

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE: HPP-STP-064-1(41) Chatham **OFFICE:** Engineering Services
P. I. No.: 522490
SR 26/US 80 from Bull River to Lazaretto Creek

DATE: April 6, 2004

FROM: David Mulling, Project Review Engineer *DM*

TO: Ben Buchan, State Urban Design Engineer

SUBJECT: IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate alternatives recommended for implementation to the extent reasonable in the design of the project.

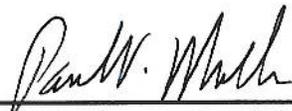
ALT No.	Description	Savings PW & LCC	Implement	Comments
BRIDGES (B)				
B-1	Shift alignment to allow widening bridges on both sides with existing in the middle	-\$7,930,759 (cost increase)	No	Alignment has been set to minimize Environmental impacts and to provide operational needs.
B-2	Use prestressed concrete beams for main span of Lazaretto Creek	\$596,101	No	Not as outlined in the VE Study, which assumed the existing bridge would be retained. A subsequent evaluation by the Office of Bridge Maintenance has determined that the existing bridge at Lazaretto Creek should be replaced.
B-3/B-4	Construct new bridges and remove existing bridges at Lazaretto Creek and Bull River (NOTE: THIS VE ALTERNATIVE RESULTS IN AN INITIAL COST INCREASE OF \$10.6 MILLION.)	\$13,558,763 for both bridges \$6,000,000+ if only Lazaretto Creek Bridge is replaced	Yes	Lazaretto Creek Bridge will be replaced. Bull River Bridge will also be replaced if further investigation determines that the existing pile bents do not have acceptable penetration with regard to predicted scour depths.

ALT No.	Description	Savings PW & LCC	Implement	Comments
B-7	Lower design speed to reduce bridge width	\$2,205,621	No	Not equal or better than what was proposed. Design Speed is set to coincide with adjacent roadway sections.
EARTHWORK (EW)				
EW-1	Lower the profile	\$1,856,589	No	Does not meet Need and Purpose Statement which states that the minimum roadway elevation should be 9' (2.7 m).
EW-3	Lower design speed and minimize median	\$471,524	No	Not equal or better than what was proposed. Design Speed is set to coincide with adjacent roadway sections.
EW-4	Use MSE Edge Walls on Outside Shoulders	-\$5,794,984 (cost increase)	No	National Park Service and Tybee Island residents oppose since it would negatively affect the view shed of the National Monument. This VE Alternate introduces a Barrier Wall at the Shoulder Break Point on each side of the road.
EW-5	Use 4:1 slopes in lieu of 6:1 slopes	\$70,899	No	6:1 slopes reduce Clear Zone width, provide better erosion control protection and reduce the ditch width required.
EW-7/BP-8	Provide roadway improvements at existing grade	\$9,924,597	No	Does not meet Need and Purpose Statement which states that the minimum roadway elevation should be 9' (2.7 m).
EW-9	Minimize the quantity of Wick drains	\$3,285,230	Yes	Subject to OMR approval in Soil Survey.
EW-10	Eliminate the Geogrid material	\$1,443,000	Yes	Subject to OMR approval in Soil Survey.
EW-11	Use a single layer of higher grade filter fabric in lieu of two layers	\$1,352,812	Yes	Subject to OMR approval in Soil Survey.
CONCRETE WORK (CW)				
CW-1	Minimize the use of raised concrete median	\$368,762	Yes	Some will be required due to width being less than 10'.
CW-3	Eliminate temporary concrete barriers	\$838,246	No	Can not be eliminated due to grade changes and safety requirements.
BASE AND PAVING (BP)				
BP-4	Construct separate bicycle facility	\$59,515	No	Not feasible due to land constraints. Also, may be illegal based on type of funding.

