

VALUE ENGINEERING REPORT

SR 225 @ New Town Creek & Coosawattee River
BHF00-0151-01(006), PI 631570
Gordon County
February 18, 2011

OWNER AND DESIGN TEAM:



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

VALUE ENGINEERING CONSULTANT:



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BHF00-0151-01(006)

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EXECUTIVE SUMMARY

Executive Summary

VALUE ENGINEERING STUDY

SR 225 @ New Town Creek & Coosawattee River

February 7-10, 2011

Introduction

This report presents the results of a value engineering (VE) study conducted on the proposed design for the replacement of the SR 225 bridges over New Town Creek and the Coosawattee River in Gordon County. This project will replace the two SR 225 bridges and their approach roadway section on a new alignment north of the existing roadway and bridges. Reconstruction of the new bridges and associated roadways west of the Coosawattee River will take place within the New Echota Historic site. This project also impacts a golf course located on the north side of the existing roadway on the western section of the project.

The new 660-foot long Coosawattee River Bridge will be constructed on a horizontal curve with superelevation. Major contract work items include bridge construction, bridge removal, bridge approach embankments and roadway paving. The total estimated project cost including right-of-way (R/W) is \$5.77 million. The study took place February 7-10, 2011, at the Georgia DOT general offices 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

The VE team was presented with several constraints/considerations to consider when developing their recommendations. The constraints/considerations were; the western half of the project lies within the New Echota Historic Site/State Park, maintain access to the existing public boat ramp on the Coosawattee River, maintain access to the confluence of the various rivers under the new Coosawattee River Bridge, assure adequate landscaping is provided to block the view of the golf course from the historic site, utilize context sensitive design features on the bridges, and improve the entrance to the historic site.

Current project status: The Project Concept Report has been approved. The Project's Final EA and Finding of No Significant Impact (FONSI) is in its final review and should be submitted to the FHWA within the new few weeks. Right-of-way acquisition is scheduled for June 2011 and construction is scheduled for November 2012.

Results Obtained

The VE team focused their efforts on the high cost items of the project. Through the use of function analysis and "brain storming" techniques, the team generated 27 ideas with 10 being identified for additional evaluation as possible recommendations. The VE team developed six recommendations. Implementation of the six recommendations has the potential to reduce the project cost by approximately \$1.04 million. 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: Eliminate the Coosawattee River Bridge curve and tie the alignment back into the existing alignment near Station 137.

The original design proposes to construct a 660-foot by 47-foot new bridge across the Coosawattee River. The new 12-span concrete bridge would be built on a 1,274-foot radius horizontal curve with a superelevation rate of 5.84 percent.

This recommendation eliminates the curve on the new Coosawattee Bridge and ties the new roadway alignment back into the existing roadway alignment near Station 137. This concept would utilize the same bridge span configuration as currently proposed. It would not change any roadway/bridge alignments west of the Coosawattee River where the project lies within the historic site. This concept improves value by eliminating the bridge curve, reducing farm impacts east of the river, reducing the required R/W, and eliminating scope creep on the east side of the river. This concept would require an environmental re-evaluation for the change in alignment east of the river. However this alignment is closer to the existing alignment and any impacts should be reduced.

Total potential savings if accepted is \$586,000.

Idea A-2: Construct the main channel spans of the Coosawattee River Bridge with two, 150-foot spans in-lieu-of three, 100-foot spans.

The preliminary bridge layout shows three, 100-foot spans over the main channel and uses Bulb Tee 63-inch beams to span the 100-foot distance.

This recommendation constructs the main river spans using two, 150-foot spans in-lieu-of three, 100-foot spans. The longer spans would use Bulb Tee 72-inch beams. This concept eliminates one high concrete pier in the channel resulting in a cost savings and simplifying/accelerating construction of the bridge. Using the deeper beams would not impact the waterway opening.

Total potential savings if accepted is \$103,000.

Idea A-3: Use BT 54-inch beams in-lieu-of BT 63-inch beams for the main river channel spans of the Coosawattee River Bridge.

The preliminary bridge layout uses BT 63-inch beams in the three 100-foot main channel spans.

This recommendation uses BT 54-inch beams for the three 100-foot main channel spans in lieu of BT 63-inch beams. This option is feasible since the BT-54-inch beams can span the 100-foot distance with same number of beams as a BT 63-inch beams. This change results in cost savings because of the difference in cost per feet of beams.

Total potential savings if accepted is \$35,000.

Idea A-6: Lower the roadway/bridge profile height 5 feet to eliminate excess vertical clearance over the 100-year flood elevation.

The original concept provides 10.14 feet of vertical clearance above the 100-year flood elevation at the Coosawattee River Bridge and 8.48 feet of vertical clearance above the 100-year flood elevation at the New Town Creek Bridge.

This recommendation lowers the roadway/bridge profile 5 feet to bring the bridge elevations closer to the required minimum clearance of 2-feet above the 100-year flood elevation. This profile change would take place between Station 110 and Station 137 where the new roadway is on a high embankment. This concept improves value by reducing the required R/W, reducing the project's footprint, reducing the project's visual impact on the historic site and golf course, simplifying and accelerating construction while still providing 12-15 feet of clearance to allow farm vehicles to pass underneath.

Total potential savings if accepted is \$169,000.

Idea B-1: Construct the Town Creek Bridge as a single span bridge in-lieu-of the originally proposed 3-span bridge.

The preliminary bridge layout for the original New Town Creek Bridge shows a 3-span structure.

This recommendation constructs a single span bridge across New Town Creek. This concept eliminates the two intermediate piers in the main channel. Eliminating the piers would reduce the structure's environmental impact on the historic site. This concept reduces project cost, simplifies/accelerates construction, and presents a more visually pleasing structure to the historic site and golf course area.

Total potential savings if accepted is \$154,000.

Idea D-1: Reduce the proposed 6 ½ foot paved shoulder to a 2-foot paved shoulder.

The original concept proposes a normal shoulder width of 10 feet with a paved shoulder width of 6.5 feet.

This recommendation changes the paved shoulder width from 6.5 feet to 2 feet on the west and east ends of the project. No shoulder width adjustments were made between the two bridges. SR 225 is not on the State or County Bike Trail System. A 10-foot shoulder width with a paved 2-foot shoulder meets AASHTO criteria. The GDOT design policy manual recommends a 6.5-foot paved shoulder for this type of roadway, however, the policy's guidance on paved shoulders is no longer a mandatory requirement.

Total potential savings if accepted is \$25,000.

**SR 225 @ New Town Creek & Coosawattee River
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	SAVINGS POTENTIAL* (%)
	RECOMMENDATIONS						
A-1	Eliminate the Coosawattee River Bridge curve and tie new alignment back into the existing alignment near Station 137	\$639,000	\$53,000	\$586,000	N/A	\$586,000	100
A-2	Construct the main channel spans of the Coosawattee Bridge with two, 150-foot spans in-lieu-of three, 100-foot spans	\$2,810,000	\$2,707,000	\$103,000	N/A	\$103,000	100
A-3	Use BT 54-inch beams in-lieu-of BT 63-inch beams for the main river spans of the Coosawattee Bridge	\$2,810,000	\$2,775,000	\$35,000	N/A	\$35,000	100
A-6	Lower the roadway/bridge profile height 5 feet to eliminate excess vertical clearance over 100-year flood elevation	\$3,594,000	\$3,425,000	\$169,000	N/A	\$169,000	100
B-1	Construct the Town Creek Bridge as a single span bridge in-lieu-of the originally proposed 3-span bridge	\$643,000	\$489,000	\$154,000	N/A	\$154,000	100
D-1	Reduce the proposed 6 ½ foot paved shoulder to a 2-foot paved shoulder	\$36,000	\$11,000	\$25,000	N/A	\$25,000	100
	* Note: Savings Potential represents how much of an individual item, exclusive of any overlapping dependent items, can be implemented.						

STUDY IDENTIFICATION

Study Identification

Project: SR 225 @ New Town Creek & Coosawattee River	Date: February 7-10, 2011
Location: Gordon County	

VE Team Members

Name:	Title:	Organization:	Telephone:
Aruna Sastry, PE	Structures	SASTRY and Associates	678-366-9375
Steven Gains, PE	Construction	Wolverton and Associates	770-447-8999
Lenor Bromberg, PE, AVS, LEED® AP	Design/Environmental	Kennedy Engineering & Associates Group LLC	678-904-8591
Keith Borkenhagen, PE, CVS	VE Team Facilitator	MACTEC	623-556-1875

Project Description

This project will replace the SR 225 Bridges over New Town Creek and the Coosawattee River in Gordon County. It will replace the two SR 225 Bridges and their approach roadway section on a new alignment north of the existing roadway. Reconstruction of the new bridges and associated roadways west of the Coosawattee River will take place within the New Echota Historic Site/State Park. The new 660-foot long Coosawattee River Bridge will be constructed on a horizontal curve with superelevation. Major contract work items include bridge construction, bridge removal, bridge approach embankments and roadway paving. The total estimated project cost including R/W is \$5.77 million.

