Review of WSDOT's Implementation of Design-Build Project Delivery

TASK 3: EVALUATE WSDOT'S CURRENT USE OF DESIGN-BUILD PROJECT DELIVERY

Prepared for:
State of Washington
Joint Transportation Committee

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EXECUTIVE SUMMARY

Engagement Overview

The Joint Transportation Committee of the Washington State Legislature engaged a team led by Hill International to study the Washington State Department of Transportation's (WSDOT) use of the design-build project delivery method, with the objective of identifying potential changes in law, practice or policy that will allow WSDOT to optimally employ design-build to maximize efficiencies in cost and schedule, and ensure that project risk is borne by the appropriate party.

The study consists of eight integrated tasks:

Task 1: Prepare basic overview of the design-build and design-bid-build delivery methods.

Task 2: Identify best practices in design-build project delivery.

Task 3: Evaluate WSDOT's current use of design-build project delivery.

Task 4: Propose improvements to maximize cost and schedule efficiencies, and ensure project risk is borne by the appropriate party.

Task 5: Propose next steps for the public and private sectors to adopt the report's recommendations.

Task 6: Work with review panel, legislators and staff workgroup.

Task 7: Prepare and deliver presentations.

Task 8: Prepare and issue draft and final reports.

White Paper Objectives

This white paper, prepared as the deliverable for Task 3, evaluates WSDOT's current design-build practices with the objective of identifying:

- What does WSDOT do well?
- Has WSDOT's delivery improved over time?
- What aspects of WSDOT's design-build program could be improved?

The consultant team addressed these questions in the context of the intended benefits of design-build (as previously identified in the Task 1 white paper) and existing industry best practices (as was discussed in the Task 2 white paper).

Key Findings

To evaluate WSDOT's current practices, the consultant team reviewed relevant reports, policies, legislation, contract documents, and other appropriate material related to WSDOT's use of design-build project delivery. Additional information and feedback were obtained through interviews conducted with WSDOT staff and industry representatives. Key findings from this review effort are summarized below.

What does WSDOT do well?

WSDOT's execution of the following aspects of design-build delivery meets or exceeds industry best practices.

Programmatic Practices

- **Industry outreach.** It is generally recognized that for design-build to work well, a mutual level of trust and respect must be established between the owner and industry groups. To this end, WSDOT regularly engages industry as it continues to develop and refine its design-build program.

- **Commitment of senior leadership.** WSDOT's senior leadership appears to be committed to the success of its design-build program. Dedicated staff have been assigned at the Headquarters level (currently 1 full-time Design-Build Engineer supported by a part-time Assistant State Construction Engineer) to support the development and coordination of the design-build program and to act as overall champions of the use of design-build. Adequate resources (either internal WSDOT staff or external consultants working on behalf of WSDOT) are generally now allocated to the project teams responsible for managing design-build projects.

Procurement and Contracting Practices

- **Risk allocation.** WSDOT worked with industry to develop a pre-assigned risk allocation matrix that allocates risks commonly encountered on highway construction projects to either WSDOT or the design-build team. This matrix is typically used as a starting point and then the risk allocation is adjusted in the solicitation documents for each project based on project-specific risks. WSDOT's risk allocation philosophy is in alignment with industry best practices for design-build in the sense that WSDOT takes responsibility for project risks that are not reasonably under the control of the design-builder and transfers risks to the design-builder that it can more effectively manage. In some cases, risks are shared. For example, consistent with other DOTs, WSDOT may use a differing site condition (DSC) risk allocation pool set at specific cap (e.g. if cap is set at $6M, the design-build team is responsible for the first $6M in DSC costs, and WSDOT is responsible for DSC costs in excess of $6M)

- **Shortlisting.** WSDOT routinely shortlists the number of proposers invited to submit a phase 2 technical proposal, a practice consistent with DBIA best practices that selects firms with the highest qualifications, and allows for a more manageable evaluation process. By winnowing down to the top quality proposals, the industry is protected from the unnecessary effort in submitting less than qualified proposals, and WSDOT can focus its efforts on selecting the firm offering the best value (i.e. combination of price and technical solutions).

- **One-on-one meetings.** One-on-one meetings, strongly supported by DBIA and practiced by many DOTs, are confidential meetings held during the procurement process between proposing design-build teams and DOT staff. Such meetings serve as a key communication tool to encourage the open and candid exchange of concepts, concerns, and ideas and to help ensure that WSDOT's project needs are being appropriately and consistently interpreted by all proposers. Furthermore, the collaborative environment fostered through these meetings often carries through to the post-award design and construction phase of the project, helping to build rapport and promote trust, equity, and a commitment to project success among the contracting parties.

- **Stipends.** To encourage competition and motivate the industry to innovate, WSDOT offers reasonable stipends consistent with current industry best practices that compensate unsuccessful shortlisted proposers that have submitted responsive technical proposals.

- **Alternative Technical Concepts (ATCs).** To further promote innovation, WSDOT routinely encourages proposers to submit ATCs. The ATC process is viewed by DBIA and the transportation industry as an effective tool for giving industry the opportunity to suggest new ideas, innovations, or concepts that may not have been directly reflected in the solicitation documents.

