431-4	0136
3	99	PC-18.06	Discipline Reports - Floodplain	Environmental Procedures Manual Section 432 Floodplain	0136
4	100	PC-18.06.01	Floodplain Discipline Report Checklist	Refer to Environmental Procedures Manual 432.05 & Exhibit 432-1	0136
4	101	PC-18.06.02	Floodplain Discipline Report	Refer to Environmental Procedures Manual 432.05 & Exhibit 432-1	0136
3	102	PC-18.07	Discipline Reports - Wildlife, Fish, Vegetation, & Wetlands	Environmental Procedures Manual Sections 436 & 437 Wildlife, Fish, and Vegetation & Wetlands	0136
4	103	PC-18.07.01	Biological Evaluation (BE)	Refer to Environmental Procedures Manual 436.05(3)(b)(5)	0136
4	104	PC-18.07.02	Wetland Inventory Discipline Report Checklist	Refer to Environmental Procedures Manual 437.05(2) & Exhibit 437-10	0136
4	105	PC-18.07.03	Wetland Inventory Discipline Report	Refer to Environmental Procedures Manual 437.05(2)	0136
4	106	PC-18.07.04	Wetland/Biology Discipline Report Checklist	Refer to Environmental Procedures Manual 437.05(3) & Exhibit 437-11	0136
4	107	PC-18.07.05	Wetland/Biology Discipline Report	Refer to Environmental Procedures Manual 437.05(3)	0136
4	108	PC-18.07.06	Botanical Surveys Report	This report is necessary for reporting to the US Forest Service and other Federal Agencies sensetive vascular and non-vascular plant species within the project area.	0136
4	109	PC-18.07.07	Conceptual Mitigation Report/Plan Checklist	Refer to Environmental Procedures Manual 437.05(4) & Exhibit 437-12	0136
4	110	PC-18.07.08	Conceptual Mitigation Report/Plan	Refer to Environmental Procedures Manual 437.05(4)	0136
4	111	PC-18.07.09	Wetland Mitigation Report/Plan Checklist	Refer to Environmental Procedures Manual 437.05(5)(a) & Exhibit 437-13	0136
4	112	PC-18.07.10	Draft Wetland Mitigation Report/Plan	Refer to Environmental Procedures Manual 437.05(5)(a)	0136
4	113	PC-18.07.11	Final Wetland Mitigation Report/Plan	Refer to Environmental Procedures Manual 437.05(5)(d)	0136
3	114	PC-18.08	Discipline Reports - Energy	Environmental Procedures Manual Section 440 Energy	0136
4	115	PC-18.08.01	Energy Discipline Report Checklist	Refer to Environmental Procedures Manual Exhibit 440-1	0136
3	116	PC-18.09	Discipline Reports - Noise	Environmental Procedures Manual Section 446 Noise	0136
4	117	PC-18.09.01	Traffic Noise Discipline Report Checklist	Refer to Environmental Procedures Manual 446.05(1)(a) & Exhibit 446-2	0136

4	118	PC-18.09.02	Traffic Noise Discipline Report	Refer to Environmental Procedures Manual 446.05(1)(a)	0136
4	119	PC-18.09.03	Traffic Noise Analysis	Refer to Environmental Procedures Manual 446.05(1)(d)	0136
3	120	PC-18.10	Discipline Reports - Hazardous Materials	Environmental Procedures Manual Section 447 Hazardous Materials	0136
4	121	PC-18.10.01	Hazardous Materials Discipline Report Checklist	Refer to Environmental Procedures Manual 447.05(3)	0136
4	122	PC-18.10.02	Hazardous Materials Discipline Report	Refer to Environmental Procedures Manual 447.05(3)	0136
4	123	PC-18.10.03	Initial Site Assessment (ISA) Checklist	Refer to Environmental Procedures Manual 447.05(4)	0136
4	124	PC-18.10.04	Initial Site Assessment (ISA)	Refer to Environmental Procedures Manual 447.05(4)	0136
4	125	PC-18.10.05	Preliminary Site Investigation (PSI) Checklist	Refer to Environmental Procedures Manual 447.05(5)	0136
4	126	PC-18.10.06	Preliminary Site Investigation (PSI)	Refer to Environmental Procedures Manual 447.05(5)	0136
4	127	PC-18.10.07	Detailed Site Investigation (DSI)	Refer to Environmental Procedures Manual 447.05(6)	0136
3	128	PC-18.11	Discipline Reports - Land Use, Land Use Plans, and Growth Management	Environmental Procedures Manual Section 451 Land Use, Land Use Plans, and Growth Management	0136
4	129	PC-18.11.01	Land Use Discipline Report Checklist	Refer to Environmental Procedures Manual 451.05(1) & Exhibit 451-1	0136
4	130	PC-18.11.02	Land Use Discipline Report	Refer to Environmental Procedures Manual 451.05(1)	0136
3	131	PC-18.12	Discipline Reports - Wild and Scenic Rivers	Environmental Procedures Manual Section 453 Wild and Scenic Rivers	0136
4	132	PC-18.12.01	Wild and Scenic Rivers Project Report	Refer to Environmental Procedures Manual 453.05(1)	0136
3	133	PC-18.13	Discipline Reports - Agricultural and Farmland	Environmental Procedures Manual Section 454 Agricultural and Farmland	0136
4	134	PC-18.13.01	Farmlands Discipline Report Checklist	Refer to Environmental Procedures Manual 454.05(1) & Exhibit 454-2	0136
4	135	PC-18.13.02	Farmlands Discipline Report	Refer to Environmental Procedures Manual 454.05(1)	0136
4	136	PC-18.13.03	Farmland Conversion Rating (Form AD-1006 or NRCS-CPA-106)	Refer to Environmental Procedures Manual 454.05(2)(c)	0136
3	137	PC-18.14	Discipline Reports - Public Lands (Section 4(f), 6(f), and Forests)	Environmental Procedures Manual Section 455 Public Lands (Section 4(f), 6(f), and Forests)	0136
4	138	PC-18.14.01	Section 4(f) Evaluation Checklist	Refer to Environmental Procedures Manual 455.05(1)(a), Exhibit 455-1, & 456.05(4)	0136
4	139	PC-18.14.02	Section 4(f) Evaluation	Refer to Environmental Procedures Manual 455.05(1)	0136
4	140	PC-18.14.03	Outdoor Recreation Property (6(f)) Discipline Report Checklist	Refer to Environmental Procedures Manual 455.05(2)(a) & Exhibit 455-3	0136
4	141	PC-18.14.04	Outdoor Recreation Property (6(f)) Discipline Report	Refer to Environmental Procedures Manual 455.05(2)(a)	0136
3	142	PC-18.15	Discipline Reports - Historic, Cultural, and Archeological Resources	Environmental Procedures Manual Section 456 Historic, Cultural, and Archeological Resources	0136
4	143	PC-18.15.01	Cultural Resources Discipline Report Checklist	Refer to Environmental Procedures Manual 456.05(1) & Exhibit 456-4	0136
4	144	PC-18.15.02	Cultural Resources Discipline Report	Refer to Environmental Procedures Manual 456.05(1)	0136
4	145	PC-18.15.03	Section 106	Refer to Environmental Procedures Manual 456.05(2)	0136
5	146	PC-18.15.03.01	Section 106 Consultation	Refer to Environmental Procedures Manual 456.05(2)	0136
5	147	PC-18.15.03.02	Section 106 Compliance	Refer to Environmental Procedures Manual 456.05(2)	0136
5	148	PC-18.15.03.03	Cultural Resource Study	Refer to Environmental Procedures Manual 456.05(2)(c)	0136
5	149	PC-18.15.03.04	Memorandum of Agreement	Refer to Environmental Procedures Manual 456.05(2)(f)	0136
3	150	PC-18.16	Discipline Reports - Socio-Economic, Environmental Justice, Transportation, Relocation, and Public Services & Utilities	Environmental Procedures Manual Sections 457, 458, 460, & 470 Socio-Economic, Environmental Justice, Transportation, and Public Services & Utilities	0136
4	151	PC-18.16.01	Social Discipline Report Checklist	Refer to Environmental Procedures Manual 457.05(1)(a) & Exhibit 457-1	0136

4	152	PC-18.16.02	Economic Discipline Report Checklist	Refer to Environmental Procedures Manual 457.05(1)(b) & Exhibit 457-2	0136
4	153	PC-18.16.03	Relocation Discipline Report Checklist	Refer to Environmental Procedures Manual 457.05(1)(c) & Exhibit 457-3	0136
4	154	PC-18.16.04	Environmental Justice Discipline Report Checklist	Refer to Environmental Procedures Manual 458.05(5) & Exhibit 458-3	0136
4	155	PC-18.16.05	Environmental Justice Discipline Report	Refer to Environmental Procedures Manual 458.05(5)	0136
4	155	PC-18.16.06	Transportation Discipline Report	Refer to Environmental Procedures Manual 458.05(5)	0136
3	156	PC-18.17	Discipline Reports - Visual Impacts, Light and Glare	Environmental Procedures Manual Section 459 Visual Impacts, Light and Glare	0136
4	157	PC-18.17.01	Visual Quality Discipline Report Checklist	Refer to Environmental Procedures Manual 459.05(1) & Exhibit 459-1	0136
4	158	PC-18.17.02	Visual Quality Discipline Report	Refer to Environmental Procedures Manual 459.05(1)	0136
3	159	PC-18.18	Environmental Documentation Complete	***MAJOR MILESTONE*** - All environmental documentation complete prior to Design Approval and Right of Way Approval. See Project Control & Reporting Manual.	
2	160	PC-19	**Environmental Permits**	**Identify and complete permits required for the project. Permit requirements are scoped as part of the Environmental Review Summary. See Environmental Procedures Manual for procedures.**	**0138**
3	161	PC-19.01	Corps Section 404 Permit	This permit is needed for discharging, dredging, or placing fill material within waters of the United States or adjacent wetlands. Responsible Agency: Army Corp of Engineers.	0138
3	162	PC-19.02	Section 10 Permit	This permit is needed for obstructions, alterations, or improvements of any navigable water (e.g., rechanneling, piers, wharves, dolphins, bulkheads, buoys, etc.). Responsible Agency: Army Corp of Engineers.	0138
3	163	PC-19.03	Coast Guard Section 9	Permission from the Coast Guard on anything that obstructs vessel passage in navigable waters.	0138
3	164	PC-19.04	Coastal Zone Management Certification	Applicants for federal permits/licenses are required to comply with the states Coastal Zone Management Program (Shoreline Management Act). Corps permits sometimes require WSDOT to receive certification from Ecology that the proposed project will comply with the Coastal Zone Management Program. Responsible Agency: Department of Ecology	0138
3	165	PC-19.05	HPA	Hydraulic Project Approval (HPA) A permit required for projects that use, divert, obstruct, or change the natural flow or bed of any state waters (e.g. culvert work, realignment, bridge replacement). Responsible Agency: Washington State Dept of Fish and Wildlife.	0138
3	166	PC-19.06	NPDES	This permit is needed from Ecology for all construction activities (including grading, stump removal, and demolish) on sites one acre or larger and when there is a discharge of stormwater to a surface water (e.g., wetlands, creeks, rivers, marine waters, ditches, estuaries). Ecology will not have to permit for 1 to 5 acres sites until September 2005. Operators of 1 to 5 acre sites may seek coverage under the current permit.	0138
3	167	PC-19.07	State Waste discharge	This permit is issues by Ecology. Discharges of pollutants to land require a State Wastewater Discharge Permit. Discharges from industrial facilities to municipal wastewater treatment plants require a State Waste Discharge Permit if they haven't been issued a Pretreatment discharge permit by the municipality.	0138
3	168	PC-19.08	Section 401 Water Quality Certification	A federal permit/license for discharge into navigable waters. Certain Army Corp permits will require a section 401. Responsible Agency: Department of Ecology; and the Environmental Protection Agency (EPA) on federal and tribal land.	0138

3	169	PC-19.09	Short Term Water Quality Modification	Issued for activities resulting in temporary minor increase in turbidity. Responsible Agency: Department of Ecology.	0138
3	170	PC-19.10	Forest Practices Permit	Permit required to remove timber or convert timber land. Responsible Agency: Department of Natural Resources.	0138
3	171	PC-19.11	Aquatic Lands Acquisition & Permit Approval	Projects involving aquatic lands contact Real Estate Services. Responsible Agency: Department of Natural Resources.	0138
3	172	PC-19.12	Floodplain Development Permit	A permit for any construction activity within the 100 year flood plain as defined by FEMA mapping. Responsible Agency: Department of Ecology, Cities and Counties.	0138
3	173	PC-19.13	Critical Area Ordinance Permit	Local approval or permits may be required for projects impacting areas defined as "critical" by counties and cities under the Growth Management Act (GMA), including wetlands, aquifer recharge areas, wellhead protections areas, frequently flooded areas, geographically hazardous areas, fish and wildlife habitat, and conservation areas. Responsible Agency: Counties and Cities.	0138
3	174	PC-19.14	Noise Variance	Construction and maintenance activities during nighttime hours may require a variance from local noise ordinances. Daytime noise from construction is usually exempt. Responsible Agency: Counties and Cities.	0138
3	175	PC-19.15	Shoreline Permit/Exemption	Required for any contract requiring work within 200 feet of a shoreline of the state as defined by the local agency with jurisdiction. Responsible Agency: Department of Ecology, Cities and Counties.	0138
3	176	PC-19.16	Tribal Approvals & Permits	Anything that tribes have delegated authority for.	0138
3	177	PC-19.17	Miscellaneous Permits & Approvals	Examples include: Federal Aviation Administration (FAA), sole source aquifer, water use permit, etc.	0138
3	178	PC-19.18	Hazardous Material Generation Permit		0138
3	179	PC-19.19	Environmental Permits Received	**MILESTONE** - All environmental permits acquired for project to go to Ad/Construction.	
4	180	PC-19.20.01	Permit Strategies and Requirements		
4	180	PC-19.20.02	Commitment and Mitigation Tracking		
2	180	PC-20	**Materials (Roadway)**	**Development of soils, surfacing, and materials reports for project.**	**0156**
3	181	PC-20.01	Pavement Determination	Preliminary recommendations for surfacing materials. See WSDOT pavement interactive guide at http://wwwi.wsdot.wa.gov/MaintOps/mats/pavementguide.htm	0156
3	182	PC-20.02	Surfacing/Resurfacing Report	A report that lists the recommendations for type, size, & depth of surfacing for each roadway and recommendations for rehabilitation of existing roadways	0156
3	183	PC-20.03	Materials Source Report	A report on a specific WSDOT material source that verifies the quality and quantity of the material requested	0156
2	184	PC-21	**Geotechnical Evaluations**	**Development of Geotechnical reports for project.**	
3	185	PC-21.01	Preliminary Site Data	Project design office is to provide a project description and location of work to be performed to Region Materials Engineer. See Design Manual Chapter 510.	0140
3	186	PC-21.02	Environmental Permit for Field Exploration	Field exploration may require permits to complete. Permits need to be provided by the Project Office to HQ Geotechnical Office/Region Materials Office to enable required field work to be started.	0138
3	187	PC-21.03	Conceptual Geotechnical Report	RME/HQ Geotechnical will provide recommendations at the conceptual / feasibility level. Some soil borings may be drilled at this time depending upon project scope and available information.	0140
3	188	PC-21.04	Project Site Data	Site information provided to RME by the project design office (specific to the type of project) to initiate geotechnical work on a project during the design and PS&E phases. See Design Manual Chapter 510.	0140

3	189	PC-21.05	RME Geotech Report(s)	Region Geotechnical Report containing geotechnical recommendations and information applicable to the project. There is a possibility of multiple reports, depending upon the scope and complexity of the project.	0140
3	190	PC-21.06	HQ Geotechnical Report(s)	HQ Geotechnical Report containing geotechnical recommendations and information applicable to the project. There is a possibility of multiple reports, depending upon the scope and complexity of the project.	0140
2	191	PC-22	**Structural Site Data**	**Site data to the Bridge and Structures Office, HQ Geotechnical Office, or Region Materials Office. May include base maps, photos, drawing or reports.**	**0144**
3	192	PC-22.01	Bridge Site Data	Structure Site Data to be sent to HQ Bridge for design and PS&E. See Design Manual Chapter 1110.	0144
3	193	PC-22.02	Wall Site Data	Structure Site Data to be sent to HQ Bridge, HQ Geotechnical, or Region Materials for design and PS&E. See Design Manual Chapter 1130.	0144
3	194	PC-22.03	Noise Wall Site Data	Plan and profile along centerline of the wall. Data to be sent to HQ Geotechnical or Region Materials for design. See Design Manual Chapter 1140.	0144
3	195	PC-22.04	Noise Barrier Height & Verification Analysis	This deliverable uses more detailed design data to optimize barrier height and verify that feasibility and requirements are met.	0144
2	196	PC-23	**Structure Design**	**Development of structures reports and contract plans, specifications, and estimates (PS&E).**	**0145**
3	197	PC-23.01	Bridge Condition Report	A Report produced by the Bridge Office which describes the condition of the deck and general information about the structure.	0145
3	198	PC-23.02	Preliminary Bridge Plan	Preliminary plan showing location, length, type of structure (TS&L) and estimate.	0145
3	199	PC-23.03	Demolition Plan	Development and/or review of demolition plans .	0145
3	200	PC-23.04	Sign Structure Design	Cantilever and monotube sign structures and bridges.	0145
3	201	PC-23.05	Noise Wall Design	Document/design noise walls that are non-standard or are part of a retaining wall.	0145
3	202	PC-23.06	Retaining Wall Design	Document/design non standard retaining walls & soldier pile walls	0145
3	203	PC-23.07	Bridge Rails/Expansion Joints Design	Document/design rehabilitation of bridge rails, expansion joints and bridge decks	0145
3	204	PC-23.08	Other Structure Design	Document/design ~~tunnels~~, approach slabs, emergency repairs and other structural design.	0145
3	205	PC-23.09	Consultant Structural Plans Review	60%, 90% or 100% review of all structural plans produced by consultants	0145
3	206	PC-23.10	90% Bridge & Structures Plan	90% Plans turn-in to the regions 4 weeks prior to 100% turn-in	0145
3	207	PC-23.11	Bridge & Structures PS&E	100% Plan, Specials and Estimates ready for region 12 week review.	0145
3	207	PC-23.12	Tunnel Design	Tunnel related designs	0145
4	207	PC-23.12.01	Tunnel Design - Preliminary Structural	Preliminary/Studies/Reports	0145
4	207	PC-23.12.02	Tunnel Design - Final Structural	Final Design	0145
4	207	PC-23.12.03	Tunnel Design - Preliminary Mechanical	Preliminary/Studies/Reports	0145
4	207	PC-23.12.04	Tunnel Design - Final Mechanical	Final Design	0145
4	207	PC-23.12.05	Tunnel Design - Preliminary Electrical	Preliminary/Studies/Reports	0145
4	207	PC-23.12.06	Tunnel Design - Final Electrical	Final Design	0145
4	207	PC-23.12.07	Tunnel Design - Preliminary Communication & Control	Preliminary/Studies/Reports	0145
4	207	PC-23.12.08	Tunnel Design - Final Communication & Control	Final Design	0145
4	207	PC-23.12.09	Tunnel Design - Preliminary Fire/Life Safety	Preliminary/Studies/Reports	0145
4	207	PC-23.12.10	Tunnel Design - Final Fire/Life Safety	Final Design	0145
4	207	PC-23.12.11	Tunnel Design - Preliminary General Systems	Preliminary/Studies/Reports	0145
4	207	PC-23.12.12	Tunnel Design - Final Fire/Life General Systems	Final Design	0145
2	208	PC-24	**Roadway Design**	**Development of earthwork design and channelization design. Also includes minor safety design and documentation.**	

3	209	PC-24.01	Preliminary Intersection Plan	Plans that are required for any increases in capacity, modification of channelization, or change of intersection geometrics, see Design Manual Chapter 910.	0174
3	210	PC-24.02	Preliminary Interchange Plan	Preliminary geometric elements for interchanges on the project	0174
3	211	PC-24.03	Preliminary Channelization Plan	Preliminary plans that show the separation of traffic movements into delineated paths of travel, see Design Manual Chapter 910.	0174
3	212	PC-24.04	Preliminary Earthwork Quantities	Preliminary calculations for embankment, roadway excavation, and other earth moving volumes.	0174
3	213	PC-24.05	Alignments	Finalization of the horizontal and vertical alignments for each roadway in the project, see Design Manual Chapters 620 & 630.	0174
3	214	PC-24.06	Intersection Plan for Approval	A plan that address the intersection design considerations in accordance with Design Manual Chapter 910	0174
3	215	PC-24.07	Interchange Plan for Approval	A plan that address the interchange design considerations in accordance with Design Manual Chapter 940	0174
3	216	PC-24.08	Channelization Plan	A plan that address the channelization design considerations in accordance with Design Manual Chapter 910.	0174
3	217	PC-24.09	Earthwork Quantities	Earthwork calculations for roadway excavation and embankment volumes.	0174
3	218	PC-24.10	Roadway Sections	Geometric roadway cross section from the subgrade to finish grade	0174
3	219	PC-24.11	Roadside Safety	Address items on the Clear Zone Inventory and any other safety items that have been discovered including documenting a decision to fix or not. Design Manual Chapter 700	0174
3	220	PC-24.12	Minor Safety Documentation	Paving projects (P1) have opportunities to improve minor deficiencies as part of the preservation work. See Design Manual Chapter 410.	0176
2	221	PC-25	**Hydraulics**	**The Hydraulic Report is intended to serve as a complete documented record containing the engineering justification for all drainage modifications that occur as a result of the project. See Hydraulics Manual.**	**0148**
3	222	PC-25.01	Type A Reports	Type A Hydraulic Reports contain documentation of design for major hydraulic work. See the Hydraulics Manual.	0148
3	223	PC-25.02	Type B Reports	Type B Hydraulics Reports contain documentation of design for hydraulics. See the Hydraulics Manual.	0148
3	224	PC-25.03	Hydraulic Summary	At the Regions discretion smaller projects may replace a Type B report with a Hydraulic Summary, see the Hydraulics Manual and Region Hydraulics Engineer for more information.	0148
3	225	PC-25.04	Special Reports	Special reports contain specialized hydraulic analysis such as bridge backwater analysis, scour and other special reports.	0148
3	226	PC-25.05	Hydraulic Report Approved	**MILESTONE** - Hydraulics Report Approved for project.	
2	227	PC-26	**Partnerships**	**A contract entered into by two or more groups.**	**0109**
3	228	PC-26.01	Local Agencies Agreements/MOU's	A contract between the Washington State Department of Transportation and a local governmental agency that includes an offer and an acceptance. Agreements are necessary to accomplish the transfer of funds into and out of state accounts for goods and services.	0109
3	229	PC-26.02	Other Agencies Agreements/MOU's	A contract between the Washington State Department of Transportation and other governmental agencies or non-governmental agencies that includes an offer and an acceptance. Agreements are necessary to accomplish the transfer of funds into and out of state accounts for goods and services.	0109

3	230	PC-26.03	Tribal Agreements/MOU's	A contract between the Washington State Department of Transportation and a tribal government that includes an offer and an acceptance. Agreements are necessary to accomplish the transfer of funds into and out of state accounts for goods and services.	0109
3	231	PC-26.04	Developer Agreements/MOU's	A contract between the Washington State Department of Transportation and a private developer that includes an offer and an acceptance. Agreements are necessary to accomplish the transfer of funds into and out of state accounts for goods and services.	0109
2	232	PC-27	**Railroad**	**Communication and tasks related to Railroads. Contact the Region Utilities Office.**	**0158**
3	233	PC-27.01	Preliminary Relocation Plan	A plan that shows railroad facility relocations/adjustments by WSDOT and needs preliminary design plans.	0158
3	234	PC-27.02	Existing Railroad Facilities Located	Locate existing railroad facilities in the field.	0158
3	235	PC-27.03	Existing Railroad Facility Plan	A plan showing the location of known railroad facilities. This plan should include all additional data acquired to insure the accuracy needed for the project.	0158
3	236	PC-27.04	Updated Railroad Facility Location plan	An update and/or enhancement of the quality of the railroad location information.	0158
3	237	PC-27.05	Railroad Facilities Relocation Plan	A plan showing railroad relocations/adjustments by DOT.	0158
3	238	PC-27.06	Railroad Agreements	A contract between the Department and a railroad for work by either party where the department will receive or pay funds.	0158
2	239	PC-28	**Right of Way (R/W) Engineering**	**Property required for a public facility, includes square footage, access rights, easements, and any property impacts as defined in the Right of Way Manual Division 6.**	
3	240	PC-28.01	Preliminary Right of Way	Determination of approximately how much additional Right of Way will be needed to construct the project. Includes any property impacts as defined in the Right of Way Manual Division 6.	0119
3	241	PC-28.02	R/W Plans	HQ R/W Plans Section makes the final review and then the Plan is stamped & signed by the responsible Project Engineer. Right of Way acquisition cannot begin without plan approval. See Plans Preparation Manual (PPM) Section 130.09.	0124
3	242	PC-28.03	Sundry Site Plans	Legal Document/Right of Way Plan showing boundary of property to be acquired by WSDOT that is not adjacent to highway right of way. Typically these would include mitigation sites, stormwater treatment areas, and maintenance sites.	0124
3	243	PC-28.04	DNR Plat	Legal Document prepared by WSDOT HQ R/W Plans Office showing a survey of property to be acquired from the Department of Natural Resources - Either uplands or aquatic	0124
3	244	PC-28.05	Monumentation Map	The official state survey document for state highway R/W alignment, see Plans Preparation Manual (PPM) 1010	0119
3	245	PC-28.06	Record of Survey	Public Record filed with the County Auditor used to preserve the evidence of land surveys. The content and format of Record of Surveys are prescribed by law.	0119
3	246	PC-28.07	Land Corner Records	Written record of corner information as prescribed by the Department of Natural Resources, used to perpetuate or establish land corners and their accessories.	0119
3	247	PC-28.08	Permit to Destroy	Application made to Department of Natural Resources requesting permission to remove or destroy monuments or make them inaccessible.	0119
3	248	PC-28.09	R/W Plan Approved	**MILESTONE** - R/W Plans are submitted to the Region R/W Plans Office for review and transmittal to HQ for approval in accordance with Plans Preparation Manual (PPM) Section 130.08	