Constraints/Considerations

The VE team was presented with several constraints/considerations in developing their recommendations. They include:

- the western half of the project lies within the New Echota Historic Site/State Park,
- maintain access to the existing public boat ramp on the Coosawattee River,
- maintain access to the confluence of the various rivers under the new Coosawattee River Bridge,
- assure adequate landscaping is provided to block the view of the golf course from the historic site,
- utilize context sensitive design features on the bridges, and
- improve the entrance to the historic site.

Project Briefing

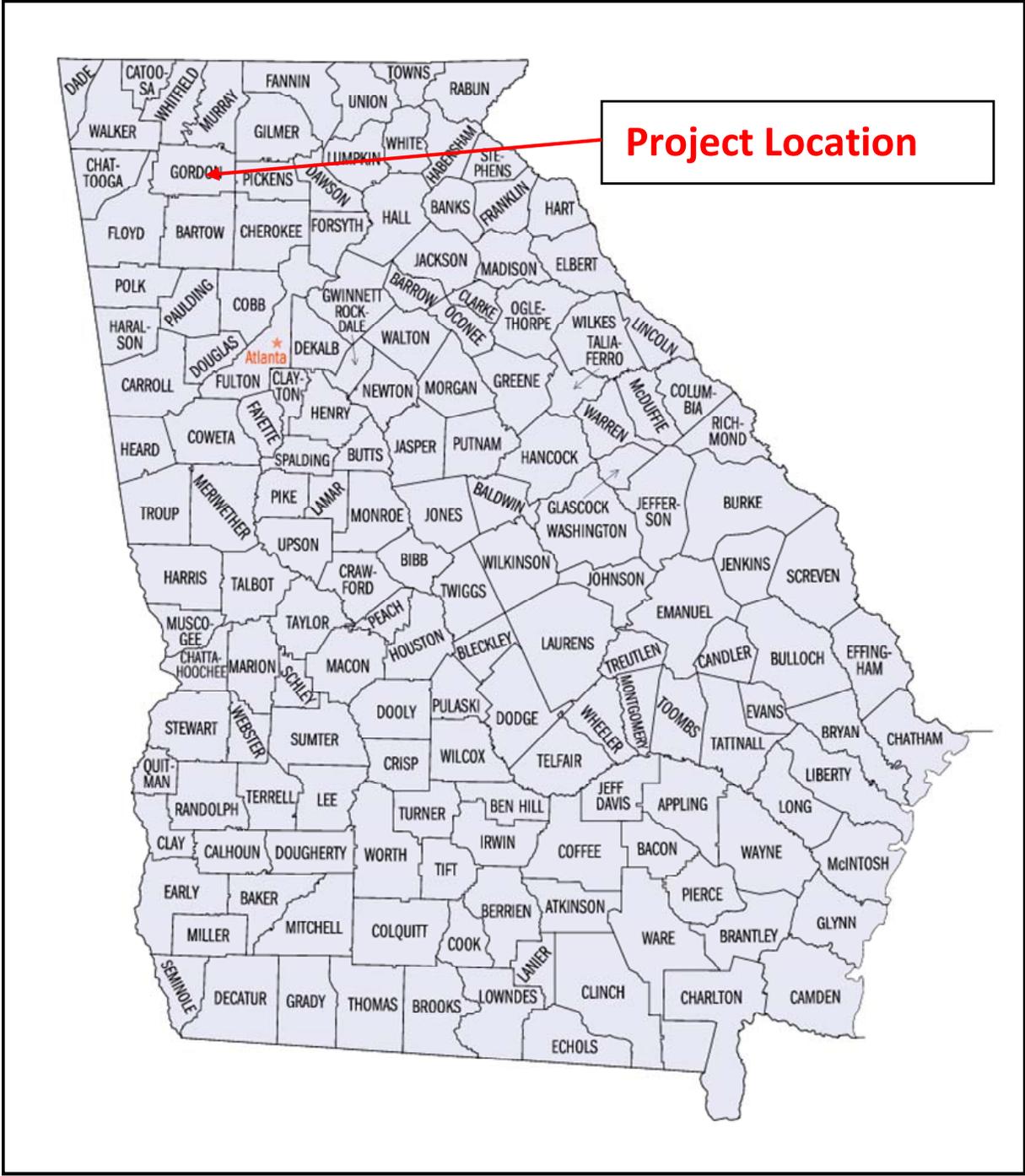
An overview of the current project status was presented by Chandria Brown from Roadway design and Umit Seyhan from Wilbur Smith Associates. The following items were discussed:

- This project will replace the SR 225 Bridges over New Town Creek and the Coosawattee River in Gordon County. The bridges will be replaced on a new alignment on the north side of the existing roadway.
- Both of the bridges have been rated structurally deficient and require replacing.
- The west half of the project is located within the New Echota Historic Site/State Park. The proposed alignment has general acceptance from the historic site owners. A memorandum of agreement has been obtained from the DNR about the impacts to DNR property both north and south of the proposed alignment.
- The project includes heavy landscaping on the north side of the proposed roadway to block the view of the golf course from the historic site. The landscaping cannot be deleted.
- The use of context sensitive design features are encouraged on the two bridges to minimize their impact on the historic site. The design consultant has indicated that special bridge rails (Kansas Design) are being considered for both bridges.
- The vertical profile has been set to be at or near the vertical profile of the existing SR 225 roadway. While this height is significantly above the height required to clear the required waterway opening, it will allow farm vehicles to pass under the structure on the east side of the river.
- The existing boat ramp is to remain in its current location. It will be accessed of the south side of the proposed roadway between the two bridges.
- The draft Environmental Assessment Document is in its final stages and should be submitted to the FHWA within the next few weeks.
- This project needs to have R/W authorized this fiscal year (June 2011). The project has a November 2012 letting date.

The following individuals attended the project design briefing.

Lisa Myers	GDOT	Matt Sanders	GDOT
Ron Wishon	GDOT	James Magnus	GDOT
Bill DuVall	GDOT	Umit Seyhan	Wilbur Smith Associates
Chandria Brown	GDOT	Tom Tran	Wilbur Smith Associates
Nabil Raad	GDOT	Jason Morrell	GDOT
Sam Pugh	GDOT	Aruna Sastry	Sastry and Associates
George Obaranec	MACTEC	Steven Gaines	Wolverton & Associates
Keith Borkenhagen	MACTEC	Lenor Bromberg	Kennedy Engineering

Figure 1
Project Vicinity Map



County Map of Georgia

VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR 225 @ New Town Creek & Coosawattee River

IDEA No.: A-1	Sheet No.: 1 of 7	CREATIVE IDEA: Eliminate the Coosawattee River Bridge curve and tie the alignment back into the existing alignment near Station 137.
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Comp By: K.B. Date: 02/08/2011 Checked By: S.G. Date: 02/09/2011

Original Concept: The original design proposes to construct a 660-foot by 47-foot new bridge across the Coosawattee River. The new 12-span curved concrete bridge would consist of three, 100-foot spans and nine, 40-foot spans and be built approximately 150 feet north of the existing bridge and on a 1,274-foot radius horizontal curve (Curve #2) with a superelevation rate of 5.84 percent.

Proposed Change: This recommendation eliminates the bridge curve by constructing the new Coosawattee Bridge on tangent and tying the new roadway alignment back into the existing roadway alignment near Station 137. This concept would utilize the same bridge span configuration as the currently proposed bridge and would be approximately the same length.

This concept requires the horizontal curve (Curve #2) radius on the approach section to the Coosawattee River Bridge to be reduced to 1,060 feet, resulting in a 431-foot long curve between the two bridges. This new radius meets a 55 mph design speed at a superelevation rate of 6.0 percent. The currently proposed alignment and cross slope (2 % in one direction) on the New Town Creek Bridge would not be affected by this change. The superelevation transition from reverse crown on the New Town Creek Bridge to the 6 percent superelevation rate and back to reverse crown would be accomplished within the curve thus eliminating the need for superelevation transitions occurring within each bridge deck. The reverse crown superelevation would be continued the full length of the new proposed Coosawattee Bridge.