Contract Administration Practices

- **Co-location.** On larger projects, WSDOT routinely co-locates its staff with those of the design-build team. This practice helps promote communication, collaboration, and effective and efficient resolution of issues.

How has WSDOT's delivery improved over time?

WSDOT recognizes some deficiencies in its past implementation of design-build and is actively taking steps to enhance the program. This is apparent in the recent strides WSDOT has taken to more fully implement industry best practices and in the initiatives it currently has underway to further advance this goal. Examples of these efforts include the following:

- **Procedural Guidance.** Recognizing the need for more standardization and guidance, WSDOT has established an internal design-build Work Group to provide ongoing support for the development of an updated design-build manual providing guidance for all aspects of design-build delivery from project development, procurement, and contract execution and administration.

- **Development of design-build template documents.** WSDOT has been working closely with the AGC Subcommittee for Design-Build and ACEC representation to review standard contract language and template documents. From a DOT's perspective, standard template documents help streamline the effort needed to develop and review solicitation and contract documents for specific projects, while also ensuring that roles and responsibilities related to design, quality, third-party coordination, and similar requirements that may change under design-build are clearly and adequately defined. They also help a DOT focus programmatically on its design-build procurement, contracting, and execution procedures. From industry's perspective, the familiarity and comfort level afforded by an owner's repeated use of standardized documents can facilitate their bidding processes and lead to better proposals.

- **Development and implementation of Project Delivery Method Selection Guidance (PDMSG).** Design-build is not appropriate for all projects. WSDOT's PDMSG is adapted from a guidance developed by the University of Colorado and implemented by several other DOTS. It provides a robust and scalable process for evaluating different delivery methods against given a project's goals, constraints, and risks. Using such a structured approach lends transparency and consistency to the decision process and helps ensure the appropriate application of design-build. WSDOT's PDMSG reflects the most current best practice for a qualitative project selection tools.

- **Use of design-build on small projects.** WSDOT is beginning to expand the use of design-build to smaller projects, which should help grow the design-build industry by expanding opportunities for smaller firms to prime projects.

Furthermore, by virtue of the experience gained through completed design-build projects, WSDOT has also begun to see some improvement in the following areas:

- **Design-build experience.** Although design-build expertise is not widely dispersed across WSDOT staff, a strong knowledge base of experience and lessons learned now exists among the project team members working in the Puget Sound area. Tapping this knowledge base can provide an effective starting point for development of a robust training program designed to transfer and instill this knowledge to others within WSDOT.

- **Quality management.** WSDOT has had success growing the private sector quality assurance (QA) industry in Washington State. In contrast to other DOTs, this is allowing WSDOT to transfer more QA responsibility to industry (i.e., design-builder or its agent conducts sampling and testing; DOT performs verification testing).

What aspects of WSDOT's design-build program could be improved?

As part of the upcoming Task 4 effort, the consultant team will develop a detailed and prioritized set of recommendations for enhancing WSDOT's design-build program. These recommendations will largely target the areas of need identified below.

- **Disbursement of design-build expertise.** Design-build expertise is not widely dispersed across WSDOT staff. Staff experience is primarily concentrated in the Northwest and Olympic Regions, where most of the design-build projects have been located. However, even within these regions, most staff outside of the design-build teams have limited design-build knowledge or experience.

- **Training.** WSDOT currently lacks a formalized design-build training program. Training efforts are largely ad hoc, with most staff learning on the job through the mentoring efforts of experienced Project Managers. To broaden the application of design-build, particularly to other areas of the state, statewide training is needed to promote consistency

- **Standardization of design-build processes.** WSDOT's design-build practices (particularly those related to post-award contract administration) are largely improvised and are inconsistently applied by project team members or between WSDOT offices. To address this gap, WSDOT is currently working on the development of a standard design-build guidance manual to more formally define its design-build processes.

  To ensure the manual will serve the intended purpose and further promote consistency in design-build contract administration, WSDOT must also devise an effective strategy for rolling out the manual and enforcing the use of the procedures contained therein (i.e., holding the project teams accountable).

  Developing and enforcing a more comprehensive set of design-build policies and procedures aligned with leading practices, coupled with a robust staff training program in these best practices, should help WSDOT foster a more sustainable and effective design-build program.

- **Reliance on consultants.** Although outside consultants can provide much needed assistance, particularly during the early development and expansion of a DOT's design-build program, overreliance on consultants can stunt the growth and development of the DOT's own staff, creating a void of sufficient design-build experience and qualifications to provide meaningful project-level decision-making. A common complaint regarding WSDOT's design-build program voiced by industry representatives was that WSDOT often yielded too much control to its consultant

resources, particularly for design reviews. The issue stems in part from the perception that the consultants, who are paid by the hour, are incentivized to be unnecessarily critical of design-builder submissions. With the new Connecting Washington funding, the mandate is to create a sustainable core workforce. The increase in the program size with the new legislation will also necessitate the use of design-build and alternate delivery methods and supplemental consultant staff to deliver the program in the required time frame.

