OREGON DEPARTMENT OF TRANSPORTATION

Final Evaluation Report
A+C+D Best Value/Multiple-Parameter Bidding Project

for the

I-84: Sandy River – Jordan Road Bundle 210 Project
Vietnam Veterans Memorial Highway
Multnomah County

Key Number: 14032
ODOT Contract Number: 14165
Exemption Number: 2009-03

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1 – Introduction

1-1: Purpose

This post construction report is an end of construction evaluation of the best value A+C-D bidding method for the Interstate 84 (I-8): Sandy River – Jordan Road Bundle 210 project (I-8: Sandy River – Jordan Road Project). The Oregon Department of Transportation (ODOT) submits this final evaluation report under the provisions of Special Experimental Project No. 14 (SEP-14) for the use of the best value Price (A) Plus Technical Qualifications (C) Plus Technical Approach (D) (A+C+D) bidding method for transportation projects. The purpose of this final evaluation report is to fulfill the reporting requirements of the Work Plan for SEP-14 regarding the evaluation of the best value A+C+D bidding method as provided by ODOT to the Federal Highway Administration (FHWA) on November 25, 2009.

This final report includes a brief scope of the project, a brief history of the contracting process, and summary evaluation of project innovations, along with suggestions, lessons learned, and recommendations pertaining to the use of the best value A+C+D bidding method on other projects.

2 – Background

2-1: The Project

The I-8: Sandy River – Jordan Road Project consisted of the replacement of two (2) bridges (06875 and 06875A) and the repair of two (2) bridges (06945 and 06945A) on I-84 in Multnomah County. Two (2) of the project's bridges span the Sandy River, which is a sensitive environmental area.

The project also had several complicated construction constraints and technical requirements that required the contractor to have specialized expertise in designing and constructing the I-8 bridges with steel box girders and drilling eight (8) foot diameter shafts with post-grouting. Neither of these methods is commonly used in Oregon. In addition, the contractor successfully staged construction work within the six-week in-water work windows.

After contract award, ODOT identified the need to mitigate the risk of increased flood elevations that would significantly impact communities along the Sandy River. In order to minimize potential flooding, ODOT determined that the construction methodology would be revised to eliminate the number of temporary work bridges and detour structure piles placed in the Sandy River.

2-2: A+C+D Bidding

ODOT utilized the best value A+C+D bidding method to address project needs by evaluating components, which include the contractor's technical qualifications and technical approach, as well as price, which results in ODOT selecting the prime contractor that provides the best value. This procurement method encompasses the Oregon Legislature's focus on economic efficiency

and stimulation and provides recognition of the value to the public of employing enhanced contracting methods, which will accomplish the required work in the most effective manner.

The Oregon Department of Transportation received permission to use best value contracting in the form of A+C+D bidding method for the complicated construction constraints and technical requirements of the I-8: Sandy River – Jordan Road Project. ODOT's Director approved exemption Number 2009-03 to the low bid process on November 19, 2009, as provided for in the Oregon Revised Statutes 279C.335.

Using the best value A+C+D bidding method ensured that the prime contractor had the knowledge, skills, and experience to successfully complete the complex I-8: Sandy River – Jordan Road Project.

3 – Report

3-1: Project Costs

Table 1 – I-84 Sandy River – Jordan Road Project Costs

Description	Original Authorization	Final Cost	Variance Over/(Under)
Contract Bid Items	$ 48,469,707.69	$ 42,935,929.78	$ (5,533,777.91)
Contract Change Orders	$ -	$ 14,802,547.15	$ 14,802,547.15
Extra Work Orders	$ -	$ 218,268.09	$ 218,268.09
State Force Orders	$ -	$ 13,076.39	$ 13,076.39
Anticipated Items	$ 4,440,000.00	$ -	$ (4,440,000.00)
Ajustments	$ -	$ 141,757.24	$ 141,757.24
Contingency	$ 1,696,124.76	$ -	$ (1,696,124.76)
Engineering	$ 8,574,750.00	$ 8,223,679.92	$ (351,070.08)
Totals	$ 63,180,582.45	$ 66,335,258.57	$ 3,154,676.12

3-2: Contract Change Orders

There were 68 Contract Change Orders (CCO) issued for the project to address changes in site conditions, scope and schedule and contractor methods. The cost of the CCOs was approximately 30% of the original Bid Item costs.

3-3: Extra Work Orders - ODOT utilized Extra Work Orders to authorize items of extra work that were not included in the contract, but were deemed by ODOT to be necessary to complete the project.

