



VALUE ENGINEERING REPORT

**SR 67 Widening
Bulloch County
STP00-0149-01(030), PI No. 522460**

February 2, 2012

OWNER:



Georgia Department of Transportation
600 West Peachtree Street
Atlanta, GA 30308

VALUE ENGINEERING CONSULTANT:



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VALUE ENGINEERING STUDY

SR 67 Widening
Bulloch County
Project No. STP00-0149-01(030)
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EXECUTIVE SUMMARY

Executive Summary

VALUE ENGINEERING STUDY

**SR 67 Widening
STP00-0149-01(030)
January 23-26, 2012**

Introduction

This report presents the results of a value engineering (VE) study conducted on the proposed design for widening SR 67 from I-16 to the south side of Statesboro. The project will widen a 10.86-mile section of SR 67 from two-lanes to four-lanes where adequate right-of-way (R/W) can be acquired and from two-lanes to five-lanes where R/W acquisition is restricted through the community of Denmark and several Historic areas. The project will also add bicycle shoulders to SR 67. Widening SR 67 will relieve congestion and improve traffic conditions between I-16 and Statesboro.

Major contract work items include roadway embankment, mainline paving, structures, drainage improvements, and curb and gutter. The total estimated project cost including right-of-way (R/W) is \$34.69 million. The design is currently in the concept stage. The study took place January 23-26, 2012, at the Georgia DOT Headquarters in Atlanta using a four-person VE team.

This report presents the Team's recommendations and all back-up information, for consideration by the decision-makers. This **Executive Summary** includes a brief description of each recommendation. The **Study Identification** section contains information about the project and the team. The **Recommendations** section presents a more detailed description and support information about each recommendation. The **Appendix** includes a complete record of the Team's activities and findings. The reader is encouraged to review all sections of the report in order to obtain a complete understanding of the VE process.

Considerations

Several considerations / constraints were presented to the VE team to consider when developing their recommendations. The constraints were; to provide a 5-lane roadway section through the community of Denmark, to stay within the project's proposed R/W along the Historic areas, and to provide bicycle shoulders on both sides of SR 67. Current project status: A Draft Project Concept Report has been prepared. No Environmental Document has been prepared. Right-of-way acquisition is scheduled for 2013 and construction is scheduled for 2017. The current project layout and alignment has been presented to, discussed with and tentatively approved by the State Historic Preservation Office (SHPO).

Results Obtained

The VE team focused their efforts on the high cost items of the project. Using function analysis and brain storming techniques, the team generated 33 ideas with 16 identified for additional evaluation as possible recommendations or design suggestions. The VE team developed five independent recommendations and one alternative recommendation. Implementation of the five independent recommendations has the potential to reduce the project cost by approximately \$457,000. A detailed write-up of each recommendation is contained in the respective portion of this report. A summary of the recommendations follows.

Recommendation Highlights

Idea A-1 & A-2: Construct SR 67 as a 5-lane roadway from the I-16 North Ramp intersection to the north side of the Griffin-Futch House historic area (Station 380).

The original design uses a combination of two divided 4-lane roadway sections and three 5-lane roadway sections to widen SR 67 between the I-16 North Ramp intersection and Station 380. This mix of short 4-lane / 5-lane sections allows for R/W adjustments to satisfy historic permitting and local resident requests. This design changes the roadway typical sections 11 times over 4.46 miles.

This recommendation provides for a uniform 5-lane section between the I-16 North Ramp intersection and Station 380. The VE concept minimizes the amount of R/W required for the project, satisfies historic permitting requirements, meets local resident requests, simplifies construction, improves local access, and complies with State standards.

The total potential savings is \$397,000.

Idea A-9: Shift the new SB Bridge closer to the existing bridge and reduce the median width from 44 feet to 32 feet (Station 330).

The original design shows separate bridges across Woodcock Branch. The NB roadway will use the existing bridge and a new bridge will be constructed for the SB roadway. The new SB Bridge will be constructed on the old roadway alignment providing a 44-foot median between the two bridges. All other 4-lane sections on the project have 32-foot medians. The 44-foot median between the bridges requires a transition from the 32-foot median offset before the bridge and the 5-lane section after the bridge.

This recommendation shifts the location of the new SB Bridge and associated roadway to create a 32-foot wide median. Reducing the median width provides consistency with the other 4-lane sections on the project. Providing a 32-foot median eliminates the 4-lane transition on the south side and makes the transition to the 5-lane section on the north side easier. Shifting the bridges closer together will reduce the amount of earthwork required to construct the new SB bridge approach sections.

The total potential savings is \$32,000.

Idea A-10: Keep the 5-lane roadway and shift the alignment to the west between Station 343 – 370 to reduce / eliminate impacts to historic property on the east side.

The original alignment provides a symmetrical widening from the Woodcock Branch north through the historic properties between Station 343 and Station 370. This symmetrical widening requires the acquisition of an approximate 20-foot wide strip from the Historical area on the east side.

This recommendation keeps the 5-lane roadway section between Stations 343 and 370, but shifts its alignment west to eliminate acquiring the 20-foot strip of land from the Historic area. The VE concept improves value by reducing the project's impact on the Historic area by eliminating the acquisition of approximately 1.26 acres of Historic property. This concept assumes the cost of the R/W (farmland) would be the same on either side of the roadway.

The total potential savings is \$0.

Idea A-10.1 Alternative to Idea A-10 Continue the divided 4-lane roadway and shift the mainline alignment to the west between Station 343 to 370 to reduce / eliminate impacts to historic property on the east side.

The original alignment provides a symmetrical widening from the Woodcock Branch north through the historic properties between Station 343 and Station 370. This symmetrical widening requires the acquisition of an approximate 20-foot wide strip from the Historical area on the east side.

This recommendation continues the divided 4-lane roadway through Stations 343 and 370, but shifts the alignment west to eliminate acquiring the 20-foot strip of land from the Historic area. The VE concept eliminates the acquisition of about 1.26 acres of historic property and provides an additional 2,700 feet of divided 4-lane roadway before transitioning into the narrower 5-lane section in front of the Historic Griffin-Futch House and Barn at Station 370 to 374. Continuing the 4-lane section as long as feasible reduces the length of 5-lane section that would be posted at 55 MPH.

The total potential increase is \$54,000.

Idea B-10: Use V Gutter in the 5-lane roadway section between Station 370 and Station 374 in-lieu-of Type 7 Curb and Gutter.

The original design (typical section 9) incorporates the use of curb and gutter to minimize R/W widths and impacts to the historic Griffin-Futch House and Barn properties.

This recommendation would change the curb and gutter type to use V-gutter (Detail D-33) in lieu of the curb and gutter. The GDOT Design Policy Manual states “The AASHTO Green Book states that vertical curbs should not be used along freeways or other high-speed (i.e., > 45 MPH) roadways, but if a curb is needed, it should be of the sloping type. Where used for pavement drainage or to intercept runoff from the roadside, V-gutter (with appropriately spaced inlets) is preferred over sloped curb.”

The total potential increase is \$3,000

Idea I-2: Shift the new SB roadway alignment closer to the existing box culvert and reduce the median width from 44 feet to 32 feet (Station 391+50).

The original design uses a 32-foot median for all 4-lane roadway sections except where the dual bridges (Station 330) and the triple box culvert at Zetterower Branch will be constructed. The 44-foot median width at the box culvert requires roadway transitions from a 5-lane section to the south and a 32-foot median width to the north.

This recommendation shifts the SB alignment to the east at the box culvert area and constructs a 32-foot wide median. Changing the median width from 44 feet to 32 feet reduces the amount of alignment shift needed between the 5-lane section to the south and eliminates the alignment shift between the different 4-lane sections to the north. This concept reduces potential wetlands impacts at the creek crossing. It also provides an additional 12 feet for outfall protection before additional R/W would be required.