2	249	PC-29	**Right of Way Acquisition**	**WSDOT Real Estate Services performs and coordinates all real estate transactions for the department, and issues guidelines for all state agencies engaged in real estate activities covered by the Uniform Relocation Assistance and Real Property Acquisition Policies Act.**	
3	250	PC-29.01	Preliminary Right of Way Costs	Initial estimate as to what Right of Way costs will be.	0168
3	251	PC-29.02	Ownership Interests and Encumbrances (Title Reports)	Legal records that defines property interest and boundaries needed to prepare the R/W Plans.	0220
3	252	PC-29.03	Right of Entry	Field investigations and field explorations, other than land surveying, that are obtrusive in nature require a Right of Entry from the property owner. RCW 47.01.170	0220
3	253	PC-29.04	Project Funding Estimate (PFE)	A parcel by parcel estimate of all right of way and condemnation costs.	0222
3	254	PC-29.05	R/W Funding Approved	**MILESTONE** - Work Order set up by Program Management and authorizes funding. Notification to RES to proceed with R/W acquisition.	
3	255	PC-29.06	Parcel (Parcel ID)	The process of securing the property needed for highway improvements that conforms with Federal and State regulations called the Uniform Relocation and Acquisition Act. It includes, but is not limited to square footage, access rights, and easements. This element of the MDL can be repeated in the project work breakdown structure for individual parcels.	
4	256	PC-29.06.01	Appraisal/Administrative Offer Summary	An analysis of real estate market used to estimate the value of the real property and the damages to the remaining property.	0222
4	257	PC-29.06.02	Review & Determination of Value	Appraisal Review checks the accuracy of the appraisal data and the soundness of the appraisers reasoning then writes a determination of value (DV) which is the amount of money to be offered to the property owner for the property needed for the highway project.	0224
4	258	PC-29.06.03	Document Development	Development of legal descriptions for real property or property rights to be acquired.	0220
4	259	PC-29.06.04	Negotiations	The formal offer to purchase, including payment and recording of documents.	0220
4	260	PC-29.06.05	Purchase	The formal transaction for real property and damages to remaining property.	0220
4	261	PC-29.06.06	Property Management	Tenant leases are signed, rents collected, property is secured if vacant to prevent vandalism. Demolition of improvements if needed.	0211
4	262	PC-29.06.07	Condemnation	A judicial process to acquire property where the state has been unable to reach a settlement through negotiation. This is handled by the office of the Attorney General.	0230
4	263	PC-29.06.08	Possession & Use	A regional or judicial formal document that grants the State the ability to possess and use the property in its construction project prior to the condemnation trial.	0230
4	264	PC-29.06.09	Relocation	A program of benefits to assist owners, tenants, businesses, farms and non profit organizations that are being displaced by a highway project to move to replacement facilities.	0240
3	265	PC-29.07	R/W Certification	***MAJOR MILESTONE*** - Date the Region RES Manager assures all right of way necessary for construction, operation, and maintenance has been obtained and that no displace remains in the project limits. This process is required before construction is advertised for bids.	
2	266	PC-30	**Roadside Restoration**	**WSDOT projects that disturb operational, environmental, visual and auxiliary functions (see Chapter 110 of the Roadside Manual) must be restored according to the policy set forth in the Roadside Classification Plan.**	**0162**

3	267	PC-30.01	Roadside Master Plan	A Roadside Master Plan may be prepared for a route or portion of a route where conditions require coordination of planning, design, construction, and maintenance activities with anticipated route development, construction projects, environmental or other commitments, and/or a special route designation. See the Roadside Classification Plan.	0162
3	268	PC-30.02	Restoration Estimate	Region Landscape Architects or the HQ Roadside and Site Development Unit prepares a restoration estimate which includes all costs to restore and establish a sustainable plant community per the Roadside Classification Plan, 1996, Chapter 810.	0162
3	269	PC-30.03	Landscape Design	Landscape design and revegetation plans are required when the project disturbs the roadside. See the Roadside Classification Plan and Roadside Manual Chapter 800.	0162
2	270	PC-31	**Traffic Design**	**Gathering of traffic data and development of Traffic reports, studies, designs, and plans.**	
3	271	PC-31.01	Collision Data	Validate accident data. Update / supplement if necessary	0150
3	272	PC-31.02	Preliminary Traffic Analysis Report	A report that identifies safety and/or capacity deficiencies and list of recommendations including geometric configurations and appropriate traffic control devices.	0150
4	272	PC-31.02.01	Preliminary Traffic Analysis Effort	The planning and management effort, including committee meetings, required to coordinate large project transportation and traffic designs.	0150
3	273	PC-31.03	Preliminary Illumination Design	Scope illumination system using appropriate design matrix and design level. Identify project specific issues and needs	0152
3	274	PC-31.04	Preliminary ITS Design	Scope ITS system in accordance with Region ITS Implementation Plan.	0152
3	275	PC-31.05	Preliminary Signing Design	Scope signing system using appropriate design matrix and design level. Identify project specific issues and needs	0152
3	276	PC-31.06	Preliminary Signal Design	Scope signal system using appropriate design matrix and design level. Identify project specific issues and needs	0152
3	277	PC-31.07	Bus Stop Inventory	Design decisions . Approval, denial, or variance per engineering and traffic considerations.	0150
3	278	PC-31.08	Traffic Volumes & Movements	Validate traffic counts. Update / supplement if necessary	0150
3	279	PC-31.09	Traffic Model	Validate traffic model. Update/supplement if necessary	0150
3	280	PC-31.10	Traffic Analysis Report	Finalize traffic analysis report	0150
3	281	PC-31.11	Traffic Signal Permit	State statutes (RCWs) require Department of Transportation approval for the design and location of all conventional traffic signals and some types of beacons located on city streets forming parts of state highways. Approval by the Department of Transportation for the design, location, installation, and operation of all other traffic control signals installed on state highways is required by department policy. The Traffic Signal Permit (DOT Form 242-014 EF) is the formal record of the department's approval of the installation and type of signal. The permit is completed by the responsible agency and submitted to the Regional Administrator for approval.	0152
3	282	PC-31.12	Illumination Design	Document project specific design decisions, deviations, justifications, and other approvals. Request soils investigation, foundation design, utility service agreement.	0152
3	283	PC-31.13	ITS Design	Document project specific design decisions, deviations, justifications, and other approvals. Request soils investigation, foundation design, utility service agreement.	0152
3	284	PC-31.14	Signing Design	Document project specific design decisions, deviations, justifications, and other approvals. Request soils investigation, foundation design, utility service agreement.	0152

3	285	PC-31.15	Signal Design	Document project specific design decisions, deviations, justifications, and other approvals. Request soils investigation, foundation design, utility service agreement.	0152
2	286	PC-32	**Utilities**	**The Utility Accommodation Team evaluates and authorizes the installation of utilities and other facilities or activities within the state highway right of way.**	**0160**
3	287	PC-32.01	Existing Utilities Located	Locate existing utilities in the field to level of accuracy required. Can vary from quality level D (most basic) to quality level A (Subsurface Utility Engineering (SUE)). See Utilities Manual.	0160
3	288	PC-32.02	Existing Utility Plan	A plan showing the location of known aerial and underground utility facilities. This plan should include all additional data acquired to insure the accuracy needed for the project.	0160
3	289	PC-32.03	Utility Relocation Plan	A plan showing utility relocations/adjustments by DOT.	0160
3	290	PC-32.04	Utility Agreements	A contract between the Department and a utility for work by either party where the department will receive or pay funds.	0160
3	290	PC-32.05	Utility Agreements	AWV Utility Studies	0160
3	290	PC-32.06	Utility Agreements	AWV Conceptual Ultility Designs	0160
3	290	PC-32.07	Utility Agreements	AWV Utility Basis of Design Reports	0160
3	290	PC-32.08	Utility Agreements	AWV Utility CADD Management	0160
2	291	PC-33	**Work Zone Traffic Control (WZTC)**	**The planning, design, and preparation of contract documents for the modification of traffic patterns during construction is known as work zone traffic control. See Design Manual Chapter 810.**	**0154**
3	292	PC-33.01	Preliminary TC Plans	A conceptual plan to provide safety in a work zone for the traveling public and the workers. See Design Manual Chapter 810.	0154
3	293	PC-33.02	Work Zone Traffic Control Meeting	A meeting with the Work Zone Traffic Control (WZTC) team to discuss various traffic control strategies for the project. See Design Manual Chapter 810.	0154
3	294	PC-33.03	Staging Design	A strategy for staging the work and/or developing detour plans that are efficient, cost effective, and safe. See Design Manual Chapter 810.	0154
2	295	PC-34	**Design Documentation**	**Design documentation is prepared to record the evaluations by the various disciplines that result in design recommendations. See Design Manual Chapter 330.**	**0172**
3	296	PC-34.01	Design Documentation Package	A compilation of assumptions, decisions, justifications, and approvals that support the ultimate design of the project, to include review of the package. See Design Manual Section 330.06	0172
3	297	PC-34.02	Deviation	A documented decision granting approval at project specific locations to differ from the design level specified in the Design Manual.	0172
3	298	PC-34.03	Evaluate Upgrade	Documentation of whether or not to correct an existing design element as designated in the design matrices.	0172
3	299	PC-34.04	Design Exception	Preauthorization to omit correction of an existing design element for various types of projects, as designated in the design matrices. See Chapter 325. A DE designation indicates that the design element is normally outside the scope of the Project Type.	0172
3	300	PC-34.05	Design Approved	**MILESTONE** - An action taken to formally approve the Design (Documentation) File, see Design Manual Section 330.07	
2	**301**	**PC-35**	**Design-Build Procurement**	**The process resulting in an executed contract that represents the best value to the public.** ***(Note: Review Contract Ad & Award and Construction Milestones for additional Design Build Reporting Milestones.)***	

3	302	PC-35.01	RFQ	The Request for Qualifications is a document asking interested proposing teams to submit a well defined package outlining historical information related to capabilities, experience and past performances on specific issues pertinent to the design-build project.	0190
3	303	PC-35.02	Draft RFP	The draft Request for Proposals is documentation furnished to interested proposing teams to guide the preparation and submittal of qualifications and proposals.	0190
3	304	PC-35.03	RFP	The final Request for Proposals document.	0190
3	305	PC-35.04	Technical & Price Evaluation	A systematic scoring of proposals in two parts. First, the Technical Proposal is scored, according to criteria published in the RFP. Second, the Price Proposals are opened and evaluated for completeness and conformance with the requirements in the RFP. The technical score is then divided by the price of qualified proposals to arrive at the final score.	0191
2	306	PC-36	**Contract Plan Sheets Preparation**	**Development of the Contract Plansheets. See Plans Preparation Manual (PPM) M22-31.**	
3	307	PC-36.01	Contract Plan Workforce Hammock	This task is a hammock task for uniform resource loading the effort involved with contract plan preparation. This task is used when the plan sheet deliverables are constrained by other activities or dates and are not resource loaded. When used, this task will have no constraints, in order to have the task span the entire duration of plan preparation (parent or summary activity).	0178
3	308	PC-36.02	Index	Required on all projects with 30 plan sheets or more, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	309	PC-36.03	Vicinity Map	A plan sheet that is required for all projects to show the approximate location of the project on the state route, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	310	PC-36.04	Summary of Quantities	These plans are a complete tabulation of all bid items and pay quantities required for the project, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	311	PC-36.05	Reclamation Plans	Plans that are required on all WSDOT projects that contain a WSDOT furnished material source, including borrow, pit, quarry, stockpile, waste site, and reclamation plans. See Plans Preparation Manual (PPM) Chapter 460.	0178
3	312	PC-36.06	Roadway Section Plans	Plans that show the geometric roadway cross section from subgrade up to finished grade, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	313	PC-36.07	Grading Section Plans	Plans that show finished ground contours, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	314	PC-36.08	Stage Construction Plans	These plans show the different stages required to construct the project. See Plans Preparation Manual (PPM) Chapter 460.	0178
3	315	PC-36.09	Alignment / Right of Way Plans	Plans that contain horizontal alignment & R/W information, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	316	PC-36.10	Quantity Tabs	Plans that tabulate quantities and identifies locations and notes pertaining to specific bid items, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	317	PC-36.11	Site Preparation Plans	These plans show existing topography, removal & demolition work, see Plans Preparation Manual (PPM) Chapter 460.	0178
3	318	PC-36.12	Existing Utilities Plan	This is an extension of the Site Preparation Plan and is only required if the existing utilities are so extensive that they cannot be clearly shown of the site preparation plans. See Plans Preparation Manual (PPM) Chapter 460.	0160
3	319	PC-36.13	Environmental and/or Wetland Mitigation Plans	A plan sheet that identifies wetland mitigation. See Plans Preparation Manual (PPM) Chapter 460.	0162
3	320	PC-36.14	Roadway Profiles	Plans that identify a change in the vertical alignment of the roadway, see Plans Preparation Manual (PPM) Chapter 460.	0178

3	321	PC-36.15	TESC Plans	These plans are required if the project involves land disturbance, to include Qtabs, Plansheets, and Details. see Plans Preparation Manual (PPM) Chapters 460 and 750.	0162
3	322	PC-36.16	Drainage Plans	Plans that show how the drainage system relates to the rest of the project, including Drainage Structure Notes, Drainage Profiles, and Drainage Details. See Plans Preparation Manual (PPM) Chapter 460.	0178
3	323	PC-36.17	Utility Plans	Plans that are required when there is work on existing utilities as part of the contract, to include Utility Structure Notes and utility details. See Plans Preparation Manual (PPM) Chapter 460.	0160
3	324	PC-36.18	Irrigation Plan	These plans are developed by the Region Landscape Office. Includes Irrigation Structure notes and details. See Plans Preparation Manual (PPM) Chapter 460.	0162
3	325	PC-36.19	Landscape Plan	Plans that are developed by the Region Landscape Office. Includes Qtabs and details. See Plans Preparation Manual (PPM) Chapters 460 and 750.	0162
3	326	PC-36.20	Interchange Contours	Plansheets showing the contour grading of interchanges. See Plans Preparation Manual (PPM) Chapter 460.	0178
3	327	PC-36.21	Paving Plans	Plans that show total roadway widths to be paved, including Qtabs and details. See Plans Preparation Manual (PPM) Chapter 460.	0178
3	328	PC-36.22	Pavement Marking Plans	Plans that show the type and location of pavement markings for the project, including Qtabs and details. See Plans Preparation Manual (PPM) Chapter 460.	0178
3	329	PC-36.23	Minor Structures Plans	Plans that show the information required to construct retaining walls, etc. Includes Qtabs, profiles, and details. See Plans Preparation Manual (PPM) Chapters 460 and 750.	0145
3	330	PC-36.24	Illumination Plan	Plans that show street lighting, including Qtabs and details. See Plans Preparation Manual (PPM) Chapter 460.	0152
3	331	PC-36.25	Traffic Signal Plans	Plans developed by the Region or HQ Traffic Office, including details. See Plans Preparation Manual (PPM) Chapter 460.	0152
3	332	PC-36.26	ITS Plan	Plans normally developed by the Region Traffic Office that show how to construct Intelligent Transportation Systems, including details. See Plans Preparation Manual (PPM) Chapter 460.	0152
3	333	PC-36.27	Signing Plans	Plan sheets developed in accordance with Plans Preparation Manual (PPM) Chapter 460. Includes sign specification sheets and details.	0152
3	334	PC-36.28	Bridge Plan	Bridge plans are prepared by the Headquarters Bridge & Structures Office, see Plans Preparation Manual (PPM) Chapter 460.	0145
3	335	PC-36.29	Wall Plans	Plans that show the information required to construct major walls and noise walls. See Plans Preparation Manual (PPM) Chapters 460 and 750.	0145
3	336	PC-36.30	Sign Structure Plans	These plans show the details for overhead sign structures. See Plans Preparation Manual (PPM) Chapter 460.	0145
3	337	PC-36.31	Building Plans	Plans that show building structures, to include Qtabs, and details. See Plans Preparation Manual (PPM) Chapter 460.	0145
3	338	PC-36.32	Traffic Control Plans	These are site specific work zone traffic control plans, see Plans Preparation Manual (PPM) Chapter 460.	0154
3	339	PC-36.33	Detour Plan	Plans that show the route to be used as a detour while the project is being constructed. See Plans Preparation Manual (PPM) Chapters 460 and 750.	0154
2	340	PC-37	**Contract Specifications Development**	**Development of Contract Provisions. See Plans Preparation Manual (PPM).**	
3	341	PC-37.01	Contract Specifications	Development of Contract Provisions, Amendments, General Special Provisions, and appendices. See Plans Preparation Manual (PPM) Division 6.	0179
3	342	PC-37.02	Summary of Geotechnical Conditions	HQ Geotechnical and/or Region Materials prepares summary of geotechnical conditions for inclusion into the PS&E as Appendix B.	0140

2	343	PC-38	**Construction Estimate Development**	**Development of Contract Estimates for costs and time. See Plans Preparation Manual (PPM).**	**0167**
3	344	PC-38.01	Engineer's Cost Estimate of Construction	An estimate used to initiate funds for the construction activity and to evaluate the contractor's bids, see Plans Preparation Manual (PPM) Division 8.	0167
3	345	PC-38.02	Lump Sum Breakout	Calculations for determining estimate of Lump Sum items.	0167
3	346	PC-38.03	Working Day Estimate	Contract time determined in accordance with Plans Preparation Manual (PPM) Appendix A6	0167
2	347	PC-39	**Construction Permits**	**Development and documentation of permits from other public agencies for work to be done outside of WSDOT right of way and within other public agency right of way.**	**0181**
3	348	PC-39.01	Construction Permits	Construction Permits accommodate WSDOT activities on public owned right of way. See Design Manual, Section 1410.04.	0181
3	349	PC-39.02	Haul Road and Detour Agreement	When the project provides a materials source, or requires traffic to be detoured from the state highway, the region is required to acquire agreements with the owners of the roads that will be used as the haul route or the detour route. See Plans Preparation Manual (PPM) Section 750.10.	0181
3	350	PC-39.03	Turnback Agreement	Areas for relinquishment are areas that the state acquires for the improvement or construction of roads that will not remain a part of the highway system. See Plans Preparation Manual (PPM) Chapter 130.	0181
2	351	PC-40	**Constructability Reviews**	**To develop a quality project, WSDOT uses a series of reviews at predetermined stages of project development. These reviews, called constructability reviews, attempt to ensure that: project development process is on schedule; project definition and estimates are correct; project is buildable; project is maintainable; and project documents are biddable.**	**0180**
3	352	PC-40.01	Scoping Phase Review (PDR)	Scoping Phase Review	0180
3	353	PC-40.02	0% Constructability Review	Transitional / Design Re-Start Review	0180
3	354	PC-40.03	30% Constructability Review	Geometric Review	0180
3	355	PC-40.04	60% Constructability Review	General Plans Review	0180
3	356	PC-40.05	90% Constructability Review	Contract Plans Review	0180
2	357	PC-41	**PS&E Reviews**	**Plans Specifications & Estimate (PS&E) Reviews. Check for completeness and compatibility between the Plans, Specifications and Estimate.**	**0181**
3	358	PC-41.01	Local Agency Review	A check of the plans, specification and estimate by a local governmental or non-governmental agency or tribal nation to ensure compliance with established agreements or memorandum of understandings.	0181
3	359	PC-41.02	Region PS&E Review	Region Project Office submits PS&E package to Region for review.	0181
3	360	PC-41.03	State Materials Justification/Approval	Justification for use of State Furnished Materials and approval by the ASDE.	0181
3	361	PC-41.04	Proprietary Item Approval	Item approved with final PS&E to Region and a copy to job file.	0181
3	362	PC-41.05	HQ PS&E Review	Region forwards PS&E package to Headquarters for review.	0181
3	363	PC-41.06	FHWA PS&E Review	Headquarters forwards PS&E package to FHWA for review.	0181
3	364	PC-41.07	FRA PS&E Review	Headquarters forwards PS&E package to Federal Railroad Administration (FRA) for review.	0181
3	365	PC-41.08	Federal Transit Agency (FTA) PS&E Review	Headquarters forwards PS&E package to FTA for review.	0181
3	366	PC-41.09	Final Signed PS&E to Region	**MILESTONE** - Project Manager returns stamped and signed AD ready PS&E package to the Region.	
3	367	PC-41.10	Ad Package to Headquarters	**MILESTONE** - Final PS&E to HQ with all appropriate attachments as required on the Final Check Sheet, five(5) days prior to the scheduled Ad date.	

2	368	PC-42	**Project Shelf**	**Completion milestones and documentation for projects not funded for construction. Re-start milestones for projects coming off the shelf for advertisement.**	**0187**
3	369	PC-42.01	Incomplete Project to Shelf	**MILESTONE** - The date that an incomplete project goes to a holding area (called "the shelf"). This project is not ready for advertisement and will need to undergo further design/adjustments and reviews.	
3	370	PC-42.02	AD Ready Project to Shelf	**MILESTONE** - The date that a fully designed, reviewed and permitted project goes to a holding area (called "the shelf"). This project is ready for advertisement without any further adjustments or reviews	
3	371	PC-42.03	Shelf to AD Ready	**MILESTONE** - Date project is taken off shelf.	
3	372	PC-42.04	Shelf/Ad Ready Letter	A Memo from the Project Engineer to the Assistant Region Administrator for Project Development to formally suspend work on a project until a later date.	0187
3	373	PC-42.05	Estimate to Make AD Ready	Estimate of scope, time, and cost to get an incomplete, "shelved", project ready for advertisement	0187
2	374	PC-43	**Contract Ad & Award**	**Advertisement and award of construction contracts. See Ad and Award Manual.**	
3	375	PC-43.01	Construction Funding Approval	**MILESTONE** - Official approval from HQ Program Management and FHWA (if federal funds are used) to move ahead with the advertisement of the construction phase of a project	
3	376	PC-43.02	Printing	Reproduction and distribution of plans, specifications, and bid proposal package. Contact HQ Printing Services for information.	0189
3	377	PC-43.03	Project Geotechnical Documentation Package	Printing of pertinent geotechnical reports for sale to prospective bidders. Prepared by HQ Geotechnical and/or Region Materials and printed by HQ Printing Services.	0140
3	378	PC-43.04	Advertisement (AD Date)	***MAJOR MILESTONE*** - Date the project is first advertised for bid. (*Note: For Design-Build, this is reported as the RFP date)*	
3	379	PC-43.05	Addendum Deadline	**MILESTONE** - Date addenda are due in headquarters. 14 calendar days prior to the scheduled bid opening.	
3	380	PC-43.06	Bid Opening	***MAJOR MILESTONE*** - Public opening and reading of sealed bids *(Note: For Design-Build projects, this is reported as the selection date)*	
3	381	PC-43.07	Award	***MAJOR MILESTONE*** - Official notice of award of the contract to the successful bidder. *(For Design-Build projects, this is reported as the Contract Award date)*	
2	382	PC-44	**Construction Milestones**	**Project Control and Reporting milestones for Construction phase of the project. Estimates here are for the Preconstruction phase and will be revised/updated when project is in construction phase.**	
3	383	PC-44.01	Contract Execution	***MAJOR MILESTONE*** - Project Control & Reporting (PC&R) Milestone. This is the date when the Department signs the actual contract with the contractor. This typically occurs within 21 days following contract award. See 1-03.3 of the Standard Specifications for further detail. *(Note: For Design-Build projects, this is reported as the Notice to Proceed date)*	

3	384	PC-44.02	Construction Start	***MAJOR MILESTONE*** - Project Control & Reporting (PC&R) Milestone. This is the date when work actually starts on building the project and activity might be seen on the site. The first day that can be charged against the contract. This day is usually the 10th calendar day following execution but is also sometimes changed by Special Provision. See 1-08.5 and contract special provisions for further details.	
3	385	PC-44.03	Operationally Complete	***MAJOR MILESTONE*** - Project Control & Reporting (PC&R) Milestone. This is the date when the intended end user (the public in the case of facilities such as highways and ferry terminals, WSDOT employees in the case of facilities) has free and unobstructed use of the facility. In some cases, the facility will be open, but minor work items may remain to be completed. See 1-01.3 of the Standard Specifications for further details (Substantial Completion).	
3	386	PC-44.04	Final Contract Completion	***MAJOR MILESTONE*** - Project Control & Reporting (PC&R) Milestone. This is the date when the contract is finalized. All contractual work will have been completed and all payments to contractors will have been completed. After all contractual obligations have been fulfilled, the Department accepts the contract as complete by signature of the Secretary on the Final Contract Voucher Certification. See 1-01.3 and 1-05.12 of the Standard Specifications for further detail.	
1	**387**	**CN**	**Construction**		
2	**388**	**CN-PE**	**Project Engineer Contract Support Activities**	**CN-PE-01 through PE-09**	
3	389	CN-PE-01	Project Management	See Project Management On-line Guide (PMOG) http://www.wsdot.wa.gov/Projects/ProjectMgmt/	
4	390	CN-PE-01.06	Managing the Project Hammock Task	Hammock task to assign and account for the resource needs and effort required to manage the project.	
4	391	CN-PE-01.07	Project Management Plan	The Project Management Plan describes both the Project Performance Baseline for the project deliverables and the schedule and budget plans for delivering them, and the Project Management Methods that will be used by the Project Team during their delivery. See Project Management On-line Guide (PMOG) for details. http://www.wsdot.wa.gov/Projects/ProjectMgmt/	
4	392	CN-PE-01.08	Endorsement	MILESTONE - Endorsement is the process of gaining the commitment of the Project Team then the endorsement of the Management entities responsible for the resources needed to successfully execute the Project Management Plan. The process is a formal one and culminates in documented commitment of support by the Team members, management and others - customers, team and sponsors as appropriate. See Project Management On-line Guide (PMOG) for details. http://www.wsdot.wa.gov/Projects/ProjectMgmt/	
3	393	CN-PE-02	Bridge Technical Advisor	Bridge engineer assigned to be an advisor to a construction project.	
4	394	CN-PE-02.01	Bridge Technical Advisor Assigned		
3	395	CN-PE-03	Geotechnical Advisor	Provides support to the Region during construction. Much like a Bridge Technical Advisor.	
4	396	CN-PE-03.01	Geotechnical Advisor Assigned		
3	397	CN-PE-04	Consultant Administration		
4	398	CN-PE-04.01	Management of Consultant On-Call Agreement	The process of ensuring the original design consultant is available for services during construction under a legally binding agreement. See Consultant Proceedures Manual.	
4	399	CN-PE-04.02	Management of Disputes Review Board Agreements	The process of ensuring State and Third Party members of Disputes Review Board are available for services during the construction project under legally binding agreements. See Consultants Proceedures Manual.	