ALT No.	Description	Savings PW & LCC	Implement	Comments
BP-5	Use existing McQueen's Island Trail as bicycle facility - connect to existing facility at ends of project	\$509,838	No as proposed See comments	This should be considered for implementation with 3 m shoulders if agreeable with the Resource Agencies.
BP-6	Add evacuation lanes on each side of existing roadway at grade and incorporate bicycle lanes on evacuation lanes	\$28,118,134	No	Does not meet Need and Purpose Statement which states that the minimum roadway elevation should be 9' (2.7 m).
MISCELLANEOUS (M)				
M-1	Use slip forms for wildlife barriers	\$1,018,510	No	May be an option during construction of project. Contractor will determine construction method.
M-2	Use gabions for wildlife barriers	\$1,787,017	Yes	Dependant upon results of a study to determine satisfactory performance. Study to be initiated by Design Office and coordinated with the appropriate Offices.
M-8	Create a wildlife sanctuary	\$2,951,489	No	Does not address the purpose of the Wildlife Barrier.
M-10	Increase the number of Sabal Palm trees	-\$320,827 (cost increase)	Yes	The intent is to place the Palm Trees at 15 m intervals, but this is subject to LGPA commitments, and public input.
M-12	Have another entity pay for the Sabal Palm trees	\$182,299	Yes	Will consider during project development but subject to local participation where possible.
M-13	Reuse/relocate existing Sabal Palm trees	\$62,049	Yes	
M-14	Use dredge spoils for embankment material	Design Suggestion	No	Location of Borrow Material will be determined by the Contractor.

A meeting was held on March 15, 2004 to discuss the above recommendations. Darryl VanMeter and Vinesha Pegram of Urban Design, Sam Teal of the Bridge Office, and Ron Wishon of the Office of Engineering Services were in attendance.

The above reflects the consensus of those in attendance and those that provided comments.

Approved: 
Paul V. Mullins, P. E., Chief Engineer

Date: 4/6/04

DTM/REW

Attachments

- c: Gus Shanine, FHWA
Floyd Moore, FHWA
Darryl VanMeter, Theresa Holder, and Vinesha Pegram, Urban Design
Lisa Westberry and Mike Murdoch, Office of Environment/Location
Vince Wilson, Bridge Design
James Magnus, G.O. Construction
Scott Zehngraft, Traffic Safety and Design, TMC
Jerry Milligan, Right of Way, West Annex
Tom Scruggs, Materials and Research
Lisa Myers, Engineering Services
General Files

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE HPP-STP-064-1(41), Chatham County OFFICE Urban Design
P.I. No. 522490
US 80/SR 26 From Bull River to Lazaretto Creek DATE February 19, 2004

FROM  James B. Buchan, P.E., State Urban Design Engineer

TO David T. Mulling, P.E., State Project Review Engineer

SUBJECT **Response to VE Study Recommendations**



Attached are the comments and responses to the VE Study held for the above referenced project.

This Office would also like to note that there are several inconsistencies within the text of the VE Study and the actual proposed design of the roadway.

Statement #1 (page 3): *This [flooding] has not been of sufficient severity to leave the residences of Tybee Island stranded through an impassable roadway.*

Response: This statement has little validity and is a little misleading. There is no historical data present to substantiate this statement, and eyewitness accounts from residents have indicated the road has been covered by a few inches occasionally through the years. Since the usual advice offered to motorists is to not enter a place where water is over the road, to say it has not been impassable is somewhat contradictory.

Statement # 2 (page 4-Earthwork): *A concern that the VE team encountered on this project was the apparent high profile. Raising the entire roadwork by 2.7 m results in over 190,000 cubic meters (m³) of in-place embankment and 300,000 m³ in surcharged material- all having to be imported.*

Response: This statement is incorrect. The current design proposes to raise the roadway TO a minimum elevation of 2.7 m not BY 2.7 m. This means the new roadway will only be about 1 meter above the existing roadway, which is around 1.9 m on average.

Statement # 3 (page 4-Base and Paving): *Building on previous ideas Alternative BP-6 adapted the concept of providing two new "evacuation" lanes on each side of the existing roadway at grade and incorporating the proposed bicycle lanes on these "evacuation" lanes. Savings for this concept is an eye-opening \$28,000,000 and acknowledges a lower profile that would be prone to the same spring tidal effects being experienced today. However, these*

David Mulling, P.E.
February 19, 2004
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tidal effects will be further from the drivable surfaces and the wildlife barriers would, to some extent, ameliorate the effects by acting as mini-dams for water intrusion.

Response: This statement is not correct. Weep holes will be installed in the barrier wall to facilitate the relief of hydrostatic pressure of groundwater behind the wall, thus, preventing its function as a "mini-dam" altogether. Furthermore, this action would have severe impacts on the oyster bed, which is to the south of the roadway; a fatal flaw that has caused rejection of other alternates considered. While it is desirable to cut costs, the basis for considering this alternate is not sound, as it violates engineering reason and the need and purpose for the project.