The total potential savings is \$30,000.

SR 67 Widening

SUMMARY OF POTENTIAL COST SAVINGS

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL LIFE CYCLE SAVINGS
RECOMMENDATIONS						
A-1 & A-2	Construct SR 67 as a 5-lane roadway from the I-16 North Ramp intersection to the north side of the Griffin-Futch House historic area (Station 380).	\$1,020,000	\$623,000	\$397,000	N/A	\$397,000
A-9	Shift the new SB bridge closer to the existing bridge and reduce the median width from 44 feet to 32 feet (Station 330 / Woodcock Branch)	\$32,000	\$0	\$32,000	N/A	\$32,000
A-10	Keep the 5-lane roadway and shift the alignment to the west between Station 343 – 370 to reduce / eliminate impacts to historic property on the east side.	\$0	\$0	\$0	N/A	\$0
A-10.1	Alternative to Idea A-10 Continue the divided 4-lane roadway and shift the mainline alignment to the west between Station 343-370 to reduce / eliminate impacts to historic property on the east side.	\$120,000	\$174,000	(\$54,000)	N/A	(\$54,000)
B-10	Use V Gutter in the 5-lane roadway section at Station 370 – 374 in-lieu-of standard Type 7 Curb and Gutter.	\$9,000	\$12,000	(\$3,000)	N/A	(\$3,000)
I-2	Shift the new SB roadway alignment closer to the existing box culvert and reduce the median width from 44 feet to 32 feet (Station 391+50).	\$10,000	\$0	\$30,000	N/A	\$30,000

STUDY IDENTIFICATION

Study Identification

Project: SR 67 Widening	Date: January 23-26, 2012
Location: Bulloch County	

VE Team Members

Name:	Title:	Organization:	Telephone:
George Obaranec, PE, CVS	Highway Design	AMEC	770-421-3400
Greg Grant, PE	Structures	RS & H	678-528-7229
Joe Wheeler, PE	Highway Design	RS & H	678-528-7225
Keith Borkenhagen, PE, CVS	VE Team Facilitator	AMEC	623-556-1875

Project Description

This project will widen a 10.86-mile section of SR 67 from I-16 to the south side of Statesboro. It will widen SR 67 from two-lanes to four-lanes where adequate R/W can be acquired and from two-lanes to five-lanes where R/W acquisition is restricted through the community of Denmark and several Historic areas. The project will also add bicycle shoulders to SR 67. Major contract work items include roadway embankment, mainline paving, structures, drainage improvements, and curb and gutter. The total estimated project cost including right-of-way (R/W) is \$34.69 million.

Project Conditions and Constraints

Several considerations / constraints were presented to the VE team to consider when developing their recommendations. The constraints were:

- to provide a 5-lane roadway section through the community of Denmark,
- to stay within the project's proposed R/W along the Historic areas, and
- to provide bicycle shoulders on both sides of SR 67.

Project Design Briefing

The VE team received a project briefing by Rebecca Thigpen, District 5 Design Squad Leader and Dennis Odom, District 5 Design Engineer. The following comments were presented:

- This project will widen SR 67 between I-16 and Statesboro. The existing two-lane road will be widened to divided four-lane and five lane sections. The four-lane section will be constructed with a 32-foot median except at the dual bridges (Station 330) and triple box culvert (Station 391+50) where the median widens to 44 feet.

- The divided four-lane sections will be used where adequate R/W can be acquired.
- Through the community of Denmark and Historic areas, a five-lane section will be used to minimize the amount of R/W required for the project.
- The divided four-lane sections include two 12-foot and two 11-foot travel lanes. The five-lane sections include a 14-foot center turn lane and two 12-foot and two 11-foot travel lanes.
- The current design that incorporates the five-lane section through the Historic areas has received SHPO approval. No alignment or roadway configuration changes that require additional R/W from the Historic areas should be made to the project. Changes that reduce the project's impact on the Historic areas can be suggested.
- No R/W has been purchased for this project. R/W acquisition is scheduled to begin in 2013.
- Outside of the SHPO coordination to date, no other environmental document or studies have been developed, submitted or approved for this project.
- The current project has a design speed of 55 MPH and the District plans to sign the roadway at 55 MPH except for the five-lane section through the community of Denmark. Signing the five-lane sections at 55 MPH will require special consideration.
- The existing bridge across Woodcock Branch will be incorporated into the new NB roadway. It was reconstructed recently and is offset sufficiently to provide a 44-foot median.
- No bridge construction is included at the I-16 overpass.
- The roadway section at the triple box culvert at Station 391+50 will be widened sufficiently to provide for a 44-foot wide median.
- The project will add bicycle shoulders to both sides of the roadway. The bicycle shoulders will be placed on the outside shoulders in the divided four-lane sections, the rural five-lane sections, and in the right travel lane in the urban five-lane section through Denmark.

VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR-67 Widening

IDEA No.:
A-1 & A-2

Sheet No.:
1 of 4

CREATIVE IDEA: Construct SR 67 as a 5-lane roadway from the I-16 North Ramp intersection to the north side of the Griffin-Futch House historic area (Station 380).

Comp By: G.A.O. Date: 1/25/2012 Checked By: K.B. Date: 1/30/2012

Original Concept:

The original design uses a combination of two short divided 4-lane roadway sections and three short 5-lane roadway sections to widen SR 67 between the I-16 North Ramp intersection and Station 380. This mix of short 4-lane / 5-lane sections allows for the adjustment of R/W widths to satisfy historic permitting and local resident requests. This design changes the roadway typical section 11 times over 4.46 miles.

Proposed Change:

This recommendation would provide for a uniform 5-lane section between the I-16 North Ramp intersection and Station 380.

Justification:

The original design does not provide a uniform roadway template. Changing the roadway typical section 11 times over 4.46 miles is inconsistent with driver expectancy. The VE concept of constructing a 5-lane section through this 4.46-mile area would minimize the amount of R/W required for the project, satisfy historic permitting requirements, meet local resident requests, and comply with State standards. Constructing a single 5-lane section will simplify construction and reduce cost. The 5-lane roadway will allow more local access than a divided 4-lane facility.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$1,020,000		
Proposed	\$623,000		
Savings	\$397,000		\$397,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$397,000

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: A-1 & A-2
Client: GDOT
Sheet 3 of 4

Assumed Cost of Right of Way:

Total cost of R/W - \$7,208,000

Total area required – 51.36 acre residential + 4.02 commercial = 55.38 acres

Cost per Acre

$\$7,208,000 / 55.38 \text{ acres} = \$130,155 \text{ per acre}$ **USE \$130,000 per acre**

Assume Asphalt Pavement Costs: Use 8 ½ inches of asphalt on 10 inch GAB

$(8.5 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.053125 \text{ ton} / \text{SF}$

$(10 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.05625 \text{ ton} / \text{SF}$

Cost per SY

$(0.053125 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$70 / \text{ton}) + (0.05625 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$11.70 / \text{ton}) =$
 $\$33.47 + \$5.92 = \$39.39 / \text{SY}$ **USE: \$40 per SY**

Original Design:

Required R/W 4-lane section

Station 157+50 to 229+50 and Station 256+80 to 343+00 = 7,200 ft + 8,620 ft = 15,820 ft

Assume outside ditch sections for both 4 and 5 lane sections are the same

Median width difference: = 32 ft – 14 ft = 18 ft

Additional R/W $15,820 \text{ ft} \times 18 \text{ ft} = 284,760 \text{ SF} = \mathbf{6.537 \text{ acres}}$

Additional earthwork for 4-lane section = 18 ft wide; assume 2 feet deep

$15,820 \text{ ft} \times 18 \text{ ft} \times 2 \text{ ft} = 569,520 \text{ CF} / 27 = \mathbf{21,093 \text{ CY}}$

VE Design:

Additional pavement required for continuous 5-lane section:

Assume 2-ft inside shoulders are paved full depth

$14 \text{ ft} - 2 \text{ ft} (2) = 10 \text{ ft}$

$15,820 \text{ ft} \times 10 \text{ ft} = 158,200 \text{ SF} / 9 = \mathbf{17,578 \text{ SY}}$

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: A-1 & A-2
Client: GDOT
Sheet 4 of 4

Original Design Typical Roadway Sections

# Lanes	Typical Section #	Station	Length
5	#2	144+50 to 157+00	1,250
4	#3	157+00 to 229+50	7,250
5	#4	229+50 to 242+53	1,303
5	#5	242+53 to 252+00	947
5	#6	252+00 to 257+00	500
4	#7	257+00 to 263+00	600
4	#8	263+00 to 319+00	5,600
4	#7	319+00 to 343+00	2,400
5	#2	343+00 to 370+00	2,700
5	#9	370+00 to 374+00	400
5	#2	374+00 to 380+00	600
4	#10	380+00 to 385+00	500
4	#11	385+00 to 397+00	1,200
4	#7	397+00 to 399+00	200
4	#8	399+00 to 461+00	6,200
5 *	#5	461+00 to 471+00	1,000
5 *	#4	471+00 to 495+00	2,400
5	#2	495+00 to 503+00	800
5	#12	503+00 to 517+00	1,400
4	#10	517+00 to 520+00	300
4	#7	520+00 to 523+00	300
4	#8	523+00 to 629+00	10,600
5	#4	629+00 to 642+00	1,300
5	#2	642+00 to 647+00	500
			50,250

NOTE: Section being changed from 5-lane section to 4-lane section / District Office

VE Design Typical Roadway Sections (Station 144+50 – Station 380)

# Lanes	Typical Section #	Station	Length
5	#2	144+50 to 242+53	9,803
5	#5	242+53 to 257+00	1,447
5	#2	257+00 to 370+00	11,300
5	#9	370+00 to 374+00	400
5	#2	374+00 to 380+00	600

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR-67 Widening

IDEA No.:
A-9

Sheet No.:
1 of 6

CREATIVE IDEA: Shift the new SB bridge closer to the existing bridge and reduce the median width from 44 feet to 32 feet (Station 330 / Woodcock Branch)

Comp By: G.C.G. Date: 01/25/2012 Checked By: K.B. Date: 1/30/2012

Original Concept: Original concept calls for separate bridges across Woodcock Branch. The existing bridge was constructed in 2001 at an offset from the existing roadbed in anticipation of route being up-graded to a divided 4-lane highway. The existing bridge will carry the NB lanes and a new bridge will be constructed to carry the SB lanes along the old roadbed near the bridge. The proposed SB bridge is 35 feet wide from gutterline to gutterline and is set at a 68-foot offset (bridge centerlines) providing room for a 44-foot median.

The current design uses a 32-foot median for the 4-lane sections except for the area where the dual bridges (also the triple box culvert at Station 391+50) will be constructed. This area incorporates a 44-foot median requiring a transition to and from the 32-foot standard offset before and after the bridge.

Proposed Change:

This recommendation would shift construction of the new SB bridge and associated roadway to create a 32-foot wide median.

Justification:

Changing from a 44-foot median to a 32-foot median maintains consistency of typical section with the major portions of the rest of the project. Reducing the median width to 32 feet will make it easier to transition from the 5-lane roadway section at Station 343. Shifting the bridges closer together will reduce the amount of earthwork required to construct the new SB bridge approach sections. Also, the existing pavement structure through this area will require reconstruction because the new roadway profile is higher than the existing profile.

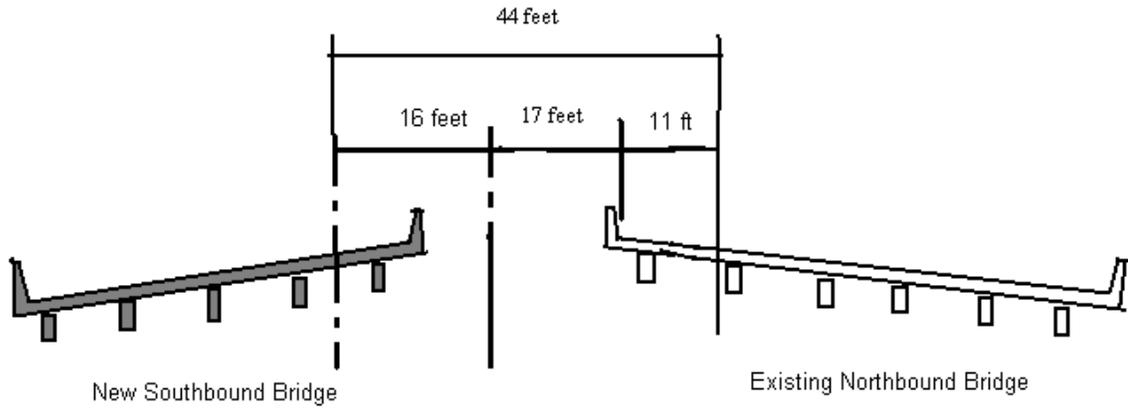
COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$32,000		
Proposed	\$0		
Savings	\$32,000		\$32,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$32,000

SKETCH

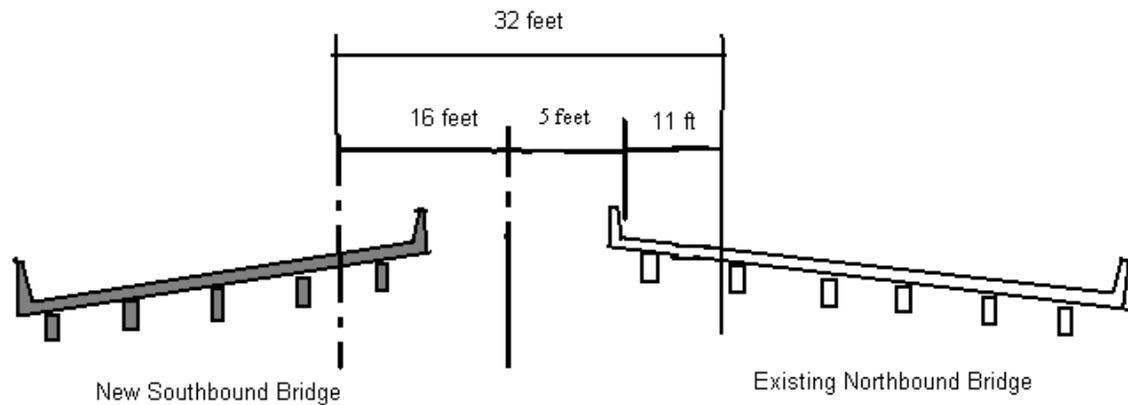
Project: Project: SR-67 Widening

Idea No.: A-9
Client: GDOT
Sheet 2 of 6

Note: NO SCALE



ORIGINAL CONCEPT



PROPOSED CHANGE

COST WORKSHEET

Project: Project: SR-67 Widening					Idea No.: A-9 Client: GDOT Sheet 3 of 6		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Excess Earthwork	CY	4,000	\$8.00	\$32,000			
VE Design:							
Earthwork	CY				0		\$0
SUBTOTAL				\$32,000			\$0
TOTAL ROUNDED				\$32,000			\$0

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: A-9
Client: GDOT
Sheet 4 of 6

Distance Calculations for Original Concept:

Distance between PGL NB to PGL SB bridge = 44 feet
Distance from PGL SB to CL Original Concept = 16 feet
 $44 \text{ feet} - 16 \text{ feet} = 28 \text{ feet}$ (distance from cl roadway to PGL NB Bridge)
CL NB Bridge to gutterline = 22 feet
 $22 \text{ feet} - 11 \text{ foot inside lane} = 11 \text{ foot inside shoulder}$
 $28 \text{ feet from CL to NB inside lane} - 11 \text{ feet inside shoulder} = 17 \text{ feet}$ (see sketch)

Distance Calculations for Proposed Change:

Distance between PGL NB to PGL SB bridge = 32 feet
Distance from PGL SB to CL Original Concept = 16 feet
 $32 \text{ feet} - 16 \text{ feet} = 16 \text{ feet}$ (distance from cl roadway to PGL NB Bridge)
CL NB Bridge to gutterline = 22 feet
 $22 \text{ feet} - 11 \text{ foot inside lane} = 11 \text{ foot inside shoulder}$
 $16 \text{ feet from CL to NB inside lane} - 11 \text{ feet inside shoulder} = 5 \text{ feet}$ (see sketch)

Savings by using this Proposed Change:

Median earthwork savings.