- **Flexibility in procurement options.** WSDOT currently procures design-build services using a two-step best-value approach. Several of the DOTs with more mature design-build programs have the ability to implement design-build in different ways based on project types or characteristics. Particularly if WSDOT continues to expand the use of design-build to smaller, less complex projects, more streamlined design-build procurement options, including low bid design-build and bundling of multiple projects, may help achieve efficiencies in project development and procurement.

- **Preliminary design and project scoping.** It appears that inadequate or inappropriate project scopes may have prevented WSDOT from achieving some of the desired benefits of design-build, such as contractor innovation and cost and time savings.

    - In part due to late delivery method selection decisions, WSDOT has often procured design-build services using designs that are much more developed and prescriptive than what is normally needed for design-build. For example, the design for US 2/Rice Road was almost complete when the decision was made to include it as part of the design-build small projects program. This required the design team to restructure the design documents to make them more suitable for design-build.

    - Although preliminary design work should not be advanced too far by the owner, appropriate front-end tasks (e.g., geotechnical/environmental investigations, third party coordination, etc.) must still be performed to ensure the development of a realistic understanding of the project's scope and budget and to provide proposers with information that they can reasonably rely upon in establishing their price.

      The appropriate level of front-end work should be informed in part by the identified project risks. Although WSDOT has a very mature standardized risk assessment process that is used to identify and evaluate project risks that could impact budget and schedule, the extent to which WSDOT's risk evaluation process is integrated with other project development activities, such as scoping and selection of appropriate proposal evaluation criteria, is unclear. For example, given the geotechnical risks on the SR 520 project, it may have been beneficial to evaluate proposers' geotechnical design/approach as part of the scored criteria and to have more fully defined the risks in the solicitation documents.

    - Use of performance specifications is generally viewed as a best practice for design-build delivery to provide the greatest opportunity for contractor flexibility and innovation. WSDOT instead seems to rely on fairly prescriptive specifications and a resource intensive ATC process to achieve the same goal.

    - WSDOT currently lacks a clear strategy for seamlessly integrating Practical Design into the delivery of a design-build project.

- **Evaluation criteria.** It does not appear that WSDOT has any guidance or standardized processes to assist project teams with identifying appropriate project-specific evaluation criteria and proposal

deliverables that align with project goals and risks. The evaluation criteria and associated weightings used by WSDOT to select the design-builder have not always provided for meaningful distinctions among proposers, particularly given the high weighting generally allocated to price.

- **Objective evaluation of proposals.** WSDOT does not appear to have standardized and repeatable guidance for evaluating proposals. Some industry representatives commented that shortlisting of finalists is not consistent among the WSDOT regions, further noting that WSDOT's qualifications process does not necessarily provide for a fully competitive procurement (as the same two proposers always seem to make the shortlist).

- **Contract administration.** WSDOT currently lacks any formal guidance related to owner monitoring, supervision, and oversight during project execution – a key area affecting design-build project success. The design phase in particular is challenging some WSDOT designers who are having difficulty understanding their role in the final design process.

- **Lessons learned.** WSDOT lacks a formal system to capture lessons learned in a manner that could be used to inform future project development activities.

White Paper Structure and Contents

The findings described above stemmed from two evaluation efforts:

- The first, as described in Section 1 of this white paper, entailed a review of WSDOT's design build project performance (as informed by the available project data and interviews with WSDOT staff and industry representatives) to determine the extent to which WSDOT achieved the intended benefits of design-build.

- The second task entailed identifying how WSDOT's current use of design-build delivery compares to industry leading practices. The results of this assessment are summarized in Section 2.

Conclusions are presented in Section 3. More detailed information, including raw data collected through the interview process, are provided in the following attachments to this report:

Attachment A - WSDOT's DB Program Summary (based on interview with HQ staff)
Attachment B - Project Summaries (based on interviews with WSDOT project personnel)
Attachment C – Local Industry Interviews

Project Performance Evaluation

1.1 Background

Between 2000 and 2015, WSDOT expended approximately $11.6 billion on its capital program, of which $4.5 billion (or 38% of the total) was delivered using design-build. Design-build projects thus make up a significant part of WSDOT's overall program in terms of dollars expended.

WSDOT has applied design-build on 29 projects, which have generally fallen within the following size ranges:

- > $300 M: 5 projects/programs
- $100 - $200M: 4 projects

- $50 - $100M: 4 projects
- $10 - $50M: 8 projects
- $2M - $10M: 8 projects (part of the small project pilot program)

Additional details regarding WSDOT's design-build program are provided in Attachment A.

1.2 Evaluation Approach

To evaluate WSDOT's use of design-build project delivery, the consultant team assessed the extent to which WSDOT is realizing the perceived advantages of design-build. Key advantages of design-build, as identified in the Task 1 white paper, include contractor innovation, time savings, costs savings, and improved risk allocation.

To perform the assessment, the team evaluated performance data for six substantially complete WSDOT design-build projects as identified in Table 1 below.

