

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE: CSBRG-0007-00(021) Forsyth Hall **OFFICE:** Engineering Services
P.I. No.: 0007021
SR 53 @ Chestatee River Bridge Replacement **DATE:** March 16, 2012

FROM: Lisa L. Myers, State Project Review Engineer

TO: Bobby K. Hilliard, PE, State Program Delivery Engineer
Attn.: Otis Clark

SUBJECT: IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES

The VE Study for the above project was held December 5-8, 2011. Responses were received on March 8, 2012. Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. The Project Manager shall incorporate the VE alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT #	Description	Potential Savings/LCC	Implement	Comments
A-1	Shift the centerline of the alignment south y 24 feet closer to the existing bridge	\$853,000	Yes	Shifted centerline will lower wall heights and decrease earthwork. This change will decrease wall length, shorten walls, decrease earthwork and reduce right of way impacts.
A-2	Shorten the eastern termination point; end at Sta. 48+00 in lieu of Sta. 50+00	\$56,000	No	The existing vertical curve (Sta. 44+00 to Sta. 52+00) is substandard. In order to improve this curve to meet standards, the project must be extended to Sta. 52+50.
B-7	Reduce the number of beams in Alternate B from 5 to 4	\$245,000	No	Preliminary design suggests that 5 beams per span are more efficient than the use of 4 beams. Should the design team determine that reducing the number of beams is more cost effective as the final design progresses, the number of beams will be reduced.
B-9	Eliminate bridge deck overhands on Alternate B	\$91,000	No	There is a potential for minimal savings using this alternative, but it requires the screed to be supported directly over a beam and the deck to be patched at the screed supports. This makes it difficult to get a smooth finish. The Construction Office does not recommend this technique due to these constructability issues. Many contractors in Georgia are not familiar with this method of construction. This could discourage contractors from bidding and reduce the competitiveness of bids.

B-10	Increase deck strength from 3500 psi to 4500 psi	Proposed = \$34,000 Revised = \$18,500	Yes, partially	The Bridge Office is utilizing 4,000 psi concrete in LRFD designs and OMR has developed a special provision for this higher strength. The Department has had issues getting higher strength from ready-mix concrete therefore it is not recommended to utilize higher than 4,000 psi. Although this project is designed using the AASHTO Standard code, not LRFD, there is a potential to reduce the deck cost by using a higher concrete strength. In addition, higher concrete strengths will be beneficial in meeting deck stress requirements in the design of the post-tensioned composite beam section.
B-13	Shorten the drilled caissons by 20 to 25 feet	Design Suggestion	No	This project is in the concept development/preliminary plan stage. New borings have not been obtained and the BFI is not underway. The foundations will be determined at the appropriate point in the project development.
CM-2	Allow a base bid bridge design (Alternate B) with allowable design bid options by the contractor	\$245,000	No	As the foundation recommendations develop the design team may provide alternate foundation types in the plans, but it is premature to make a decision on foundation at this point in the project. Cost savings should be "\$0" for this VE Alternative.
CM-2.1	Develop a base bid bridge design (Alternate B) with two or three bid options	\$98,000	No	As the foundation recommendations develop the design team may provide alternate foundation types in the plans, but it is premature to make a decision on foundation at this point in the project. Cost savings should be "\$0" for this VE Alternative.
P-4	Lower the profile on the eastern end of the alignment from Sta. 32+26 to Sta. 48+30	Proposed = \$122,000 Actual = \$45,000	Yes, partially	The roadway profile may be partially lowered from existing grades of -0.5382% and 2.2222% to -0.74265 and 2.4800%. This change will shorten height and decrease total length of retaining walls, decrease fill, and improve staging. The VE proposed grades of -1% and 2.94% were unachievable while maintaining the sufficiency of the following vertical curve.