The PGL's for north and south bound will shift in from 44 feet to 32 feet.

$44 \text{ ft} - 32 \text{ ft} = 12 \text{ ft shift}$

The entire transition happens by shifting the new SB alignment toward the NB alignment.

So, the length of the transition = $14 \text{ ft} \times 55 \text{ mph} = 770 \text{ ft}$

Use Typical Section #7 for the calculations below:

Median width is 32 feet at station 319+00 (998 feet from start of bridge)

Transition Length is OK ($>770 \text{ ft}$)

Start bridge = 328+98 End Bridge = 330+58

Median width is 32 feet at Station 343+00 (1,242 ft from end of bridge)

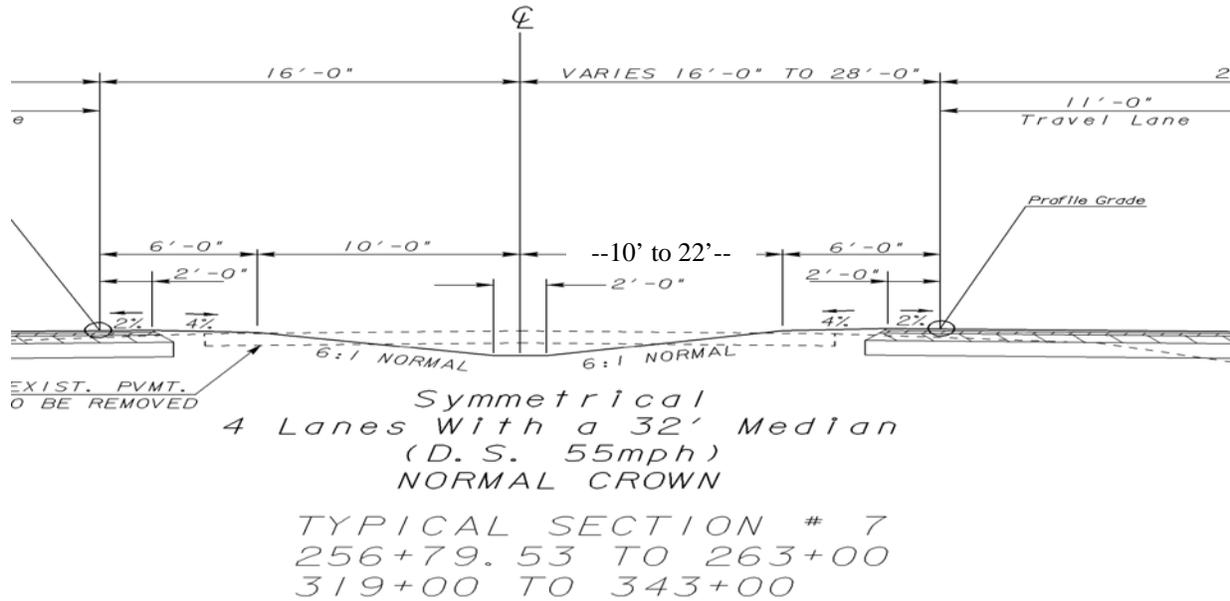
Transition Length is OK ($>770 \text{ ft}$)

SKETCH

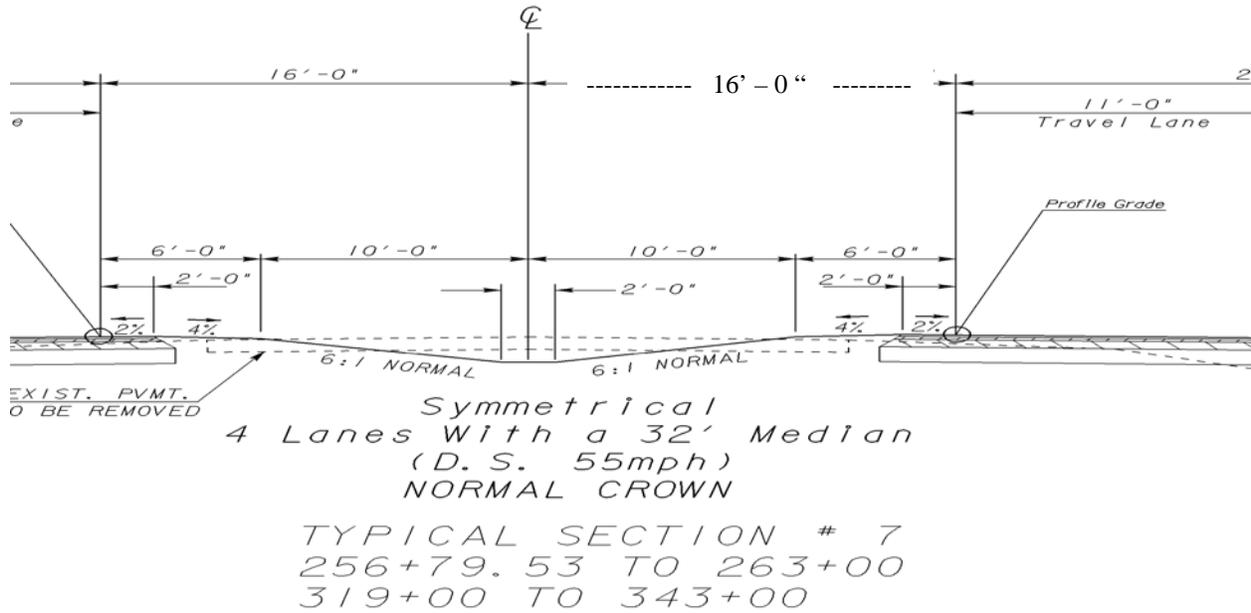
Project: Project: SR-67 Widening

Idea No.: A-9
 Client: GDOT
 Sheet 5 of 6

Original Design: SB Shoulder Varies from 16 – 28 Feet



VE Design: SB Shoulder Set at 16 Feet



CALCULATIONS

Project: Project: SR-67 Widening

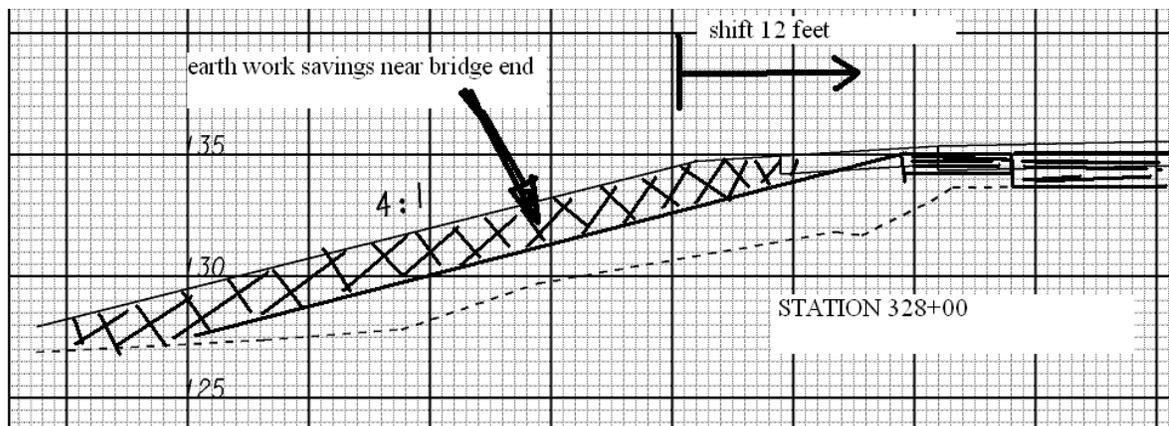
Idea No.: A-9
Client: GDOT
Sheet 6 of 6

Volume of Earthwork

Approximate savings in earthwork

At the bridge, the savings is a 12-foot reduction in width on a 4:1 outside slope for the SB alignment.

