



Oregon

John A. Kitzhaber, MD, Governor

Department of Transportation
Major Projects Branch
680 Cottage St., NE
Salem, OR 97301-2412
Telephone (503) 986-4445
FAX (503) 986-4469

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TO: Matthew Garrett
Director, Department of Transportation

FROM: Jim Cox 
Assistant Branch Manager, ODOT Major Projects Branch

SUBJECT: Findings of Fact Exemption # 2006-52 Final Evaluation Report
Bundle No. 306, I-5: Weaver
Design-Build Project
Key No. 14047

The post-construction evaluation for the Bundle No. 306, I-5: Weaver Design-Build project is enclosed for your review as required by ORS 279C.355.

Use of the design-build project delivery method requires an exemption from letting the construction contract through competitive low bid (ORS 279C.335). The exemption process includes the development and adoption of findings prior to awarding the design-build contract, and a post-construction evaluation of the project.

The Bundle No. 306, I-5: Weaver project was granted exemption 2006-52 by the Director of the Department of Transportation (ODOT), under ORS 279C.335. The statute requires that the post-construction evaluation be submitted to the Director of ODOT and made available for public review. The evaluation compares the actual project results with the expected benefits of using design-build delivery method described in the adoption findings and with the estimated results had the project been delivered using design-bid-build. The results of those comparisons are summarized in the following table.

PROJECT DELIVERY RESULTS COMPARISON SUMMARY			
Factors	Exemption Findings Estimate	Actual Project Results	Hypothetical Design-Bid-Build Estimate
Cost	\$40 to \$45 Million	\$54,689,914	\$56,786,484
Duration	37 Months	46 Months	51 Months

No formal action by the Director of ODOT is required. The final evaluation report will be posted on the ODOT Design-Build website within ten business days at:

<http://www.oregon.gov/ODOT/HWY/MPB/i5w.shtml>

Enclosure: I-5: Weaver Final Evaluation Report

**Final Evaluation
For The
I-5: Weaver
Design-Build Project**
(as required by ORS 279C.355)

Project Name: Bundle No. 306, I-5: Weaver

Exemption Number: 2006-52

Contract Number: 13308

Key Number: 14047

FAP: OTIA-IM-STP-S001 (222)

Design-builder: Hamilton Construction Co.

Designer: David Evans & Associates (DEA).

Project Description

The Interstate - 5 (I-5): Weaver design-build project was located in Douglas County, between Winston and Canyonville Oregon. This project included replacing of six bridges and repairing of one bridge on I-5 between mile point (MP) 104 and MP 110. Bridge replacements and repairs were part of the statewide OTIA III Bridge Program. The new bridges were built to current design standards and now provide increased capacity for heavy loads and to accommodate future traffic capacity requirements.

I. Introduction.

On May 19, 2006 the Oregon Department of Transportation's (ODOT) I-5: Weaver design-build project received an order from the ODOT Director granting an exemption from competitive bidding to allow the use of the design-build project delivery method. ORS 279C.335(2) permits the Director of Transportation to grant exemptions to ODOT from the requirement for competitive bidding on approval of specific findings. Under ORS 279C.335(4) a public hearing must be held before the findings are adopted, allowing an opportunity for interested parties to comment on the draft findings. The public hearing was held April 28, 2006 and there were no comments received.

ORS 279C.355 requires an evaluation of the public improvement project upon its completion. The evaluation includes, but is not limited to the following matters:

1. The actual project cost as compared with original project estimates.
2. The number of project change orders issued by the public agency.
3. A narrative description of successes and failures during the design, engineering, and construction of the project.
4. An objective assessment of the use of the alternative contracting process as compared to the findings required by ORS 279.015 (now ORS 279C.335).

In the following sections, two types of comparisons are made. The first evaluation, reported in Section II, compares actual results of the project with results that would be expected on a typical design-bid-build project. The second evaluation, reported in Section III, compares actual results of the project with the expected results described in the original exemption findings. Notice-to-Proceed was issued to the design-builder on November 02, 2006 and construction was completed on September 09, 2010. Dollar amounts provided in this report are rounded to the nearest whole dollar.

