

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE: NH000-0017-01(022) Carroll **OFFICE:** Engineering Services
P.I. No.: 621990
SR 1/US 27 @ SR 166 Interchange **DATE:** February 8, 2010

FROM: Ronald E. Wishon, State Project Review Engineer *RTW*

TO: Bobby K. Hilliard, PE, State Program Delivery Engineer
Attn.: Chandria Brown, PE

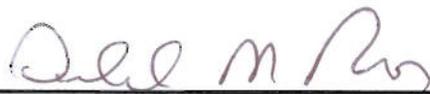
SUBJECT: IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES

The VE Study for the above project was held October 19-23, 2009. Responses were received on February 5, 2010. 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-3-1	Decrease lane width to 11 ft, inside paved shoulder width to 2 ft and outside paved shoulder width to 6 ft. On the bridge, decrease inside shoulder width to 5 ½ ft and outside shoulder width to 8 ft, and build parallel bridges	\$426,000	No	US 27/SR 1 is an Urban Principal Arterial with forecasted traffic of 38,300 ADT in 2015 and 52,180 in 2035 with 7% truck volume. With 12 foot lanes, a LOS of D is anticipated in 2035. Reducing the lanes to 11 ft would reduce capacity by 4% and create LOS to E. Crash data indicates that US 27/SR 1 at SR 166 interchange has a higher accident rate than the statewide average. The design recommended by the VE Team would separate the twin bridge by approximately 12 feet. Protecting the bridge ends and the gap between them would be difficult as there is no GA Std. that applies to such narrow medians.
A-3-2	Decrease lane widths on the ramps from 12 ft to 11 ft	Proposed = \$67,000 Actual = \$29,300	Yes	This will be done; however there was an error in the VE Team's calculations. The savings has been adjusted to correct the mistake and allow for the cost of redesigning the ramps.

D-3	Modify timing and Interconnect Signals to include the existing signals along US 27 that are adjacent to the project instead of only the signals at the ramps	Proposed = (\$-98,000) Cost increase Actual = \$0	Yes	There is currently existing interconnection for the existing signals which can be reused. There will be no additional cost to implement this recommendation.
H-2	Eliminate Field Office	\$74,000	No	District Construction Personnel has stated that there is no suitable alternative location for a field office.
K-1	Widen Ramp C to inside instead of outside	\$36,000	Yes	This will be done. By widening to the inside, the need to acquire ROW is eliminated.

The Office of Engineering Services concurs with the Project Manager's responses.

Approved:  Date: 2/9/10
 Gerald M. Ross, PE, Chief Engineer

REW/LLM
 Attachments

c: Ben Buchan
 Paul Liles/Bill Duvall/Bill Ingalsbe
 Stanley Hill/Chandria Brown
 Patrick Bowers
 Ken Werho
 Lisa Myers
 Matt Sanders

VE Team: Matt Bennett
 Keith Collins
 Jonathan Craig
 LaToya Johnson
 Joe King
 Cindy Pollard
 Melvin Waldrop

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA



INTERDEPARTMENT CORRESPONDENCE

FILE NH000-0017-01(022), Carroll County OFFICE Program Delivery
P.I. No. 621990
SR1/US 27 @ SR 166 in Carrollton DATE 02/04/2010

FROM Bobby K. Hilliard, PE, State Program Delivery Engineer *B.K.H.*

TO Ronald E. Wishon, Project Review Engineer
Attn: Lisa Myers

SUBJECT **Value Engineering Study-Responses**

Reference is made to the recommendations that were contained in the Value Engineering Study (VE) Final Report dated November 12, 2009 for the above referenced project. Our responses and recommendations are as follows:

VE Alternative A-3-1

Description: Decrease the lane widths to 11 feet. Decrease widths on the bridge to a 5'-6" inside shoulder and 8' outside shoulder. The existing parallel bridges would remain and only widened approximately 16 feet to the inside. The new roadway design will include 11 foot lanes, 2 foot inside paved shoulder and 6 foot paved outside shoulder.