There were six (6) Extra Work Orders issued for the project. These were for painting Jordan Rd pedestrian tunnel, removal, and reinstallation of guardrail and pile, pole foundation demolition, deck weather sensor, roadway repair, debris removal, and reuse of detour aggregate.

3-4: State Force Orders - ODOT utilized State Force Orders to perform non-contract work through public forces.

There were three (3) State Force Orders (SFO) issued for this project. These were for USDA-APHIS wildlife services and traffic signal and illumination inspections.

4 – Conclusion

4-1 – Final Project Remarks - Summary of effects of best value A+C+D method on Project objectives:

- **Did the project deliver the high level of quality expected of a contractor team especially experienced in the work items and overall supervision of such a complex project?**

  Yes. Overall, Hamilton Construction, the prime contractor had quality subcontractors and ODOT experienced very few issues on the project, except for issues relating to manufacturing and delivery delays, weld quality, diaphragm fit-up, and variation in lengths of the steel girders, and discrepancies in record keeping by the earthwork sub-contractor. Hamilton provided superior supervision, but sometimes lacked in proper control and monitoring of their subcontractors. Communication with ODOT was good and the agency was informed of upcoming issues or problems in a timely manner that allowed issues to be solved as a team.

  - Innovations:

    To mitigate the risk of increased flood created by the original proposed construction method of placing significant number pilings in the Sandy River, Hamilton implemented an innovative "Top Down" construction method. Hamilton utilized a modified gantry crane/beam launching system, that included two (2) 100-ton hoist lifts to lunch steel girders measuring up to 165 feet across the river from shore side. By setting the beams from above the river, the project team avoided the need for a work bridge. This innovative change avoided debris backing up against work bridge pilings, which would have increased flood levels and high water impacts to the local communities.

  - Awards:

    - 2015 Top Project, Transportation Category, First Place, Daily Journal of Commerce

- **Did the project meet schedule and budget with a minimum of modifications, in particular planning and schedule based?**

  Yes, the project schedule was met, and additional work for bike path additions and changes in construction approach added time to the contract. The project competed under budget and modifications were at a normal level for this size of a project.

  - Schedule:

    ODOT originally estimated the project completion date as November 30, 2013. To compensate for new design and construction approaches resulting from a change in site

conditions ODOT changed the targeted completion date for the project to December 23, 2014. ODOT issued second notice on December 29, 2014.

- Budget:

  ODOT originally estimated $95M for total project cost. Final project cost was $66,335.258.27, approximately $29M in cost savings.

- **Did the contractor's submitted proposed technical approaches accurately reflect the approaches taken during construction to maintain schedule, budget, and other project goals?**

  Yes, Hamilton followed all of their proposed technical approaches, including the changes to deliver and utilize the gantry system for steel girder deployment.

4-2: Lessons Learned and Recommendations:

- **Lessons learned**:

  Changes at the beginning of the project with the deletion of work bridges and addition of the gantry system due to debris movement and flooding concerns should have been known prior to the start of the project. Having a more active involvement in the project by ODOT benefited the outcome and timelines in addressing issues. There were several unknown risks and manufacturing issues that revealed themselves as the project progressed, and the team worked well to address these issues and proceed in an uninterrupted manner.

- **Recommendations pertaining to the use of the best value A+C+D bidding method on other ODOT projects**:

  For this project and other projects that require very close coordination and have difficult and complex issues and technical needs, this best value A+C+D bidding method was the best choice in providing a means for ODOT to select high quality subcontractors and a prime contractor that had the knowledge and expertise need to overcome several unique challenges and deliver the project on time and within the budget.

5 – Summary

The use of the best value A+C+D bidding method accomplished the purposes stated in the Work Plan of producing a savings in time and cost for the project and enhancing ODOT's efficiency in its use of tax dollars for transportation projects and while allowing for innovation in construction methods.

APPENDICES 6-1

Final Evaluation
For The
I-84: Sandy River – Jordan Road Bundle 210
A+C+D Best Value Multiple-Parameter Bidding Project

(as required by ORS 279C.355)

Project Name: I-84: Sandy River – Jordan Road, Bundle 210

Exemption Number: 2009-03

Contract Number: 14165

Project Key Number: 14032

FAP Identification Number: IM-OTIA-S002(093)

Prime Contractor: Hamilton Construction Company

A&E: David Evans & Associates, Inc.