Table 1. WSDOT DB Projects Reviewed as Part of this Study

Project	Region	Final Contract Value	Substantial Completion Year
US 2/Rice Road Intersection Safety Improvement	Northwest	$2,410,519	2012
I-5 Skagit River Bridge Permanent Bridge Replacement	Northwest	$7,139,139	2013
SR 167 Puyallup River Bridge Bridge Replacement Project	Olympic	$27,331,648	2015
I-5 et al., Active Traffic Management System	Urban Corridors (NW)	$37,021,000	2011
I-405/I-5 to SR 169 Stage 2 Widening and SR 515 Interchange Project	Northwest	$84, 650,000	2011
SR 520 Eastside Transit and HOV Project	Urban Corridors (NW)	$364,131,001	2015

These projects were selected to obtain a representative cross-section of WSDOT experience, considering the following criteria:

- Project size (small, medium, large)
- Project type (roadway, interchange, bridge, active traffic management system)
- Region (NW, Olympic)
- Program (e.g., 520, 405, small project)

In addition to reviewing the available project data and documentation, the team conducted in-depth interviews with the project managers for each of these projects, focusing on the following key evaluation areas:

- Agency organization, culture, and staffing
- Training
- Communication
- Delivery method selection
- Project development (scoping, performance specifications, etc.)
- Procurement (delivery options, procurement approach, stipends, ATCs)
- Management of risk, scope, budget and schedule
- Contract administration (oversight of design and construction)
- Lessons learned and performance outcomes

Summaries of these project interviews are provided in Attachment B.

To supplement this largely qualitative assessment of WSDOT's project performance, the team also compared select project performance data (e.g., cost growth, number of change orders) to that of comparable projects delivered by other DOTs (as retrieved from an FHWA database of design-build projects).

1.3 Evaluation Results

1.3.1 Were the perceived benefits of design-build realized?

The Task 1 white paper identified several advantages and disadvantages related to the use and implementation of design-build, as summarized in Table 2.

Table 2: Advantages and Disadvantages of Design-Build

Advantages	Disadvantages
• Contractor innovation • Early contractor involvement • Owner not at significant risk for design errors • Less owner coordination of A/E and contractor • Time savings and often cost savings • Earlier cost and schedule certainty • Improved risk allocation	• Reduced owner control over design process • Time and effort to run a 2-step competitive procurement process • Personnel learning curve - changes in roles and responsibilities requiring different levels of training for owner and industry • Potential higher initial costs (i.e., contractor risk pricing) • Standard contract administration practices may conflict with expedited delivery • Fewer opportunities for smaller contractors with limited resources to serve as prime contractors

Table 3 summarizes where these advantages were realized (or not realized) on the projects reviewed; while Table 4 summarizes where the potential disadvantages did (or did not) create challenges for the WSDOT project teams. It should be noted that all six of the projects selected for review were delivered before the PDMSM was implemented. For at least two of these projects, staff indicated that in hindsight, design-build might not have been the best delivery option because of the projects' advanced level of design, limits on innovation, or other project constraints.

Table 3. Were the Advantages of Design-Build achieved on the Six WSDOT Projects? [1]

Potential Design-Build Advantages	US 2/Rice Road Intersection Safety Improvements	I-5 Skagit River Bridge Permanent Bridge Replacement	SR 167 Puyallup River Bridge Replacement	I-5 et al. Active Traffic Management System	I-405/I-5 to SR 19 Stage 2 Widening and SR 515 Interchange Project	SR 520 Eastside Transit and HOV Project
Achievement of Project Goals	Yes	Yes	Yes	No	Yes	No
Contractor innovation	No	Yes	Yes	No	Yes	No
Time savings	Yes	Yes	No	No	Yes	No
Cost savings[2]	No	Yes	No	Yes	Yes	Yes
Earlier cost and schedule certainty	No	Yes	No	Yes	Yes	Yes
Improved risk allocation	Yes	Yes	Yes	Yes	Yes	Yes

1. A "yes" indicates that the advantage was realized; whereas a "no" indicates the advantage was not realized.

2. Cost savings were evaluated by comparing bid prices to the Engineer's Estimates. A "yes" indicates that the Engineers estimates were higher than the contract award.

As reflected in the above table, WSDOT achieved mixed results on these design-build projects in terms of meeting specific project goals and the advantages of design-build identified in the Task 1 white paper:

- The goals for the sampled projects included minimizing work zone impacts to the public, delivering quality designs, safety enhancement, managing geotechnical conditions, and time savings. The projects generally met the project goals with the exception of the I-5 ATMS where the staff reported that minimizing traffic impacts was not an appropriate goal for the project (whereas innovation should have been a goal); and for the SR 520 project, the time savings goal was not realized.

- Innovation was realized on three out of five projects. One of the five projects, the US 2/Rice Road Intersection Safety Improvements, was a small ($2.4M) design-build project providing contractors with little opportunity for innovation given the advanced level of design at the time of bid.

