




Oregon

Department of Transportation
Office of Project Delivery
Interoffice Memo

TO: Lorna Youngs, Interim ODOT Director

FROM:  Raymond Mabey, OTIA III Bridge and Design Build Deputy Program Manager

DATE: October 11, 2005

SUBJECT: Evaluations for your review – Lower Perry and Coast Fork

The post-construction evaluations for the Lower Perry Interchange (Grande Ronde) Bridge and the Coast Fork Willamette River Bridge design-build projects are enclosed for your review as required by ORS279C.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 evaluations compare the expected benefits of using design-build described in the adopted findings with the project results.

The Lower Perry and Coast Fork projects were granted exemptions by the Director of the Department of Administrative Services under the statute in force at the time (ORS 279.015). The statute was revised in 2005 and now allows the Director of ODOT to grant these exemptions (ORS 279C.335). Both the current and previous statutes require that the post-construction evaluation be submitted to the Director of ODOT and made available to the public for review.

No formal action by the Director is required. The evaluations will be posted on the ODOT design-build internet site within 10 business days.

Enclosures: Final Evaluation Coast Fork DB Project.doc
Final Evaluation Lower Perry DB Project.doc

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**Final Evaluation
Of the
Coast Fork Willamette River Bridge Design-Build Project**

Project Name: Coast Fork Willamette River Bridge Design-Build Project

Exemption Number: EX 408

Contract Number: 12696

Project Key Number: 12358

FAP Identification: OTIA-S001 (139)

Design-Builder: Holm II and CH2MHILL Constructors, a Joint Venture

Project Description: The Coast Fork Willamette River Bridge Design-Build Project removed and replaced the southbound bridge over the Willamette River on Interstate 5 approximately 3 miles south of Creswell (Mile Point 179.99). The work included the construction of a temporary detour bridge which was left in place and is being used by a current separate project to replace the northbound bridge.

I. Introduction.

The Oregon Department of Transportation's (ODOT) Coast Fork Willamette River Bridge Design-Build Project (the "Coast Fork Project") received an order from the Department of Administrative Services granting an exemption from competitive bidding to allow the use of design-build project delivery.

ORS 279.103 (now ORS279C.355) requires an evaluation of the public improvement project upon its completion. The evaluation must include the following:

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 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 279.015 (now ORS 279C.335).

In the following sections, two types of comparisons are made. The first evaluation, reported in Section II, compares data taken from the Coast Fork Project--actual experience, with results that would be expected on a typical design-bid-build project. The second evaluation, reported in Section III, compares data taken from the Coast Fork Project—actual experience, with what the project was originally expected to yield under the terms of the contract.

II. Comparison of the Coast Fork Project Actual Results vs. a Typical Design-Bid-Build Project

A. Schedule and Project Duration

The following graph and table compare actual Coast Fork Project figures realized utilizing the design-build contracting model with what would have been expected under the traditional design-bid-build method of project delivery based upon ODOT historical experience. The schedule comparison includes the typical four-month period between release of the Request for Proposals to contract award for the design-build method, and a similar three-month period from Request for Bids to contract award for design-bid-build delivery.

Under the traditional design-bid-build model ODOT obtains all environmental clearances and permits, and completes biddable final plans and specifications, prior to initiating procurement of the construction contract. Under the design-build contracting model, both design 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.

As the graph below indicates, a project equivalent to the Coast Fork Project completed under the design-bid-build method of delivery would typically take approximately 60 months (5 years), while the Coast Fork Project, utilizing the design-build method of project delivery, took 45 months. The acceleration of 15 months on the Coast Fork Project is principally attributable to concurrent design and construction activities.

On the Coast Fork Project the preliminary design and permitting effort was provided by ODOT, and the permitting process continued post-contract award because the environmental regulators required final designs prior to determining appropriate mitigation measures. Therefore, this project had a contingency item priced for a "Wetland Mitigation Site" that became part of the project costs via change orders. For this design-build project the permitting effort became a shared task between ODOT and the design-builder.