If you have any questions concerning this information, please contact Darryl VanMeter or Vinesha C. Pegram at (404) 656-5447.

JBB:DVM:vcp
Attachment

VALUE ENGINEERING COMMENTS

HPP-STP-064-1 (41) CHATHAM COUNTY US 80 / SR 26 WIDENING FROM BULL RIVER TO LAZARETTO CREEK P.I. NO. 522490

Earthwork

ALT EW-1: Lower the profile.

No. Lowering the profile would defeat the whole Need and Purpose of the project.

"The US 80 corridor is also the only hurricane evacuation route for Tybee Island. Improvements to this portion of US 80 are included in the 2025 Regional Transportation Plan (RTP) adopted by the CUTS Policy Committee in 1999 and in the CUTS Transportation Improvement Program. At its present elevation, the spring tide approaches the edge of the travel way on this section of US 80..... This project is needed to provide an adequate hurricane evacuation route and to satisfactorily accommodate existing and future traffic demands, while decreasing the roadways susceptibility to flooding. The addition of bicycle lanes in the corridor will provide an additional benefit."

ALT EW-3: Lower design speed and minimize median.

No. Again the design speed is set to coincide with the design speed of those areas adjacent to the project limits. Fluctuations in design speed present safety hazards and concerns within the project limits. This practice is heavily discouraged by AASHTO.

ALT EW-4: Use mechanically stabilized embankment walls.

No. The project is currently adjacent to a National Park and of importance as a scenic route to the residents of Tybee Island. Both have been opposed heavily to any structure or project enhancement which obstructs the view of the marsh. The addition of the mechanically stabilized wall would be in conflict with the interest of the National Parks Services.

ALTEW-5: Use 4:1 slopes in lieu of 6:1 slopes.

No. Flatter slopes would reduce the clear zone requirements and provide a better recovery area for most vehicles.

ALT EW7/BP-8: Provide roadway improvements at existing grade.

No. This conflicts with the Need and Purpose of the project. Refer to the response to ALT EW-1.

ALT EW-9: Minimize the quantity of wick drains.

The Department will do.

ALT EW-10: Eliminate the geogrid material.

The Department will consider, subject to approval of OMR.

ALT EW-11: Use a single layer of higher grade filter fabric in lieu of two layers.

The Department will consider, subject to approval of OMR.

Concrete Work

ALT CW-1: Minimize the use of raised concrete median.

The Department will do.

ALT CW-3: Eliminate temporary concrete barriers.

Yes, but only where appropriate roadside protection can be provided without use of the temporary concrete barrier.

Base and Paving

ALT BP-4: Construct separate bicycle facility.

No. A separate bicycle facility can not be constructed due to land constraints. Most of the land adjacent to the road is either historic or is owned by the National Park Service. Under these conditions further encroachment is undesirable. Secondly, additional fill and subsurface soil reconditioning will be required to construct the bicycle facility; therefore, increasing not only the environmental impacts of the project, but the cost as well. Lastly, such an action is illegal according to Georgia code and use of the Motor Fuel Tax.

ALT BP-5: Use existing McQueen's Island Trail as bicycle facility-connect to existing facility at ends of project.

No. Tying the bicycle path into the existing facility will cause further encroachment into the wetlands and will encroach upon a historical roadbed. This alternative will cause an additional cost. Additionally, using McQueen's Island Trail as a bike facility would be a fatal flaw, equivalent to taking a park and converting it to a roadway.

ALT BP-6: Add evacuation lanes on each side of existing roadway at grade and incorporate bicycle lanes on evacuation lanes.

No. Use of the existing roadway at grade conflicts the Need and Purpose of the project, since it is subject to flooding. Refer to the response for ALT EW-1. Establishing "evacuation lanes" would still require the profile to be raised.

Miscellaneous

ALT M-1: Use slip forms for wildlife barriers.

No. This is a construction method that is always an option for contractors, but never mandated.

ALT M-2: Use gabions for wildlife barriers.

The Department will consider. If used in lieu of concrete retaining walls, this option could be explored.

ALT M-8: Create a wildlife sanctuary.

The purpose of the wildlife barrier is to inhibit the natural migration of the Diamondback Terrapin across the roadway and keep them and their natural habitat. Another site may not be conducive to proper mating conditions and may interfere with the breeding cycle. Furthermore, this would not compensate for the number of turtles which would die crossing the road. The issue is to eliminate the number of roadway deaths on the terrapins.