- Three out of six projects realized time savings. Delays to the SR 520 were primarily caused by owner design changes, the most significant were a change to retaining walls attributed in part to unforeseen geotechnical conditions and a change to screening/noise wall designs. Delays to the I-5 Active Traffic Management project were caused by changes to technology specifications and scoping for message signs.

- Four of the six projects recorded costs savings (based on a comparison of the WSDOT Engineer's estimate to the final payment amount).

- Early cost and schedule certainty (i.e. compared to traditional bid-build delivery) was reported for four of six projects.

- Improved risk allocation is considered a benefit of design-build for all six projects. Unlike typical bid-build projects, the design-build process systematically assesses risks, then uses the design-build risk matrix to allocate risks to the party best able to manage - either the owner or the design-builder.

Table 4. Were the Disadvantages of using Design-Build Delivery observed on the six WSDOT projects? [1]

Potential Design-Build Disadvantages	US 2/Rice Road Intersection Safety Improvements	I-5 Skagit River Bridge Permanent Bridge Replacement	SR 167 Puyallup River Bridge Replacement	I-5 et al. Active Traffic Management System	I-405/I-5 to SR 19 Stage 2 Widening and SR 515 Interchange Project	SR 520 Eastside Transit and HOV Project
Reduced owner control over design process	No	No	No	Yes	No	Not discussed
Time and cost to run competitive 2-step procurement process	Yes	No	Yes	No	Yes	Not discussed
Potential higher initial costs (i.e., risk pricing)	No	Yes	No	No	No	No
Parties assume different and unfamiliar risks (learning curve)	Yes	Yes	Yes	Yes	Yes	Yes
Standard owner practices conflict with expedited delivery	No	No	No	No	No	Yes
Fewer opportunities for smaller contractors	No	No	No	No	Yes	No

1. A "yes" indicates that the potential disadvantage of design-build created challenges for the WSDOT project team. A "no" indicates that the potential disadvantage did not create any issues.

There were two potential design-build disadvantages that the respondents generally agreed were issues for the six WSDOT design-build projects. The first was inexperienced WSDOT staff being challenged by the differing roles and responsibilities on a design-build project. This learning curve disadvantage is common with many DOT design-build programs until they mature and develop a core of experienced design-build staff.

The second disadvantage was the time and cost to run a competitive two-step procurement process. Though perceived as a disadvantage on three of the five projects, in part due to the time and resources required for the ATC process, both DOTs (including WSDOT) and the industry agree that ATCs and one-on-one meetings are effective procurement tools to improve project outcomes, and the benefits outweigh the disadvantages.

Reduced owner control over design was not seen as a challenge by the project managers interviewed for these projects with the exception of the I-5 ATMS project. For this project, the WSDOT PE concluded that

this technology-driven project was not an ideal candidate for design-build in the sense that greater owner control and prescription would have resulted in a better outcome (i.e. fewer design changes).

Aside from the I-5 Skagit River Bridge emergency project, bid pricing was lower than the Engineer's estimates; however it is possible that favorable market conditions were a factor in this outcome. Only one project (I-405) perceived that there may have been issues with opportunities (or lack thereof) for smaller contractors.

1.3.2 How do WSDOT's project performance metrics compare to other DOTs?

To further evaluate project performance, a comparison was made with WSDOT design-build projects in the six sample projects to data from 115 DB projects in a larger Federal Highway Administration (FHWA) database across the country. The evaluation addressed the following performance metrics: cost growth, schedule growth, and number of change orders. The cost growth assessment focused on three different metrics: 1) Engineer's Estimate to Award, 2) Engineers Estimate to Final Payment, and 3) Award to Final Payment.

1) Engineers Estimate (EE) to Award – WSDOT is consistently higher than similar projects nationally

Comparing the EE to actual award (bid) prices, completed WSDOT DB projects were compared with data from a larger FHWA sample of 115 DB projects. Based on the results shown in Table 5 below, all the DB projects realize some level of award savings (comparing the Engineers Estimates (EE) to the award or bid prices). For the national FHWA database, the average award savings was 5 to 7%. For the WSDT 29 project sample, the average award savings was approximately 17%.

Table 5. Analysis of Average Award Savings Compared to Engineers Estimate [Source: Preliminary Findings for FHWA DFTH61-13-C-00024]

Project Sample	Project Type	# of Projects	Average Savings (-percent %)
FHWA	DB/Low Bid	37	5%
	DB/Best Value	78	7%
WSDOT	DB/Best Value	29	16.7%

Thus, the award savings (17%) for the WSDOT DB projects was approximately 2-1/2 times higher on average than the larger FHWA data set (5 to 7%). This indicates that the WSDOT estimates for design-build projects are much more conservative than the national average estimates for design-build, and WSDOT could benefit by examining the reasons for this difference. Apart from using conservative estimating practices that builds more risk (contingency) pricing into estimates (i.e. CVEP), market conditions could also play a role (i.e. more favorable bids at the time the estimates were made).