(Cost Savings = \$426,000)

Response

*Approval of the VE Alternative A-3-1 is **not Recommended**.*

- The area between the existing parallel bridges will not be left open as recommended due to geometric constraints.
- The 12' lanes and shoulder widths will not be reduced due to safety reasons.

VE Alternative A-3-2

Description: Decrease the ramp lane widths to 11-ft.
(Cost Savings = \$67,000)

Recommendation

*Approval of the VE Alternative A-3-2 is **Recommended**.*

- There was an error in the VE Team's calculation of the cost savings for this recommendation. The actual cost savings of reducing the ramp lane widths is \$40,000. (Please see the attachments for the cost savings recalculation.) Thus the new cost savings would be \$40,000 minus the cost of redesign(\$10,700) which calculates to be \$29,300.

VE Alternative D-3

Description: Interconnect the existing signals along US27 that are directly adjacent to the project. This would include interconnect for the signals at the entrance to the strip mall north of the project and Central High Road which is south of the project.

(Cost Savings = -\$98,000)

Recommendation

*Approval of the VE Alternative D-3 is **Recommended**.*

- There is currently existing interconnection for the existing signals which can feasibly be re-used. Therefore, no cost would be associated with this recommendation.(Please see the attachments for reference)

VE Alternative H-2

Description: Eliminate field office
(Cost Savings = \$74,000)

*Approval of the VE Alternative H-2 is **not Recommended**.*

- At this time, there is no suitable alternative/substitute location for a field office as stated by District Construction Personnel. Thus we recommend leaving the field office cost as part of this project and addressing alternate possibilities for offsite locations during PFPR.

VE Alternative K-1

Description: Widen the westbound SR166 Off Ramp (Ramp C) to the inside of the interchange.
(Cost Savings = \$36,000)

*Approval of the VE Alternative K-1 is **Recommended**.*

If there are any questions, please contact Chandria L. Brown of this Office at (404) 631- 1580.

S.H.
BKH:SH:clb
Attachments

Cc: Doug Layton, P.E., AECOM
Dan Bodycomb, P.E. AECOM



AECOM
 1360 Peachtree Street NE,
 One Midtown Plaza, Suite 500
 Atlanta, GA 30309
 www.aecom.com

404 965 9600 tel
 404 965 9605 fax

February 4, 2010

Ms. Chandria Brown, P.E.
 Office of Program Delivery
 Georgia Department of Transportation
 600 West Peachtree Street, 25th Floor
 Atlanta, GA 30308

RE: Response to Value Engineering Recommendations
 US27/SR166 Interchange
 Project No. NH-017-1(22), Carroll County GA
 P.I. No. 621990

Dear Ms. Brown,

A Value Engineering (VE) study for the US27/SR166 Interchange was performed by GDOT staff on October 19 to 23, 2009. The results of the study were included in the Value Engineering Training Study Report dated November 12, 2009.

The VE Study Team generated a total of thirty (30) ideas of which fourteen (14) were evaluated as possible recommendations. The result of the evaluation resulted in five (5) independent recommendations.

Idea No.	Creative Idea Description	Original Initial Cost	Proposed Initial Cost	VE Cost Savings	Revised VE Cost Savings
A-3-1	Decrease lane and shoulder width - mainline	\$2,477,000	\$2,051,000	\$426,000	\$426,000
A-3-2	Decrease lane width - ramps	\$306,000	\$239,000	\$67,000	\$40,000
D-3	Modify timing - interconnect signals	\$0	\$98,000	(\$98,000)	(\$98,000)
H-2	Eliminate field office	\$74,000	\$0	\$74,000	\$74,000
K-1	Widen Ramp C to inside	\$226,000	\$190,000	\$36,000	\$36,000
				Total Savings	\$478,000

Outlined below are responses to the recommendations.

Item No. A-3-1

Description: Decrease the lane widths to 11 feet. Decrease widths on the bridge to a 5'-6" inside shoulder and 8' outside shoulder. The existing parallel bridges would remain and only widened approximately 16 feet to the inside. The new roadway design will include 11 foot lanes, 2 foot inside paved shoulder and 6 foot paved outside shoulder.