Original Cross-section near bridge end



Proposed Cross-section near bridge end

An exact analysis of earthwork needs to be performed, but an approximation would be as follows.

At the bridge end

$$(12 \text{ horizontal feet} \times \sim 8 \text{ feet tall} / 2 \times 998 \text{ ft from start of bridge}) + \\ (12 \text{ horizontal feet} \times \sim 8 \text{ feet tall} / 2 \times 1,242 \text{ ft from end of bridge}) / 27 = 3,982 \text{ CY}$$

Use **4,000 CY**

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR-67 Widening

IDEA No.:
A-10

Sheet No.:
1 of 3

CREATIVE IDEA: Keep the 5-lane roadway and shift the alignment to the west between Station 343 – 370 to reduce / eliminate impacts to historic property on the east side.

Comp By: G.A.O. Date: 1/25/2012 Checked By: K.B. Date: 1/30/2012

Original Concept:

The original alignment provides a symmetrical widening from the Woodcock Branch north through the historic properties between Station 343 and Station 370. This concept requires R/W acquisition from both sides of the existing roadway including the acquisition of an approximate 20-foot wide strip from the Historical area on the east side.

Proposed Change:

This recommendation would keep the original 5-lane roadway and shift its alignment to the west through Stations 343 – 370 to eliminate the need to acquire the 20-foot strip of land from the Historic area.

Justification:

The VE concept reduces the project’s impact on the Historic area by eliminating the need to acquire approximately 1.26 acres of Historic property. Assuming the cost of the R/W (primarily farmland) would be the same on either side of the roadway this change does not affect project costs, but improves project value.

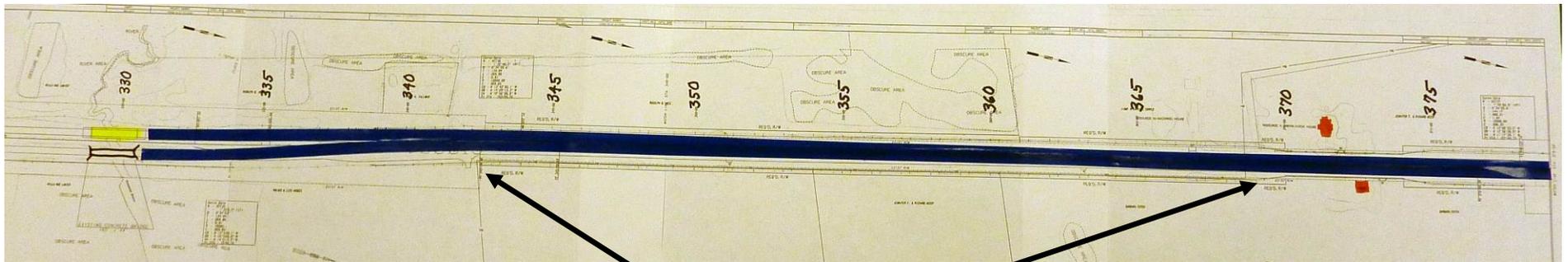
COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$0		
Proposed	\$0		
Savings	\$0		\$0
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$0

SKETCH

Project: Project: SR-67 Widening

Idea No.: A-10
Client: GDOT
Sheet 2 of 3

**VE Concept: Keep 5-Lane Roadway & Shift Alignment West
Station 335 to Station 370**



Reduce / Eliminate Impacts to Historic Property
Station 343 to Station 370

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: A-10
Client: GDOT
Sheet 3 of 3

Assumed Cost of Right of Way:

Total cost of R/W - \$7,208,000

Total area required – 51.36 acre residential + 4.02 commercial = 55.38 acres

Cost per Acre

$\$7,208,000 / 55.38 \text{ acres} = \$130,155 \text{ per acre}$ **USE \$130,000 per acre**

VE Concept:

Shift roadway west between Station 343+00 and Station 370+00

Historic property on east side between Station 342+50 and Station 370+00 2,750 ft

Average width of shift is 20 ft

$2,750 \text{ ft} \times 20 \text{ ft} = 55,000 \text{ SF} = 1.263 \text{ acres}$

R/W Impact:

Acquire additional R/W on west side $1.263 \text{ AC} \times \$130,000 = \$164,190$

Eliminate R/W on east side $1.263 \text{ AC} \times \$130,000 = \$164,190$

Net Change = $\$164,190 - \$164,190 = \$0$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR-67 Widening

IDEA No.:
A-10.1

Sheet No.:
1 of 4

CREATIVE IDEA: Alternative to Idea A-10 Continue the divided 4-lane roadway and shift the mainline alignment to the west between Station 343-370 to reduce / eliminate impacts to historic property on the east side.

Comp By: GAO Date: 1/25/2012 Checked By: K.B. Date: 1/30/2012

Original Concept:

The original alignment provides a symmetrical widening from the Woodcock Branch north through the historic properties between Station 343 and Station 370+00. This concept requires R/W acquisition from both sides of the existing roadway including the acquisition of an approximate 20-foot wide strip from the Historical area on the east side.

Proposed Change:

This recommendation would continue the 4-lane divided roadway and shift its alignment to the west through Stations 343 – 370 to eliminate the need to acquire the 20-foot strip of land from the Historic area.

Justification:

This concept eliminates the acquisition of about 1.26 acres of historic property on the east side and continues the divided 4-lane roadway north to Station 370. It provides an additional 2,700 feet of divided 4-lane roadway before transitioning into the narrower 5-lane section in front of the Historic House and Barn at Station 370 – 374. Continuing the 4-lane section as long as feasible maintains driver expectancy and reduces the length of 5-lane roadway that would be posted at 55 MPH. This concept increases project costs, but reduces impacts to the historic property on the east side.

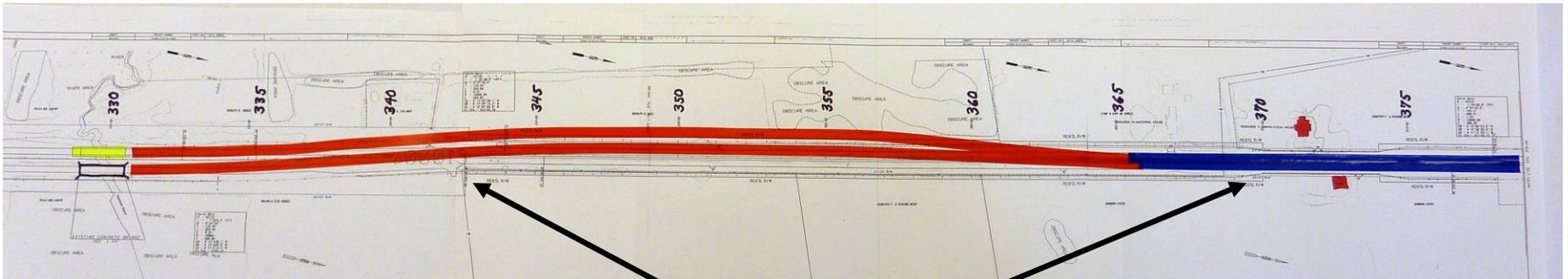
COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$120,000		
Proposed	\$174,000		
Savings	(\$54,000)		(\$54,000)
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			(\$54,000)