2) Engineers Estimate to the Final Payment Amount – WSDOT is consistently higher than similar projects nationally

Similarly, comparing the EEs to final payment amounts (accounting for cost growth during construction), WSDOT's relative savings for the sampled projects was still on average higher than the national averages. For the FHWA database (with 114 design-build projects reporting data), the savings (EE to final payment amount) was approximately 2% on average. For the WSDOT DB sample, the savings was approximately

12%, on average. Thus, the WSDOT savings was again significantly higher compared to the averages in the larger FHWA database, indicating that WSDOT could benefit from examining the reasons for the higher EEs.

3) Award to Final Payment Amount

Comparing award to final costs, 24 WSDOT design-build projects that reached substantial completion as shown in Table 6 were compared to average cost growth from the FHWA database for 114 projects.

Table 6. Analysis of Cost Growth for 24 WSDOT DB Projects

Project Sample	Project Size ($M)	# of Projects	Average Cost Growth (%)
WSDOT	$0-20M	7	9%
	$20-100M	9	4.6%
	>$100M	8	9.6%
	All Projects	24	7.5%
FHWA	DB/Low Bid	36	4.02%
	DB/Best-Value	78	3.95%

The data in the 24 WSDOT DB project sample in Table 6 indicated that the average cost growth (award to final payment percent change) was approximately 7.5%. The national average cost growth for DB projects was approximately 4%, slightly lower than the WSDOT average cost growth.

The national database did not have a comparable breakout of cost growth data based on project value. It did show that on the whole, the average percent cost growth for design-build is slightly less than for bid-build.

Schedule Growth

Consistent schedule metrics were not available to compare WSDOT design-build projects with similar design-build projects outside of WA. As noted in Table 3, schedule savings were realized for three of the six WSDOT DB projects. This mixed result was similar to the national FHWA findings also showing mixed results (i.e. both schedule savings and growth for different design-build categories). In a broader context, however, the FHWA data showed reduced average schedule growth for design-build compared to traditional bid-build projects.

Change Orders

The team was unable to reach a meaningful conclusion regarding the impact of change orders for WSDOT DB projects. Though the number of change orders were somewhat higher for WSDOT projects than for projects outside of WA, a more meaningful metric would be a comparison of the relative cost growth for different categories of change orders (i.e. owner-directed, unforeseen conditions, errors and omissions, etc.). These change order categories were not consistently provided in the sample of WSDOT design-build projects. Thus, no conclusions can be made from reviewing this data aside from the observations made by the WSDOT project engineers addressing the causes of specific change orders.

2. Comparison of WSDOT's Use of Design-Build to Industry Best Practices

To evaluate WSDOT's current practices, the consultant team reviewed relevant reports, policies, legislation, contract documents, and other appropriate material related to WSDOT's use of design-build project delivery. Additional feedback was obtained through interviews conducted with WSDOT staff and industry representatives. Based on this information, the consultant team compared WSDOT's current practices to the best practices identified in the Task 2 white paper to assess the degree to which WSDOT:

(1) is in alignment with industry best practices (yes),

(2) is working towards improving practices (partial), or

(3) requires improvement to bring practices into alignment (no).

Table 7 summarizes the results of this assessment. An analysis of WSDOT's current practices compared to DBIA's design-build best practices and the leading practices adopted by other DOTs for transportation projects will be provided in Task 4. The document entitled "Design-Build Done Right: Design-Build Practices" with Transportation Sector implementing techniques published by the Design-Build Institute of America (DBIA), will serve as the key benchmark for DBIA best practices. This document includes both universal implementing techniques and implementing techniques specific to the transportation sector. Task 4 document will also identify where DBIA and DOT best practices are in alignment and where they diverge.

Table 7. Evaluation of WSDOT DB Compared to Industry Best Practices[1]

Element	Transportation Industry Best Practices	Alignment with Best Practices	What is WSDOT doing well?	What could WSDOT Improve?
Organization and Staffing	• Dedicated staff at HQ assigned to DB Program including technical support • Core DOT DB staff for Project Management (PM)	Partial	• WSDOT has dedicated staff and Assistant State Construction Engineers (ASCE) at HQ • WSDOT recognizes need for more formalized training developed and implemented by HQ • WSDOT's goal is to develop sustainable workforce for DB program and supplement with consultant staff	• Supplement HQ DB staff – possibly with additional in-house or consultant technical staff experienced with DB • Extend training and mentoring for DB to WSDOT regional staff • More competitive salary structure needed to attract, train, and retain qualified staff
Training	• Standardized basic and advanced DB training programs	Partial	• WSDOT has developed some level of DB training programs within regions and programs to advance DB. • WSDOT has developed very specific training for evaluation of proposals for specific projects or corridors, but it has not been widely disseminated.	• Develop standard formalized HQ DB training programs and workshops for all Regions. WSDOT currently lacks formalized state-wide training. Training efforts have been mostly ad hoc, with staff learning on the job through mentoring efforts of experienced Project Managers. • Develop statewide training for day-to-day DB project execution • Expand mentoring, shadowing, and/or peer-to-peer exchanges • Tie DB training to career development and develop a strategy to retain experienced WSDOT staff

[1] Alignment with best practices (as designated by a "yes" response in the table) indicates that WSDOT's practices are well established, aligned with best practices, formally defined (e.g., project delivery method selection) and encouraged by WSDOT. "Partial" alignment means that WSDOT is working towards improving practices or promoting consistency. "No" alignment means that WSDOT is currently not implementing what is perceived as an industry best practice.