W-1	Lengthen the bridge by 622 feet and replace MSE walls/embankment with bridge structure	Cost increase (\$876,000)	No	The design team agrees that impacts to lake volume and environmental impacts are a major issue in the planning and construction of this project. While limiting these impacts is a priority, the ability to obtain permitting for the projects with the original concept is not in doubt. Though there may be some cost risk associated with the volatility of mitigation costs, it is small relative to the cost of additional bridge. The cost associated with lengthening the bridge to this extent is not justified. Additionally, if VE alternatives A-1 and P-4 are implemented, there would be a reduced benefit and greater net cost to W-1. However, the Bridge Office does not recommend constructing MSE walls which may be inundated by the lake, as water in the back fill produces the greatest amount of risk to this type of retaining wall. Therefore, it will be necessary to extend the bridge to eliminate any walls below elevation 1071. The design team will determine the appropriate length of the bridge in conjunction with the implementation of other alternatives. An extension of between 100 and 150 feet will likely be adequate.
W-1.1	Lengthen the bridge by 522 feet and replace MSE walls/embankment with bridge structure	Cost increase (\$665,000)	No	See response to W-1.
W-1.2	Lengthen the bridge by 147 feet and replace MSE walls/embankment with bridge structure	Cost increase (\$273,000)	Yes	See response to W-1.

W-2	Use more sloped fill (2:1) in lieu of MSE walls	\$586,000	No	As stated in the VE Study, this alternate would significantly increase the amount of fill in the lake and environmental impacts over the original concept. This increase would complicate the environmental permitting and delay the permitting process. The amount of additional lake volume mitigation required under this alternate may require mitigation off site, further complicating the environmental process. The extent of the required fill slopes may also increase the required ROW to construct the project, reducing the cost savings. In addition, the implementation of A-1 and P-4 will allow for some portions of MSE walls to be eliminated, thereby reducing the savings of W-2.
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The Office of Engineering Services concurs with the Project Manager's responses.

Approved:  Date: 3/19/2012
Gerald M. Ross, PE, Chief Engineer

LLM

Attachments

- c: Russell McMurry
- Bobby Hilliard/Stanley Hill/Otis Clark
- Paul Liles/Ben Rabun/Bill Duvall
- Bobby Dollar
- Johnny Emmett
- Ken Werho
- Lisa Myers
- Matt Sanders

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE **CSBRG-0007-00(021), Forsyth/Hall Counties**
SR 53 over Chestatee River (Lake Lanier) Bridge Replacement
P.I. No. 0007021

OFFICE Program Delivery

FROM  Bobby Hilliard, P.E., State Program Delivery Engineer

DATE March 8, 2012

TO Lisa Myers, Acting State Project Review Engineer

SUBJECT **Response to Value Engineering Study Alternatives**

Attached are the responses for the Value Engineering Study. This office concurs with the responses.

If you have any questions or require further information please call Otis Clark at (404) 631-1577.

BKH: SH: OC

**GEORGIA DEPARTMENT OF TRANSPORTATION
CSBRG-0007-00(021) P.I. No. 0007021
SR 53 over Chestatee River (Lake Lanier) Bridge Replacement
Forsyth and Hall Counties
Value Engineering Report --- RESPONSE**



GEORGIA DEPT. OF TRANSPORTATION
Project CSBRG-0007-00(021) Forsyth and Hall Counties PI 0007021
S.R. 53 over Chestatee River (Lake Lanier)

RESPONSE TO THE VALUE ENGINEERING (VE) REPORT Dated: January 2012

This response to the Value Engineering Study/Report prepared by Value Management Strategies for the above project is the LPA Design Team analysis of the recommendations offered in the VE study/report that, if implemented, would presumably reduce the overall project costs and/or provide the best value for the Department in developing a project that would achieve the need and purpose. Out of 23 original alternatives/recommendations considered by the VE team, 13 were selected for implementation. The response provided herein will focus only on the 13 alternatives/recommendations suggested by the VE Team for implementation and will address each conceptual alternative. The format and order of the responses follow the presentation in the VE Report.

VE Alternatives/recommendations for implementation:

A-1: Shift the centerline of the alignment south by 24 feet, closer to the existing bridge.