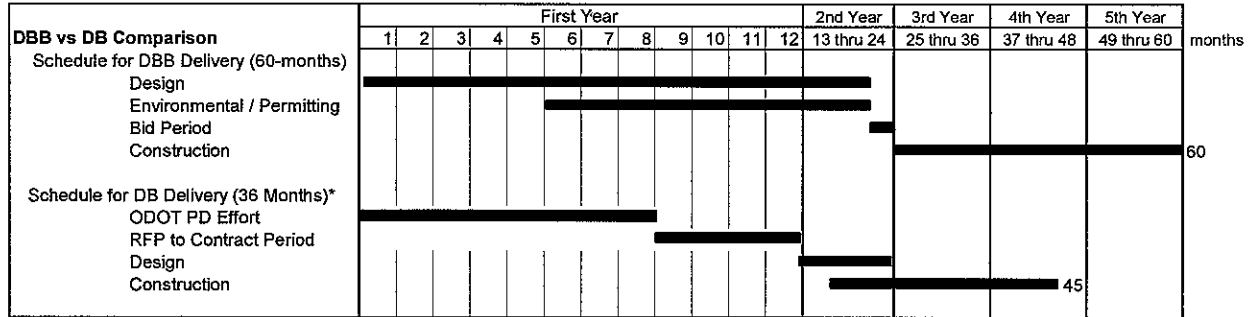
B. Costs.

The construction value assigned to the hypothetical design-bid-build project utilized the actual construction costs incurred on the Coast Fork Project, adjusted upwards by an inflation factor of 3½% attributable to the last 15 months of construction. The numbers used in arriving at the hypothetical design-bid-build design and environmental and permitting values were developed as percentages of construction value, 15% and 10% respectively, consistent with ODOT's expenditure history.

Conclusion: The use of design-build contracting resulted in the Coast Fork Willamette River Bridge being opened for public use 15 months earlier than it would have been under a typical design-bid-build contracting model. That accelerated delivery reduced the overall cost of the

project by over \$1,000,000; a savings of approximately 15% over what would otherwise have been expected utilizing the design-bid-build method of project delivery.

Actual Costs under Design-Build Model vs. Estimated Cost under Design-Bid-Build Model



Estimated Cost for DBB Delivery	
Design (AE and ODOT PE Costs @ 15% of CV)	\$ 949,500
Environmental / Permitting (ODOT @ 10% of CV)	\$ 633,000
Construction Value (CV)	\$ 6,330,000
ODOT CE / CM Costs @ 10% of CV	\$ 633,000
Total Est Cost	\$ 8,545,500
Actual Cost for DB Delivery	
ODOT PD and partial Permitting Costs	\$ 416,974
Final Design and partial Permitting (DBer)	\$ 572,213
Construction (DBer)	\$ 6,115,707
ODOT PM Costs	\$ 310,500
Total Costs	\$ 7,415,394
Difference between DBB and DB in Total Cost	\$ 1,130,106

Note: In the foregoing graph and table “DBB” refers to design-bid-build; “DB” refers to design-build.

III Coast Fork Actual Results vs. Contract Requirements

A. Project Successes and Failures. The comparisons made in this section are between the Coast Fork Project contract requirements and the actual results.

Among the successes experienced on the Coast Fork Project were early project completion, cost containment, environmental excellence, and avoidance of Contract claims/disputes.

1. **Early Completion.** The contract was completed April 2004, 8 months ahead of schedule. The detour bridge was completed September 11, 2002, 4 months ahead of schedule. Early completion on this project was of particular importance because the old bridge was weight-restricted, requiring out-of-direction travel and associated delay with an estimated cost impact to industry of up to \$18,000 per day.
2. **Under Budget.** The original estimate for this design-build project was \$9,100,000. The actual cost was \$7,415,000. Total savings below original estimate was approximately \$1,595,000.

3. Environmental Excellence. The project included as a baseline the requirement of compliance with all applicable environmental laws and regulations. The design-builder exceeded these minimum requirements, performing significantly above contract requirements. For its environmental excellence it was awarded almost all of the potential \$90,000.00 incentive award.
4. Claims Avoidance. No claims were filed on the Coast Fork Project.

No failures were identified for this project.

B. Comparison to Original ORS 279C.335 Findings. The comparisons made in this section of the final report are between the original findings presented in support of an exemption for the Coast Fork Project and actual contract performance under the design-build model.