This shift in alignment can be accommodated within the required R/W as currently shown on the plans west of the Coosawattee River. This concept would require a revision to the R/W east of the Coosawattee River, but it would be an overall reduction in the needed R/W. The realignment would shift the alignment at the west Coosawattee River bridge abutment north approximately 17 feet. The revised tangent bridge's east abutment would remain at least

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$639,000		
Proposed	\$53,000		
Savings	\$586,000		\$586,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$586,000

CONTINUATION

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: A-1
Client: GDOT
Sheet 2 of 7

10 feet north of the existing SR 225 Bridge's east abutment allowing traffic to continue using the old bridge until the new bridge is finished. The curve tying the tangent bridge back into the old roadway alignment near Station 137 would have a radius of approximately 1,100 feet.

The wetland ESA boundary located south of the existing SR 225 roadbed from approximate Station 129+00 to 131+00 would be located approximately 21 feet south of the proposed shoulder break point of the recommended realignment. A review of the contours indicates that it may be possible to tie to the existing ground without impacting this ESA boundary. To assure there would be no wetland ESA boundary impact, the VE team included the cost for constructing a small 200-foot long retaining wall through this area.

Justification: Eliminating the curve on the Coosawattee Bridge makes it simpler to design and construct. Having a straight bridge improves the sight distance on the east side of the new boat ramp driveway. The original design provides approximately 540 feet of horizontal site east of the boat ramp driveway while the VE concept provides approximately 1,080 feet of horizontal site distance. Shifting the new alignment back to the original alignment near Station 137 eliminates most of the proposed new R/W east of the bridge.

A comparison of this recommended alignment to that which is currently proposed utilizing the criteria in the Evaluation of Conceptual Alternatives table (Table 1) that is included on page 13 of the May 2009 SR 225 Bridge Replacement and Realignment Draft Environmental Assessment (EA) indicates that the VE concept alignment would receive the same score as the currently proposed alignment (referred to as the Preferred Build Alternative/Alternative 6/Orange). The score for the recommended alignment would total 9 and consist of:

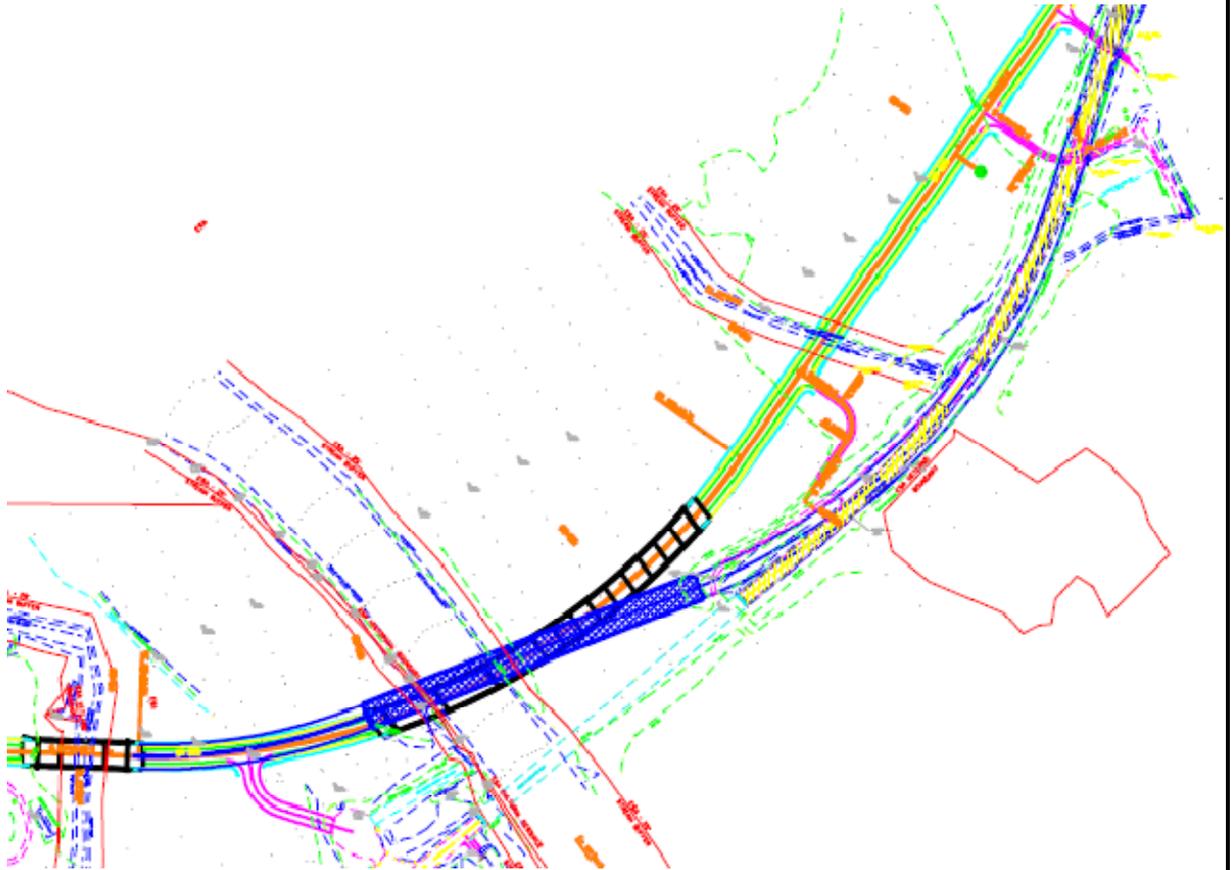
Corrects Curve 1	1	No Proximity to Confluence	1
Corrects Curve 2	1	No Golf Course Impact	0
Improves Bridge 1	1	No Historic Site Impact	1
Improves Bridge 2	1	No Wetlands Impact	1
Maintains Traffic	1	No Archaeological Impact	0
Improves Access to Historic Site	1		

It is recognized that the Final EA is being prepared for approval by FHWA and that concurrences from SHPO, DNR and the involved tribal organizations have been received. The changes proposed with this recommendation would not affect the commitments made to these agencies or change the overall footprint of the project within the New Echota Historic Site. It is possible that the changes to the alignment and reduction in R/W impacts to the east of the Coosawattee River bridge could be addressed in a document re-evaluation in order to continue to maintain the current schedule of events (i.e. meet R/W letting date).

SKETCH

Project: SR 225 @ New Town Creek & Coosawattee River

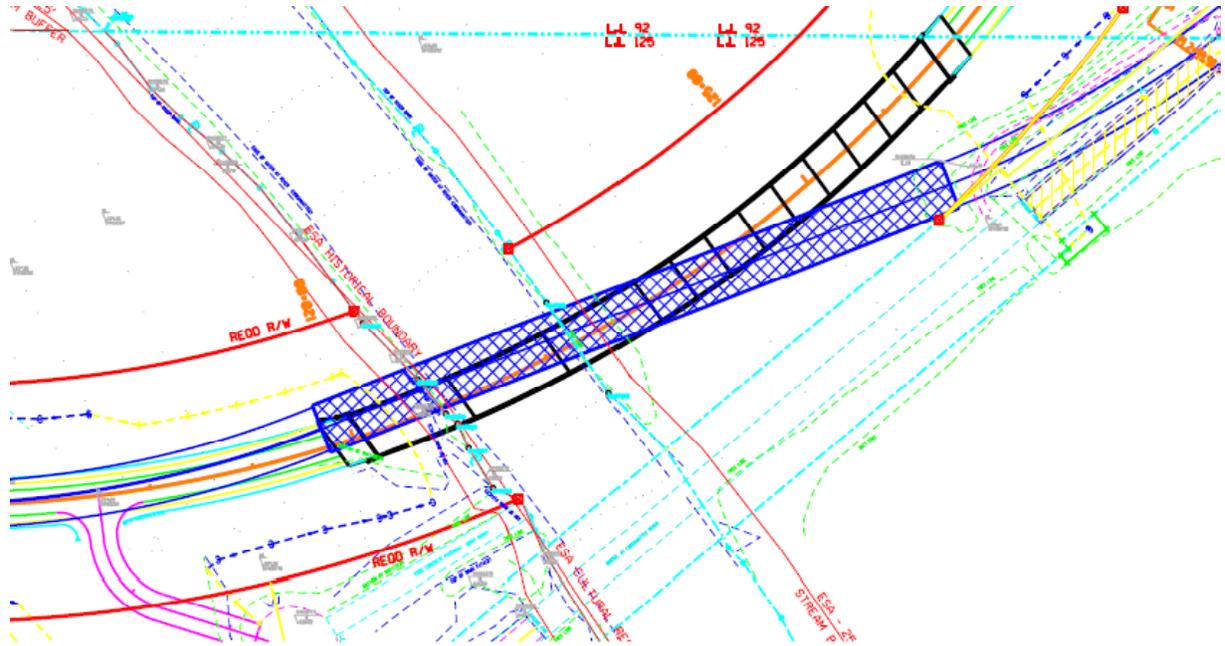
Idea No.: A-1
Client: GDOT
Sheet 3 of 7



SKETCH

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: A-1
Client: GDOT
Sheet 4 of 7



CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: A-1
Client: GDOT
Sheet 6 of 7

Embankment reduction east of the bridge east abutment (original design):

$$\text{Area Station 127+00} = (60 \text{ ft} \times 20 \text{ ft}) + (40 \text{ ft} \times 20 \text{ ft}) = 1,200 \text{ SF} + 800 \text{ SF} = 2,000 \text{ SF}$$

$$\text{Area Station 132+00} = (60 \text{ ft} \times 18 \text{ ft}) + (32 \text{ ft} \times 18 \text{ ft}) = 1,080 \text{ SF} + 640 \text{ SF} = 1,720 \text{ SF}$$

$$\text{Area Station 140+00} = (40 \text{ ft} \times 4 \text{ ft}) + (20 \text{ ft} \times 4 \text{ ft}) = 160 \text{ SF} + 80 \text{ SF} = 240 \text{ SF}$$

Volume:

$$\text{Station 127} - 132 \quad (2,000 \text{ SF} + 1,720 \text{ SF})/2 \times 500 \text{ ft}/27 = 34,444 \text{ CY}$$

$$\text{Station 132} - 140 \quad (1,720 \text{ SF} + 240 \text{ SF})/2 \times 800 \text{ ft}/27 = 29,037 \text{ CY}$$

$$\text{Total Volume} = 34,444 \text{ CY} + 29,037 \text{ CY} = \mathbf{63,481 \text{ CY}}$$

Embankment added to existing roadway embankment on the north side to accommodate full shoulder (VE design):

$$\text{Area Station 127+00} = (15 \text{ ft} \times 20 \text{ ft}) = 300 \text{ SF}$$

$$\text{Area Station 132+00} = (6 \text{ ft} \times 18 \text{ ft}) = 108 \text{ SF}$$

$$\text{Area Station 137+00} = (1 \text{ ft} \times 10 \text{ ft}) = 10 \text{ SF}$$

Volume:

$$\text{Station 127} - 132 \quad (300 \text{ SF} + 108 \text{ SF})/2 \times 500 \text{ ft}/27 = 3,778 \text{ CY}$$

$$\text{Station 132} - 137 \quad (108 \text{ SF} + 10 \text{ SF})/2 \times 500 \text{ ft}/27 = 1,093 \text{ CY}$$

$$\text{Total Volume} = 3,778 \text{ CY} + 1,093 \text{ CY} = \mathbf{4,871 \text{ CY}}$$

Pavement reduction (original design): Station 137 - 148

$$24 \text{ ft} \times 1,100 \text{ ft} = 26,400 \text{ SF}/9 = \mathbf{2,933 \text{ SY}}$$

Shoulder reduction:

$$6.5 \text{ ft} \times 2 \times 1,100 \text{ ft} = 14,300 \text{ SF}/9 = \mathbf{1,589 \text{ SY}}$$

Driveway reduction (original design):

$$\text{Station 138} \quad 140 \text{ ft} \times 12 \text{ ft} = 1,680 \text{ SF}/9 = 187 \text{ SY}$$

$$\text{Station 135} \quad 200 \text{ ft} \times 12 \text{ ft} = 2,400 \text{ SF}/9 = 267 \text{ SY}$$

$$\text{Total driveway area:} \quad 187 \text{ SY} + 267 \text{ SY} = \mathbf{454 \text{ SY}}$$

Driveway Embankment (original design):

$$(20 \text{ ft} \times 170 \text{ ft} \times 1/2) \times 40 \text{ ft} = 68,000 \text{ SF}/27 = 2,519 \text{ CY}$$

$$(40 \text{ ft} \times 10 \text{ ft} \times 1/2) \times 200 \text{ ft} = 40,000 \text{ SF}/27 = 1,481 \text{ CY}$$

$$\text{Total driveway embankment} = 2,519 + 1,481 = \mathbf{4,000 \text{ CY}}$$

Culvert Pipe Adjustments:

Original design: Station 142 Remove 2 x 72 ft = **144 ft of 42" pipe + 4 end sections**

Original design: Station 130 Remove **161 ft of 36" pipe**

VE design: Station 130 Add additional **60 ft of 36" pipe**

The 2 - 36" end sections are eliminated in the original design but still required in the VE design

$$\text{ROW area reduction} = (220 \text{ ft} \times 550 \text{ ft} \times 1/2) + (220 \text{ ft} \times 540 \text{ ft}) + (220 \text{ ft} \times 360 \text{ ft} \times 1/2) = \mathbf{218,900 \text{ SF}}$$

CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: A-1
Client: GDOT
Sheet 7 of 7

Retaining Wall:

Assume a 200-foot x 3-foot high retaining wall is needed to avoid wetland area southeast of Station 137

Retaining Wall Area: 200 ft x 3 ft = 600 SF

Pavement Costs

9.5 mm (\$64/ton)

19 mm (\$58/ton)

25 mm (\$54/ton)

GAB (\$15/ton)

Paved Shoulder

Paved Shoulder Section (1.5" 9.5mm, 2" 19mm, 6" GAB)

9.5 mm Cost/SY = (1 SY)(1.5 in)(1 ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000 #)(\$64/ton) = \$5.22

19 mm Cost/SY = (1 SY)(2 in)(1ft/12in)(9 SF/1SY)(145 #/1 CF)(1 ton/2000 #)(\$58/ton) = \$6.31

6" GAB Cost/SY = (1 SY)(6 in)(1 ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000#)(\$15/ton) = \$4.89

Total Cost = \$5.22 + \$6.31 + \$4.89 = **\$16.42**

Mainline

Mainline Section (1.5" 9.5mm, 2" 19mm, 5" 25mm, 12" GAB)

9.5 mm Cost/SY = (1 SY)(1.5 in)(1 ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000 #)(\$64/ton) = \$5.22

19 mm Cost/SY = (1 SY)(2 in)(1 ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000 #)(\$58/ton) = \$6.31

25 mm Cost/SY = (1 SY)(5 in)(1ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000 #)(\$54/ton) = \$14.68

6" GAB Cost/SY = (1 SY)(12 in)(1 ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000 #)(\$15/ton) = \$9.79

Total Cost = \$5.22 + \$6.31 + \$14.68 + \$9.79 = **\$36.00**

ROW Costs (Agricultural Property) :

\$129,216 + 55% (Scheduling Cont.) + 60% (Adm./Court Cont.)

\$129,216 + \$71,069 + \$77,530 = \$277,815

Cost/SF = Total Mark-up Cost/area

\$277,815/717,869 SF = **\$0.39/SF**

Note: Driveway at Station 130 must be flipped to the north side of SR 225

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR 225 @ New Town Creek & Coosawattee River

IDEA No.: A-2	Sheet No.: 1 of 4	CREATIVE IDEA: Construct the main channel spans of the Coosawattee River Bridge with two, 150-foot spans in-lieu-of three, 100-foot spans.
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Comp By: A.S. Date: 02/09/2011 Checked By: K.B. Date: 02/11/2011

Original Concept:

The preliminary bridge layout shows three, 100-foot spans over the main channel with high intermediate piers inside the main channel. This design uses Bulb Tee 63-inch beams to span the 100-foot distance.

Proposed Change:

This recommendation would construct the main river spans of the Coosawattee Bridge using two, 150-foot spans in-lieu-of three, 100-foot spans. The longer spans would require the use of Bulb Tee 72-inch beams.