3	400	CN-PE-05	Qualified Tester Program	Headquarters Materials Lab program that establishes uniform testing procedures, insures that testing staff is qualified in performing the testing procedures, and provides regular review. See Construction Manual 9-5.5	
4	401	CN-PE-05.01	Qualify Field Staff		
3	402	CN-PE-06	Public Outreach	The public should be notified of upcoming construction projects. Contact the Communications office for additional information.	
4	403	CN-PE-06.01	Communication Plan Developed		
4	404	CN-PE-06.02	Communication with Public Completed		
3	405	CN-PE-07	Change Management	Active identification and assessment of encountered change using the change management plan including obtaining proactive endorsement (by the necessary authority) of changes to project scope, schedule, or budget before the change is implemented.	
4	406	CN-PE-07.01	Changes and Issue Resolutions Documented		
3	407	CN-PE-08	Mapping	CN-PE-08.01 through 08.02 Mapping necessary for R/W Maintenance	
4	408	CN-PE-08.01	Surveying	R/W research, layout and maintenance of R/W, R/W markers, and R/W controls.	
4	409	CN-PE-08.02	Records	Actions necessary to record R/W surveying activities with local county governments and the maintenance of department R/W records	
3	410	CN-PE-09	Conveyances & Permits	Management of Permits, easements, etc granted to WSDOT for completion of the contract work.	
4	411	CN-PE-09.01	Permit/Easement Conditions Met		
2	**412**	**CN-CC**	**Contract Completion**	**CN-CC-01 through CC-05 General Term for the various stages of contract completion**	
3	413	CN-CC-01	Substantial Completion	A Stage of completion where the contract work has progressed to the extent that the Contracting Agency has full use and benefit of the facilities. See 1-01.3 of the Standard Specifications for further details	
4	414	CN-CC-01.01	Substantial Completion Letter Sent to Contractor		
3	415	CN-CC-02	Physical Completion	A stage of completion where all physical work of the contract has been completed. See 1-01.3 of the Standard Specifications for further details.	
4	416	CN-CC-02.01	Physical Completion Letter Sent to Contractor		
3	417	CN-CC-03	Completion	A stage of completion that generally follows Physical completion where all administrative paperwork required by the contract has been submitted. All aspects of the work both physical and administrative are completed and the job is now ready for Acceptance by the Secretary of the Department. See 1-01.3 and 1.08.9 of the Standard Specifications for further details	
4	418	CN-CC-03.01	Letter of Completion sent to Secretary		
3	419	CN-CC-04	Contract Acceptance	After all contractual obligations have been fulfilled the Department accepts the contract as complete by signature of the Secretary on the Final Contract Voucher Certification. See 1-01.3 and 1-05.12 of the Standard Specifications for further detail	
4	420	CN-CC-04.01	Endorsement of Final Contract Voucher		
3	421	CN-CC-05	FHWA Stewardship Acceptance	An act of acceptance by FHWA for work completed under the contract. This Federal Stewardship action clears the way for completion of Federal funding for the contract. Refer to the FHWA/WSDOT Stewardship Agreement, Construction Monitoring Plan for further details.	
4	422	CN-CC-05.01	Letter of Stewardship accepted by FHWA		
2	**423**	**CN-EOT**	**Estimated Open to Traffic**	**The date key traffic components are open for public use.**	
2	**424**	**CN-CS**	**Contractor Specific/Contract Driven Activities**	**CN-CS-01 through CS-02**	

3	**425**	CN-CS-01	Contract Administration	CN-CS-01.01 through 01.08.01 The administrative work in managing a contract towards it's completion.	
4	**426**	CN-CS-01.01	Contract Execution	This is the date on which the contract between WSDOT and the contractor for completion of the work has been fully executed or signed. See 1-03.3 of the Standard Specifications for further detail.	
4	**427**	CN-CS-01.02	First Chargeable Working Day	The first day that can be charged against the contract. This day is usually the 10th calendar day following execution but is also sometimes changed by Special Provision. See 1-08.5 and contract special provisions for further details.	
4	**428**	CN-CS-01.03	Contract Records	Construction records that are prepared to document the completion of the contract. Some of these records include contract payments, contract materials, Correspondence, etc. See the Construction Manual for further detail on the various records kept in support of the construction project.	
4	**429**	CN-CS-01.04	Contract Surveying	Survey work necessary for the layout and construction of the project.	
4	**430**	CN-CS-01.05	Inspection	Inspection activities conducted by the Project Engineer and their staff to ensure the construction effort adheres to the requirements noted in the contract plans, contract provisions as well as the Standard Specifications for Road Bridge and Municipal Construction.	
4	**431**	CN-CS-01.06	Environmental Review/Permits	Changes or omissions that result in impacts to the environment not already covered in environmental permits & documentation for the project.	
4	**432**	CN-CS-01.07	ESA Compliance/Listing Updates	ESA listings change every 6 months, concurrence with Section 7 should be reviewed every 6 months for the life of the project.	
4	**433**	CN-CS-01.08	Materials Testing & Acceptance	Construction Project Engineers actions to approve and accept materials for use in WSDOT Construction projects. See contract Provisions, Contract Plans, Amendments to the Standard Specifications, Standard Specification, and Construction Manual for specific requirements and guidance.	
5	**434**	CN-CS-01.08.01	Qualified Tester Modules	A program implemented by the HQ Lab to ensure the use and understanding of national standard test procedures such as AASHTO, ASTM, WAQTC, as well as WSDOT procedures. This program uses elements of the HQ Materials Lab accreditation extending that accreditation to tessting completed in field offices and on construction sites.	
3	**435**	CN-CS-02	Scheduling/Workforce Leveling	A program implemented by the HQ Lab to ensure the use and understanding of national standard test procedures such as AASHTO, ASTM, WAQTC, as well as WSDOT procedures. This program uses elements of the HQ Materials Lab accreditation extending that accreditation to tessting completed in field offices and on construction sites.	
2	**436**	CN-DB	Design-Build Contract Administration	The process of ensuring that construction is in conformance with the design-build contract.	
3	**437**	CN-DB.01	Environmental Compliance	The monitoring to ensure the design builder's compliance with environmental requirements of the design-build contract.	0335
3	**438**	CN-DB.02	Design-Build Design Oversight	The process of ensuring that design is in conformance with the design-build contract.	0325
3	**439**	CN-DB.03	Utilities - Design Build	The monitoring to ensure the design builder's compliance with utility requirements of the design-build contract.	0336
3	**440**	CN-DB.04	QA - Construction	The monitoring to ensure the design builder's compliance with the construciton quality assurance requirements of the design-build contract.	0337

Project Management & Reporting Language included in Task Orders

PART 1 GENERAL

1.1 Description

A. Update Task Order management plan, parameters and processes developed under Task No. SA to track and communicate scope, quality, cost, and schedule requirements to the CONSULTANT team and the STATE.

B. Manage and Track Task Order scope, budget and schedule compliance with the planned activities.

C. Coordinate Task Order issues between CONSULTANT team and STATE.

D. Work Includes:

1) 09.01 Task Order Management
2) 09.02 Schedule Management
3) 09.03 Budget Management
4) 09.04 Change Control
5) 09.05 Meetings
6) 09.06 Project Closeout

1.2 Reference

A. In addition to the Project Standards described in this Task Order (Attachment 3), the following PROJECT guide documents will apply to this subtask:

1) Project Management Plan, 2006
2) Document Control Plan
3) Quality Assurance/Quality Control Plan

1.3 Assumptions

A. STATE will provide:

1) Necessary software and login access to the P3e/Primavera and EBASE database system.
2) A detailed format for reporting Task Order progress.

B. Invoicing is described and included in Task No. AA.

C. Except for the 100% PS&E submittal, the normal review period by the STATE for a submittal from the CONSULTANT will be 25 working days. The period for STATE review and CONSULTANT revision between the 100% PS&E submittal and the Ad Date will be 10 calendar weeks, as described in the Ad-Ready PS&E manual.

D. The schedule planned durations will be for regular 8-hour work days, five days per week. STATE holidays will be taken into account.

E. Schedule submittals will be made electronically, either by e mail or on CD.

F. Baseline Budget is defined as the original contract value. Current Approved Budget is defined as the original contract value plus amendments. Estimate at Completion is defined as the cumulative actual plus or minus estimate to complete.

G. The schedule assumes that a "Concurrence Point" of critical decisions occurs no later than April 30, 2008. The Concurrence Point is the point in time when the PROJECT design concept is sufficiently defined for the civil alignment and utilities concepts to be considered final. The following events must have occurred to achieve the Concurrence Point:

1) Final agreement on railroad alignments
2) Final roadway alignments set
3) Final Draft Amended Right of Way Plans submitted to the STATE

H. Unless specifically stated otherwise in this Task Order and its Subtasks, the following activities will be the responsibility of the STATE, with the CONSULTANT providing support services only that are budgeted based on a level of effort:

1) PC – 10 Cost Risk Estimate & Management (Support)

2) PC – 11 Public and Agency Involvement (Support)
3) PC – 15 Value Engineering (Support)
4) PC – 18 Environmental Documentation (Support)
5) PC – 19 Environmental Permits (Support)
6) PC – 21 Geotechnical Evaluations (Support)
7) PC – 26 Partnerships (Support)
8) PC – 29 Right of Way Acquisition (Support)
9) PC – 39 Construction Permits (Support)
10) PC – 40 Constructability Reviews (Support)

PART 2 APPROACH

2.1 09.01 Task Order Management

A. Provide single point of responsibility, authority and accountability for planning and executing scope, budget, quality, and schedule.
B. Lead the daily CONSULTANT activities required to carry out this Task Order.
C. Provide staff to deliver the scope and schedule.
D. Update Task Order Management Plan for CONSULTANT team.
E. Develop the Task Order staff organization.
F. Develop a mutually agreed upon WBS/ Progress Reporting Performance Measurement System Plan to report to and comply with the STATE's Cost Management System.
G. Prepare monthly progress report describing the status of scope, budget, and schedule and significant issues.
H. Provide administrative personnel required to fulfill routine documentation and document control requirements.
I. Provide information to the STATE to support the STATE's Project Management Plan (PMP).

2.2 09.02 Schedule Management

A. Prepare a PS&E Project Design Schedule (PDS) using the critical path method (CPM).
B. Reflect the deliverable milestone dates as specified by the STATE and described in this Task Order. Reflect dates when STATE or third party action is required. Include relevant activities that are necessary to prepare PS&E packages, to advertise the construction contracts and award to the construction contractors. Such relevant activities include:
    1) Concurrence Point
    2) Environmental Documentation
    3) Environmental Permits
    4) Geotechnical Evaluations
    5) Agency and Developer Agreements
    6) Railroad and Private Utility Agreements
    7) Right of Way Acquisition
    8) Construction Permits
C. Review the permit process and deadlines of the PROJECT. Include pertinent permit milestones in the PDS.
D. The turn-in dates for various permits and associated discipline reports shall be agreed upon as milestones to be placed in the PDS.
E. The PDS shall reflect any required hydraulics reports and TESC plans, and other elements and reports that will need to be approved and finalized prior to submitting requests for permits.
F. Prepare the schedule in consideration of the following factors.
    1) The organizational WBS/Progress Reporting Performance Measurement System Plan as described in PC-09.01.

2) Review periods for all PROJECT deliverables.

G. Coordinate the preparation of the PDS with the STATE for integration into the AWVSRP Master Schedule.

H. Provide weekly updates of deliverables status to CONSULTANT Task Manager.

I. Submit the PDS for approval by the STATE.

J. Review and/or revise the schedule on a monthly basis and report critical path changes. Monthly updates will be due the fifth (5th) working day of the succeeding month for approval by the STATE.

K. Support the schedule component for the monthly CONSULTANT financial reports and submittal of cost data to the STATE as described in Task No. AA, Amendment 4. Schedule data is expected to contain the following information:
   1) Physical Percent Complete by activity code
   2) Current Schedule Dates (Early Start, Early Finish, Late Start, Late Finish) by activity code

L. Provide schedule analysis for Change Control as described in PC-09.04.

2.3 09.03 Budget Management

A. Prepare a planned expenditures timeline.

B. Monitor budget and report expenditures by activity code at the MDL level.

C. Monitor the planned monthly expenditures versus actual rate of expenditure for each work element in accordance to the WBS/Progress Reporting Performance Measurement System described in PC-09.01.

D. Identify budget trends for reporting purposes.

E. Identify and implement corrective actions, if necessary, per the applicable provisions of the Project Management Plan.

F. Support the monthly CONSULTANT financial reports and submittal of cost data to the STATE as described in Task No. AA, Amendment 4. Cost data is expected to contain the following information:
   1) Period Estimated Actual hours and dollars by activity code
   2) Cumulative Estimated Actual hours and dollars by activity code
   3) Physical Percent Complete by activity code

G. Prepare an estimate at completion at the 60 percent and 90 percent PS&E milestones for PS&E package No. 2. This will be done at the Task Order Level.

2.4 09.04 Change Control

A. Communicate to STATE known potential changes identified from any source. Comply with the STATE's PMP and the identified Change Management Process.

B. Facilitate the analysis of the change and determine its impacts to scope, schedule, and budget. Facilitate the development of a response strategy.

C. Identify and analyze the likelihood of the potential change introducing risk into the Task Order delivery.

D. Characterize change risk to the extent possible and outline control measures for minimizing its negative effects.

E. Communicate the proposed strategy(s) to resolve the change and make appropriate revisions as necessary.

F. Revise the Task Order scope and receive written approval to proceed prior to undertaking the work as a result of the change. A written change authorization will be required prior to commencing work.

G. Monitor the implementation of the change using the standard project tools and techniques.

2.5 09.05 Meetings

A. STATE Status Report and Technical Meetings

1) Provide scope, schedule, deliverable and issues status information to the STATE for use at weekly Project Coordination Team meetings.

2) Provide scope, schedule, and budget status information to the STATE for use at monthly Confidence Report meetings.

3) Provide technical information for Project Decision Team Meetings as directed by the STATE.

B. Design Team Meetings

1) Conduct weekly design team meetings to discuss scope, schedule, and budget status.

2) Conduct weekly design team meetings to discuss technical issues, emerging or ongoing issues, task assignment updates, and overall project progress.

C. Consultant Management Team Meetings

1) Attend weekly consultant management team meetings to discuss the status of the scope, schedule, and budget as well as emerging and ongoing issues.

2.6 09.06 Project Closeout

A. Upon completion of the Task Order, the CONSULTANT will document and closeout the PROJECT file.

B. Provide CADD data to the STATE in a format that can be used directly by MicroStation. Additionally, provide Utilities CADD data in AutoCAD Civil 3D in PROJECT CADD standards for submittal to the CITY.

C. Provide roadway design data, including all coordinate geometry data, horizontal and vertical alignments, existing and proposed surfaces, superelevation data, cross sections, and roadway configurations/templates to the STATE in a format that can be imported directly into InRoads with no loss of accuracy, identifiers, or feature codes.

D. Provide earthwork, grading and paving data to the STATE in a format that can be imported directly into InRoads.

E. With the exception of utilities, provide CADD File Documentation to the STATE using STATE methodologies and standards as defined in the STATE's Plans Preparation Manual (PPM), and containing the CADD file documentation sheets as defined in the PPM. Utilities will be provided in PROJECT CADD standards.

F. The CONSULTANT shall verify that all CADD files will plot using MicroStation.

PART 3 WORK PRODUCTS

3.1 09.01 Task Order Management

A. Updated Task Order Management Plan for CONSULTANT use.

B. Monthly Progress Report.

3.2 09.02 Schedule Management

A. Draft PDS.

B. Final Baseline Task Order Schedule.

C. Schedule Progressing and Updates.

D. Weekly Deliverables Status Report.

3.3 09.03 Budget Management

A. Draft Planned Expenditure Timeline.

B. Final Planned Expenditure Timeline.

C. Monthly Cost Data Report.

3.4 09.04 Change Control
- A. Change documentation as required.

3.5 09.05 Meetings
- A. Meeting Notes and Attendance List.

3.6 09.06 Project Closeout
- A. MicroStation electronic copy of final CADD package. Utilities will be provided in AutoCAD Civil 3D for City of Seattle (CITY) use.
- B. Electronic copies of InRoads compatible survey and design files.

3.7 Deliverable(s)
- A. 9715SB.P09.01 Baseline Task Order Schedule.
- B. 9715SB.P09.02 Baseline Planned Expenditure.
- C. 9715SB.P09.03 Project Closeout File.

Example Consultant Monthly Percent Complete Report

ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

PHYSICAL PERCENT COMPLETE

DATA DATE: 1st MAY 2008

WSDOT COST ACCOUNT	TASK	DESCRIPTION	Actual Hours This Period	Actual Hours To Date	Actual Costs This Period	Actual Costs To Date	Physical % Complete To Date	Early Start Date	Early Finish Date	Late Start Date	Late Finish Date
BBP36.9715TA001.0000	TA.01	(BST) VE Project Management	0	667	$0	$76,656	100%	13-Aug-07 A	18-Apr-08 A		
BBP36.9715TA002.0000	TA.02	(BST) VE Study Review and Response	0	568	$0	$81,294	100%	13-Aug-07 A	28-Sep-07 A		
BBP36.9715TA003.0000	TA.03	(BST) Baseline Project Recommendations	0	572	$0	$93,730	100%	20-Aug-07 A	31-Dec-07 A		
BBP36.9715TA004.0000	TA.04	(BST) Concrete Corrosion Report	18	259	$11,769	$40,573	95%	14-Feb-08 A	2-May-08	6-Jun-08	9-Jun-08
BBP36.9715TA009.0000	TA.PC-09	(BST) Task Order Management	1015	2708	$121,714	$330,447	56%	01-Oct-07 A	15-Jan-09	1-Oct-07	31-Dec-08
BBP36.9715TA010.0000	TA.PC-10	(BST) Cost Risk Estimate & Management (Support)	(474)	67	($58,530)	$6,482	100%	07-Jan-08 A	15-Feb-08 A		
BBP36.9715TA011.0000	TA.PC-11	(BST) Public & Agency Involvement Support	17	51	$2,397	$8,396	40%	17-Oct-07 A	15-Jan-09	17-Apr-08	31-Dec-08
BBP36.9715TA012.0000	TA.PC-12	(BST) Project Data	93	150	$12,086	$19,619	70%	22-Oct-07 A	3-Jul-08	22-Oct-07	16-Oct-08
BBP36.9715TA018.0000	TA.PC-18	(BST) Environmental Documentation (Support)	0	6	$0	$799	95%	09-Oct-07 A	15-Jan-09	9-Oct-07	26-Feb-09
BBP36.9715TA019.0000	TA.PC-19	(BST) Environmental Permits (Support)	0	7	$0	$703	28%	09-Oct-07 A	15-Jan-09	9-Oct-07	23-Mar-09
BBP36.9715TA023.0400	TA.PC-23.04	(BST) Sign Structure Design	151	353	$15,130	$35,821	68%	22-Oct-07 A	5-Dec-08	8-May-08	23-Dec-08
BBP36.9715TA023.1200	TA.PC-23.12	(BST) Tunnel Design	278	1320	$25,450	$168,147	68%	12-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA023.1400	TA.PC-23.14	(BST) Tunnel Emergency Egress & Control Room Mods.	108	1028	$17,097	$161,800	68%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA023.1500	TA.PC-23.15	(BST) Tunnel Ventillation	29	301	$5,387	$54,022	60%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA023.1600	TA.PC-23.16	(BST) Tunnel Electrical Design	193	652	$30,181	$100,409	68%	19-Dec-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA023.1700	TA.PC-23.17	(BST) Fire Protection System Design	344	1404	$36,035	$153,272	65%	22-Oct-07 A	5-Dec-08	12-May-08	23-Dec-08
BBP36.9715TA024.0000	TA.PC-24	(BST) Roadway Design	0	103	$0	$13,611	60%	17-Oct-07 A	14-May-08	20-Jun-08	3-Jul-08
BBP36.9715TA025.0000	TA.PC-25	(BST) Hydraulics	54	147	$7,937	$22,042	50%	05-Nov-07 A	4-Dec-08	19-May-08	23-Dec-08
BBP36.9715TA026.0000	TA.PC-26	(BST) Partnerships (Support)	0	4	$0	$922	0%	25-Mar-08 A	22-Oct-08	26-Mar-08	17-Dec-08
BBP36.9715TA028.0000	TA.PC-28	(BST) ROW Engineering	11	117	$1,789	$18,515	52%	17-Oct-07 A	5-Dec-08	27-May-08	31-Dec-08
BBP36.9715TA029.0000	TA.PC-29	(BST) ROW Acquisition Support	0	0	$0	$0	30%	17-Oct-07 A	26-Dec-08	6-May-08	31-Dec-08
BBP36.9715TA030.0000	TA.PC-30	(BST) Roadside Restoration (Landscape Design)	7	7	$987	$987	30%	10-Mar-08 A	5-Dec-08	8-May-08	23-Dec-08
BBP36.9715TA031.1300	TA.PC-31.13	(BST) ITS Design	95	665	$16,043	$114,320	70%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA031.1400	TA.PC-31.14	(BST) Signing Design	17	128	$2,444	$16,652	70%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA031.1600	TA.PC-31.16	(BST) Tunnel Lighting System	94	697	$11,180	$72,992	68%	17-Oct-07 A	5-Dec-08	19-May-08	23-Dec-08
BBP36.9715TA031.1700	TA.PC-31.17	(BST) Traffic Surveillance & Control	9	143	$1,721	$25,399	70%	17-Oct-07 A	5-Dec-08	19-May-08	23-Dec-08
BBP36.9715TA031.1800	TA.PC-31.18	(BST) Communications	10	114	$1,523	$21,513	70%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA031.1900	TA.PC-31.19	(BST) Supervisory Control & Data Collection	33	151	$4,759	$24,872	68%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA031.2000	TA.PC-31.20	(BST) Security Monitoring	8	31	$1,161	$5,806	68%	17-Oct-07 A	5-Dec-08	14-May-08	23-Dec-08
BBP36.9715TA032.0000	TA.PC-32	(BST) Utilities	66	381	$7,232	$38,965	74%	17-Oct-07 A	5-Dec-08	6-May-08	23-Dec-08
BBP36.9715TA034.0000	TA.PC-34	(BST) Design Documentation	9	97	$1,178	$12,816	55%	17-Oct-07 A	23-Jul-08	12-Aug-08	16-Oct-08
BBP36.9715TA036.0000	TA.PC-36	(BST) Contract Plan Sheets Preparation	291	3761	$34,268	$376,362	54%	17-Oct-07 A	9-Dec-08	1-May-08	23-Dec-08
BBP36.9715TA037.0000	TA.PC-37	(BST) Contract Specifications Development	51	251	$8,157	$41,814	63%	03-Dec-07 A	5-Dec-08	9-Jun-08	23-Dec-08
BBP36.9715TA038.0000	TA.PC-38	(BST) Construction Estimate Development	221	561	$36,639	$86,981	65%	03-Dec-07 A	5-Dec-08	19-May-08	23-Dec-08
BBP36.9715TA039.0000	TA.PC-39	(BST) Construction Permits Support	0	0	$0	$0	23%	24-Dec-07 A	3-Dec-08	24-Dec-07	23-Mar-09
BBP36.9715TA040.0000	TA.PC-40	(BST) Constructability Reviews	111	133	$21,103	$25,473	75%	17-Mar-08 A	8-Aug-08	19-Aug-08	16-Sep-08
BBP36.9715TA041.0000	TA.PC-41	(BST) PS&E Reviews	97	158	$20,658	$29,897	64%	23-Jan-08 A	2-Dec-08	29-May-08	16-Dec-08
BBP36.9715TA043.0000	TA.PC-43	(BST) Contract Ad & Award	0	0	$0	$0	0%	1-May-08	15-Jan-09	31-Dec-08	31-Dec-08
BBP36.9715TA099.0000	TA.ODC	(BST) Other Direct Costs	ODC ACC.	ODC ACC.	$4,758	$27,607	ODC ACC	13-Aug-07 A	14-May-08	27-Jun-08	11-Jul-08
BBP36.9715TA099.0000	TA.PC-99	(BST) Task Order TA Other Direct Costs (ODCs)	0	0	$0	$123,074	ODC ACC	01-Oct-07 A	15-Jan-09	1-Oct-07	31-Dec-08
BBP36.9715TA099.0300	TA-3.ODC	(BST) TA-3 Other Direct Costs	0	0	$0	$3,359	ODC ACC	14-Feb-08 A	2-May-08	6-Jun-08	9-Jun-08
MBP19.9715BN001.0000	BN.B.SW.M.01	Establish Criteria For Evaluating Alternatives	3.00	507.70	$ 398.05	$ 70,783.70	90%	25-Apr-07 A	30-Jul-08	12-Jun-08	31-Jul-08
MBP19.9715BN002.0000	BN.B.SW.M.02	Central & North Seawall Concept Studies & Report	232.10	3306.90	$ 81,555.78	$ 500,954.50	70%	19-Mar-07 A	29-Jul-08	2-May-08	30-Jul-08
MBP19.9715BN003.0000	BN.B.SW.M.03	Seawall Test Section(s) / Location(s)	10.00	10.00	$ 1,496.52	$ 1,496.52	0%	1-May-08	29-Jul-08	2-May-08	30-Jul-08
MBP19.9715BN004.0000	BN.B.SW.M.04	Drawings	0.00	0.00	$ -	$ -	5%	04-Sep-07 A	30-Jul-08	2-May-08	31-Jul-08
MBP19.9715BN099.0000	BN.ODC	Task Order BN - Other Direct Costs (ODC's)	ODC ACC.	ODC ACC.	$ 1,803.78	$ 20,133.46	ODC ACC	19-Mar-07 A	30-Jul-08	2-May-08	31-Jul-08
MBP33.9715EA001.0000	EA.01	Task Order Management	417.75	3830.50	$ 57,542.49	$ 527,768.36	80%	01-Sep-07 A	30-Jul-08	5-May-08	31-Jul-08
MBP33.9715EA002.0000	EA.02	TESC Engineering and Design	0.00	454.75	$ -	$ 51,236.79	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA003.0000	EA.03	ROW Engineering	0.00	49.00	$ -	$ 7,753.64	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA004.0000	EA.04	Pavement Restoration ans Bypass Engineering & Design	40.00	675.00	$ 5,459.65	$ 89,414.83	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA005.0000	EA.05	Utilities Engineering and Design	339.50	4423.65	$ 42,113.36	$ 451,499.58	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA006.0000	EA.06	Traffic Control Engineering and Design	96.00	672.00	$ 11,064.57	$ 79,059.28	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA007.0000	EA.07	Contract Plans Preparation 90 and 100%	927.25	4778.25	$ 86,604.27	$ 450,138.95	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA008.0000	EA.08	Contract Specifications 90 and 100%	99.50	1266.50	$ 15,456.66	$ 191,865.99	89%	04-Sep-07 A	30-Jul-08	24-Apr-08	31-Jul-08
MBP33.9715EA009.0000	EA.09	Contract Estimates 90 and 100%	37.50	783.75	$ 4,880.40	$ 110,978.52	89%	04-Sep-07 A	30-Jul-08	2-May-08	31-Jul-08
MBP33.9715EA099.0000	EA.ODC	Task Order EA Other Direct Costs (ODC's)	ODC ACC.	ODC ACC.	$ 5,502.51	$ 105,129.04	ODC ACC	01-Sep-07 A	29-Jul-08	5-May-08	31-Jul-08
MBP39.9715CA001.0000	CA.01	Sys Level Assess of Constr Impact on Central Section	28.50	715.50	$ 4,671.21	$ 93,033.59	75%	10-Sep-07 A	13-Jun-08	2-Jun-08	27-Jun-08
MBP39.9715CA002.0000	CA.02	Initial Enhancement & Regional Project Selection Recomm.	0.00	517.50	$ -	$ 80,334.78	90%	17-Sep-07 A	1-May-08	27-Jun-08	27-Jun-08
MBP39.9715CA003.0000	CA.03	Initiate & Support Enhancement & Mitigation Advisory Team	1.00	158.00	$ 115.94	$ 24,733.75	55%	01-Sep-07 A	26-Jun-08	2-May-08	27-Jun-08
MBP39.9715CA004.0000	CA.04	Planning & Engineering Support for EMAT	0.00	142.00	$ -	$ 18,972.55	35%	01-Sep-07 A	26-Jun-08	2-May-08	27-Jun-08
MBP39.9715CA005.0000	CA.05	Devel & Deployment of 1st & 2nd Tier Projects/Programs	236.00	1988.50	$ 30,694.00	$ 225,728.64	95%	10-Sep-07 A	21-May-08	12-Jun-08	25-Jun-08
MBP39.9715CA006.0000	CA.06	Downtown Transportation Operations Committee Work Plan	8.00	121.00	$ 1,332.96	$ 18,425.90	51%	05-Nov-07 A	19-Jun-08	7-May-08	25-Jun-08
MBP39.9715CA099.0000	CA.ODC	Task Order CA - Other Direct Costs (ODC's)	ODC ACC.	ODC ACC.	$ 48.80	$ 128.19	ODC ACC	01-Sep-07 A	26-Jun-08	2-May-08	27-Jun-08

ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

PHYSICAL PERCENT COMPLETE

DATA DATE: 1st MAY 2008

WSDOT COST ACCOUNT	TASK	DESCRIPTION	Actual Hours This Period	Actual Hours To Date	Actual Costs This Period	Actual Costs To Date	Physical % Complete To Date	Early Start Date	Early Finish Date	Late Start Date	Late Finish Date
MTP19.9715BL001.0000	BL.B.SW.M.01	Seawall Engineering Support	25.00	900.40	$ 3,691.60	$ 126,512.76	28%	03-Aug-06 A	31-Oct-08	2-May-08	3-Nov-08
MTP19.9715BL099.0000	BL.ODC	Task Order BL - Other Direct Costs (ODC's)	ODC ACC.	ODC ACC.	$ 199.63	$ 1,650.13	ODC ACC	03-Aug-06 A	31-Oct-08	2-May-08	3-Nov-08
NBP19.9715NA009.0000	NA.PC-09	Task Order Administration	0.00	2978.90	$ -	$ 392,352.75	60%	01-Jul-07 A	16-Apr-08	2-Jul-07	31-Dec-08
NBP19.9715NA010.0000	NA.PC-10	Cost Risk Estimate & Management (Support)	0.00	34.00	$ -	$ 5,291.41	45%	09-Jul-07 A	1-Apr-08	8-Aug-08	8-Aug-08
NBP19.9715NA011.0000	NA.PC-11	Public & Agency Involvement (Support)	0.00	0.00	$ -	$ -	0%	01-Jul-07 A	1-Apr-08	31-Dec-08	31-Dec-08
NBP19.9715NA012.0000	NA.PC-12	Project Data	0.00	274.00	$ -	$ 34,611.55	100%	09-Jul-07 A	26-Oct-07 A		
NBP19.9715NA019.0000	NA.PC-19	Environmental Permits (Support)	0.00	0.00	$ -	$ -	0%	1-Apr-08	1-Apr-08	31-Dec-08	31-Dec-08
NBP19.9715NA021.0000	NA.PC-21	Geotechnical Evaluations (Project Site Data)	0.00	68.00	$ -	$ 8,417.69	100%	25-Jun-07 A	25-Jan-08 A		
NBP19.9715NA023.0100	NA.PC-23.01	Seismic Retrofit & Modifications Strategy Technical memo	0.00	259.00	$ -	$ 29,919.42	100%	23-Jul-07 A	25-Jan-08 A		
NBP19.9715NA023.0200	NA.PC-23.02	Bridge Design Details & Plans	0.00	2937.00	$ -	$ 303,484.78	70%	09-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA023.0300	NA.PC-23.03	Demolition Plan	0.00	86.00	$ -	$ 10,385.55	70%	16-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA023.0700	NA.PC-23.07	Bridge Rails / Expansion Joints Design	0.00	331.00	$ -	$ 34,427.79	70%	09-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA023.0800	NA.PC-23.08	Walls & Sign Structures Design	0.00	284.50	$ -	$ 31,824.09	70%	27-Aug-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA024.0500	NA.PC-24.05	Roadway Alignments	0.00	683.00	$ -	$ 75,852.60	75%	26-Jul-07 A	1-Apr-08	8-Aug-08	8-Aug-08
NBP19.9715NA024.0900	NA.PC-24.09	Earthwork Quantities	0.00	37.00	$ -	$ 5,118.47	70%	29-Oct-07 A	1-Apr-08	8-Aug-08	8-Aug-08
NBP19.9715NA024.1000	NA.PC-24.10	Roadway Sections	0.00	26.00	$ -	$ 3,622.06	70%	25-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA024.1100	NA.PC-24.11	Roadside Safety	0.00	32.00	$ -	$ 4,457.92	100%	06-Aug-07 A	21-Nov-07 A		
NBP19.9715NA025.0000	NA.PC-25	Hydraulics	0.00	23.00	$ -	$ 3,281.89	20%	13-Aug-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA026.0000	NA.PC-26	Partnerships (Support)	0.00	0.00	$ -	$ -	0%	1-Apr-08	1-Apr-08	31-Dec-08	31-Dec-08
NBP19.9715NA027.0000	NA.PC-27	Railroads (Support)	0.00	0.00	$ -	$ -	10%	16-Jul-07 A	1-Apr-08	31-Dec-08	31-Dec-08
NBP19.9715NA028.0000	NA.PC-28	Right of Way Engineering	0.00	0.00	$ -	$ -	51%	16-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA029.0000	NA.PC-29	Right of Way Acquisition (Support)	0.00	0.00	$ -	$ -	40%	16-Jul-07 A	16-Apr-08	16-Jul-07	31-Dec-08
NBP19.9715NA030.0000	NA.PC-30	Roadside Restoration	0.00	52.25	$ -	$ 4,054.43	42%	17-Dec-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA031.0000	NA.PC-31	Traffic Design	0.00	1712.00	$ 3,743.22	$ 181,473.35	59%	09-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA032.0000	NA.PC-32	Utilities	0.00	23.00	$ -	$ 3,011.01	21%	13-Aug-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA033.0000	NA.PC-33	Work Zone Traffic Control	0.00	1262.00	$ -	$ 145,014.31	70%	16-Jul-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA034.0000	NA.PC-34	Design Documentation	0.00	207.50	$ (2,654.20)	$ 24,798.58	100%	16-Jul-07 A	30-Jan-08 A		
NBP19.9715NA036.0000	NA.PC-36	Contract Plan Sheets Preparation	0.00	4654.75	$ (1,061.68)	$ 449,123.32	60%	09-Jul-07 A	1-Apr-08	8-Aug-08	8-Aug-08
NBP19.9715NA037.0000	NA.PC-37	Contract Specification Development	0.00	151.00	$ -	$ 24,988.77	60%	12-Nov-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA038.0000	NA.PC-38	Construction Estimate Development	0.00	479.50	$ -	$ 74,503.13	60%	01-Oct-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA039.0000	NA.PC-39	Construction Permits (Support)	0.00	0.00	$ -	$ -	0%	01-Oct-07 A	1-Apr-08	31-Dec-08	31-Dec-08
NBP19.9715NA040.0000	NA.PC-40	Constructability Reviews (Support)	0.00	0.00	$ -	$ -	25%	22-Oct-07 A	1-Apr-08	8-Aug-08	8-Aug-08
NBP19.9715NA041.0000	NA.PC-41	PS&E Reviews	0.00	128.00	$ -	$ 14,699.05	51%	03-Oct-07 A	1-Apr-08	8-Aug-08	31-Dec-08
NBP19.9715NA043.0000	NA.PC-43	Contract Ad & Award (Support)	0.00	0.00	$ -	$ -	0%	1-Apr-08	1-Apr-08	31-Dec-08	31-Dec-08
NBP19.9715NA099.0000	NA.ODC	Task Order NA - Other Direct Costs (ODC's)	ODC ACC.	ODC ACC.	$ 4,119.50	$ 43,343.50	ODC ACC	01-Jul-07 A	16-Apr-08	2-Jul-07	31-Dec-08
SBP37.9715BJ001.0000	BJ.01	South Section Environmental Documentation Update	546	546	$63,756	$63,756	64%	01-Mar-08 A	27-Jun-08	2-May-08	30-Jun-08
SBP37.9715BJ002.0000	BJ.02	Transportation Analysis	222	222	$26,814	$26,814	50%	01-Mar-08 A	30-May-08	2-Jun-08	30-Jun-08
SBP37.9715BJ099.0000	BJ.ODC	Task Order BJ Other Direct Costs (ODCs)	ODC ACC.	ODC ACC.	$752	$752	ODC ACC	01-Mar-08 A	30-May-08	2-Jun-08	30-Jun-08
SBP37.9715SA003.0000	SA.PC-03	(South) Design Build Assessment (Support)	0.00	9.00	$ -	$ 2,172.75	100%	20-Aug-07 A	31-Jan-08 A		
SBP37.9715SA009.0000	SA.PC-09	(South) Project Management	0.00	2761.95	$ -	$ 316,776.17	100%	23-Jul-07 A	28-Mar-08 A		
SBP37.9715SA010.0000	SA.PC-10	(South) Cost Risk Estimate & Management (Support)	0.00	112.00	$ -	$ 14,649.49	100%	25-Oct-07 A	29-Nov-07 A		
SBP37.9715SA011.0000	SA.PC-11	(South) Public and Agency Involvement (Support)	0.00	178.00	$ -	$ 20,315.36	100%	25-Sep-07 A	22-Feb-08 A		
SBP37.9715SA012.0000	SA.PC-12	(South) Project Data	0.00	96.00	$ -	$ 10,561.41	100%	03-Oct-07 A	23-Nov-07 A		
SBP37.9715SA015.0000	SA.PC-15	(South) Value Engineering (Support)	0.00	14.00	$ -	$ 1,820.47	100%	21-Jan-08 A	15-Feb-08 A		
SBP37.9715SA018.0000	SA.PC-18	(South) Environmental Documentation (Support)	0.00	557.50	$ -	$ 69,767.85	100%	23-Jul-07 A	31-Jan-08 A		
SBP37.9715SA020.0000	SA.PC-20	(South) Materials (Roadway) (Support)	0.00	12.00	$ -	$ 891.05	100%	23-Jul-07 A	31-Jan-08 A		
SBP37.9715SA021.0000	SA.PC-21	(South) Geotechnical Evaluations (Support)	0	62	$0	$8,649	100%	23-Jul-07 A	31-Jan-08 A		
SBP37.9715SA022.0000	SA.PC-22	(South) Structural Site Data	0	785	$0	$99,221	100%	13-Aug-07 A	21-Jan-08 A		
SBP37.9715SA023.0000	SA.PC-23	(South) Structure Design	0	1927	$0	$250,753	100%	20-Aug-07 A	10-Dec-07 A		
SBP37.9715SA024.0500	SA.PC-24.05	(South) Roadway Design: Alignments	0	1657	$0	$208,937	100%	23-Jul-07 A	12-Nov-07 A		
SBP37.9715SA024.0800	SA.PC-24.08	(South) Roadway Design: Channelization Plans for Approval	0	868	$0	$99,828	100%	15-Aug-07 A	24-Jan-08 A		
SBP37.9715SA024.0900	SA.PC-24.09	(South) Roadway Design: Earthwork Quantities	0	208	$0	$44,835	100%	25-Sep-07 A	17-Oct-07 A		
SBP37.9715SA024.1000	SA.PC-24.10	(South) Roadway Design: Roadway Sections	0	484	$0	$54,634	100%	17-Sep-07 A	03-Oct-07 A		
SBP37.9715SA024.1100	SA.PC-24.11	(South) Roadway Design: Roadway Safety	0	61	$0	$8,122	100%	22-Oct-07 A	16-Nov-07 A		
SBP37.9715SA025.0000	SA.PC-25	(South) Hydraulics (Support)	0	53	$0	$5,176	100%	04-Oct-07 A	29-Nov-07 A		
SBP37.9715SA026.0000	SA.PC-26	(South) Partnerships (Support)	0	23	$0	$2,903	100%	23-Jul-07 A	22-Feb-08 A		
SBP37.9715SA027.0000	SA.PC-27	(South) Railroads (Support)	0	778	$0	$94,869	100%	23-Jul-07 A	28-Nov-07 A		
SBP37.9715SA028.0000	SA.PC-28	(South) Right of Way Engineering	0	463	$0	$75,892	100%	08-Aug-07 A	27-Feb-08 A		
SBP37.9715SA029.0000	SA.PC-29	(South) Right of Way Acquisition (Support)	0	195	$0	$21,372	100%	08-Aug-07 A	22-Feb-08 A		
SBP37.9715SA030.0000	SA.PC-30	(South) Roadside Restoration	190	1698	$33,623	$260,078	100%	19-Nov-07 A	18-Apr-08 A		
SBP37.9715SA031.0000	SA.PC-31	(South) Traffic Design	0	982	$0	$116,404	100%	20-Aug-07 A	29-Jan-08 A		
SBP37.9715SA032.0000	SA.PC-32	(South) Utilities (Support)	0	217	$0	$27,375	100%	15-Oct-07 A	29-Nov-07 A		
SBP37.9715SA033.0000	SA.PC-33	(South) Work Zone Traffic Control	(1)	1604	($100)	$203,186	100%	13-Aug-07 A	23-Jan-08 A		

ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROJECT

PHYSICAL PERCENT COMPLETE

DATA DATE: 1st MAY 2008

WSDOT COST ACCOUNT	TASK	DESCRIPTION	Actual Hours This Period	Actual Hours To Date	Actual Costs This Period	Actual Costs To Date	Physical % Complete To Date	Early Start Date	Early Finish Date	Late Start Date	Late Finish Date
SBP37.9715SA034.0000	SA.PC-34	(South) Design Documentation	0	612	$0	$80,904	100%	23-Jul-07 A	29-Jan-08 A		
SBP37.9715SA036.0000	SA.PC-36	(South) 30% Contract Plan Sheets Preparation	0	3764	$0	$360,189	100%	20-Aug-07 A	15-Feb-08 A		
SBP37.9715SA038.0000	SA.PC-38	(South) Construction Estimate Development	0	30	$0	$2,612	100%	16-Aug-07 A	01-Feb-08 A		
SBP37.9715SA040.0000	SA.PC-40	(South) Constructability Reviews	0	25	$0	$3,679	0%	1-May-08	1-May-08	1-May-08	1-May-08
SBP37.9715SA044.0000	SA.PC-44	(South) Traffic Analysis	0	1678	$0	$189,309	100%	06-Aug-07 A	01-Feb-08 A		
SBP37.9715SA099.0000	SA.ODC	(South) Other Direct Costs	ODC ACC.	ODC ACC.	$9,519	$80,170	ODC ACC	23-Jul-07 A	21-Apr-08 A		
SBP37.9715SB009.0000	SB.PC-09	Project Management	849	1703	$114,814	$235,349	18%	18-Feb-08 A	27-Jul-09	3-Oct-08	31-Dec-09
SBP37.9715SB010.0000	SB.PC-10	Cost Risk Estimate & Management SUPPORT	0	11	$0	$2,069	6%	18-Feb-08 A	12-Sep-08	11-Dec-08	12-Jan-09
SBP37.9715SB011.0000	SB.PC-11	Public & Agency Involvement SUPPORT	9	40	$1,215	$4,756	13%	18-Feb-08 A	2-Oct-09	23-May-08	26-Oct-09
SBP37.9715SB012.0000	SB.PC-12	Project Data	1116	1739	$110,447	$159,360	49%	03-Mar-08 A	3-Jul-08	1-May-08	21-Aug-08
SBP37.9715SB015.0000	SB.PC-15	Value Engineering SUPPORT	40	269	$5,249	$34,921	75%	25-Feb-08 A	23-May-08	17-Jul-08	31-Jul-08
SBP37.9715SB018.0000	SB.PC-18	Environmental Documentation SUPPORT	12	33	$1,847	$4,659	10%	18-Feb-08 A	6-Oct-08	19-Feb-08	17-Dec-08
SBP37.9715SB019.0000	SB.PC-19	Environmental Permits SUPPORT	46	50	$4,399	$4,919	15%	18-Feb-08 A	10-Jul-09	19-Feb-08	3-Aug-09
SBP37.9715SB021.0000	SB.PC-21	Geotechnical Evaluation SUPPORT	0	0	$0	$0	5%	14-Apr-08 A	1-Jul-09	19-May-08	14-Jul-09
SBP37.9715SB022.0000	SB.PC-22	Structural Site Data	38	56	$2,592	$5,223	54%	24-Mar-08 A	19-Jun-08	14-May-08	3-Jul-08
SBP37.9715SB023.0200	SB.PC-23.02	Structural Design : Bridge Design Coordination	619	876	$78,326	$111,816	50%	18-Feb-08 A	23-Apr-09	19-Feb-08	23-Apr-09
SBP37.9715SB023.0400	SB.PC-23.04	Structural Design : Sign Structure Design	0	0	$0	$0	0%	29-May-08	9-Jul-09	4-Jun-08	13-Jul-09
SBP37.9715SB023.0600	SB.PC-23.06	Structural Design : Retaining Wall Design	0	0	$0	$0	0%	8-May-08	9-Jul-09	21-May-08	13-Jul-09
SBP37.9715SB023.0800	SB.PC-23.08	Structural Design : Other Structure Design	0	0	$0	$0	0%	20-May-08	9-Jul-09	3-Jun-08	13-Jul-09
SBP37.9715SB023.1000	SB.PC-23.10	Structural Design : Bridge & Structures Design	65	201	$7,823	$25,953	4%	14-Apr-08 A	9-Jul-09	30-Apr-08	9-Jul-09
SBP37.9715SB023.1300	SB.PC-23.13	Structural Design : Fire Protection Design	30	48	$5,636	$9,017	3%	25-Feb-08 A	9-Jul-09	20-May-08	13-Jul-09
SBP37.9715SB024.0500	SB.PC-24.05	Roadway Design : Alignments	573	1485	$58,639	$154,610	15%	18-Feb-08 A	9-Jul-09	1-May-08	10-Jul-09
SBP37.9715SB024.0800	SB.PC-24.08	Roadway Design : Channelization Plans	38	115	$3,584	$11,160	35%	17-Mar-08 A	22-Sep-08	15-Aug-08	3-Nov-08
SBP37.9715SB024.0900	SB.PC-24.09	Roadway Design : Earthwork Quantities	0	0	$0	$0	0%	4-Jun-08	9-Jul-09	4-Jun-08	17-Jul-09
SBP37.9715SB024.1000	SB.PC-24.10	Roadway Design : Roadway Sections	0	29	$0	$4,171	9%	17-Mar-08 A	9-Jul-09	20-May-08	17-Jul-09
SBP37.9715SB024.1100	SB.PC-24.11	Roadway Design : Roadway Safety	17	17	$2,384	$2,384	4%	4-Jun-08	9-Jul-09	4-Jun-08	17-Jul-09
SBP37.9715SB025.0100	SB.PC-25.1U	Hydraulics: Early Utilities Package	104	198	$14,918	$26,111	5%	24-Mar-08 A	6-Feb-09	2-May-08	16-Jan-09
SBP37.9715SB025.0200	SB.PC-25.2C	Hydraulics: Civil Package	448	502	$51,469	$58,980	6%	17-Mar-08 A	9-Jul-09	2-May-08	17-Jul-09
SBP37.9715SB026.0000	SB.PC-26	Partnerships SUPPORT	0	0	$0	$0	0%	18-Feb-08 A	30-Jan-09	19-Feb-08	2-Feb-09
SBP37.9715SB027.0000	SB.PC-27	Railroads	150	507	$18,493	$57,800	55%	18-Feb-08 A	9-Jul-09	19-Feb-08	17-Jul-09
SBP37.9715SB028.0000	SB.PC-28	ROW Engineering	90	252	$14,342	$40,642	89%	18-Feb-08 A	14-Jan-09	17-Jun-08	23-Apr-09
SBP37.9715SB029.0000	SB.PC-29	ROWS Acquisition SUPPORT	23	26	$2,434	$2,623	13%	17-Mar-08 A	26-May-09	8-Dec-08	31-Dec-09
SBP37.9715SB030.0000	SB.PC-30	Roadside Restoration	221	458	$26,870	$52,495	8%	25-Feb-08 A	9-Jul-09	13-May-08	14-Jul-09
SBP37.9715SB031.1200	SB.PC-31.12	Traffic Design : Illumination Design	121	147	$10,138	$12,317	16%	10-Mar-08 A	9-Jul-09	6-May-08	14-Jul-09
SBP37.9715SB031.1300	SB.PC-31.13	Traffic Design : ITS Design	27	111	$3,453	$10,713	5%	24-Mar-08 A	9-Jul-09	6-May-08	14-Jul-09
SBP37.9715SB031.1400	SB.PC-31.14	Traffic Design : Signing Design	14	24	$1,790	$3,190	5%	24-Mar-08 A	9-Jul-09	4-Jun-08	14-Jul-09
SBP37.9715SB031.1500	SB.PC-31.15	Traffic Design : Signal Design	197	350	$21,735	$42,303	11%	10-Mar-08 A	9-Jul-09	2-May-08	14-Jul-09
SBP37.9715SB031.1600	SB.PC-31.16	Traffic Design : Pavement Markings	14	19	$1,491	$2,264	5%	17-Mar-08 A	7-Jul-09	16-May-08	14-Jul-09
SBP37.9715SB032.0100	SB.PC-32.1U	Utilities Design : Early Utilities Package	805	1471	$93,294	$167,083	10%	18-Feb-08 A	6-Feb-09	2-May-08	16-Jan-09
SBP37.9715SB032.0200	SB.PC-32.2C	Utilities Design : Civil Package	115	177	$12,563	$19,054	10%	18-Feb-08 A	9-Jul-09	2-May-08	14-Jul-09
SBP37.9715SB033.0100	SB.PC-33.1U	Work Zone Traffic Control : Early Utilities Package	64	254	($1,884)	$21,973	12%	03-Mar-08 A	6-Feb-09	2-May-08	16-Jan-09
SBP37.9715SB033.0200	SB.PC-33.2C	Work Zone Traffic Control : Civil Package	121	217	$24,669	$37,448	6%	03-Mar-08 A	9-Jul-09	13-May-08	14-Jul-09
SBP37.9715SB034.0000	SB.PC-34	Design Documentation	185	383	$21,218	$43,615	25%	03-Mar-08 A	14-May-09	2-May-08	18-May-09
SBP37.9715SB036.0100	SB.PC-36.1U	Contract Plan Sheet Preparation : Early Utilities Package	745	1154	$77,433	$125,079	10%	03-Mar-08 A	11-Feb-09	1-May-08	22-Jan-09
SBP37.9715SB036.0200	SB.PC-36.2C	Contract Plan Sheet Preparation : Civil Package	700	970	$72,397	$103,709	5%	17-Mar-08 A	17-Jul-09	17-Mar-08	17-Jul-09
SBP37.9715SB037.0100	SB.PC-37.1U	Contract Specifications Development : Early Utilities Package	14	31	$1,685	$3,477	3%	17-Mar-08 A	6-Feb-09	5-May-08	22-Jan-09
SBP37.9715SB037.0200	SB.PC-37.2C	Contract Specifications Development : Civil Package	7	7	$1,045	$1,045	2%	21-Apr-08 A	9-Jul-09	8-May-08	17-Jul-09
SBP37.9715SB038.0100	SB.PC-38.1U	Construction Estimate Development : Early Utilities Package	29	69	$4,325	$8,186	5%	1-May-08	6-Feb-09	19-May-08	22-Jan-09
SBP37.9715SB038.0200	SB.PC-38.2C	Construction Estimate Development : Civil Package	93	189	$15,639	$32,417	6%	10-Mar-08 A	9-Jul-09	2-May-08	17-Jul-09
SBP37.9715SB039.0000	SB.PC-39	Construction Permits SUPPORT	0	0	$0	$0	0%	18-Feb-08 A	10-Jul-09	19-Feb-08	3-Aug-09
SBP37.9715SB040.0000	SB.PC-40	Constructibility Reviews SUPPORT	27	106	$4,455	$14,872	35%	24-Mar-08 A	3-Feb-09	3-Sep-08	18-May-09
SBP37.9715SB041.0000	SB.PC-41	PS&E Reviews	6	6	$877	$877	20%	12-Mar-08 A	1-Jul-09	6-Aug-08	30-Jun-09
SBP37.9715SB044.0000	SB.PC-44	Traffic Analysis	137	332	$14,452	$39,972	40%	18-Feb-08 A	25-Jul-08	12-Jun-08	8-Sep-08
SBP37.9715SB099.0000	SB.ODC	Task Order SB - Other Direct Costs	ODC ACC.	ODC ACC.	$9,241	$14,928	ODC ACC	18-Feb-08 A	8-Dec-09	19-Feb-08	31-Dec-09