Section 1 – Project Description

The I-84: Sandy River – Jordan Road, Bundle 210 project (I-84: Sandy River – Jordan Road Project) consisted of the replacement of two (2) bridges (06875 and 06875A) and the repair of two (2) bridges (06945 and 06945A) on I-84 in Multnomah County. Two (2) of the project bridges span the Sandy River, which is a sensitive environmental area. I-84 is Oregon's main east – west commercial and recreational travel corridor.

The I-84: Sandy River – Jordan Road Project also had several complicated construction constraints and technical requirements that required the contractor to have specialized expertise in designing and constructing the I-84 bridges with steel box girders and drilling eight (8) foot diameter shafts with post-grouting, both these methods are not commonly used in Oregon. In addition, the contractor successfully staged construction work within the six-week in-water work windows.

Completion of the project provided motorists safe and reliable bridges that were built to current standards to provide efficient traffic flow along this important highway. The bridges were replaced and repaired as part of the Oregon Transportation Investment Act (OTIA) III State Bridge Program. The new bridges are more environmentally friendly, conform to current safety standards, and meet aesthetic requirements of national scenic areas.

Section 2. Introduction

On November 19, 2009, the Oregon Department of Transportation's (ODOT) I-84: Sandy River – Jordan Road Project received an order from the ODOT Director granting an exemption from competitive low bidding requirements to allow the use of the Price (A) component Plus Technical Qualifications (C) component Plus Technical Approach (D) component (A+C+D)

multiple-parameter bidding alternative contracting method (A+C+D Bidding Method). ORS 279C.335(2) permits the Director of Transportation to grant exemptions to ODOT from the requirement for competitive low 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 on October 9, 2009 and there was one (1) comment supporting the exemption from competitive bidding requirement.

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

1. The actual project cost as compared with original project estimates.
2. The amount of any guaranteed maximum price.
3. The number of project change orders issued by the public contracting agency.
4. A narrative description of successes and failures during the design, engineering, and construction of the project.
5. An objective assessment of the use of the alternative contracting process as compared to the findings required by 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 if the project had been a design-bid-build project. The second evaluation, reported in Section III, compares actual results of the project with the expected results described in the exemption findings.

Notice-to-Proceed was issued to the contractor on March 30, 2010 and construction was completed on December 29, 2014. The dollar amounts provided in this report are rounded to the nearest whole dollar.

Section 3. Comparison of the I-84: Sandy River – Jordan Road Project Actual Results vs. Expected Results of a Hypothetical Design-Bid-Build Project

3-1. 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 A+C+D Bidding Method, the Bidder's technical qualifications (C) component and technical approach (D) component, as well as price (A) component, are used to determine the best value bidder, which is awarded the contract. This procurement method encompasses the Oregon Legislature's focus on economic efficiency and stimulation and provides recognition of the value to the public of employing enhanced contracting methods, which will accomplish the required work in the most effective manner.

A project equivalent to the I-84: Sandy River – Jordan Road Project completed under the design-bid-build method of delivery would take approximately 70 months for construction. This estimated timeline excludes the time required for the A+C+D contractor solicitation. Using the A+C+D Bidding Method, the I-84: Sandy River – Jordan Road Project, took 57 months for construction from Notice-to-Proceed on March 30, 2010 to construction completion on December 29, 2014, or approximately 13 months earlier than the estimated duration if the design-bid-build method had been utilized. Completion of project closeout activities took longer

than anticipated but the parties successfully resolved all issues and reached agreement on the GMP, and Third Notification was issued on May 29, 2016.

To address changes in construction staging and methods in launching of steel girders and design changes ODOT added nearly one (1) year to the construction portion of the contract. In spite of the additional time required to implement the important project improvements, the project still took significantly less time than the estimated time required for the project with one bridge structure under the design-bid-build method.

Additionally, I-84 is Oregon's main east – west commercial and recreational travel corridor. Because of the lack of acceptable alternative access routes, the existing number of I-84 traffic lanes had to be maintained during construction. Work had to be scheduled, staged where possible, and prosecuted to minimize construction time and interference with traffic flow while maintaining safe driving conditions. A temporary bridge will be required in the median of I-84.