II. Comparison of the I-5: Weaver Project Actual Results vs. a Typical Design-Bid-Build Project

A. Schedule and Project Duration

Under the traditional design-bid-build method ODOT obtains all environmental clearances and permits, and completes biddable final plans and specifications prior to advertising and awarding the construction contract to the lowest responsive bidder. Under the design-build contracting method, design, permitting, and construction are performed by the design-builder under one contract. Because the design-builder is responsible for both design and construction, it can begin construction before plans and specifications are finalized, and construction activities can be phased in a manner that is most efficient for the particular project.

A project equivalent to the I-5: Weaver project completed under the design-bid-build method of delivery would typically take approximately 18 months for design and 33 months for construction, rendering a total project length of 51 months, or 4 years and 3 months. Using design-build method the I-5: Weaver project, took only 46 months; from Notice-to-Proceed on November 02, 2006 to construction completion on September 09, 2010, or approximately five months earlier than the estimated duration if the design-bid-build method had been utilized. After contract award ODOT extended the completion date by nine months to add deck sealing work to the scope. Prolonged project closeout activities resulted in Third Notification being issued on June 20, 2011.

Additionally, the design-builder used fast track scheduling on this project which ultimately resulted in the project being completed on-time and constructed temporary detour bridge structures in a manner that allowed a portion of a detour bridge to be used as a construction platform, significantly reducing construction time. This allowed for the new bridges being opened to full traffic sooner than originally estimated, saving motor carriers the additional operating cost do to the lower impact to traffic mobility through the project area.

B. Costs

The following tables provide actual change order costs and a comparison of actual project costs utilizing the design-build contracting method with what would have been expected under the design-bid-build method, based upon ODOT historical experience.

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The actual total construction cost for the project was \$51,774,996, inclusive of change orders, as enumerated in the below table. (Change order amounts in parenthesis are cost savings)

Base contract amount: **\$ 51,292,855**

Change Order Item	Amount
Payment for TPN	\$ 4,156
8% Contractor Administration Cost	\$ 665
Design-builder provided design exception 16' 7" VC	\$ 7,057
Design-builder provided design exception Superelevation	\$ 7,057
Revised Exhibit 8 Engineering Data, Repair Exp J	\$ 40,139
Addition of superset extender for curing desk	\$ 140,160
Reimbursement to ODOT for Roadway Safety Operator	\$ (1,122)
Riddle interchange flatwork	\$ 12,776
Median barrier	\$ 78,854
Safety railing	\$ 21,730
Credit to ODOT for paving shoulders	\$ (22,099)
Credit to ODOT for rumble strips	\$ (4,667)
Credit to ODOT doe permanent stripe	\$ (19,539)
Credit to ODOT for Boomer fence	\$ (9,968)
Markup on labor-excluding median barrier	\$ 158
Markup on material-excluding median barrier	\$ 4,245
Markup on subcontractor work	\$ 643
Markup on median barrier material	\$ 4,438
Riddle INTCHG/Pruner Rd bridge (20628) seal BR	\$ 28,683
NB S Umpqua Ricer bridge (20611) bridge seal BR	\$ 69,930
SB S Umpqua Ricer bridge (20612) bridge seal BR	\$ 70,140
CORP bridge (20303) Seal BR Deck	\$ 31,613
Boomer Hill bridge (20717) Seal BR Deck	\$ 19,900
Price reduction for failed CONC testing	\$ (2,730)
Missing cylinder break	\$ (75)
Total Change Order Amount	\$ 482,144

Base contract amount plus change orders: **\$51,774,999**

For the cost comparison below we also add the change order cost increase to the design-bid-build estimate and use the following assumptions:

- Fifteen percent (15 %) of the change order cost is related to design/engineering, a common percentage in the industry, and the remainder to construction.
- The change orders would have been issued in a design-bid-build project.

Actual Costs Under Design-Build Method vs. Estimated Cost Under Design-Bid-Build Method

Estimated Cost for Hypothetical Design-Bid-Build Delivery:	Amount
Design (15 % of Construction Value)	\$ 6,496,655
Environmental/Permitting (5 % of Construction Value)	\$ 2,165,552
Construction Value	\$ 43,311,030
ODOT Construction Engineering/Construction Management (10 % of Construction Value)	\$ 4,331,103
Change Order Costs (Source - CCO Table Total)	\$ 482,144
Total Estimated Cost:	\$ 56,786,484
Actual Cost for I-5 Weaver Design-Build Delivery:	
Amount	
ODOT Preliminary Design and partial Permitting	\$ 1,037,670
Final Design and partial Permitting - Design-Builder (Design Services)	\$ 7,981,825
Construction (Construction & Engineering Services)	\$ 43,311,030
ODOT Project Management	\$ 1,877,245
Change Order Costs (Source - CCO Table Total)	\$ 482,144
Total Actual Cost :	\$ 54,689,914
Difference between Hard Bid (Design-Bid-Build) and Design-Build in Total Cost Savings:	\$ 2,096,570