Justification:

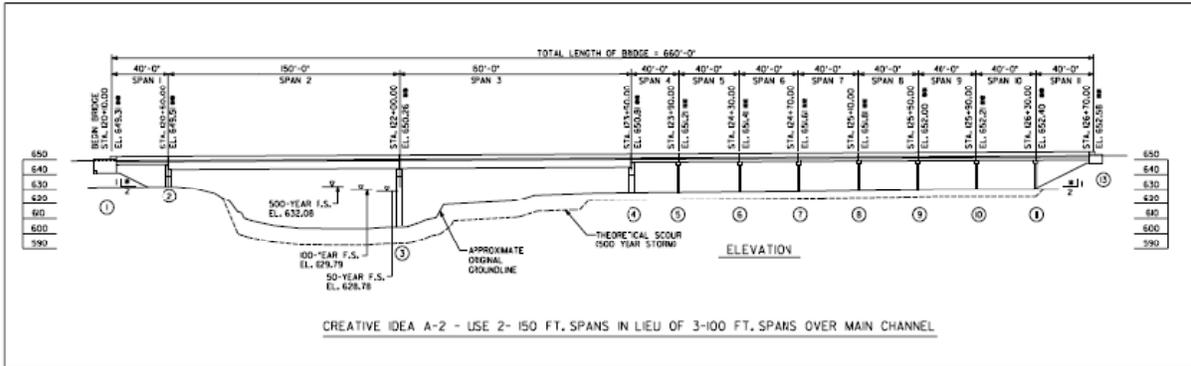
This concept eliminates one high concrete pier in the channel. The elimination of one high intermediate pier would result in cost savings and simplify/accelerate the construction of the bridge. Using the deeper Bulb Tee 72-inch beams would not impact the waterway opening for this structure since the bottom of the beam would still be approximately 15 feet above the 100 year flood.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST: - Original	\$2,810,000		
- Proposed	\$2,707,000		
- Savings	\$103,000		\$103,000
FUTURE COST: - Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$103,000

SKETCH

Project: SR 225 @ New Town Creek & Coosawattee River

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



CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

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

Bridge Cost Assumption: The cost/SF of bridge would be the same (\$90) for either design.

Original Bridge cost:

This bridge utilizes 3-100 ft. span BT 63 PSC beams
 $660 \text{ ft} \times 47.25 \text{ ft} = 31,218 \text{ SF} \times \$90/\text{SF} = \$ 2,809,620.00$

VE Proposed Bridge cost:

VE bridge design utilizes 2-150 ft. span BT 72 PSC beams
 $660 \text{ ft} \times 47.25 \text{ ft} = 31,218 \text{ SF} \times \$90/\text{SF} = \$ 2,809,620.00$

VE concept eliminates one main pier from the proposed bridge.

Lump Sum Pier Cost Calculations:

Pier Cap: $5 \text{ ft} \times 5 \text{ ft} \times 45 \text{ ft long} \times 1/27 = 41.67 \text{ CY} @ \$615.51 = \$ 25,648.30$

Two Columns: $4 \text{ ft} \times 4 \text{ ft} \times 42 \text{ ft high} \times 2 \text{ col.} \times 1/27 = 49.78 \text{ CY} @ \$615.51 = \$30,640.08$

Approx. Rebar: $(91.45 \times 150 \text{ lb/Cy} @ \$0.82/\text{LB} = \$11,248.35$

Drilled Caisson:

Two Drilled Caisson $\times 20 \text{ ft long} @ \$868.05/\text{ft} = \$34,722.00$

Total cost of pier: **\$102,258.73**

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR 225 @ New Town Creek & Coosawattee River

IDEA No.: A-3	Sheet No.: 1 of 3	CREATIVE IDEA: Use BT 54-inch beams in-lieu-of BT 63-inch beams for the main river channel spans of the Coosawattee River Bridge.
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Comp By: A. S. Date: 02/08/2011 Checked By: K.B. Date: 02/09/2011

Original Concept:

The preliminary bridge layout uses BT 63-inch PSC beams in the three 100-foot main channel spans.

Proposed Change:

This recommendation would use BT 54-inch PSC Beams for the three 100-foot main channel spans in lieu of BT 63-inch PSC Beams.

Justification:

This option is feasible since the BT-54-inch PSC beams can span the 100-foot distance with same number of beams as a BT 63-inch PSC beams.

This change will result in cost savings because of the difference in cost per feet of beams.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST: - Original	\$2,810,000		
- Proposed	\$2,775,000		
- Savings	\$35,000		\$35,000
FUTURE COST: - Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$35,000

COST WORKSHEET

Project: SR 225 @ New Town Creek & Coosawattee River					Idea No.: A-3		
					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 Bridge Design:							
660 ft x 47.25 ft bridge	SF	31,218	\$90.00	\$2,809,620			
VE Bridge design:							
660 ft x 47.25 ft bridge	SF				31,218	\$90.00	\$2,809,620
Reduction using BT 54" beams	LS				LS	LS	(\$34,434)
SUBTOTAL				\$2,809,620			\$2,775,186
TOTAL ROUNDED				\$2,910,000			\$2,775,000

CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

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

Original Bridge Design:

The original bridge utilizes three 100-foot spans with BT 63 PSC beams
 $660 \text{ ft.} \times 47.25 \text{ ft.} = 31,218 \text{ SF} \times \$90/\text{SF} = \$2,809,620.00$

VE Bridge Design Cost:

The VE bridge utilizes three 100-foot spans with BT 54 PSC beams
 $660 \text{ ft.} \times 47.25 \text{ ft.} = 31,218 \text{ SF} \times \$90/\text{SF} = \$2,809,620.00$

Lump Sum Cost Calculations:

The cost/LF of BT 63 inch beams (6 beams x 100 ft) x 3 spans x \$161.37 = \$290,466.00

The cost/LF of BT 54 inch beams (6 beams x 100 ft) x 3 spans x \$142.24 = \$256,032.00

Total cost savings: **\$34,434.00**

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR 225 @ New Town Creek & Coosawattee River

IDEA No.:
A-6

Sheet No.:
1 of

CREATIVE IDEA: Lower the roadway/bridge profile height 5 feet to eliminate some of the excess vertical clearance over the 100-year flood elevation.

Comp By: A.S. & S.W.G. Date: 02/08/2011 Checked By: K.B. Date: 02/09/2011

Original Concept:

The original concept proposes a minimum profile grade elevation of 647.93 feet for the SR 225 Bridge over the Coosawattee River. This elevation was apparently established to match the elevation of the existing SR 225 structure and to allow farm vehicles to pass under the east end of the bridge. The original concept also proposes a minimum profile grade elevation of 645.63 feet for the SR 225 Bridge over New Town Creek. This elevation appears to have been established to connect the profile from the other bridge to tie-in to the existing alignment at Station 105+00.

Proposed Change:

This recommendation would lower the elevation of both SR 225 Bridges and associated approach embankments by 5 feet. The controlling clearance for lowering the two bridges is the SR 225 Bridge clearance over New Town Creek. This structure could be lowered up to 8.48 feet without impacting the hydraulic opening or backwater elevation.

Justification:

The proposed bottom of beam elevation for the Coosawattee River Bridge is 640.93 feet and the proposed bottom of beam elevation for the New Town Creek bridge is 640.88 feet.

The flood elevations provided in the plans are as follows:

<u>SR 225 over Coosawattee River</u>	<u>SR 225 over New Town River</u>
50 Year Elevation 628.78	50 Year Elevation 630.21
100 Year Elevation 629.79	100 Year Elevation 631.40

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
<u>INITIAL COST:</u> - Original	\$3,594,000		
- Proposed	\$3,425,000		
- Savings	\$169,000		\$169,000
<u>FUTURE COST:</u> - Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$169,000

CONTINUATION

Project: SR 225 @ New Town Creek & Coosawattee River

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

The GDOT design criteria for bridge design requires a 2-foot clearance over the 50 year flood elevation and a 1-foot clearance over the 100 year flood elevation. The revised VE concept provides adequate clearance according to these guidelines.

Reducing the Coosawattee River bridge 5-feet would reduce the pile bents in the eastern side from 18 – 20 feet to 13 – 15 feet thereby eliminating the need to provide addition bracing for the pile bents.

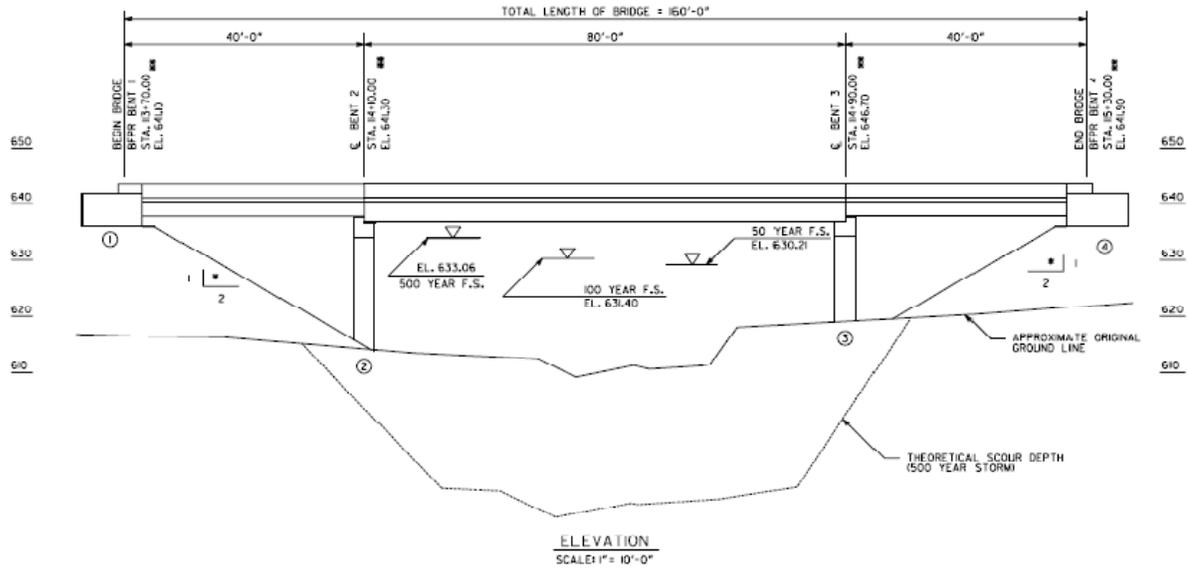
Reducing the project's roadway/bridge elevation between Station 110 and Station 138 adds value by reducing the amount of R/W required for the project, reducing the project's impacts on the historical site and environmentally sensitive areas, and reducing the project's visibility from the primary historic site/buildings/trails south of the existing highway. It will also reduce the project's visual impact on the golf course north of Station 110 to Station 115.