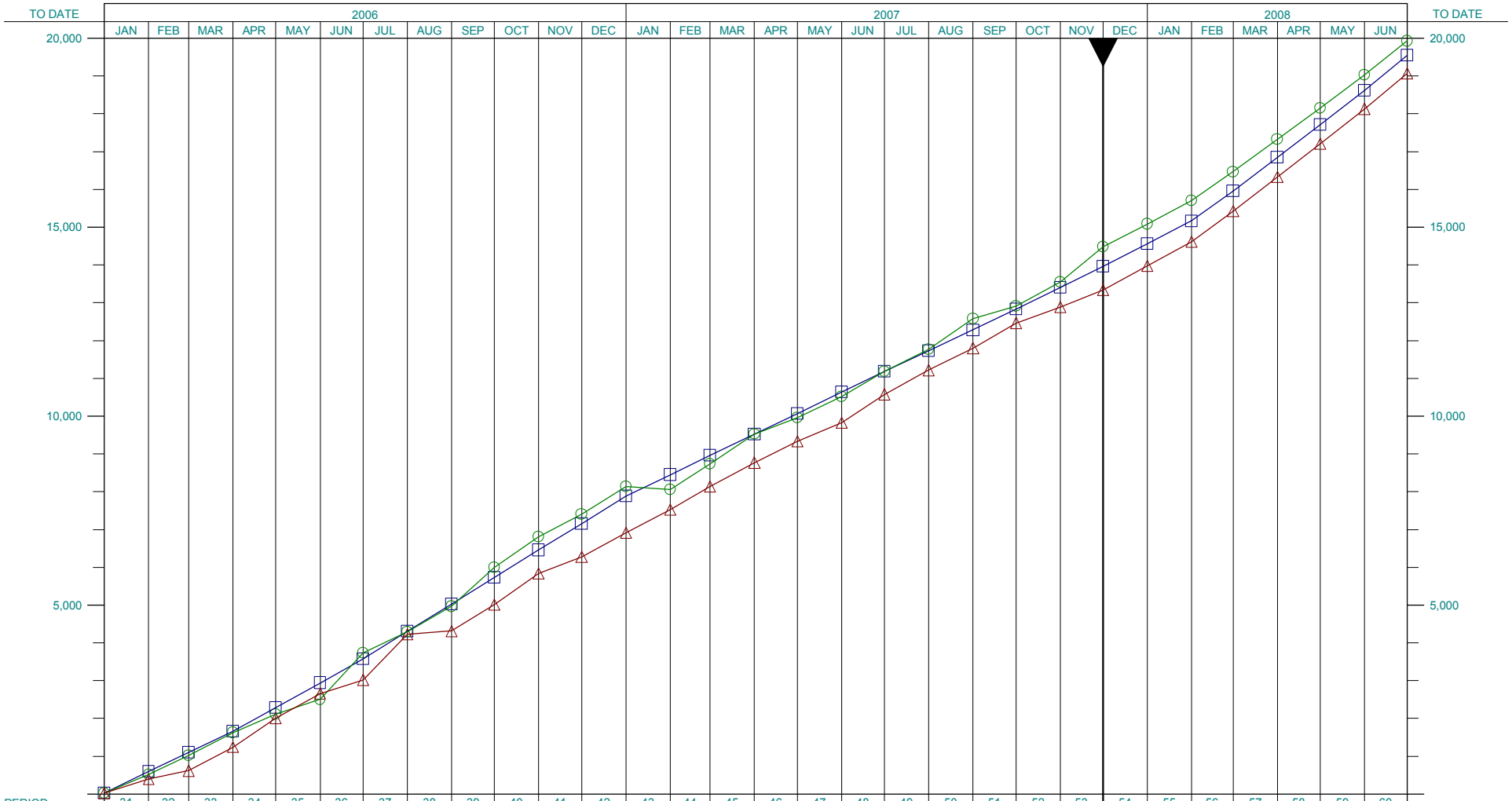
Example Task Order Manager Report

PERFORMANCE

PERIOD BUDGET	PERIOD EARNED	PERIOD ACTUAL	PERIOD S. VAR.	PERIOD C. VAR.	TO DATE BUDGET	TO DATE EARNED	TO DATE ACTUAL	TO DATE S. VAR.	TO DATE C. VAR.	AT COMPLETION BUDGET	AT COMPLETION ESTIMATE	AT COMPLETION VARIANCE
AGREE/TASK ORDER: Y9715 Task AA - AWV Project Management and Direct Costs												
MBP19.9715AA001.0000 Project Management, Y-9715 AA										100.0% Complete		
0	0	0	0	0	9,402,216	9,402,216	9,060,999	0	341,217	9,402,216	9,060,999	341,217
MBP19.9715AA002.0000 Co-location Facility and Equipment, Y-9715 AA										100.0% Complete		
0	0	0	0	0	1,511,088	1,511,088	1,383,092	0	127,996	1,511,088	1,383,092	127,996
MBP19.9715AA003.0000 Corridor Wide Design Support: LOE										100.0% Complete		
0	0	0	0	0	243,859	243,859	137,184	0	106,675	243,859	137,184	106,675
MBP19.9715AA004.0000 Project Management, Y-9715 AA-3 ('07-'09 biennium)										28.0% Complete		
273,391	300,730	210,158	27,339	90,571	1,394,295	1,403,407	1,092,729	9,112	310,678	5,012,171	5,012,171	0
MBP19.9715AA005.0000 Central Section Planning and Design Support: RFS										0.0% Complete		
57,028	0	0	-57,028	0	255,990	0	0	-255,990	0	1,881,904	1,881,904	0
MBP19.9715AA006.0000 Corridor Wide Planning and Design Support: LOE										28.0% Complete		
110,082	284,560	200,587	174,478	83,973	561,416	1,327,950	1,067,384	766,534	260,566	4,742,681	4,742,681	0
MBP19.9715AA007.0000 Corridor Wide Planning and Design Sppt: RFS Y-9715 AA4, PBA										22.4% Complete		
35,262	43,230	43,230	7,968	0	158,286	260,520	260,520	102,234	0	1,163,635	1,163,635	0
MBP19.9715AA099.0000 ODC's - Co-Location Facility and General, Y-9715 AA4, PBA										21.0% Complete		
69,604	296,025	0	226,421	296,025	354,979	296,025	296,025	-58,953	0	1,412,956	1,412,956	0
MBP19.9715AA099.0001 ODC's - Staff Relocations, Y-9715 AA4, PBA										4.7% Complete		
10,345	9,895	0	-449	9,895	52,759	9,895	9,895	-42,863	0	210,000	210,000	0
AGREE/TASK ORDER: Y9715 Task AA - AW V Project Management and Direct Costs												
555,712	934,443	453,976	378,731	480,466	13,934,888	14,454,963	13,307,830	520,075	1,147,132	25,580,510	25,004,622	575,888

Time Phased Data w/ CPI & SPI

Y9715 Task AA - AWV Project Management and Direct Costs



PERIOD	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
BUDGET :	563	508	563	631	652	631	726	726	702	726	702	726	565	510	565	546	565	546	548	550	556	574	556	594	606	790	894	865	906	926
EARNED :	486	511	598	486	397	1,226	561	674	1,035	802	605	726	-73	669	796	431	558	669	585	806	330	641	934	602	615	766	859	832	874	897
ACT/ETC :	372	216	625	762	654	365	1,204	85	704	818	446	636	609	620	627	565	489	751	643	582	664	418	454	634	647	808	907	878	922	943
S.I. :	0.86	1.01	1.06	0.77	0.61	1.94	0.77	0.93	1.47	1.10	0.86	1.00	-0.13	1.31	1.41	0.79	0.99	1.23	1.07	1.47	0.59	1.12	1.68	1.01	1.02	0.97	0.96	0.96	0.96	0.97
C.I. :	1.31	2.36	0.96	0.64	0.61	3.36	0.47	7.89	1.47	0.98	1.36	1.14	-0.12	1.08	1.27	0.76	1.14	0.89	0.91	1.38	0.50	1.53	2.06	0.95	0.95	0.95	0.95	0.95	0.95	0.95
TO DATE	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
BUDGET :	563	1,071	1,633	2,264	2,916	3,546	4,272	4,998	5,701	6,427	7,129	7,855	8,420	8,930	9,494	10,041	10,605	11,152	11,700	12,249	12,805	13,379	13,935	14,529	15,135	15,924	16,818	17,683	18,589	19,515
EARNED :	486	997	1,596	2,082	2,478	3,704	4,266	4,939	5,974	6,776	7,380	8,106	8,033	8,703	9,499	9,930	10,488	11,157	11,742	12,549	12,879	13,521	14,455	15,057	15,672	16,438	17,298	18,157	19,003	19,900
ACT/ETC :	372	588	1,213	1,975	2,629	2,994	4,198	4,283	4,987	5,805	6,250	6,886	7,495	8,115	8,741	9,307	9,796	10,547	11,190	11,772	12,436	12,854	13,308	13,941	14,588	15,396	16,303	17,180	18,102	19,045
S.I. :	0.86	0.93	0.98	0.92	0.85	1.04	1.00	0.99	1.05	1.05	1.04	1.03	0.95	0.97	1.00	0.99	0.99	1.00	1.00	1.02	1.01	1.01	1.04	1.04	1.04	1.03	1.03	1.03	1.02	1.02
C.I. :	1.31	1.70	1.32	1.05	0.94	1.24	1.02	1.15	1.20	1.17	1.18	1.18	1.07	1.07	1.09	1.07	1.07	1.06	1.05	1.07	1.04	1.05	1.09	1.08	1.07	1.07	1.06	1.06	1.05	1.04

DATA UNIT IS COST IN $ x1,000

WASHINGTON DEPT. OF TRANSPORTATION

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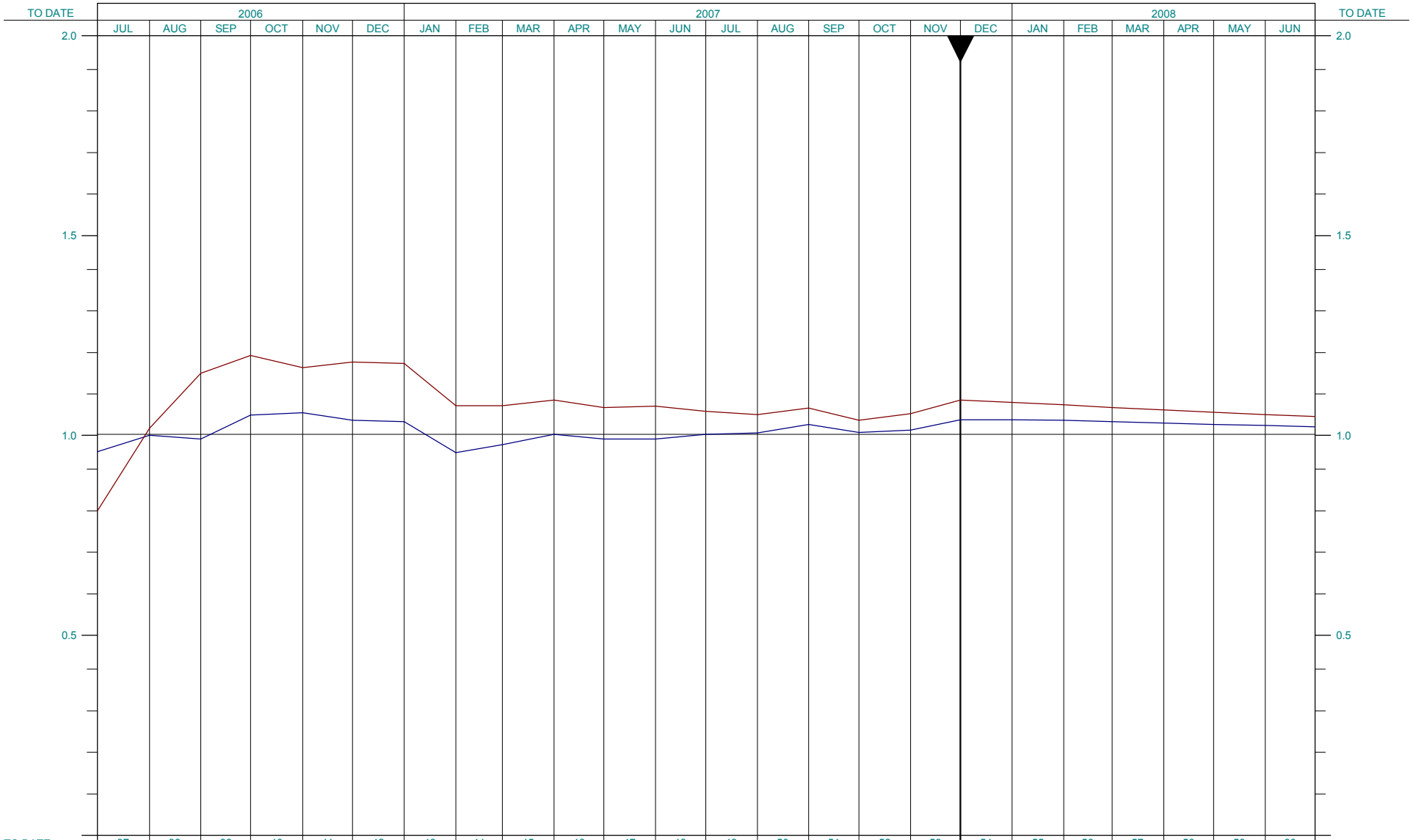
PERFORMANCE INDEX CURVE

Y9715 Task AA - AWV Project Management and Direct Costs



TO DATE		37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
BUDGET	:	4,272	4,998	5,701	6,427	7,129	7,855	8,420	8,930	9,494	10,041	10,605	11,152	11,700	12,249	12,805	13,379	13,935	14,529	15,135	15,924	16,818	17,683	18,589	19,515
EARNED	:	4,266	4,939	5,974	6,776	7,380	8,106	8,033	8,703	9,499	9,930	10,488	11,157	11,742	12,549	12,879	13,521	14,455	15,057	15,672	16,438	17,298	18,129	19,003	19,900
ACTUAL	:	4,198	4,283	4,987	5,805	6,250	6,886	7,495	8,115	8,741	9,307	9,796	10,547	11,190	11,772	12,436	12,854	13,308	13,941	14,588	15,396	16,303	17,180	18,102	19,045
S.P.I	:	1.00	0.99	1.05	1.05	1.04	1.03	0.95	0.97	1.00	0.99	0.99	1.00	1.00	1.02	1.01	1.01	1.04	1.04	1.04	1.03	1.03	1.03	1.02	1.02
C.P.I	:	1.02	1.15	1.20	1.17	1.18	1.18	1.07	1.07	1.09	1.07	1.07	1.06	1.05	1.07	1.04	1.05	1.09	1.08	1.07	1.07	1.06	1.06	1.05	1.04

DATA UNIT IS COST IN $ x1,000

WASHINGTON DEPT. OF TRANSPORTATION

PRISM-TOM-12/19/2007-15:29:35

Example EV Data Presented in Monthly Confidence Meetings

Alaskan Way Viaduct and Seawall Replacement Program

CONFIDENCE REPORT MEETING

April 30, 2008

MARCH REPORTS

Washington State Department of Transportation

Confidence Report – Mar 2008

SR99
S Holgate St to S King St
Viaduct Replacement

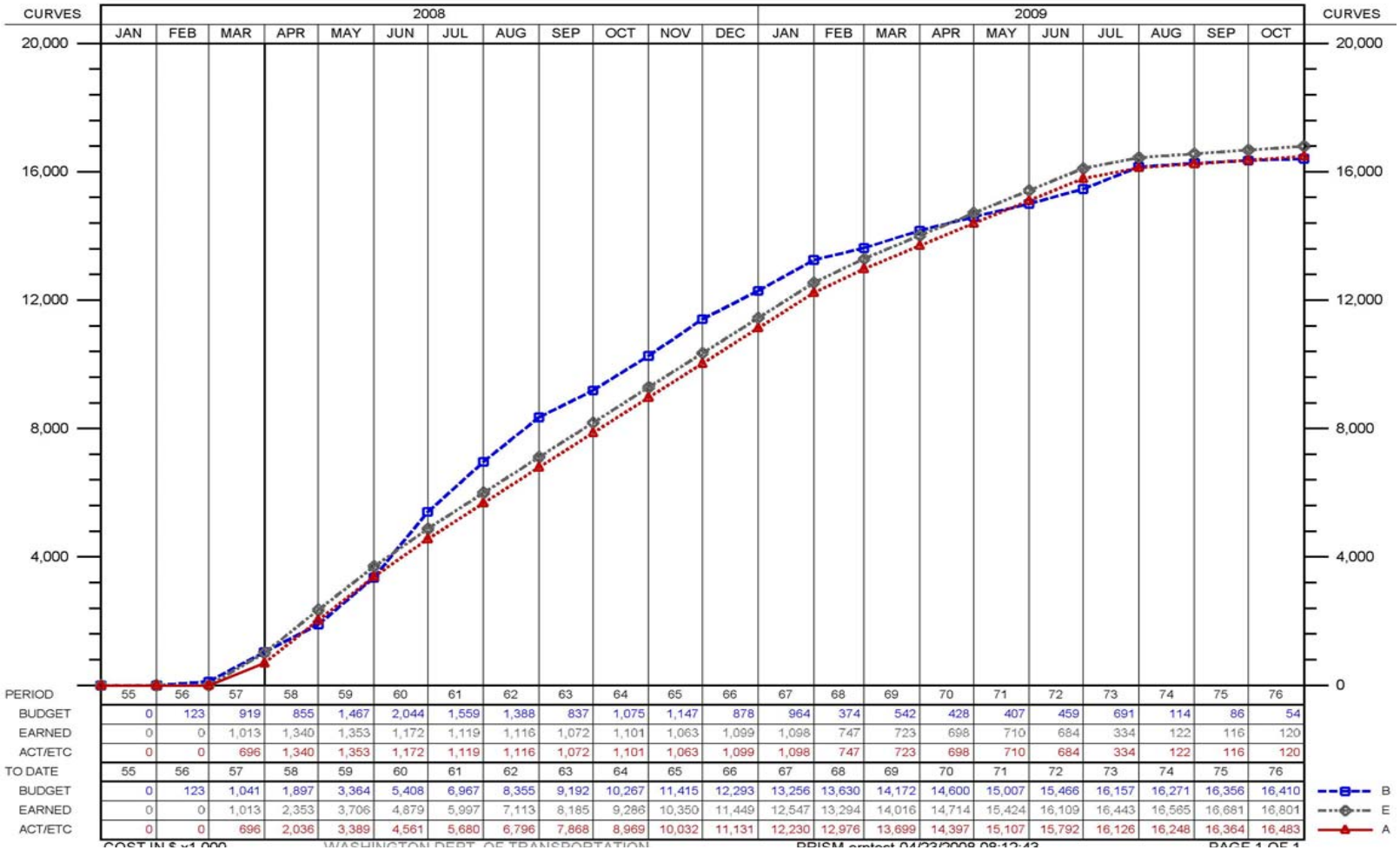
Washington State
Department of Transportation

S Holgate St to S King St Viaduct Replacement

Cost and Schedule Variance

Time Phased Data

AGREE/TASK ORDER: Y9715SB0



PERIOD	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
BUDGET	0	123	919	855	1,467	2,044	1,559	1,388	837	1,075	1,147	878	964	374	542	428	407	459	691	114	86	54
EARNED	0	0	1,013	1,340	1,353	1,172	1,119	1,116	1,072	1,101	1,063	1,099	1,098	747	723	698	710	684	334	122	116	120
ACT/ETC	0	0	696	1,340	1,353	1,172	1,119	1,116	1,072	1,101	1,063	1,099	1,098	747	723	698	710	684	334	122	116	120
TO DATE	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
BUDGET	0	123	1,041	1,897	3,364	5,408	6,967	8,355	9,192	10,267	11,415	12,293	13,256	13,630	14,172	14,600	15,007	15,466	16,157	16,271	16,356	16,410
EARNED	0	0	1,013	2,353	3,706	4,879	5,997	7,113	8,185	9,286	10,350	11,449	12,547	13,294	14,016	14,714	15,424	16,109	16,443	16,565	16,681	16,801
ACT/ETC	0	0	696	2,036	3,389	4,561	5,680	6,796	7,868	8,969	10,032	11,131	12,230	12,976	13,699	14,397	15,107	15,792	16,126	16,248	16,364	16,483

