MEMORANDUM

TO: Bob Farley

From: Robert T. Semones
Value Engineering Coordinator
Division of Program Performance

Date: August 13, 2007

Subject: Value Analysis
Harlan County
US 421 Relocation
Item No. 11-269.00
Virginia State Line to Barn Branch

Bob,

At the request of Ray Polly, an in-house value analysis study was performed for the subject project. The first meeting was held on August 6, 2007 at the Kentucky Transportation Center in Conference Room 308. The value analysis team members are as follows:

Quentin Smith, D11
Joel Holcomb, D11
David Fuson, D11
Mike Calebs, D11
Robert Semones, CO Program Performance

The proposed corridor is a cross country design. The road begins at the Virginia State line at Sta. 10+00 and extends to existing US 421 at Station 188+00. The current ADT is 2,050. The road is designed for 55 mph and as a rural arterial in mountainous terrain. An updated set of plans and cross sections were obtained from DLZ. The first day of the study was to go through and review all items that could be adjusted to reduce costs. The project consists of two bridges. The first bridge is over Garrett Hollow Road and is currently shown as a five span structure located at approximate Station 61+00. The second bridge is current shown as a nine span structure over a floodway at approximate Station 135+00. The following items were discussed:

1. Take a look at the vertical alignment. What can be done to reduce waste on this job? We can possibly raise the grade, but this would raise the pier heights on the bridges.

2. We can modify the template somewhat. We can start the slopes about 5' from the right of way line and construct a 1.5:1 until we intersect a 6% slope from the shoulders. We can also use false cuts to minimize the hauling of waste material.
3. We can reduce the bridge height at Garrett Hollow Road by filling in a portion of the hollow. This would reduce the pier heights. The maximum pier height at this time is approximately 180 feet. This idea would place the piers on piling. We can use concrete beams for the tail spans and increase the span arrangement and use steel beams. One idea is to eliminate the bridge entirely and use the area for a waste site. Eliminating the bridge and using the area for waste material would cause more right of way negotiations. We consulted with Mark Hite of Structural Design on the beams lengths. Concrete beams of 150 feet in length could be used if we can get them to the job site. Steel beams could definitely be used because they can be assembled at the site.
4. We also looked at the cut sections. We could reduce waste if we can use 18' benches instead of the 25 foot cut bench and increase the slope to ¼:1.
5. We looked at eliminating the truck climbing lane. If we use the truck climbing lane, we can reduce the shoulder width in the truck climbing lane area.
6. We looked at eliminating the bridge at Station 135+00 and over KY 568. This is a floodway area, so more investigation would have to be performed to ensure no rise in the 100 year floodplain elevation.
7. We can separate the surfacing from the Grade and Drain. This will allow lower bidding on the job itself. This will probably save 5% of the original estimate.

The value analysis meeting continued on August 7, 2007 in the District 11 conference room. Those in attendance were:

Quentin Smith, D11
Joel Holcomb, D11
David Fuson, D11
Mike Calebs, D11
Robert Semones, CO Program Performance

The value analysis team assembled a few value analysis recommendations.

Value Analysis Recommendation Number 1

ADJUST THE GRADE ONLY

Advantages

1. Balance Cut and Fill
2. Reduce Excavation
3. Possibility of eliminating some truck climbing lanes
4. Eliminating the truck climbing lane on the bridge at Sta. 135+00

5. Less hauling and reduce waste
6. Flattening some grades

Disadvantages

1. Increase some grades
2. Additional right of way acquisition
3. Lengthening of pipes and culverts
4. Raising the bridges

There was also discussion about modifying the template and incorporate the modified template into some value analysis recommendations. The modified template would be:

From 12’ graded, 10’ paved shoulder to 8’ graded, 4’ paved
Reduce cut benches from 25’ to 18’ throughout the project
Use steeper cuts (1/4:1)
Use false cuts to waste excess material

Value Analysis Recommendation Number 2

ADJUST THE GRADE AND INICORPORATE MODIFIED TEMPLATE

Advantages

1. Reduces excavation
2. Balance cut and fill
3. eliminate guardrail in false cut areas
4. reduce hauling
5. reduce pavement area
6. reduce maintenance cost of guardrail
7. reduce bridge width (carry 8’ shoulder across bridge)

Disadvantages

1. Maintenance costs (steeper slopes)
2. Maintenance of gravel shoulders
3. Installation of chain link mesh protection for slopes (rock fences)
4. Minimal increase of channel lining ditches
5. Less usable shoulder of original design

Notice this value engineering analysis recommendation includes both bridges.

Value Analysis Recommendation Number 3

This recommendation includes the same as Value Analysis Number 2 but the bridge at Station 61+00 (Garrett Hollow Road) has been eliminated. The value analysis team also proposed at eliminating the bridge at Sta. 135+00. This bridge is located in a floodplain area. After consulting with David Moses in the Central Office drainage Section, it was determined that this bridge needs to be left in place. The value analysis team has considered using steel girders and eliminating some of the spans.

Eliminating the bridge and incorporating the modified template makes Value Analysis Recommendation Number 3 the preferred recommendation to use. A life cycle cost analysis for the bridge at Sta. 61+00 would show more savings since future maintenance of the bridge is eliminated.

Advantages

1. Balance cut and fill
2. Structure costs eliminated
3. No maintenance of structure
4. More freedom to adjust the grade in the localized area
5. Reduce hauling
6. Direct access to US 421 for Garrett Hollow Road
7. Construction time and phasing

Disadvantages

1. Increase right of way and relocation of 3 to 4 houses
2. Construct 1000 linear feet of drainage structure
3. Fill height at approximately 220 feet
4. Environmental impacts
5. Construct tie for Garrett Hollow Road

If this recommendation is chosen, it is the opinion of the value analysis team that a cost around $2.50 per yard can be bid for waste material.

From rough calculations during the study, Value Analysis Recommendation Number 1 can save approximately 3 million dollars.

From rough calculations during the study, Value Analysis Recommendation Number 2 can save approximately 8 million dollars.

From rough calculations during the study, Value Analysis Recommendation Number 1 can save approximately 15 million dollars.

Please let me know if you concur with any of the recommendations and if you would like to carry them further. If you would like to carry any ideas forward, the value analysis team can refine the calculations and generate a final value analysis report.

Please contact me at direct extension 3867 or 502-564-4555.

Robert Semones
Value Engineering Coordinator