

# Initial Report for Innovative Contracting Practices “Alternate Pavement Type Bidding”

Special Experimental Project No. 14 (SEP14)

(Issued July 9, 2008)

Prepared by

Idaho Transportation Department



Submitted to

Federal Highway Administration

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## Project Information

**Bid Date:** August 19, 2008

**Contract No.** 7170

**ITD Key Number:** 11489

**Federal Project:** A011(489)

**Location:** I-84, Garrity Interchange (IC) to Ten Mile Road Mainline Reconstruction

**Project Description:** Widening and Reconstructing Interstate 84 (I-84) from MP 38.66 to MP 41.30; Garrity IC to Ten Mile Rd.

**Prime Contractor:** Idaho Sand & Gravel Company

**Owner Agency:** Idaho Transportation Department (ITD)

**Project Engineer:** Shawna King, Resident Engineer (ITD)

## Purpose

The purpose of this report is to document the advertising and bidding processes of an innovative contracting method called Alternate Pavement Type Bidding (APTB) used by the Idaho Transportation Department (ITD) GARVEE Transportation Program. The concept was developed based on research about innovative contracting practices used by ITD on other projects and innovative practices used by other states. The APTB was selected to take advantage of the cost-competitive market between flexible and rigid pavements. Other states that have used APTB have generally experienced increased competition and a reduction in bid prices on projects where APTB has been utilized. With rising costs associated with paving materials, there is a challenge to reduce costs. Due to increasing demands on available highway funds, ITD chose to actively pursue this method since it has the potential to enhance the use of tax dollars. This particular project was advertised with an alternate pavement type having an equal design life.

This particular concept was approved on July 9, 2008, for use on a reconstruction project along I-84 in Ada and Canyon counties, Idaho by the Idaho Division of the Federal Highway Administration (FHWA) and FHWA headquarters under the provisions of Special Experimental Project No. 14 (SEP-14) (Appendix A).

This report is a requirement of the SEP-14 work plan, as approved by the FHWA. This report incorporates the findings and conclusions regarding the bidding process. The report also includes individual bid items, quantities, and cost for the work (Appendix B) as well as the life cycle cost analysis (Appendix C).

## Background

The intent of the I-84, Garrity Interchange to Ten Mile Road Mainline Reconstruction project is to improve the geometric features, increase the capacity, and improve the traffic flow of the interstate between mileposts 38.66 and 41.30. It was specified that construction would comply with ITD's Standard Specifications for Highway Construction, edition 2004, and current Supplemental Specifications and any special provisions. It was specified that the pavement be constructed using Idaho's Quality Acceptance (QA) special provisions.

The design work included the required surveys, geotechnical investigations, pavement design, bridge design as applicable, drainage design, and roadway design. The designs meet the current requirements of ITD's Design Manuals and AASHTO Standard Specifications for the Design of Highways and Bridges.

After holding several meetings with representatives of the Associated General Contractors (AGC), the Asphalt Institute, and the American Concrete Paving Association (ACPA) to obtain industry feedback concerning the alternate pavement bidding process, the Department chose to alternatively bid a Standard Plain Jointed Doweled Portland Cement Concrete Pavement as the rigid option, with an Asphalt Perpetual Pavement as the flexible option. The rigid option was designed using Darwin AASHTO 93 and adjusted with Mechanistic Empirical Pavement Design Guide (MEPDG). The flexible option was designed using the Per Road Flexible Perpetual Pavement Design & Analysis Software. Analysis of traffic information resulted in the use of Truck Traffic Classification (TTC) default group 3 for this project.

## Bidding Process

The I-84, Garrity IC to Ten Mile IC project was advertised on July 29, 2008. Prior to bidding, ITD provided the Life Cycle Cost (LCC) adjustment factor value to be added to the Contractor's initial bid price for the Asphalt Perpetual Pavement option. The LCC adjustment factor represents the difference in future major maintenance and rehabilitation actions between rigid and flexible pavements based on a design life of 56 years. The LCC was estimated using current costs for the future actions. Future actions costs specific to the pavement type were calculated using ITD's standard process. The LCC adjustment factor included a discount rate and was presented as a present worth value.

A pre-bid conference was held on August 5 and bids were opened on August 19, 2008. Four (4) contractors submitted bids for this project:

Engineer's Estimate	\$31,848,190.52	100%	
Contractor	Bid Amount	% of Engineer's Estimate	Pavement Type
Idaho Sand & Gravel Company	\$28,654,777.00	90%	(asphalt)
Central Paving Co.	\$29,989,385.35	94%	(asphalt)
Hap Taylor dba Knife River	\$31,470,650.98	99%	(concrete)
Western Construction, Inc.	\$33,472,731.34	105%	(concrete)

It was determined that the successful bidder would be the contractor with the least cost sum of the initial bid cost plus the LCC adjustment factor provided by ITD. The two low bids were for the asphalt alternate, and the two higher bids were for the concrete alternate. An evaluation of the bids showed that the concrete pavement alternate had lower pavementrelated prices than the asphalt pavement alternate. The biggest difference between the two pavement alternates was the mobilization item. The mobilization item for the concrete pavement alternate bid was three times that of the asphalt pavement alternate. Because of this spread, the LCC adjustment factor for the asphalt alternate did not have as much effect on the bidding outcome as was initially anticipated.