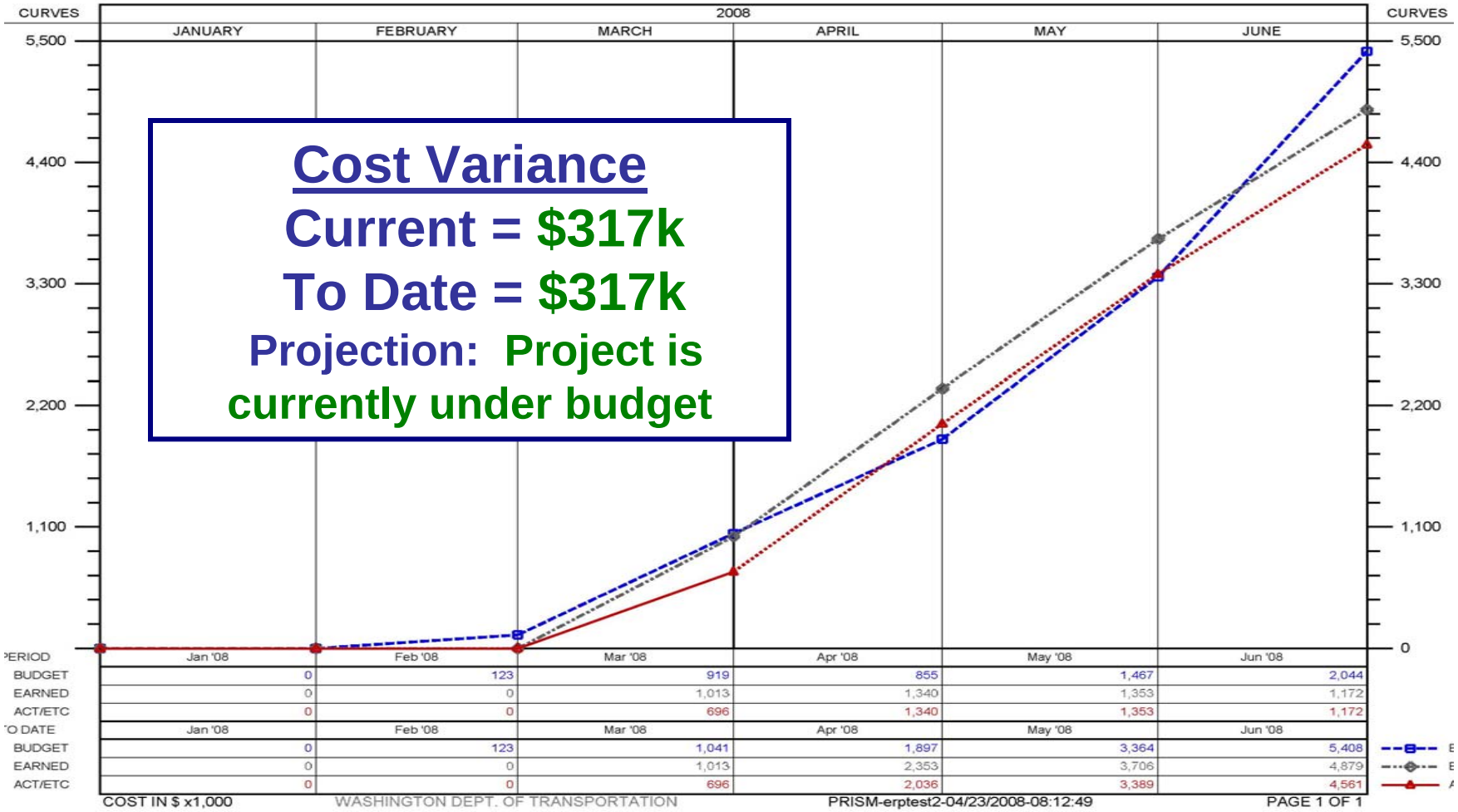
COST IN $ x1,000 WASHINGTON DEPT. OF TRANSPORTATION PRISM.rptest 04/23/2008 08:12:43 PAGE 1 OF 1

S Holgate St to S King St Viaduct Replacement

Cost and Schedule Variance

Time Phased Data

AGREE/TASK ORDER: Y9715SB0



S Holgate St to S King St Viaduct Replacement

Cost and Schedule Variance

Time Phased Data

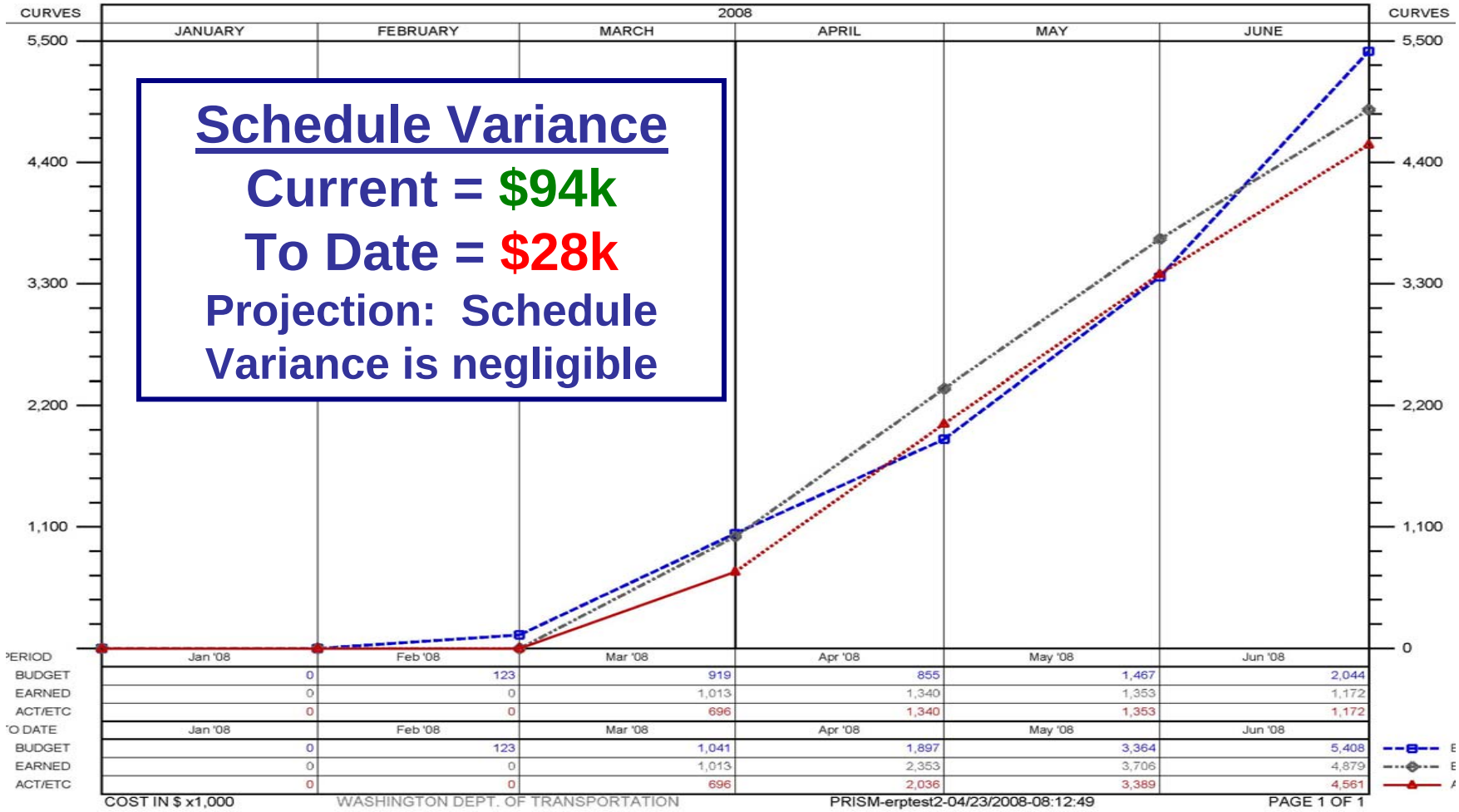
AGREE/TASK ORDER: Y9715SB0

Schedule Variance

Current = $94k

To Date = $28k

Projection: Schedule Variance is negligible



PERIOD	Jan '08	Feb '08	Mar '08	Apr '08	May '08	Jun '08
BUDGET	0	123	919	855	1,467	2,044
EARNED	0	0	1,013	1,340	1,353	1,172
ACT/ETC	0	0	696	1,340	1,353	1,172
TO DATE	Jan '08	Feb '08	Mar '08	Apr '08	May '08	Jun '08
BUDGET	0	123	1,041	1,897	3,364	5,408
EARNED	0	0	1,013	2,353	3,706	4,879
ACT/ETC	0	0	696	2,036	3,389	4,561

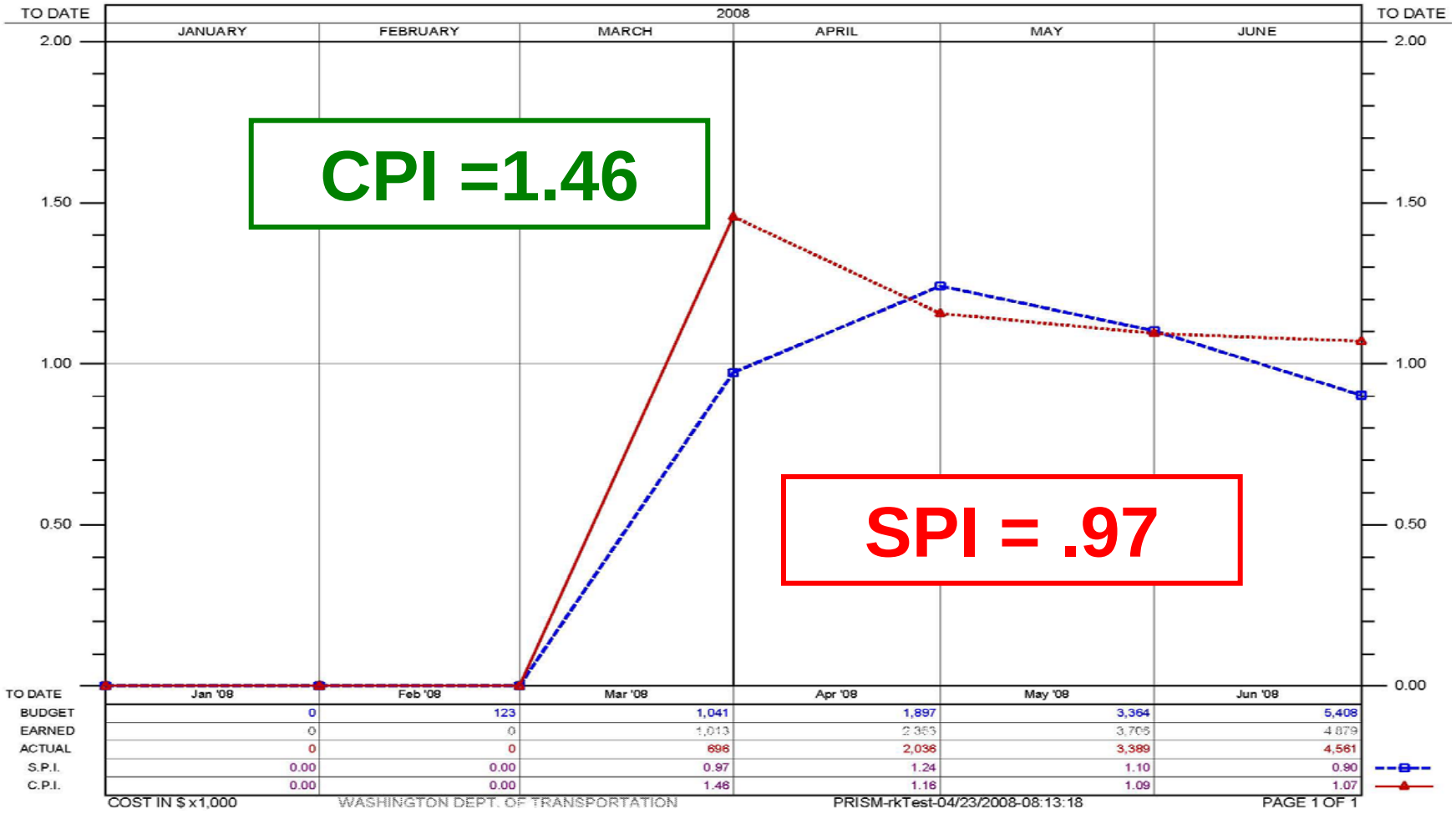
COST IN $ x1,000 WASHINGTON DEPT. OF TRANSPORTATION PRISM-erptest2-04/23/2008-08:12:49 PAGE 1 OF 1

S Holgate St to S King St Viaduct Replacement

Variance Review

PERFORMANCE INDEX CURVE

AGREE/TASK ORDER: Y9715SB0



TO DATE	Jan '08	Feb '08	Mar '08	Apr '08	May '08	Jun '08
BUDGET	0	123	1,041	1,897	3,364	5,408
EARNED	0	0	1,013	2,355	3,705	4,879
ACTUAL	0	0	698	2,036	3,389	4,561
S.P.I.	0.00	0.00	0.97	1.24	1.10	0.90
C.P.I.	0.00	0.00	1.46	1.16	1.09	1.07

COST IN $ x1,000 WASHINGTON DEPT. OF TRANSPORTATION PRISM-rkTest-04/23/2008-08:13:18 PAGE 1 OF 1

S Holgate St to S King St Viaduct Replacement

Variance Analysis

Problem Analysis

- **Cost variance indicates $317,000 under run to date. Final Design was still in a start up phase in March with the major production effort beginning in April.**

- **Schedule variance is negligible.**

Corrective Action Plan

- **None**

Estimate At Completion (EAC) Impact

- **EAC for Task SB is still projected to match the planned budget.**

Example Monthly Progress Report

Alaskan Way Viaduct & Seawall Replacement Program

Monthly Project Report

August 2007

Alaskan Way Viaduct & Seawall Replacement Program Hotline
1.888.AWV.LINE

Ron Paananen, Program Director
Matt Preedy, Deputy Program Director
Kimberly Farley, Program Manager

Washington State Department of Transportation
Alaskan Way Viaduct & Seawall Replacement Program Office
999 Third Avenue, Suite 2424
Seattle, WA 98104

U.S. Department of Transportation
Federal Highway Administration
Washington State Department of Transportation
City of Seattle

Alaskan Way Viaduct & Seawall Replacement Program

Summary for Biennium '07-'09 — Aug '07

SCOPE OF WORK:

The project will construct a new replacement facility for the existing Alaskan W ay Viaduct and the adjacent Seattle Seawall between Holgate Street and the Battery Street Tunnel.

SCHEDULE PERFORMANCE:

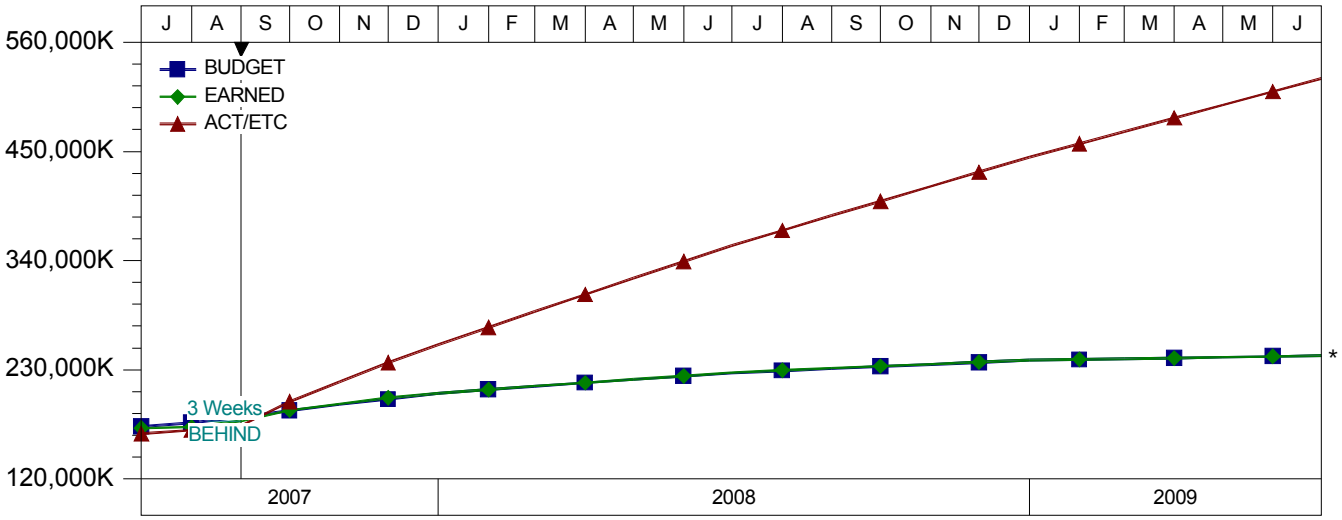
Period and to-date schedule performance is behind plan due to delay in executing new Task Orders for the 07-09 Bienn; BST scope definition has also been delayed.

COST PERFORMANCE:

Favorable cost variance largely driven by the Utilities area of the project. This scope is being re-planned and re-negotiated.

PROJECT MANAGERS:

Director: Ron Paananen
Deputy Director: Matt Preedy
Program Manager: Kimberly Farley
Const. Engr. Mgr.: Tom Madden
Design Engr. Mgr.: Alec W Illiamson



	BUDGET	EARNED	ACT/ETC	S.V.	C.V.	S.P.I.	C.P.I.		
PREV. PERIODS	176,420,544	172,456,990	169,187,568	-3,963,554	3,269,422	0.98	1.02	BUDGET	264,170,788 *
CURR. PERIOD	6,086,509	5,783,508	4,529,986	-303,001	1,253,522	0.95	1.28	EAC	2 ,414,203,867
TO DATE	182,507,053	178,240,498	173,717,554	-4,266,556	4,522,944	0.98	1.03	SCHED. % COMP.:	69.09 *
								ACTUAL % COMP.:	67.47 *

MILESTONES	APPROVED	CURRENT	VAR.
PE Phase Start	July 28, 2003	July 28, 2003	0
Environmental Document Complete	June 02, 2008	June 30, 2011	-1123
Right of Way Certification - Roadway	November 24, 2009	June 30, 2013	-1314
Contract Ad - Roadway	December 07, 2009	October 23, 2008	410
Operationally Complete	November 30, 2020	May 17, 2018	928

ACCOMPLISHMENTS:

1. Advertised and opened bids for the Yesler Way Vicinity Foundation Stabilization project.
2. Issued 60% PS&E for Phase 1 of the Electrical Line Relocation Project.
3. Held Battery Street Tunnel Value Engineering workshop and are now aligning project scope and budget.
4. New AWV Hotline for construction compliance is up and running: 1-888-AWV-LINE.

CONCERNS:

1. Obtaining City of Seattle street use and SPU permits in order to be able to provide Notice to Proceed to Yesler Way Vicinity Foundation Stabilization contractor within the contract time specification.
2. Completing a Memorandum of Agreement with the City of Seattle regarding the Electrical Relocation Project.
3. Understanding new SDOT processes for issuing street use permits.
4. Projections from BNSF indicate significant tail track blockage of Atlantic Street.

PREPARED BY: R. Kerwin DATE: 09/25/2007 APPROVED BY: K. Farley DATE: 09/25/2007

* In this report, the term "Budget" actually means "Committed Dollars" and calculations, such as Percent Complete, are based on committed dollars, not the total estimated project cost (EAC).

Alaskan Way Viaduct & Seawall Replacement Program
August 2007

Project Accomplishments, Challenges, and Opportunities

Preliminary Engineering

Accomplishments

- Advertised the Yesler Way Vicinity Foundation Stabilization Project
- Issued 60% Plans, Specifications and Estimate for Phase 1 of the Electrical Relocation Project.
- Held Battery Street Tunnel Value Engineering workshop, and began to align the scope of the project to the project budget.

Challenges

- Reaching a mutually agreeable preferred alternative design for Phases 2 and 3 of the Electrical Line Relocation Project and a Memorandum of Agreement with the City of Seattle.

Opportunities

- Proceeding with at-risk conceptual design for a “Utilidor” and Combined Sewer Overflow (CSO) facility for Phase 2 and 3 of the Electrical Relocation Line Project while discussions are ongoing with the City of Seattle.

Environmental

Accomplishments

- The AWV Hotline for construction compliance contacts is up and running and has been advertised to the Pioneer Square community. 1-888-AWV-LINE.

Challenges

- The Seattle Department of Transportation (SDOT) is changing their internal structure and review processes for street use permits for "major projects". Gaining a clear understanding of the new processes is a challenge for the entire AWV team.
- Development of Memorandum of Agreement (MOA) language between the City and the State for the Electrical Relocation project now includes agreements on permitting and handling of contaminated materials.

Opportunities

- The National Park Service (NPS) has agreed to help the AWVSR Program conduct a Level II Historical American Engineering Record (HAER) documentation of the Viaduct and Battery Street Tunnel.

Right of Way

Accomplishments

- Obtained Temporary Construction Easement for Yesler Way Vicinity Stabilization Project.
- Arranged Community Outreach meeting for the Polson & Western Building tenants.
- Right of Entry secured for geotech soil boring on U-Park.
- Project approvals for roof repair and window screening on WOSCA site and removed Clear Channel sign.

Opportunities

- Received a counter-offer for U-park site which is an opportunity to avoid condemnation.

Construction

Accomplishments

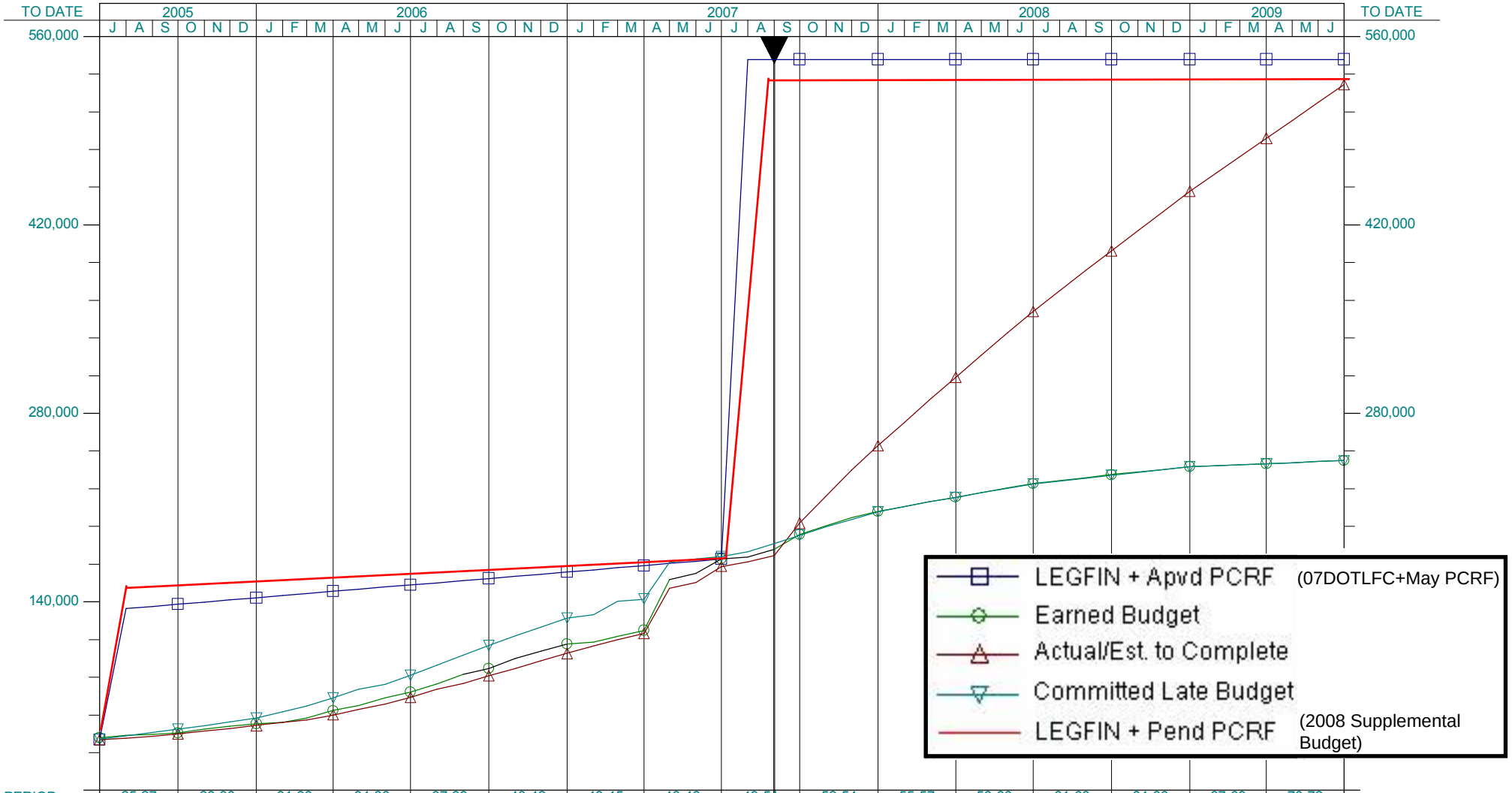
- Opened bids on Contract 7402, Yesler Way Vicinity Foundation Stabilization project. C.A. Carey Corporation is the apparent low bidder.

Challenges

- Obtaining the City of Seattle street use permit in order to be able to provide Notice to Proceed to Yesler Way Vicinity Foundation Stabilization contractor within the contract time specification.