The revised concept provides 12 feet – 15 feet of clearance beneath the Coosawattee River Bridge on the northeast end to allow for the passage of farm equipment. According to a current publication by Purdue University Cooperative Extension Service, A clearance of 13 feet – 15 feet is recommended for modern grain farm equipment.

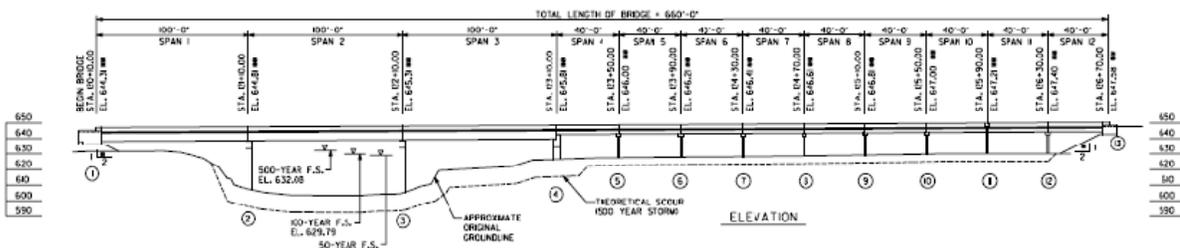
SKETCH

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: A-6
Client: GDOT
Sheet 3 of 6



CREATIVE IDEA: A-6 - REDUCE THE BRIDGE HEIGHT BY 5 FEET



CREATIVE IDEA A-6 - REDUCE THE HEIGHT OF THE BRIDGE BY 5 FEET

CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

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

Assumptions: Revise roadway grade to provide a 5-foot reduction through the two bridges and returning to original grade at Station 110 and Station 138.

Coosawattee Bridge: 31,218 SF @ \$90/SF = \$2,809,620

Town Creek Bridge: 7,568 SF @ \$85.00/SF = \$643,280

Embankment. Volumes – Affected areas; Stations 110+00 to 113+00, Stations 115+60 to 119+75, and Stations 127+00 to 138+00. The other station ranges have been excluded to account for tie-ins. Assume average reduction of 500 SF per roadway template is assumed. R/W Area – Assume 20' reduction per roadway template based on 2:1 slopes.

Original Concept: (Lump Sum Calculations)

Coosawattee Bridge: Lower two main piers

Two Columns: 4 ft x 4 ft x 5 ft high x 4 col. X 1/27 = 11.85 CY x \$615.51 = \$7,294.98

Approx. Rebar (11.85 x 150 lb/CY x \$0.82/LB = \$ 1,457.55

Savings in Pile lengths:

6 piles x 8 bents x 5 ft Long x \$42.14 = \$10,113.60

Total cost savings: **\$18,866.13**

Town Creek Bridge: Lower two main piers

Columns: 4 ft x 4ft x 5ft high x 4 col. X 1/27 = 11.85 CY x \$615.51 = \$7,294.98

Approx. Rebar (11.85 CY x 150 lb/CY x \$0.82/LB = \$1,457.55

Total cost savings: **\$8,752.53**

Embankment Reduction:

Volume = (500)[(11,300-11,000)+(11,975-11,560)+(13,800-12,700)] = 907,500 CF =>
33,611 CY

R/W Reduction:

Area = (20)[(11,300-11,000)+(11,975-11,560)+(13,800-12,700)] = **36,300 SF**

CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

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

SR 225 over Coosawattee River

100 Year Flood Elevation $629.79 + 1'$ minimum = 630.79 (Controls)

50 Year Flood Elevation $628.78 + 2'$ minimum = 630.78

Lowest PGL = $649.31 - (23.625 \times 0.0584) = 647.93$

Using 72" Bulb Tees (BT-72) + 1' of slab = 7' +/- Structure Depth

Minimum Bottom of Beam = $647.93 - 7 = 640.93$

Actual Lowering of Bridge = $640.93 - 630.79 = \mathbf{10.14 \text{ feet}}$

SR 225 over New Town River

100 Year Flood Elevation $631.40 + 1 \text{ ft}$ minimum = 632.40 (Controls)

50 Year Flood Elevation $630.21 + 2 \text{ ft}$ minimum = 632.21

Lowest PGL = $646.10 - (23.625 \times 0.02) = 645.63$

Using Type III PSC + 1 ft of slab = 4.75 ft +/- Structure Depth

Minimum Bottom of Beam = $645.63 - 4.75 = 640.88$

Actual Lowering of Bridge = $640.88 - 632.40 = \mathbf{8.48 \text{ feet}}$

Assume a 5-foot reduction in the profile height for the VE design through the two bridges and returning to grade at Station 110 and Station 138.

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR 225 @ New Town Creek & Coosawattee River

IDEA No.: B-1	Sheet No.: 1 of 4	CREATIVE IDEA: Construct the Town Creek Bridge as a single span bridge in-lieu-of the originally proposed 3-span bridge.
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Comp By: A.S. Date: 02/09/2011 Checked By: K.B. Date: 02/14/2011

Original Concept:

The preliminary bridge layout for the original New Town Creek Bridge is a 3-span structure. It has spans of 40 feet, 80 feet, and 40 feet using Type III PSC beams.

Proposed Change:

This recommendation would construct a single span bridge across New Town Creek. It would use Bulb Tee 72-inch or Bulb Tee 74-inch PSC beams in-lieu-of Type III PSC beams with intermediate piers inside the main channel.

Justification:

This concept eliminates the two intermediate piers in the main channel which would involve building drilled caissons. Eliminating the piers in the main channel area would reduce the structure's environmental impact to the historic site. This change will simplify/accelerate construction and reduce the cost of the project. A single span bridge would also present a more visually pleasing structure to the historic/golf course area.

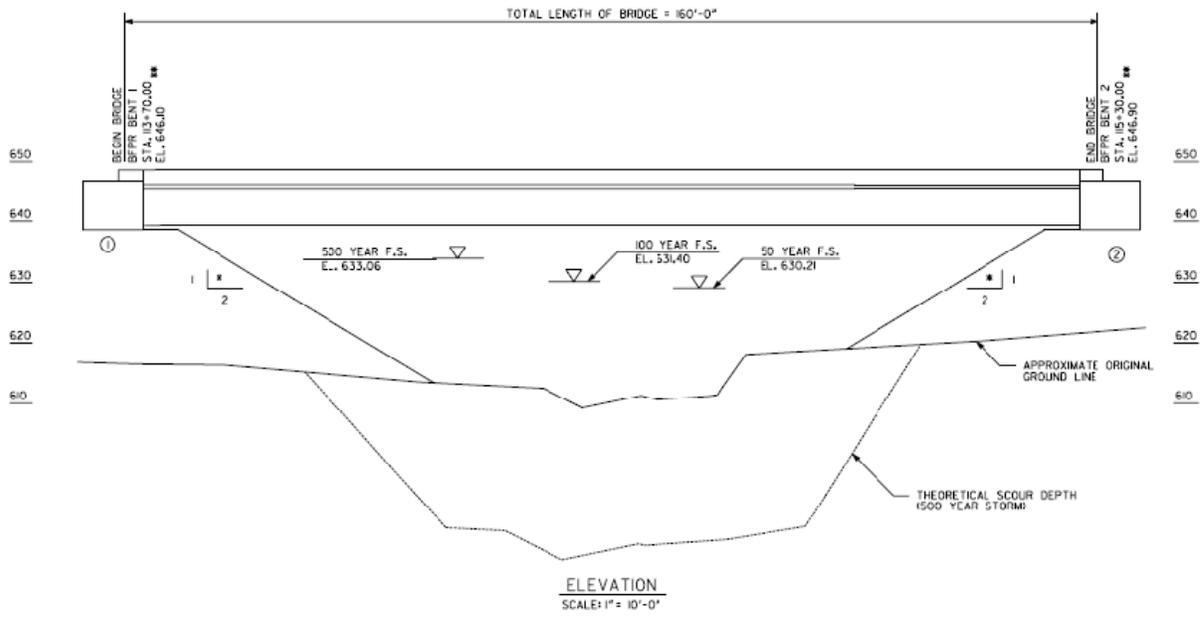
The original design has adequate clearance (over 8 feet) above the 100-year flood elevation to install the larger Bulb Tee 72-inch or Bulb Tee 74-inch beams. The analysis increased the square foot cost of the bridge from \$85 to \$90 per square foot to accommodate the use of Bulb Tee 72-inch or Bulb Tee 74-inch PSC beams instead of Type III AASHTO beams.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST: - Original	\$643,000		
- Proposed	\$489,000		
- Savings	\$154,000		\$154,000
FUTURE COST: - Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$154,000

