



GEORGIA DEPARTMENT OF TRANSPORTATION

WIDENING AND RECONSTRUCTION OF CARPENTER ROAD FROM US 82/SR 520 TO DAVIS ROAD

STP00-0003-00(430) – P.I. NO. 0003430

TIFT COUNTY

VALUE ENGINEERING REPORT



AUGUST 2010

SUBMITTED BY:





An employee-owned company

August 4, 2010

Ms. Lisa Myers, AVS
Design Review Engineer Manager/VE Coordinator
Georgia Department of Transportation-Engineering Services
One Georgia Center
600 W. Peachtree Street NW
Atlanta, GA 30308

RE: Final Value Engineering Report
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road from
US 82/SR 520 to Davis Road
Tift County

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our Value Engineering Report for widening of 2.5 miles of Carpenter Road from US 82/SR 520 to Davis Road.

Using the Value Engineering “Job Plan” – Investigation, Analysis (*Function*), Speculation, Evaluation & Development, the VE Team identified:

- Six (6) Alternatives recommended improving the project value.

We trust that you will find this report to be in proper order. It should be noted that the results of this workshop are volatile in that they can be overcome by the events that accompany the expeditious continuance of the design process. Accordingly, we encourage an equally expeditious implementation meeting to design the disposition of the contents of this report.

Please contact me at 678-677-6420 should you have any questions regarding this submittal.

On behalf of our VE Team, we thank you very much for the opportunity to work with you and the hard working staff of the Georgia Department of Transportation.

Yours truly,

A handwritten signature in black ink that reads "Les M. Thomas".

Les M. Thomas, P.E., CVS-Life
VE Team Leader

A handwritten signature in black ink that reads "Randy S. Thomas".

Randy S. Thomas, CVS
Assistant Team Leader

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Carpenter Road - Tift County

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1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

The purpose of this value engineering study report is to provide Georgia Department of Transportation (GDOT) with an analysis on the proposed project for the widening of Carpenter Road starting at US 82/SR 520 and extending north to Davis Road. The length of the project is 2.5 miles.

This project is located in Tift County.



Figure 1 - Aerial View of Project

1.2 PROJECT DESCRIPTION

The project is located in Tift County and is partially located within the Tifton city limits. The widening and reconstruction of Carpenter Road commences just north of its current intersection with US 82/SR 520 and continues north to Davis Road and then transitions to the existing pavement. The roadway will be widened to five lanes with two 12' travel lanes in each direction, a 14' two-way left-turn lane, and a 5' sidewalk on both sides as well as curb and gutter. No raised medians are planned.

Carpenter Road serves as a rural major collector. Land use includes residential, commercial, and public/institutional properties. Major reconstruction and re-alignment are planned for the intersection at Whiddon Mill Road. Proposed design speed will remain at the current 45mph. Total length of the project is 2.5 miles.

1.3 PROJECT CONCERNS AND OBJECTIVES

The project should avoid the existing power easements and minimize adverse effects to the existing wetlands. The project should be constructed with the least impact to its users by maintaining at least one lane of travel in each direction as the proposed project is constructed. Staging should be carefully considered at the Whiddon Mill Road intersection such that traffic operations may encounter the least amount of interruption as possible as the improvements are built.

1.4 VALUE ENGINEERING PROCESS

The Value Engineering (VE) team followed the seven-step Value Engineering Job Plan as promulgated by SAVE International.

Using the first two steps of the Value Engineering Job Plan— Investigation and Analysis —the VE Team identified the goal of this project is to “promote growth” - to add capacity in order to accommodate traffic volumes.

This led the team through the Speculative phase, which identified possible design alternatives. The VE Team then moved to the Evaluation and Development phases where the team determined that the ideas would either offer an improvement to the project value or the ideas would have to be discarded. During the evaluation process it was decided to use a comparison matrix to determine which ideas regarding the Whiddon Mill Road intersection should be further studied.

ANALYSIS PHASE

ANALYSIS MATRIX

STUDY NO. STP00-0003-00(430) - P.I. No. 0003430
 Widening and Reconstruction of Carpenter Road - Tift County

List the best ideas from the ranking and comparison techniques on the preceding pages. Fill in the diagonal headings with the most desired criteria, and in the boxes below rate each (on a scale of 1 to 10) for its importance to the user. Then, in the upper left triangle, record how well (on a scale of 1 to 4*) each idea fulfills each criterion. In the lower box record the product of the two numbers. Total the products to determine which ideas best fit the desired criteria.			Desired Criteria	First Cost	LCCA	Constructability	Traffic Operations	Environmental Impacts	Total
			a	b	c	d	e		
Weight of Importance (1-10)			8	5	4	9	6		
RD-8	Realign Whiddon Mill Road to reduce wetland impacts	rating 1-4 Score	2 16	3 15	3 12	4 36	4 24	103	
RD-10	Retain current alignment on Whidden Mill Road	rating 1-4 Score	4 32	4 20	3 12	2 18	4 24	106	
RD-12	Construct a grade separation at Whidden Mill Road	rating 1-4 Score	1 8	1 5	2 8	4 36	3 18	75	
RD-13	Use free flow truning with existing alignment on Whiddon Mill Road	rating 1-4 Score	3 24	3 15	3 12	3 27	4 24	102	
RD-15	Use a SPUI arrangement at existing alignment	rating 1-4 Score	3 24	3 15	3 12	2 18	4 24	93	
RD-17	Use one way pairs at Whiddon Mill Road	rating 1-4 Score	2 16	2 10	3 12	2 18	2 12	68	
	Current Design	rating 1-4 Score	2 16	3 15	3 12	3 27	1 6	76	

Following the development phase, the team prepared a summary of recommendations and presented them to the owner on the last day of the study.

1.5 OBSERVATIONS

The VE Team noted the following items of the project that may warrant further review:

1. The grading estimate at \$2.5 million appears to be high.
2. The 9.5mm Superpave shown on the estimate should be 12.5mm Superpave per OMR recommendations.
3. The Tift County/City of Tifton ROW costs are not reflected on the GDOT estimate provided to the VE team.
4. On sheet 7 of the plans, the Allowable Ranges Table for pavement cross slopes should be deleted as this is a Federal Aid project. Cross slopes may only vary +/- 0.2% in tangent section.
5. Additional channelized islands and acceleration lanes for the right-turn movements at Carpenter Road and Whiddon Mill Road should be considered to improve operations.
6. The proposed location of the new Whiddon Mill road intersection is in apparent conflict with the existing school entrance onto Whiddon Mill Road.

1.6 CONCLUSIONS AND RECOMMENDATIONS

The VE Team concluded that the project should meet the functional requirements of the project as proposed. The VE Team identified eighteen alternatives. As a result of the evaluation and development phases, the VE Team **recommends the following six design alternatives** for implementation, which have the greatest opportunity to increase the value of the project without negatively impacting it.

PROJECT:	STP00-0003-00(430) – P.I. No. 0003430 Widening of Carpenter Road-Tift County	SHEET NO.: 1 of 1
ALTERNATIVE NUMBER	DESCRIPTION OF RECOMMENDED ALTERNATIVES	INITIAL COST SAVINGS
	Roadway (RW)	
RD-1	Use 11' travel lanes	\$435,038
RD-2	Use 11' inside lanes and 12' outside lanes	\$217,519
RD-3	Use a 12' two-way left turn	\$217,519
RD-10	Retain existing alignment at Whiddon Mill Road	\$3,295,160
RD-11	Utilize existing pavement for 14' two-way left turn lane	\$319,168
RD-18	Delete field engineer's office; use GDOT District Office	\$82,800

2 STUDY RESULTS

2.1 INTRODUCTION

This section includes the study results presented in the form of fully developed value engineering alternatives that include descriptions of the original design, description of the alternative design configurations, comments on the technical justifications, opportunities and risks associated with the alternatives, sketches, calculations and technical justification for these alternatives. For the most part, these fully developed alternatives represent an array of choices that clearly could have an impact on the eventual cost and performance of the finished project.

This introductory sheet is followed by a **Summary of Alternatives**. It should be noted that the alternatives that are included, which have cost estimates attached are not necessarily representative of the final cost outcome for each alternative. Some of these alternatives have components that are mutually exclusive so they may not be added together.

The users of this report are asked to consider these alternatives and design suggestions as a smorgasbord of choices for selection and use as the project moves forward. The enclosed **Summary of Alternatives** may also be used as a “score sheet” within the bounds of an implementation meeting.

2.2 COST CALCULATIONS

The cost calculations are intended only as a guide to the approximate results that might be expected from implementation of the alternatives. They should be helpful in making clear choices as to the pursuit of individual alternatives.

The composite mark-up of 10% for the construction cost comparisons was derived from the cost estimate for the project. This estimate can be found in the section of this report entitled **Project Description**.

2.3 DOCUMENTATION OF ALTERNATIVES AND DESIGN SUGGESTIONS

Following the **Summary of Alternatives** on the next page are the individual fully developed alternatives and design suggestions.

Summary of Alternatives & Design Suggestions



PROJECT: STP00-0003-00(430) – P.I. No. 0003430		SHEET NO.: 1 of 1
Widening of Carpenter Road-Tift County		
ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
	Roadway (RW)	
RD-1	Use 11' travel lanes	\$435,038
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Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-1

DESCRIPTION: **Use 11' travel lanes**

SHEET NO.: **1 of 4**

Original Design:

The original designs proposes constructing 2-12' travel lanes in each direction throughout the project.

Alternative:

The alternative proposes using 2-11' travel lanes in each direction throughout the project.

Opportunities:

- Reduction in full depth pavement quantities
- Reduction in ROW required

Risks:

- None Noted

Technical Discussion:

Reduction of width of travel lanes throughout the project would result in 4' of full build-up widening that would not have to be constructed, resulting in significant cost savings. AASHTO's "Policy on Geometric Design of Highways 2004" states that 11'-0" lanes are permissible. It also states that under interrupted –flow operating conditions at low speeds (45 mph or less), narrower lanes are normally adequate and have some advantages. (See Pages 472-473).

Due to the low speed (45mph), low % trucks (3%) and rural character of the project, 11'-0" lanes should pose no operational issues.