1. Impact on Competition. In the original 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 Coast Fork Project. In fact, five design-build teams proposed on this project, resulting in a competitive procurement.
2. 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-bid project delivery model when compared to the traditional design-bid-build model. ODOT concluded that if Oregon experienced similar results, it could expect to realize a total savings of approximately \$595,000. Utilizing ODOT's historical experience, the project cost approximately \$1,130,000 less than would have been expected on a comparable design-bid-build project. This number exceeds the estimate in the original exemption findings by nearly 100 percent.
 - a. Change Orders. ODOT anticipated that in keeping with industry experience, cost growth associated with change orders would be reduced by up to 4.5% under the design-build model compared to what would be expected under the design-bid-build model, yielding a potential savings on the Coast Fork Project of up to \$300,000. In fact, the Coast Fork Project incurred no additional costs through change orders relating to work included in the original contract scope of work. However due to the permitting application process, environmental mitigation tasks had to be added after contract execution by way of eleven change orders totaling \$962,000. Since that extra work would have also been required under the design-bid-build model, for purposes of evaluating the two contracting methods the environmental mitigation cost was eliminated from both design-build and design-bid-build figures set out in the foregoing chart.

With regard to change order work associated with original contract scope, it is presumed that the Agency saved substantially more than the \$300,000 projected.

- b Bid Documents. ODOT projected that by eliminating the separation between the design and build phases in the solicitation process under the design-bid model ODOT could reduce preliminary engineering costs by approximately \$15,000 on the Coast Fork Project, as compared to the design-bid-build model. Data on preliminary engineering indicates a savings of approximately \$40,000.
- c Maintenance. ODOT projected a savings of up to \$300,000 in maintenance and repair expenditures in the event the project was completed 12 months earlier than could be expected under the typical design-bid-build model. Since the project came in 15 months earlier, the projected savings is presumed to have been achieved.
- d. Inflation. ODOT calculated a savings of approximately \$105,000 due to avoidance of costs resulting from inflation when comparing the Coast Fork Project against the design-bid-build model. Again, the project came in 15 months earlier than industry data suggested. Applying a 3½% inflation rate to the construction value for the last 15 months of construction under the design-bid-build model results in an estimated savings of \$214,000 on the Coast Fork Project associated with inflation.
- e. Commercial Traffic/Industry Savings. ODOT estimated that industry was incurring up to \$18,000.00 per day in costs associated with out-of-direction travel and delay along the I-5 corridor where the Coast Fork Project is situated. As the project was completed 15 months earlier than might have been expected under the design-bid-build model, and assuming the figures calculated for out-of direction travel and delay, it is expected that industry saved millions of dollars due to early Project completion.

IV. Summary.

In conclusion, the Coast Fork Project met or exceeded every expectation ODOT included in its original findings supporting the granting of an exemption from competitive bidding. The project achieved or exceeded all savings predicted in comparing it against the traditional design-bid-build contracting model. Further, the project came in under budget, ahead of schedule, and without claims. Whether evaluating the project on the basis of hypothetical comparisons or actual results, the design-bid delivery model implemented on the Coast Fork Project saved taxpayer and transportation industry dollars, and reduced the period of transportation delay and inconvenience to the traveling public.

SUMMARY COMPARISON			
Evaluation Factor	Coast Fork Projected	Coast Fork Actual	Typical Design-Bid-Build
Project Cost	\$9,100,000	\$7,415,000	\$8,545,500
Project Duration	53 months	45 months	60 months



Final Evaluation Of the Lower Perry Interchange Bridge Design-Build Project

Project Name: Lower Perry Interchange (Grande Ronde River) Bridge Design-Build Project

Exemption Number: EX 409

Contract Number: C12695

Project Key Number: 12396

FAP Identification: OTIA-S006 (35)

Design-Builder: Holm II and CH2MHILL Constructors, a Joint Venture

Project Description: The Lower Perry Interchange (Grande Ronde River) Bridge Design-Build project removed and replaced the northbound bridge over the Grand Ronde River on Interstate 84 approximately 2 miles west of La Grande, Oregon.

I. Introduction.

The Oregon Department of Transportation's (ODOT) Lower Perry Interchange (Grande Ronde) Bridge Design-Build Project (the "Lower Perry Project") received an order from the Department of Administrative Services granting an exemption from competitive bidding to allow the use of design-build project delivery.