SKETCH

Project: SR 225 @ New Town Creek & Coosawattee River

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



CREATIVE IDEA B-1- USE SINGLE SPAN 160 FT. BT-74 INCH PSC BEAMS

CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: B-1
Client: GDOT
Sheet 4 of 4

Original Bridge:

This bridge utilizes Type III PSC beams with 40'-80'-40' spans
 $160 \text{ ft} \times 47.25 \text{ ft} = 7,568 \text{ SF} \times \$85/\text{SF} = \mathbf{\$643,280}$

VE Proposed Bridge:

This concept utilizes BT 72-inch or BT 74-inch beams with a 160' span
Assume a \$5/SF cost increase due to the larger beams
 $160 \text{ ft} \times 47.25 \text{ ft} = 7,568 \text{ SF} \times \$90/\text{SF} = \mathbf{\$681,120}$

Lump Sum Cost Calculations:

Eliminate the two main piers from the original bridge design.

Pier Caps: $5 \text{ ft} \times 5 \text{ ft} \times 45 \text{ ft long} \times 1/27 = 41.67 \text{ CY} @ \$615.51 = \$25,648.30 \times 2 \text{ caps} =$
 $\$51,296.60$

Two Columns: $4 \text{ ft} \times 4 \text{ ft} \times 25 \text{ ft high} \times 4 \text{ col.} \times 1/27 = 59.26 \text{ CY} @ \$615.51 = \$36,474.66$

Approx. Rebar: $(142.6 \text{ CY} \times 150 \text{ lb/CY} @ \$0.82/\text{LB} = \$17,539.70.00$

Drilled Caissons: $4 \text{ caissons} \times 25 \text{ ft. long} @ \$868.05/\text{ft} = \$86,805.00$

Total cost of two piers: $\$192,115.96$ **Say \$192,116**

DEVELOPMENT AND RECOMMENDATION PHASE

Project: SR 225 @ New Town Creek & Coosawattee River

IDEA No.: D-1	Sheet No.: 1 of 3	CREATIVE IDEA: Reduce the proposed 6 ½ foot paved shoulder to a 2-foot paved shoulder.
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Comp By: S.W.G. Date: 02/08/2011 Checked By: K.B. Date: 02/09/2011

Original Concept:

The original concept proposes a normal shoulder width of 10 feet with a paved shoulder width of 6.5 feet.

Proposed Change:

The revised concept proposes a normal shoulder width of 10 feet with a paved shoulder width of 2 feet. No shoulder width adjustments were made to the new roadway section between the two bridges.

Justification:

The need and purpose of the project is to replace the deficient bridges and improve the alignment to a 55 mph design speed. This can be accomplished with a reduced shoulder width. SR 225 is not on the State or County Bike Trail System. A 10-foot shoulder width with a paved shoulder width of 2-foot meets AASHTO criteria.

The GDOT design policy manual recommends a 6.5-foot paved shoulder for this type of roadway, however, the policy's guidance on paved shoulders is no longer a mandatory requirement.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST: - Original	\$36,000		
- Proposed	\$11,000		
- Savings	\$25,000		\$25,000
FUTURE COST: - Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$25,000

CALCULATIONS

Project: SR 225 @ New Town Creek & Coosawattee River

Idea No.: D-1
Client: GDOT
Sheet 3 of 3

Assumptions

Exclude shoulder sections between bridges and shoulder taper areas for comparison.

Paved Shoulder Section (1.5" 9.5mm, 2" 19mm, 6" GAB)

Pavement Costs

9.5 mm (\$64/ton)

19 mm (\$58/ton)

GAB (\$15/ton)

9.5 mm Cost/SY = (1 SY)(1.5 in)(1 ft/12 in)(9 SF/SY)(145 #/1 CF)(1 ton/2000 #)(\$64/ton) = \$5.22

19 mm Cost/SY = (1 SY)(2 in)(1 ft/12 in)(9 SF/1 SY)(145 #/1 CF)(1 ton/2000 #)(\$58/ton) = \$6.31

6" GAB Cost/SY = (1 SY)(6 in)(1 ft/12 in)(9 SF/SY)(145 #/CF)(1 ton/2000 #)(\$15/ton) = \$4.89

Total Cost = \$5.22 + \$6.31 + \$4.89 = **\$16.42**

Original Concept

Paved Shoulder Area = (6.5)[(11200-10050)+(14750-12850)] = 19,825 SF => **2,203 SY**

VE Revised Concept

Paved Shoulder Area = (2)[(11200-10050)+(14750-12850)] = 6,100 SF => **678 SY**

Note: No shoulder width adjustments were made to the new roadway section between the two bridges.

Sources

Approving/Authorizing Persons

Name:	Position:	Telephone:
Chandria Brown	Project Manager	404-631-1580
Ron Wishon	Engineering Services	404-631-1753
Gerald Ross	Deputy Commissioner and Chief Engineer	404-631-1004

Personal Contacts

Name:	Telephone:	Notes:
Chandria Brown	404-631-1580	Project Briefing
Umit Seyhan	770-936-8650	Project Briefing
Keith Posey	404-699-4463	Background information on the original alternatives.
Sam Pugh	404-631-1167	Additional Environmental Data. Status of keeping/removing the Town Creek Bridge
Chandria Brown	404-631-1580	Provided vertical clearances for proposed bridges.
Suzan Beck	404-631-1862	Hydraulic information relating to the height of the bridges to pass the required waterway opening.
Tom Tran	770-436-8650	Obtain Bridge Plan information