SKETCH

Project: Project: SR-67 Widening

Idea No.: A-10.1
Client: GDOT
Sheet 2 of 4

**VE Concept: Continue 4-Lane Roadway & Shift Alignment West
Station 335 to Station 370**



Reduce / Eliminate Impacts to Historic Property
Station 343 to Station 370

COST WORKSHEET

Project: Project: SR-67 Widening					Idea No.: A-10.1 Client: GDOT Sheet 3 of 4		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
R/W	AC	0		\$0			
Earthwork	CY	0		\$0			
Eliminate center lane Pav't	SY	3,000	\$40.00	\$120,000			
VE Design:							
Additional R/W for median	AC				1.116	\$130,000	\$145,080
Earthwork	CY				3,600	\$8.00	\$28,800
Pavement	SY				0		\$0
SUBTOTAL				\$120,000			\$173,880
TOTAL ROUNDED				\$120,000			\$174,000

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: A-10.1
Client: GDOT
Sheet 4 of 4

Assumed Cost of Right of Way:

Total cost of R/W - \$7,208,000

Total area required – 51.36 acre residential + 4.02 commercial = 55.38 acres

Cost per Acre

$\$7,208,000 / 55.38 \text{ acres} = \$130,155 \text{ per acre}$ **USE \$130,000 per acre**

Assume Asphalt Pavement Costs: Use 8 ½ inches of asphalt on 10 inch GAB

$(8.5 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.053125 \text{ ton} / \text{SF}$

$(10 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.05625 \text{ ton} / \text{SF}$

Cost per SY

$(0.053125 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$70 / \text{ton}) + (0.05625 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$11.70 / \text{ton}) =$
 $\$33.47 + \$5.92 = \$39.39 / \text{SY}$ **USE: \$40 per SY**

VE Concept:

Shift roadway west between Station 343+00 and Station 370+00

Historic property on east side between Station 342+50 and Station 370+00 = 2,750 ft

Average width of shift is 20 ft

Additional R/W to avoid Historic area $2,750 \text{ ft} \times 20 \text{ ft} = 55,000 \text{ SF} = 1.263 \text{ AC}$

R/W Impact to avoid Historic area:

Acquire additional 20 feet of R/W on west side $1.263 \text{ AC} \times \$130,000 = \$164,190$

Eliminate 20 feet of R/W on east side $1.263 \text{ AC} \times \$130,000 = \$164,190$

Roadway Revise 5-lane to 4-lane between Station 343+00 to 370+00 = 2,700 ft

Assume outside ditch sections for both 4 and 5 lane sections

Median width difference: $32 - 14 = 18 \text{ ft}$

Additional R/W for divided median $2,700 \times 18 = 48,600 \text{ sq ft} = 1.116 \text{ AC}$

Additional earthwork – 18 ft wide; assume 2 feet deep

$2,700 \times 18 \times 2 = 97,200 \text{ CF} / 27 = 3,600 \text{ CY}$

Pavement reduction for a 4-lane section:

$14 \text{ ft} - 2 (2 \text{ ft inside shoulders}) = 10 \text{ ft}$

$2,700 \text{ ft} \times 10 \text{ ft} = 27,000 \text{ SF} / 9 = 3,000 \text{ SY}$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR-67 Widening

IDEA No.: B-10	Sheet No.: 1 of 4	CREATIVE IDEA: Construct a V Gutter through the 5-lane section at Station 370 – 374 in-lieu-of standard curb and gutter.
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Comp By: J.W. Date: 1/25/2012 Checked By: K.B. Date: 1/30/2012

Original Concept:

Typical section number 9 incorporates the use of curb and gutter to minimize impacts to the historic properties from Sta. 370+00 to Sta. 374+00. The type of curb and gutter was not identified on the typical section. For purposes of this report, it is assumed to be 8" × 30", Type 7 curb and gutter.

Proposed Change:

This recommendation would change the curb and gutter type to use V-gutter (Detail D-33) in lieu of the curb and gutter.

Justification:

Section 6.9 of the GDOT Design Policy Manual states “The AASHTO Green Book states that vertical curbs should not be used along freeways or other high-speed (i.e., > 45mph) roadways, but if a curb is needed, it should be of the sloping type. Where used for pavement drainage or to intercept runoff from the roadside, V-gutter (with appropriately spaced inlets) is preferred over sloped curb.”

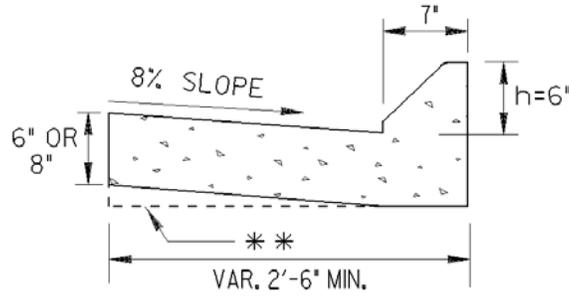
Cost estimates were made using weighted unit prices from the December 2011 Item Mean Summary.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$9,000		
Proposed	\$12,000		
Savings	\$(3,000)		\$(3,000)
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			(\$3,000)

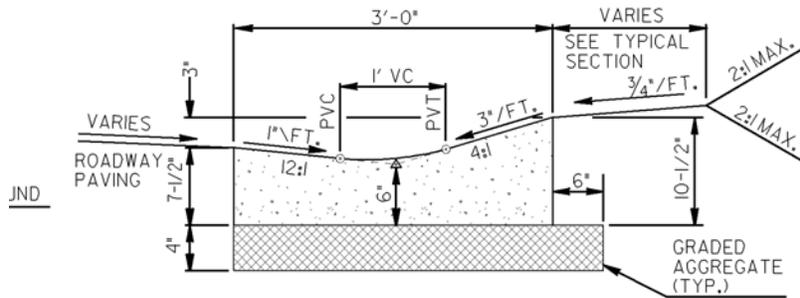
SKETCH

Project: Project: SR-67 Widening

Idea No.: B-10
 Client: GDOT
 Sheet 2 of 4



TYPE 7



1. CONCRETE SHALL BE CLASS "A", OR PER SECTION 44I.
2. BASIS OF PAVEMENT: CONCRETE "V" GUTTER PER LIN. FT.

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: B-10
Client: GDOT
Sheet 4 of 4

Typical section applies from Sta. 370+00 to Sta. 374+00 – curb and gutter on both sides of road.

$$400 \text{ LF} \times 2 = 800 \text{ LF}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR-67 Widening

IDEA No.: I-2	Sheet No.: 1 of	CREATIVE IDEA: Shift the new SB roadway alignment closer to the existing box culvert location and reduce the median width from 44 feet to 32 feet (Station 391+50).
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Comp By: G.A.O. Date: 1/25/2012 Checked By: K.B. Date: 1/30/2012

Original Concept:

The current design uses a 32-foot median for the 4-lane roadway sections except for the area where the dual bridges (Station 330) and the triple box culvert at Zetterower Branch will be constructed. These areas incorporate a 44-foot median requiring a transition to and from the 32-foot standard offset. The 44-foot wide median matches the roadway constructed previously and is intended to re-use the original roadbed.

Proposed Change:

This recommendation shifts the SB alignment to the east at the box culvert area and constructs a 32-foot wide median.