It is also noted that this route is not on the National Highway System, and is not a GRIP route.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,811,709	\$ 0	\$ 6,811,709
ALTERNATIVE	\$ 6,376,670	\$ 0	\$ 6,376,670
SAVINGS	\$ 435,038	\$ 0	\$ 435,038

Illustrations



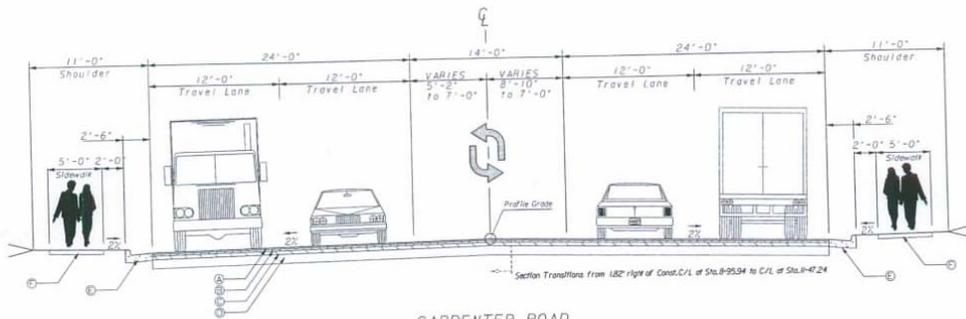
PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-1

DESCRIPTION: **Use 11' travel lanes**

SHEET NO.: **2 of 4**

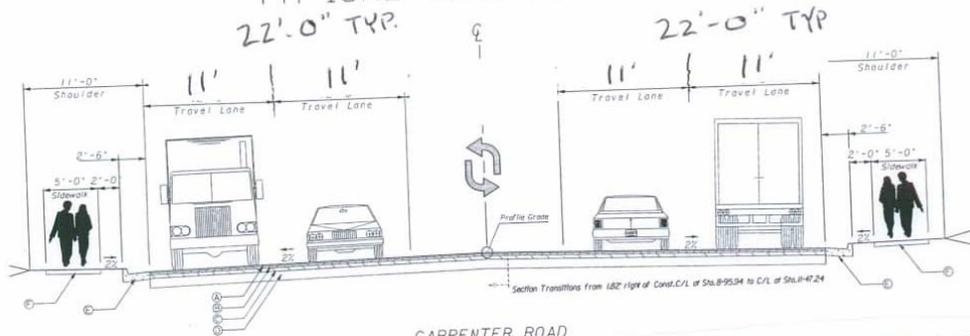
TYPICAL SECTION NO. 1



CARPENTER ROAD

ORIGINAL - 12' TYPICAL TRAVEL LANES

TYPICAL SECTION NO. 1



CARPENTER ROAD

ALTERNATIVE - 11' TYPICAL TRAVEL LANES

Calculations



PROJECT: **Georgia Department of Transportation
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Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-1

DESCRIPTION: **Use 11' travel lanes**

SHEET NO.: **3** of **4**

Assumptions:

- Project length- STA 8+95.94-STA 141+91.34= 13,295.4 LF(2.518 mi)
- Reduce full-depth pavement by 4' overall. 2' NB, 2' SB
- Asphalt application rates used as found in plan typical sections
- ROW savings= 4' w throughout project

Pavement Reduction:

13,295.4 LF x 4'w/9=5909 SY full-depth pavement reduction.

GAB= 5909 SY x 800LB/SY/2000LB/TN=2364 TN reduction

12.5mm Superpave-5909 SY x 135LB/SY/2000LB/TN= 399 TN reduction

19mm Superpave-5909 SY x 220LB/SY/2000LB/TN= 650 TN reduction

25mm Superpave-5909 SY x 330LB/SY/2000LB/TN= 975 TN reduction

ROW Savings Estimate:

ROW costs derived from ROW cost estimate provided to VE Team with concept documents.

13,295LF x 4'w=53,180SF/43,560SF/AC=1.22 AC saved

Raw Land cost=\$2,316,722.46/Total land Area Req'd (13.34 AC)=\$173,667.35/AC average cost

1.22 AC saved x \$173,667.35=\$211,874.17 land cost savings computed

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-2

DESCRIPTION: **Use 11' inside/12' outside travel lanes**

SHEET NO.: **1 of 4**

Original Design:

The original designs proposes constructing 2-12' travel lanes in each direction throughout the project.

Alternative:

The alternative proposes constructing the inside travel lanes at an 11' width, and constructing the outside travel lanes at 12' width throughout the project.

Opportunities:

- Reduction in ROW required
- Reduction in full depth pavement quantities

Risks:

- None Noted

Technical Discussion:

Reduction of width of travel lanes throughout the project would result in 2' of full build-up widening that would not have to be constructed, resulting in significant cost savings. AASHTO's "Policy on Geometric Design of Highways 2004" states that 11'-0" lanes are permissible. It also states that under interrupted –flow operating conditions at low speeds (45 mph or less), narrower lanes are normally adequate and have some advantages. (See Pages 472-473). Due to the low speed (45mph), low % trucks and rural character of the project, 11'-0" lanes should pose no operational issues.

The provision of a 12' outside travel lane would be a compromise from using either 12' or 11' travel lanes only, allowing additional width on the outside travel lanes for the stated 3% truck travel volume.

It is also noted that this route is not on the National Highway System, and is not a GRIP route. However, design volumes are significant, in the range of 22,900 VPD.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,811,709	\$ 0	\$ 6,811,709
ALTERNATIVE	\$ 6,594,189	\$ 0	\$ 6,594,189
SAVINGS	\$ 217,519	\$ 0	\$ 217,519

Illustrations



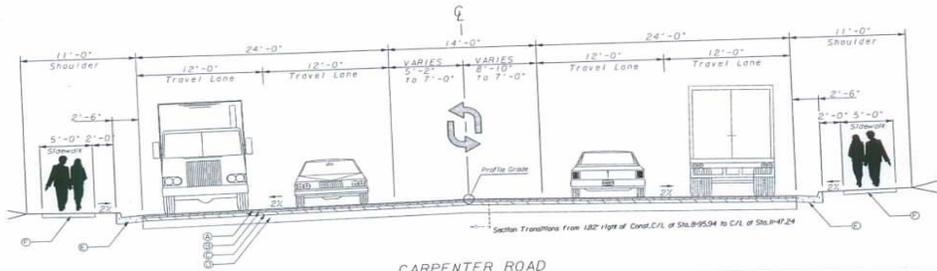
PROJECT: **Georgia Department of Transportation
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Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-2

DESCRIPTION: **Use 11' inside/12' outside travel lanes**

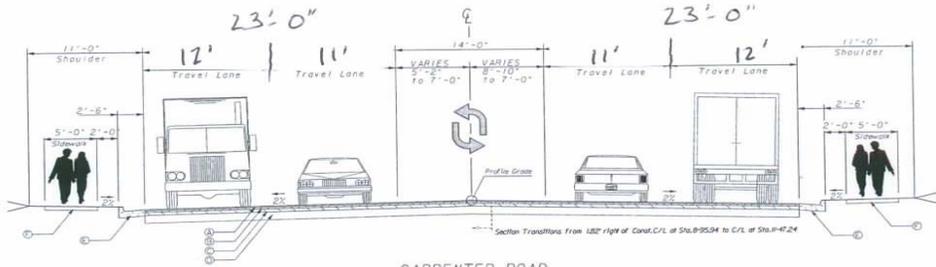
SHEET NO.: **2 of 4**

TYPICAL SECTION NO. 1



CARPENTER ROAD
ORIGINAL - 12' TYPICAL TRAVEL LANES

TYPICAL SECTION NO. 1



CARPENTER ROAD
**ALTERNATIVE - 11' INSIDE / 12' OUTSIDE
TYPICAL TRAVEL LANES**

Calculations



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-2

DESCRIPTION: **Use 11' inside/12' outside travel lanes**

SHEET NO.: **3** of **4**

Assumptions:

- Project length- STA 8+95.94-STA 141+91.34= 13,295.4 LF(2.518 mi)
- Reduce full-depth pavement by 2' overall. 1' NB, 1' SB
- Asphalt application rates used as found in plan typical sections
- ROW savings= 2' w throughout project

Pavement Reduction:

13,295.4 LF x 2' w/9=2955SY full-depth pavement reduction.

GAB= 2955 SY x 800LB/SY/2000LB/TN=1182 TN reduction

12.5mm Superpave-2955 SY x 135LB/SY/2000LB/TN=199 TN reduction

19mm Superpave-2955 SY x 220LB/SY/2000LB/TN= 325TN reduction

25mm Superpave-2955 SY x 330LB/SY/2000LB/TN= 488 TN reduction

ROW Savings Estimate:

ROW costs derived from ROW cost estimate provided to VE Team with concept documents.

13,295LF x 2' w=26,590SF/43,560SF/AC=0.61 AC saved

Raw Land cost=\$2,316,722.46/Total land Area Req'd(13.34 AC)=\$173,667.35/AC average cost

0.61 AC saved x \$173,667.35=\$105,937.08 land cost savings computed

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP00-0003-00(430) - P.I. No. 0003430 Widening and Reconstruction of Carpenter Road from US82/SR 520 to Davis Road Tift County	ALTERNATIVE NO.:	RD- 2
DESCRIPTION:	Use 11' inside/12' outside travel lanes	SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
12.5 mm Superpave	TN	8,318	\$65.00	\$ 540,670	8,119	\$65.00	\$ 527,735
19.0 mm Superpave	TN	13,308	\$65.00	\$ 865,020	12,983	\$65.00	\$ 843,895
25.0 mm Superpave	TN	19,963	\$65.00	\$ 1,297,595	19,475	\$65.00	\$ 1,265,875
GAB	TN	53,245	\$22.02	\$ 1,172,455	52,063	\$22.02	\$ 1,146,427
ROW savings	AC	13.34	\$ 173,667	\$ 2,316,722	12.73	\$ 173,667	\$ 2,210,785
Sub-total				\$ 6,192,462			\$ 5,994,718
Cons't Mark-up 10.00%				\$ 619,246			\$ 599,472
TOTAL				\$ 6,811,709			\$ 6,594,189

Estimated Savings: \$217,519

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Use 12' width for two-way left turn lanes**

SHEET NO.: **1 of 4**

Original Design:

The original design proposes constructing a 14' wide two-way left turn lane throughout the project.

Alternative:

The alternative proposes narrowing the two-way left turn lane from 14' to 12' throughout the project.

Opportunities:

- Reduction in pavement costs
- Reduction in required ROW
- Reduction in construction time

Risks:

- None Apparent

Technical Discussion:

The alternative proposes narrowing the 14' two-way left turn lane to 12' throughout the project. The resulting savings would be calculated based on reduction in full build-up pavement costs, as well as the reduction of 2' of ROW required to construct the project. The 12' two-way left turn lane would be operationally sufficient in a 45 mph design speed.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,811,709	\$ 0	\$ 6,811,709
ALTERNATIVE	\$ 6,594,189	\$ 0	\$ 6,594,189
SAVINGS	\$ 217,519	\$ 0	\$ 217,519

Illustrations



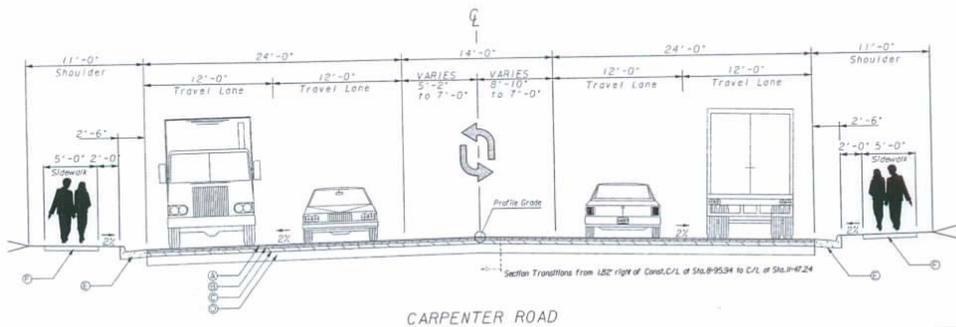
PROJECT: **Georgia Department of Transportation
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Tift County**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Use 12' width for two-way left turn lanes**

SHEET NO.: **2 of 4**

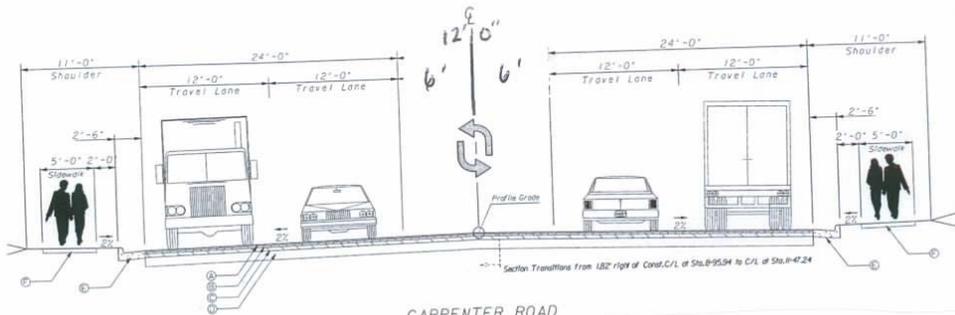
TYPICAL SECTION NO. 1



CARPENTER ROAD

ORIGINAL - 14' FLUSH MEDIAN

TYPICAL SECTION NO. 1



CARPENTER ROAD

ALTERNATIVE - 12' FLUSH MEDIAN

Calculations



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Use 12' width for two-way left turn lanes**

SHEET NO.: **3** of **4**

Assumptions:

- Project length- STA 8+95.94-STA 141+91.34= 13,295.4 LF(2.518 mi)
- Reduce full-depth pavement by 2' overall.
- Asphalt application rates used as found in plan typical sections
- ROW savings= 2' w throughout project

Pavement Reduction:

13,295.4 LF x 2' w/9=2955SY full-depth pavement reduction.