Documents/Abstracts

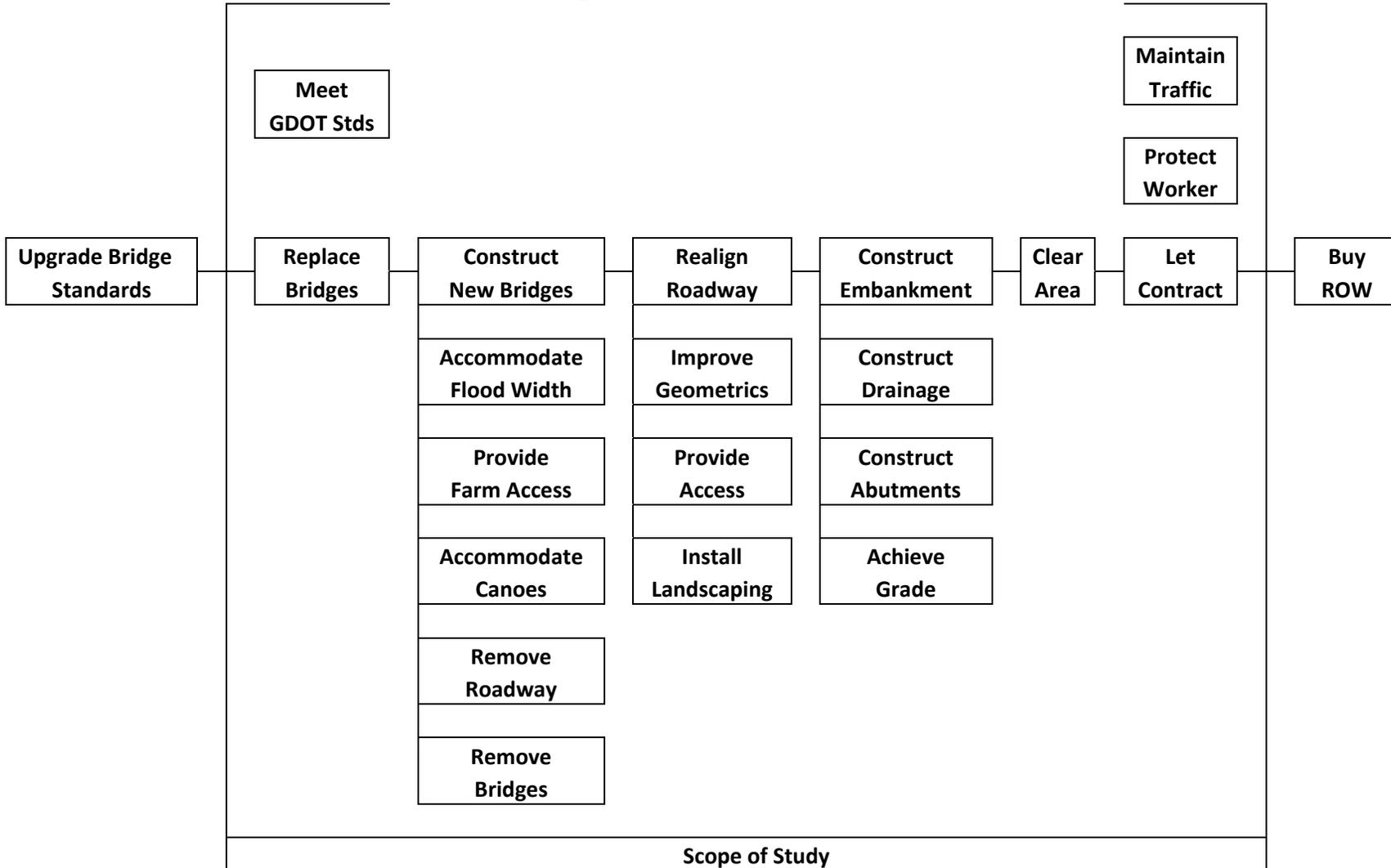
Reference:	Reference:
Concept report	Soils report
Preliminary Plans	Cost Estimate
Landscape Plans	Bridge Foundation Investigation Report (Coosawattee River Bridge)
Preliminary Bridge Layouts	VE Study Constraints
100 Scale Aerial Layout	Hydraulic/Hydrological Study
Draft Environmental Statement (May 2009)	Bridge Foundation Investigation Report (New Town Creek Bridge)

FAST DIAGRAM

SR 225 @ New Town Creek & Coosawattee River

HOW >>

<< WHY



INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 225 @ New Town Creek & Coosawattee River

Function: Replace Deficient Bridges

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
A	Coosawattee River Bridge	Cross	River	\$2,810,000	48.7	Yes
		Replace	Deficient Br			
		Provide	Access			
		Pass	Farm Vehicles			
		Meet	Flood Elevation			
		Meet	Bridge Policies			
		Remove	Existing Bridge			
B	New Town Creek Bridge	Cross	Creek	\$643,000	11.1	Yes
		Replace	Deficient Br			
		Meet	Flood Elevation			
		Meet	Bridge Policies			
		Remove	Existing Bridge			
C	Right of Way (ROW)	Store	Project	\$622,000	10.8	Yes
		Realign	Roadway			
		Allow	Local Access			
		Acquire	Golf Course Pt			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 225 @ New Town Creek & Coosawattee River

Function: Replace Deficient Bridges

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
D	Asphalt Pavement & Base Course	Carry	Traffic	\$603,000	10.5	Yes
		Support	Loads			
		Improve	Geometrics			
		Access	Boat Ramp			
		Improve	Access			
E	Utilities	Avoid	TVA Pole	\$293,000	5.1	No
F	Borrow	Construct	Embankment	\$243,000	4.2	Yes
		Achieve	Grade			
		Pass	Farm Vehicle			
		Realign	Road			
		Improve	Geometrics			
G	Erosion Control	Protect	Environment	\$104,000	1.8	No
		Contain	Run-off			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 225 @ New Town Creek & Coosawattee River

Function: Replace Deficient Bridges

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
H	Drainage	Carry	Water	\$104,000	1.8	No
		Match	Existing Pipes			
I	Clearing & Grubbing	Allow	Construction	\$100,000	1.7	No
		Remove	Old Pavement			
J	Guardrail	Redirect	Vehicle	\$92,000	1.6	Yes
		Improve	Aesthetics			
		Allow	2:1 Slopes			
K	Concrete Approach Slabs	Connect	Road to Bridge	\$76,000	1.3	No
		Minimize	Settlement			
L	Unclassified Excavation	Remove	Unsuitable Mat.	\$45,000	0.8	No

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Coosawattee River Bridge		
A-1	Reduce the bridge curvature, or make tangent and tie back into existing roadway near Station 130	Eliminate bridge curve, eliminates scope creep east side, reduces cost, modify EIS	✓
A-2	Construct bridge using two, 150-foot spans in-lieu-of three, 100-foot spans over the main channel	Eliminates one major pier in main channel area, reduces cost	✓
A-3	Replace the BT 63" beams with BT 54" beams over the main channel	Reduces beam cost	✓
A-4	Replace the nine, 40-foot spans with four, 90-foot spans	Fewer spans, drilled shaft piers vs. pile bents	
A-5	Construct the bridge with decorative bridge rails	Already being considered	X
A-6	Reduce the height of the bridge to eliminate excess vertical clearance	Bridge height 8 ½ feet above height needed to provide hydraulic opening	✓
A-6.1	Reduce the height of the bridge by lowering the Farm access road	Provide access via access road on north side of roadway if needed (Combine with A-6)	✓
A-7	Construct the new bridge closer (60-100 ft) to the existing alignment	Major environmental impacts, new roadway alignment, requires superelevation change on Bridge	X
A-8	Close the road, detour the traffic, and construct the bridge on the existing alignment	Detour impacts, may require superelevation changes on the bridges	X
✓ = Will be considered further; X = 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	New Town Creek Bridge		
B-1	Construct the bridge using a single span in-lieu-of the proposed 3-span bridge	Reduce impacts to creek area, eliminate two high piers	✓
B-2	Construct the bridge with decorative bridge rails	Already being considered	X
B-3	Reduce the height of the bridge to eliminate excess vertical clearance	Combine with A-1	X
B-4	Construct the new bridge closer (60-100 ft) to the existing alignment	Major environmental impacts, new roadway alignment, superelevation concerns	X
B-5	Close the road, detour the traffic, and construct the bridge on the existing alignment	Detour impacts, may require superelevation changes on the bridges	X
C	Right of Way (ROW)		
C-1	Shift the alignment north/east of the Coosawattee River Bridge and use more of the existing road alignment	Combine with A-1	X
C-2	Construct an MSE/Retaining wall on the north side of the road between Station 108 and Station 113.62 (abutment)	Reduce project footprint, possible visual impacts, reduce area needed for landscaping	X
C-3	Construct combination MSE/Retaining/Embankment on the north side of the road between the two bridges	Reduce project footprint, possible visual impacts, reduce area needed for landscaping	X
✓ = Will be considered further; X = 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
D	Asphalt Pavement & Base Course		
D-1	Reduce the proposed 6 ½ foot paved shoulder to 2-4 feet	Not a bike route	✓
D-2	Construct a local access road on the north side of the road to access the farm area in-lieu-of raising the bridge high enough to allow farm vehicles to pass under the bridge	See Idea A-6, A-6.1	X
E	Utilities		
E-1	Ensure the new roadway alignment does not impact the large TVA Power pole	High cost to relocate pole, pole has been moved once	X
F	Borrow		
F-1	Use a combination of MSE/Retaining Wall/Embankment on the north side of the road to reduce ROW takings	Eliminates the area needed for the landscaping	X
F-2	Lower the roadway profile to reduce the size of the embankment	See Idea A-6	X
F-3	Construct the new bridges/roadway closer to the existing roadway	See Ideas A-1, A-7, and A-8	X
✓ = Will be considered further; X = 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
M	Other		
M-1	Construct a pedestrian walkway on the south side of the roadway between the visitor center buildings and the boat ramp/viewing area	Already discussed in environmental documents and discarded	X
M-2	Identify the volume of large riprap that will be placed on the embankment at the abutments	Provide information to design consultant	DS
M-3	Allow the Town River Bridge to remain in place, maintained by the Natural Resources Agency, for accessing the historical site	Must transfer bridge to DNR who has no funds to maintain	X
M-4	Identify the volume of existing roadway and roadway embankment that is to be removed	Provide information to design consultant	DS
M-5	Develop cost for project landscaping	Provide information to design consultant	DS
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			