Element	Transportation Industry Best Practices	Alignment with Best Practices	What is WSDOT doing well?	What could WSDOT Improve?
Programmatic Documents and Guidance	• Standard DB Contract Templates • DB manual • Project Delivery Selection Guidance • Collaboration with Industry	Partial	• WSDOT recognizes the need for standard DB contract templates and is currently updating its DB templates (Books 1 and 2) and guidance manual. The original DB guidebook, developed at the outset of its program (2004) was one of the first in the industry. • WSDOT has developed detailed Project Delivery Method Selection Guidance (PDMSG)	• Develop an updated DB guidance manual to provide more detailed guidance for the procurement and administration of DB projects, and to supplement existing design and construction policy manuals. The current DB guidance manual is outdated and limited to planning and development. • Provide additional resources in the short term to support the development of DB guidance manual
Performance Tracking	• Track DB project cost, time, change orders, etc. to sustain program	No	• Metrics are tracked for all projects (in Spell out first (CCIS) • Construction audit tracking system (CATS) is used on DB projects to measure non-conformances, cost growth, etc.	• Develop more systematic evaluations and performance tracking specifically for DB projects (and DB teams) to compare with standard bid-build projects. Although it is possible to mine data, there is not consistent implementation or analysis of CATS information. • Develop specific DB tools and processes to help staff evaluate and manage the performance of the Design-Builder during the execution of the contract, not just after. • HQ or others should create project report cards to evaluate the extent to which the project met performance goals, as well as DB team and owner performance. WSDOT has documented lessons-learned on ad hoc basis, not for all projects
Delivery Method Selection	• Selection criteria/ selection processes	Yes	• WSDOT has developed and implemented a detailed Project Delivery Method Selection Guidance (PDMSG) tool.	• As WSDOT delivers DB projects moving forward, it should evaluate the success of the selection decisions based on PDMSG and refine as needed.

Element	Transportation Industry Best Practices	Alignment with Best Practices	What is WSDOT doing well?	What could WSDOT Improve?
Scoping	• Clarify what can and can't be done to meet requirements • Scope should be developed by core group of experienced DB staff	Partial	• WSDOT modifies the standard project development process for DB • Mission of HQ is to provide policy and guidance for regions/programs for DB project development. This policy and guidance will address effective scoping for DB in the DB Manual	• Provide training and guidance for WSDOT staff regarding DB scoping requirements for different project elements and requirements. For example, this guidance should include when to use performance versus prescriptive requirements and level of design required. There is considerable latitude in how the regions modify the standard bid-build project development process for DB.
Performance Specifications	• Project goals inform level of design and use of performance as opposed to prescriptive specifications	Partial	• WSDOT's RFP documents for DB include performance criteria/measures. Performance criteria are generally used much more for DB projects.	• Address appropriate use of performance specifications in the DB manual and provide guidance in a formalized training program
Procurement Options	• Allow for procurement flexibility for small projects, such as US 2, Rice Road	No		• Develop a streamlined process for procurement of small projects (i.e. a one-step process) where time savings is the primary driver. WSDOT currently uses 2-step best-value approach for procurement of all DB projects, which is not as efficient for smaller projects.
Best-Value Selection criteria	• Appropriate technical criteria and weightings • Use of risk criteria	Partial	• Procurement process is well understood and WSDOT asks for a reasonable level of detail in best-value solicitations.	• Provide guidance in DB manual on alignment of objectives and selection criteria, and weightings that provide meaningful distinctions between proposers • Use project risks and risk mitigation strategies in selection criteria

Element	Transportation Industry Best Practices	Alignment with Best Practices	What is WSDOT doing well?	What could WSDOT Improve?
Alternate Technical Concepts	• Use ATCs for innovation and improved performance	Yes	• WSDOT has a mature ATC process and routinely encourages proposers to submit ATCs	• Consider two categories of ATCs. Cost value ATCs (the current equal to or better strategy), and Cost Reduction ATCs (where the cost savings does not significantly reduce performance, or impact safety or quality) • Consider streamlining approval process for smaller or less complex projects
Stipends	• Provide appropriate stipends for more substantive technical proposals • Advertise stipend in RFQ	Yes	• WSDOT routinely offers stipends that are consistent with transportation industry practices (i.e. typically 0.1- 0.3% of the estimated project costs)	• Consider increasing stipends for projects where greater technical effort (allowing for more differentiation among technical proposals) is desired
DB Delivery Strategies	• Use different DB delivery strategies to achieve goals o Bundled DB o DB w/ optional scope • Different DB delivery strategies combined with procurement flexibility improve DB delivery efficiency within a fixed budget.	Partial	• WSDOT is receptive to using different delivery strategies to achieve project goals. It has used DB with optional scope.	• WSDOT should use bundled DB for work items with similar scope, permitting, and design requirements to achieve economy of scale and delivery efficiency • WSDOT should use DB with options (i.e. most scope or best design for defined budget). This approach is effective where the owner seeks creative solutions from industry for design solutions or maximum scope within a not-to-exceed budget.