The successful low bidder was Idaho Sand & Gravel Company.

On August 22, 2008, ITD's Roadway Design Section received a letter from Hap Taylor & Sons, Inc. d/b/a Knife River protesting the determination by ITD that Staker & Parson Companies d/b/a Idaho Sand & Gravel Company was the lowest responsive and responsible bidder for the project (Appendix D). Knife River claimed that the bid specifications for the project were ambiguous and/or defective with respect to the asphalt alternate bid because it was impossible to calculate the true cost of the asphalt alternate bids. On August 29, 2008, ITD issued a letter to Knife River denying the bid protest (Appendix E). On September 10, 2008, the FHWA concurred with ITD's determination that there was no evidence of improper bidding (Appendix F).

A notice to proceed was issued to Idaho Sand & Gravel Company on September 8, 2008.

## Contractor Response to APTB

ITD prepared a questionnaire to determine contractors' responses to the APTB process. A copy of the questionnaire is included as Appendix G, and compiled survey results are included as Appendix H.

## Evaluation of Contractor Responses

A comparison of the bid costs of the four bidders indicated the two lowest bidders bid on the asphalt alternate, while the two highest bidders bid on the concrete alternate. The lowest asphalt bid was 10 percent below the Engineer's Estimate, and the lowest concrete bid was 1 percent below the Engineer's Estimate; consequently, there was a 9 percent difference between the asphalt and concrete alternates. The two asphalt bids were within 4 percent of each other, and the two concrete bids were within 6 percent of each other.

As mentioned above, a questionnaire comprised of ten questions was sent to each of the contractors to request their feedback regarding the APTB process. A telephone call was made to each of the contractors from whom no response was received; therefore, their verbal responses were recorded accordingly. Following are the results of the contractor's responses:

1. Each of the contractors considers itself to be primarily an asphalt pavement type company versus a concrete pavement type company. Final Report for Innovative Contracting Practices 4 SEP-14 "Alternate Pavement Type Bidding"
2. The low bidder and the second low bidder felt that because of the APTB project, they took proactive steps to be more competitive with their bids. The low bidder accounted for the future pricing of asphalt, and the second low bidder looked at comparisons of asphalt against concrete pavement in items such as materials and recycled items. The two high bidders, concrete, indicated that the APTB process did not cause them to take proactive steps over a traditional single pavement type project.
3. The two low bidders evaluated both pavement types before submitting their bids. The two high bidders did not.
4. For the low bidder, staging and traffic control requirements did not influence its decision on the pavement type to bid, but for the second and third low bidders, staging and traffic control requirements did influence their decisions.
5. The construction schedule requirements had an influence on which pavement type to bid for the low bidder and the two highest bidders, but not for the second low bidder.

6. The two low bidders thought there was adequate bidding time for effective decisionmaking related to the APTB project, but the two high bidders did not think enough time was allowed. They thought there was only enough time afforded to explore one alternate, not both.
7. Three of the bidders thought the plans and specifications were sufficiently clear to prepare a bid. The third lowest bidder did not.
8. Three of the bidders thought ITD's use of the LCC adjustment factor incorporated into the bid was sufficiently clear, but the second low bidder did not. Although the highest bidder thought the use of the LCC adjustment factor was clear, he thought the concrete LCC was "grossly understated in comparison to the asphalt alternative."
9. Recommendations for improving the APTB provisions:

Comments from the contractors: the low bidder cites that there is a lack of competitive quotes for concrete bidding in this geographical area. One contractor believes that ITD should be allowed to accept the low bid of either alternate after the bid opening. Another contractor feels that more bidding time should be allowed for this type bid and that there should be an increased evaluation of the concrete LCC analysis.