The construction value assigned to the hypothetical design-bid-build project uses the actual design-build construction cost for the project. It does not include adjustments for inflation. If inflation is factored in and attributed to the time period difference between actual completion of the design-build project versus the time the hypothetical design-bid-build project would have concluded, the difference in cost grows wider. The hypothetical design-bid-build cost for design, construction engineering/management and environmental/permitting were calculated using percentages of construction cost. Those percentages were developed by ODOT based on experience and history and are commonly used to develop project estimate.

C. Conclusion

The use of design-build contracting resulted in the I-5: Weaver project being opened for public use about five months earlier than it would have been anticipated under the design-bid-build contracting method. Also of note, the design-builder's overall innovative approach to design, staging traffic control and construction methods allowed the design-builder to incorporate the additional work and site changes and minimize impacts to project schedule and budget. Design-builder utilized temporary detour

structures that accommodated oversized vehicles and maintained over-dimensional loads, minimizing impacts to motor freight carriers.

The actual total cost of the project was \$54,689,914, when compared to the estimated cost for delivery of the project using design-bid-build of \$56,786,484 ODOT realizes an estimated cost saving of \$2,096,570. The calculated amounts in the above Actual Costs Under Design-Build Method vs. Estimated Cost Under Design-Bid-Build Method table indicate a cost savings of approximately 4% in comparing actual design-build cost with estimated design-bid-build cost.

This does not take into account the cost efficiencies and savings resulting from construction acceleration using design-build as compared to the traditional design-bid-build delivery method.

III. I-5: Weaver Actual Project Results vs. Estimated Results Stated in the Original Exemption Findings

In this section the actual project results are compared to the original estimated project results in the exemption findings for the I-5: Weaver project.

A. Project Successes.

Successes experienced on the I-5: Weaver project were:

1. On Time Completion – After award, ODOT moved the completion deadline approximately nine months to compensate for additional work for deck sealing. The exemption findings estimated 37 months for project completion, with the nine month extension the estimated project completion date adjusts to 46 months. Actual completion took 46 months. The project completed on time as scheduled in the amended contract.
2. Direct Cost Savings – The exemption order for this project estimated a maximum direct cost savings of \$600,000 in utilizing design-build method versus design-bid-build. In comparison of actual project cost with estimated design-bid-build cost, the project achieved a direct cost savings of about \$2,096,570 or more than three times than the savings estimated in the exemption order.
3. Innovations:
 - a. Mobility – Design-builder utilized historical and real-time traffic volume data to develop alternative routing methods which included, ramp detours, level flagging efforts and lane shifts to maintain steady traffic flow. Design-builder coordinated with the Regional Operations Center to communicate and assess potential impacts to traffic flow.
 - b. Construction Methods – Design-builder constructed temporary detour bridge structures in a manner that a portion of the detour bridge could be used as a

construction platform, significantly reducing the need for work bridges and cost associated with work bridges.

Design-builder designed certain bridges to have adjacent pre-cast slabs and poured the concrete bridge decking directly on the slabs. This method significantly reduced the need for on-site construction forming between beams and bridge construction time.

- c. Traffic Control – Design-builder utilized wireless traffic monitoring systems to measure real-time traffic volumes. The Traffic Control Supervisor was able to make on the spot adjustments to traffic control devices and methods, maximizing efficiency in traffic movement and decreasing the number of vehicles held up in traffic queues and construction related traffic impacts to local residents, commuters and commerce.
- d. Value Engineering – Just prior to bid letting ODOT discovered that one of the bridges scoped for repair had additional structural issues that mandated replacement of the bridge. After contract award the design-builder's team absorbed the site change and additional work while maintaining original contract timelines by adapting scheduling, staging and construction resources and activates, creating innovative design solutions within a short time span.
- e. Environmental Stewardship:

- (1) Design-builder worked closely with Regulatory Agencies, including Oregon Department of Fish and Wildlife and provided site tours during construction activities such as demolition drilled shaft work, and fish salvage. Weekly on-site inspections were held to ensure environmental permit compliance.