The contractor used fast track scheduling, traffic staging, and control on this project, which ultimately resulted in the project being completed on time and significantly reduced the construction time. Elimination of the work bridges and a change in delivery system for the new superstructures allowed for the east-bound and west-bound traffic to be rerouted over the new east-bound bridge two (2) lanes each direction and need for a two-lane detour structure. This change in staging and construction methods allowed for demolition of the existing bridges and construction of the replacement bridges to occur with minimal impact to the traveling public and commerce. The new bridges were opened to full traffic significantly sooner than originally estimated in the FFE and for an equivalent design-bid-build project, saving motor carriers the additional operating cost due to the lower impact to traffic mobility through the project area.

B. Costs

The information in this section provides actual Contract Change Order (CCO) costs and a comparison of actual project costs utilizing the A+C+D Bidding Method.

The final amount paid to the contractor for construction services was $58,098,503.00, inclusive of CCOs as enumerated below. There were 68 CCOs issued for the project.

Base Contract Amount:	**$ 42,935,930.00**
Total CCO Amount:	**$14,802,547.00**
Adjustments and Extra Work Orders:	**$260,023.00**
Adjusted A+C+D Bidding Method Contract Amount	**$58,098,503.00**

The following table provides a comparison of final project costs utilizing the CM/GC contracting method with what would have been expected under the design-bid-build method, based upon ODOT historical experience.

Final Project Costs Under A+C+D Bidding Method vs. Estimated Cost Under Design-Bid-Build Method

Estimated Hypothetical Design-Bid-Build Project Costs:	Estimated Amounts
Construction Cost	$ 77,815,597.00
Anticipated Items	$ 66,500.00
Contingencies	$ 12,441,665.00
ODOT Design	$ 5,062,336.00
Total Estimated Cost:	**$ 95,386,098.00**
Final I-84: Sandy River – Jordan Road A+C+D Best Value Project Costs:	**Final Amounts**
Construction Cost	$ 42,935,930.00
Adjustments	$ 141,757.00
Extra Work Orders	$ 218,269.00
State Force Orders	$ 13,076.00
Change Orders	$ 14,802,547.00
ODOT Design	$ 8,223,680.00
Final Total Cost :	**$ 66,335,259.00**
(Difference between Hypothetical Design-Bid-Build and A+C+D Bidding Method) Total Cost Savings:	**$ 29,050,839.00**

The hypothetical costs for design and construction were based on ODOT's original estimates for design and construction costs for the project. Those estimates were developed by ODOT based on experience and history on equivalent projects and are commonly used to develop estimates for design-bid-build projects.

C. Conclusion

The use of A+C+D Bidding Method resulted in the I-84: Sandy River – Jordan Road Project being completed on schedule and open for public about 13 months earlier than it would have been anticipated under the design-bid-build contracting method. The contractor's overall innovative approach to address the projects challenges and construction methods also produced minimal impacts to the site, project schedule, and budget.

Final total cost of the I-84: Sandy River – Jordan Road Project was $66,335,259.00 using A+C+D Bidding Method. The estimated cost for delivery the project using the design-bid-build method was $95,386,098.00. ODOT realized an estimated cost savings of $29,050,839.00. The calculated amounts in the above Final Project Costs Under A+C+D Bidding Method vs. Estimated Cost Under Design-Bid-Build Method table indicate a cost savings of approximately 30% when comparing final I-84: Sandy River – Jordan Road Project costs with estimated hypothetical design-bid-build cost.

III. I-84: Sandy River – Jordan Road Actual Project Results vs. Estimated Results Stated in the Exemption Findings

In this section, the actual project results are compared to the original estimated project results in the exemption findings for I-84: Sandy River – Jordan Road Project.

A. Project Successes

Successes experienced on the I-84: Sandy River – Jordan Road Project were:

1. On-time Completion – The project construction completed on December 29, 2014, per the final contract as modified by the CCOs. Completion of the I-84: Sandy River – Jordan Road Project restored and enhanced a vital transportation link that is a critical part of the State's transportation system and is a major east-west corridor for the Western United States and a statewide freight route. At the same time, it has made travel easier for local drivers and critical tourism, recreation and industrial sections of the state's economy.

2. Direct Cost Savings – The exemption findings for this project estimated a maximum direct cost savings of $2,795,000. When comparing the final total project cost of $66,335,259.00 to the estimated total project cost of $85,000,000 in the exemption findings, there was an actual direct cost savings of approximately $18,664.741.00 or approximately six (6) times more savings than estimated in the exemption findings.