Time Spread Cost Data Curve - Two Biennia

Alaskan Way Viaduct & Seawall Replacement Program

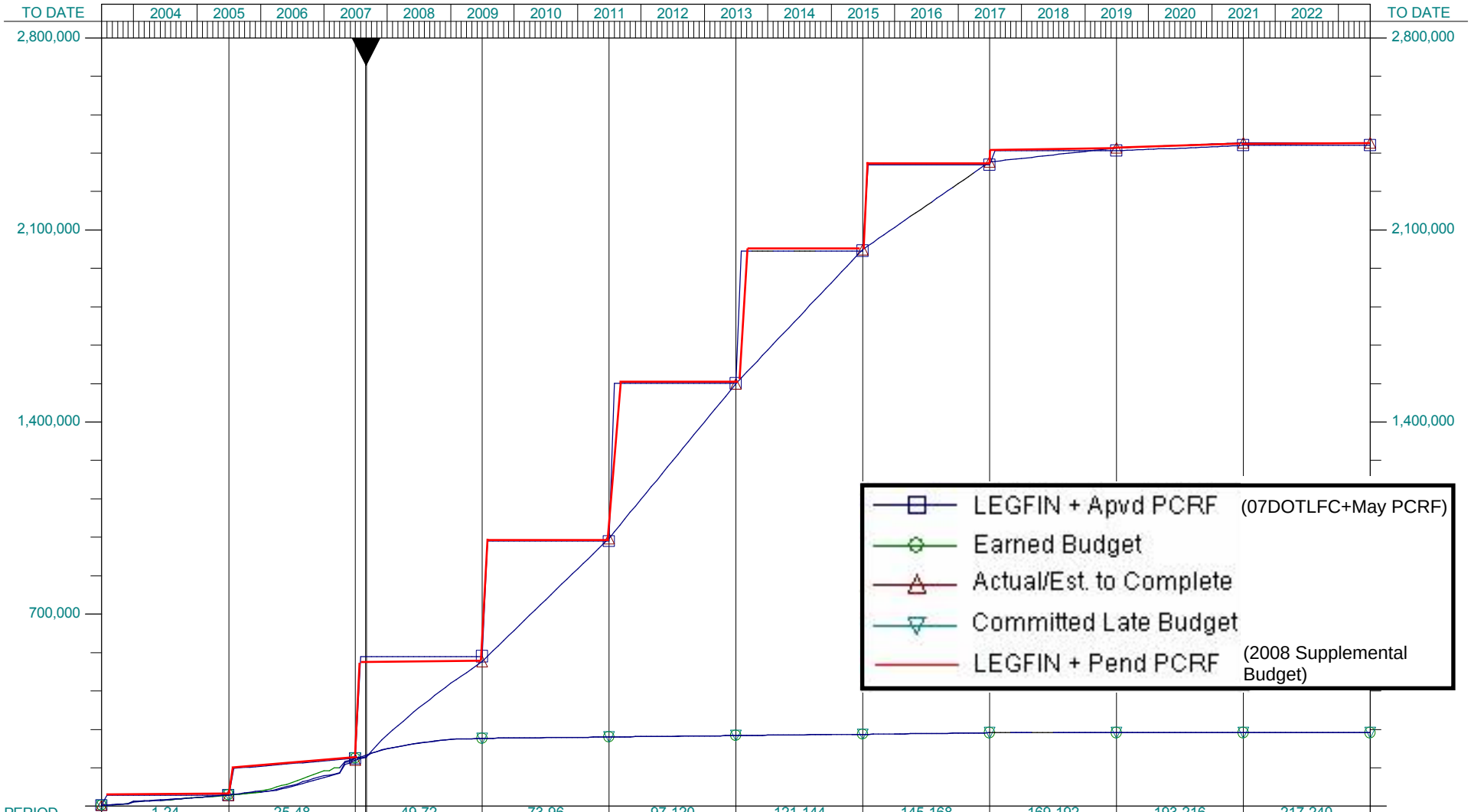


PERIOD	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	61-63	64-66	67-69	70-72
APVD-PCRF:	100,575	4,827	4,722	4,774	4,827	4,827	4,722	4,774	371,188	0	0	0	0	0	0	0
EARNED:	3,532	6,635	9,848	13,673	17,534	18,187	10,247	53,033	18,044	17,071	10,701	10,034	6,680	5,969	2,221	2,242
ACTUAL/ETC:	4,316	6,174	7,948	13,065	15,902	16,720	14,742	49,750	32,234	57,642	50,452	49,129	44,941	44,224	39,474	39,909
LATE BUDGET:	7,432	8,188	15,127	16,681	22,236	20,325	14,143	31,521	15,820	17,357	10,796	9,809	6,590	6,230	2,385	2,245
TO DATE	25-27	28-30	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	61-63	64-66	67-69	70-72
APVD-PCRF:	137,482	142,309	147,031	151,805	156,632	161,459	166,181	170,955	542,143	542,143	542,143	542,143	542,143	542,143	542,143	542,143
EARNED:	42,010	48,645	58,493	72,166	89,701	107,888	118,135	171,168	189,212	206,283	216,983	227,017	233,697	239,666	241,887	244,129
ACTUAL/ETC:	41,223	47,397	55,345	68,410	84,312	101,032	115,774	165,524	197,757	255,400	305,852	354,981	399,922	444,146	483,620	523,528
LATE BUDGET:	44,675	52,863	67,990	84,671	106,907	127,232	141,376	172,897	188,717	206,075	216,871	226,680	233,270	239,500	241,886	244,131

DATA UNIT IS COST IN $ x1,000 WASHINGTON DEPT. OF TRANSPORTATION PRISM-QPR01-09/25/2007-10:14:10

Time Spread Cost Data Curve - Total Project

Alaskan Way Viaduct & Seawall Replacement Program



PERIOD	1-24	25-48	49-72	73-96	97-120	121-144	145-168	169-192	193-216	217-240
APVD-PCRF:	36,907	134,049	371,188	419,776	574,800	483,500	313,500	50,868	19,400	0
EARNED:	38,479	132,689	72,961	4,581	4,856	5,147	5,456	0	0	0
ACTUAL/ETC:	36,907	128,616	358,004	448,607	564,198	488,647	318,956	50,868	19,400	0
LATE BUDGET:	37,242	135,655	71,234	4,581	4,856	5,147	5,456	0	0	0
TO DATE	1-24	25-48	49-72	73-96	97-120	121-144	145-168	169-192	193-216	217-240
APVD-PCRF:	36,907	170,955	542,143	961,919	1,536,719	2,020,219	2,333,719	2,384,587	2,403,987	2,403,987
EARNED:	38,479	171,168	244,129	248,710	253,566	258,713	264,169	264,169	264,169	264,169
ACTUAL/ETC:	36,907	165,524	523,528	972,135	1,536,333	2,024,980	2,343,936	2,394,804	2,414,204	2,414,204
LATE BUDGET:	37,242	172,897	244,131	248,712	253,567	258,715	264,171	264,171	264,171	264,171

DATA UNIT IS COST IN $ x1,000

WASHINGTON DEPT. OF TRANSPORTATION

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Time Spread Cost Data Table

WASHINGTON DEPT. OF TRANSPORTATION | ***SR099 Alaskan Way Viaduct and Seawall Replacement*** | PRISM-QPR1-09/25/2007-10:13:59

SR99 AWV&SW Replacement | WSDOT, SEATTLE, FHWA | PAGE 1

Alaskan Way Viaduct and Seawall Replacement Projec | COST IN $ x1,000 | Reporting Period 50: Aug '07

		03 - 05 BI	05 - 07 BI	07 - 09 BI	09 - 11 BI	11 - 13 BI	13 - 15 BI	15 - 17 BI	17 - 19 BI	19 - 21 BI	21 - 23 BI	REMAIN	TOTAL
P	Preliminary Engineering.												
	BUDGET	28,021	96,383	62,761	0	0	0	0	0	0	0	0	187,165
	EARNED	29,563	92,514	65,085	0	0	0	0	0	0	0	1	187,165
	ACTUAL/ETC	28,021	89,001	134,565	15,548	0	0	0	0	0	0	-0	267,134
	PROP-PCRF	28,020	89,125	134,320	15,548	0	0	0	0	0	0	0	267,014
	APVD-PCRF	28,020	95,748	159,089	7,776	0	0	0	0	0	0	0	290,634
	LEGFIN	28,020	102,148	161,229	7,776	0	0	0	0	0	0	0	299,174
R	Right of Way												
	BUDGET	8,886	39,607	8,470	4,580	4,855	5,147	5,456	0	0	0	0	77,005
	EARNED	8,915	40,174	7,875	4,580	4,855	5,147	5,456	0	0	0	0	77,005
	ACTUAL/ETC	8,886	39,614	114,600	133,059	7,697	5,147	5,456	0	0	0	0	314,462
	PROP-PCRF	8,886	39,614	114,600	133,039	18,300	0	0	0	0	0	0	314,440
	APVD-PCRF	8,886	38,300	143,098	112,000	18,300	0	0	0	0	0	0	320,584
	LEGFIN	8,886	31,900	143,098	112,000	18,300	0	0	0	0	0	0	314,184
C	Construction												
	BUDGET	0	0	0	0	0	0	0	0	0	0	0	0
	EARNED	0	0	0	0	0	0	0	0	0	0	0	0
	ACTUAL/ETC	0	0	108,838	300,000	556,500	483,500	313,500	50,868	19,400	0	0	1,832,606
	PROP-PCRF	0	0	108,838	300,000	556,500	483,500	313,500	50,868	19,400	0	0	1,832,606
	APVD-PCRF	0	0	69,000	300,000	556,500	483,500	313,500	50,868	19,400	0	0	1,792,768
	LEGFIN	0	0	69,000	300,000	556,500	483,500	313,500	50,868	19,400	0	0	1,792,768
REPORT TOTALS													
	BUDGET	36,907	135,991	71,232	4,580	4,855	5,147	5,456	0	0	0	0	264,170
	EARNED	38,478	132,689	72,960	4,580	4,855	5,147	5,456	0	0	0	1	264,170
	ACTUAL/ETC	36,907	128,616	358,004	448,607	564,197	488,647	318,956	50,868	19,400	0	-0	2,414,203
	PROP-PCRF (2008 Supplemental)	36,906	128,740	357,759	448,587	574,800	483,500	313,500	50,868	19,400	0	0	2,414,061
	APVD-PCRF (DOTLFC+May PCRF)	36,906	134,048	371,187	419,776	574,800	483,500	313,500	50,868	19,400	0	0	2,403,987
	LEGFIN (07DOTLFC)	36,906	134,048	373,327	419,776	574,800	483,500	313,500	50,868	19,400	0	0	2,406,127

WSDOT - TREND ANALYSIS

WASHINGTON DEPT. OF TRANSPORTATION | ***SR099 Alaskan Way Viaduct and Seawall Replacement*** | PRISM©UCO-TA01-09/25/2007-10:13:54

SR99 AWV&SW Replacement | WSDOT, SEATTLE, FHWA | PAGE 1

Report by PIN/Phase '03-'23 | COST IN $ x1,000 | Reporting Period 50: Aug '07

ELEMENT	UNIT	ACTUAL TO DATE	ESTIMATE TO COMP.	ESTIMATE AT COMPLETION CURRENT	ESTIMATE AT COMPLETION TREND	ESTIMATE AT COMPLETION VARIANCE	BUDGET BASELINE	BUDGET APPROVED	APPR. BUD. - CUR. E.A.C.
PIN NUMBER:									
P Preliminary Engineering.									0.0% Complete
PIN NUMBER:									0.0% Complete
* HOURS *	HR	0	0	0	0	0	0	0	0
* COST *	$	0	0	0	0	0	0	0	0
PIN NUMBER: 0000000 - Program Item Number not applicable									
P Preliminary Engineering.									0.0% Complete
PIN NUMBER: 0000000 - Program Item Number not applicable									0.0% Complete
* HOURS *	HR	0	0	0	0	0	0	0	0
* COST *	$	0	0	0	0	0	0	0	0
PIN NUMBER: 809936J - SR 99/Alaskan Way Viaduct 99/540 - EIS For Seismic Retrofit Or Replace									
P Preliminary Engineering.									100.0% Complete
HOURS	HR	10,223	0	10,223	10,223	0	0	0	-10,223
State-PEF-I	$	22	0	22	22	0	14	22	0
00990731	$	472	0	472	472	0	449	472	0
00990733	$	401	0	401	401	0	403	401	0
00990811	$	0	0	0	0	0	9	0	0
GCA3424R	$	382	0	382	382	0	382	382	0
GCA3483R	$	2,042	0	2,042	2,042	0	2,139	2,042	0
* COST *	$	3,320	0	3,320	3,320	0	3,399	3,320	0
PIN NUMBER: 809936J - SR 99/Alaskan Way Viaduct 99/540 - EIS For Seismic Retrofit Or Replace									100.0% Complete
* HOURS *	HR	10,223	0	10,223	10,223	0	0	0	-10,223
* COST *	$	3,320	0	3,320	3,320	0	3,399	3,320	0
PIN NUMBER: 809936K - Alaskan Way Viaduct - EIS - EIS (Nickel)									
P Preliminary Engineering.									74.6% Complete
HOURS	HR	86,572	78,718	165,290	149,841	-15,449	0	134,837	-30,453
State-N-Impr	$	10,182	4,710	14,892	15,114	221	13,955	12,017	-2,875
00990811	$	1,987	0	1,987	1,987	0	2,126	1,987	0
00990961	$	6,069	5,642	11,712	12,875	1,163	4,970	10,327	-1,384
Fed Unfunded	$	0	64	64	20	-44	0	6	-57
* COST *	$	18,238	10,417	28,656	29,997	1,341	21,052	24,339	-4,316
PIN NUMBER: 809936K - Alaskan Way Viaduct - EIS - EIS (Nickel)									74.6% Complete
* HOURS *	HR	86,572	78,718	165,290	149,841	-15,449	0	134,837	-30,453
* COST *	$	18,238	10,417	28,656	29,997	1,341	21,052	24,339	-4,316

WSDOT - TREND ANALYSIS

ELEMENT	UNIT	ACTUAL TO DATE	ESTIMATE TO COMP.	ESTIMATE AT COMPLETION CURRENT	ESTIMATE AT COMPLETION TREND	ESTIMATE AT COMPLETION VARIANCE	BUDGET BASELINE	BUDGET APPROVED	APPR. BUD. - CUR. E.A.C.
PIN NUMBER: 809936L - Alaskan Way Viaduct - ROW - Advance Right of Way After EIS (Nickel)									
R Right of Way									64.9% Complete
HOURS	HR	60,990	41,009	102,000	101,113	-886	0	62,268	-39,731
State-N-Impr	$	49,613	56,407	106,020	105,957	-63	80,247	77,005	-29,015
State-TPA-I	$	0	208,441	208,441	208,441	0	0	0	-208,441
00990961	$	0	0	0	0	0	59,200	0	0
* COST *	$	49,613	264,848	314,462	314,398	-63	139,447	77,005	-237,457
PIN NUMBER: 809936L - Alaskan Way Viaduct - ROW - Advance Right of Way After EIS (Nickel)									64.8% Complete
* HOURS *	HR	60,990	41,009	102,000	101,113	-886	0	62,268	-39,731
* COST *	$	49,613	264,848	314,462	314,398	-63	139,447	77,005	-237,457
PIN NUMBER: 809936M - SR 99/Alaskan Way Viaduct - Design And Early Right of Way									
P Preliminary Engineering.									67.0% Complete
HOURS	HR	666,427	512,804	1,179,231	1,018,590	-160,641	0	1,038,796	-140,435
State-N-Impr	$	23,744	63,658	87,402	69,696	-17,705	81,629	54,186	-33,215
00990871	$	1,000	0	1,000	1,000	0	992	1,000	0
00990931	$	983	1	985	1,089	104	0	983	-1
00990951	$	2,195	7,324	9,520	8,862	-657	0	10,410	890
00990961	$	29,129	3,631	32,760	30,604	-2,156	65,246	34,521	1,761
00990971	$	43,589	55,734	99,323	91,411	-7,911	0	54,736	-44,586
GCA4292R	$	566	0	566	566	0	911	566	0
GCA4395R	$	484	0	484	484	0	598	484	0
GCA4970R	$	781	1,590	2,372	2,217	-154	0	2,460	87
GCA4991R	$	11	460	472	472	0	0	14	-458
* COST *	$	102,485	132,401	234,886	206,405	-28,481	149,378	159,364	-75,521
PIN NUMBER: 809936M - SR 99/Alaskan Way Viaduct - Design And Early Right of Way									66.9% Complete
* HOURS *	HR	666,427	512,804	1,179,231	1,018,590	-160,641	0	1,038,796	-140,435
* COST *	$	102,485	132,401	234,886	206,405	-28,481	149,378	159,364	-75,521
PIN NUMBER: SR99 - Yesler Way Vicinity - Stabilize Foundation									
P Preliminary Engineering.									41.4% Complete
HOURS	HR	1,228	1,422	2,650	2,629	-21	0	2,650	0
State-N-Impr	$	8	30	39	39	-0	0	19	-20
00990961	$	2	-2	0	0	0	0	0	0
01013041	$	49	72	121	120	-0	0	121	0
Fed Unfunded	$	0	111	111	111	0	0	0	-111
* COST *	$	60	212	272	271	-1	0	140	-131

WSDOT - TREND ANALYSIS

ELEMENT		UNIT	ACTUAL TO DATE	ESTIMATE TO COMP.	ESTIMATE AT COMPLETION CURRENT	TREND	VARIANCE	BUDGET BASELINE	BUDGET APPROVED	APPR. BUD. - CUR. E.A.C.
C	Construction									0.0% Complete
	State-TPA-I	$	0	556	556	556	0	0	0	-556
	Fed Unfunded	$	0	3,565	3,565	3,565	0	0	0	-3,565
	* COST *	$	0	4,121	4,121	4,121	0	0	0	-4,121
PIN NUMBER: SR99 - Yesler W ay Vicinity - Stabilize Foundation										41.4% Complete
	* HOURS *	HR	1,228	1,422	2,650	2,629	-21	0	2,650	0
	* COST *	$	60	4,334	4,394	4,393	-1	0	140	-4,253

PIN NUMBER: 809936Z - SR 99/Alaskan Way Viaduct And Seawall - Replacement TPA Funds Portion

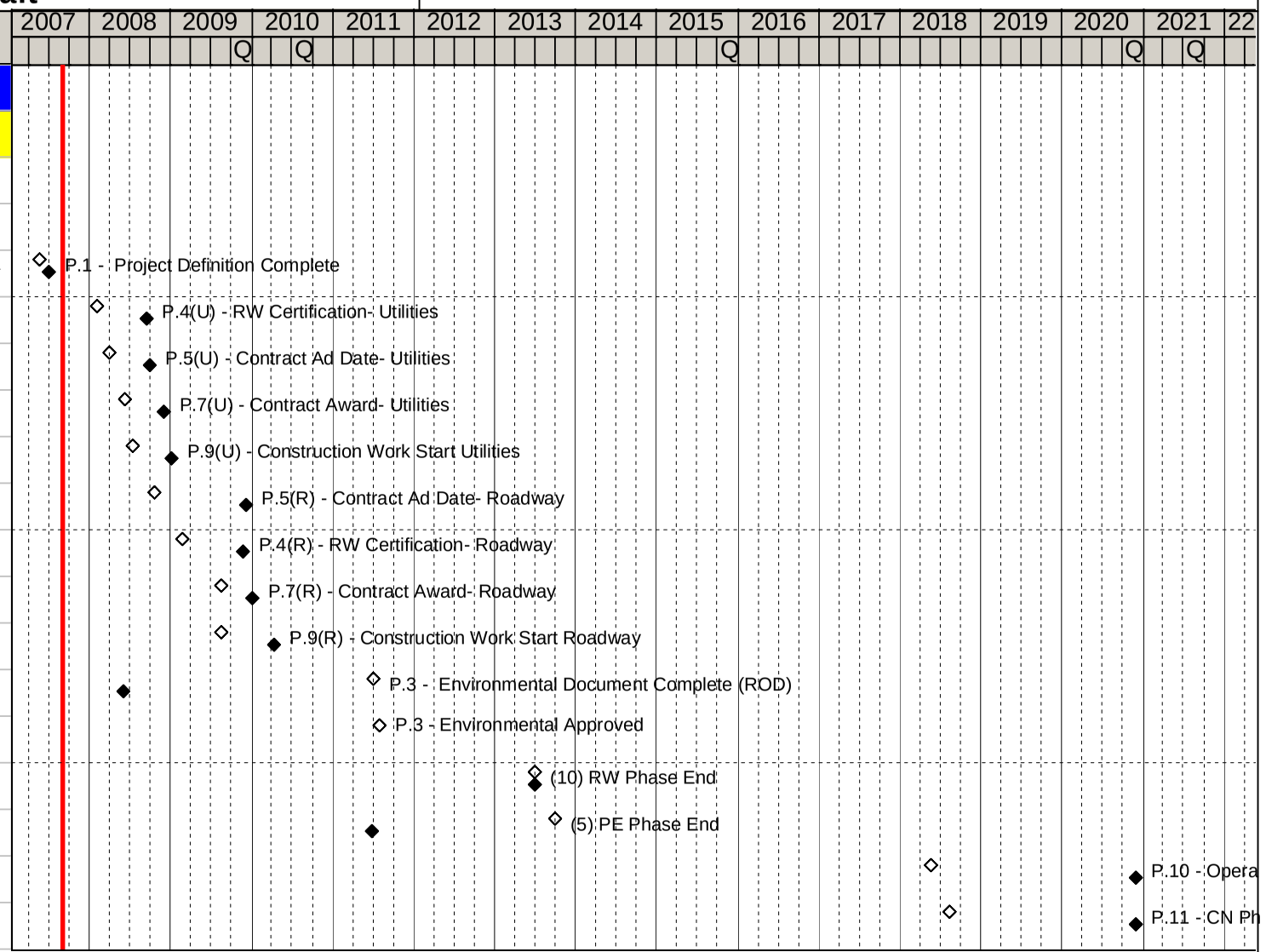
C	Construction									0.0% Complete
	Special C Pg	$	0	47,400	47,400	47,400	0	0	0	-47,400
	MultiModalAc	$	0	200,000	200,000	200,000	0	0	0	-200,000
	State-N-Impr	$	0	91,430	91,430	91,430	0	0	0	-91,430
	State-TPA-I	$	0	1,388,240	1,388,240	1,388,240	0	0	0	-1,388,240
	00990961	$	0	0	0	0	0	20,000	0	0
	Fed Unfunded	$	0	101,415	101,415	101,415	0	0	0	-101,415
	* COST *	$	0	1,828,485	1,828,485	1,828,485	0	20,000	0	-1,828,485
PIN NUMBER: 809936Z - SR 99/Alaskan W ay Viaduct And Seawall - Replacement TPA Funds Portion										0.0% Complete
	* HOURS *	HR	0	0	0	0	0	0	0	0
	* COST *	$	0	1,828,485	1,828,485	1,828,485	0	20,000	0	-1,828,485
REPORT TOTALS										67.4% Complete
	* HOURS *	HR	825,441	633,955	1,459,397	1,282,398	-176,998	0	1,238,553	-220,843
	* COST *	$	173,717	2,240,486	2,414,204	2,387,000	-27,204	333,276	264,170	-2,150,033

SR99/AWV Moving Forward Projects Master Schedule...

Draft

25-Sep-07 13:59

Activity ID	Activity Name	Legis Start	Legis Finish	Fcst/Act Start	Fcst/Act Finish
SR99/AWV Moving Forward Projects Master Schedule		28-Jul-03	30-Nov-20	28-Jul-03 A	13-Aug-18
Program Management		28-Jul-03	30-Nov-20	28-Jul-03 A	13-Aug-18
PM02	P.2 - PE Phase Start	28-Jul-03		28-Jul-03 A	
PM04	(4) ROW Phase Start	24-Nov-03		24-Nov-03 A	
PM01	P.1 - Project Definition Complete		02-Jul-07		18-May-07 A
PM07U	P.4(U) - RW Certification- Utilities		17-Sep-08		01-Feb-08
PM08U	P.5(U) - Contract Ad Date- Utilities	01-Oct-08		02-Apr-08*	
PM09U	P.7(U) - Contract Award- Utilities		01-Dec-08		06-Jun-08*
PM11U	P.9(U) - Construction Work Start Utilities	02-Jan-09		15-Jul-08	
PM08R	P.5(R) - Contract Ad Date- Roadway	07-Dec-09		23-Oct-08*	
PM07R	P.4(R) - RW Certification- Roadway		24-Nov-09		24-Feb-09
PM09R	P.7(R) - Contract Award- Roadway		07-Jan-10		17-Aug-09*
PM11R	P.9(R) - Construction Work Start Roadway	12-Apr-10		17-Aug-09	
PM03	P.3 - Environmental Document Complete (ROD)		02-Jun-08		30-Jun-11
PM06	P.3 - Environmental Approved				29-Jul-11
PM10	(10) RW Phase End		28-Jun-13		27-Jun-13*
PM05	(5) PE Phase End		28-Jun-11		27-Sep-13
PM12	P.10 - Operationally Complete		30-Nov-20		17-May-18*
PM13	P.11 - CN Phase End		30-Nov-20		13-Aug-18*



Legend:
In milestones PM07U, PM08U, PM09U. and PM11U, the U represents the Electrical Line Relocation - Phase 1 Project.

In milestones PM07R and PM09R, the R represents the Holgate to King St Viaduct Removal Project.

In milestones PM08R and PM11R, the R represents the Lenora to BST Project.

AWV&SRP Legislative Milestones

August 2007

◆ Legislative Milestone
◇ Fcst/Act Milestone

Example Earned Value Analysis Accompanying the Monthly Progress Report

ALASKAN WAY VIADUCT AND SEAWALL REPLACEMENT PROGRAM

AUGUST 2007 MONTHLY REPORT
COST / SCHEDULE STATUS

(Source: Alaskan Way Viaduct Prism Data)

1. **General:** Note that the August 2007 earned value analysis is based on budgeted and planned figures that represent only the amount of executed and committed task orders. AWVSRP has not yet fully programmed and planned the entire program budget of $2.4 billion. Please see "Internal and External Influences on Schedule and Cost Performance" below.