GAB= 2955 SY x 800LB/SY/2000LB/TN=1182 TN reduction
12.5mm Superpave-2955 SY x 135LB/SY/2000LB/TN=199 TN reduction
19mm Superpave-2955 SY x 220LB/SY/2000LB/TN= 325TN reduction
25mm Superpave-2955 SY x 330LB/SY/2000LB/TN= 488 TN reduction

ROW Savings Estimate:

ROW costs derived from ROW cost estimate provided to VE Team with concept documents.
13,295LF x 2' w=26,590SF/43,560SF/AC=0.61 AC saved
Raw Land cost=\$2,316,722.46/Total land Area Req'd(13.34 AC)=\$173,667.35/AC average cost
0.61 AC saved x \$173,667.35=\$105,937.08 land cost savings computed

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP00-0003-00(430) - P.I. No. 0003430 Widening and Reconstruction of Carpenter Road from US82/SR 520 to Davis Road Tift County	ALTERNATIVE NO.:	RD- 3
DESCRIPTION:	Use 12' width for two-way left turn lane	SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
12.5 mm Superpave	TN	8,318	\$65.00	\$ 540,670	8,119	\$65.00	\$ 527,735
19.0 mm Superpave	TN	13,308	\$65.00	\$ 865,020	12,983	\$65.00	\$ 843,895
25.0 mm Superpave	TN	19,963	\$65.00	\$ 1,297,595	19,475	\$65.00	\$ 1,265,875
GAB	TN	53,245	\$22.02	\$ 1,172,455	52,063	\$22.02	\$ 1,146,427
ROW savings	AC	13.34	\$ 173,667	\$ 2,316,722	12.73	\$ 173,667	\$ 2,210,785
Sub-total				\$ 6,192,462			\$ 5,994,718
Cons't Mark-up 10.00%				\$ 619,246			\$ 599,472
TOTAL				\$ 6,811,709			\$ 6,594,189

Estimated Savings: \$217,519

Value Analysis Design Alternative



PROJECT: Georgia Department of Transportation
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Tift County

ALTERNATIVE NO.:
RD-10

DESCRIPTION: Retain the existing alignment at Whiddon Mill Road

SHEET NO.: 1 of 4

Original Design:

The original design calls for re-aligning Carpenter Road to the west at Whiddon Road in order to improve the intersection angle.

Alternative:

The Alternative design would propose utilizing the existing alignment of Carpenter Road at Whiddon Road.

Opportunities:

- Reduced paving cost
- Reduced grading and drainage costs
- Reduced right-of-way cost
- Reduced wetland impact
- Reduced stream impacts
- Eliminate the need for an individual storm water discharge permit
- Eliminate a potential 4f document for the acquisition of the school property
- Eliminate an undesirable conflict with the existing school entrance on Whiddon Road.

Risks:

- Less than desirable intersection angle

Technical Discussion:

While realigning the intersection would be desirable in order to reduce the number of accidents and improve operations of the intersection, the proposed design has substantial environmental impacts. The approved Concept Report discusses the desirability of realigning the intersection yet doesn't specifically identify if the intersection has an undesirable accident history. It should also be noted that the traffic volumes for Whiddon Mill Road would dictate widening to four lanes in the future. Future widening along Whiddon Mill Road may impact additional properties that could be utilized to accommodate realignment of this roadway.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,295,160	\$ 0	\$ 3,295,160
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 3,295,160	\$ 0	\$ 3,295,160

Illustrations

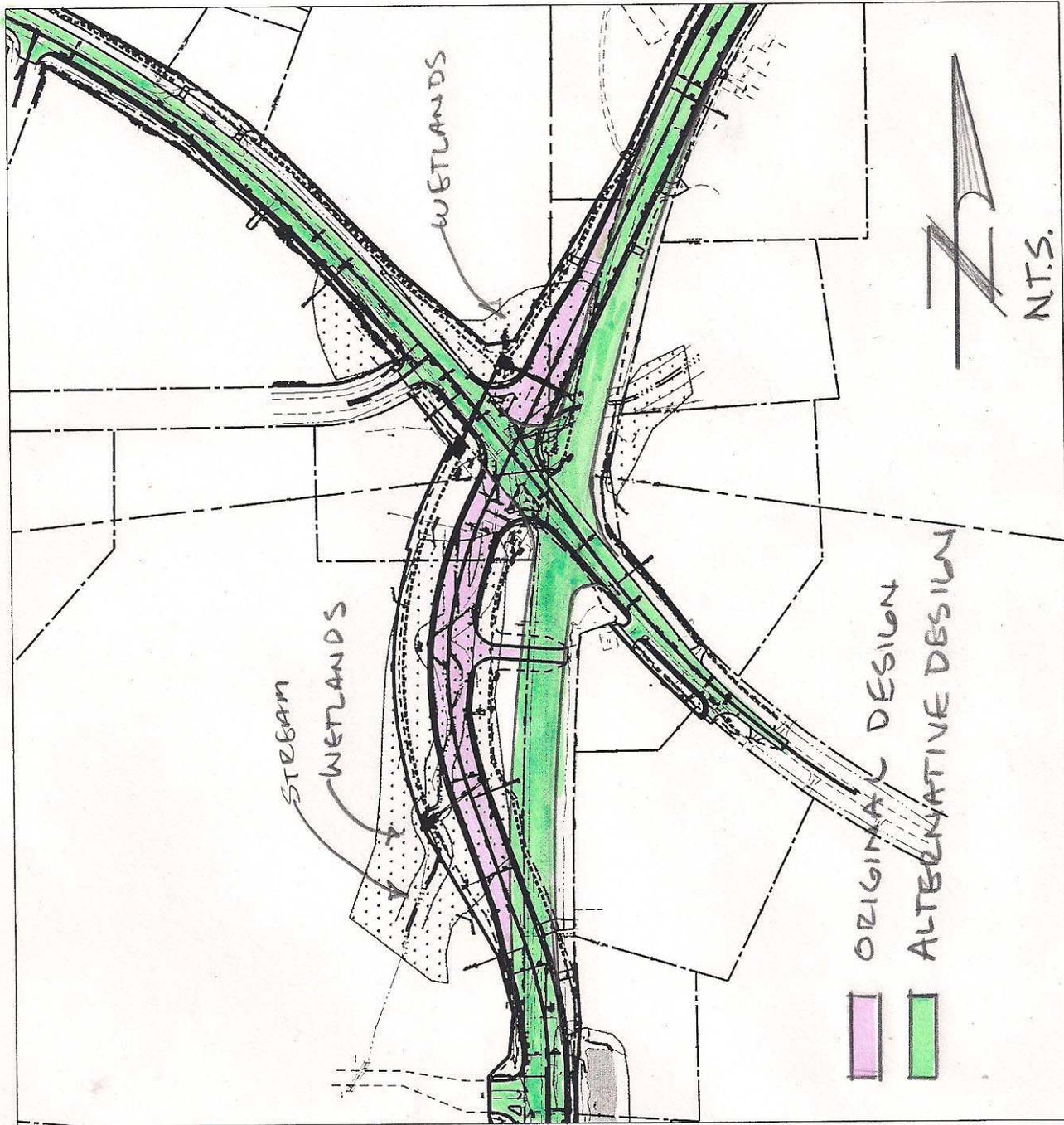


PROJECT: Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County

ALTERNATIVE NO.:
RD-10

DESCRIPTION: Retain the existing alignment at Whiddon Mill Road

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-10

DESCRIPTION: **Retain the existing alignment at Whiddon Mill Road**

SHEET NO.: **3 of 4**

Right of Way:

Two Parcels to be reduced - #31/Tift County Board of Education (4.23 acres) and #31 Tift County (0.99 Acres).

Assume reduction to be 90% - $(4.23 \text{ AC} + 0.99 \text{ AC}) \times 0.90 = 4.67$

Net Cost	4.70 AC x \$175,000/AC	= \$ 822,500
Scheduling	55% = \$ 452,375	
Administrative	60% = \$ 493,500	
Inflation	40% = \$ 329,000	
Total		= \$ 2,097,375

Paving:

Assume that the additional pavement required for the current design (new alignment) will remain about the same for construction at the alternate location (existing alignment).

Assume an additional 250 LF of existing pavement can be saved.
 $250 \text{ LF} \times 62 \text{ FT} = 15,500 \text{ SF} / (9 \text{ SF/SY}) \Rightarrow 1725 \text{ SY}$

Superpave 12.5mm	= $[(1,725 \text{ SY} \times 165 \#/\text{SY-IN}) / (2000 \#/\text{Ton})] \Rightarrow$	143 TN
Superpave 19.0mm	= $[(1,725 \text{ SY} \times 220 \#/\text{SY-IN}) / (2000 \#/\text{Ton})] \Rightarrow$	190 TN
Superpave 25.0mm	= $[(1,725 \text{ SY} \times 330 \#/\text{SY-IN}) / (2000 \#/\text{Ton})] = >$	285 TN
12" GAB	= $[(15,500 \text{ SF} \times 1.0 \text{ FT} \times 135 \#/\text{CF}) / (2000 \#/\text{Ton})] = >$	1,047 TN

Wetland Mitigation and Stream Mitigation:

Estimates obtained from OEL project environmentalist Sam Pugh.

Wetlands-\$200,000
Streams- \$635,000

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP00-0003-00(430) - P.I. No. 0003430 Widening and Reconstruction of Carpenter Road from US82/SR 520 to Davis Road Tift County	ALTERNATIVE NO.: RD- 10
DESCRIPTION:	Retain the existing alignment at Whiddon Mill Road	SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Reduction in pavement as a result of using existing pavement							
12.5 mm Superpave	TN	143	\$65.00	\$ 9,295	0	\$65.00	\$ -
19.0 mm Superpave	TN	190	\$65.00	\$ 12,350	0	\$65.00	\$ -
25.0 mm Superpave	TN	285	\$65.00	\$ 18,525	0	\$65.00	\$ -
GAB	TN	1,047	\$22.02	\$ 23,055	0	\$22.02	\$ -
Reduction in impacts:							
ROW	LS	1	\$ 2,097,375	\$ 2,097,375	0	\$ -	\$ -
Wetland Mitigation	LS	1	\$ 200,000	\$ 200,000	0	\$ -	\$ -
Stream Mitigation	LS	1	\$ 635,000	\$ 635,000	0	\$ -	\$ -
Sub-total				\$ 2,995,600			\$ -
Cons't Mark-up 10.00%				\$ 299,560			\$ -
TOTAL				\$ 3,295,160			\$ -

Estimated Savings: \$3,295,160

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-11

DESCRIPTION: **Utilize existing pavement for the 14' two-way left turn lane**

SHEET NO.: **1** of **5**

Original Design:

The Original Design proposes removing and reconstructing the entire existing pavement structure.