Justification:

Reducing the median width from 44 feet to 32 ft will reduce the amount of alignment shift between the 5-lane section at Station 380 and the 4-lane section at Station 385 and eliminate the alignment shift between the different 4-lane sections north of Station 385. While the plans show no R/W acquisition in this area, outfall protection for the large box culvert could extend beyond the existing R/W. Reducing the box culvert length allows an additional 12 feet for outfall protection before additional R/W would be required. This concept also reduces potential wetlands impacts at the creek crossing. The existing pavement structure through this area will require reconstruction because the new roadway profile is higher than the existing profile.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$30,000		
Proposed	\$0		
Savings	\$30,000		\$30,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$30,000

COST WORKSHEET

Project: Project: SR-67 Widening					Idea No.: I-2 Client: GDOT Sheet 2 of 3		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Box Culvert reduction	CY	23.4	\$652	\$15,242			
Rebar & Backfill	LS	1	\$5,000	\$5,000			
Earthwork reduction	LS	1	\$10,000	\$10,000			
VE Design:							
Box Culvert	CY				0		\$0
Backfill	LS				0		\$0
Earthwork	LS				0		\$0
SUBTOTAL				\$30,242			\$0
TOTAL ROUNDED				\$30,000			\$0

CALCULATIONS

Project: Project: SR-67 Widening

Idea No.: I-2
Client: GDOT
Sheet 3 of 3

VE Design:

Reduction in Triple Box Culvert Length:

$$\text{Width} = (7 \text{ ft} \times 3 + 0.83 \text{ ft} \times 2 + 0.75 \text{ ft} \times 2) \times 0.75 \text{ ft} = 18.12 \text{ SF} \times 2 + 36.24 \text{ SF}$$

$$\text{Walls} = 2 \times 0.75 \text{ ft} \times 5 \text{ ft} + 2 \times 0.83 \text{ ft} \times 5 \text{ ft} = 15.8 \text{ SF}$$

$$\text{Total Volume} = (36.24 \text{ SF} + 15.8 \text{ SF}) \times 12 \text{ ft} = 631.2 \text{ CF} / 27 = 23.4 \text{ CY}$$

$$23.4 \text{ CY} @ \$652 = \$15,242$$

Assume rebar & backfill @ \$5,000

Assume miscellaneous earthwork savings = \$10,000

APPENDIX

VE STUDY SIGN-IN SHEET

Project No.: STP00-0149-01(030) County: Bulloch Date: January 23-26, 2012

PI No.: 522460-

Days

FIRST	LAST	NAME	GDOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Lisa L. Myers	Engineering Services	404-631-1770	lmyers@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Matt Sanders	Engineering Services	404-631-1752	msanders@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Melissa Harper	Construction	404-631-1971	mharper@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ken Werho	Traffic Operations	404-635-8144	kwerho@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Bill DuVall	Bridge Design	404-631-1883	bduvall@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Brad Saxon	Preconstruction Engineer	912-427-5715	bsaxon@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Joe Wheeler	RS&H	678-528-7225	joe.wheeler@rsandh.com
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	George Obaranec	AMEC	770-421-3346	george.obaranec@AMEC.com
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Greg Grant	RS&H	678-528-7229	greg.grant@rsandh.com
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Keith Borkenhagen	AMEC	623-556-1875	keith.borkenhagen@AMEC.com
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	David Moyer	Program Delivery	404-291-5880	dmoyer@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Rebecca Thigpen	D5 Design Squad Leader	912-427-5794	rethigpen@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Claude "CR" Jackson	D5 Area Engineer	912-871-1108	clajackson@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dennis Odom	District Design Engineer	912-427-5716	dodom@dot.ga.gov
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Check all that attend Did Not Attend 13 Attended Project Overview (Day 1) 10 Attended Project Presentation (Day 4)

Sources

Approving/Authorizing Persons

Name:	Position:	Telephone:
David Moyer	Project Manager – Program Delivery	404-291-5880
Brad Saxon	District Preconstruction Engineer	912-427-5715
Lisa Myers	Acting State Project Review Engineer	404-631-1770

Personal Contacts

Name:	Telephone:	Notes:
Rebecca Thigpen	912-427-5794	Project Design Briefing
Dennis Odom	912-427-5716	Project Design Briefing
Brad Saxon	912-427-5715	Project Design Briefing
Rebecca Thigpen	912-427-5794	PDF Files of the project layout drawings

Documents/Abstracts

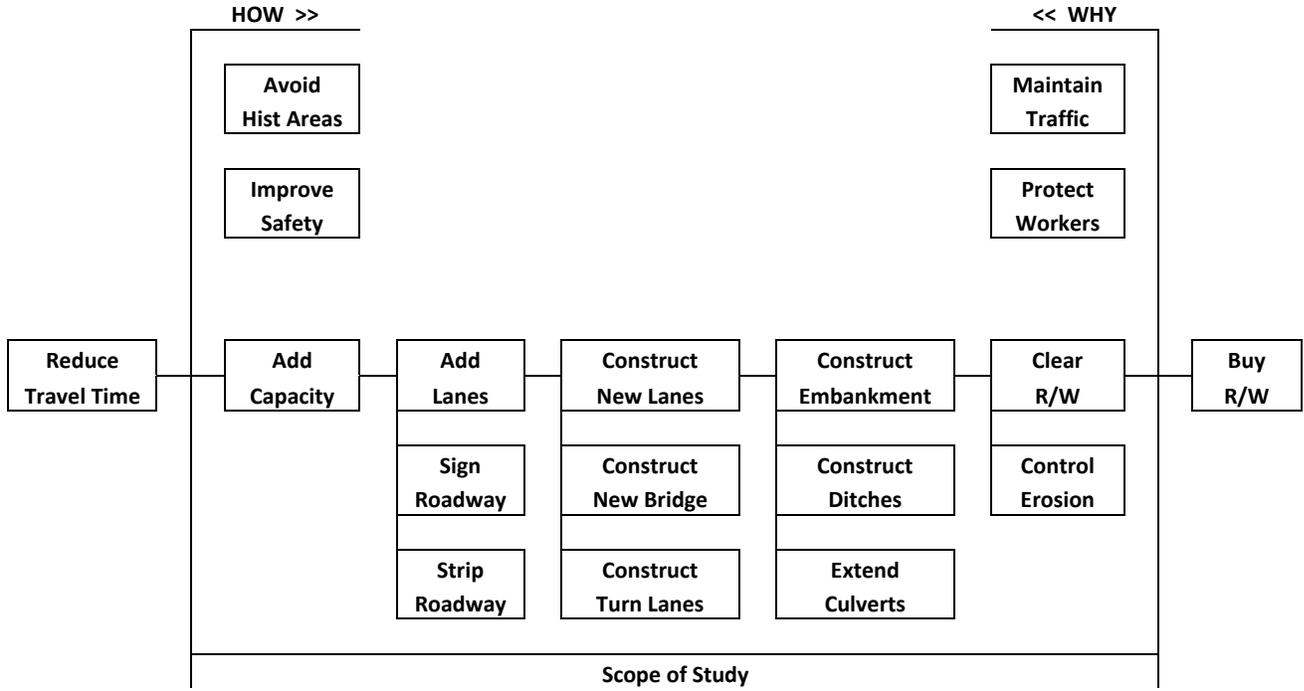
Reference:	Reference:
Preliminary Plans	Roadway Cross Sections
Preliminary Cost Estimate	Preliminary Bridge Layout
Project Concept Report	100 Scale Layout
Draft Revised Project Concept Report	Approved 1993 Project Concept Report
Project Traffic Data	Preliminary R/W Cost Estimate

SR 67 Widening

Cost Model / Distribution

Item	Description	\$ Amount	% of Total Project
A	Asphalt Pavement	\$8,961,000	29.3
B	Right-of-Way	\$7,208,000	23.5
C	Miscellaneous	\$5,765,000	18.8
D	Clearing & Grubbing	\$3,000,000	9.8
E	Special Subgrade Complete	\$1,650,000	5.4
F	Earthwork	\$1,312,000	4.3
G	Aggregate Base Course	\$1,310,000	4.3
H	Bridge	\$645,000	2.1
I	Box Culverts	\$515,000	1.7
J	Storm Drain Pipe	\$252,000	0.8
	Total Project Cost	\$30,618,000	
	Engineering & Inspection	\$1,171,000	
	AC Adjustment	\$2,228,000	
	Utility	\$677,000	
		\$34,694,000	
	NOTE: Cost Model developed from the 9/23/2011 project cost estimate		