Element	Transportation Industry Best Practices	Alignment with Best Practices	What is WSDOT doing well?	What could WSDOT Improve?
Risk Allocation/ Management	• Early identification, assessment, and allocation project risks to party best able to manage	Partial	• WSDOT has very mature risk assessment process in place for estimating and scheduling (i.e. CVEP). • WSDOT has an established risk allocation matrix for DB, developed in collaboration with industry	• Implement training and guidance for risk management and use of updated risk register to manage and mitigate risks throughout the project. All large WSDOT projects require a risk assessment to establish Engineer's estimate and develop a risk register as part of project development. It was not evident from interviews whether risk management processes and tools were consistently being used to manage risk during the project.
Design Administration	• Co-location of key project staff (DOT and industry) • Administrative processes/ timelines for design submittals and reviews to meet DB production schedule • Review for compliance with contract requirements	Partial	• WSDOT HQ and the Puget Sound regions with significant DB programs, understand benefits of co-location and the changed roles and responsibilities for design reviews.	• Provide specialized training for WSDOT design staff on changed roles and responsibilities for design reviews. More staff need design administration training and exposure to DB projects to meet the needs of the program. • Address effective DB design review processes in DB manual
Construction Administration	• Administrative processes/ timelines for testing, inspection, responses to support DB production schedule • Formal partnering and communication to enhance collaboration	Partial	• WSDOT DB staff are committed to partnering and effective communication and collaboration during the construction phase.	• Implement specialized training for WSDOT construction and inspection staff on changed roles and responsibilities regarding, inspection, quality verification, responses to request for information/clarification, change management, payment, and documentation requirements. • Address effective construction and quality management oversight for DB in the DB manual

Budgeting

At the suggestion of WSDOT HQ, the team reached out to a representative from the Eastern Region, and followed up with the Director of the WSDOT Capital Program Development office regarding the project funding mechanisms for the "Connecting Washington" program.

The Eastern region is typically appropriated funding by the Legislature for each biennium. Of four projects in the region slated for Connecting Washington Act (CWA) funding, it appears that two have enough funding for design for a given biennium, with construction money slated for the next biennium. Whereas the other two projects have funding for design and some construction during the first biennium, with additional construction appropriations occurring in the succeeding biennia. The legislative staff indicated that there are mechanisms in place for WSDOT to advance funding or change project timing through the normal budgeting process.

The Eastern region indicated is very open to using alternative delivery (DB) but it has to be the right project and the financing has to be structured for its use (i.e. full project funding). The region has used the new PDMSG tool and has identified a potential project (or projects) suitable for DB.

In follow-up discussion, the WSDOT Capital Program Office Director explained that in the prior legislation (Nickle and TPA) and the current the CWA legislation, the conditions in the law and policy necessitated caps or limits on how much can be spent in a given biennium. These caps or limits are addressed in a Maximum Rate of Payment specification incorporated into selected construction contracts. Funding constraints of this type can constrain the ability of the design-builder to expedite design and construction activities to their full potential.

The legislative staff pointed out that the maximum rate of payment was not specifically required by legislation or policy. WSDOT provided the project list and priority used to develop the appropriations schedule. The CWA projects were based on cash-flow availability with feedback from WSDOT on how individual spending should be aged and phased. The delivery method was not considered or mandated through this project list. Again, the staff pointed out that appropriations can be adjusted each fall when WSDOT submits a new (or adjusted) Capital Plan. The team will further evaluate these issues and provide follow-up recommendations.

3. Conclusions

This summary of WSDOT's current design-build program, including the responses from the WSDOT staff and industry, resulted in a number of general findings in the different topic areas investigated. This state of practice was then generally compared with design-build best practices from the Task 1 design-build benefits, Task 2 transportation design-build best practices, and DBIA best practices to determine elements of WSDOT's current practice that are in alignment with best practices, and areas where there are gaps or WSDOT is working towards improving its design-build program.

Lastly, we evaluated a sample of projects in WSDOT's design-build program to assess performance outcomes against similar design-build projects from a national FHWA database programs that is currently comparing performance metrics for design-build and design-bid-build projects. Based on these comparisons, the team will make specific recommendations for improvements to the WSDOT design-build program in Task 4.

List of Recurring Abbreviations

ATC	Alternative Technical Concept
ASCE	Assistant State Construction Engineer
CEI	Construction Engineering & Inspection
CVEP	Cost Validation Estimating Process
DBIA	Design Build Institute of America
DOT	Department of Transportation
EE	Engineers Estimate
HQ	WSDOT Headquarters
PDMSG	Project Delivery Method Selection Guidance
RFQ	Request for Qualifications
RFP	Request for Proposals