ORS 279.103 (now ORS279C.355) requires an evaluation of the public improvement project upon its completion. The evaluation must include the following:

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 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 279.015 (now ORS 279C.335).

In the following sections, two types of comparisons are made. The first evaluation, reported in Section II, compares data taken from the Lower Perry Project--actual experience, with results that would be expected on a typical design-bid-build project. The second evaluation, reported in Section III, compares data taken from the Lower Perry Project—actual experience, with what the project was originally expected to yield under the terms of the contract.

II. Comparison of the Lower Perry Project Actual Results vs. a Typical Design-Bid-Build Project

A. Schedule and Project Duration

Under the traditional design-bid-build model ODOT obtains all environmental clearances and permits, and completes biddable final plans and specifications, prior to initiating procurement of the construction contract. Under the design-build contracting model, both design and construction are performed by the design-builder under one contract. Responsibility for obtaining environmental clearances and permits was shared between ODOT and the contractor on the Lower Perry design-build project. 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 Lower Perry Project completed under the design-bid-build method of delivery would typically take approximately 60 months (5 years), while the Lower Perry Project, utilizing the design-build method of project delivery, took 48 months. The acceleration of 12 months on the Lower Perry Project is principally attributable to concurrent design and construction activities.

B. Costs

The following table compares actual Lower Perry Project figures realized utilizing the design-build contracting model with what would have been expected under the traditional design-bid-build method of project delivery based upon ODOT historical experience.

Actual Costs under Design-Build Model vs. Estimated Cost under Design-Bid-Build Model

Estimated Cost for Design-Bid-Build Delivery:	
Design (15% of Construction Value)	\$ 1,282,000
Environmental/Permitting (5% of Construction Value)	\$ 427,000
Construction	\$ 8,547,000
ODOT Construction Engineering/Construction Management (10% of Construction Value)	\$ 854,500
Total Estimated Cost:	\$11,110,500
Actual Cost for Lower Perry Design-Build Delivery:	
ODOT Preliminary Design and partial Permitting	\$ 233,500
Final Design and partial Permitting (Design-Builder)	\$ 816,000
Construction	\$ 8,258,000
ODOT Project Management	\$ 265,000
Total Actual Cost:	\$ 9,572,500
Difference between Design-Bid-Build and Design-Build in Total Cost:	\$ 1,538,000

The construction value assigned to the hypothetical design-bid-build project utilized the actual construction costs incurred on the Lower Perry Project, adjusted upwards by an inflation factor of 3½% attributable to the last 12 months of construction. The numbers used in arriving at the hypothetical design-bid-build design and construction management values were developed as percentages of construction value, 15% and 10% respectively, consistent with ODOT's expenditure history. Environmental and permitting values were estimated at 5% of construction value, consistent with ODOT's expenditure history on equivalent projects.

C. Conclusion

The use of design-build contracting resulted in the Lower Perry Interchange (Grand Ronde River) bridge being opened for public use 12 months earlier than it would have been under a typical design-bid-build contracting model. Further, as the figures in the above table indicate, the overall cost of the project was over \$1,500,000 less than the projected cost under the design-bid-build method of project delivery, a savings of approximately 13%.

III. Lower Perry Actual Results vs. Contract Requirements

The comparisons made in this section are between the original Lower Perry Project contract requirements and the actual results.

A. Project Successes.

Among the successes experienced on the Lower Perry Project were early bridge completion, cost containment, environmental excellence, and avoidance of Contract claims/disputes.

1. **Early Completion.** The contract was completed ahead of schedule, with the bridges opened to unrestricted truck traffic one year early.
2. **Under Budget.** The original ODOT engineer's estimate for this design-build project was \$10,900,000. The actual cost was \$9,572,500. Total savings below original estimate was approximately \$1,327,500.
3. **Environmental Excellence.** The project included as a baseline the requirement of compliance with all applicable environmental laws and regulations. The design-builder exceeded these requirements by: designing and constructing the temporary bridge to minimize impact to the streambed and bank; reducing bridge piers in the water, utilizing pre-cast footing and columns; increasing bridge span lengths so the new piers could be placed above the ordinary high water elevation; replacing petroleum based equipment fluids with fluids less likely to impact the environment; removing an abandoned bridge, regrading and planting the slope, installing bird and bat habitat, stream bed enhancements, planting more trees than the contract required; and reducing the in-water work to one season. For its environmental excellence the design-builder was awarded almost all of the potential \$150,000 incentive award.