Proposed Cost savings: \$853,000

Response: WILL IMPLEMENT

Shifted centerline will lower wall heights and decrease earthwork. This change will decrease wall length, shorten walls, decrease earthwork and reduce right of way impacts.

A-2: Shorten the eastern termination point, end at STA 48+00 in lieu of STA 50+00

Proposed Cost savings: \$56,000

Response: WILL NOT IMPLEMENT

The existing vertical curve (approximately STA 44+00 to STA 52+00) is substandard. In order to improve this curve to meet standards, the project must extend to STA 52+50.

BR-7: Reduce the number of beams in Alternate B from 5 to 4

Proposed Cost Savings: \$254,000

Response: WILL NOT IMPLEMENT

Preliminary design suggests that 5 beams per span are more efficient than the use of 4 beams. Should the design team determine that reducing the number of beams is more cost effective as

they move to final design then they will reduce. This is common practice with the design of any bridge.

BR-9: Eliminate bridge deck overhangs on Alternative B

Proposed Cost Savings: \$91,000

Response: ***WILL NOT IMPLEMENT***

There is a potential for minimal savings using this alternative but requires the screed to be supported directly over a beam, the deck must be patched at the screed supports and is difficult to get a good finish. The Construction Office does not recommend this technique due to these constructability issues. Also, this is a construction method that many contractors in Georgia are not familiar with. This could discourage contractors from bidding and/or reduce competitiveness of bids.

BR-10: Increase deck concrete strength from 3,500psi to 4,500psi.

Proposed Cost Savings: \$34,000

Revised Cost Savings: \$18,500

Response: ***WILL IMPLEMENT (PARTIALLY)***

The Bridge Office is utilizing 4,000 psi concrete in LRFD designs and the Office of Materials and Research has developed a special provision for this higher strength. The Department has had issues getting higher strength from ready-mix concrete and therefore it is not recommended to utilize higher than 4,000 psi. Although this project is to be designed using the AASHTO Standard code, not LRFD, there is a potential to reduce the deck cost by using a higher concrete strength. In addition, higher concrete strengths will be beneficial in meeting deck stress requirements in the design of the post-tensioned composite beam section.

BR-13: Shorten the drilled caissons.

Proposed Cost Savings: NA (design suggestion)

Response: ***WILL NOT IMPLEMENT***

This project is in the concept development – preliminary plan stage. New borings have not been obtained and the Bridge Foundation Investigation is not underway. The foundations will be determined at the appropriate point in the project development.

CM-2.0: Allow a base bid bridge design with allowable design bid options by the contractor.

Proposed Cost savings: \$245,000

Response: WILL NOT IMPLEMENT

As the foundation recommendations develop the design team may provide alternate foundation types in the plans, but it is premature to make a decision on foundations at this point in the project. Cost savings should be "\$0" for this VE Alternative

CM-2.1: Develop a base bid bridge design with 2 to 3 foundation bid options.

Proposed Cost savings: \$98,000

Response: WILL NOT IMPLEMENT

As the foundation recommendations develop the design team may provide alternate foundation types in the plans, but it is premature to make a decision on foundations at this point in the project. Cost savings should be "\$0" for this VE Alternative.

P-4: Lower the profile on the eastern end of the alignment from STA 32+26.76 to STA 48+30

Proposed Cost savings: \$122,000

Revised Cost Savings: \$45,000

Response: WILL IMPLEMENT (PARTIALLY)

The roadway profile may be partially lowered from existing grades of (-0.5382% and 2.2222%) to (-0.7426% and 2.4800%). This change will shorten height and decrease total length of retaining walls, decrease fill, and improve staging. The VE proposed grades of -1.000% and 2.94% were unachievable while maintaining the sufficiency of the following vertical curve.

W-1.0: Lengthen the bridge by 622 feet and replace MSE walls/embankment with structure.