3. Innovations:

   a. Mobility – Original plan was to route over a two-lane detour structure; eastbound traffic detoured first, then reverse and detour westbound traffic. With the elimination of the work bridges, traffic staging was changed to route east-bound and west-bound traffic over the new east-bound Sandy River Bridge (two (2) lanes each direction).

   b. Construction Methods – Top Down construction method using a Hamilton-modified gantry crane/beam launching system that spanned the 90-ft-long superstructure and ran along tracks, allowing for the 165 ft. long steel girders to be "launched" from shore side. This innovative method resulted in elimination of the need to design and construct a second work bridge, shaving almost five years off the project's schedule. These gantry cranes spanned the 90-ft-long superstructure and ran along a track that allowed for placement of the steel tub girders from the top down.

   c. Traffic Control – None

   d. Value Engineering – None

   e. Environmental Stewardship – Modeling programs revealed that a traditional work bridge approach would hang up debris during high water events and increased flooding risk to the local community upstream from Sandy River Bridges. The team used a modified gantry crane solution for launched the steel girders from the shore. As part of this solution, the contractor removed a work bridge that had already constructed, cutting the number of required piles in the river to 12 from 100. The wider spans between the piles reduced the chance for debris and water backing up and flooding the local residents and businesses.

4. Awards – I-84: Sandy River – Jordan Road Project was recognized as one of the most outstanding projects completed in Oregon or Southwest Washington in 2014. The project received first place for the Daily Journal of Commerce 2015 Top Project, Transportation category.

5. Safety: No lost-time injuries or injuries to the public occurred during the project.

B. Project Failures:

1. There were numerous issues with diaphragms not aligning and bolting up, particularly on the eastbound Sandy River Bridge. These issues were addressed by a request for interpretation and ultimately resolved.

2. Claims Avoidance – There were two (2) claims filed against the project.

   a. Steel subcontractor submitted claim for corrective actions on delivered steel girders. The claim was denied by the claims review board and no further action was required.

   b. Excavation subcontractor submitted claim disputing the documented quantity of excavation work completed for the project. The claim is pending ODOT review.

C. Comparison to ORS 279C.335 Exemption Findings. The comparisons made in this section are between the findings presented in support of an exemption for the I-84: Sandy River – Jordan Road Project and the actual project performance under the A+C+D Bidding Method.

1. Impact on Competition – In the 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-84: Sandy River – Jordan Road Project. Five (5) contractors submitted proposals in response to request for proposals on this project, resulting in a competitive procurement.

2. Net Cost Savings – In the exemption findings, ODOT presented data from national studies that indicated cost savings could be expected in several areas through utilization of the A+C+D Bidding Method when compared to the traditional design-bid-build method. ODOT concluded that the use of the A+C+D Bidding Method could produce a total minimum savings of approximately $2,795,000. For this project, the actual project cost savings was $18,664.741.00, approximately $15,869,741.00 more than the estimated savings in the exemption findings.

3. Schedule Changes – The original construction completion date for the I-84: Sandy River – Jordan Road Project was November 30, 2013. To address changes in constriction staging and methods to allow for the top down gantry crane/beam launching of steel girders and design changes for retaining walls and bike path, ODOT issued change orders to add the additional work and 13 months to the construction portion of the contract. However, these changes proved to be well worth the added cost and time in terms of the improved final product.

ODOT would have to address the same issues with CCOs if the project had been delivered by design-bid-build method.

IV. Summary

In conclusion, the I-84: Sandy River – Jordan Road Project exceeded the expectations presented in ODOT's exception findings for estimated cost and time savings.

In-addition, the project had significant achievements and successes in innovations, environmental stewardship, and recognition by the industry as a top transportation project. The achievements and successes of the I-84: Sandy River – Jordan Road Project presented in this report support the granting of an exemption from competitive bidding.

The successes of the I-84: Sandy River – Jordan Road Project demonstrated that the A+C+D Bidding Method when compared to traditional design-bid-build method could save ODOT time and money for certain construction projects.

FINAL PROJECT RESULTS AND ESTIMATED RESULTS COMPARISON SUMMARY				
Evaluation Factors	**I-84: Sandy River – Jordan Rd (CM/GC) Exemption Findings Estimated Results**	**I-84: Sandy River – Jordan Rd (CM/GC) Final Project Results**	**Hypothetical (Design-Bid-Build) Estimated Results**	**I-84: Sandy River – Jordan Rd Actual Savings Compared to Exemption Findings**
Project Cost	$85,000,000.00	$63,336,259.00	$95,386,098.00	$15,869,741.00 (More)
Project Duration	56 Months	57 Months	70 Months	None

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