ALT M-10: Increase the number of Sabal Palm Trees.

No. The Sabal Palm trees were incorporated into the project due to public interest. Public sentiment is that these trees were planted as a memorial to local citizens who perished in World War I. Additional palm trees would serve no purpose, aesthetically or technically, as there is green space along Fort Pulaski and along McQueen's Island Trail which will not be impacted by the project. The palm trees serve no purpose in the enhancement of the technical design of the roadway.

ALT M-12: Have another entity pay for the Sabal palm trees.

The Department will consider.

ALT M-13: Reuse/relocate existing Sabal Palm trees.

The Department will set up remove and relocate Palm Trees.

ALT M-14: Use dredge spoils for embankment material.

No. This option would require extensive classification and study of material prior to utilizing for embankment, further extending the amount of time for this project's construction.

MEMORANDUM

Ben Buchan

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January 27, 2004

sections and proposed typical section, symmetrical widening of these bridges will not allow enough of the new bridge to be built to maintain two 12 foot lanes of traffic during construction.

Another reason to avoid shifting the alignment to the south as suggested by the VE Study is that an oxbow of Lazaretto Creek already approaches State Route 26 in the vicinity of station 11+840 and appears to be migrating toward the roadway. The migration of this channel toward SR 26 could eventually lead to the undermining of the roadway.

This Office recommends that the proposed construction centerline at the Bull River bridge be shifted 2.0 meters to the left looking ahead, for a total distance of 8.6 meters between the proposed construction centerline and the existing bridge centerline. This will match the inside face of the proposed barrier on the right side looking ahead to the existing bridge gutterline. This 2.0 meter shift will enable the right side barrier to be constructed with no additional substructure required to be built on this side. However, if the results from the hydraulic and hydrological study show that the existing pile bents of the Bull River bridge have inadequate penetration, then the recommended shift of 2.0 meters will not be needed since the bridge will be replaced.

In addition, if the bridge at Lazaretto Creek is replaced as recommended, then a similar shift of 2.3 meters will not be required at that site.

This recommended shift in the alignment is based on the typical section at the bridges shown in the VE Study and in the latest roadway plans that were provided to this Office. This bridge typical section shows a total bridge width of 26.4 meters from barrier to barrier, with a distance of 6.6 meters from the construction centerline to the centerline of the existing bridge on the eastbound side.

Alt.B-2) Use prestressed concrete beams for the main spans of the Lazaretto Creek bridge.

No, not as outlined in the study. Due to the difference in live load deflections between the two types of superstructure, this Office does not agree with placing a longitudinal joint along the bridge.

As stated above, the Bridge Design Office recommends completely replacing these main steel beam spans with PSC beam spans. This recommendation is due to the construction savings involved of the PSC beam spans vs. the steel girder units, as well as the long term maintenance costs being greatly reduced.

The proposed PSC beam main span at this site will need to clear the 120 foot wide navigation channel while avoiding conflicts with the existing concrete pile footings. Due to the limited distance between the existing bents and fender system, a drilled caisson substructure will possibly be needed to build these proposed intermediate bents. The Office of Materials and

MEMORANDUM

Ben Buchan

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Research confirmed by telephone conversation that caissons were a feasible substructure alternate at this site.

Alt. B-3 & B-4) Construct new bridges and remove existing bridges at Lazaretto Creek and Bull River.

The Office of Maintenance has evaluated the Bull River bridge and determined that this structure is acceptable to retain and widen unless the existing pile bents do not have acceptable penetration with regard to the predicted scour depths. As stated above, the predicted scour depths for these structures will be determined by the hydraulic and hydrological study for this project. Unless the calculated scour depths determine otherwise, the Office of Maintenance evaluation is the determining factor.

As stated above, this Office is in favor of replacing the Lazaretto Creek bridge.

Alt. B-7) Lower design speed to reduce bridge width.

No. The minimum bridge width is set by MOG No. 4265-10. Speed Design is not a criterion that is used in setting the bridge widths for multilane rural bridges in this MOG.

If there are any questions and/or comments, please contact Sam Teal of this Office at telephone number (404) 656-5285, or at email address sam.teal@dot.state.ga.us.