Proposed Cost savings: (\$876,000)

Response: WILL NOT IMPLEMENT

The Design Team agrees that impacts to lake volume and environmental impacts are a major issue in the planning and construction of this project. While limiting these impacts is a priority, the ability to obtain permitting for the project (with the original concept) is not in doubt. Though there may be some cost risk associated with the volatility of mitigation costs, it is small relative to the cost of additional bridge. The cost associated with lengthening the bridge to this extent is

not justified. Additionally, if VE alternates A-1 and P-4 are implemented, there would be a reduced benefit and greater net cost to W-1. However, the Bridge Office does not recommend constructing MSE walls which may be inundated by the lake, as water in the backfill produces the greatest amount of risk to this type of retaining wall. Therefore, it will be necessary to extend the bridge to eliminate any walls below elevation 1071. The design team will determine the appropriate length of the bridge in conjunction with the implementation of other VE alternates. An extension of between 100 and 150 feet will likely be adequate.

W-1.1: Lengthen the bridge by 522 feet and replace MSE walls/embankment with structure.

Proposed Cost savings: (\$665,000)

Response: WILL NOT IMPLEMENT

See response to W-1.0

W-1.2: Lengthen the bridge by 147 feet and replace MSE walls/embankment with structure.

Proposed Cost savings: (\$273,000)

Response: WILL IMPLEMENT

See response to W-1.0

W-2: Use more sloped fill (2:1) in lieu of MSE walls.

Proposed Cost savings: \$586,000

Response: WILL NOT IMPLEMENT

As stated in the VE Study, this alternate would significantly increase the amount of fill in the lake and environmental impacts over the original concept. This increase would complicate the environmental permitting and delay the permitting process. The amount of additional lake volume mitigation required under this alternate may require mitigation off site, further complicating the environmental process. The extent of the required fill slopes may also increase the required right of way to construct the project, reducing the cost savings. Therefore the Design Team recommends that this alternate not be implemented. In addition, the implementation of alternates A-1 and P-4 will allow for some portions of MSE wall to be eliminated. If these alternates are implemented, the MSE limits will be optimized, reducing the cost savings of alternate W-2.

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE CSBRG-0007-00(021) FORSYTH-HALL COUNTIES OFFICE Atlanta, GA
SR 53 / Chestatee River (Lake Lanier) DATE February 13, 2012
P.I. No. 0007021

FROM Benjamin F. Rabun, III, P.E., State Bridge Engineer

TO Bobby Hilliard, P.E., State Program Delivery Engineer
Attn: Otis Clark

SUBJECT **BRIDGE DESIGN VALUE ENGINEERING RESPONSE**

The Value Engineering Study for the above referenced project dated December 20, 2011 contained 9 VE Alternatives and one Design Suggestion requiring responses from the Bridge Office: VE Alternatives B-7.0, B-9.0, B-10.0, CM-2.0, CM-2.1, W-1.0, W-1.1, W-1.2, and W-2.0 and Design Suggestion B-13. The Bridge Office proposes the following in response.

VE Alternative B-7.0 – “Reduce the number of beams in Alternate B from 5 to 4”

Recommendation: **Do Not Implement.** Preliminary design suggests that 5 beams per span are more efficient than the use of 4 beams. Should the design team determine that reducing the number of beams is more cost effective as they move to final design then they will reduce. This is common practice with the design of any bridge.

VE Alternative B-9.0 – “Eliminate the bridge deck overhang on Alternate B”

Recommendation: **Do No Implement.** There is a potential for minimal savings using this alternative but requires the screed to be supported directly over a beam, the deck must be patched at the screed supports and is difficult to get a good finish. The Construction Office does not recommend this technique due to these constructability issues.

VE Alternative B-10.0 – “Increase the deck concrete strength from 3,500 psi to 4,500 psi”

Recommendation: **Implement with Modification.** The Bridge Office is utilizing 4,000 psi concrete in LRFD designs and the Office of Materials and Research has developed a special provision for this higher strength. The Department has had issues getting higher strength from ready-mix concrete and therefore it is not recommended to utilize higher than 4,000 psi.