FAST DIAGRAM



INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 67 Widening

Basic Function: Increase Capacity

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
A	Asphalt Pavement	Widen	Roadway	\$8,961,000	29.3%	Yes
		Support	Load			
		Add	Capacity			
		Improve	Safety			
		Add	Bike Lanes			
		Allow	Access			
		Reduce	Historic Imp.			
		Add	Turn Lanes			
		Connect to	Existing Rdwy			
B	Right-of-Way	Allow	Construction	\$7,208,000	23.5%	Yes
		Store	Project			
		Avoid	Historic Sites			
		Widen	Roadway			
		Add	Bike Lanes			
		Establish	Corridor			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 67 Widening

Basic Function: Increase Capacity

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
C	Miscellaneous	Complete	Project	\$5,765,000	18.8%	No
D	Clear & Grubbing	Clear	R/W	\$3,000,000	9.8%	Yes
		Allow	Construction			
		Avoid	Historic Areas			
E	Special Subgrade Complete	Stabilize	Material	\$1,650,000	5.4%	No
F	Earthwork	Add	Lanes	\$1,312,000	4.3%	Yes
		Widen	Roadway			
		Construct	Rdwy Template			
		Construct	Ditches			
		Construct	Median			
		Drain	Roadway			
		Realign	Cross Roads			
		Reuse	Existing Rdwy			
G	Aggregate Base Course	Support	Roadway	\$1,310,000	4.3%	No

INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 67 Widening

Basic Function: Increase Capacity

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
H	Bridge	Span	Woodcock Branch	\$594,000	4.9%	Yes
		Match	Existing Bridge			
		Use	Existing Roadway			
I	Concrete Box Culverts	Extend	Existing Culverts	\$139,000	1.2%	Yes
		Allow	Drainage			
		Avoid	Historic Property			
		Cross	Creek Areas			
J	Storm Drain Pipe	Extend	Existing Pipes	\$380,000	3.1%	No
		Drain	5-Lane Section			
		Convey	Water			
		Collect	Runoff			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Asphalt Pavement		
A-1	Continue rural 5-lane section from the south end of the project to Station 242+50 (south of Denmark)	Meets driver expectancy, Maintain same road section for a longer period, Would require a possible reduction in travel speed	✓
A-2	Construct a rural 5-lane section between Station 256+80 and Station 343	Meets driver expectancy, Maintain same road section for a longer period, Would require a possible reduction in travel speed	✓
A-3	Start the rural 5-lane section at Station 320 to include the area the new bridge	Does not save any bridge costs, Would add additional roadway costs	X
A-4	Eliminate the CR 253 (Clifton Rd) / SR 67 intersection.	Improve mainline operation	✓
A-5	Reduce the depth of the bike lane pavement on the SB lane through Denmark	Reduce cost, Simplify construction	✓
A-6	Extend the 5-lane curb and gutter section (with 6 1/2 -foot offset) through the entire historic area (Station 343 – 380) to reduce the need to acquire R/W from the historic area	Reduce roadway typical section width,	✓
A-7	Extend the 5-lane curb and gutter section used in the Denmark area through the entire historic area (Station 343 – 380) to reduce R/W acquisition from the historic area	Reduce roadway typical section width, Reduce impacts to historic area, Requires a closed drainage system	X
✓ = Will be considered further; × = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
A-8	Review the proposed design of the intersection north of the Interstate ramp intersection.	Possibly reduce the intersection skew angle	✓
A-9	Maintain the 32-foot median between Station 320 and Station 365, construct the NB roadway on the existing roadway, and shift to a 5-lane section at Station 365	Shift all new R/W needs away from the historic area, Eliminate the center left turn lane, Continue divided 4-lane section further	✓
A-10	Shift the roadway west (Station 343 – 370) to avoid Historic land on the east side	Reduce impacts to historic area	✓
B	Right-of-Way		
B-1	Construct a separate bike trail in-lieu-of dual bike lanes on the shoulders and pavement.	Not adequate R/W to construct a separate trail	X
B-2	Reduce the median width from 32 feet to 20 feet.	Have median curbs in a 55 MPH highway	X
B-3	Make the entire roadway a 5-lane section.	Not cost effective, Would require lower speed	X
B-4	Widen the existing 2-lane road to 4 lanes by adding 2 outside lanes.	Doesn't provide a median, constructability issues, Traffic control issues	X
B-5	Reduce the 5-lane section (Station 343 – 380) through the historic area to a 4-lane road with a dual striped 4/6-foot median.	Reduced roadway section width, Less impact to historic area, Non-standard roadway section	✓
✓ = Will be considered further; × = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
B-6	Construct a continuous 5-lane section from the south end of the project through the unincorporated Denmark area	See Idea B-1	X
B-7	Construct a 4-lane section (Station 343 – 380) through the historic area with a reduced median width and a concrete median barrier.	Adding a median barrier would require median shoulders, which would widen the roadway section. See Idea A-5	X
B-8	Extend the 5-lane curb and gutter section (with 8-foot offset) through the entire historic area (Station 343 – 380) to reduce the need to acquire R/W from the historic area	Reduce roadway impact on historic area. Would require constructing a closed drainage system	X
B-9	Reduce the proposed 12-foot travel lane to 11 feet	Not acceptable width for 55 MPH roadway	X
B-10	Construct V Gutter in-lieu-of standard curb & gutter through the historic area	Meets design standards for the 55 MPH roadway design	✓
B-11	Construct header curb in-lieu-of standard curb & gutter through the historic area	Does not have the gutter area to collect / transfer water	X
B-12	Extend the 5-lane curb and gutter section (with 6 1/2 -foot offset) through the entire historic area (Station 343 – 380) to reduce the need to acquire R/W from the historic area	See Idea B-6	X
B-13	Extend the 5-lane curb and gutter section used in the Denmark area through the entire historic area (Station 343 – 380) to reduce R/W acquisition from the historic area	See Idea B-7	X
✓ = Will be considered further; × = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
B-14	Realign roadway at Station 576 to reduce impacts to historic property on west side (R/W relocation on east side may allow a shift in the road to the east)	Possible reduction in historic area impacts	✓
C	Miscellaneous	N/A	
D	Clearing and Grubbing		
D-1	Clear only out to the construction limits in-lieu-of clearing R/R to R/W	Simplify construction, Reduce cost	✓
E	Special Subgrade Course	N/A	
F	Earthwork		
F-1	Shift the new bridge alignment toward the existing bridge.	See Idea B-3 & B-9	X
F-2	Adjust the ditch widths to obtain a uniform distance	Does not provide 26-foot clear area	X
F-3	Reduce the median width from 32 feet to 20 feet	Have median curbs in a 55 MPH highway	X
✓ = Will be considered further; × = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
G	Aggregate Base Course	N/A	
H	Bridge		
H-1	Combine the dual bridges into a single structure	Possible cost reduction	✓
H-2	Construct a 2-span structure in-lieu-of a 4-span structure	Requires a change in the roadway profile	X
H-3	Match the new bridge width to the proposed roadway lane widths	Match bridge lanes to roadway lanes, Reduce cost	✓
I	Concrete Box Culverts		
I-1	Check the box culvert at Station 571 for impacts to the historical property on the west side of the roadway	Possible shift in roadway	✓
I-2	Keep the 32-foot median width at the triple box culvert at Station 395	Reduce Stream Impacts, Reduce earthwork	✓
J	Storm Drain Pipe	N/A	
✓ = Will be considered further; × = will be dropped; DS = Design suggestion –written for consideration by design team			