2. **Schedule Performance To-Date:**
   A. The program continues to be three weeks behind schedule, as reported for the month of July 2007 (last Monthly Progress Report). In $ terms, this equates to - $4.3 million (earned value of $178.2 million versus planned progress of $182.5 million). This is over a 50 month timeframe (July 2003 through August 2007), and equates to a schedule performance index (SPI representing earned value versus planned progress) of 0.98, which indicates behind-schedule performance of about 2% behind the plan.
   B. Contributing to this to-date schedule variance by program phase are the following items of work:
      1) Preliminary Engineering (major variance items only):
         a) Environmental: schedule variance of $1.7 million behind planned progress.
         b) Engineering: schedule variance of $1.0 million behind planned progress.
         c) Utilities: schedule variance of $0.8 million ahead of planned progress.
      2) Right-of-Way: The purchase of the WOSCA and Integrus right-of-way parcels ahead of plan in the previous biennium has resulted in a to-date performance of $0.3 million ahead of planned progress.
      3) Factors contributing to schedule status to-date:
         a) Engineering work is behind progress on the Viaduct Removal, Holgate-to-King Project due to coordination issues with a variety of stakeholders that require resolution; and the Battery Street Tunnel (BST) Fire Life Safety Improvements Project where project scope definition work is still ongoing.
         b) The Environmental discipline is being impacted by progress issues mentioned above on the Holgate-to-King and BST projects. Also, environmental documentation strategies for specific projects are still being defined, preventing that discipline from completing work according to the program plan.
         c) As of this date, the program continues to be without an executed Memoranda of Understanding (MOU) for the program overall, or a Memorandum of Agreement (MOA) specifically for the Electrical Relocation Project, Phase 1, with the City of Seattle. Although this has had a negative effect on the ability to progress utilities work according to plan, AWVSRP staff continues work on both documents. The Electrical Relocations Phase 1 MOA is projected to be delivered to the City of Seattle for their consideration and hopeful execution in late September 2007.

3. **Schedule Performance this Month:**
   A. Program Prism data indicates that the program progressed (expressed in earned value) in the amount of $5.8 million versus a planned amount of work equal to $6.1 million. This represents an adverse schedule performance of just over $0.3 million, and a schedule performance index for August 2007 of 0.95.
   B. The majority of the adverse schedule performance for the month of August 2007 is in the Engineering and Environmental areas of the program.

4. **Cost Performance To-Date:**
   A. The program is under budget overall. In $ terms, this equates to $4.5 million under budget (earned value of $178.2 million versus actual costs of $173.7 million). This is over a 50 month timeframe (July 2003 through August 2007), and equates to a cost performance index (earned value divided by actual cost) of 1.03, indicating under-budget cost performance by about 3%.
   B. Under-budget performance to date is primarily in the areas of Project Management, Utilities, and Seawall Design.

5. **Cost Performance this Month:**
   A. The program was under budget for the month of August 2007. Expressed in earned value terms, $5.8 million of progress was realized, versus actual costs of $4.5 million. This represents an under budget performance in the amount of just under $1.3 million and a cost performance index for the month of 1.28.
   B. August 2007 favorable cost variance was primarily driven by under-budget performance in Project Management, Utilities, and Engineering.

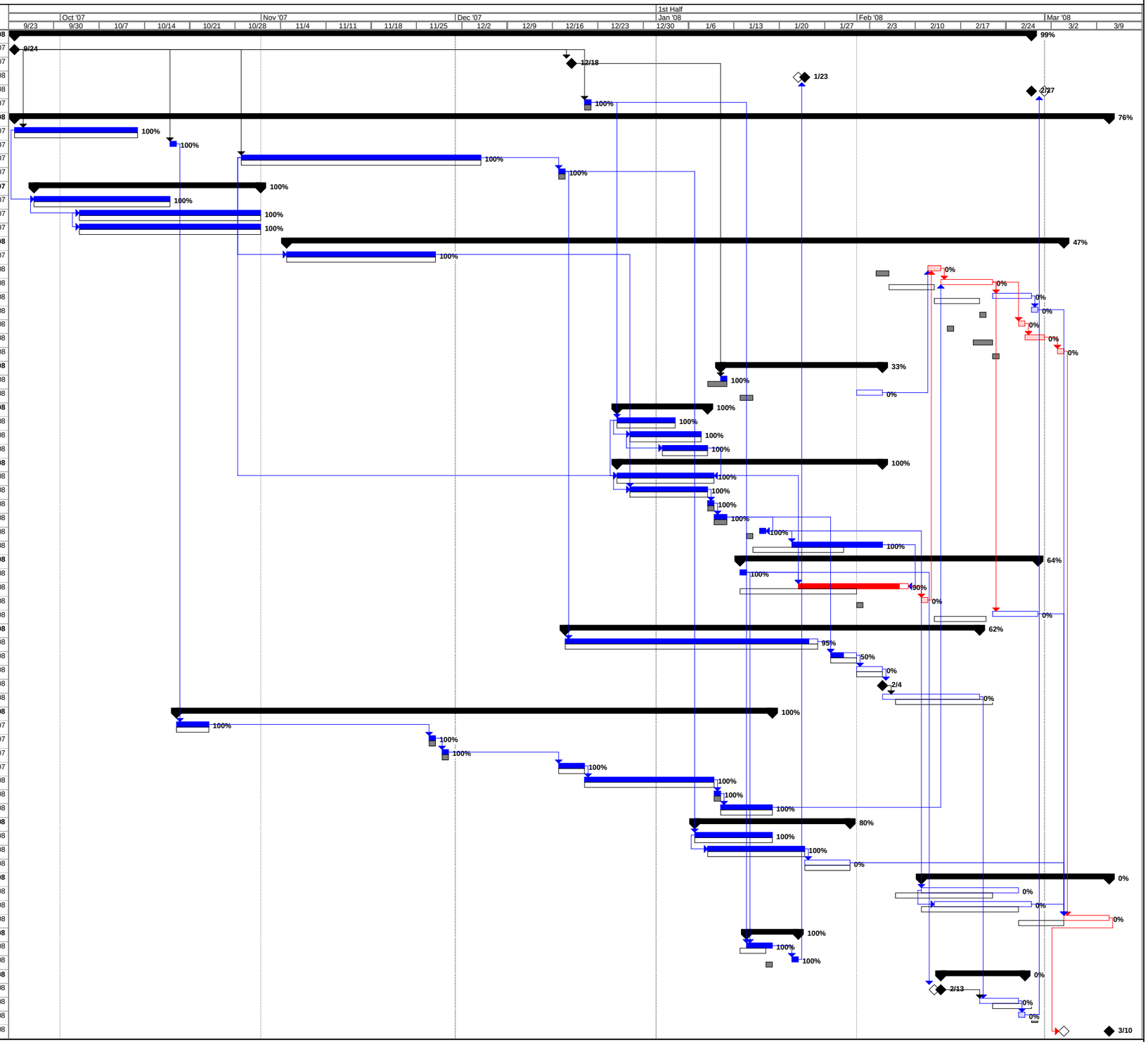
6. **Internal and External Influences on Schedule and Cost Performance:**
   A. Internal: as mentioned previously, AWVSRP staff is working to budget and plan for the entire program funded amount of $2.4 billion. This will involve using the MDL as a "checklist" for items of scope at the individual project level, and then allocating reasonable budget amounts to them along with associated schedules. Program management systems will then be populated with future "work packages" as well as current task orders. Meetings are being held at the individual project level concerning this effort.
   B. External:
      1) Resolution of stakeholder issues on the Holgate-to-King Project.
      2) Final determination of scope for the BST Fire Life Safety Improvements Project. This will involve concurrence by City of Seattle on certain issues such as egress portals.
      3) Concurrence on the part of Seattle Public Utilities and Seattle City Light concerning scope and construction approach on Phases 2 and 3 of the Electrical Relocation Project.
      4) Finalization of path-forward for environmental documentation for all individual projects. Changes of direction are possible for the Lenora-to-BST Earthquake Upgrade; BST Fire Life Safety; and Electrical Relocation Phases 2 and 3 Projects.

7. **Master Schedule Status:** A Master Schedule reflecting the Moving Forward Projects has been developed, although detailed content is still changing reflecting the scope, Environmental, and external entity issues previously mentioned. The schedule exhibit prepared for the August 2007 Monthly Progress Report is the result of correlating the individual sets of milestones for each of the Moving Forward Projects, plus the Central Waterfront Section, with the Legislative Milestones reflected in CPMS.

Tracking Schedule used for Allocation of Program-wide Costs to Individual Projects

Alaskan Way Viaduct and Seawall Replacement Program
Budget Projectization Work Plan

ID	Task Name	Work Days	Start	Finish
1	**Key Reporting Cycles and Events**	**105 days**	**9/24/07**	**2/27/08**
2	Project Start	0 days	9/24/07	9/24/07
3	November Monthly Progress Report Upload to Sharepoint	0 days	12/18/07	12/18/07
4	December Monthly Progress Report Upload to Sharepoint	0 days	1/23/08	1/23/08
5	January Monthly Progress Report Upload to Sharepoint	0 days	2/27/08	2/27/08
6	Decisions on Lenora to BST Project & Transit Enhancement Communicated to Business Mgmt	1 day	12/21/07	12/21/07
7	**Projectizing Budgets**	**113 days**	**9/24/07**	**3/10/08**
8	High level budget by Phase	15 days	9/24/07	10/12/07
9	UCO PIN Workshop	1 day	10/18/07	10/18/07
10	Work to Date on Allocations and Funding Discussions with UCO	25 days	10/29/07	12/4/07
11	Direction to Consultants for Invoicing on Corridor-wide Task Orders	1 day	12/17/07	12/17/07
12	**Input from Project Teams**	**25 days**	**9/27/07**	**10/31/07**
13	Project Budgeting Meetings	15 days	9/27/07	10/17/07
14	State Force forecast by Project Team	20 days	10/4/07	10/31/07
15	Other Task Order or work elements by Phase	20 days	10/4/07	10/31/07
16	**Work Orders & Group Codes (PE Phase Only)**	**78 days**	**11/5/07**	**3/3/08**
17	Establish Work Orders on Paper	15 days	11/5/07	11/27/07
18	Revise Work Orders Authorizations (WOAs - 8 total) for Modified Project Amounts	2 days	2/12/08	2/13/08
19	HQ Approves WOAs for TRAINS	5 days	2/14/08	2/21/08
20	HQ Accounting inputs Data into TRAINS	4 days	2/22/08	2/27/08
21	Work Orders opened for Charges	1 day	2/28/08	2/28/08
22	HQ Returns Approved WOAs to UCO Prog. Mgmt & AWVSR Prog. Mgmt	1 day	2/26/08	2/26/08
23	UCO Prog. Mgmt WOA QC Check and E-Mail back to AWVSR Program	3 days	2/27/08	2/29/08
24	AWVSR Prog. Mgmt provide Notification to UCO Prog. Mgmt to close Groups and discontinue old WOA	1 day	3/3/08	3/3/08
25	**CPMS Update**	**16 days**	**1/11/08**	**2/4/08**
26	January - Provide UCO Prog Mgmt with CPMS Update	1 day	1/11/08	1/11/08
27	January - UCO Prog. Mgmt Updates CPMS	2 days	2/1/08	2/4/08
28	**Reconciliation of Cost to Date with Project Funding (PE Phase Only)**	**8 days**	**12/26/07**	**1/8/08**
29	Re-Review of Applicable Task Order(s) (up to 33 Task Orders)	5 days	12/26/07	1/3/08
30	Create Task Specific Spreadsheets to Split Expenditures to Date	5 days	12/28/07	1/7/08
31	Subtract prior expenditures to establish "new" budgets going forward	5 days	1/2/08	1/8/08
32	**New Work Order Budgets and Allocation of Projectwide costs (PE Phase Only)**	**26 days**	**12/26/07**	**2/4/08**
33	Develop spreadsheet for distribution of T.O. budgets and State Force budgets	9 days	12/26/07	1/9/08
34	Review Task Orders with discrete "Moving Forward" Tasks and assign to Work Orders	6 days	12/28/07	1/8/08
35	Review Proposed Allocations with Program Management	1 day	1/9/08	1/9/08
36	Prepare Final Moving Forward Project Budget Allocation Worksheet(s)	2 days	1/10/08	1/11/08
37	Meet w/ Consultants to Provide Updated Instructions for Future Allocations	1 day	1/17/08	1/17/08
38	Consultants to Provide Actuals-to-Date by Work Order & Control Account	10 days	1/22/08	2/4/08
39	**Journal Voucher Transfers (PE Phase Only)**	**32 days**	**1/14/08**	**2/28/08**
40	December FIRS Data Availability	1 day	1/14/08	1/14/08
41	Round 1 for Expenditures through Dec 07	13 days	1/23/08	2/8/08
42	Submit all Worksheets to UCO Prog. Mgmt. after review by AWVSR Prog.Mgmt	1 day	2/11/08	2/11/08
43	Round 2 for Expenditures incurred during the Transition	5 days	2/22/08	2/28/08
44	**PRISM Preparation (PE Phase Only)**	**40 days**	**12/18/07**	**2/19/08**
45	Model Project budget in spreadsheet & Establish new Control Accounts	24 days	12/18/07	1/25/08
46	Reconcile Modeled Budget with Business Mgmt	4 days	1/28/08	1/31/08
47	Final Review and QC	2 days	2/1/08	2/4/08
48	Review Proposed Set-up with Project Team	0 days	2/4/08	2/4/08
49	Double entry bookkeeping in PRISM with Aging (Align with CPMS)	10 days	2/5/08	2/19/08
50	**PCRFs**	**60 days**	**10/19/07**	**1/18/08**
51	Initial PCRF Preparation	3 days	10/19/07	10/23/07
52	Separate PCRF discussion with R. Rolfer	1 day	11/27/07	11/27/07
53	PCRF "How to" Workshop	1 day	11/29/07	11/29/07
54	PCRF Finalization for Moving Forward Project & Submittal to UCO Program Mgmt	4 days	12/17/07	12/20/07
55	HQ & UCO Comments submitted to AWVSRP	10 days	12/21/07	1/9/08
56	AWVSRP Incorporates Comments	1 day	1/10/08	1/10/08
57	Approval of Revised PCRFs	6 days	1/11/08	1/18/08
58	**Monthly Invoicing and Reporting Cycle - December**	**17 days**	**1/7/08**	**1/30/08**
59	Consultants with Affected T.O.s provide Summary Invoicing per Old Instructions	10 days	1/7/08	1/18/08
60	Invoices Processed (against Old Work Orders, but with new Group Codes)	10 days	1/9/08	1/23/08
61	Invoices Paid against TRAINS (against Old Work Orders, with new Group Codes)	5 days	1/24/08	1/30/08
62	**Monthly Invoicing and Reporting Cycle - January**	**20 days**	**2/11/08**	**3/10/08**
63	Consultants with Affected T.O.s provide Summary Invoicing per Updated Instructions	10 days	2/11/08	2/25/08
64	Invoices Processed (against New Work Orders)	10 days	2/13/08	2/27/08
65	Invoices Paid against TRAINS (against New Work Orders)	5 days	3/4/08	3/10/08
66	**PRISM Reporting (December Data)**	**5 days**	**1/15/08**	**1/22/08**
67	Upload Actuals (Against Existing Control Accounts)	4 days	1/15/08	1/18/08
68	Publish Existing PRISM Project Reports	1 day	1/22/08	1/22/08
69	**PRISM Reporting (January Data) (PE Phase Only)**	**8 days**	**2/13/08**	**2/26/08**
70	January Data Available in FIRS	0 days	2/13/08	2/13/08
71	Upload Actuals (Against New Control Accounts)	4 days	2/20/08	2/25/08
72	Publish New Projectized PRISM Project Reports	1 day	2/26/08	2/26/08
73	Project Completion (PE Phase)	0 days	3/10/08	3/10/08



Project: BudgetProjectization1
Date Printed: 5/22/08

Critical | Critical Progress | Task | Task Progress | Baseline | Baseline Milestone | Milestone | Summary

AWVSRP Organization Charts

AWV and SR 519 Program Team

Executive Oversight Committee (WSDOT/City/FHWA)

FHWA
Steve Boch

Program Director
John White

City
Bob Powers

Senior Administrative Assistant
Sally Arany

Deputy Project Director
Engineering & Operations
Matt Preedy

Deputy Director
Programs & Services
Kimberly Farley

Deputy Program Manager
Harry Jarnagan

Environmental
Allison Hanson

Communications
Kristy Laing

To be organized around work areas

See T.O. for Communications

See T.O. for Programs & Services

See T.O. for Environmental

Prime Consultant Manager
Mike Rigsby

Asst Prime Consultant Manager
Ralph Petereit

See T.O. for Administration

Engineering Manager
South Section
Ali Amiri

Project Engineer
Utilities Contracts
Mark Anderson

PB Manager
South Engineering
Steve Kautz

Asst Project Engineer
Steve Beadle
H2K

Asst Project Engineer
Dan McKillop
Utilities

PB Manager
Electrical Line Relocation & Utility Design
Rick Conte

Engineering Manager
Roland Benito
SR 519

Project Engineer
Vacant

See T.O. for SR 519 Design Build

CH2M Hill Manager
SR 519
TBD

Design Manager
Alec Williamson

Asst Design Manager
Jim Robison

Civil Design Reviewer & Design Documentation Manager
Cliff Mansfield

Design Review
On-Call
Rudy Lemus (Coord)

Central Water Front Planning & Design Support Manager

Project Engineer
Transit Enhancements & Improvements
Paul Lacy

Asst Project Engineer
Vacant

Asst Project Engineer
Richard Nordon

PB Manager
North
DeWitt Jenson

PB Manager
BST
DeWitt Jenson

PB Manager Transit Enhancements & Improvements Design
Chris Wellander

PB Manager
Construction Traffic Planning State/City/ County

Geotechnical
Jim Struthers

Shannon Wilson Manager
Monique Nykamp

Construction Manager
Tom Madden
(Acting)

Asst Const Manager
Vacant

See T.O. for Project Field Offices

Key

= WSDOT

= City of Seattle

= FHWA

= PB

= PMAC

= EnviroIssues

= Pharos

= Other Consultants

Draft 6/25/08

Programs & Services Organization

Key

- = WSDOT
- = City of Seattle
- = FHWA
- = PB Americas
- = PMAC
- = EnviroIssues
- = Pharos
- = Other Consultants

Deputy Project Director
Programs & Services
Kimberly Farley

Deputy Program Manager
Harry Jarnagan

QA/QC Manager

Administrative Support
Daja Preston-Jackson

Administrative Support
Rhonda Garrett

Program Services Manager

Program Controls Manager
Brian Smith

Lead Cost Engineer
Alberta George

Cost Engineer
Resa Conway

Cost Engineer
Dan Liang

Tech Writer/ Reporting Coord
Janice Edwards

Lead Schedule Engineer
Chris Ludington

Schedule Engineer

Program Estimator
Michael Morrison

Information Tech Manager

Applications Support

Infrastructure Support

Document Systems Manager
Michael Duggan

Document Specialist
Tammie Stover

Document Systems Specialist
Sarah Penor

Document Systems Specialist
Deanna Curry

Trend Engineer
Rudy Lemus

Local Agreements Manager
Karen Stagner

Agreements Support
Rachelle Hein

Real Estate & ROW Manager
Todd Hudak

Deputy Real Estate & ROW Manager/Relocation Manager
Larry Ellington

Relocation Reviewer
Brad Thomas

Appraisals
McKee & Schalka

Bates McKee
Amy Hovelin

Environmental CDM
Susan Penoyar

Title Examiner
Greg Sancewich

GIS/Database Developer
Rachel King
Somer Flores

Administrative Support
Linda Matheson

Right-of-Way Agent
John Goldman

Relocation Agent

Program Administration Manager
Ward Anderson

Office Management

WSDOT HR

Accounting Manager
Pamela Martin

Design Contract Administrator
Tom Tobin

Contract Specialist
Laurie Macey

Budget Engineer
Larry Schwantes

Environmental Manager
Allison Hanson

Environmental Deputy Manager
David Mattern

Administrative Support
Lisa Vogt

Project Environmental Lead
Angela Freudenstein

Environmental Permit Lead
Heather Page

Permits
Kathy Fendt

Permits
Jesse Halstead

SR 519 EA Lead/ Tribal Coordinator
Margaret Kucharski

Section 106 Project Coordinator
Ann Costanza

NEPA/SEPA Coordinator
Kathy Rossi

Compliance Mitigation Specialist
Gwen McCullough

Environmental Planner
Jill Czamecki

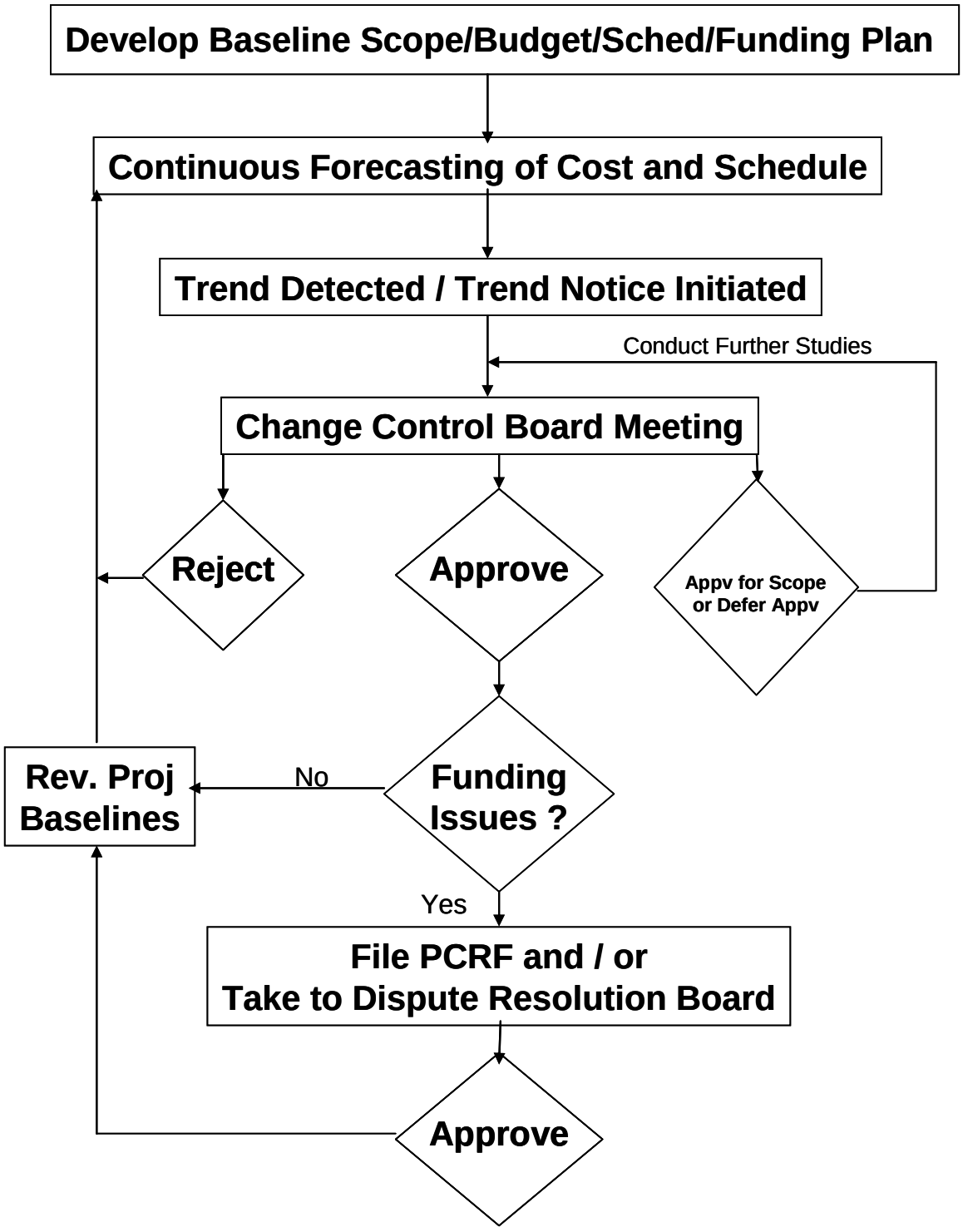
Environmental Planner
Colin Drake

Document Coordinator/Editing
Lorena Dinger

Graphics/Document Design
Jean Schwinberg

Draft 6/25/08

Trend Program Process Diagram


Develop Baseline Scope/Budget/Sched/Funding Plan
Continuous Forecasting of Cost and Schedule
Trend Detected / Trend Notice Initiated
Conduct Further Studies
Change Control Board Meeting
Reject
Approve
Appv for Scope or Defer Appv
Rev. Proj Baselines
No
Funding Issues ?
Yes
File PCRF and / or Take to Dispute Resolution Board
Approve

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9.0 Contributors to this Report

Primary Author:

Harry Jarnagan, PE CCE. Hatch Mott MacDonald

Reviewers:

Robert Garrett. Hatch Mott MacDonald
Stephen Mauss, PE. Hatch Mott MacDonald
Brian Smith, CCE PMP. Hatch Mott MacDonald

Interviewees:

Ward Anderson, PE. Washington State Department of Transportation
Geoff Baillie, PE. Baillie & Associates
Russell Kerwin. Washington State Department of Transportation
Richard Patterson, PE. Baillie & Associates
Larry Schwantes. Washington State Department of Transportation
Michael Sullivan. Baillie & Associates