Cost Savings: \$426,000

Response: US27 is an Urban Principal Arterial with forecasted traffic of 38,800 ADT in 2015 and 52,180 ADT in 2035 with 7% truck volume. With 12-foot lanes, the future year Level of Service (LOS) is anticipated to perform at a LOS of D. Reducing the lane widths to 11-feet would reduce lane capacity by 4% from 1630 pcphpl and 1569 pcphpl. This reduction in capacity lowers the future year LOS to E.



Crash data for the years 2006 thru 2008 indicates that the SR1 at SR166 interchange has a higher accident rate than the state wide average. AASHTO notes that the lane width of a roadway greatly influences the safety and comfort of driving. The reduction in lane width on this roadway could increase the potential for traffic accidents.

The design as recommended in the VE Study would separate the twin bridges by approximately 12-feet. Protecting the bridge ends and the gap between them would require a design variance as there is no standard that applies to such narrow medians.

Revising the plans at this time to construct all 11-foot lanes, would require a redesign of all preliminary plans controlled by the mainline footprint, including the bridge plans, the plan sheets, and the roadway cross-sections. The additional design fee would be approximately \$18,500, reducing potential cost savings to \$407,500.

Considering the high traffic volumes, the reduction in LOS, and the safety concerns related to the above average accident rate, the full shoulders and 12-foot lanes should remain.

Approval: Not recommended

Item No. A-3-2

Description: Decrease the ramp lane widths to 11-ft.

Cost Savings: \$67,000

Response: The VE study team noted discrepancies between the original cost estimate and the new estimate created by the VE study team. In order to eliminate that error, a new cost savings estimate was calculated and is attached as part of this document. The actual cost savings of reducing the lane width is \$40,000.

Revising the plans at this time to construct all 11-foot lanes, would require a redesign of all preliminary plans controlled by the ramp alignments, including the plan sheets, the profiles, and the roadway cross-sections. The implementation of the project would be delayed by a minimum of 3 weeks due to these plan changes. The additional design fee is approximately \$10,700, thus reducing the cost savings to \$29,300.

GDOT's Design Policy Manual, Table 6.5, requires 12-ft lanes for Multi Lane Entrance/Exit Ramps. A design variance would be required.

Approval: Recommended

Item No. D-3

Description: Interconnect the existing signals along US27 that are directly adjacent to the project. This would include interconnect for the signals at the entrance to the strip mall north of the project and Central High Road which is south of the project.

Cost Savings: (\$98,000)

Response: Signal interconnect already exists at this location and will be re-used as part of this project. Since it already exists, the additional cost of \$98,000 will not be incurred.

Approval: Recommended



Item No. H-2

Description: Eliminate field office

Cost Savings: \$74,000

Response: According to the District 6 Engineer, the local GDOT Maintenance Office located at 195 Northside Dr. Carrollton, GA 30117 cannot be used as a GDOT field office for this project. This message was relayed through the Area Engineer on 12/11/09.

Based upon further discussion with the District Engineer and the District Construction Engineer, there is no suitable alternative/substitute location for a field office. Thus we recommend leaving the field office as part of this project and addressing alternate possibilities for offsite locations during PFPR.

Approval: Not recommended

Item No. K-1

Description: Widen the westbound SR166 Off Ramp (Ramp C) to the inside of the interchange.

Cost Savings: \$36,000

Response: We agree that widening Ramp C to the inside will eliminate the need for required right-of-way.

Approval: Recommended

In summary, our recommendation is to implement three of the five VE Study ideas for a total project savings of \$65,300.

Idea No.	Creative Idea Description	Recommend Implementation	VE Cost Savings
A-3-1	Decrease lane and shoulder width - mainline	No	-
A-3-2	Decrease lane width - ramps	Yes	\$29,300
D-3	Modify timing - interconnect signals	Yes	\$0
H-2	Eliminate field office	No	-
K-1	Widen Ramp C to inside	Yes	\$36,000
Total Savings			\$65,300

Please feel free to contact me at 404.965.9629 with any questions or concerns.