Alternative:

The Alternative Design would propose removing only the portions of existing pavement that would be under the thru lanes or in the major intersections.

Opportunities:

- Reduction in paving costs.

Risks:

- Requires a slightly more complex traffic control plan.

Technical Discussion:

OMR's Pavement Evaluation Summary of September 27, 2007 recommended full depth reclamation/reconstruction of the existing road. The VE team is recommending OMR be consulted on the suitability of overlaying the existing roadway for use only as the median turn lane and removing all portions of the existing roadway that would be under the thru lanes or in the major intersections. Since the majority of the roadway is being widened symmetrically significant portions of the existing roadway could be utilized. Discussions with the County's consultant and District 4 personnel seemed to indicate the road is in good condition.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 319,168	\$ 0	\$ 319,168
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 319,168	\$ 0	\$ 319,168

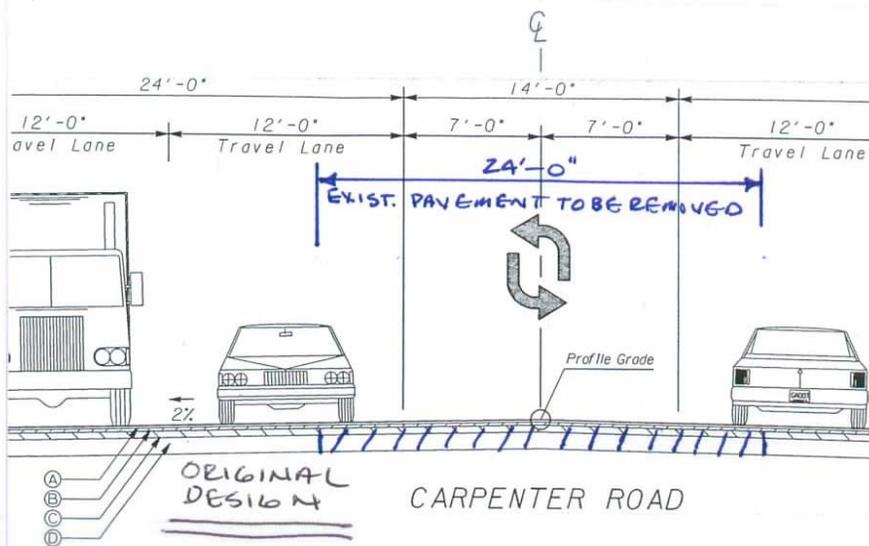
Illustrations

PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

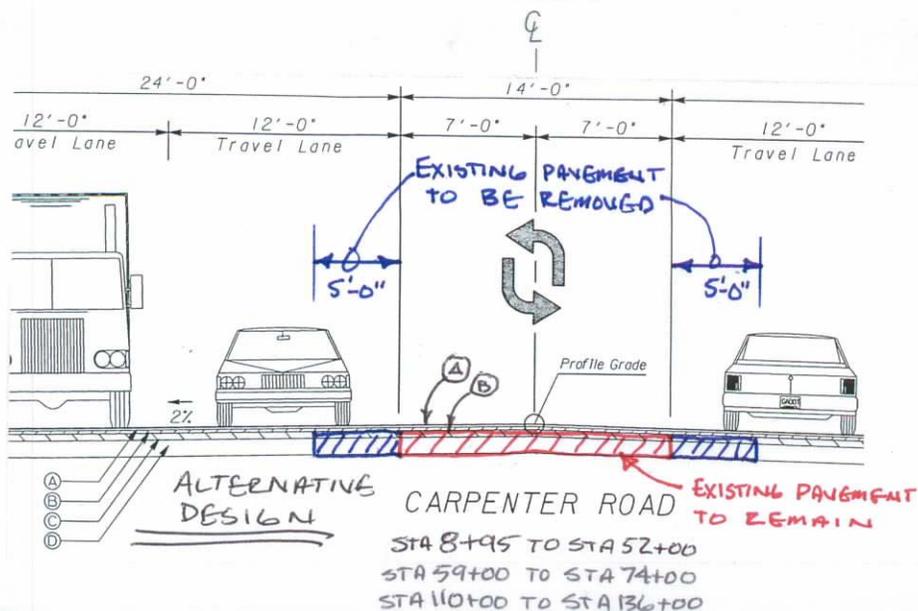
DESCRIPTION: **Utilize existing pavement for the 14' two-way left turn lane**

ALTERNATIVE NO.:
RD-11

SHEET NO.: 2 of 5



- Ⓐ RECYCLED ASPH CONC 9.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME, (135 LB/SY)
- Ⓑ RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME, (220 LB/SY)
- Ⓒ RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME, (330 LB/SY)
- Ⓓ GR AGGR BASE CRS, INCL MATL, 8 IN
- Ⓔ 8" X 30" CONC. CURB & GUTTER, GA. STD. 9032 B. TYPE 2



Illustrations

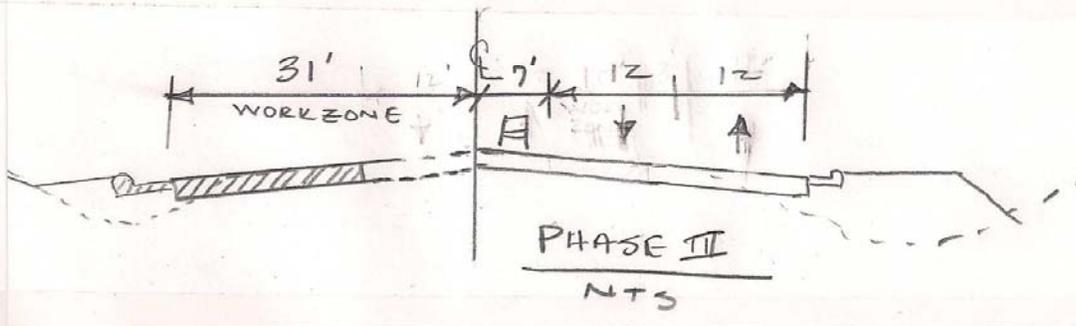
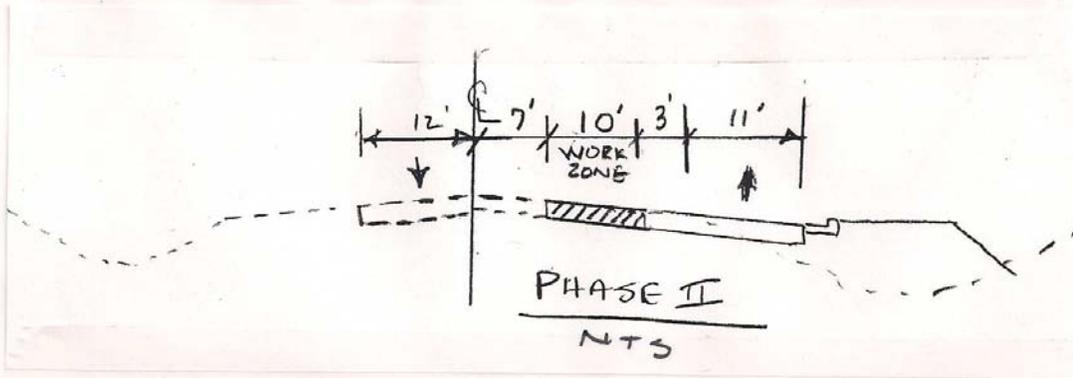
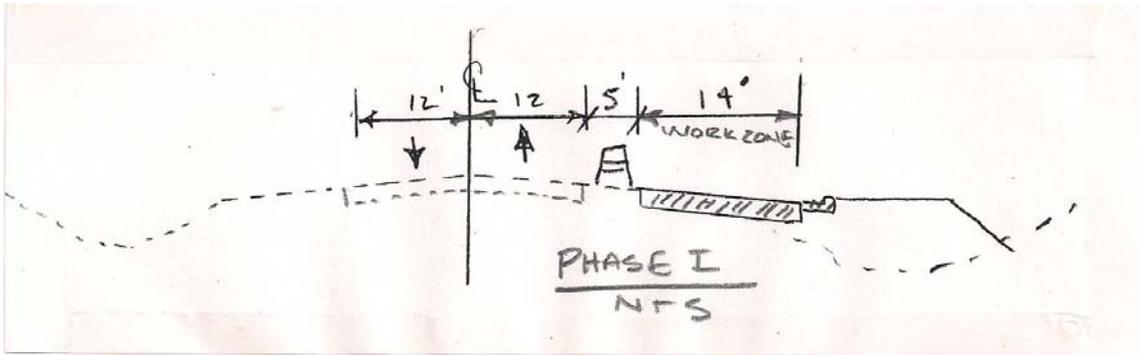


PROJECT: Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County

ALTERNATIVE NO.:
RD-11

DESCRIPTION: Utilize existing pavement for the 14' two-way left turn lane

SHEET NO.: 3 of 5



CONSTRUCTION PHASING

Calculations



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-11

DESCRIPTION: **Utilize existing pavement for the 14' two-way left turn
lane**

SHEET NO.: **4** of **5**

Paving:

Original Design-

Station 8+95 to Station 136+00 => 12,705 LF Full Depth
12,705' x 14' = 177,870 SF / 9sf/sy => 19,765 SY

Superpave 12.5mm	= [(19,765 SY x 165#/SY-IN) / (2000#/Ton)]	=>	1,631 TN
Superpave 19.0mm	= [(19,765 SY x 220#/SY-IN) / (2000#/Ton)]	=>	2,174TN
Superpave 25.0mm	= [(19,765 SY x 330 #/SY-IN) / (2000#/Ton)]	=>	3,262 TN
12" GAB	= [(177,870 SF x 1.0FTx135#/CF)/(2000#/Ton)]	=>	12,006 TN

Alternative Design-

Stations to retain existing pavement

Station 8+95 to Station 52+00 => 4,305

Station 59+00 to Station 74+00 => 1,500

Station 110+00 to Station 136+00 => 2,600

=> 8,405

Full Depth:

(12,705' - 8,405') x 14' = 60,200 SF / 9sf/sy => 6,689 SY

Superpave 12.5mm	= [(19,765 SY x 165#/SY-IN) / (2000#/Ton)]	=>	1,631 TN
Superpave 19.0mm	= [(19,765 SY x 220#/SY-IN) / (2000#/Ton)]	=>	2,174TN
Superpave 25.0mm	= [(6,689 SY x 330 #/SY-IN) / (2000#/Ton)]	=>	1,104 TN
12" GAB	= [(60,200 SF x 1.0FTx135#/CF)/(2000#/Ton)]	=>	4,064 TN

Traffic Control Plan-

Assume 1 additional phase of Traffic Control at an additional cost of \$25,000

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-18

DESCRIPTION: **Delete Field Engineer’s Office, Use GDOT District 4
Office**

SHEET NO.: **1** of **4**

Original Design:

The original design proposes inclusion of a Field Engineer’s Office, Type II in the cost estimate at a cost of \$75,272.56.

Alternative:

The alternative proposes deleting the inclusion of a Field Engineer’s Office from the cost estimate, and locating the Field Engineer’s office at GDOT District 4.