PVL/HST/jym

cc: John Tiernan, attn: Sam Teal

Mike Davis

David Mulling, State Project Review Engineer



SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: US 80/SR 26 WIDENING BULL RIVER TO LAZARETTO CREEK <i>Preliminary Design Development</i>		PRESENT WORTH OF COST SAVINGS				
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
BRIDGES (B)						
B-1	Shift alignment to allow widen bridges on both sides with existing in the middle	\$24,240,238	\$32,170,997	(\$7,930,759)		(\$7,930,759)
B-2	Use prestressed concrete beams for main span of Lazaretto Creek	\$3,865,102	\$3,269,001	\$596,101		\$596,101
B-3/B-4	Construct new bridges and remove existing bridges at Lazaretto Creek and Bull River	\$23,302,599	\$33,890,993	(\$10,588,394)	\$24,147,157	\$13,558,763
B-7	Lower design speed to reduce bridge width	\$21,246,707	\$19,041,086	\$2,205,621		\$2,205,621
EARTHWORK (EW)						
EW-1	Lower the profile	\$4,609,183	\$2,752,594	\$1,856,589		\$1,856,589
EW-3	Lower design speed and minimize median	\$4,424,142	\$3,952,618	\$471,524		\$471,524
EW-4	Use mechanically stabilized embankment walls	\$4,495,940	\$10,290,924	(\$5,794,984)		(\$5,794,984)
EW-5	Use 4:1 slopes in lieu of 6:1 slopes	\$70,899	\$0	\$70,899		\$70,899
EW-7/BP-8	Provide roadway improvements at existing grade	\$13,771,278	\$3,846,681	\$9,924,597		\$9,924,597
EW-9	Minimize the quantity of Wick drains	\$8,213,075	\$4,927,845	\$3,285,230		\$3,285,230
EW-10	Eliminate the geogrid material	\$1,443,000	\$0	\$1,443,000		\$1,443,000
EW-11	Use a single layer of higher grade filter fabric in lieu of two layers	\$5,411,250	\$4,058,438	\$1,352,812		\$1,352,812
CONCRETE WORK (CW)						
CW-1	Minimize the use of raised concrete median	\$3,458,384	\$550,286	\$2,908,098		\$2,908,098
CW-3	Eliminate temporary concrete barriers	\$638,650	\$0	\$638,650		\$638,650
BASE AND PAVING (BP)						
BP-4	Construct separate bicycle facility	\$4,111,595	\$4,052,080	\$59,515		\$59,515
BP-5	Use existing McQueen's Island Trail as bicycle facility - connect to existing facility at ends of project	\$509,838	\$0	\$509,838		\$509,838
BP-6	Add evacuation lanes on each side of existing roadway at grade and incorporate bicycle lanes on evacuation lanes	\$31,011,852	\$2,893,718	\$28,118,134		\$28,118,134

From the Desk of Angela T. Alexander

Date: March 10, 2004
To: Paul Mullins
RE: VE Study Review

Sir,

I've reviewed the recommendations in the VE study for the SR 26/US80 widening project from Bull River to Lazaretto Creek. There are extremely sensitive environmental issues within the project limits. Also, this route is a designated Hurricane Evacuation route and an extensive study was done to determine the appropriate roadway elevation. Given these two factors, any recommendation that would increase the fill, increase visual impacts or affect the turtles in the area should be avoided.

I concur with the recommendations in the report with exception of BP-5 and M-2.

VE recommendation BP-5 recommends using the McQueen's Island Trail as the bike facility from Station 6+300 to 11+000(4800 m) and reducing the shoulder width in this area from 3.0m(10 ft) to 0.6m(2 ft). This recommendation could be implemented if agreeable with the resource agencies, however, the shoulder width should not be reduced to 0.6m. The response to this recommendation could be revised to "No As Proposed. Will Consider with 3.0m shoulders."

*Agree
Keep shoulder
widths*

VE recommendation M-2 recommends the use of gabions as the wildlife barrier instead of the gravity wall proposed. A gabion is an openwork frame, as of poles, filled with stones and sunk, to assist in forming a bar dyke, etc., as in harbor improvement. There is no GDOT history of the use of gabions in this situation and therefore no track record for its performance. This response could be "Will Consider pending further study of the performance and use of gabions".

*Gabions green
blend better
w/environment*

If you would like to discuss this in detail next Monday, please let me know.

*but may not be
effective. Agn
to consider further
however*

Thanks

Angela T. Alexander
Executive Assistant to the Chief Engineer

Attachments

PJM