Sincerely,

Dan Bodycomb, PE
Project Manager

Attachments

CC: Stanley Hill, PE
Doug Layton, PE
File 60018447.418



Memorandum

To: Dan Bodycomb, P.E., AECOM

From: Scott Moore, Jacobs Engineering Group, Inc. (JEG)

Date: January 6, 2010

Subject: SR 166 @ SR 1 Capacity Analysis Results

Jacobs Engineering Group, Inc. conducted analysis as a part of the concept development for SR 166 at SR 1 interchange improvements (Carroll County) prepared by AECOM. The capacity analysis results indicated the need for dual left turn lanes along northbound and southbound SR 1 and an additional left turn lane be constructed for the eastbound and westbound off-ramps. The capacity improvements would provide the acceptable LOS D for design year 2035 traffic volumes.

The DHV forecast traffic for the SR 1 corridor is 4,885 in 2035, while the truck percentage is 7%. Given these volumes and the geometric conditions, HCS calculations indicate that the maximum service flow rate (MSF) with 12-foot lanes at LOS D is 1630 pcphpl and 1569 pcphpl for 11-foot lanes. This results in a 4% reduction in capacity for the corridor. Additionally, the reduction in flow rate increases vehicle delay the signalized ramp intersections. LOS during the 2035 PM peak hour with 12-foot lanes is D at both ramps. Reducing the lane widths to 11-feet would result in increased delay and LOS D at the westbound ramp and LOS E at the eastbound SR 166 ramp intersection.

Collision History

Corridor crash history analysis has been conducted for the most current three years. Table 1 shows the historical number of crashes at the segment of SR 1 between and including the SR 166 on-ramps.

Segment	2006	2007	2008
SR 1 at the SR 166 interchange (Carroll County)	6	9	4

These crashes were used to calculate standard corridor crash rates per one hundred million vehicle-miles (100 MVM) traveled shown in Table 2.

Segment	100 MVM		
	2006	2007	2008
SR 1 at the SR 166 interchange (Carroll County)	329	588	238
Statewide Average	298	445	430



Memorandum

The functional classification of SR 1 at the SR 166 interchange in Carroll County is urban, non-freeway, NHS, principal arterial. The statewide average crash rates per 100 MVM for urban principal arterial are shown in table 2. Comparing the statewide average to the Carroll County rates shows that SR 1 has a higher than average crash rate for two of the three study years.

JOB TITLE SR166 Ramp savingsJOB NO. _____ CALCULATION NO. _____ ORIGINATOR DB DATE 1/5/10SHEET 1 OF 2 REVIEWER _____ DATE _____

Reducing lane widths on ramps from 12' to 11'

Ramp A - requires full depth widening.

therefore \$ saved will be calculated using
the area saved measured from microstation

$$\text{Area 1} - 1486.9 \text{ ft}^2$$

$$\text{Area 2} - \underline{556.7 \text{ ft}^2}$$

$$2043.6 \text{ ft}^2 = 227 \text{ sy} = \text{Pavement}$$

$$\text{GAB} - \text{extra area} = 650' \times 6'' = 325 \text{ ft}^2 = 36 \text{ sy}$$

$$\text{GAB} = 227 + 36 = 263 \text{ sy} = \text{GAB}$$

Ramp B - same as A

$$\text{Area} = 1424 \text{ ft}^2 = 158 \text{ sy} = \text{Pavement}$$

$$\text{GAB} = 830' \times 6'' = 415 \text{ ft}^2 = 46 \text{ sy}$$

$$= 205 \text{ sy} = \text{GAB}$$

Ramp C - same as A

$$\text{Area} = 1827 \text{ ft}^2 = 203 \text{ sy} = \text{Pavement}$$

$$\text{GAB} = 615' \times 6'' = 367.5 \text{ ft}^2 = 34 \text{ sy}$$

$$= 237 \text{ sy} = \text{GAB}$$

Ramp D

$$\text{Area} = 1537 \text{ ft}^2 = 171 \text{ sy} = \text{Pavement}$$

$$\text{GAB} = 715' \times 6'' = 388 = 43 \text{ sy} = 214 \text{ sy} = \text{GAB}$$