Design-builder used environmentally friendly vegetable oil in pile hammers that were used over waterways.

- (2) The contract included up to \$50,000 available as an Environmental Excellence Award. The award to the design-builder of \$18,000 represents recognition for excellence in the following areas.
 - (a) **Habitat Enhancement** – for incorporating additional bat house into the South Umpqua Bridge, enhancing the habitat above ODOT expectations.
 - (b) **Protection of Regulated Areas** – for the use of bio-fuel in pile hammer, reducing potential impact to environmental sensitive water way.
 - (c) **Implementation of Protective Design Features** – for openness in communicating with the regulatory community significantly improving the regulatory agencies view on the deign-builder's ability to reduce impacts to low quality jurisdictional features.

(d) **Restoration–Document** – for constructing a bioswale that provided an additional year of water quality treatment.

4. Awards: ODOT and the design-builder's team placed second in the Daily Journal of Commerce's 2010 Top Projects public works/infrastructure/transportation - \$50.1M to \$100M category. Projects were rated on the following:
 - How well the project fulfills its intent.
 - How well challenges and obstacles were overcome.
 - How well the project finished with regard to budget and timeline, and overall quality of work.
5. Claims Avoidance –There were no claims filed against this project. The design-builder cooperated well with ODOT in resolving several very difficult situations involving third-party impacts on the project that required significant changes in the Design-Builder's plans.

B. Project Failures - There were no failures identified specific to the use of the design-build method for this project. The following project issues should be evaluated by ODOT for possible impacts and ways to avoid them for future bridge projects.

1. Availability of compensatory wetland mitigation for unavoidable wetland and waters impacts – ODOT planned on utilizing the Comprehensive Mitigation Conservation Strategy (CMCS) program or Cow Hollow Mitigation Bank, the only mitigation bank in Region 3 to compensate for impacts by the project. Neither of these compensatory methods was available after contract award. ODOT and the design-builder had to spend additional effort to research and develop an alternative mitigation strategy. The Cow Hollow Mitigation Bank became available as permit applications were being finalized, allowing the design-builder to proceed with previously approved methods and approaches and, maintain project schedule.

C. Comparison to Original ORS 279.103 Exemption Findings. The comparisons made in this section are between the original findings presented in support of an exemption for the I-5: Weaver project and the actual design-build project performance.

1. Impact on Competition – In the original exemption findings ODOT suggested that there would be no impairment of competition under a solicitation process utilizing technical and price-based evaluation and selection factors, as many firms had expressed interest in the I-5: Weaver project. In fact, two design-build teams submitted statement of qualifications and two design-build teams proposed on this project, resulting in a competitive procurement.
2. Net Cost Savings – In the original exemption findings, ODOT presented data from national studies that indicated cost savings could be expected in several areas through utilization of the design-build project delivery method when compared to the traditional design-bid-build method. ODOT concluded that if

Oregon experienced similar results by eliminating the separation between design and construction phases, it could expect to realize a total savings of approximately \$600,000. Actual project savings exceeded the original exemption findings estimated savings by about \$1,497,000.

3. Schedule Changes – Additional work for deck sealing extended final contract completion date by approximately nine months.

IV. Summary

In conclusion, the I-5: Weaver project met or exceeded the expectations presented in ODOT’s original exception findings; this supports the granting of an exemption from competitive bidding. The project demonstrated that the design-build method saves ODOT time and money for construction projects as compared to traditional design-bid-build method.

The project was completed on time, within the timeline estimated in the exemption findings, with no construction contract claims. Whether evaluating the project on the basis of comparisons to a comparable design-bid-build project or expectations contained in the original exemption findings, the design-build delivery method implemented on the I-5: Weaver project saved ODOT significant dollar amounts.

PROJECT DELIVERY RESULTS COMPARISON SUMMARY			
Evaluation Factors	I-5: Weaver Project (Design-Build) Exemption Findings	I-5: Weaver Project (Design-Build) Actual	Hypothetical (Design-Bid-Build) Estimated
Project Cost	\$40 to \$45 Million	\$54,689,914	\$56,786,484
Project Duration	37 Months	46 Months	51 Months

The public benefited from this project through improved safety by increasing both the flow of traffic and increased allowable load capacities for interstate commerce along this portion on the interstate highway system.