

Value Engineering Study Report

*Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties*



Value Management Team



Design Team



March 19, 2009



March 19, 2009

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

RE: Submittal of the final Value Engineering Report
Project No.: **CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866**
Widening and Reconstruction of SR 92
Cobb and Paulding Counties

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our final Value Engineering Report for the Widening and Reconstruction of SR 92

This Value Engineering Study, which was performed during the period March 2 through March 5, 2009, identified **25 Alternative Ideas** of which **10 ideas are recommended for implementation**. In addition, the team identified **1 Design Suggestion**. We believe that the Alternative Ideas recommended may have a significant positive affect on the project.

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.

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

Yours truly,

PBS&J

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

Value Engineering Study Report

Project No. CSSTP-0006-00(857)(866)

P.I. No. 0006857 and 0006866

Widening and Reconstruction of State Road 92

Cobb and Paulding County

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EXECUTIVE SUMMARY

INTRODUCTION

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a Value Engineering study during the period of March 2 through March 5, 2009 in Atlanta, at the office of the Georgia Department of Transportation. The subject of the Value Engineering study was Project CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866, Widening and Reconstruction of SR 92, Paulding and Cobb Counties.

The design for the project has been prepared by URS. At the time of the workshop, the plans had advanced to the preliminary design level.

PROJECT DESCRIPTION

SR 92 is a vital east-west corridor through Cobb and Paulding counties providing access to I-75 as well as US 41. The object of the project is to create a more efficient and safer corridor while meeting the traffic demands of future traffic.

At the present time, SR 92 is a two lane road with 12' lanes with auxiliary left and right turn lanes and curb and gutter intermittently throughout the corridor. In areas without curb and gutter there are rural shoulders of 0' to 2'. The posted speed is 45 mph.

The projects propose to widen and reconstruct SR 92 from a two lane facility to a divided four lane facility with 12' lanes, a 20' raised concrete median, 16' shoulders with curb and gutter, and 5' sidewalks. Project CSSTP-006-00(857) is located in Paulding County and begins at CR 73/Old Burnt Hickory Road and goes to Picketts Mill Place. Project CSSTP-006-00(866) is located in Cobb County and runs from Picketts Mill Place to US 41/SR 3/ Cobb Parkway. Total length of the projects is 4.42 miles.

Project CSSTP-006-00(857) has projected construction costs of \$13,814,808, right-of-way costs of \$ 2,394,688, and reimbursable utility costs of \$250,000 for a projected project total of \$16,459,496.

Project CSSTP-006-00(866) has projected construction costs of \$12,386,891 and right-of-way costs of \$1,726,973 for a projected project total of \$14,113,864.

This project is more fully described in the documentation that is located in the Tabbed section of this report, entitled ***Project Description***.

PROJECT CONCERNS AND OBJECTIVES

Some of the information from the concept report and the designer's presentation indicated the following important points about the project:

- Alignment
- Future traffic needs
- Safety Enhancement

VALUE ENGINEERING PROCESS

The Value Engineering team followed the seven step Value Engineering job plan as promulgated by SAVE International. This seven step job plan includes the following:

- Investigative
- Analysis
- Speculation
- Evaluation
- Development
- Recommendation
- Presentation

This report is a component of the Presentation Phase. As part of the VE workshop in Atlanta, the team made an informal presentation of their results on the last morning of the workshop. This report is intended to formalize the workshop results and set the stage for a formal implementation meeting in which alternatives and design suggestions will typically be accepted, accepted with modifications, or rejected for cause. The worksheet that follows, along with the formally developed alternatives and design suggestions can be used as a “score sheet” for the implementation meeting. It is also included in this report to identify, on a summary basis, the results of the workshop. The reader is encouraged to visit the third tabbed section of this report entitled **Study Results** for a review of the details of the developed alternatives. The tabbed section **Project Description** includes information about the project itself and the tabbed section **Value Engineering Process** presents the detailed process of the Value Engineering Study.

CONCLUSIONS AND RECOMMENDATIONS

During the speculation phase the VE Team identified **26 Alternative Ideas** that appeared to hold potential for reducing the construction cost, improving the end product, and/or reducing the difficulty and time of project construction.

After the evaluation phase was completed, **10 Alternative Suggestions** and **1 Design Suggestion** remained for further consideration. These Alternative Ideas may be found, in their documented form, in the section of this report entitled **Study Results**.

The following **Summary of Alternatives and Design Suggestions** coupled with the documentation of the developed alternatives should provide the reader with the information required to fully evaluate the merits of each of the alternatives.

Summary of Alternatives & Design Suggestions



PROJECT: Georgia Department of Transportation CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties	SHEET NO.: 1 of 1
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ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
	ROADWAY (RD)	
RD-1	Use 12' Shoulders in-lieu of 16'	\$901,648
RD-3	Use one 11' and one 12' traffic lane	\$185,975
RD-4	Eliminate MSE wall between sta. 227+ and sta. 232+50	\$113,192
RD-5	Use raised grass median in-lieu of concrete raised median	\$2,666,761
RD-6	Use a 5 lane urban section	\$5,105,981
RD-10	Eliminate sidewalks in selected areas	\$554,035
RD-13	Obtain Design Exception in-lieu of eliminating sag vertical curve correction	\$230,643
RD-17	Review/modify select intersection configurations	DS
RD-24	Use 6" concrete median; 6" valley gutter; and 30' combo curb and gutter at the 6" height	\$832,623
RD-26	Use 4" concrete in-lieu of 6" or 8" concrete in the median	\$1,569,167
RD-27	Use modular block walls in-lieu of gravity walls	\$215,098

STUDY RESULTS

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 and Design Suggestions*. 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 & Design Suggestions* may also be used as a “score sheet” within the bounds of an implementation meeting.

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*.

**Georgia Department of Transportation
Projects: CSSTP-0006-00(857)(866)
P.I. Nos. 0006857 and 0006866
Cobb and Paulding Counties
Widening and Reconstruction of SR 92**



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Summary of Alternatives & Design Suggestions



PROJECT: Georgia Department of Transportation CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties		SHEET NO.: 1 of 1
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RD-27	Use modular block walls in-lieu of gravity walls	\$215,098

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-1

DESCRIPTION: **Use 12' shoulders in-lieu of 16'**

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

Original Design:

The original design calls for the construction of 16' shoulders in either direction throughout the project.

Alternative:

The alternative proposes constructing 12' shoulders in either direction throughout the project.

Opportunities:

- Reduces ROW costs
- Reduces construction footprint

Risks:

- Minimal design impacts
- Possible reduction in construction staging areas

Technical Discussion:

The alternative proposes constructing 12' shoulders in both directions of the proposed roadway, in lieu of the as-designed 16' shoulders. The alternative will have the effect of reducing 4' of ROW required in each direction by narrowing the shoulders. All of the proposed design elements will remain on the alternative shoulders (i.e. 5' sidewalk). Identified risks include a possible reduction in width for staging during construction, which would need to be developed as the project plans progress.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 4,530,471	\$ 0	\$ 4,530,471
ALTERNATIVE	\$ 3,628,823	\$ 0	\$ 3,628,823
SAVINGS	\$ 901,648	\$ 0	\$ 901,648

Illustration

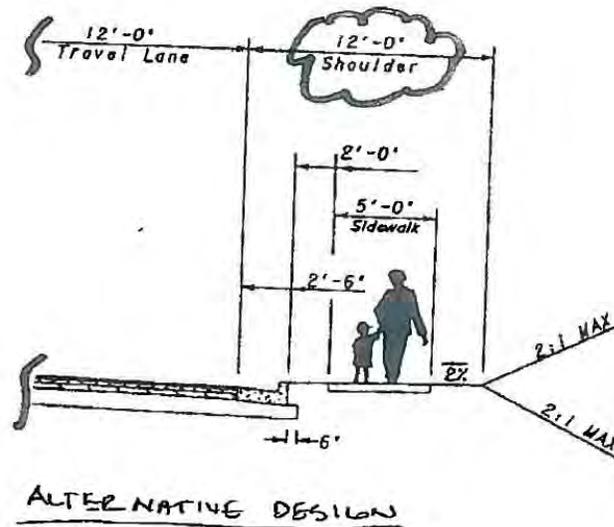
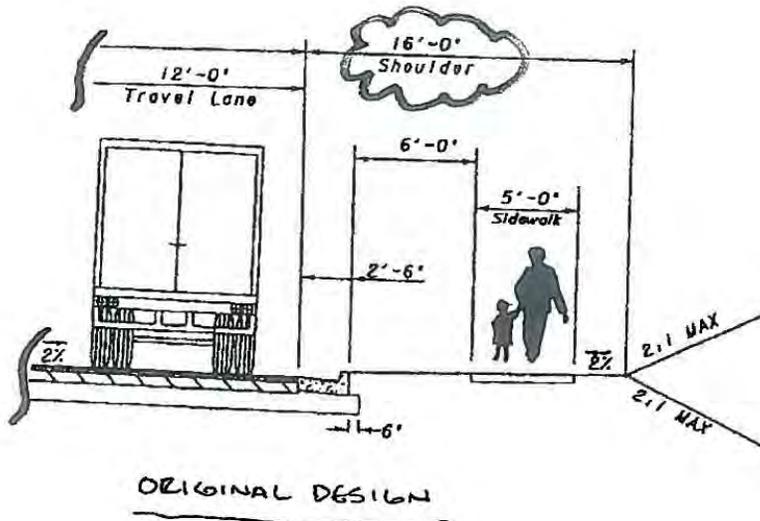


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Widening and Reconstruction of SR 92
Cobb and Paulding Counties

ALTERNATIVE NO.:
RD-1

DESCRIPTION: Use 12' shoulders in-lieu of 16'

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and
0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-1

DESCRIPTION: **Use 12' shoulders in-lieu of 16'**

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

Assumptions:

- Corridor will be narrowed by 8' total, 4' in either direction by reducing the shoulder width from 16' to 12'.
- Widening limits= approximate STA 100+00 to approximate STA 318+00= 21,800LF
- $21,800\text{LF} \times 8' \text{w} = 174,400\text{SF} / 43,560 = 4.00\text{AC}$ saved.
- ROW cost figures derived from Preliminary ROW Cost Estimates dated June 27, 2008 for Cobb and Paulding Counties, included in the project concept report.

Cost Calculations:

The preliminary ROW cost estimate shows 876,300SF to be acquired or to have an easement on for both projects, both residential and commercial. Our shoulder savings calculated above stands at 174,400SF. The complete, burdened cost of the ROW acquisition and easements for both projects is \$4,121,661 (\$1,726,973-Cobb, \$2,394,688-Paulding) This results in a average burdened cost of \$4.70/SF.

- $174,400\text{SF} \times \$4.70 = \$819,680$ calculated burdened ROW savings.

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Use one 11' travel lane and one 12' travel lane**

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

Original Design:

The original design proposes construction of two 12' travel lanes eastbound and westbound throughout the project.

Alternative:

The alternative proposes constructing a 12' outside travel lane, as well as an 11' inside travel lane throughout the project.

Opportunities:

- Reduction in pavement costs
- Reduced ROW footprint
- Reduction in construction time

Risks:

- Minimal design impacts
- May be contrary to driver expectations

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' 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). The combination would construct 12' outside lanes to accommodate the local truck traffic, as well as allowing a greater turn radius to right-turning vehicles.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 7,352,697	\$ 0	\$ 7,352,697
ALTERNATIVE	\$ 7,166,722	\$ 0	\$ 7,166,722
SAVINGS	\$ 185,975	\$ 0	\$ 185,975

Illustration

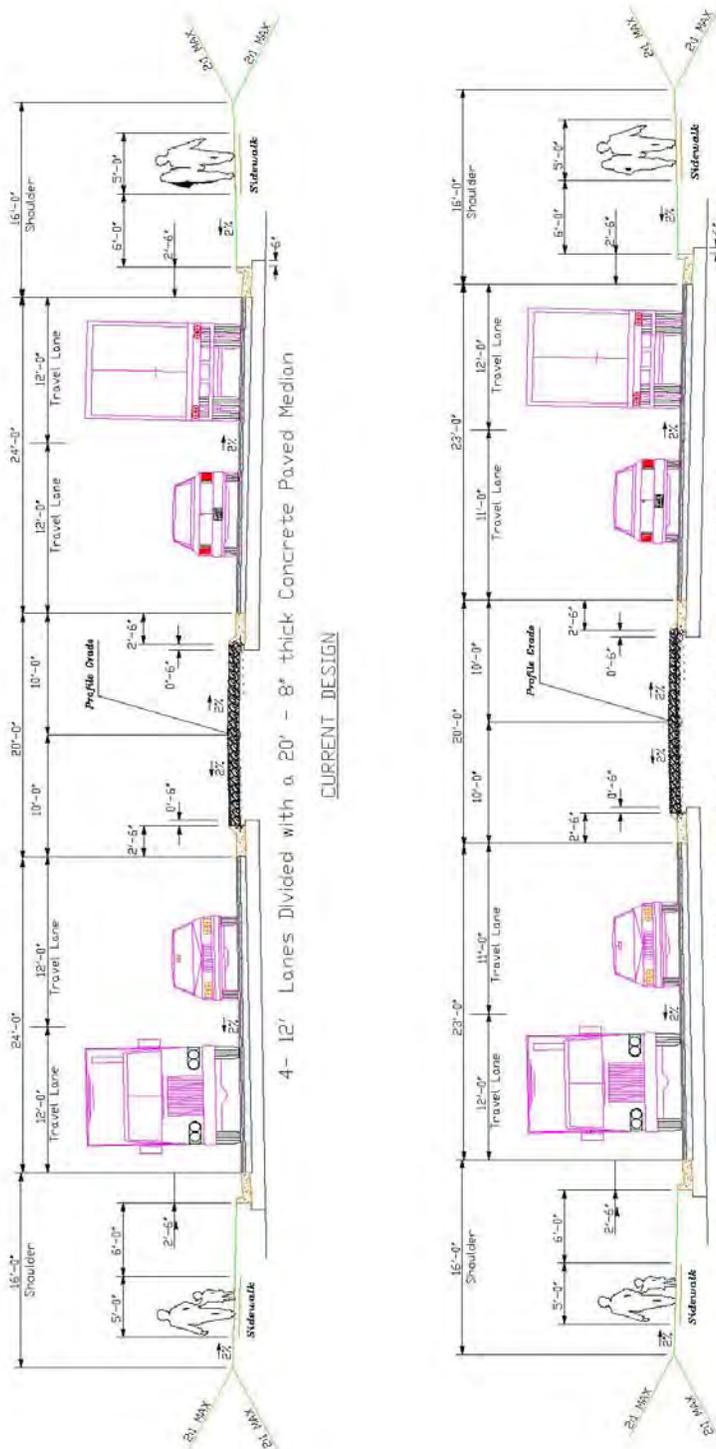


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Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Use one 11' travel lane and one 12' travel lane**

SHEET NO.: **2** of **4**



Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Use one 11' travel lane and one 12' travel lane**

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

Assumptions:

-Reduce inside travel lane width from 12' proposed to 11' alternative width in both directions throughout the project.