JOB TITLE _____

JOB NO. _____ CALCULATION NO. _____ ORIGINATOR _____ DATE _____

SHEET 2 OF 2 REVIEWER _____ DATE _____

	Ramp A	B	C	D	Total
12.5 mm	227 sy	158	203	171	759 sy
19 mm	227 sy	158	203	171	795 sy
25 mm	227 sy	158	203	171	759 sy
GAB	263 sy	205	237	214	919 sy

		depth	lbs	tons
12.5 mm	759 sy	1.5	110	125,235
19 mm	759 sy	3	110	125
25 mm	759 sy	5	110	209
GAB	919 sy	12	150	1,654,200

		unit cost	
12.5 mm	63	74.31	4,681.53
19 mm	125	67.77	8,471.25
25 mm	209	59.47	12,429.23
GAB	827	17.04	<u>14,092.08</u>
			<u>\$ 39,674.09</u> savings

Brown, Chandria

From: Highfield, Joe
Sent: Tuesday, November 24, 2009 2:20 PM
To: Brown, Chandria; Belford, Charity; Maddox, Harry Hill, Stanley
Cc:
Subject: RE: 621990 SR166 Interchange VE Study

Chandria,

We currently have interconnection at these locations, so it would be in our benefit to have it put back into place. This could be a location where it would be feasible to re-use the existing interconnection, be it that the contractor does not damage the material during removal and reinstallation. We would like new terminations put on the ends if the fiber is reused. The fiber optic cable is very delicate and requires caution when handling. If the cable is damaged, then it would be useless and new would have to be installed.

Joe Highfield
Georgia Department of Transportation
District Signal Engineer
770-387-3632 Office
770-359-9496 Cell

From: Brown, Chandria
Sent: Wednesday, November 18, 2009 3:50 PM
To: Belford, Charity; Maddox, Harry; Highfield, Joe
Cc: Hill, Stanley
Subject: RE: 621990 SR166 Interchange VE Study

I also want to add that the VE Team offered the recommendation to re-use existing signalization materials in order to help offset the increased cost of implementing this VE recommendation. There is a separate Note under the Justification section for this VE Recommendation.

The Construction Cost Estimate used for the VE Study is attached for your use.

Thanks,
Chandria L. Brown, P.E.
Project Manager
Georgia Department of Transportation
600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Phone: (404) 631-1580

Brown, Chandria

From: Nash, Michael
Sent: Wednesday, December 02, 2009 12:26 PM
To: Brown, Chandria; Maddox, Harry; Hill, Stanley
Cc: Highfield, Joe; Belford, Charity
Subject: RE: 621990 SR166 Interchange VE Study

Interconnection is standard when used to coordinate a group of intersections; there are two basic ways to interconnect the signals – by direct means or indirect means. The direct method employs a physical connection between the intersections using several methods (i.e. fiber optics, electrical wires, etc.). If interconnection exist, as in this case it is best to reuse it, providing that it is remove and replaced without damage. (See Joe Highfield’s explanation). The indirect method is using wireless or time-based coordination.

Call me if you have any questions.

Michael D. Nash
Traffic Design Supervisor
Office of Traffic Safety and Design
(404) 635-8146 (O)
(404) 635-8116 (F)
mnash@dot.ga.gov (e-mail)

From: Brown, Chandria
Sent: Monday, November 30, 2009 4:20 PM
To: Highfield, Joe; Belford, Charity; Maddox, Harry; Nash, Michael
Cc: Hill, Stanley
Subject: RE: 621990 SR166 Interchange VE Study

All,

Is Signal Interconnection a standard part of signal design? What is the standard design procedure when signal interconnection already exists as in this case?

Thanks,
Chandria L. Brown, P.E.
Project Manager
Georgia Department of Transportation
600 West Peachtree Street, 25th Floor
Atlanta, GA 30308
Phone: (404) 631-1580
Mobile: (404) 357-5049