4. High-Quality Construction. The concrete finish was above and beyond specifications.
5. Safety. No lost-time injuries occurred.
6. Claims Avoidance. No claims were filed on the Lower Perry Project.

B. Project Failures.

There were no failures on this project.

C. Comparison to Original ORS 279.103 Findings. The comparisons made in this section of the final report are between the original findings presented in support of an exemption for the Lower Perry Project and actual design-build contract performance.

1. Impact on Competition. In the original 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 Lower Perry Project. In fact, four 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 model when compared to the traditional design-bid-build model. ODOT concluded that if Oregon experienced similar results, it could expect to realize a total savings of approximately \$595,000. Utilizing ODOT's historical experience, the project cost approximately \$1,538,000 less than would have been expected on a comparable design-bid-build project. This number exceeds the estimate in the original exemption findings by over 100 percent.
 - a. Change Orders. ODOT anticipated that in keeping with industry experience, cost growth associated with change orders would be reduced by up to 4.5% under the design-build model compared to what would be expected under the design-bid-build model, yielding a potential savings on the Lower Perry Project of up to \$300,000. In fact, the Lower Perry Project incurred additional costs in the amount of \$624,232 in change order work, for a total of 6.5% of the contract value. However, \$390,000, or 4% of the contract value, was due to errors in the initial survey data ODOT provided to the Design-Builder at notice to proceed. This change order work would have been required under the design-bid-build model also. Therefore, for purposes of evaluating the two contracting models, with amounts associated with faulty survey data eliminated from the analysis, ODOT experienced approximately 2.5% cost escalation due to change order work.
 - b. Bid Documents. ODOT projected that by eliminating the separation between the design and build phases in the solicitation process under the design-bid model ODOT could reduce preliminary engineering costs by approximately \$15,000 on the Lower Perry

Project, as compared to the design-bid-build model. Data on preliminary engineering indicates actual savings of \$39,000.

- c. Maintenance. ODOT projected a savings of up to \$300,000 in maintenance and repair expenditures in the event the project was completed 12 months earlier than could be expected under the typical design-bid-build model. Since the project came in 12 months earlier, the projected savings is presumed to have been achieved.
- d. Inflation. ODOT calculated a savings of approximately \$105,000 due to avoidance of costs resulting from inflation when comparing the Lower Perry Project against the design-bid-build model. Again, the project came in 12 months earlier than industry data suggested. Applying a 3.5% inflation rate to the construction value for the last 12 months of construction under the design-bid-build model results in an estimated savings of \$111,600 on the Lower Perry Project associated with inflation.
- e. Commercial Traffic/Industry Savings. ODOT estimated that about 40% of truck traffic (five axle or greater) had to be rerouted by about 100 miles due to Lower Perry bridge weight restrictions, with a cost impact to industry estimated conservatively at in excess of one million dollars per year. As the project was completed 12 months earlier than might have been expected under the design-bid-build model, it is expected that industry saved in the neighborhood of one million dollars due to early Project completion.

IV. Summary.

In conclusion, the Lower Perry Project met or exceeded nearly every expectation ODOT included in its original findings supporting the granting of an exemption from competitive bidding. With the exception of change order work, the project achieved or exceeded all savings predicted in comparing it against the traditional design-bid-build contracting model. Further, the project came in under budget, ahead of schedule, and without lost-time injuries or claims. Whether evaluating the project on the basis of comparisons to comparable design-bid-build projects or expectations in the contract, the design-build delivery model implemented on the Lower Perry Project saved taxpayer and transportation industry dollars, and reduced the period of transportation delay and inconvenience to the traveling public.

SUMMARY COMPARISON			
Evaluation Factor	Lower Perry Projected	Lower Perry Actual	Typical Design-Bid-Build
Project Cost	\$10,900,000	\$9,572,000	\$11,110,500
Project Duration	48 months	48 months	60 months