Design Suggestion B-13 – “Shorten the drilled caissons by 20 to 25 feet”

Recommendation: **Do Not Implement.** This project is in the concept development – preliminary plan stage, new borings have not been obtained and the Bridge Foundation Investigation is not underway. The foundations will be determined at the appropriate point in the project development.

VE Alternative CM-2.0 – “Allow a base bid bridge design (Alternate B) with allowable design bid options by the contractor”

Recommendation: **Do Not Implement.** As the foundation recommendations develop the design team may provide alternate foundation types in the plans but it is premature to make a decision on foundations at this point in the project. Cost savings should be “0” for this VE Alternative.

VE Alternative CM-2.1 – “Develop a base bid bridge design (Alternate B) with 2 -3 specific foundation bid options”

Recommendation: **Do Not Implement.** As the foundation recommendations develop the design team may provide alternate foundation types in the plans but it is premature to make a decision on foundations at this point in the project. Cost savings should be “0” for this VE Alternative.

VE Alternative W-1.0 – “Lengthen the bridge by 622 feet and replace MSE walls/embankment with structure”

Recommendation: **Implement with Modification.** The Bridge Office does not recommend constructing MSE walls which may be inundated by the lake. Water in the backfill produces the greatest amount of risk to this type of retaining wall. The design team needs to determine the appropriate length of bridge, profile and alignment to minimize this risk. This may require the bridge to be between 522 to 622 feet of additional length.

VE Alternative W-1.1 – “Lengthen the bridge by 522 feet and replace MSE walls/embankment with structure”

Recommendation: **Do not Implement.** See response to W-1.0.

VE Alternative W-1.2 – “Lengthen the bridge by 147 feet and replace MSE walls/embankment with structure”

Recommendation: **Do not Implement.** See response to W-1.0.

VE Alternative W-2.0 – “Use more sloped fill (2:1) in lieu of MSE walls”

Recommendation: **Do not Implement.** The project footprint depends greatly on the impacts to Lake Lanier. Certainly sloped fills are more cost effective however the project may not be constructible without constructing some walls.

If you have any questions and/or comments, please contact Bill DuVall of the Bridge Design Office at (404) 631-1883 or at email address bduvall@dot.ga.gov.

BFR:WMD

cc: Bill DuVall, Bridge Design

PRECONSTRUCTION STATUS REPORT FOR PI:0007021

PROJ ID : 0007021
COUNTY : Forsyth, Hall
LENGTH (MI) 0.40
PROJ NO.: CSBRG-0007-00(021)
PROJ MGR: Clark, Otis
AOHD Initials: SSH
OFFICE : Program Delivery
CONSULTANT: Consultant Design (DOT contract)
SPONSOR : GDOT
DESIGN FIRM: The LPA Group Incorporated

SR 53 @ CHESTATEE RIVER
MPO: Atlanta TMA, Gainesville
TIP #: FT-310
MODEL YR : 2016
TYPE WORK: Bridges
CONCEPT: Replacement
PROG TYPE: N
Prov. for ITS: N
BOND PROJ :

PRIORITY CODE:
DOT DIST: 1
CONG. DIST: 9
BIKE: N
MEASURE:
NEEDS SCORE: 6
BRIDGE SUFF:

MGMT LET DATE : 09/15/2014
MGMT ROW DATE : 05/15/2013
BASELINE LET DATE: 09/17/2014
SCHED LET DATE : 10/31/2014
WHO LETS? : GDOT Let
LET WITH :