Opportunities:

- Reduction in project costs

Risks:

- None Apparent

Technical Discussion:

The VE Team proposes deleting Item 153-1300, Field Engineer’s Office, Type II from the cost estimate and locating the project office at GDOT District 4. It appears from a map search that GDOT District 4 is approximately 2 miles away from the project site, which makes access convenient.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 82,800	\$ 0	\$ 82,800
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 82,800	\$ 0	\$ 82,800

Illustrations

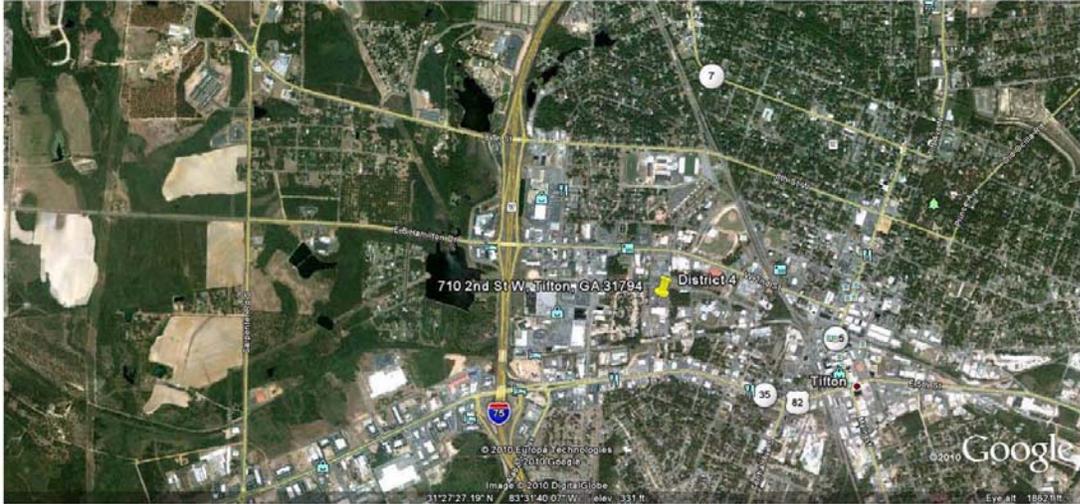


PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

ALTERNATIVE NO.:
RD-18

DESCRIPTION: **Delete Field Engineer's Office, Use GDOT District 4
Office**

SHEET NO.: **2 of 4**



Calculations



PROJECT: **Georgia Department of Transportation
STP00-0003-00(430) – P.I. No. 0003430
Widening and Reconstruction of Carpenter Road
From US82/SR 520 to Davis Road
Tift County**

DESCRIPTION: **Delete Field Engineer's Office, Use GDOT District 4
Office**

ALTERNATIVE NO.:
RD-18

SHEET NO.: **3** of **4**

Unit cost for Item 153-1300- Field Engineers Office, Type III = \$75,272.56
Composite mark-up at 10% = \$7,527.26
Sum= \$82,800 total savings

3 PROJECT DESCRIPTION

3.1 INTRODUCTION

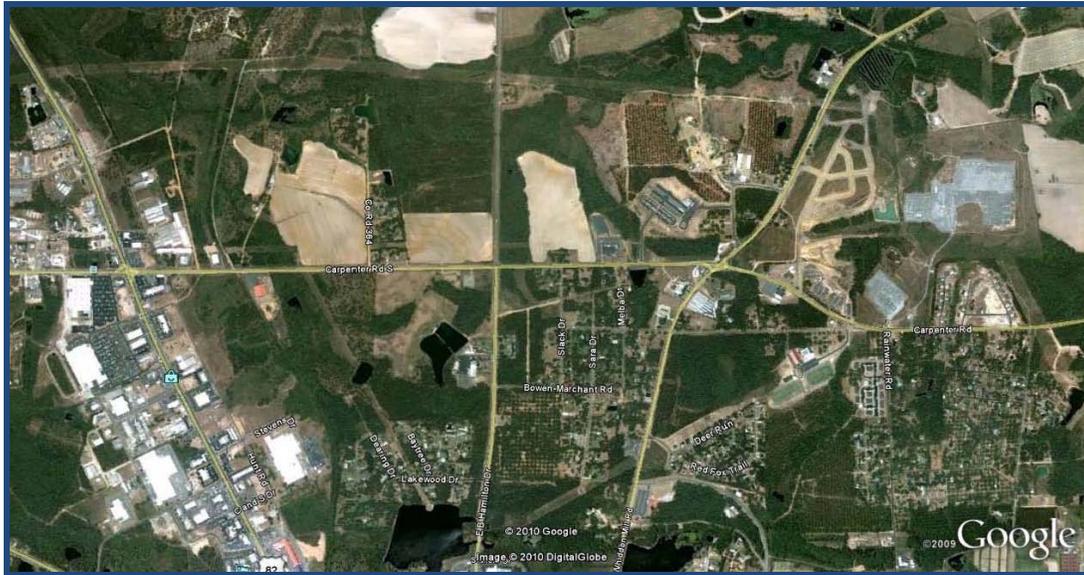


Figure 2 - Carpenter Road Improvements

3.2 PROJECT DESCRIPTION

The project is located in Tift County and is partially located within the Tifton city limits. The widening and reconstruction of Carpenter Road commences just north of its current intersection with US 82/ SR 520 and continues north to Davis Road and then transitions to the existing pavement. The roadway will be widened to five lanes with two 12' travel lanes in each direction, a 14' two way left turn lane, and a 5' sidewalk on both sides as well as curb and gutter. No raised medians are planned.

Carpenter Road serves as a rural major collector. Land use includes residential, commercial, and public/institutional properties. Major reconstruction and re-alignment are planned for the intersection at Whiddon Mill Road. Proposed design speed will remain at the current 45mph. Total length of the project is 2.5 miles.

3.3 NEED AND PURPOSE

The need and purpose of the proposed project is to satisfactorily accommodate the existing and future traffic demands of the project corridor.

3.4 REPRESENTATIVE DOCUMENTS

The Georgia Department of Transportation furnished the following documents to the VE Team:

- Construction Cost Estimates
- Concept Reports
- Project Location Map
- Traffic Analysis
- Typical Road Section
- Construction Plans

Estimate Report for file "Carpenter Road (new)"

Section SECTION01 ROADWAY					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
149-0100	1	LS	25000.00	CONTRACTOR CERTIFIED CROSS SECTIONS	25000.00
150-1000	1	LS	250000.00	TRAFFIC CONTROL - STP-0003-00 (430)	250000.00
151-1000	1	LS	100000.00	MOBILIZATION - STP-0003-00 (430)	100000.00
153-1300	1	EA	75272.56	FIELD ENGINEERS OFFICE TP 3	75272.56
205-0300	2	MI	14750.00	CONTRACTOR CERTIFIED CROSS SECTIONS	29500.00
207-0203	1000	CY	50.55	FOUND BK FILL MATL, TP II	50550.00
210-0100	1	LS	2500000.00	GRADING COMPLETE - STP-0003-00 (430)	2500000.00
310-1101	53245	TN	22.02	GR AGGR BASE CRS, INCL MATL	1172454.90
318-3000	350	TN	20.00	AGGR SURF CRS	7000.00
402-3110	8318	TN	65.00	RECYCLED ASPH CONC 9.5 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	540670.00
402-3112	13308	TN	65.00	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	865020.00
402-3121	19963	TN	65.00	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1297595.00
413-1000	12000	GL	1.84	BITUM TACK COAT	22080.00
441-0016	255	SY	30.00	DRIVEWAY CONCRETE, 6 IN TK	7650.00
441-0018	65	SY	40.00	DRIVEWAY CONCRETE, 8 IN TK	2600.00
441-0104	15287	SY	20.00	CONC SIDEWALK, 4 IN	305740.00
441-0303	10	EA	2142.06	CONC SPILLWAY, TP 3	21420.60
441-0748	25	SY	38.26	CONCRETE MEDIAN, 6 IN	956.50
441-4020	1100	SY	38.30	CONC VALLEY GUTTER, 6 IN	42130.00
441-4030	272	SY	45.27	CONC VALLEY GUTTER, 8 IN	12313.44
441-6222	27500	LF	10.00	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	275000.00
444-1000	1000	LF	4.94	SAWED JOINTS IN EXIST PAVEMENTS - PCC	4940.00
446-1002	1000	LF	2.50	PVMT REINF FABRIC STRIPS, TP 2, INCL BITUM BINDER	2500.00
500-3101	153	CY	578.66	CLASS A CONCRETE	88534.98
500-3800	60	CY	896.15	CLASS A CONCRETE, INCL REINF STEEL	53769.00
511-1000	11247	LB	0.95	BAR REINF STEEL	10684.65
550-1180	9972	LF	30.00	STORM DRAIN PIPE, 18 IN, H 1-10	299160.00
550-1240	2176	LF	45.00	STORM DRAIN PIPE, 24 IN, H 1-10	97920.00
550-1300	1598	LF	65.92	STORM DRAIN PIPE, 30 IN, H 1-10	105340.16
550-1360	1229	LF	77.97	STORM DRAIN PIPE, 36 IN, H 1-10	95825.13
550-1480	285	LF	130.46	STORM DRAIN PIPE, 48 IN, H 1-10	37181.10
550-2180	50	LF	28.99	SIDE DRAIN PIPE, 18 IN, H 1-10	1449.50
550-2240	20	LF	35.23	SIDE DRAIN PIPE, 24 IN, H 1-10	704.60
550-2300	40	LF	40.28	SIDE DRAIN PIPE, 30 IN, H 1-10	1611.20
550-2360	100	LF	43.00	SIDE DRAIN PIPE, 36 IN, H 1-10	4300.00
550-3518	1	EA	1142.78	SAFETY END SECTION 18 IN, STORM DRAIN, 6:1 SLOPE	1142.78
550-3624	1	EA	756.97	SAFETY END SECTION 24 IN, SIDE DRAIN, 6:1 SLOPE	756.97
550-3630	1	EA	1661.17	SAFETY END SECTION 30 IN, SIDE DRAIN, 6:1 SLOPE	1661.17
550-4118	2	EA	636.02	FLARED END SECTION 18 IN, SIDE DRAIN	1272.04
550-4124	1	EA	707.57	FLARED END SECTION 24 IN, SIDE DRAIN	707.57
550-4136	4	EA	1200.00	FLARED END SECTION 36 IN, SIDE DRAIN, 6:1 SLOPE	4800.00
550-4218	5	EA	678.07	FLARED END SECTION 18 IN, STORM DRAIN	3390.35
550-4224	3	EA	882.93	FLARED END SECTION 24 IN, STORM DRAIN	2648.79
550-4230	2	EA	909.32	FLARED END SECTION 30 IN, STORM DRAIN	1818.64

4/9/2009

Detail Estimate: Cost Estimate Report

Item Number	Quantity	Units	Unit Price	Item Description	Cost
611-3000	1	EA	1905.69	RECONSTR CATCH BASIN, GROUP 1	1905.69
668-1100	118	EA	2277.92	CATCH BASIN, GP 1	268794.56
668-2100	17	EA	4470.97	DROP INLET, GP 1	76006.49
Section Sub Total:					\$8,771,778.37

Section SECTION02 PERMANENT EROSION CONTROL

Item Number	Quantity	Units	Unit Price	Item Description	Cost
603-2018	75	SY	48.11	STN DUMPED RIP RAP, TP 1, 18 IN	3608.25
603-2024	25	SY	53.68	STN DUMPED RIP RAP, TP 1, 24 IN	1342.00
603-7000	100	SY	4.83	PLASTIC FILTER FABRIC	483.00
700-6910	10	AC	906.91	PERMANENT GRASSING	9069.10
700-7000	10	TN	58.05	AGRICULTURAL LIME	580.50
700-7010	25	GL	19.30	LIQUID LIME	482.50
700-8000	3	TN	348.14	FERTILIZER MIXED GRADE	1044.42
716-2000	1000	SY	1.15	EROSION CONTROL MATS, SLOPES	1150.00
Section Sub Total:					\$17,759.77

Section SECTION03 TEMPORARY EROSION CONTROL

Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	10	AC	571.97	TEMPORARY GRASSING	5719.70
163-0240	150	TN	183.84	MULCH	27576.00
163-0300	4	EA	2872.37	CONSTRUCTION EXIT	11489.48
163-0501	10	EA	924.07	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 1	9240.70
163-0520	500	LF	16.16	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	8080.00
163-0521	100	EA	198.82	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS	19882.00
163-0530	5000	LF	3.67	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	18350.00
163-0550	100	EA	308.76	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	30876.00
165-0010	5000	LF	0.93	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	4650.00
165-0030	25000	LF	1.83	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	45750.00
165-0040	100	EA	79.16	MAINTENANCE OF EROSION CONTROL CHECKDAMS/DITCH CHECKS	7916.00
165-0070	5000	LF	2.29	MAINTENANCE OF BALED STRAW EROSION CHECK	11450.00
165-0101	0	EA	660.01	MAINTENANCE OF CONSTRUCTION EXIT	0.00
165-0105	140	EA	110.84	MAINTENANCE OF INLET SEDIMENT TRAP	15517.60
167-1000	100	EA	1349.35	WATER QUALITY MONITORING AND SAMPLING	134935.00
167-1500	24	MO	1035.76	WATER QUALITY INSPECTIONS	24858.24
171-0010	5000	LF	1.80	TEMPORARY SILT FENCE, TYPE A	9000.00
171-0030	25000	LF	3.84	TEMPORARY SILT FENCE, TYPE C	96000.00
Section Sub Total:					\$481,290.72

Section SECTION04 HIGHWAY SIGNS AND STRIPING

Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1020	232	SF	15.31	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	3551.92
636-1033	320	SF	20.72	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	6630.40
636-2070	1220	LF	8.75	GALV STEEL POSTS, TP 7	10675.00
653-0120	4	EA	72.67	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	290.68
653-0210	4	EA	108.18	THERMOPLASTIC PVMT MARKING, WORD, TP 1	432.72
653-1501	27500	LF	0.63	THERMOPLASTIC SOLID TRAF STRIPE, 5	17325.00

4/9/2009

Detail Estimate: Cost Estimate Report

Item Number	Quantity	Units	Unit Price	Item Description	Cost
653-1501	27500	LF	0.69	IN, WHITE	17525.00
653-1502	27500	LF	0.69	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	18975.00
653-1704	532	LF	5.02	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	2670.64
653-1804	5450	LF	1.99	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, WHITE	10845.50
653-3501	27500	GLF	0.48	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	13200.00
653-3502	27500	GLF	0.36	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, YELLOW	9900.00
653-6004	450	SY	2.79	THERMOPLASTIC TRAF STRIPING, WHITE	1255.50
653-6006	400	SY	3.21	THERMOPLASTIC TRAF STRIPING, YELLOW	1284.00
654-1001	400	EA	3.64	RAISED PVMT MARKERS TP 1	1456.00
654-1003	700	EA	3.78	RAISED PVMT MARKERS TP 3	2646.00
Section Sub Total:					\$101,138.36

Section SECTION05 TRAFFIC SIGNALS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
647-0220	2	LS	50000.00	TRAFFIC SIGNAL INSTALLATION, TEMPORARY	100000.00
647-1000	2	LS	75000.00	TRAFFIC SIGNAL INSTALLATION NO - 1 & 2	150000.00
Section Sub Total:					\$250,000.00

Total Estimated Cost: \$9,621,967.22

Subtotal Construction Cost	\$9,621,967.22
E&C Rate 10.0 %	\$962,196.72
Inflation Rate 0.0 % @ 0 Years	\$0.00
<hr/>	
Total Construction Cost	\$10,584,163.94
Right Of Way	\$0.00
ReImb. Utilities	\$0.00
<hr/>	
Grand Total Project Cost	\$10,584,163.94

17 May, 2002

Project Concept Report Page: 4
Project Number: STP-0003-00(430)
P. I. Number: 0003430
County: Tift

Description of the project:

Reconstruction, rehabilitation, and widening of Carpenter Rd. (CR 75) in Tift County. The project begin SR 520/US 82 and extends north to Davis Rd. (CR 216) and is partially in the City Limits of Tifton. The length of the project is approximately 2.5 miles. This project is in Land Lot No.'s 246, 247, 260, 261, 293, 306 and 307, in the 6th Land District, GMD No. 1314. The existing 2-lane road will be widened to 4 lanes with combination bicycle lane/sidewalk, and curb & gutter. The intersections of King Rd. & Whiddon Mill Rd. will be signalized.

Is the project located in a Non-attainment area? Yes No

PDP Classification: Major Minor
Federal Oversight: Full Oversight Exempt State Funded or Others

Functional Classification: Rural Major Collector

U.S. Route Number(s): none State Route Number(s): none

Traffic (ADT):
Opening Year: (2003) 7,279 Design Year: (2023) 13,078

Existing Design Features:

- Typical Section: One 12' lane in each direction with rural shoulders.
- Posted Speed 45 mph
- Maximum Grade: 6 %
- Width of right of way: 100 ft.
- Major structures: none
- Major interchanges or intersections along the project: M4708/King Road, M4710/Whiddon Mill Road, CR 218/Rainwater Road, CR 216/Davis Road
- Existing length of roadway segment and the beginning mile logs for each county segment. For new location projects, the existing length of roadway is zero(0). county mile 2.47 to 4.97 mile

Proposed Design Features: (Based on .08 SE)

- Proposed typical section(s): Two 12' lanes in each direction, one 14' turning lane, 10' combination bicycle lane/sidewalk on west side, and curb and gutter on each side.
 - Proposed Design Speed Mainline: 45 mph
 - Proposed Maximum grade Mainline: 6 %
 - Proposed Maximum grade Side Street: 3 %
 - Proposed Maximum grade driveway: 10 %
 - Proposed Maximum degree of curve: 10°
 - Right of way
 - ⇒ Width 100'
 - ⇒ Easements: Temporary Permanent Utility Others
 - ⇒ Type of access control: Full Partial By Permit Others
- Maximum grade allowable: 8 %
Maximum grade allowable: 3 %
Maximum degree allowable: 10°

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⇒ Number of parcels 20

Number of displacements:

- ⇒ Business: 0
- ⇒ Residents: 0
- ⇒ Mobile homes: 0
- ⇒ Others: 0

• Structures:

- ⇒ Bridges: none
- ⇒ Retaining walls: None Anticipated

- Major intersections and interchanges: M4708/King Road, M4710/Whiddon Mill Road, CR 218/Rainwater Road, CR 216/Davis Road
- Traffic control during construction: Staging plans
- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ROADWAY WIDTH:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SHOULDER WIDTH:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VERTICAL GRADES:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CROSS SLOPES:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
STOPPING SITE DISTANCE:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SUPERELEVATION RATES:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
HORIZONTAL CLEARANCE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SPEED DESIGN:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VERTICAL CLEARANCE:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BRIDGE WIDTH:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BRIDGE STRUCTURAL CAPACITY:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Design Variances: none
- Environmental concerns: Anticipated permits: Section 404 Wetlands, Archaeological Survey, Air & Noise Study.
- Level of environmental analysis:
 - ⇒ Are Time Saving Procedures appropriate? Yes , No
 - ⇒ Categorical Exclusion:
 - ⇒ Environmental Assessment/Finding of No Significant Impact (FONSI) , or
 - ⇒ Environmental Impact Statement (EIS) .
- Utility involvement: Potential impacts to MEAG Power, Georgia Transmission, Colquitt E.M.C., Georgia Power, City of Tifton Utilities, Tift County Utilities, BellSouth Telephone, Mediacom.

Project responsibilities:

- ⇒ Design: Stevenson & Palmer Engineering, Inc.
- ⇒ Right of Way Acquisition: City of Tifton
- ⇒ Relocation of Utilities: Utility Owner and/or City of Tifton
- ⇒ Letting to contract: Georgia Department of Transportation
- ⇒ Supervision of construction: Georgia Department of Transportation
- ⇒ Providing material pits: n/a
- ⇒ Providing detours: n/a

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State of Georgia
Department of Transportat

Project Concept Report Page: 6
Project Number: STP-0003-00(430)
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County: Tift

Coordination:

- Initial Concept Meeting Date November 29, 2001
A pre-design meeting was conducted at the City of Tifton Engineering Department. Minutes are attached.
- Concept Meeting Date February 26, 2002
- P. A. R. Meeting Date N/A
- Public involvement: There will be a Public Information Meeting after preliminary plans showing right-of-way are completed.
- Local government comments: The Tifton/Tift County Development Authority strongly supports the project.
- Other projects in area: Intersection rehabilitation at Carpenter Road and US 82/SR 520, STP-0000-00(087), Georgia AgriRama Railroad in Tifton, 2001. STP-0000-00(088), Tifton Multi-Phased Ped Safety & Downtown Beautification, 2001 NH-026-2(81), SR 520/US 82 from Magnolia Dr. East to Central Ave. in Tifton, 2002 STP-001-1(56), SR 7/US 41 S. Main St. over Little River Tributary, 2002.
- Other coordination to date: _____
- Railroads: none

Scheduling - Responsible Parties' Estimate 9

- Time to complete environmental process: 3 Months.
- Time to complete preliminary construction plans: 3 Months.
- Time to complete right of way plans: 2 Months.
- Time to complete the Section 404 Permit: 2 Months.
- Time to complete final construction plans: 4 Months.
- Time to complete to purchase right of way: 3 Months.
- List other major items that will affect the project schedule: _____ Months.

Other alternates considered: n/a.

Comments: _____

Attachments:

1. Cost Estimates:
 - a) Construction including E&C,
 - b) Right of Way, and
 - c) Utilities.
2. Typical Sections
3. Traffic Evaluation (Report prepared by Day Wilburn Associates, Inc.)
4. Minutes of Initial Concept meeting

4 VALUE ENGINEERING PROCESS

4.1 WORK SHOP TEAM

PBS&J’s Value Engineering (VE) team performed a VE study July 26-29, 2010, in Atlanta, Georgia, for the Georgia Department of Transportation (GDOT). The VE Study team consisted of the following members:

Les M. Thomas, PE, CVS-Life	Team Leader
Randy Thomas, CVS	Assistant Team Leader
Luke Clarke, PE, AVS	Senior Highway Design Engineer
Kevin Martin, Esq., AVS	Highway Construction Specialist

4.2 SEVEN-STEP VALUE ENGINEERING PLAN

For the purposes of this study as it relates to the project, the VE team followed SAVE International’s Seven-step Value Engineering job plan. This seven-step job planning includes:

1. Investigation/Information Phase
 2. Analysis Phase
 3. Speculation Phase
 4. Evaluation Phase
 5. Development Phase
 6. Recommendation Phase
 7. Presentation Phase
- **Investigation/Information Phase**— during this phase, the team received a briefing from the GDOT staff. This briefing included discussions of the design intent behind the project, the cost concerns, and the physical project limitations. In the working session that followed, the VE team developed cost models from the cost data provided by the GDOT designers and familiarized themselves with the construction drawings and other data that was available to the team. Some of the representative project information (concept report, cost estimate, and special provisions) may be found in the tabbed section of this report titled **Project Description**. Following this current narrative the reader will also find a cost model done in the Pareto fashion (i.e., identifying the highest costs down to the lowest costs for the larger construction cost elements). This cost model, developed by the VE team, was used to help the team focus its work week. The headings on the Pareto Chart also were used as headings for creative phase activities.
 - **Analysis Phase**— during this phase the VE Team determined the “Functions” of the project by asking basic questions such as: *What is the project supposed to do?*, and *How is it supposed to accomplish this purpose?* In the Value Engineering vernacular, the answers to these questions are cast in the form of active verbs and measurable nouns. These verb/noun pairs form the basis of the function analysis that distinguishes a Value Engineering effort from a potentially damaging cost-cutting exercise. A FAST diagram was prepared highlighting the projects required functions.
 - The important functions of the project were identified as follows:
 - **Project Objective/Goals**
 - Promote development
 - Improve connectivity
 - Reduce impacts to the wetlands

- Minimize impacts to existing utilities
 - **Project Basic Functions**
 - Increase capacity
 - Expedite traffic
- **Speculation Phase / Creative**— During a brainstorming session, the VE team identified ideas that might help meet the project objectives. Initially, there were numerous ideas identified and then evaluated in the next phase, but ultimately the team honed the list to ideas that focused on the project’s primary objectives:
 - Eliminate any unnecessary work while maintaining project functional requirements
 - Identify other means of providing function requirements
 - Improve service
 - Reduce impact to wetlands

For reference purposes, please see “Creative Idea Listing” worksheets included in this report. These worksheets were also used to record the results of the Evaluation phase.

- **Evaluation Phase**— Once the VE team identified and listed the creative ideas, the team could then decide which alternatives should be carried forward. This process was part of the Evaluation phase. The VE team reflected back on the project constraints and objectives shared with the team by the owner’s representatives in the kick-off meeting on the first day of the workshop. From that guidance, the team was able to select ideas that could improve the project and that were capable of being implemented by a vote process.

The VE team used the following values as measures of whether or not an alternative had enough merit to be carried forward in the VE process:

- First Costs
- Life Cycle Costs (LCCA)
- Constructability
- Traffic Operations
- Environmental Impacts

These items were thence applied in the following matrix to determine the best alternatives to address the Whiddon Mill road intersection:

ANALYSIS PHASE

ANALYSIS MATRIX

STUDY NO. STP00-0003-00(430) - P.I. No. 0003430
 Widening and Reconstruction of Carpenter Road - Tift County

List the best ideas from the ranking and comparison techniques on the preceding pages. Fill in the diagonal headings with the most desired criteria, and in the boxes below rate each (on a scale of 1 to 10) for its importance to the user. Then, in the upper left triangle, record how well (on a scale of 1 to 4) each idea fulfills each criterion. In the lower box record the product of the two numbers. Total the products to determine which ideas best fit the desired criteria.		Desired Criteria	First Cost	LCCA	Constructability	Traffic Operations	Environmental Impacts	
			a	b	c	d	e	Total
Weight of Importance (1-10)			8	5	4	9	6	
RD-8	Realign Whiddon Mill Road to reduce wetland impacts	rating 1-4 Score	2 16	3 15	3 12	4 36	4 24	103
RD-10	Retain current alignment on Whidden Mill Road	rating 1-4 Score	4 32	4 20	3 12	2 18	4 24	106
RD-12	Construct a grade separation at Whidden Mill Road	rating 1-4 Score	1 8	1 5	2 8	4 36	3 18	75
RD-13	Use free flow truning with existing alignment on Whiddon Mill Road	rating 1-4 Score	3 24	3 15	3 12	3 27	4 24	102
RD-15	Use a SPUI arrangement at existing alignment	rating 1-4 Score	3 24	3 15	3 12	2 18	4 24	93
RD-17	Use one way pairs at Whiddon Mill Road	rating 1-4 Score	2 16	2 10	3 12	2 18	2 12	68
	Current Design	rating 1-4 Score	2 16	3 15	3 12	3 27	1 6	76

This Matrix identified alternatives 8, 13 and 10 as being worthy of further evaluation. Additionally, the VE Team using the same criteria but not in matrix form, evaluated the other alternatives and graded them on a scale of 1 to 5 with 5 being "Excellent" and 1 being "Poor". Other notes about the alternatives are annotated at the bottom of the enclosed creative idea list.

- Development Phase**— During this phase, the VE team developed each of the selected design alternatives whose rating was "4" or "5" because of time constraints. If time permitted, the team will develop additional recommendations. This effort included a detailed explanation of the idea with sketches as appropriate to clarify the idea from the original concept, advantages and disadvantages, a technical explanation and an estimation of the cost and resultant savings if implemented (see the tabbed section titled *Study Results*).
- Recommendation Phase**—Next, the VE team reviewed the alternative ideas to confirm which were appropriate for the project, have an opportunity for success and which will improve the value of the project if implemented.

- Presentation Phase**—Finally, the team made an informal “out-briefing” on the last day of the workshop, which was designed to inform the Owners and the Designers of the initial findings of the VE study that are formalized in this written report.

Source: SAVE International

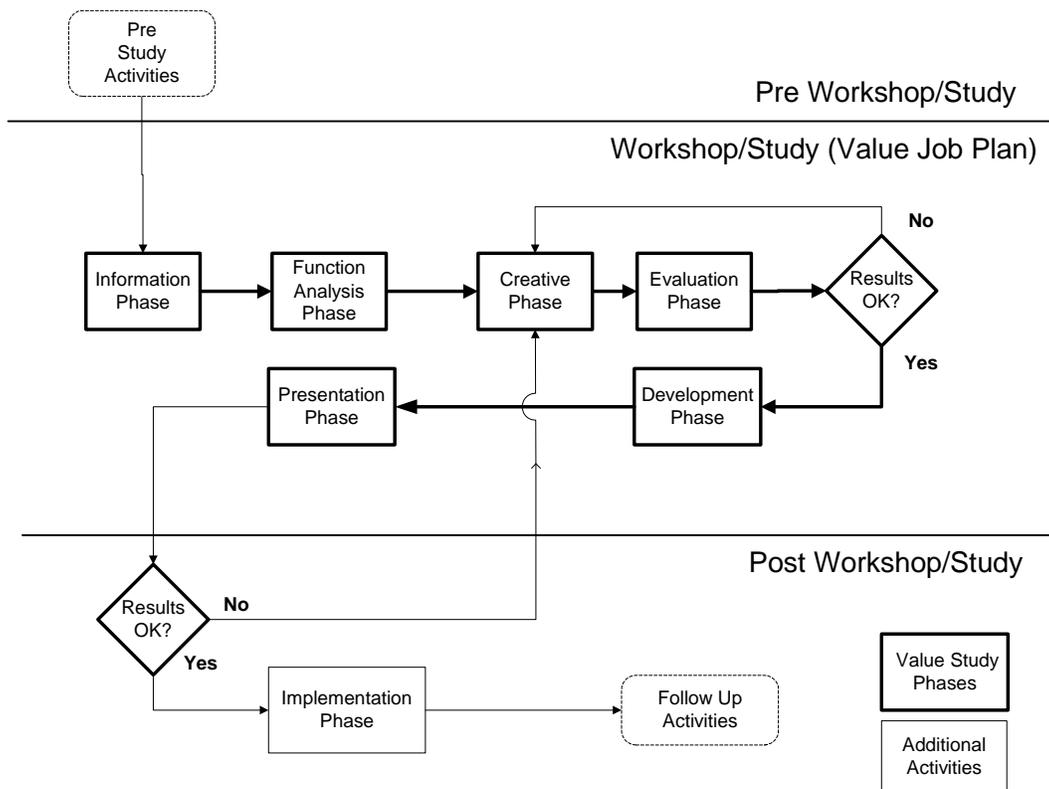


Figure 3 – Value Engineering Job Plan

4.3 AGENDA

VALUE ENGINEERING STUDY AGENDA
Georgia Department of Transportation
July 26-29, 2010
STP00-0003-00(430) – P.I. No. 0003430
Widening of Carpenter Road from US 82/ SR 520 to Davis Road (CR 216)
Tift County

Pre-Workshop Activities

VE team leader organizes the study, coordinates with the Owner/Designer to identify the project objectives and documents necessary to conduct the study. The VE team receives and reviews all project documents. The team develops a Pareto chart and/or cost model for the project. The Team Leader and Assistant Team Leader visited the project site and took photographs for the teams use during the study.

Day One

9:00-10:30 Design Team Presentation (Information Phase)

- Introduction of participants, owner, designer, and VE team members
- Presentation of the project by the design engineer including:
 - History and background
 - Design Criteria and Constraints
 - Special “U” turn requirements
 - Special needs (schools, businesses, etc.)
 - Sidewalks, bicycle lanes, and or multi-use trails
 - Historical Property protection
 - Current Construction Completion Schedule
 - Project Cost Estimate and Budget Constraints
- Owner Presentation – special requirements, definition of life-cycle period and interest rate for life-cycle costs
- Review VE Pareto chart/cost model
- Discussion, questions and answers
- Overview of the VE process and agenda – Workshop goals and project goals

10:30-12:00 VE Team reviews project (Information Phase)

- Review design team’s presentation
- Review agenda and goals of the study
- Review comments from the site visit

1:00-2:30 Function Analysis Phase

- Analyze Cost Model – Pareto
- Identify basic and secondary functions
- Complete Function Matrix/FAST diagram

2:30-5:00 Creative Phase

- Brainstorming of alternative ideas

Day Two**8:00-10:00****Evaluation Phase**

- Establish criteria for evaluation
- Rank ideas
- Identify “best” ideas for development
- Identify those ideas that will become design suggestions
- Develop a cost/worth analysis
- Identify a “champion” for each idea to be developed

10:00-5:00**Development Phase**

- Develop alternative ideas design suggestions with assessment of original design and write up new alternatives including:
 - Opportunities and risks
 - Illustrations
 - Calculations
 - Cost worksheets
 - Life-cycle cost analysis

Day Three**8:00-5:00****Development Phase**

- Continue developing alternative ideas
- Continue developing design suggestions
- Prepare for presentation to Owners and Designers

Day Four**8:00-9:00****Prepare presentation****9:00-10:00****VE team presentation**