Comments from staff (ITD and Connecting Idaho Partners, ITD's Program Manager) involved with the project: one staff member believes the perpetual pavement specification needs work. Another staff member thinks the specification tolerances were unclear. Reference is made to construction Change Orders 5 (changes specifications to broaden tolerance for voids filled with asphalt [VFA]), 27 (changes specifications to modify the superpave special provision for stone matrix asphalt [SMA] for the test strip and for production), and 30 (changes specifications for all SMA asphalt to be compacted to a 94% density). Another staff member believes that the use of APTB must be identified up-front so that the plans and documents may be fully developed to reflect both alternates. (Note that it was not determined until late in the final design stage of the development of the project that APTB would be used on this project.) Final Report for Innovative Contracting Practices 5 SEP-14 "Alternate Pavement Type Bidding"

10. Would you like to see future projects by ITD bid as APTB?

Comments from the contractors: the two low bidders would like to see ITD advertise more projects in the future using APTB, with these comments “where practical”, and “in hopes of bidding on jobs that would be advertised normally as concrete only.” The two high bidders would not like to see this. One contractor stated, “They won’t get it right,” and the other gave a lengthy response (please refer to Appendix H for the full response) that in summary states that the owner/agency should allow the contracting community to think outside the box and not to stifle innovation by requiring a structured set of rules (specifications) that must be followed in the bidding process.

Comments from staff (ITD and Connecting Idaho Partners, ITD’s Program Manager) involved with the project: one staff member suggests putting more effort into the design process and specifications before a project is advertised as an APTB project. Another staff member believes there were constructability issues with this APTB project that should be addressed before bidding another project of this type. Another staff member believes the design engineer needs to know that the project is APTB prior to starting the design since it adds complexity to the design package and requires more time to develop the project documents for each type of pavement in order to convey the proper construction staging, which may differ for each alternative. Another staff member thinks the specifications for the asphalt alternative are difficult to achieve.

## Conclusions

The GARVEE Transportation Program of ITD used an APTB process on an I-84 mainline reconstruction project (I-84, Garrity IC to Ten Mile Road) for the purpose of providing flexibility in contractor competition in an attempt to achieve lower bid prices. This approach allowed ITD to explore the practice of including rigid (concrete) versus flexible (asphalt) pavement structure alternates in the bid process on an equivalent basis.

It appears that the APTB process helped ITD achieve its goal of obtaining competitive bidding on this project. However, the full cost effectiveness of the APTB process cannot be determined until an evaluation can be made of the long-term pavement performance and maintenance costs of APTB projects versus those of the non-APTB approach. Only after these long-term evaluations are completed can the cost effectiveness of an APTB process be accurately determined.

## Recommendations

1. Keep the project manageable and straightforward by avoiding simultaneous implementation of new innovative techniques on the same project. For instance, this project had multiple variables in the form of new (or at least infrequently used) approaches, design methods, and materials. These included APTB contracting and the use of a perpetual pavement design method.
2. ITD should develop guidelines for determining when using APTB would be applicable. Factors that should be considered include using the process only when there is no preference for type of pavement to be used, size of project (i.e., a particular dollar value) Final Report for Innovative Contracting Practices 6 SEP-14 “Alternate Pavement Type Bidding” for which APTB should be used, and range of difference between life cycle costs for each type of pavement considered.
3. Decide on and incorporate APTB early in the project development phase. Some of the APTB problems identified during bidding of this project were related to preparing the alternate pavement design late in the project development process.
4. Ensure that the LCC adjustment factor for the asphalt pavement is a fair and representative amount. Also, all aspects of the future maintenance should be considered, e.g., traffic control costs should be included in the pavement maintenance performance for future mill and inlay/overlay of the asphalt pavement alternative versus sealing joints for the concrete alternative. ITD may want to meet with industry representatives and the Association of General Contractors (AGC) to decide on an acceptable method for making such determination of the adjustment factor.
5. Be mindful during the development of the project of the level of effort needed for traffic control staging when adjustments to the storm water inlets and manholes are necessary, especially when placing pavements that have intermediate layers. These adjustments may have potential costs associated with them.
6. Consider using the incentive/disincentive program for the QC/QA acceptance for plant mix pavement versus the thickness and profile incentives for the concrete pavement.
7. Be mindful of the available aggregates for concrete pavements. There are good aggregate sources in southwestern Idaho, but special consideration may be necessary for projects located in eastern, central, and northern Idaho.
8. Identify specific variables, such as climate and geographic area, related to performance of each pavement alternate. It may be that such variables are significant enough that ITD would want to specify a particular type of pavement and not go through the APTB process.
9. The length of the projects that are bid as alternate pavement types should be identical. Due to construction scheduling of adjacent projects, about a half mile of concrete was required for the concrete alternate that was not required for the asphalt alternate.



10. ITD should perform a long-term evaluation of the pavement performance and maintenance costs of this project to help determine the success of the APTB process. Appendix A: FHWA Approval

Appendices ( available upon request).

- A) Federal Highway Administration (FHWA) Approval of Work Plan (SEP-14) Alternative Contracting
- B) Individual Bid Items, Quantities and Cost for the Work
- C) Life Cycle Cost Analysis
- D) Bid Protest from Hap Taylor & Sons, Inc. d/b/a/ Knife River
- E) Idaho Transportation Department Denial of Bid Protest
- F) FHWA Concurrence with ITD Determination of No Evidence of Improper Bidding
- G) Contractor Questionnaire
- H) Compiled Survey Results