-Widening limits= approximate STA 100+00 to approximate STA 318+00= 21,800LF

-Area= $21,800\text{LF} \times 2'(1' \times \text{WB} + \text{EB})/9 = 43600\text{SF}/9 = 4844\text{SY}$ reduction in full pavement build-up area.

-Full build-up pavement assumptions:

10" GAB

440LB/SY 25mm Superpave

220LB/SY 19mm Superpave

165LB/SY 12.5mm Superpave

Calculations:

- $4844\text{SY} \times 1000\text{LB}/\text{SY} / 2000\text{LB}/\text{TN} = 2422$ TN reduction.

- $4844\text{SY} \times 440\text{LB}/\text{SY} / 2000 = 1066$ TN reduction 25mm Superpave

- $4844\text{SY} \times 220\text{LB}/\text{SY} / 2000 = 533$ TN reduction 19mm Superpave

- $4844\text{SY} \times 165\text{LB}/\text{SY} / 2000 = 400$ TN reduction 12.5mm Superpave

Cost Worksheet



PROJECT: Georgia Department of Transportation **ALTERNATIVE NO.:**
 CSSTP-0006-00(857)(866)
 P.I. No. 0006857 and 0006866
 Widening and Reconstruction of SR 92 **RD-3**
 Cobb and Paulding Counties

DESCRIPTION: Use one 11' travel lane and one 12' travel 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
310-1101-GAB, inc mat'l	TN	60,163	\$ 18.06	\$ 1,086,544	57,741	\$ 18.06	\$ 1,042,802
402-3121- 25mm Superpave	TN	50,749	\$ 59.90	\$ 3,039,865	49,683	\$ 59.90	\$ 2,976,012
402-3190- 19mm Superpave	TN	13,834	\$ 67.17	\$ 929,230	13,301	\$ 67.17	\$ 893,428
402-3130- 12.5mm Superpave	TN	25,376	\$ 64.18	\$ 1,628,632	24,976	\$ 64.18	\$ 1,602,960
Sub-total				\$ 6,684,270			\$ 6,515,202
Mark-up at 10.00%				\$ 668,427			\$ 651,520
TOTAL				\$ 7,352,697			\$ 7,166,722

Estimated Savings: \$185,975

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding County	ALTERNATIVE NO.:	RD-4
DESCRIPTION:	Eliminate MSE Wall between Station 227+00 and Station 232+50	SHEET NO.:	1 of 4

Original Design:

The original design provides a MSE wall on the west side of the roadway opposite the north end of the high school campus.

Alternative:

The alternative is to acquire an easement to construct the slope.

Opportunities:

- Eliminate the deep excavation for the strap placement
- Reduce cost
- Ease construction

Risks:

- Minimal design impact
- Requires additional construction easement
- Requires additional 30" RCP

Technical Discussion:

The use of a slope will ease construction and avoid the necessity of using temporary concrete barrier to protect the excavation required to install the wall straps.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 376,036	\$ 0	\$ 376,036
ALTERNATIVE	\$ 263,844	\$ 0	\$ 263,844
SAVINGS	\$ 113,192	\$ 0	\$ 113,192

Illustration



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:
RD-4

DESCRIPTION: **Eliminate MSE Wall between Station 227+00 and Station
232+50**

SHEET NO.: **2** of **4**

Eliminate the “PROP RETAINING WALL”



Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866)– P.I. No. 0006857 & 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-4

DESCRIPTION: **Eliminate MSE Wall between Station 227+00 and Station
232+50**

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

Right of Way:

Assume easement cost @ 50% of fee title R.O.W.

600 lf x 50' wide (average) = 30,000 sf

Net Cost (easement) 30,000 sf x \$4.00/sf x 0.50 = \$ 60,000

Scheduling 55% = \$ 33,000

Administrative 60% = \$ 36,000

Inflation 40% = \$ 24,000

Total = \$ 153,000

Earthwork:

Average height- from the retaining wall quantity 6500 sf / 550 lf = 11.8'

Average width- (0' - 100') / 2 = 50'

Length- 600 lf

Volume- (600' x 11.8' x 50') / (27 cf / cy) => 13,111 cy

Temporary Barrier:

Assume 20' end offset at a 10:1 taper = 200 lf at each end

(200 lf x 2) + 600 lf tangent => 1000 lf

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0006-00(857)(866) P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding County	ALTERNATIVE NO.:	RD-4
DESCRIPTION:	Eliminate MSE Wall between Station 227+00 and Station 232+50	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
Right of Way	LS	0	\$ -	\$ -	1	\$ 153,000	\$ 153,000
MSE Wall	SF	6,500	\$ 44.37	\$ 288,405	0	\$ -	\$ -
30" RCP	LF	0	\$ 59.46	\$ -	80	\$ 59.46	\$ 4,757
Clearing and Grubbing	AC	0	\$ 10,000	\$ -	1	\$ 10,000	\$ 10,000
Earthwork-Borrow	CY	0	\$ 5.43	\$ -	13,111	\$ 5.43	\$ 71,193
Temporary Safety Barrier	LF	1,000	\$ 30.28	\$ 30,280	0	\$ 30.28	\$ -
Pedestrian Handrail	LF	550	\$ 42.12	\$ 23,166	0	\$ 42.12	\$ -
Sub-total				\$ 341,851			\$ 238,950
Mark-up at 10.00%				\$ 34,185			\$ 23,895
TOTAL				\$ 376,036			\$ 262,844
Estimated Savings:							\$113,192

Value Analysis Design Alternative



PROJECT: Georgia Department of Transportation
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 Widening and Reconstruction of SR 92
 Cobb and Paulding Counties

ALTERNATIVE NO.:
RD-5

DESCRIPTION: Use raised grassed median in-lieu of raised concrete median

SHEET NO.: 1 of 4

Original Design:

The original design proposes a 20' raised concrete median to be constructed throughout the project.

Alternative:

The alternative proposes construction of the raised median interior with earth, with a grassed surface in lieu of the proposed 8" concrete paved surface.

Opportunities:

- Large reduction in project costs
- Reduction in construction time

Risks:

- Minimal design impacts
- Requires local authorities to agree to maintenance

Technical Discussion:

The intent of the alternative is to replace the 20' raised concrete median, and replace it with an earth-filled, grassed final surface in the raised median. The alternative would remove the proposed 8" concrete median, resulting in huge initial project savings. The alternative would require maintenance agreements for Paulding and Cobb Counties to maintain their respective portions throughout the project following its completion. In the concept report, a Summary of Meeting minutes from April 8, 2008, contained a statement from a representative from Cobb DOT requesting a grassed median, and indicating that Cobb County would maintain the grassed areas, as well as pay for upgrades for plantings. If Paulding County would reciprocate on the maintenance for their portion, the cost savings would be great.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,671,941	\$ 0	\$ 2,671,941
ALTERNATIVE	\$ 5,180	\$ 0	\$ 5,180
SAVINGS	\$ 2,666,761	\$ 0	\$ 2,666,761

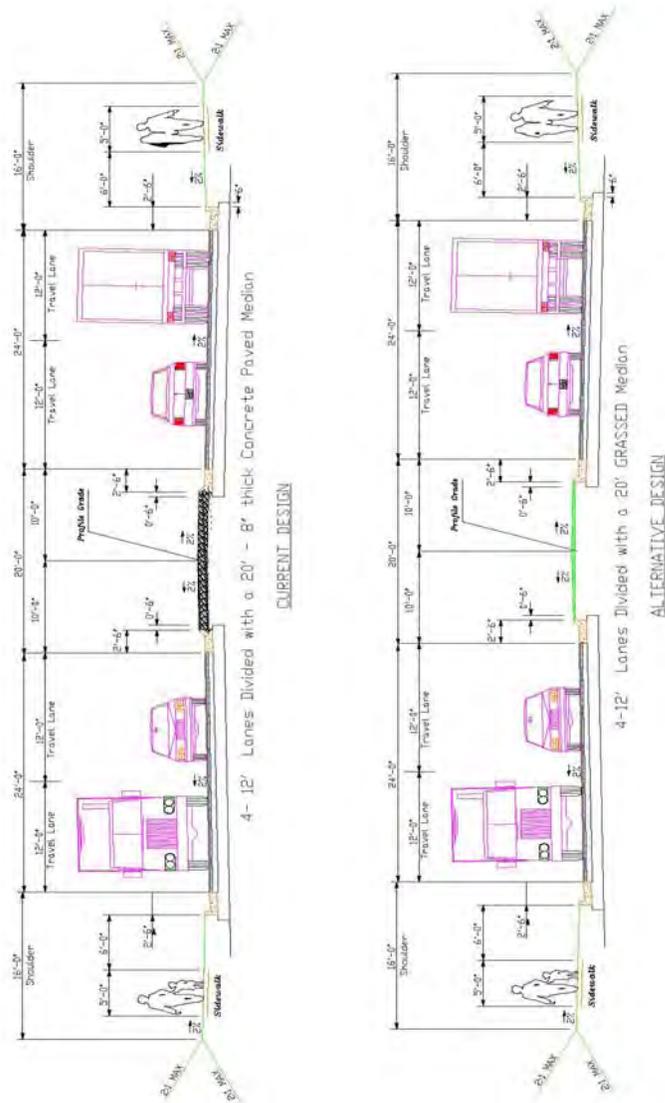
Illustration

PROJECT: **Georgia Department of Transportation
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Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-5

DESCRIPTION: **Use raised grassed median in lieu of raised concrete median**

SHEET NO.: **2 of 4**



Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-5

DESCRIPTION: **Use raised grassed median in lieu of raised concrete
median.**

SHEET NO.: **3 of 4**

Assumptions:

- Replace 8" concrete median with earth backfill and grass surface.
- Area to be replaced= $30,242 \text{ SY} / 43,560 = 0.69 \text{ AC}$ Grassing
- Use 1 ton/acre for mulching application rate= $0.69 / \text{AC} \times 1 \text{ ton/acre} = 0.69 \text{ TN mulch}$
- Borrow excavation quantity= $30,242 \text{ SY} \times 0.66' = 19960 / 27 = 740 \text{ CY}$ Borrow required

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0006-00(857)(866) P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties	ALTERNATIVE NO.:	RD-5
DESCRIPTION:	Use raised grassed median in lieu of raised concrete median	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
441-0756-Concrete Median, 8"	SY	30,242	\$ 80.32	\$ 2,429,037	0	\$ 80.32	\$ -
206-0002-Borrow Excavation, f	CY	0	\$ 5.43	\$ -	740	\$ 5.43	\$ 4,018
700-6910-Permanent Grassing	AC	0	\$ 831.65	\$ -	0.69	\$ 831.65	\$ 574
163-0240-Mulch	TN	0	\$ 169.64	\$ -	0.69	\$ 169.64	\$ 117
Sub-total				\$ 2,429,037			\$ 4,709
Mark-up at 10.00%				\$ 242,904			\$ 471
TOTAL				\$ 2,671,941			\$ 5,180
Estimated Savings:							\$2,666,761

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:
RD-6

DESCRIPTION: **Use a five lane urban section**

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

Original Design:

The original design provides four 12' lanes and a 20' raised median.

Alternative:

The alternative design is to construct a five lane section with four 12' lanes a 14' flush median.

Opportunities:

- Salvage more of the existing pavement
- Reduce cost
- Ease construction
- Reduce right-of-way

Risks:

- Moderate to major redesign effort
- Reduces access control

Technical Discussion:

The use of five lane section will significantly reduce costs and ease the construction. The design year AADT is 35,960 vpd with 15.5 % trucks and this would generally make a five lane section less desirable. However, this roadway's access points are primarily public roads or "well spaced" entrances to major developments with relatively few minor driveways.

Additional savings may also be realized by a reduction of the amount of temporary paving required to construct the job.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,208,366	\$ 0	\$ 6,208,366
ALTERNATIVE	\$ 1,102,385	\$ 0	\$ 1,102,385
SAVINGS	\$ 5,105,981	\$ 0	\$ 5,105,981

Illustration

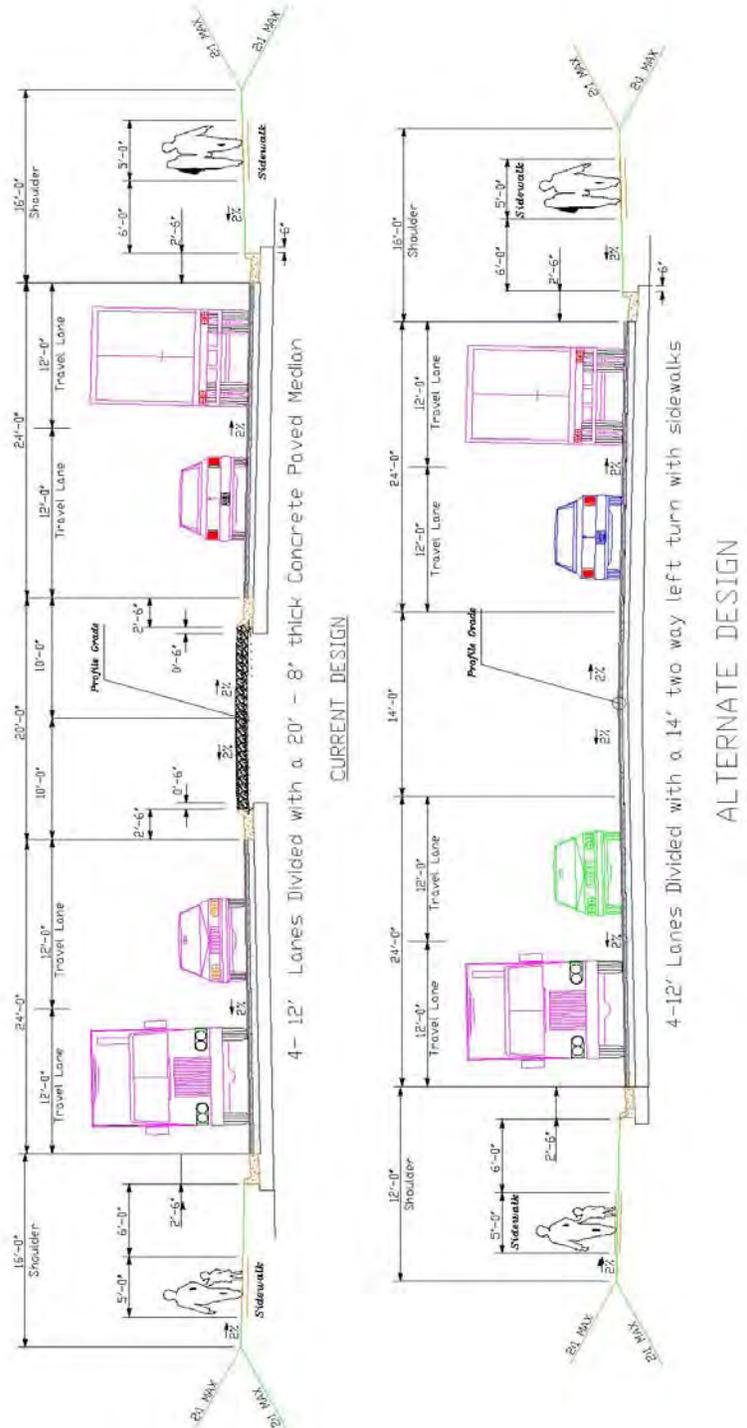


PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:
RD-6

DESCRIPTION: **Use a five lane urban section**

SHEET NO.: **2 of 4**



Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866)– P.I. No. 0006857 & 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-6

DESCRIPTION: **Use a five lane urban section**

SHEET NO.: **3 of 4**

Total project length = 24,350 lf less intersections and grade corrections Assume 20,000 lf

Reduced Right of Way:

Average Cost (burdened) \$4,121,661 / 876,300 sf => \$4.70 / sf

20,000 lf x 6' wide x \$4.70 / sf = \$ 564,000

Reduced Earthwork:

Assume an average depth of 1.5 ft

20,000 lf x 1.5 ft x 6' wide = 180,000 cf

180,000 cf / (27 cf / cy) = 6,667 cy

Assume the existing will be overlaid with 165# friction course and a 220# upper binder and 10' of new paving will be eliminated.

Overlay:

Overlay- 20,000 lf x 24' = 480,000 sf / (9sf / sy) = 53,333 sy

12.5 mm Superpave- (53,333 sy) x (220#/sy) / (2000#/ton) => 5,867 tons

19.0 mm Superpave- (53,333 sy) x (165#/sy) / (2000#/ton) => 4,340 tons

Reduced Paving:

Reduced Paving- 10' wide x 20,000 lf = 200,000 sf / (9sf / sy) = 22,222 sy

12.5 mm Superpave- (22,222 sy) x (165#/sy) / (2000#/ton) => 1,833 tons

19.0 mm Superpave- (22,222 sy) x (220#/sy) / (2000#/ton) => 2,444 tons

25.0 mm Superpave- (22,222 sy) x (440#/sy) / (2000#/ton) => 4,889 tons

10" GAB-(200,000 sf x 10 /12 ft) x (135#/cf) / (2000#/ton) => 11,250 tons

Reduced Curb and Gutter:

Assume 20,000 lf x 2' = 40,000 lf

Reduced Median paving:

Use a Pro-rata quantity (20,000 lf / 24,350 lf) x 30,242 sy => 24,839 sy

Striping and Marking:

Assume 20,000 lf x 2 skip stripes / (5280lf/mile) = 8 glm

Assume 20,000 lf x 2 solid stripes / (5280lf/mile) = 8 lm

Assume 25 sf for one marking set every 500' => (20,000' / 500') = 40 ea

Traffic Control:

Assume the project requires four major phases to construct the project and that may be reduced by one phase.

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.: **RD-10**

DESCRIPTION: **Eliminate sidewalks in selective areas**

SHEET NO.: **1 of 4**

Original Design:

The original design calls for construction of a 5' sidewalk in both directions throughout the project.

Alternative:

The alternative would eliminate the sidewalk in selected areas where it appears the pedestrian demand would be minimal on the project.

Opportunities:

- Reduced costs for sidewalk installation
- Opportunity for ROW cost savings

Risks:

- Lack of contiguous pedestrian access
- Minimal design impacts

Technical Discussion:

The alternative would remove the proposed sidewalk from STA 318+00 to STA 250+00, and reduce the shoulder width in these areas from 16' to 12'. The intent of the alternative is to identify areas on the project where pedestrian demand may be limited. The areas identified begin at approximately STA 250+00 and continue east to the project terminus at US 41/Cobb Parkway. Although these areas appear to be in a moderately concentrated residential area, the alternative keeps the sidewalk in the areas of the schools on the project, as well as the commercial development at the beginning of the project on Cedar Crest Road. Further analysis may yield additional areas where the utility of sidewalk construction on the project is marginal, and further cost savings may be realized.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 5,545,912	\$ 0	\$ 5,545,912
ALTERNATIVE	\$ 4,991,877	\$ 0	\$ 4,991,877
SAVINGS	\$ 554,035	\$ 0	\$ 554,035

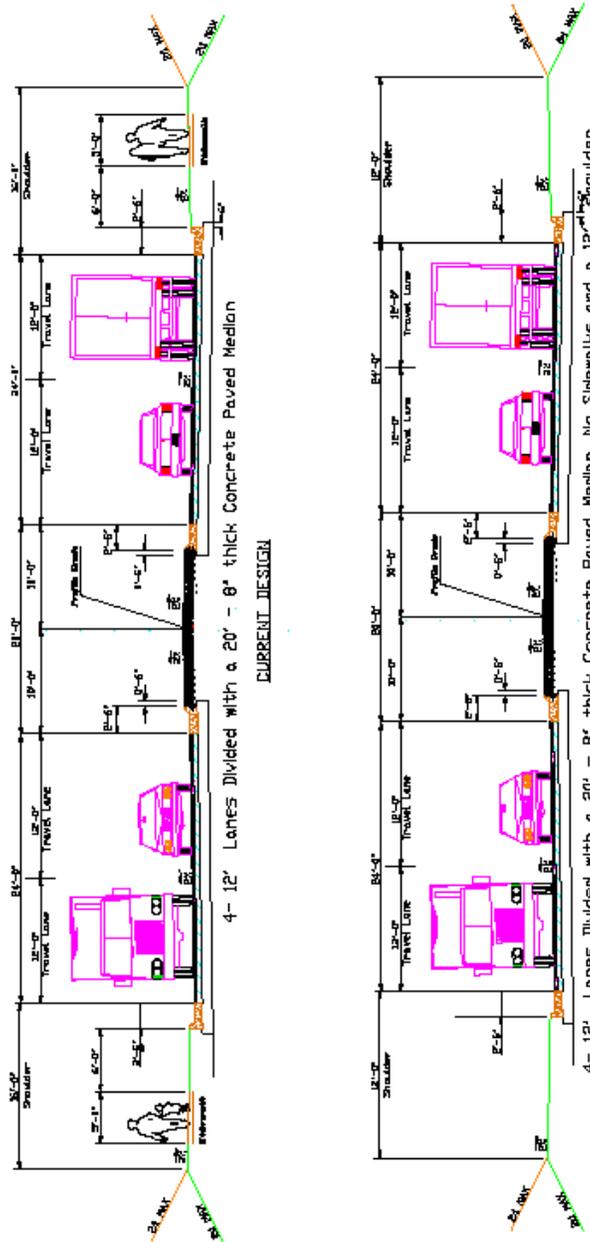
Illustration

PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-10

DESCRIPTION: **Eliminate sidewalks in selective areas**

SHEET NO.: **2 of 4**



Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-10

DESCRIPTION: **Eliminate sidewalks in selective areas**

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

Assumptions:

- Reduce shoulder width from 16' proposed to 12' alternative in areas of proposed sidewalk deletion.
- Delete sidewalk from STA 318+00 to STA 250+00. Construct sidewalk on remainder of project.
- STA 318+00-STA 250+00= 6,800LF x 2 sides=13,600LF x 5'w/9=7,556SY sidewalk reduction.
- Shoulder reduction= 6,800LF x 2 sides=13,600LF x 4'w reduction=54,400SF ROW/Easement reduction.

Cost Calculations:

The preliminary ROW cost estimate shows 876,300SF to be acquired or to have an easement on for both projects, both residential and commercial. The complete, burdened cost of the ROW acquisition and easements for both projects is \$4,121,661 (\$1,726,973-Cobb, \$2,394,688-Paulding) This results in a average burdened cost of \$4.70/SF.

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0006-00(857)(866) P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties	ALTERNATIVE NO.:	RD-10
DESCRIPTION:	Eliminate sidewalks in selective areas	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		
441-0104-Concrete Sidewalk-4"	SY	28,127	\$ 32.82	\$ 923,128	20,571	\$ 32.82	\$ 675,140		
ROW AVG Cost(see Calculations page)	SF	876,300	\$ 4.70	\$ 4,118,610	821,900	\$ 4.70	\$ 3,862,930		
Sub-total				\$ 5,041,738				\$ 4,538,070	
Mark-up at	10.00%				\$ 504,174				\$ 453,807
TOTAL				\$ 5,545,912				\$ 4,991,877	
Estimated Savings:							\$554,035		

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.: **RD-13**

DESCRIPTION: **Obtain a design exception in-lieu of a sag vertical correction at Station 160+51.43**

SHEET NO.: **1 of 4**

Original Design:

The original design provides a grade correction of up to 6' for the vertical curve at Station 160+51.43.

Alternative:

The alternative is to secure a design exception.

Opportunities:

- Reduce right-of-way
- Reduce earthwork
- Ease construction
- Reduce length of cross drain
- Eliminate the potential need for temporary pavement
- Reduce wetland Impacts

Risks:

- Minimal design impact
- Potentially less safe

Technical Discussion:

Not correcting the grade in this area will ease construction, reduce the quantity of roadway items, and avoid the potential of having to use temporary paving to phase the construction. The primary concern with not utilizing a minimum “K” value for the vertical curve would be one of stopping sight distance (reduced safety). From a review of the accident data it appears that there are no significant problems currently associated with this area. In addition by widening to a four lane divided roadway safety will be improved by providing an additional lane for maneuvering. There will be a full width raised median in the vicinity of the vertical curve, and because it is located in front of the school it is not anticipated that future driveways would be located in this area.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 230,643	\$ 0	\$ 230,643
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 230,643	\$ 0	\$ 230,643

Illustration

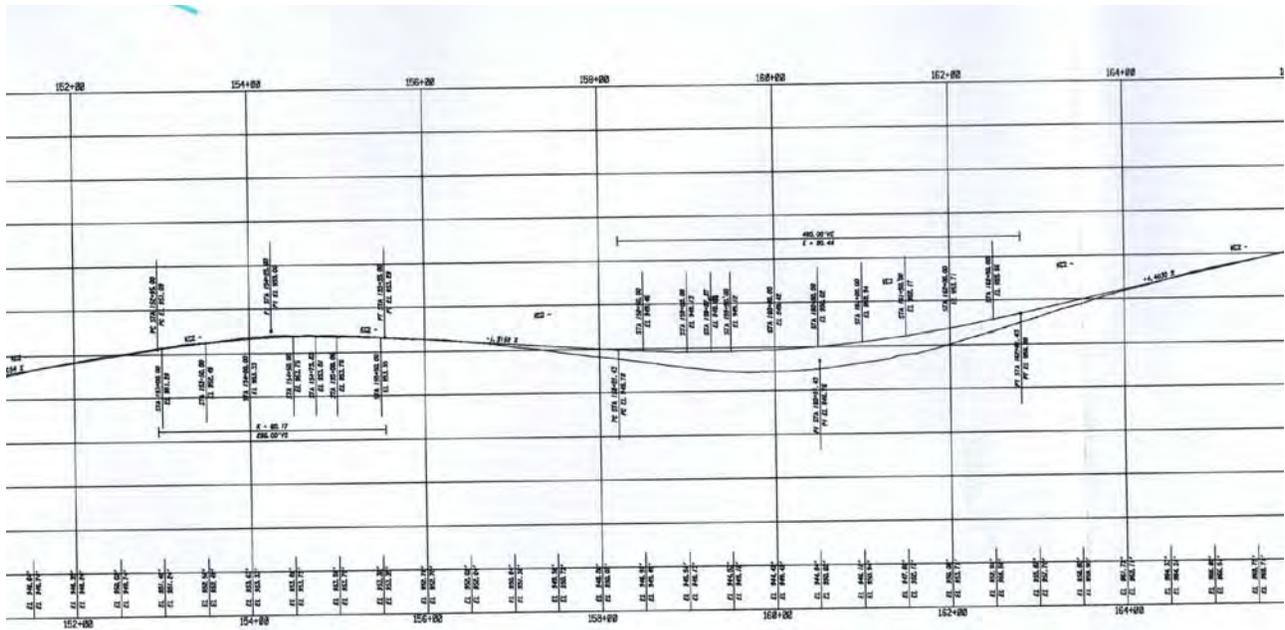
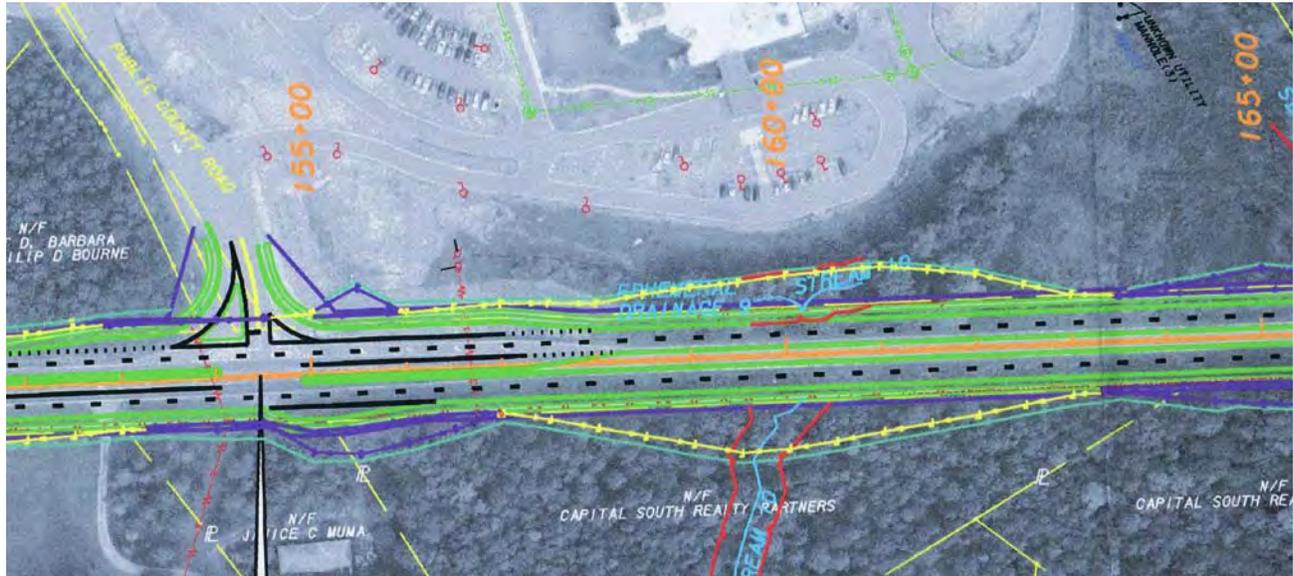


PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:
RD-13

DESCRIPTION: **Obtain a design exception in-lieu of a sag vertical
correction at Station 160+51.43**

SHEET NO.: **2** of **4**



**ELIMINATE THIS SAG CORRECTION BY "EXCEPTION" IN-LIEU OF A MAJOR
RECONSTRUCTION**

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866)– P.I. No. 0006857 & 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-13

DESCRIPTION: **Obtain a design exception in-lieu of a sag vertical
correction at 160+51.43**

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

Station 156+50 to Station 164+00 => 750 lf

Right of Way:

Assume easement cost @ 50% of fee title R.O.W.
2 x 750 lf x 20' wide (average) = 30,000 sf
Net Cost (easement) 30,000 sf x \$4.00/sf x 0.50 = \$ 60,000
Scheduling 55% = \$ 33,000
Administrative 60% = \$ 36,000
Inflation 40% = \$ 24,000
Total = \$ 153,000

Earthwork:

Assume an Average Width = 100'
Average Height- (0' + 6') / 2 = 3'
Volume- (750' x 3' x 100') / (27 cf / cy) => 8,333 cy

Temporary Barrier:

Assume 20' end offset at a 10:1 taper = 200 lf at each end
(200 lf x 2) + 600 lf tangent => 1000 lf

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0006-00(857)(866) P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding County	ALTERNATIVE NO.:	RD-13
DESCRIPTION:	Obtain a design exception in-lieu of a sag vertical correction at Station 160+51.43	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
Right of Way	LS	1	\$ 153,000	\$ 153,000	0		\$ -
Earthwork-Borrow	CY	8,333	\$5.43	\$ 45,248		\$5.43	\$ -
30" RCP	LF	24	\$ 59.46	\$ 1,427	0	\$ 59.46	\$ -
Clearing and Grubbing	AC	1	\$ 10,000	\$ 10,000	0	\$ 10,000	\$ -
Sub-total				\$ 209,675			\$ -
Mark-up at 10.00%				\$ 20,968			\$ -
TOTAL				\$ 230,643			\$ -

Estimated Savings: \$230,643

Value Analysis Design Suggestion



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 & 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:
RD-17

DESCRIPTION: **Review/modify select intersection configurations**

SHEET NO.: **1** of **2**

Original Design:

The original design is as proposed in the original preliminary layout.

Alternative:

The alternative would propose a variety of individual operational modifications outlined on sheet 2. These modifications include the addition of turning movements, intersection signalization and closing of median crossovers. Each of these improvements should be evaluated individually.

Opportunities:

- Improved operations
- Improved safety

Risks:

- Increased cost

Technical Discussion:

The designer should look more deeply at operational improvement to each intersection to improve the level of service. Based on the traffic volumes and the significant delay outlined in the LOS evaluation a number of intersections should either be signalized or geometrically modified to provide more flexibility with the signal timing.

Value Analysis Design Suggestion



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 & 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:

RD-17

DESCRIPTION: **Review/modify select intersection configurations**

SHEET NO.: **2** of **2**

Alternative Continued:

- 1) SR92/Cedarcrest Road Intersection – Construct a double right turn from SR92 eastbound onto SR92 eastbound.
- 2) SR92/Cedarcrest Road Intersection – Construct a double left turn from SR92 westbound onto SR92 westbound.
- 3) SR92/US41 Intersection- Construct the channelized left turn from SR92 eastbound onto US41 Northbound. This will segregate the left right and through movements at the intersection and allow more flexibility with the signal phasing.
- 4) Close the median opening at Old Dallas Ackworth Road. This will reduce interference with the queues for US41. It will discourage the use of Old Dallas Ackworth Road by queue jumpers. Local traffic going south on Old Dallas Ackworth Road will be able to access US41 by U-turning at the median opening at Bridgemont Place.
- 5) Perform signal warrants for the following intersections and consider the installation of signals:
 - Royal Sunset Drive - Station ~125+00
 - Old Stilesboro Road - Station ~195+00
 - Pickett's Ridge - Station ~240+00
 - Cheatham Road -Station ~259+00
 - North Shores Road - Station ~296+00

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties	ALTERNATIVE NO.:	RD-24
DESCRIPTION:	Use 6” concrete median, 6” valley gutter, and 30” combo curb and gutter at 6” height.	SHEET NO.:	1 of 4

Original Design:

The original design calls for concrete median, valley gutter, and Type II curb and gutter to be constructed at an 8” thickness throughout the projects.

Alternative:

The alternative proposes using 6” concrete median, 6” valley gutter, and 6” x 30” Type II curb and gutter.

Opportunities:

- Reduced material costs
- Reduced construction time

Risks:

- Minimal design impacts

Technical Discussion:

The intent of the alternative is to reduce the proposed thickness of the concrete median, concrete valley gutter, and Type II curb and gutter from 8” to 6”. The reduction in thickness realizes cost savings for the materials, and should have the effect of reducing time required to construct.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 4,123,636	\$ 0	\$ 4,123,636
ALTERNATIVE	\$ 3,291,013	\$ 0	\$ 3,291,013
SAVINGS	\$ 832,623	\$ 0	\$ 832,623

Illustration

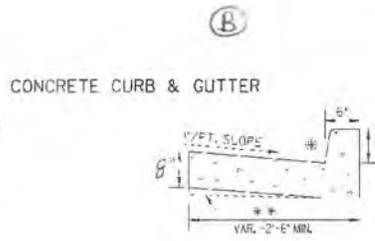
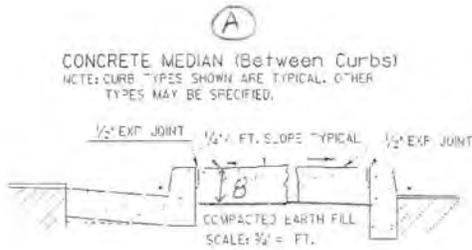


PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-24

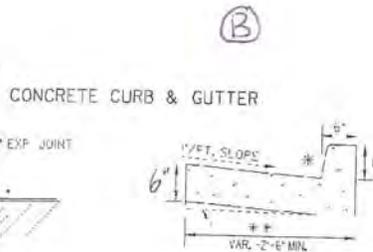
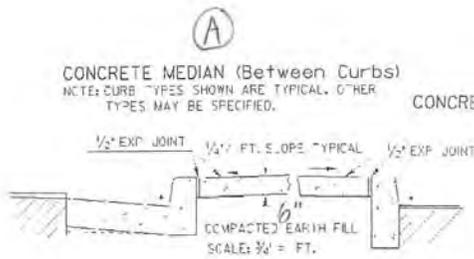
DESCRIPTI **Use 6" concrete median, 6" valley gutter, and 30" combo
curb and gutter at 6" height.**

SHEET NO.: **2** of **4**



TYPE 2, 3 OR 4

ORIGINAL



TYPE 2, 3 OR 4

ALTERNATIVE

RD24-2 TO# 38 - COBB + PAULDING COUNTIES

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-24

DESCRIPTION: **Use 6” concrete median, 6” valley gutter, and 30” combo
curb and gutter at 6” height**

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

Assumptions:

- Use 6” valley gutter, 6” concrete median, and 30” Type II curb and gutter at 6” height in lieu of the proposed 8” thickness.
- Original unit prices were derived from cost estimate provided to VE team in concept report.
- Proposed prices were derived from GDOT Item Mean Summary dated January 20, 2009.
- All item quantities are unchanged, savings reflect unit price differentials from original to alternative items.

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0006-00(857)(866) P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties	ALTERNATIVE NO.:
		RD-24
DESCRIPTION:	Use 6" concrete median, 6" valley gutter, and 30" combo curb and gutter at 6" height	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
441-0756-Concrete Median, 8"	SY	30,242	\$80.32	\$ 2,429,037	0	\$80.32	\$ -
441-4030- Valley Gutter, 8"	SY	9,424	\$ 46.42	\$ 437,462	0	\$ 46.42	\$ -
441-6222- Conc. Curb and Gutter, *" x 30", Type II	LF	55,523	\$ 15.89	\$ 882,260	0	\$ 15.89	\$ -
441-0748- Concrete Median, 6"	SY			\$ -	30242	\$ 57.71	\$ 1,745,266
441-4020- Valley Gutter, 6"	SY			\$ -	9424	\$ 37.95	\$ 357,641
441-6022- Conc. Curb and Gutter, 6" x 30", Type II	LF			\$ -	55,523	\$ 16.01	\$ 888,923
Sub-total				\$ 3,748,760			\$ 2,991,830
Mark-up at 10.00%				\$ 374,876			\$ 299,183
TOTAL				\$ 4,123,636			\$ 3,291,013

Estimated Savings: \$832,623

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-26

DESCRIPTION: **Use 4” concrete median**

SHEET NO.: **1** of **3**

Original Design:

The original design calls for the construction of an 8” concrete median as the surface for the 20’ proposed raised median.

Alternative:

The alternative proposes using a 4” concrete median as the surface for the proposed 20’ raised median.

Opportunities:

- Lower initial costs
- Reduction in construction time

Risks:

- Minimal design impacts
- Will require additional fill for base construction

Technical Discussion:

The alternative proposal would reduce the proposed thickness of the 20’ concrete median from 8” original to 4” proposed. The resulting cost savings are based on the differential in unit prices of the above items. Additional costs may be incurred in providing fill to account for the vertical difference between the 8” proposed surface and the 4” alternative treatment.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,671,941	\$	\$ 2,671,941
ALTERNATIVE	\$ 1,102,775	\$	\$ 1,102,775
SAVINGS	\$ 1,569,167	\$	\$ 1,569,167

Illustration



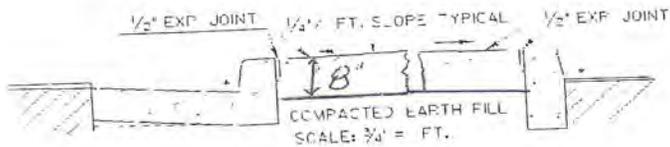
PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding County**

ALTERNATIVE NO.:
RD-26

DESCRIPTION: **Use 4" concrete median**

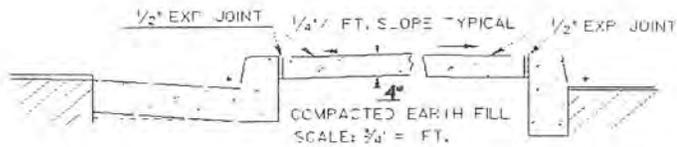
SHEET NO.: **2 of 3**

CONCRETE MEDIAN (Between Curbs)
NOTE: CURB TYPES SHOWN ARE TYPICAL. OTHER
TYPES MAY BE SPECIFIED.



ORIGINAL

CONCRETE MEDIAN (Between Curbs)
NOTE: CURB TYPES SHOWN ARE TYPICAL. OTHER
TYPES MAY BE SPECIFIED.



ALTERNATIVE

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00-(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-27

DESCRIPTION: **Use modular block walls in-lieu of CIP gravity walls**

SHEET NO.: **1** of **3**

Original Design:

The original design provides a CIP Gravity Wall in selected areas throughout the entire project.

Alternative:

The alternative is to utilize a Modular Block Wall at these locations

Opportunities:

- Improve aesthetics
- Reduce cost
- Ease construction
- Provide consistency with other existing walls

Risks:

- Minimal design impact

Technical Discussion:

These walls are typically short (less than 6') non load bearing walls. There are existing modular walls on the project. A modular wall should be more than adequate and will speed construction and improve safety by reducing the equipment required onsite for the installation.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,203,499	\$ 0	\$ 1,203,499
ALTERNATIVE	\$ 988,401	\$ 0	\$ 988,401
SAVINGS	\$ 215,098	\$ 0	\$ 215,098

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0006-00(857)(866)– P.I. No. 0006857 & 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

ALTERNATIVE NO.:
RD-27

DESCRIPTION: **Use modular block walls in-lieu of CIP gravity walls**

SHEET NO.: **2** of **3**

Retaining Walls: GDOT Standard 903IL

Assume modular walls cost at \$17.50 / sf complete.

Assume walls average 6' in total height.

Concrete volume => 0.46 cy / lf

From the project estimate- 2616 cy total / (0.46 cy/ lf) = 5,687 lf

5687 lf x 6' height = 34,122 sf.

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0006-00(857)(866) P.I. No. 0006857 and 0006866 Widening and Reconstruction of SR 92 Cobb and Paulding Counties	ALTERNATIVE NO.: RD-27
DESCRIPTION:	Use modular block walls in-lieu of CIP gravity walls	SHEET NO.: 3 of 3

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Modular Block Wall	SF	0	\$ 17.50	\$ -	34,122	\$ 17.50	\$ 597,135
Modular Block Wall- coping	LF	0	\$ 53.00	\$ -	5,687	\$ 53.00	\$ 301,411
Class A Conc. Retaining Wall	CY	2,616	\$ 418.23	\$ 1,094,090	0	\$ 418.23	\$ -
Sub-total				\$ 1,094,090			\$ 898,546
Mark-up at 10.00%				\$ 109,409			\$ 89,855
TOTAL				\$ 1,203,499			\$ 988,401
Estimated Savings:							\$215,098

PROJECT DESCRIPTION

INTRODUCTION

The project for this Value Engineering Study is No. CSSTP-006-00(857)(866) - P.I. Nos. 0006857 and 0006866. The purpose of the project is widening and reconstruction of SR 92 in Cobb and Paulding Counties.

SR 92 is a vital east-west corridor through Cobb and Paulding counties providing access to I-75 as well as US 41. The object of the project is to create a more efficient and safer corridor while meeting the traffic demands of future traffic.

At the present time, SR 92 is a two lane road with 12' lanes with auxiliary left and right turn lanes and curb and gutter intermittently throughout the corridor. In areas without curb and gutter there are rural shoulders of 0' to 2'. The posted speed is 45 mph.

The projects propose to widen and reconstruct SR 92 from a two lane facility to a divided four lane facility with 12' lanes, a 20' raised concrete median, 16' shoulders with curb and gutter, and 5' sidewalks. Project CSSTP-006-00(857) is located in Paulding County and begins at CR 73/Old Burnt Hickory Road and goes to Picketts Mill Place. Project CSSTP-006-00(866) is located in Cobb County and runs from Picketts Mill Place to US 41/SR 3/ Cobb Parkway. Total length of the projects is 4.42 miles.

Project CSSTP-006-00(857) has projected construction costs of \$13,814,808, right-of-way costs of \$ 2,394,688, and reimbursable utility costs of \$250,000 for a projected project total of \$16,459,496.

Project CSSTP-006-00(866) has projected construction costs of \$12,386,891 and right-of-way costs of \$1,726,973 for a projected project total of \$14,113,864.

REPRESENTATIVE DOCUMENTS

- Georgia Department of Transportation
 - Half size plan set
 - Construction Cost Estimates
 - Preliminary Right-of-Way Cost Estimate
 - Utility Costs
 - Concept Report
 - Traffic Analysis

The VE Team utilized the supplied project materials noted above and the current standard drawings, details and specifications provided by URS Corporation.

Estimate Report for the "Process 2002-03-02"

Item	Description	Unit	Quantity	Unit Price	Total Price
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Attachment 1

Cost Estimates

Item	Description	Unit	Quantity	Unit Price	Total Price
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Estimate Report for file "0006857_2009-02-02"

Section Roadway Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	300000.00	TRAFFIC CONTROL - CSSTP-0006-00(857)	300000.00
153-1300	1	EA	70578.50	FIELD ENGINEERS OFFICE TP 3	70578.50
210-0100	1	LS	710478.20	GRADING COMPLETE - CSSTP-0006-00(857)	710478.20
310-1101	30780	TN	18.06	GR AGGR BASE CRS, INCL MATL	555886.80
318-3000	5774	TN	21.01	AGGR SURF CRS	121311.74
402-1802	12943	TN	82.81	RECYCLED ASPH CONC PATCHING, INCL BITUM MATL & H LIME	1071809.83
402-1812	17261	TN	69.41	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	1198086.01
402-3121	26922	TN	59.90	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1612627.80
402-3130	13462	TN	64.18	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	863991.16
402-3190	7949	TN	67.17	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	533934.33
413-1000	22843	GL	2.13	BITUM TACK COAT	48655.59
432-5010	4440	SY	1.25	MILL ASPH CONC PVMT, VARIABLE DEPTH	5550.00
441-0104	15364	SY	32.82	CONC SIDEWALK, 4 IN	504246.48
441-0756	16380	SY	80.32	CONCRETE MEDIAN, 8 IN	1315641.60
441-4030	5187	SY	46.42	CONC VALLEY GUTTER, 8 IN	240780.54
441-6222	32549	LF	15.89	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	517203.61
446-1100	8418	LF	5.14	PVMT REINF FABRIC STRIPS, TP 2, 18 INCH WIDTH	43268.52
500-3107	1440	CY	418.23	CLASS A CONCRETE, RETAINING WALL	602251.20
500-3200	361	CY	417.35	CLASS B CONCRETE	150663.35
500-3900	720	CY	682.50	CLASS B CONCRETE, INCL REINF STEEL	491400.00
500-9999	362	CY	191.53	CLASS B CONC, BASE OR PVMT WIDENING	69333.86
550-1180	14444	LF	39.05	STORM DRAIN PIPE, 18 IN, H 1-10	564038.20
550-1240	447	LF	46.58	STORM DRAIN PIPE, 24 IN, H 1-10	20821.26
550-1300	87	LF	59.46	STORM DRAIN PIPE, 30 IN, H 1-10	5173.02
550-2180	911	LF	32.35	SIDE DRAIN PIPE, 18 IN, H 1-10	29470.85
550-3518	7	EA	1142.78	SAFETY END SECTION 18 IN, STORM DRAIN, 6:1 SLOPE	7999.46
550-3524	3	EA	716.69	SAFETY END SECTION 24 IN, STORM DRAIN, 6:1 SLOPE	2150.07
550-3530	1	EA	0.00	SAFETY END SECTION 30 IN, STORM DRAIN, 6:1 SLOPE	0.00
550-3618	49	EA	544.70	SAFETY END SECTION 18 IN, SIDE DRAIN, 6:1 SLOPE	26690.30
611-4001	3	EA	2662.33	RECONSTR MINOR DRAINAGE STR	7986.99
634-1200	228	EA	99.08	RIGHT OF WAY MARKERS	22590.24
668-1100	64	EA	2541.90	CATCH BASIN, GP 1	162681.60
668-1110	5	LF	202.02	CATCH BASIN, GP 1, ADDL DEPTH	1010.10
668-1200	2	EA	3078.58	CATCH BASIN, GP 2	6157.16
668-2100	5	EA	2425.77	DROP INLET, GP 1	12128.85
668-2110	5	LF	253.80	DROP INLET, GP 1, ADDL DEPTH	1269.00
668-4300	3	EA	2250.04	STORM SEWER MANHOLE, TP 1	6750.12
Section Sub Total:					\$11,904,616.34

Section Signing and Marking Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
653-1501	58042	LF	0.47	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	27279.74
653-1502	447	LF	0.48	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	214.56
653-1704	97	LF	3.48	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	337.56
653-3501	28785	GLF	0.33	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	9499.05
653-6004	781	SY	2.77	THERMOPLASTIC TRAF STRIPING, WHITE	2163.37
654-1001	159	EA	3.06	RAISED PVMT MARKERS TP 1	486.54
654-1003	1791	EA	3.26	RAISED PVMT MARKERS TP 3	5838.66
Section Sub Total:					\$45,819.48

Section Erosion Control Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	33	AC	385.22	TEMPORARY GRASSING	12712.26
163-0240	874	TN	172.38	MULCH	150660.12
163-0300	5	EA	1234.88	CONSTRUCTION EXIT	6174.40
163-0503	59	EA	451.42	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	26633.78
163-0550	75	EA	206.02	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	15451.50
165-0030	9334	LF	0.78	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	7280.52
165-0087	30	EA	110.72	MAINTENANCE OF SILT CONTROL GATE, TP 3	3321.60
165-0101	5	EA	511.06	MAINTENANCE OF CONSTRUCTION EXIT	2555.30
165-0105	38	EA	83.16	MAINTENANCE OF INLET SEDIMENT TRAP	3160.08
171-0030	18667	LF	3.46	TEMPORARY SILT FENCE, TYPE C	64587.82
700-6910	64	AC	825.66	PERMANENT GRASSING	52842.24
700-7000	194	TN	63.09	AGRICULTURAL LIME	12239.46
700-7010	160	GL	21.49	LIQUID LIME	3438.40
700-8000	58	TN	384.56	FERTILIZER MIXED GRADE	22304.48
700-8100	3430	LB	2.30	FERTILIZER NITROGEN CONTENT	7889.00
Section Sub Total:					\$391,250.96

Section Traffic Signal Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
632-0003	1	EA	7982.81	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	7982.81
639-3004	6	EA	12505.85	STEEL STRAIN POLE, TP IV	75035.10
647-1000	2	LS	55515.34	TRAFFIC SIGNAL INSTALLATION NO -	111030.68
647-2150	6	EA	1720.00	PULL BOX, PB-5	10320.00
682-6233	375	LF	2.96	CONDUIT, NONMETL, TP 3, 2 IN	1110.00
938-1100	2	EA	5875.76	INTERSECTION VIDEO DETECTION SYSTEM ASSEMBLY, TYPE A	11751.52
Section Sub Total:					\$217,230.11

Total Estimated Cost: \$12,558,916.89

Estimate Report for file "0006866_2009-02-02"

Section Wall					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
627-1020	6500	SF	44.37	MSE WALL FACE, 20 - 30 FT HT, WALL NO -	288405.00
Section Sub Total:					\$288,405.00

Section Roadway Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	114066.57	TRAFFIC CONTROL -	114066.57
310-1101	29383	TN	18.06	GR AGGR BASE CRS, INCL MATL	530656.98
318-3000	4717	TN	21.01	AGGR SURF CRS	99104.17
402-1802	10574	TN	82.81	RECYCLED ASPH CONC PATCHING, INCL BITUM MATL & H LIME	875632.94
402-1812	14102	TN	69.41	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	978819.82
402-3121	23827	TN	59.90	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1427237.30
402-3130	11914	TN	64.18	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	764640.52
402-3190	5885	TN	67.17	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	395295.45
413-1000	20217	GL	2.13	BITUM TACK COAT	43062.21
432-5010	3627	SY	1.25	MILL ASPH CONC PVMT, VARIABLE DEPTH	4533.75
441-0104	12763	SY	32.82	CONC SIDEWALK, 4 IN	418881.66
441-0756	13862	SY	80.32	CONCRETE MEDIAN, 8 IN	1113395.84
441-4030	4237	SY	46.42	CONC VALLEY GUTTER, 8 IN	196681.54
441-6222	22974	LF	15.89	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	365056.86
446-1100	3531	LF	5.14	PVMT REINF FABRIC STRIPS, TP 2, 18 INCH WIDTH	18149.34
500-3107	1176	CY	418.23	CLASS A CONCRETE, RETAINING WALL	491838.48
500-3200	295	CY	417.35	CLASS B CONCRETE	123118.25
500-3900	588	CY	682.50	CLASS B CONCRETE, INCL REINF STEEL	401310.00
500-9999	296	CY	191.53	CLASS B CONC, BASE OR PVMT WIDENING	56692.88
550-1180	515	LF	39.05	STORM DRAIN PIPE, 18 IN, H 1-10	20110.75
550-1240	260	LF	46.58	STORM DRAIN PIPE, 24 IN, H 1-10	12110.80
550-1300	87	LF	59.46	STORM DRAIN PIPE, 30 IN, H 1-10	5173.02
550-2180	650	LF	32.35	SIDE DRAIN PIPE, 18 IN, H 1-10	21027.50
550-3518	7	EA	1142.78	SAFETY END SECTION 18 IN, STORM DRAIN, 6:1 SLOPE	7999.46
550-3524	3	EA	716.69	SAFETY END SECTION 24 IN, STORM DRAIN, 6:1 SLOPE	2150.07
550-3530	1	EA	0.00	SAFETY END SECTION 30 IN, STORM DRAIN, 6:1 SLOPE	0.00
550-3618	37	EA	544.70	SAFETY END SECTION 18 IN, SIDE DRAIN, 6:1 SLOPE	20153.90
611-4001	3	EA	2662.33	RECONSTR MINOR DRAINAGE STR	7986.99
634-1200	165	EA	99.08	RIGHT OF WAY MARKERS	16348.20
668-1100	47	EA	2541.90	CATCH BASIN, GP 1	119469.30
668-1110	5	LF	202.02	CATCH BASIN, GP 1, ADDL DEPTH	1010.10
668-1200	1	EA	3078.58	CATCH BASIN, GP 2	3078.58
668-2100	4	EA	2425.77	DROP INLET, GP 1	9703.08
668-2110	5	LF	253.80	DROP INLET, GP 1, ADDL DEPTH	1269.00
668-4300	3	EA	2250.04	STORM SEWER MANHOLE, TP 1	6750.12
Section Sub Total:					\$8,672,515.43

Section Signing and Marking Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
653-1501	51241	LF	0.47	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	24083.27
653-1502	447	LF	0.48	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	214.56
653-1704	97	LF	3.48	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	337.56
653-3501	24351	GLF	0.33	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	8035.83

653-6004	547	SY	2.77	THERMOPLASTIC TRAF STRIPING, WHITE	1515.19
654-1001	130	EA	3.06	RAISED PVMT MARKERS TP 1	397.80
654-1003	1463	EA	3.26	RAISED PVMT MARKERS TP 3	4769.38
Section Sub Total:					\$39,353.59

Section Erosion Control Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	27	AC	385.22	TEMPORARY GRASSING	10400.94
163-0240	714	TN	172.38	MULCH	123079.32
163-0300	4	EA	1234.88	CONSTRUCTION EXIT	4939.52
163-0503	47	EA	451.42	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	21216.74
163-0550	56	EA	206.02	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	11537.12
165-0030	7511	LF	0.78	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	5858.58
165-0087	24	EA	110.72	MAINTENANCE OF SILT CONTROL GATE, TP 3	2657.28
165-0101	4	EA	511.06	MAINTENANCE OF CONSTRUCTION EXIT	2044.24
165-0105	28	EA	83.16	MAINTENANCE OF INLET SEDIMENT TRAP	2328.48
171-0030	15021	LF	3.46	TEMPORARY SILT FENCE, TYPE C	51972.66
700-6910	52	AC	825.66	PERMANENT GRASSING	42934.32
700-7000	159	TN	63.09	AGRICULTURAL LIME	10031.31
700-7010	131	GL	21.49	LIQUID LIME	2815.19
700-8000	47	TN	384.56	FERTILIZER MIXED GRADE	18074.32
700-8100	2802	LB	2.30	FERTILIZER NITROGEN CONTENT	6444.60
Section Sub Total:					\$316,334.62

Section Traffic Signal Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
632-0003	1	EA	7982.81	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	7982.81
639-3004	6	EA	12505.85	STEEL STRAIN POLE, TP IV	75035.10
647-1000	2	LS	55515.34	TRAFFIC SIGNAL INSTALLATION NO -	111030.68
647-2150	6	EA	1720.00	PULL BOX, PB-5	10320.00
682-6233	375	LF	2.96	CONDUIT, NONMETL, TP 3, 2 IN	1110.00
938-1100	2	EA	5875.76	INTERSECTION VIDEO DETECTION SYSTEM ASSEMBLY, TYPE A	11751.52
Section Sub Total:					\$217,230.11

Total Estimated Cost: \$9,533,838.75

Preliminary Right of Way Cost Estimate

Date: June 27, 2008

Project: CSSTP-0006-00 (866) Cobb

P.I. Number: 0006866

Existing/Required R/W: Varies/Varies

No. Parcels: 87

Project Termini: Begins at the intersection of Cedarcrest Road and State Route 92 and runs in a northeasterly direction to the intersection of Cobb Parkway / U.S. 41

Project Description: Dallas Acworth Highway Widening Project

Land:

Commercial		
22,900 sf @ \$ 4.00/ sf =	\$	91,600
Commercial Perm. Esmt.		
76,900 sf @ \$ 4.00 @ 50%/ sf =	\$	153,800
Residential		
158,900 sf @ \$ 0.40/ sf =	\$	63,560
Residential Perm. Esmt.		
262,000 sf @ \$ 0.40 @ 50%/ sf =	\$	52,400

TOTAL \$ 361,360

Improvements:

Business, Curbing, paving, signs, Fencing and Misc. Site Improvements		
	\$	<u>215,000</u>

Relocation:

Commercial (1) @ \$25,000/parcel =	\$	25,000
Residential (0) @ \$40,000/parcel =	\$	<u> </u>

TOTAL \$ 25,000

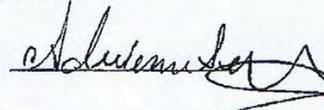
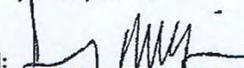
Damages: Proximity (3)	\$ 95,000	
Consequential (0)	\$	
Cost to Cure (0)	\$ <u> </u>	\$ <u>95,000</u>

TOTAL \$ 696,360

SUB-TOTAL: \$ 696,360

Net Cost		\$ 696,360
Scheduling Contingency 55 %		\$ 382,998
Adm/Court Cost 60 %		\$ 647,615
TOTAL		<u>\$ 1,726,973</u>

Total Cost **\$ 1,726,973**

Prepared By:  Reviewed / Approved: 
Howard P. Copeland
R/W Administrator

Note: Accuracy of estimate is the sole responsibility of the Preparer.
Note: The Market Appreciation(40%) is not included in this Preliminary Cost Estimate.

REVISED: 2-8-08

Preliminary Right of Way Cost Estimate

Date: June 27, 2008

Project: CSSTP-0006-00 (857) Paulding

P.I. Number: 0006857

Existing/Required R/W: Varies/Varies

No. Parcels: 58

Project Termini: Begins at the intersection of Cedarcrest Road and State Route 92 and runs in a northeasterly direction to the intersection of Cobb Parkway / U.S. 41

Project Description: Dallas Acworth Highway Widening Project

Land:

Commercial			
54,500 sf @ \$ 4.00/ sf =		\$	218,000
Commercial Perm. Esmt.			
108,700 sf @ \$ 4.00 @ 50%/ sf =		\$	217,400
Residential			
73,600 sf @ \$ 0.40/ sf =		\$	29,440
Residential Perm. Esmt.			
118,800 sf @ \$ 0.40 @ 50%/ sf =		\$	23,760

TOTAL \$ 488,600

Improvements:

Business, Curbing, paving, signs, Fencing and Misc. Site Improvements			
		\$	<u>203,000</u>

Relocation:

0 Commercial @ \$25,000/parcel	=	\$	
0 Residential @ \$40,000/parcel	=	\$	<u> </u>

TOTAL \$ 0

Damages: Proximity (2)	\$	40,000.00	
Consequential (0)	\$		
Cost to Cure (7)	\$	<u>234,000.00</u>	<u>\$ 274,000</u>

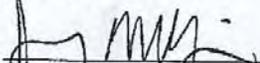
TOTAL \$ 965,600

SUB-TOTAL: \$ 965,600

Net Cost		\$	965,600
Scheduling Contingency 55 %		\$	531,080
Adm/Court Cost 60 %		\$	898,008
TOTAL		\$	<u>2,394,688</u>

Total Cost **\$ 2,394,688 .**

Prepared By: 

Reviewed / Approved: 
Howard P. Copeland
R/W Administrator

Note: Accuracy of estimate is the sole responsibility of the Preparer.

Note: The Market Appreciation(40%) is not included in this Preliminary Cost Estimate.

REVISED: 2-8-08

Cobb & Paulding County Land Sales

<u>Highest & Best Use</u>	<u>Size (acres)</u>	<u>Value/ac</u>	<u>Value/sq.ft.</u>	<u>Sales price</u>
Small Tract Residential	3.000	\$ 16,000	\$ 0.37	\$ 48,000
	3.700	\$ 17,600	\$ 0.40	\$ 65,000
	5.000	\$ 9,400	\$ 0.22	\$ 47,000
Commercial	0.660	\$ 219,700	\$ 5.04	\$ 145,000
	5.000	\$ 94,000	\$ 2.16	\$ 470,000
	7.000	\$ 114,300	\$ 2.62	\$ 800,000

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: CSSTP-0006-00(857), Paulding Co. OFFICE: Cartersville
P.I. No. 0006857

FROM: Kerry D. Bonner, District Utilities Engineer DATE: June 27, 2008

TO: Babs Abubakari, P.E., State Consultant Design & Program Delivery Engineer
ATTN: Nicoe Alexander

SUBJECT: PRELIMINARY UTILITY COST ESTIMATE

We are furnishing you with a Preliminary Utility Cost estimate for each utility with facilities potentially located within the project limits.

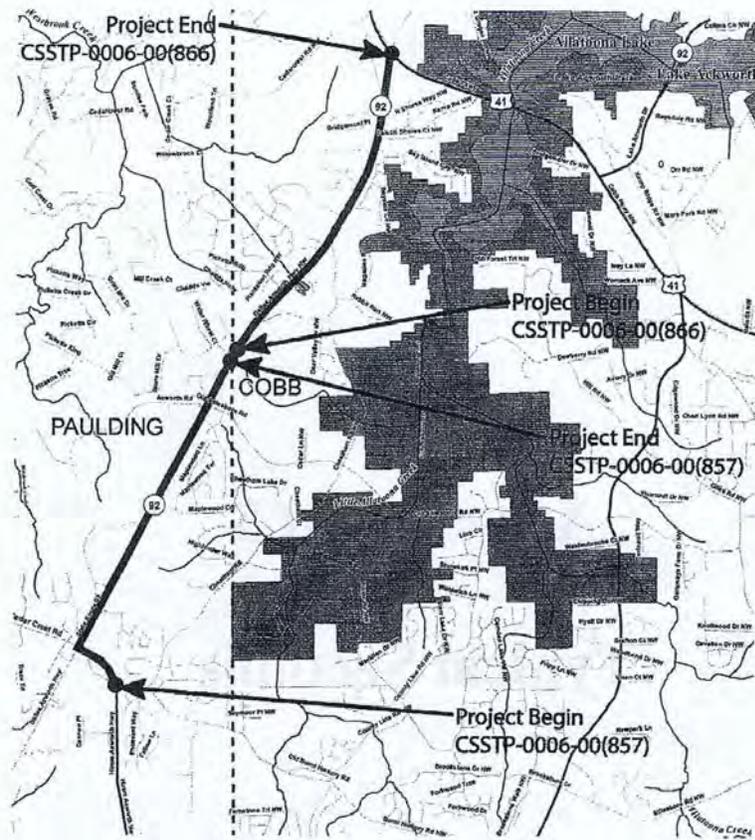
FACILITY OWNER	NON- REIMBURSABLE	REIMBURSABLE	LOCAL GOVT. COST
Atlanta Gas Light Company	\$ 1,058,775.00		
AT&T Georgia (BST)	\$ 300,000.00	\$ 250,000.00	
Comcast Communications	\$ 56,441.00		
Paulding County Water			\$3,350,000.00
Cobb EMC	\$ 120,000.00		
Totals	\$ 1,535,216.00	\$250,000.00	\$3,350,000.00

Total Preliminary Utility Cost Estimate \$5,135,216.00

If you have any questions, please contact Jennifer Deems at 770-387-3616.

KDB/d

C: Jeff Baker, P. E., State Utilities Engineer;
Jamie Simpson, Financial Management
Bill Dungan, Area Engineer
File/Estimating Book



PROJECT LOCATION MAP
 Project: CSSTP-0006-00(857) & CSSTP-0006-00(866)
 Paulding County and Cobb County
 PI 0006857 & PI 0006866

**Design (2032) Year No-Build and Build Analysis
AM & PM Design Hour Intersection Level of Service / Delay (sec)**

Location	2032 No-Build		2032 Build	
	AM	PM	AM	PM
SR 92 & US 41/Cobb Parkway (Signalized)	F / 235	F / 371	F / 188	F / 261
SR 92 & Acworth/Dallas Road Eastbound Stopped Movements	F / 341	F / Err	F / 86	F / 738
SR 92 & Bridgemont Place Eastbound Stopped Movements	F / 525	F / 403	B / 12	C / 23
SR 92 & North Shores Road Westbound Stopped Movements	F / Err	F / Err	F / Err	F / Err
SR 92 & Deer Springs Eastbound Stopped Movements	F / 699	F / 871	B / 13	C / 24
SR 92 & Bay Harbor Westbound Stopped Movements	F / 610	F / 281	F / 53	B / 14
SR 92 & Silver Lace Lane Eastbound Stopped Movements	F / 833	F / 397	B / 12	C / 24
SR 92 & Bay Side Drive Westbound Stopped Movements	F / 420	F / 222	F / 119	E / 47
SR 92 & Cheatham Road Eastbound Stopped Movements	F / Err	F / 850	F / Err	F / 143
SR 92 & Autumn View Eastbound Stopped Movements	F / Err	F / Err	B / 14	C / 23
SR 92 & Picketts Ridge Eastbound Stopped Movements	F / Err	F / Err	F / 1013	F / Err
SR 92 & Picketts Mill Eastbound Stopped Movement	F / 130	F / Err	F / 51	F / 154
SR 92 & Grist Mill Eastbound Stopped Movement	F / 190	F / 241	B / 13	C / 19
SR 92 & Acworth Road/Old Stilesboro Eastbound Stopped Movements	F / Err	F / Err	F / Err	F / Err
SR 92 & Acworth Road/Old Stilesboro Westbound Stopped Movements	F / Err	F / Err	F / Err	F / Err
SR 92 & Old Dallas Acworth Eastbound Stopped Movement	F / 239	F / 536	E / 43	F / 228
SR 92 & Cedarcrest (Signalized)	F / 324	F / 1006	F / 204	F / 156
SR 92 & Old Burnt Hickory Road Westbound Stopped Movements				

** Err – Volume greatly exceeds capacity, methodology to calculated delay not available*

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**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**
Office of Consultant Design and Program Delivery
PROJECT CONCEPT REPORT
Project Numbers: CSSTP -0006-00(857) and CSSTP -0006-00(866)
County: Paulding & Cobb
P. I. Numbers: 0006857 and 0006866

Federal Route Number: N/A
State Route Number: 92

Cobb County, Georgia
Paulding County, Georgia



m

Recommendation for approval:

DATE _____

 Project Manager

DATE _____

 State Consultant Design Engineer

The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Program (RTP) and the State Transportation Improvement Program (STIP).

DATE _____

 State Transportation Planning Administrator

DATE _____

 State Transportation Financial Management Administrator

DATE _____

 State Environment/Location Engineer

DATE _____

 State Traffic Safety and Design Engineer

DATE _____

 District 7 Engineer

DATE _____

 Project Review Engineer

DATE _____

 State Bridge and Structural Design Engineer

Project Concept Report page 3
Project Number: CSSTP -0006-00(857) and CSSTP -0006-00(866)
P. I. Number: 0006857 and 0006866
County: Paulding & Cobb
Need and Purpose:

The purpose of State Route 92 (SR 92) corridor improvements proposed for the segment extending from Old Burnt Hickory Road in Paulding County to U.S. 41 in Cobb County is to:

- Alleviate traffic congestion; accommodate the need for mobility, access, and goods movement; and better accommodate future travel demand through the addition of a travel lane and auxiliary lanes;
- Facilitate more efficient and safe operation of SR 92 through the addition of a median, which will restrict left turn movements to median openings and, thus, better manage traffic flow;
- Address unsafe driving conditions, such as inadequate stopping sight distance by correction of geometric deficiencies along SR 92, where appropriate/feasible; and
- Provide improved transportation options for the traveling public; through the addition of sidewalks.

History

SR 92 is a vital east-west corridor through Cobb and Paulding Counties providing access to I-75 as well as US 41. The overall project objective is to create a more efficient and safer transportation facility for the citizens of Cobb and Paulding Counties while meeting the capacity demands of future traffic along the SR 92 corridor. Mobility and access will be improved by the addition of travel lanes, while operational efficiency and safety will be improved by the addition of a median with turn lanes. The roadway will be made safer by improving the vertical and horizontal alignment. The proposed improvements will also improve sight distance. The project will improve pedestrian safety by adding sidewalks and crosswalks.

Description of the proposed project:

Existing

Currently, SR 92 between Hiram Acworth Highway/Old Burnt Hickory Road and US 41/SR 3/Cobb Parkway consists of two 12-foot lanes (one lane in each direction) with auxiliary left and right turn lanes and curb and gutter intermittently throughout the corridor, areas without curb and gutter have rural shoulders that vary from 0 to 2 feet. The existing right-of-way is approximately 100 feet. The posted speed limit is 45 mph throughout the corridor.

Proposed

Projects CSSTP-0006-00(857) and Project CSSTP-0006-00(866) propose to widen and reconstruct SR 92/Dallas Acworth Highway from a 2-lane facility to a divided 4-lane facility with 12-foot lanes, a raised concrete median 20 feet in width, 16-foot shoulders with curb and gutter and 5-foot sidewalks. The proposed right-of-way varies from 100 to 135 feet. The total length of the proposed projects is 4.42 miles and is located within Paulding and Cobb Counties. Project CSSTP-0006-00(857), SR 92/Dallas Acworth Highway from CR 73/Old Burnt Hickory Road (Mile Post 16.063) to Picketts Mill Place (Mile Post 18.406) is located entirely in Paulding County. Project CSSTP-0006-00(866) SR 92/Dallas Acworth Highway from Picketts Mill Place (Mile Post 18.406/Mile Post 0.000) to US 41/SR 3/Cobb Parkway (Mile Post 2.075) is located entirely in Cobb County.

Termini

The southern terminus of this proposed project is the T-intersection of CR 73/Old Burnt Hickory Road and SR 92/Hiram Acworth Highway. The State Route designation for SR 92 continues southbound along Hiram Acworth Highway, also an Urban Minor Arterial. Southbound traffic traveling along SR 92/Hiram Acworth Highway can continue south into Hiram, Georgia or turn left/east onto CR 73/Old Burnt Hickory Road bound for residential destinations.

The northern project terminus of the proposed project is the four-way intersection of SR 92/Dallas Acworth Highway and US 41/SR 3/Cobb Parkway. US 41/SR 3/Cobb Parkway is a four-lane Urban Minor Arterial. To the north of the intersection Dallas Acworth Highway becomes Awtreys Church Road a two-lane Urban Local Street. The State Route designation for SR 92 follows US 41/SR 3/Cobb Parkway east to Lake Acworth Drive. Northbound traffic can turn left onto US 41/SR 3/Cobb Parkway and proceed north into Cobb County towards Emerson, Georgia. Northbound traffic can go straight onto Awtreys Church Road and proceed east for local and residential destinations in Cobb County. Northbound traffic can turn right onto US 41/SR 3/Cobb Parkway and proceed south into Cobb County towards Marietta, Georgia. The existing typical section of SR 92 north of the proposed project terminus is sufficient to handle the projected design year ADT (2032) without further improvements.

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

The State Route 92 (SR 92) corridor improvements project is comprised of two projects, project CSSTP-0006-00(857) in Paulding County and Project CSSTP-0006-00(866) in Cobb County. Both of these projects propose to widen and reconstruct SR 92/Dallas Acworth Highway from a 2-lane facility to a divided 4-lane facility. The ARC Project number for Project CSSTP-0006-00(857) in Paulding County is PA-092E. The model description for PA-092E is Metro Arterial Connector – SR 92 (Dallas Acworth Highway) from Cedercree Road to Cobb County line north of Old Stilesboro Road – Design phase will include access management plan. The open traffic year for PA-092E is 2020. The ARC project number for project CSSTP-0006-00(866) in Cobb County is CO-329. The model description for CO-329 is Metro Arterial Connector – SR 92(Dallas Acworth Highway) from Paulding County Line to US

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Project Number: CSSTP -0006-00(857) and CSSTP -0006-00(866)

P. I. Number: 0006857 and 0006866

County: Paulding & Cobb

41(North Cobb Parkway). The open traffic year for CO-329 is 2012. The open to traffic year for CO-311 is 2012. The roadway widening project now extends approximately 2000 feet south on SR 92 to the T-intersection of CR 73/Old Burnt Hickory Road due to the findings of the traffic study and approved logical termini document from FHWA. A STIP modification will be made to update the ARC model to match the new termini of the project.

PDP Classification: Major X Minor _____

Federal Oversight: Full Oversight (), Exempt(X), State Funded(), or Other ()

Functional Classification: Urban Principal Arterial

U. S. Route Number(s): NA **State Route Number(s):** 92

Traffic (AADT):

Current Year: (2007) 19,380 Design Year: (2032) 35,960

Existing design features:

- Typical Section:
Currently, State Route 92 (SR 92) corridor improvements proposed for the segment extending from Old Burnt Hickory Road in Paulding County to U.S. 41 in Cobb County consist of two twelve-foot lanes (one lane in each direction) with turn lanes and curb and gutter intermittently throughout the corridor.
- Posted speed 45 mph Minimum radius for curve: 550'
- Maximum super-elevation rate for curve: 8 %
- Maximum mainline grade: 6 %
- Maximum cross road grade: 6 %
- Maximum driveway grade: 10 %
- Width of right-of-way: 100 ft.
- Major structures: None
- Major interchanges or intersections along the project: None
- Project CSSTP-0006-00(857), SR 92/Dallas Acworth Highway from CR 73/Old Burnt Hickory Road (Mile Post 16.063) to Picketts Mill Place (Mile Post 18.406) is located entirely in Paulding County. Project CSSTP-0006-00(866) SR 92/Dallas Acworth Highway from Picketts Mill Place (Mile Post 18.406/Mile Post 0.000) to US 41/SR 3/Cobb Parkway (Mile Post 2.075) is located entirely in Cobb County. The total length of project is 4.42 miles.

Proposed Design Features:

- Proposed typical section:

The project proposed to widen and reconstruct SR 92/Dallas Acworth Highway from a 2-lane facility to a divided 4-lane facility with 12-foot lanes, a raised concrete median 20 feet in width, 16-foot shoulders with curb and gutter and 5-foot sidewalks.

- Design Speed Mainline 45 mph
- Proposed Maximum grade Mainline 6 % Maximum grade allowable 6 %
- Proposed Maximum grade Side Street 9 % Maximum grade allowable 9 %
- Proposed Maximum grade driveway 22 %
- Proposed Minimum radius of curve 750' Minimum radius allowable 711'
- Right-of-Way
 - Width 100 to 135 Feet
 - Easements: Temporary (), Permanent (X), Utility (), Other ().

Project Concept Report page 5
 Project Number: CSSTP -0006-00(857) and CSSTP -0006-00(866)
 P. I. Number: 0006857 and 0006866
 County: Paulding & Cobb

- o Type of access control: Full (), Partial (), By Permit (X), Other ().
- o PI 0006857
 Number of parcels: 74 Number of displacements:
 - o Business: 0
 - o Residences: 0
 - o Mobile homes: 0
 - o Other: 0
- o PI 0006866
 Number of parcels: 82 Number of displacements:
 - o Business: 0
 - o Residences: 0
 - o Mobile homes: 0
 - o Other: 0

- Structures: 550-foot MSE retaining wall, varying in height to a maximum of 25- feet. Located at Station 227+00 on the left side. This wall is located within project CSSTP-0006-00(866) and in Cobb County.
- Major intersections and interchanges: None
- Traffic control during construction:
 The proposed project can be staged to allow for a minimum of two lanes of traffic to remain open during all stages of construction.

• Design Exceptions to controlling criteria anticipated:

	<u>UNDETERMINED</u>	<u>YES</u>	<u>NO</u>
HORIZONTAL ALIGNMENT:	()	()	(X)
ROADWAY WIDTH:	()	()	(X)
SHOULDER WIDTH:	()	()	(X)
VERTICAL GRADES:	()	()	(X)
CROSS SLOPES:	()	()	(X)
STOPPING SIGHT DISTANCE:	()	()	(X)
SUPERELEVATION RATES:	()	()	(X)
HORIZONTAL CLEARANCE:	()	()	(X)
SPEED DESIGN:	()	()	(X)
VERTICAL CLEARANCE:	()	()	(X)
BRIDGE WIDTH:	()	()	(X)
BRIDGE STRUCTURAL CAPACITY:	()	()	(X)

- Design Variances: A design variance for the distance between median openings may be required.
- Environmental concerns:
 - o U. S. Army Corps of Engineers Section 404 Permit. Surveys to characterize and identify the extent of Jurisdictional Waters of the U.S. within the area of potential effect resulted in the identification of 18 streams, seven ephemeral drainages, three wetlands, and four open water. Impacts to several of these resources are likely to occur.
 - o Informal Section 7 Coordination for potential impacts to the Georgia aster (*Aster georgianus*), Michaux's sumac (*Rhus michauxii*), and white fringeless orchid (*Platanthera integrilabia*).
 - o Migratory Bird Treaty Act (MBTA)--Impacts to migratory bird species would be reduced by including Special Provision 107.23G for protection migratory birds.
 - o One National Register eligible resource is located at 9945 Dallas Acworth Highway and two National Register eligible resources are located at 39 Dallas Acworth Highway.
- Level of environmental analysis:
 - o Arc Time Savings Procedures appropriate? Yes (X), No (),
 - o Categorical exclusion (X),
 - o Environmental Assessment/Finding of No Significant Impact (FONSI) (), or
 - o Environmental Impact Statement (EIS) ().
- Utility involvements:
 - o Power- Cobb EMC,
 - o Water- Cobb County, Cobb County Marietta, Paulding Water

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Project Number: CSSTP -0006-00(857) and CSSTP -0006-00(866)

P. I. Number: 0006857 and 0006866

County: Paulding & Cobb

- o Sewer- Cobb County, Cobb County Marietta, Paulding Water
- o Gas- AGL
- o Telephone – AT&T
- o Fiber - AT&T
- o Cable – Comcast

VE Study Required Yes(X) No ()

Project responsibilities:

- o Design – URS Corporation
- o Right-of-Way Acquisition - GDOT
- o Relocation of Utilities - GDOT
- o Letting to contract - GDOT
- o Supervision of construction - GDOT
- o Providing material pits - Contractor
- o Providing detours – None Anticipated

Coordination

- The ICTM for this project was held on April 8, 2008 at the main office of GDOT.
- The concept team meeting has not been scheduled at this time
- No PAR meeting date has been set.
- No FEMA, USCG, and/or TVA meetings have been held.
- Public involvement

A total of 156 people attended the Public Information Open House held for the subject project on June 3, 2008. From those attending, 31 comment forms, 1 letter and 3 verbal statements were received. An additional 7 comments were received during the ten-day comment period following the public information open house. A total of 42 comments were received. This total includes duplicate comments from 1 respondent; however, their positions on the project has only been counted once in the following summary:

Number opposed – 5, Number in support- 15, number uncommitted – 4, and number conditional – 15.

Major concerns included: citizens recognize a need for signalization and left turn lanes at various points throughout the corridor, particularly at the schools and subdivisions. Citizens are concerned with raised median and access to properties along the corridor. Citizens are concerned with the issue of compensation and how the project will negatively affect the value of their property or business.

Officials attending included the following: Scott Greene – Paulding County DOT, Jerry Shearin – Paulding County Board of Commissioners, David A. Jackson – Cobb DOT

- Other projects in the area
 - o CSSTP-0006-00(862), PI 0000862, SR 92 (Lake Acworth Drive/Cowan Road) from US 41 (North Cobb Parkway) to Cowan Road at I-75 North widening from two lanes to four lanes. (Construction 2012)
 - o CSSTP-0007-00(692), PI No 0007692 – SR 92 FM SR 120 TO CR 473/CEADARCREST ROAD - SEGMENT 3 & 4 (Construction 2012) This project proposed to widen SR 92 from two to 4-lanes.
- Railroads - none

Scheduling – Responsible Parties' Estimate

- Time to complete the environmental process: 9 Months.
- Time to complete preliminary construction plans: 13 Months.
- Time to complete right-of-way plans: 3 Months.
- Time to complete the Section 404 Permit: 6 Months.
- Time to complete final construction plans: 12 Months.
- Time to complete to purchase right-of-way: 24 Months.
- List other major items that will affect the project schedule: 0 Months.

Other alternates considered:

Typical Section Alternatives:

All alternatives considered, except for the no-build alternative, propose widening and reconstruction of SR 92 between Hiram Acworth Highway/Old Burnt Hickory Road and US 41/SR 3/Cobb Parkway from 2-lanes undivided to 4-lanes divided

Alternative 1: This alternative is a 4-lane typical section with four 12-foot travel lanes (2-lanes in each direction), a 20-

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Project Number: CSSTP -0006-00(857) and CSSTP -0006-00(866)
P. I. Number: 0006857 and 0006866
County: Paulding & Cobb

foot raised concrete median and 16-foot outside shoulders with curb and gutter and sidewalks provided throughout the project limits. This is the preferred Alternative.

Alternative 2: No Build – Does not meet the Need and Purpose of the project.

Alignment Alternatives:

Alternative 1: This alternative is to widen existing SR 92 symmetrically along the existing alignment. This alternative minimizes impacts to environmental resources, as well as right of way impacts. This is the preferred Alternative.

Alternative 2: This alternative proposes to widen existing SR 92 to the south in order to avoid utility conflicts on the north side of the project. This will result in an asymmetrical widening, which causes greater impacts to right of way, additional displacements and impacts to existing historical resources.

Alternative 3: No Build – Does not meet the Need and Purpose of the project.

Attachments:

1. Cost Estimates:
 - a. Construction including E&C,
 - b. Right-of-Way, and
 - c. Utilities
2. Sketch location map,
3. Typical sections,
4. Accident summaries,
5. Capacity analysis,
6. Minutes of Initial Concept and Concept meetings,
7. RTP Plan for ARC Project Numbers CO-329 and PA-092E
8. Conforming plan's network schematics showing thru lanes for RTP Plan for ARC Project Numbers CO-329 and PA-092E
9. Traffic Diagrams
10. Logical Termini Documentation(not included in this draft)

VALUE ENGINEERING PROCESS

This report summarizes the analysis and conclusions by the PBS&J Value Engineering team as they performed a VE Study during the period of March 2 through March 5, 2009 in Atlanta, Georgia, for the Georgia Department of Transportation.

INTRODUCTION

The Value Engineering Study team and its leadership were provided by PBS&J. This VE Team consisted of the following:

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

The Value Engineering Team followed the Seven Step Value Engineering job plan as promulgated by SAVE International. This Seven Step job plan includes the following:

- **Investigation/Information Phase** – during this phase of the VE Team’s work, the team received a briefing from the Georgia Department of Transportation (GDOT) staff and from URS Engineering. 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 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 entitled **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 by the VE Team to help focus their week of work. 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. This was accomplished by reviewing the project from the simplest format in asking the questions of “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 which distinguishes a Value Engineering effort from a potentially damaging cost cutting exercise.
- The important functions of the project were identified as follows:

- **Project Objective/Goals**
 - **Improve Level of Service**
 - **Improve safety**
 - **Accommodate economic growth**
 - **Maintain reasonable schedule**
 - **Reduce construction costs**
- **Project Basic Functions**
 - **Separate traffic**
 - **Increase capacity**
 - **Reduce conflicts**
 - **Improve pavement**
- **Speculation Phase** - The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
 - **Add travel lanes**
 - **Reduce right-of way taking**

This brainstorming session initially identified numerous ideas that were then evaluated in the Judgment phase. The reader will find the creative worksheets enclosed. These same work sheets were also used to record the results of the Judgment/Evaluation Phase.

- **Evaluation Phase** – Once the VE Team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Evaluation or Judgment 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 selected ideas that they believed would improve the project by a vote process.

Following that selection 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:

- Construction cost savings
- Improve value
- Maintainability
- Ability to implement the idea
- General acceptability of the alternatives
- Constructability
- Scheduling delays

Based on these criteria, the VE Team evaluated the alternatives and graded them from 5 (Excellent) down to 1 (Poor). Other notes about the alternatives are annotated at the bottom of the enclosed creative and evaluation sheets.

- **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 – Study Results)

- **Recommendation Phase** – During this phase the VE Team reviews the alternative ideas to confirm which ones are appropriate for the project, have an opportunity for success and which will improve the value of the project if implemented.

- **Presentation Phase** – As noted earlier, the team made an informal “out-briefing” on the last day of the workshop, designed to inform the Owners and the Designers of the initial findings of the VE Study. This written report is intended to formalize those findings.

The following **Function – Worth - Cost** Analysis, was utilized to focus the team and stimulate brainstorming; a copy of the **Attendance Sheets** is also attached so that the reader can be informed about who participated in the Study proceedings.

VALUE ENGINEERING STUDY AGENDA
for
Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties
March 2-5, 2009

Pre-Workshop Activities

VE Team Leader organizes study, coordinates with the Owner and Designer the project objectives and materials necessary. The VE Team receives and reviews all project documents. The team develops a Pareto Chart and/or Cost Model for the project.

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 & project goals

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

- Review design team’s presentation
- Review agenda and goals of the study
- VE Team Site Visit if time allows

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 & 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

FUNCTION ANALYSIS AND COST-WORTH



Georgia Department of Transportation
CSSTP-0006-00(857) – P.I. No. 0006857
Paulding County

SHEET NO.: **1 of 2**

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
1	OVERALL PROJECT	Increase	Traffic Capacity	B	16,459	13,000	CW=1.26
		Reduce	Congestion	B			
		Enhance	Safety	S			
2	ASPHALT PAVING	Create	Lanes	B	5,335	3,000	C/W=1.77
		Increase	Capacity	B			
		Enhance	Safety	RS			
3	RIGHT-OF-WAY	Accommodate	Widening	B	2,395	1,500	C/W=1.59
		Facilitate	Utilities	RS			
4	MEDIANS	Separate	Traffic	S	1,316	900	C/W=1.46
		Enhance	Safety	S			
5	DRAINAGE	Convey	Storm Water	S	854	854	C/W=1.0
6	CURB & GUTTER	Route	Storm water	S	758	700	C/W=1.08
7	OTHER CONCRETE PAVING	Enhance	Project Operations	S	711	711	C/W=1.0

Function defined as: Action Verb
 Measurable Noun

Kind: B = Basic
 S = Secondary
 RS = Required Secondary
 HO = Higher Order
 LO = Lower Order

Cost/Worth Ratio =
 (Total Cost ÷ Basic Worth)

FUNCTION ANALYSIS AND COST-WORTH



Georgia Department of Transportation
CSSTP-0006-00(857) – P.I. No. 0006857
Paulding County

SHEET NO.: **2 of 2**

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
8	GRADING & EARTHWORK	Prepare	Alignment	B	710	710	C/W=1.0
		Control	Erosion	S			
9	BASE	Support	Road	S	677	600	CW=1.12
10	RETAINING WALLS	Stabilize	Earthwork	S	646	500	C/W=1.35
11	SIDEWALKS	Enhance	Safety	S	504	400	C/W=1.26
12	EROSION CONTROL-	Stabilize	Earthwork	S	391	391	C/W=1.0
13	TRAFFIC CONTROL	Facilitate	Safe Construction	S	300	300	C/W=1.0
14	TRAFFIC SIGNALS	Enhance	Safety	S	217	217	C/W=1.0
		Reduce	Congestion	S			
14	FIELD ENGINEER'S OFFICE	Oversee	Construction	S	70	70	C/W=1.0
14	SIGNING & MARKING	Enhance	Safety	S	68	68	C/W=1.0

Function defined as: Action Verb
 Measurable Noun

Kind: B = Basic HO = Higher Order
 S = Secondary LO = Lower Order
 RS = Required Secondary

Cost/Worth Ratio =
 (Total Cost ÷ Basic Worth)

FUNCTION ANALYSIS AND COST-WORTH



Georgia Department of Transportation
CSSTP-0006-00(866) – P.I. No. 0006866
Cobb County

SHEET NO.: **1 of 2**

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
1	OVERALL PROJECT	Increase	Traffic Capacity	B	14,114	12,000	CW=1.17
		Reduce	Congestion	B			
		Enhance	Safety	S			
2	ASPHALT PAVING	Create	Lanes	B	4,489	3,000	C/W=1.49
		Increase	Capacity	B			
		Enhance	Safety	RS			
3	RIGHT-OF-WAY	Accommodate	Widening	B	1,727	1,500	C/W=1.14
		Facilitate	Utilities	RS			
4	MEDIANS	Separate	Traffic	S	1,113	900	C/W=1.23
		Enhance	Safety	S			
5	RETAINING WALLS	Support	Load	S	798	500	C/W=1.59
6	BASE	Support	Road	S	677	600	CW=1.12
7	OTHER CONCRETE PAVING	Enhance	Project Operations	S	581	581	C/W=1.0

Function defined as: Action Verb
 Measurable Noun

Kind: B = Basic
 S = Secondary
 RS = Required Secondary
 HO = Higher Order
 LO = Lower Order

Cost/Worth Ratio =
 (Total Cost ÷ Basic Worth)

FUNCTION ANALYSIS AND COST-WORTH



Georgia Department of Transportation
CSSTP-0006-00(866) – P.I. No. 0006866
Cobb County

SHEET NO.: **2 of 2**

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
8	CURB & GUTTER	Route	Storm water	S	562	500	C/W=1.12
9	SIDEWALKS	Enhance	Safety	S	419	300	C/W=1.39
10	EROSION CONTROL-	Stabilize	Earthwork	S	316	316	C/W=1.0
	DRAINAGE	Convey	Storm Water	S	254	254	C/W=1.0
11	TRAFFIC SIGNALS	Enhance	Safety	S	217	217	C/W=1.0
		Reduce	Congestion	S			
12	TRAFFIC CONTROL	Facilitate	Safe Construction	S	114	114	C/W=1.0
14	SIGNING & MARKING	Enhance	Safety	S	39	39	C/W=1.0

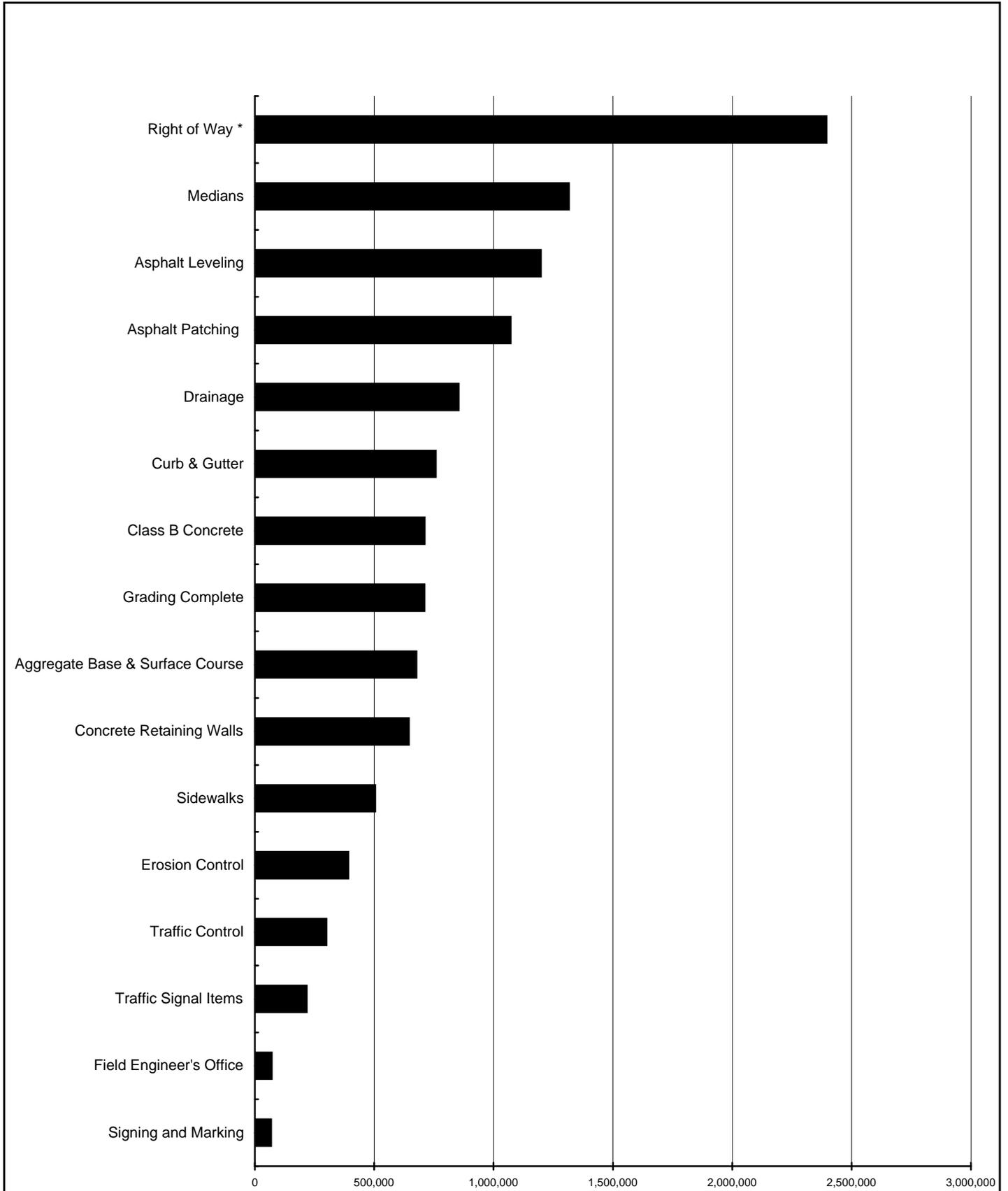
Function defined as: Action Verb
 Measurable Noun

Kind: B = Basic HO = Higher Order
 S = Secondary LO = Lower Order
 RS = Required Secondary

Cost/Worth Ratio =
 (Total Cost ÷ Basic Worth)

PARETO CHART - COST HISTOGRAM

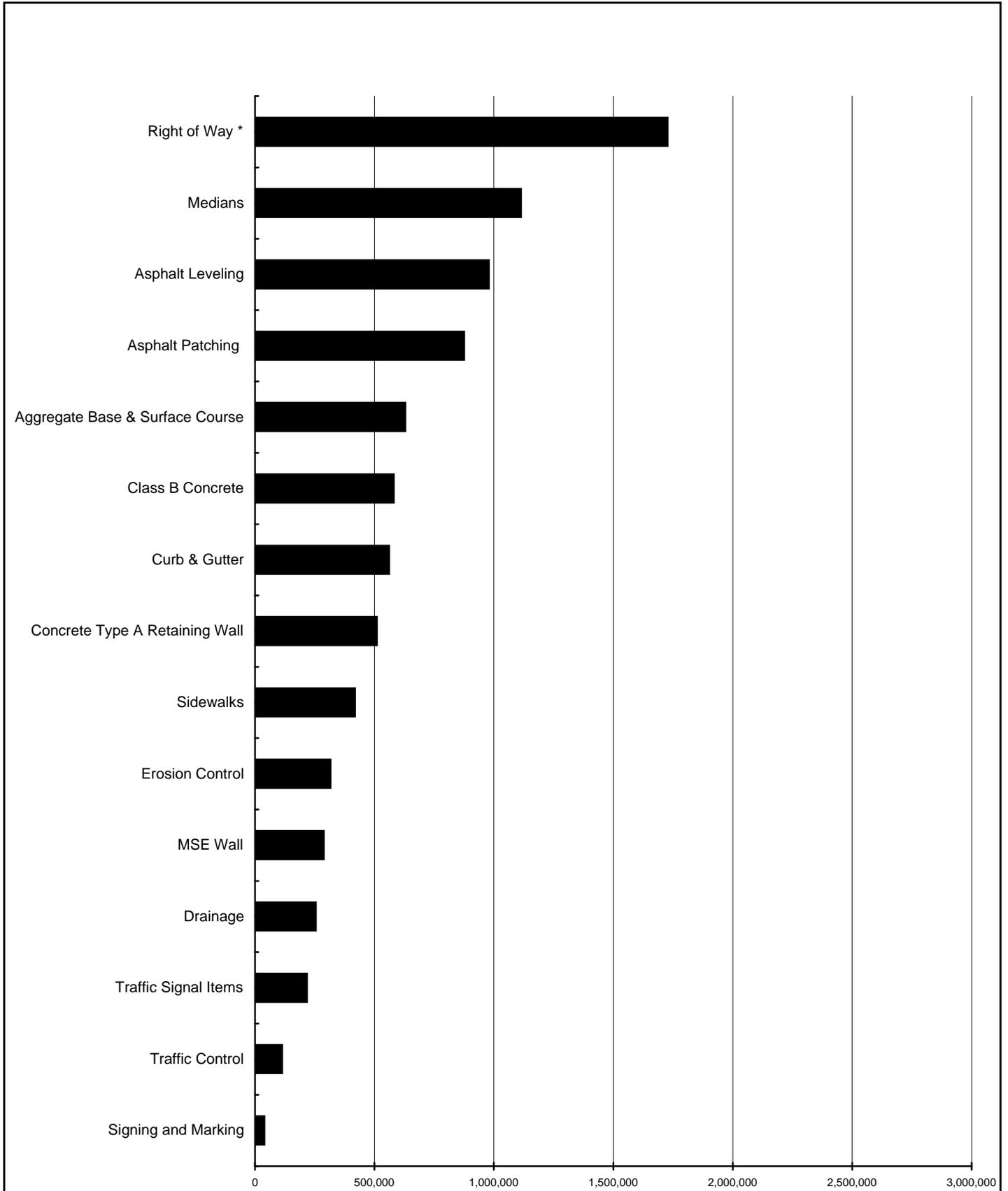
PROJECT: Georgia Department of Transportation CSSTP-0006-00(857) – P.I. No. 0006857 Paulding County			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Superpave Asphalt	3,064,759	24.40%	24.40%
Right of Way *	2,394,688	19.07%	19.07%
Medians	1,315,642	10.48%	34.88%
Asphalt Leveling	1,198,086	9.54%	44.42%
Asphalt Patching	1,071,810	8.53%	52.95%
Drainage	854,326	6.80%	59.76%
Curb & Gutter	757,985	6.04%	65.79%
Class B Concrete	711,397	5.66%	71.46%
Grading Complete	710,478	5.66%	77.11%
Aggregate Base & Surface Course	677,199	5.39%	82.50%
Concrete Retaining Walls	645,520	5.14%	87.64%
Sidewalks	504,246	4.02%	91.66%
Erosion Control	391,251	3.12%	94.77%
Traffic Control	300,000	2.39%	97.16%
Traffic Signal Items	217,230	1.73%	98.89%
Field Engineer's Office	70,579	0.56%	99.46%
Signing and Marking	68,408	0.54%	100.00%
*Subtotal not including Utilities or Right of Way	\$ 12,558,916		
E & C Rate @10	\$ 1,255,892		
Inflation Rate 0%	\$ -		
Subtotal =	\$ 13,814,808		
Total Construction Cost =	\$ 13,814,808		
Reimb. Utilities =	\$ 250,000		
Right-of-Way	\$ 2,394,688		
TOTAL	\$ 16,459,496		



PARETO CHART - COST HISTOGRAM



PROJECT: Georgia Department of Transportation CSSTP-0006-00{857) – P.I. No. 0006866 Widening and Reconstruction of SR 92 Cobb County			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Superpave Asphalt	2,634,769	23.40%	23.40%
Right of Way *	1,726,973	15.34%	38.73%
Medians	1,113,396	9.89%	48.62%
Asphalt Leveling	978,820	8.69%	57.31%
Asphalt Patching	875,633	7.78%	65.09%
Aggregate Base & Surface Course	629,761	5.59%	70.68%
Class B Concrete	581,121	5.16%	75.84%
Curb & Gutter	561,739	4.99%	80.83%
Concrete Type A Retaining Wall	509,987	4.53%	85.36%
Sidewalks	418,882	3.72%	89.08%
Erosion Control	316,332	2.81%	91.89%
MSE Wall	288,405	2.56%	94.45%
Drainage	254,341	2.26%	96.71%
Traffic Signal Items	217,230	1.93%	98.64%
Traffic Control	114,067	1.01%	99.65%
Signing and Marking	39,354	0.35%	100.00%
*Subtotal not including Utilities or Right of Way	\$ 11,260,810		
E & C Rate @10	\$ 1,126,081		
Inflation Rate 0%	\$ -		
Subtotal =	\$ 12,386,891		
Total Construction Cost =	\$ 12,386,891		
Reimb. Utilities =	\$ -		
Right-of-Way	\$ 1,726,973		
TOTAL	\$ 14,113,864		



DESIGNER PRESENTATION



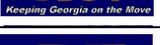
MEETING PARTICIPANTS

Geogia Department of Transportation		March 2, 2009	
CSSTP-0006-00(857)(858) - P.I. No. 0006857 & 0006866 - Cobb and Paulding Counties			
NAME	ORGANIZATION & TITLE	E-MAIL	PHONE
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Kenny Beckworth	 GDOT	kbeckworth@dot.ga.gov	770-332-3609
N. Raad	 GDOT-Traffic Operations	nraad@dot.ga.gov	404-635-8126
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Randy Thomas, CVS	 PBSJ	rsthomas@pbsj.com	770-883-1545
Kevin Martin, Esq., AVS	 PBSJ	klmartin@pbsj.com	205-969-3776

VE TEAM PRESENTATION



MEETING PARTICIPANTS

Georgia Department of Transportation		March 5, 2009		
CSSTP-0006-00(857)(858) - P.I. No. 0006857 & 0006866 - Cobb and Paulding Counties				
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N. Raad		GDOT-Traffic Operations	nraad@dot.ga.gov	404-635-8126
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Kevin Martin, Esq., AVS		PBSJ	klmartin@pbsj.com	205-969-3776

CREATIVE IDEA LISTING



**PROJECT: Georgia Department of Transportation
CSSTP-0006-00(857)(866) – P.I. No. 0006857 and 0006866
Widening and Reconstruction of SR 92
Cobb and Paulding Counties**

SHEET NO.: 1 of 2

NO.	IDEA DESCRIPTION	RATING
ROADWAY (RD)		
RD-1	Use 12' Shoulders in-lieu of 16'	4
RD-2	Use 11' travel lanes	1
RD-3	Use one 11' and one 12' traffic lane	4
RD-4	Eliminate MSE wall between sta. 227+ and sta 232+50	4
RD-5	Use raised grass median in-lieu of concrete raised median	5
RD-6	Use a 5 lane urban section	5
RD-7	Modify profile grade in areas of sag vertical curves	2
RD-8	Reduce median width	2
RD-9	Provide flashing lights at schools	ABD
RD-10	Eliminate sidewalks in selected areas.	5
RD-11	Eliminate all sidewalks	1
RD-12	Eliminate sidewalks on one side	2
RD-13	Obtain Design Exception in-lieu of eliminating sag vertical curve correction	4
RD-14	Bifurcate roadway where possible	1
RD-15	Salvage existing pavement where possible	3
RD-16	Review/modify intersection alignment at SR 92 and US 41	3
RD-17	Review/modify select intersection alignments	DS
RD-18	Construct a 44' depressed greased median w/rural section	1
RD-19	Use a multi-use trail in-lieu of sidewalks	1
RD-20	Use a triple left turn lane from US 41 onto SR 92 and dual right turn lanes with acceleration lanes onto SR 92 southbound	3
RD-21	Eliminate outside curb and gutter	3
RD-22	Install loop detectors in the beginning of the turn bay in-lieu of the end of the bay	3
RD-23	Use AC in-lieu of concrete paving in medians	2

**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**