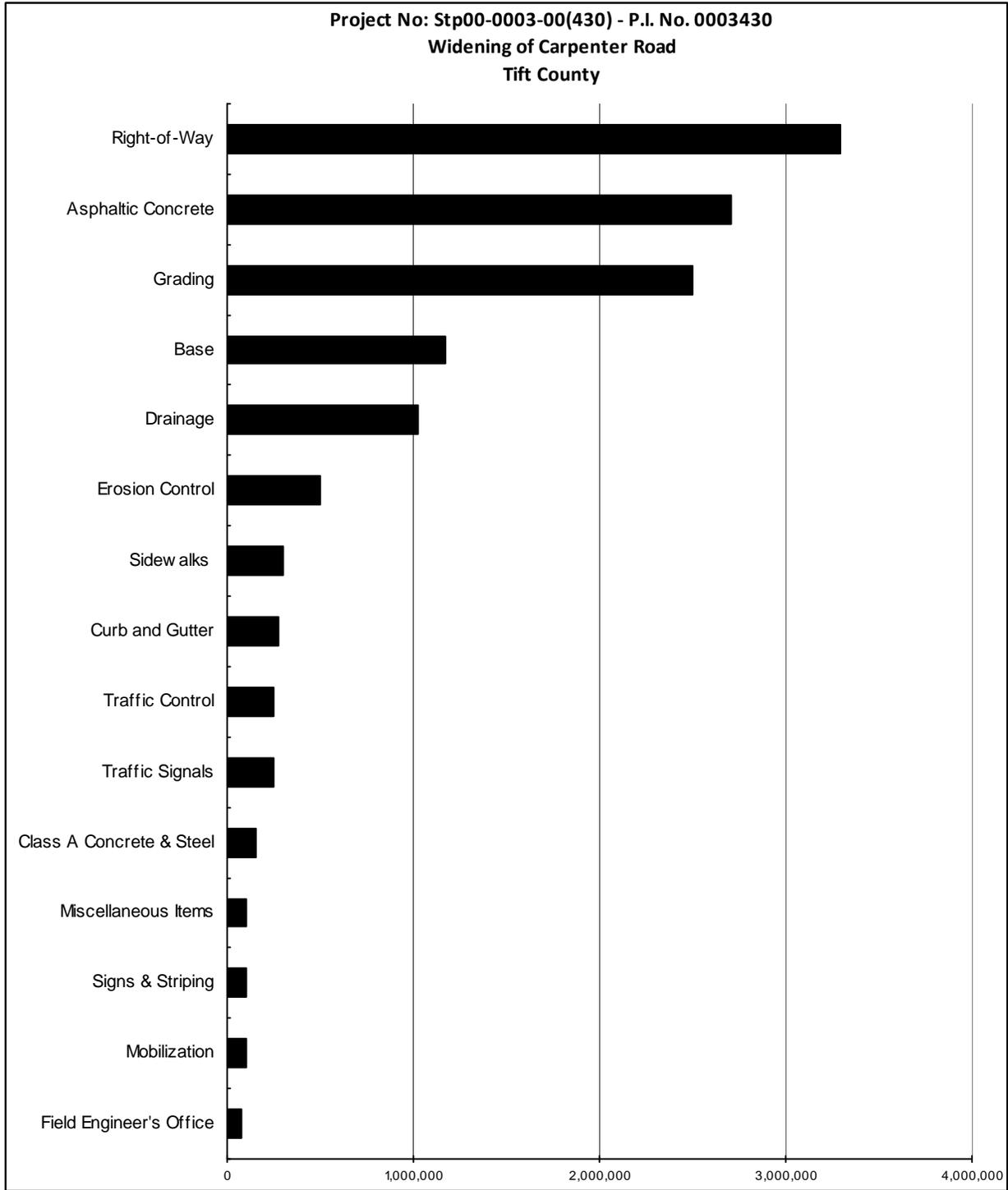
4.4 PARETO CHARTS

PARETO CHART - COST HISTOGRAM



PROJECT: Georgia Department of Transportation STP00-0003-00(430) - P.I. No. 0003430 Widening and Reconstruction of Carpenter Road from US 82/SR 520 to Davis Road Tift County			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Right-of-Way	3,292,708	25.50%	25.50%
Asphaltic Concrete	2,703,285	20.93%	46.43%
Grading	2,500,000	19.36%	65.79%
Base	1,172,455	9.08%	74.86%
Drainage	1,029,816	7.97%	82.84%
Erosion Control	499,050	3.86%	86.70%
Sidewalks	305,740	2.37%	89.07%
Curb and Gutter	275,000	2.13%	91.20%
Traffic Control	250,000	1.94%	93.13%
Traffic Signals	250,000	1.94%	95.07%
Class A Concrete & Steel	152,989	1.18%	96.26%
Miscellaneous Items	102,227	0.79%	97.05%
Signs & Striping	101,138	0.78%	97.83%
Mobilization	100,000	0.77%	98.60%
Field Engineer's Office	75,273	0.58%	99.19%
Concrete Valley Gutters	54,443	0.42%	99.61%
Found Backfill	50,550	0.39%	100.00%
Construction Cost including ROW & Utilities	\$ 12,914,674		
Construction Cost less ROW & Utilities	\$ 9,621,967		
E & C Rate @10%	\$ 962,197		
Total Construction Costs	\$ 10,584,164		
Right-of-Way	\$ 3,292,708		
Utilities Reimbursement	\$ -		
TOTAL	\$ 13,876,872		





4.5 FAST DIAGRAM

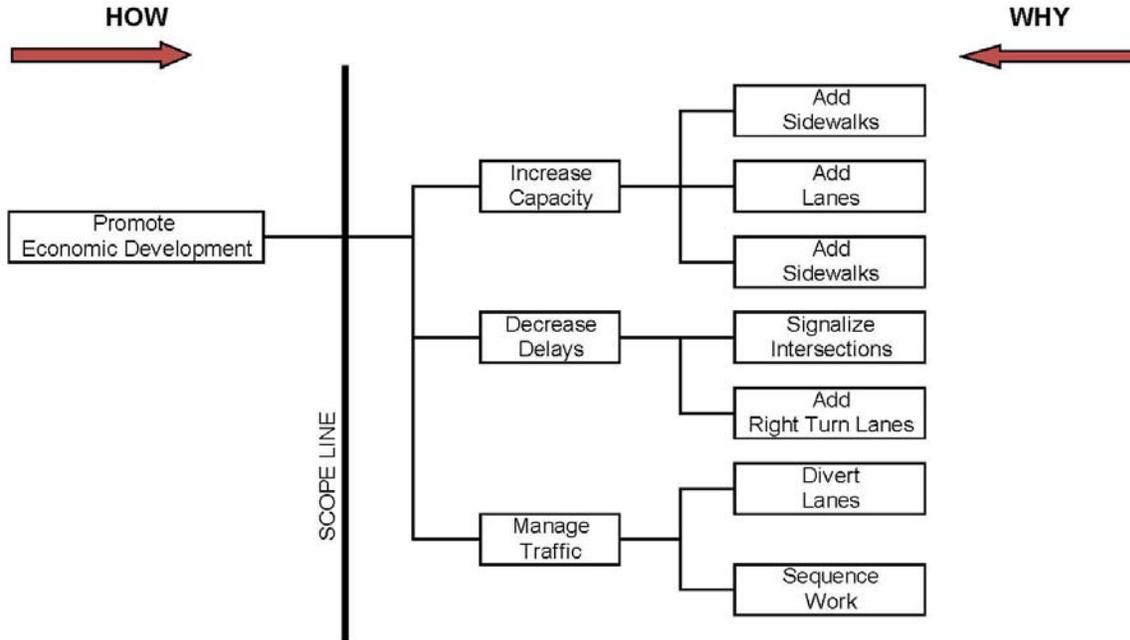
FUNCTIONAL ANALYSIS SYSTEMS TECHNIQUE (FAST)

Widening and Reconstruction of Carpenter Road

Project No. STP00-0003-00(430) - P.I. No. 0003430

Georgia Department of Transportation

Tift County



4.6 ATTENDANCE SHEET FOR DESIGNERS AND VE TEAM PRESENTATIONS



DESIGNER PRESENTATION

MEETING PARTICIPANTS

Geogia Department of Transportation STP00-0003-00(430 - P.I. No. 0003430 Tift County		July 26, 2010	
NAME	ORGANIZATION & TITLE	E-MAIL	PHONE
Lisa Myers	 GDOT - Engineering Services	lmyers@gdot.ga.gov	404-631-1770
Matt Sanders	 GDOT-Engineering Services	msanders@gdot.ga.gov	404-631-1752
Ron Wishon	 GDOT-Engineering Services	rwishon@gdot.ga.gov	404-631-1753
Les Thomas, PE, CVS Life	 PBS&J	lmthomas@pbsi.com	678-677-6420
Luke Clarke, PE, AVS	 PBS&J	lwclarke@pbsi.com	205-746-4615
Kevin Martin, Esq., AVS	 PBS&J	klmartin@pbsi.com	205-969-3776
Randy Thomas, CVS	 PBS&J	rsthomas@pbsi.com	770-883-1545
N. Raad	 GDOT-Traffic Operations	nraad@gdot.ga.gov	404-631-8126
Mike Popp	 GDOT-District 4-Design Engineer	mppopp@gdot.ga.gov	229-386-3031
Sandy Griffin	 GDOT-District 4-Project Manager	sgriffin@gdot.ga.gov	229-386-3618
Ancyl Miller	AAM/TSD	ancyl@aamillereing.com	678-787-2135
Brent Thomas	 GDOT-District Preconstruction	btthomas@gdot.ga.gov	229-386-3300
Roger Dill	Consultant-Tift County	roger.dill@hotmail.com	229-276-7830



VE TEAM PRESENTATION



MEETING PARTICIPANTS

Georgia Department of Transportation S.T.P00-0003-00(430) - P.I. No. 0003430		July 29, 2010	
Tift County			
NAME	ORGANIZATION & TITLE	E-MAIL	PHONE
Lisa Myers	 GDOT - Engineering Services	lmvrs@dot.ga.gov	404-631-1770
Matt Sanders	 GDOT - Engineering Services	msanders@dot.ga.gov	404-631-1752
Ron Wishon	 GDOT - Engineering Services	rwishon@dot.ga.gov	404-631-1753
Les Thomas, PE, CVS-Life	 PBS&J	lmthomas@pbsj.com	678-677-6420
Luke Clarke, PE, AVS	 PBS&J	lwclarke@pbsj.com	205-746-4615
Kevin Martin, Esq., AVS	 PBS&J	klmartin@pbsj.com	205-969-3776
Randy Thomas, CVS	 PBS&J	rsthomas@pbsj.com	770-883-1545
N. Raad	 GDOT - Traffic Operations	nraad@dot.ga.gov	404-631-8126
Mike Popp	 GDOT - District 4 - Design Engineer	mpopp@dot.ga.gov	229-386-3031
Sandy Griffin	 GDOT - District 4 - Project Manager	sgriffin@dot.ga.gov	229-386-3618
Andy Miller	AAM/TSO	andy@eamillereng.com	678-787-2135
Brent Thomas	 GDOT - District Reconstruction	brthomas@dot.ga.gov	229-386-3300
Roger Dill	 Consultant - Tift County	roger.dill@hotmail.com	229-276-7830
Joe Cowan	 GDOT - District 4 - Construction	jcowan@dot.ga.gov	229-386-3304
Curtis Ray	Lovell Engineering Associates		229-253-0900



4.7 CREATIVE IDEA LISTING AND EVALUATION WORKSHEET

CREATIVE IDEA LISTING



Georgia Department of Transportation STP00-0003-00(430) – P.I. No. 0003430 PROJECT: Widening of Carpenter Rd. from US 82/SR 520 to Davis Rd. SHEET NO.: 1 of 1 Tift County		
NO.	IDEA DESCRIPTION	RATING
	ROADWAY (RD)	
RD-1	Use 11' travel lanes	5
RD-2	Use 11' inside lanes and 12' outside lanes	5
RD-3	Use a 12' two-way left turn lane	5
RD-4	Use 6' combination curb and gutter in-lieu of 8"	2
RD-5	Construct a single 8' sidewalk in-lieu of two 5' sidewalks	2
RD-6	Construct a single 10' sidewalk in-lieu of two 5' sidewalks	2
RD-7	Construct a 20' raised median in-lieu of two-way left turn	2
RD-8	Re-align Whiddon Mill Road intersection to reduce stream impacts	2
RD-9	Minimize improvements to King Road alignment	2
RD-10	Retain existing alignment at Whiddon Mill Road	5
RD-11	Utilize existing pavement for the two way left turn lane	5
RD-12	Construct a grade separation at Whiddon Mill Road	2
RD-13	Use existing alignment with channelized right turn lanes	ABD
RD-14	Use existing Carpenter Road for right turn	2
RD-15	Use a Single Point Urban Intersection (SPUI) arrangement at Whiddon Mill Road	2
RD-16	Construct double left turn lanes at King Road westbound	2
RD-17	Use one-way pairs at Whiddon Mill Road	2
RD-18	Delete field engineer's office; use GDOT District Office	4
Rating: 1→2 = Not to be Developed; 3 = Varying Degrees of Development Potential; 4→5 = Most likely to be Developed; DS = Design Suggestion; ABD = Already Being Done; OB= Observation		