BASE START	BASE FINISH	LATE START	LATE FINISH	TASKS	ACTUAL START	ACTUAL FINISH	%	PROGRAMMED FUNDS				STIP AMOUNTS					
								Activity	Approved	Proposed	Cost	Fund	Status	Date Auth	Activity	Cost	Fund
7/25/2011	9/19/2011	4/5/2012	4/5/2012	Concept Development	9/24/2010	8/5/2011	63	PE	2007	2007	1,861,750.88	L1CO	AUTHORIZED	7/25/2006	PE	0.00	L1CO
8/8/2011	8/8/2011	4/5/2012	4/5/2012	Concept Meeting	8/5/2011	8/5/2011	100	ROW	2013	2014	1,082,432.16	L1CO	PRECAST		ROW	1,061,208.00	L1CO
8/9/2011	9/19/2011	4/5/2012	4/5/2012	PM Submit Concept Report	11/2/2011	11/2/2011	100	UTL	2015	2015	108,243.21	L1CO	PRECAST		UTL	108,243.21	L1CO
9/19/2011	9/19/2011	4/5/2012	4/5/2012	Concept Report Review and Comments	11/3/2011	11/3/2011	15	CST	2015	2015	22,081,616.06	L1CO	PRECAST		CST	22,081,616.06	L1CO
9/21/2011	2/21/2012	4/5/2012	4/5/2012	Management Concept Approval Complete	8/11/2011	8/11/2011	83										
3/7/2012	3/7/2012	4/5/2012	4/5/2012	Value Engineering Study	10/20/2011	10/20/2011	50										
9/20/2011	6/11/2012	4/5/2012	4/5/2012	Public Information Open House Held	7/29/2011	7/29/2011	50										
3/8/2012	1/9/2013	4/23/2012	4/23/2012	Environmental Approval	1/31/2011	1/31/2011	100										
6/14/2012	12/27/2012	7/30/2012	7/30/2012	Field Surveys/SDE			0										
9/20/2011	1/30/2012	4/6/2012	4/6/2012	Preliminary Plans			0										
9/20/2013	3/6/2014	11/5/2013	11/5/2013	Preliminary Bridge Design			0										
2/7/2013	2/7/2013	3/25/2013	3/25/2013	Underground Storage Tanks			0										
2/8/2013	3/7/2013	3/26/2013	3/26/2013	404 Permit Obtainment			0										
3/8/2013	4/4/2013	4/23/2013	4/23/2013	PPFR Inspection			0										
3/18/2013	3/18/2013	5/1/2013	5/1/2013	R/W Plans Preparation			0										
5/3/2013	5/30/2013	6/18/2013	6/18/2013	R/W Plans Final Approval			0										
9/6/2013	9/19/2013	10/22/2013	10/22/2013	L & D Approval			0										
12/28/2012	7/16/2013	2/12/2013	2/12/2013	R/W Authorization			0										
7/17/2013	1/14/2014	8/30/2013	8/30/2013	Stake R/W			0										
2/20/2014	2/20/2014	4/7/2014	4/7/2014	Bridge Foundation Investigation			0										
2/28/2014	3/13/2014	4/15/2014	4/15/2014	Final Design			0										
				Final Bridge Plans Preparation			0										
				FFPR Inspection			0										
				Submit FFPR Responses (OES)			0										
PDD: Reviewed 3/4/11. Need schedule for RW in FY 2012 and CST in FY 2014.													District Comments				
Bridge: BRIDGE REQUIRED; TRUSS BRIDGE OVER LAKE LANIER													Maintenance working on repair plans now, but will scale back repairs in anticipation of replacement E				
Design: LPA Developing Concept/Database/Environmental Phases													priority 298. Need to get selected consultant under contract and let in FY15. High priority (EJC				
EIS: CE/NotApyd/OnSchedule-BaseEnv-Apyd 06.11.12/Dollar 10.17.11													1-21-10). PCRf submitted requesting RW fy to move to 2013 with construction to remain in fy 2014.				
LGPA: NOTIFICATION LETTER SENT TO FORSYTH & HALL 6-27-06.																	
Programming: #1 8-2010#2 10-2010#3 8-2011#4 11-2011																	
Utility: Need 1st Plans for Util. 2-7-12																	
EMG: BRIDGE REPLACEMENT; FLY 6656708 FOR STUDY.																	
Engr Services: VE Study held Dec 5-8, 2011																	
PreI. Parcel CT: 6					Total Parcel in ROW System:					Acquired by: DOT							
Under Review:					Options - Pending:					Acquisition MGR:							
Released:					Condemnations- Pend:					R/W Cert Date:							

DEEDS CT: