

VALUE ENGINEERING MOD 1 TRAINING REPORT

SR 120 / Roswell Road
From SR 120 Alt to Bridgegate Drive

Project No. STP00-0114-01(072)

Cobb County

PI No. 721310

February 18, 2009

OWNER:



Georgia Department of Transportation
600 West Peachtree Street
Atlanta, GA 30308
(404.631.1770)

VALUE ENGINEERING
MOD 1 INSTRUCTOR:



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PI No. 721310

February 18, 2009

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EXECUTIVE SUMMARY

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VALUE ENGINEERING MOD 1 TRAINING REPORT

SR 120 / Roswell Road
From SR 120 Alt to Bridgegate Drive

Project No. STP00-0114-01(072)
Cobb County
PI No. 721310

February 18, 2009

Overview

This report summarizes the results of a value engineering (VE) study for roadway improvements on SR 120 / Roswell Road from SR 120 Alt to Bridgegate Drive in Cobb County. The study was conducted as part of the Mod 1 training session held for select GDOT staff on January 26 to 30, 2009. On Monday, January 26, 2009, the design team gave an overview of the project to the VE team and on Friday, January 30, 2009, the VE Team presented their recommendations.

Improvements to SR 120 / Roswell Road from the SR 120 Loop to Bridgegate Drive are required to provide a facility that will better handle present and future traffic demands in an efficient and safe manner. The roadway will not be able to serve its function as a principal arterial unless improvements are constructed. The current traffic volumes on SR 120 / Roswell Road approach and/or exceed the capacity of a 4 lane roadway.

The project begins at the SR 120 Loop, MP 13.70 and continues east along SR 120 / Roswell Road for approximately 1.82 miles to Bridgegate Drive in Cobb County. The project improvements will expand the existing 5 lane section to a 6 lane section with 11 foot lanes and a raised median varying from 8 to 20 feet. Turn lanes will be provided.

The total estimated construction cost of the project is \$10,600,000.

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

DEVELOPMENT PHASE - EXECUTIVE SUMMARY	
Project: STP00-0114-01(072) Cobb County, P.I. No. 721310- Location: SR 120/Roswell Road Widening	Team: 5 Date: 1/29/2009

This project involves the widening and reconstruction of S.R. 120 in eastern Cobb County, Georgia. The extreme growth in this area has caused traffic volumes to increase to the point where the existing four-lane facility no longer provides an acceptable level of service. This project proposes to widen the roadway to a six-lane urban section with a 20 foot wide, raised median.

The VE team identified five areas of opportunity for project improvement and cost savings. The first area involves the overall reduction in full depth pavement from 24.5 inches to 22.5 inches. The second opportunity area involves the overall reduction in retaining wall area by reducing the outside shoulder width from 16 feet to 12 feet. The third area involves eliminating the curb and gutter for the raised median. As an alternate to this third area, the curb and gutter would be retained, but the concrete median paving would be eliminated and the median could then be grassed or planted. The fourth opportunity area involves using standard strain poles and span wire instead of mast arms at signal locations. A fifth area was investigated which when examined, will require additional construction on a bridge culvert. This will be an additional cost instead of a savings.

The reduction in pavement depth would save \$210,800. Reducing the overall retaining wall area provides a cost savings of \$1,006,700. Eliminating curb and gutter for the raised median would save \$200,300. The alternate of retaining the curb and gutter and utilizing a grassed or planted median would save only \$99,800. Using strain poles and span wires instead of mast arms would save \$638,000. The additional required construction for the bridge culvert will result in an additional cost of \$250,000.

The implementation of these recommendations have the potential to save a total of \$1.81 million or 15.5% of the project cost. Since this project is not programmed for construction funding authorization until fiscal year 2011, there is ample time to implement these changes. In addition, the recommendations do not propose any right of way changes to the existing plan.

STUDY IDENTIFICATION

STUDY IDENTIFICATION

Project: SR 120 / Roswell Road Roadway Improvements	Dates: January 26 - 30, 2009
Location: GDOT HQ – Atlanta, 4th Floor; Conducted as part of Module 1 Training	

VE Team Members

Name:	Position:	Organization:	Telephone:
Jim Simpson	Assistant Office Head	GDOT	631-1605
Lionel Alexander	Design Group Manager	GDOT	631-1911
Bill Ingalsbe	Assistant Office Head	GDOT	631-1884
David Acree	Design Group Manager	GDOT	631-1627
Jan Hilliard	Design Group Manager	GDOT	631-1679

Project Description

Expand the existing five-lane section with a center turn lane to a six-lane section with 11-foot lanes and an 8-foot to 20 foot raised median from SR 120 Loop to East Piedmont Road with turn lanes as required. In addition, the project proposes to widen the existing four-lane section divided with median to six-lane section divided median from East Piedmont to Bridgegate Drive.

Project Constraints

ROW is 80% purchased and access control has been established. The cemetery and campground are also ROW constraints.

Figure 1
Project Vicinity Map



County Map of Georgia

VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP00-0114-01(072) Cobb County, P.I. No. 721310-			
Idea No.: A-4	Sheet No.: of	CREATIVE IDEA: Reduce pavement depth for proposed full depth pavement structure	
Comp By: JSS Date: 1/28/09		Checked By:	Date:
<p><u>Original Concept:</u> Proposed pavement depth of 24.5 inches: 1.5" 12.5MM 3" 19MM 8" 25MM 12" G.A.B.</p> <p><u>Proposed Change:</u> Reduce pavement depth to 22.5 inches: 1.5" 12.5MM 2" 19MM 7" 25MM 12" G.A.B.</p> <p><u>Justification:</u> Current proposed pavement structure is a 5.4% overdesign. Reducing the pavement depth to 22.5 inches provides an underdesign of 6.7% which should still be acceptable, thus saving costs.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	\$1,036,200		
Proposed	\$825,400		
Savings	\$210,800		
<u>FUTURE COST:</u> Savings			\$210,800
TOTAL PRESENT WORTH SAVINGS			

SKETCH

Project: SR 120 / ROSWELL ROAD
WIDENING
P.I. 721310

Idea No.: A-4
Client:
Sheet 1 OF 1



REDUCE 19 MM SUPERPAVE TO 2" THICKNESS

REDUCE 25 MM. SUPERPAVE TO 7" THICKNESS

OVERALL STRUCTURAL VALUE

WOULD BE 5.70 INSTEAD OF 6.44

REQUIRED SN = 6.11

PROPOSED CHANGE PROVIDES

6.7% UNDERDESIGN VS.

5.4% OVERDESIGN AS CURRENTLY

PROPOSED IN PLANS

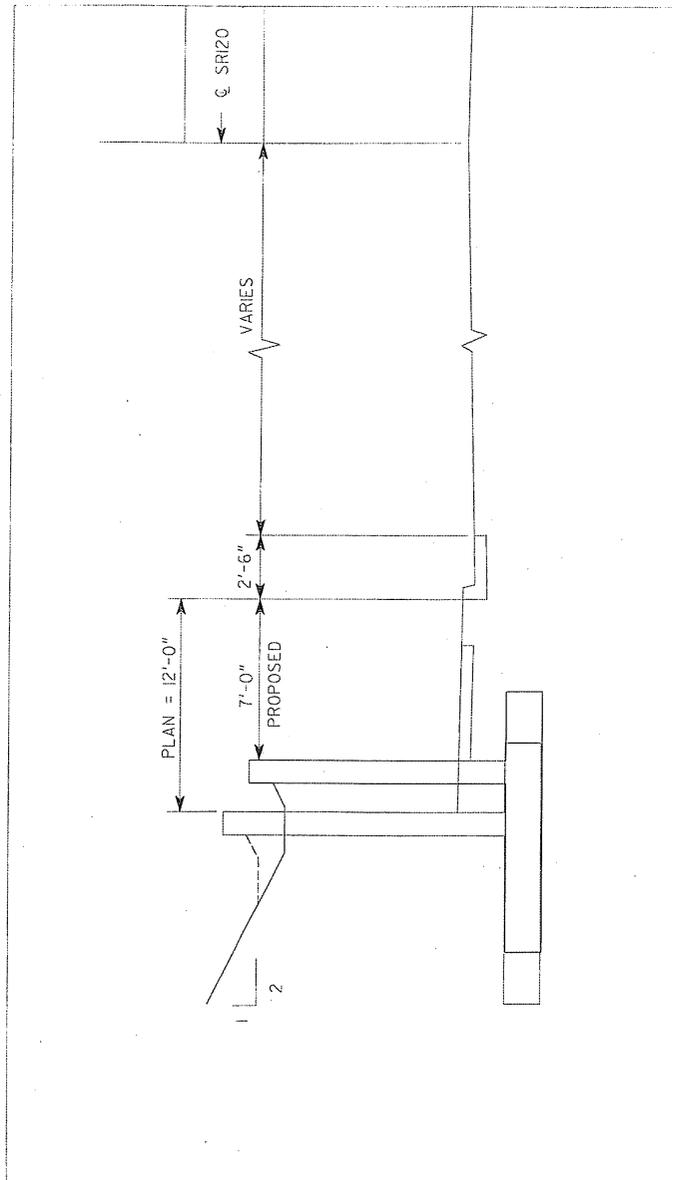
CALCULATIONS	
Project:	SR 120/ROSWELL ROAD WIDENING P.I. 721310
	Idea No.: A-4 Client: Sheet of
<p>ALSO SEE VE-9B</p> <p>ORIGINAL 19mm quantity: 5390 tons (3") PROPOSED 19mm quantity: <u>3593 tons</u> (2")</p> <p style="text-align: center;">↑</p> $\frac{2''}{3''} = .667 \times 5390 = 3593$ <p>ORIGINAL 25mm quantity: 9510 tons (8") PROPOSED 25mm quantity: <u>8321 tons</u> (7")</p> $\frac{7''}{8''} = .875 \times 9510 = 8321$	

DEVELOPMENT AND RECOMMENDATION PHASE			
Project:			
Idea No.: <i>B-1A</i>	Sheet No.: <i>1 of</i>	CREATIVE IDEA: <i>MOVE WALL IN, REDUCE SHORING, REDUCE WALL HEIGHT</i>	
Comp By:	Date:	Checked By:	Date:
Original Concept: <i>PROPOSED WALL NO 1 LOCATED .66' OF CONST. C. PROPOSED R/W VARIES FROM 76.50' LT OF CONST. C @ BEGIN WALL TO 71.62 @ END WALL. PROPOSED SHOULDER BEHIND CURB EQUALS 12 FEET.</i>			
Proposed Change: <i>CHANGE WALL OFFSET TO 61 FEET, REDUCING AREA BEHIND CURB TO 70' (5' SIDEWALK W/2' GLASS STRIP.</i>			
Justification: <i>WILL REDUCE WALL HEIGHT BY 2.5 FEET. THIS WILL REDUCE WALL LENGTH BY 250'</i>			
<i>ELIMINATE SHORING</i>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	<i>39,624</i>		
Proposed	<i>62,346</i>		
Savings	<i>27,277</i>		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			

SKETCH

Project:

Idea No. :
Client :
Sheet of

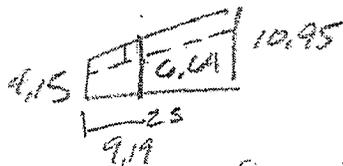


CALCULATIONS

Project: WALL NO. 1

Idea No. :
Client :
Sheet of

WALL LENGTH: $\frac{4.15 - 10.95}{25} = .272 \text{ ' / FT}$



$1.65 + .272(7) = 4.15$
 $9.19'$

$\frac{8.45 - 1.65}{9.19}$

$(-9.19)(6.64) = -62 \text{ FT}^2$

$\frac{(-30)(6) = 180 \text{ FT}^2}{62 \text{ FT}^2}$
 242

$L = 244.17 - 9 - 30 =$
 $L = 205$

ORIGINAL AREA $\times (9)(244) = 2196 \text{ FT}^2$

$\frac{242}{2196} = 0.11 = 11\%$

$103 @ 397.05 = 40,894$
 $24977 @ 0.87 = 21729$
 $\frac{40,894}{62,624}$

SHRINKING \$27,000

$(62,624) 22\% = -13,777$

$(27,000) 50\% = 13,500$
 $\frac{-13,777}{-27,277}$

$(62,624) 11\%$

Additional Savings
BY REDUCE WALL
SECTIONS $\approx 10\%$

USE 22%

DEVELOPMENT AND RECOMMENDATION PHASE			
Project:			
Idea No.:	Sheet No.:	CREATIVE IDEA: <i>MOVE WALL No 2 AWAY FROM R/W</i>	
of			
Comp By:	Date:	Checked By:	Date:
Original Concept: <i>PROPOSED WALL LOCATED MID. OF 12 FEET FROM E.P.</i>			
Proposed Change: <i>REDUCE OFFSET TO 7'0 FROM EP. REDUCE WALL LENGTH.</i>			
Justification: <i>REDUCE SHORINGS. REDUCE WALL AREA RE</i>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	<i>167,426</i>		
Proposed	<i>113,859</i>		
Savings	<i>53,567</i>		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

CALCULATIONS

Project:

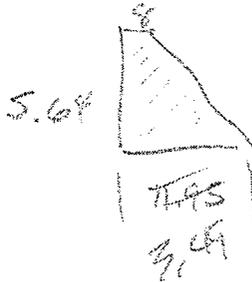
Idea No. :
Client :
Sheet of

REDUCE AREA BY $(185^{\frac{33}{100}})(5.64^{\frac{33}{100}}) = 197$

* AVG HT.

USE 200 FT²

AREA = (5.64)



$130000 = \left(\frac{5.64 \times 11.93}{2} \right) 35'$

$\frac{1245}{27} = 46.1$

COST.

$(46) 576.03 = 26567$

$(35.57 \text{ FT}^2)(185^{\frac{33}{100}}) = \frac{245.78}{39} (6520 \text{ FT}^3) 576.03 = 140,426$

SLORING

$\begin{array}{r} 27,000 \\ 26,567 \\ \hline 53,567 \end{array}$

$\begin{array}{r} 140,426 \\ 27,000 \\ \hline 167,426 \end{array}$

DEVELOPMENT AND RECOMMENDATION PHASE			
Project:			
Idea No.:	Sheet No.:	CREATIVE IDEA: CONST. SEQUENCE 3 MOVE WALL NO. 3	
of			
Comp By:	Date:	Checked By:	Date:
Original Concept: USE WALL OFFSET 66' FROM R/W, 12' TO 16' FROM PROPOSED E.P.			
Proposed Change: REQ'D CONTRACTOR TO CONSTRUCT WALL PRIOR TO WIDENING SR 120 IN THE AREA OF THE WALL, ELIMINATE SHORING, CHANGE OFFSET TO REDUCE WALL AREA.			
Justification: EXISTING E.P. IS 22 FT. BT OF E. REQUIRED EXCAVATION WILL BE 100 - 58 - 10 - 1' ^{CL} L WALL HT - 15 FT. = 39.41' > 22', OK NO SHORING L 2.5: 34.41 > 22 OK REQ'D			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	480136		
Proposed	371084		
Savings	109052		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE

Project:

Idea No.:	Sheet No.:	CREATIVE IDEA: REMOVE WALL NO 4
	of	

Comp By: Date: Checked By: Date:

Original Concept: PROPOSED GRAVITY WALL

Proposed Change: REGRADE AREA INSIDE R/W TO ELIMINATE WALL

Justification: SUFFICIENT R/W EXIST TO ELIMINATE WALL AND REGRADE AREA.

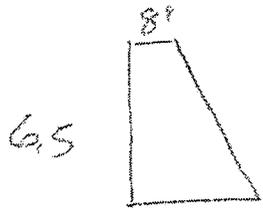
LIFE CYCLE COST SUMMARY		INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST:	Original	32833		
	Proposed	0,00		
	Savings	32833		
FUTURE COST:	Savings			
TOTAL PRESENT WORTH SAVINGS				

CALCULATIONS

Project:

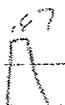
Idea No. :
Client :
Sheet of

Avg Ht. \approx 6.5



$$\left(\frac{6.5}{2} + 8'' = \frac{3.92 + 67}{2} \right) 6.5 = 14.92 \text{ 9FT.}$$

$$\frac{(102.80) 14.92}{27} = 57 \text{ cy}$$

DEVELOPMENT AND RECOMMENDATION PHASE			
Project:			
Idea No.:	Sheet No.:	CREATIVE IDEA: WALL No. 5	
of			
Comp By:	Date:	Checked By:	Date:
<p>Original Concept: 225' SPECIAL DESIGN WALL</p> <p style="margin-left: 100px;">MAX. HT. = 6.29</p> <div style="display: flex; align-items: center; margin-left: 50px;"> <div style="text-align: center;"> $\frac{(14.69) 225}{27} = 122$ </div> <div style="margin: 0 20px;">  </div> <div style="margin-left: 20px;"> <p>AREA = 14687</p> </div> </div> <p>Proposed Change: REDUCE DISTANCE 3.0</p> <p>FROM E.P. TO FROM FALL OF WALL FROM 12'-0"</p> <p>TO, 7'-0"</p> <p>Justification: REDUCE SHORING & WALL HEIGHT by 1.5</p> <div style="display: flex; align-items: center; margin-left: 50px;"> <div style="text-align: center;"> $\frac{5.29}{27}$ </div> <div style="margin: 0 20px;">  </div> <div style="margin-left: 20px;"> $\frac{(9.879) 225}{27} = 83.09$ </div> </div> <p style="margin-left: 50px;">SHORING: 120,000 / 2</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	9051.5		
Proposed	6092.1		
Savings	30594		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE

Project:

Idea No.:	Sheet No.:	CREATIVE IDEA: <u>BULL NO. 6</u>
of		<input checked="" type="checkbox"/> <u>EDGE SHOULDER USE STD. WALL</u>

Comp By: _____ Date: _____ Checked By: _____ Date: _____

Original Concept: SPECIAL DESIGN w/OUT WALL-TOP

Proposed Change: REDUCE DIST. FROM EP FROM
CURRENT 12 FOOT MIN. TO 8 FOOT MIN.
MAX. HT. = 11' USE TYPE
REDUCE SAVING \$710,000

Justification: USE OF MORE EFFICIENT WALL
SECTION P3



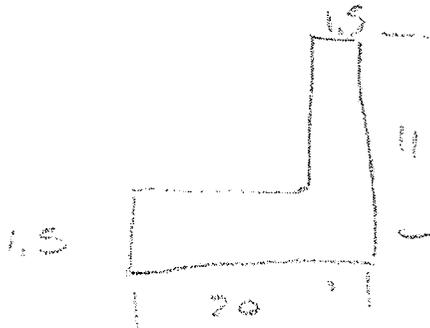
$$AREA = (11)(11.5) \approx (46.5 \text{ ft}^2/\text{ft})$$

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	345,574		
Proposed	116,600		
Savings	229,000		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			

CALCULATIONS

Project:

Idea No. :
Client :
Sheet of



$$AREA: (46.5 \text{ FT}^2) / \text{FT} (119) =$$

$$\frac{14.161}{27} = 52404$$

$$\#/04 - (244 \#/04) 524 =$$

$$127,067 \neq$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project:

Idea No.:	Sheet No.:	CREATIVE IDEA:
	of	WALL No. 7

Comp By: Date: Checked By: Date:

Original Concept: SPECIAL DESIGN "L" WALL

Proposed Change: REDUCATE WALL TO REDUCING DISTANCE FROM EP FROM 12 MIN TO 7 FOOT MIN, USE P WALL

Justification: STD. TO WALL CHANGE

$$\frac{46.5}{27} = (1.72 \text{ CY/FT}) \times 356 = 612 \text{ CY}$$

$$(244 \text{ #/CY}) \times 356 = 86864$$

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	327293		
Proposed	151600		
Savings	175693		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE

Project:

Idea No.:	Sheet No.:	CREATIVE IDEA:
	of	<i>WALL No 8</i>

Comp By:	Date:	Checked By:	Date:
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Original Concept: *SPECIAL DESIGN WALL 241' FT.*

Proposed Change: *REDUCE WALL OFFSET FROM E.P. TO WALL FROM 12' FT. TO 7' FT.*

Justification: *RELOCATE TO ELIMINATE WALL*

$$\begin{aligned}
 & (1.72 \text{ cy/ft}) \cdot 241 = 414.5 \\
 & (244 \text{ \$/ft}) \cdot 241 = 58,804
 \end{aligned}$$

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	<i>203,280</i>		
Proposed	<i>0.000</i>		
Savings	<i>203,280</i>		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE			
Project:			
Idea No.:	Sheet No.:	CREATIVE IDEA: <i>WALL No 9</i>	
of			
Comp By:	Date:	Checked By:	Date:
Original Concept: <i>RE TYPE CA 3 B WALL</i>			
Proposed Change: <i>REDUCE DISTANCE FROM E.P TO WALL FROM 16'-0" TO 8'-0" CUT WALL IN HALF DUE TO ORIGINAL GROUND.</i>			
Justification:			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	<i>71214</i>		
Proposed	<i>36195</i>		
Savings	<i>35028</i>		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			

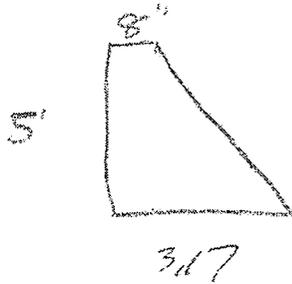
SKETCH

Project:

Idea No. :

Client:

Sheet of



$$A = (9.6 \text{ ft}^2 / \text{ft})$$

$$(9.6) 111' = \frac{1065}{27} = 39$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: 14

Idea No.:	Sheet No.:	CREATIVE IDEA:
	of	WALK 14

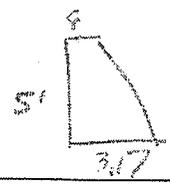
Comp By: _____ Date: _____ Checked By: _____ Date: _____

Original Concept: GRAVITY WALL w/ HAND RAIL

Proposed Change: SIDE BARRIER

Justification: SIDEWALK NOT ADA COMPLIANT.
USE SIDE BARRIER AND PLACE

SIDE WALK BEHIND WALL



$7.6 \text{ ft}^2 / 10 (81) = 777$

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	16600		
Proposed	36000		
Savings	-19400		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE

Project:

Idea No.:	Sheet No.: of	CREATIVE IDEA: <i>wall No 15</i>
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Comp By: **Date:** **Checked By:** **Date:**

Original Concept: *SHOULDER DIST. E.P. TO WALL EQUALS 14'*

Proposed Change: *REDUCE DIST FROM EP TO WALL FROM 14' TO 7'*

Justification:

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	<i>179,478</i>		
Proposed	<i>150,072</i>		
Savings	<i>29,406</i>		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE

Project:

Idea No.:	Sheet No.:	CREATIVE IDEA:
	of	<i>Wall No 11</i>

Comp By: Date: Checked By: Date:

Original Concept: *ORIGINAL WALL OFFSET FROM E.P VARIES FROM 233' TO MIN. 12 FEET*

Proposed Change: *REDUCE MIN OFFSET FROM E.P. TO 7.0"*

Justification: *REDUCE WALL HT BY 23.0'*
CONC. (88') 3' (1.1) = 10 cy

$$\frac{\quad}{27}$$

(244 #/cu) 10 = 2440

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original			
Proposed			
Savings	<i>26000</i>		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE

Project: *Wall 12*

Idea No.:	Sheet No.:	CREATIVE IDEA:
	of	<i>RESOLVE SCHEDULE LOW STREET</i>

Comp By: Date: Checked By: Date:

Original Concept: *USE 11.17' FROM E.P. TO WALL*

Proposed Change: *USE 8' FROM E.P. TO WALL*

Justification: *REDUCE WALL HT. BY 4'*

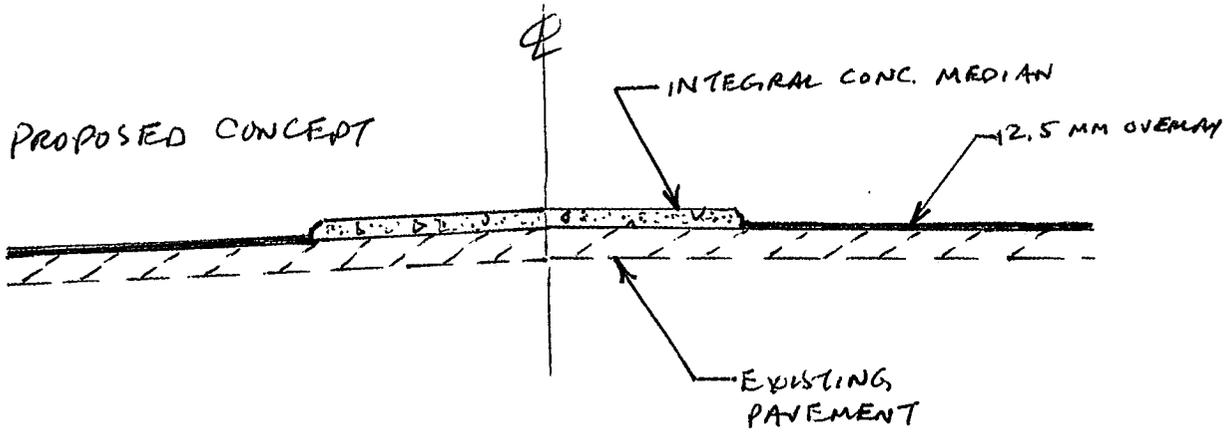
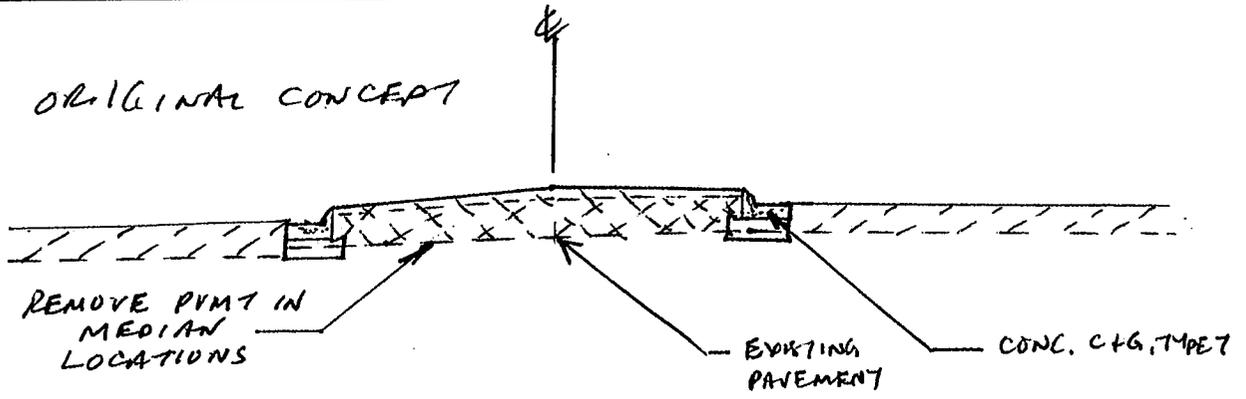
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	<i>106560</i>		
Proposed	<i>79920</i>		
Savings	<i>26640</i>		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: PI 721310 Project STP-114-1(72) Cobb County			
Idea No.: C-1	Sheet No.: of	CREATIVE IDEA: Reduce Curb and gutter length and using integral median	
Comp By:	Date:	Checked By:	Date:
<p><u>Original Concept:</u></p> <p>The concept uses median paving between the type 7 curb and gutter sections in the median area. The also requires the removal of the existing pavement section to install the curb and gutter.</p> <p><u>Proposed Change:</u></p> <p>Proposed changes include to use a integral 7.5' concrete median throughout a majority of the project instead of the curb and gutter section with median paving</p> <p><u>Justification:</u></p> <p>Reduce amount of curb and gutter, eliminate the need of removal of existing pavement. Provides time savings in completion of project and is easier to stage and construct with less overall disruption to public.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	522,324		
Proposed	302,049		
Savings	200,300		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			\$200,300

SKETCH

STP00-0114-01(072) COBECO, P.L.# 721310-
Project: SR 120/ROSWELL RD. WIDENING

Idea No.: C1
Client: :
Sheet of



Calculation of median 7 1/2" (Total)

Total Median Area for project

73,455 - 8-20' wide (From C1) For Removal

8' section 25,425 - Pavement Removal Area From C-3 (From C-3)

20' Area total 48,030 / 20' = 2401.5' ^{Total Area} ^{Back Cal from} ^{Pavement Removal} ^{Area}

For 7.5" median Area 2401.5 x W(6)

$$2401.5 \times 16 \quad 38,424 \quad + 2/9 = 4,270$$

$$4270 + 1832 = \boxed{6102 \text{ yd}^2} \text{ - will be Alt C-1 cost}$$

^{Calc} Amount of 4" med paving that can be removed

Area 20' median 2401.5'

$$2401.5 \times 15 = 36022.5 \text{ ft}^2 / 9 = 4002.5$$

$$4002.5 \quad \text{20' section (15' wide of 4")}$$

$$+ 7374 \quad \text{8' sections}$$

$$\boxed{5643 \text{ yd}^2}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: PI 721310 Project STP-114-1(72) Cobb County

Idea No.:
C-3

Sheet No.:
of

CREATIVE IDEA:
Remove concrete paving and grass median

Comp By:

Date:

Checked By:

Date:

Original Concept:

Pave the median in the 20' wide sections

Proposed Change:

Grass the median in the 20' wide sections and use integral median in the 8' wide sections

Justification:

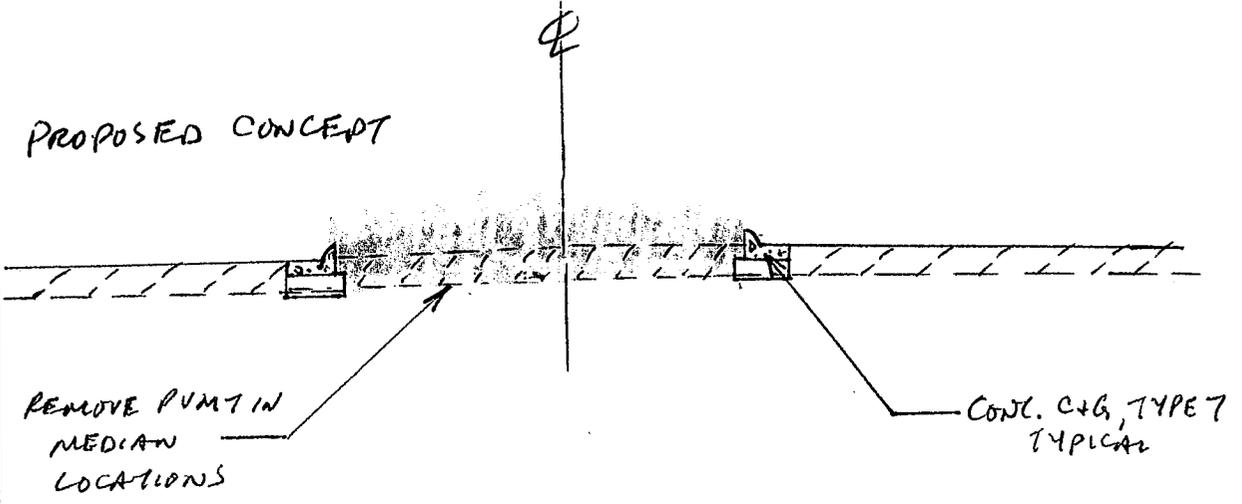
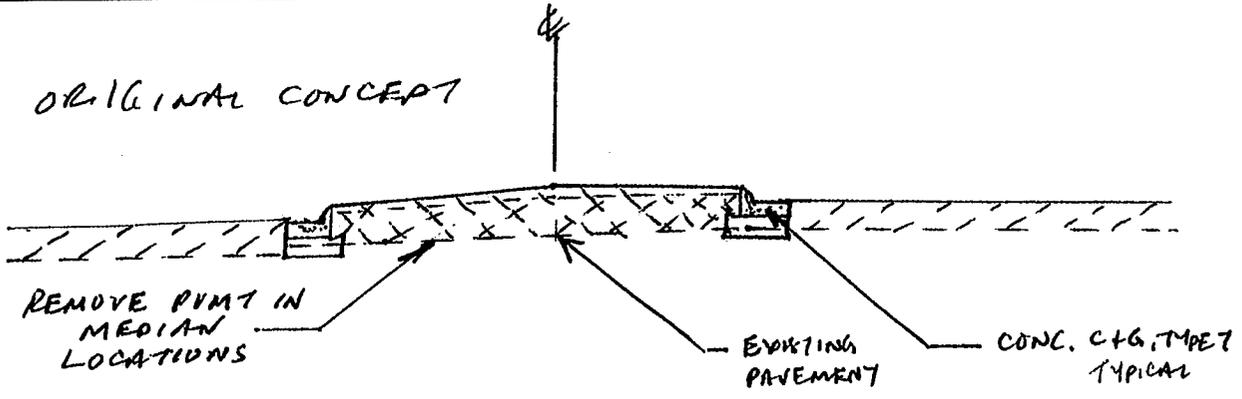
Reduce the amount of concrete median paving and uses grass. Reduce the amount of asphalt removal in the turn bay areas and use 7.5" integral median.

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$205,045		
Proposed	\$91,625		
Savings	\$113,420		
FUTURE COST: Savings			99830
TOTAL PRESENT WORTH SAVINGS			\$99,830

SKETCH

Project: STPOD-0114-01(072) COBB CO., R.I. # 721310-
SR 120 (POSWELL RD. WIDENING)

Idea No.: C3
Client:
Sheet of



C-3

Page 4

1/E-9C

Idea C-3 summary calculations of savings Cost saving for using concrete intergal median on top of median on 8' sections of median (turn bays)	savings		savings		Savings GAB / tons	Cost	
	Area of median paving 4" Yd 2	Length of type 7	Asphat removal Yd2	Asphat removal Yd2		GRASS /acre	Cost
Intersection 1	83	500	450	450			111
Intersection 2	223	1340	595	595			297
Intersection 3	448	2690	120	120			597
Intersection 4	210	1260	560	560			280
Intersection 5	280	1680	750	750			373
Intersection 6	130	780	350	350			173
Totals	1374	8250	2825	2825	927	0.9	1832
Cost per unit	33.79	13.39	4.5	4.5	18.12	950	45
Total cost	46427.46	110467.5	12712.5	12712.5	16797.24	855	82440
sum of savings	\$186,404.70						
sum of Cost	\$83,295						
cost of maintenance	\$13,590.00						
Savings	\$89,520						

C-3 page 1 calc's
Roswell Road @ Greenbriar Pkwy 27+06.40

441-0754
51 yd²
(45

$250 - x \cdot 3 = 750 \text{ ft}^2$ 83 yd²
x2 opposite side - 83 yd Total 166 yd² of conc med

500' of Type 7

4000 450 yd² of Pavement Removal

Private Drive STA 39+32.65

$360 \times 3 = 1080 / 9 = 120 \text{ yd}^2$

$310 \times 3 = 930$

103 yd²

223 yd² * Total

670 ft of x2 4690' of type 7 * Total 1340

Removal 670 x 8 = 5360 / 9 595 yd² Removal

Rob in sum / Private 54+50 (Includes Barns mill (to left))

295-

$780 - 270 = 1050$

→ Total ~~Area~~ ^{length} 1050 (to left) + 295 = 1345 ft

$1345 \times 3 = 4035 = 448 \text{ yd}^2$ - med Pav

2690 w/ Type 7

Removal 1345 x 8 = 1076 Removal $\frac{6}{9} = 120 \text{ yd}^2$

Left side @ #3 - Barns mill 64+00

630 (to RT) (Includes left of Sewell mill)

$630 \times 3 = 1890 / 9 = 210 \text{ yd}^2$

1260 w/ Type 7

Removal $(630 \times 8) / 9 = 560 \text{ yd}^2$

72+79 Roswell @ Sewell mill (Red)

840' $840 \times 3 / 9 = 280 \text{ yd}^2$

$840 \times 2 = 1680$ Type 7

$840 \times 8 / 9 = 750 \text{ yd}^2$

Ed Donnell
@ 81+00

No. 937 811E
Engineer's Computation Pad



#6 East Piedmont @ Roswell 9/17/16

390' to Left Keep RT side same

$340 \times 3/9 = 130 \text{ yd}^2 - \text{Area med}$

$390 \times 2 = 780 \text{ @ TYP 7}$

$390 \times 8/9 = 350 \text{ yd}^2 \text{ Removal}$

No. 937 811E
Engineer's Computation Pad



Area Dist
 $350 \text{ yd}^2 \times \frac{13\frac{1}{2}}{12} \times \frac{5+3}{3}$

$3150 \text{ yd}^2 \times 13\frac{5}{12} = \frac{3543\frac{5}{12}}{27}$

~~1031.25~~
 $131 \times 12 = 1572$

$3150 \text{ ft}^2 \times 13.5/12$

$3545/27$

131.25 yd^3

$350 \text{ yd}^2 \times$

Total Area of median (Removal)

$- 8,162 \text{ yd}^2 - \text{Removal}$

$(\text{Round } 2825) \text{ TL}$

Remove
 $1/3 \text{ above yard}$
 12
 $4'' - 34'' \text{ median}$
 $13\frac{1}{2}''$

$1 \text{ yd} \times \frac{12''}{13\frac{1}{2}''}$

$\frac{13}{12} \times \frac{1\frac{3}{4}}{12} \times 12$

~~140 yd^2~~
 $\rightarrow 4.5 \text{ yd}^2$

$\frac{13\frac{1}{2}}{12} \times \frac{1\frac{3}{4}}{12} \times 12 = 1575$

150 ft^2

Cost Change

- Remove 4" core media - Same as C1
- ● ● Add - GRASS - cost
- Remove ● cut pavement in 9' sec ^{- Asphalt}
- Remove - GAB
- Remove - length of C-6 -

Area Med Pavng - See
Length Time 7 ✓

GRASS - Length 20'

244 240' length of 20' -

$240 \times 15 = 36015 \text{ ft}^2$

$43,560 \text{ ft}^2 / \text{Acre} =$

$.826 \text{ Acre}$

Use 910 sq Feet

$910 \times .826$

~~GAB - Area 1374 x 20' wide =~~

$\text{Area } 1374 \times 9 = 12366 \text{ ft}^2 \times 150 \# \text{ ft} / 2000$

927

GRASS Maintenance -

maint 1000 dollars

$\$1000 \text{ maint} \times 11$

13590

DEVELOPMENT AND RECOMMENDATION PHASE

Project: STP00-0114-01(072) Cobb County, P.I. No. 721310-

Idea No.: D-1 & D-2	Sheet No.: of	CREATIVE IDEA: Use existing traffic signals. Where possible use strain poles & span wire in lieu of mast arms
-------------------------------	-------------------------	---

Comp By: JSS Date: 1/28/09 Checked By: Date:

Original Concept:

Proposed seven (7) new complete traffic signal installations with mast arms (even at the five (5) locations/intersections with existing traffic signals).

Proposed Change:

Modify existing traffic signals where possible, upgrade equipment where necessary and use span wire in lieu of mast arms at five (5) existing locations/intersections.
Use span wire in lieu of mast arms at two (2) new complete locations/intersections.

Justification:

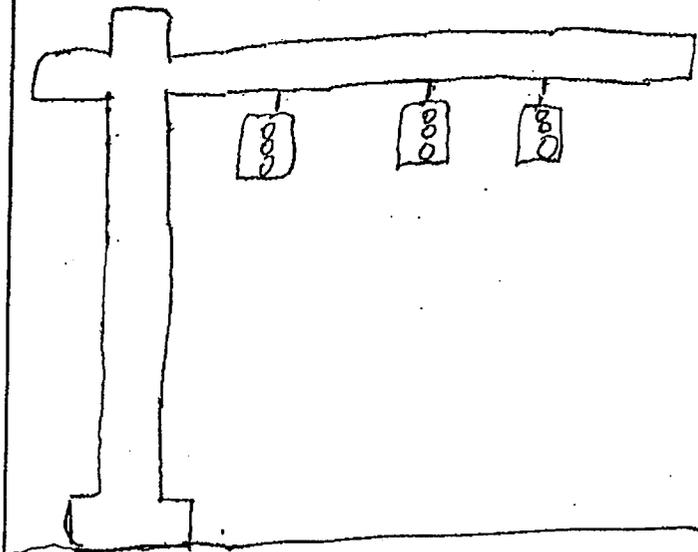
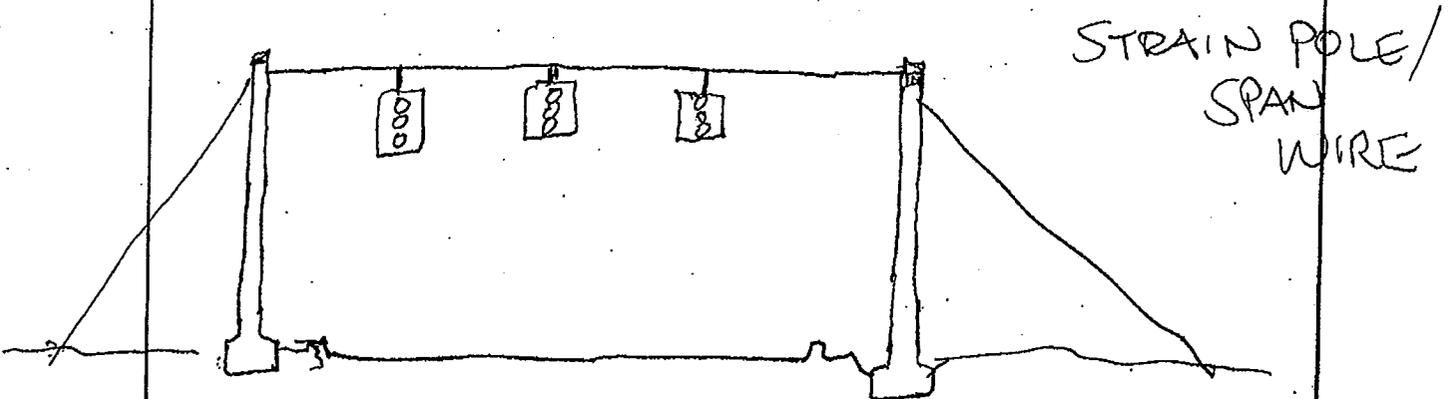
Traffic signals will function the same without mast arms and their associated additional expense. Typically when mast arms are desired for aesthetic purposes, the local government pays the cost difference. Modifications and upgrades to the existing five (5) signals and equipment would also provide cost savings versus a completely new installation.

LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$1,270,500		
Proposed	\$632,500		
Savings	\$638,000		
FUTURE COST: Savings			638,000
TOTAL PRESENT WORTH SAVINGS			

SKETCH

Project: SR 120/ROSWELL ROAD WIDENING
P.I. 721310

Idea No.: D1, D2
Client:
Sheet / of 1 ~~2~~



CALCULATIONS

Project: STP00-0114-01(072) Cobb County,
P.I. No. 721310-

Idea No.: D-1 & D-2
Client::
Sheet of

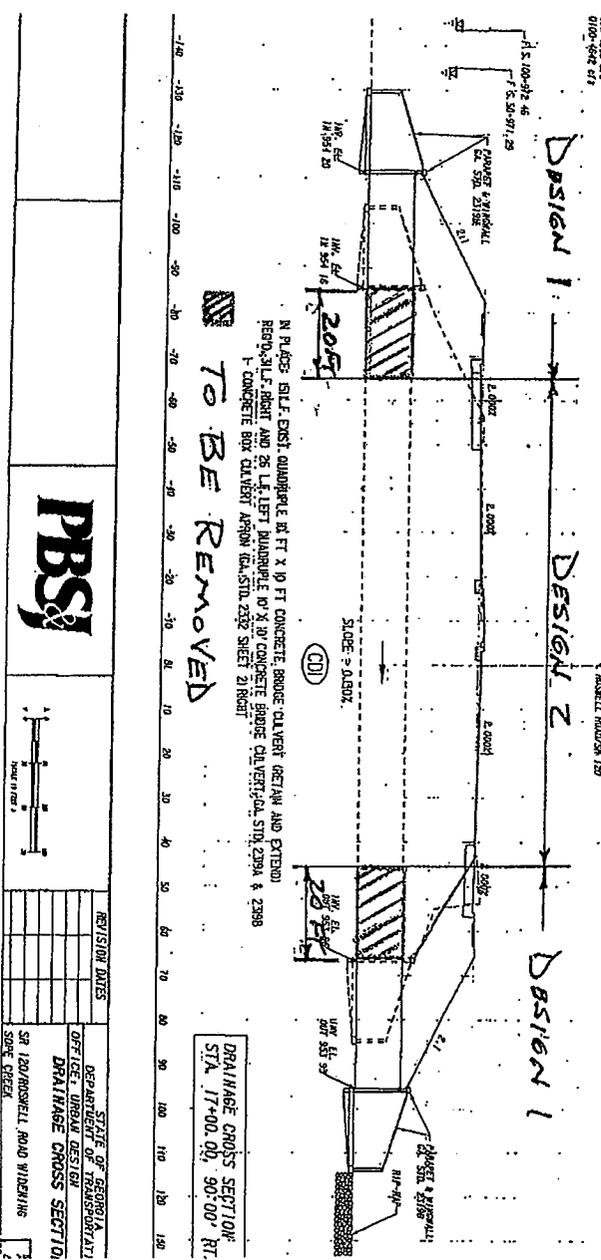
See VE-9B

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP00-0114-01(072) Cobb County, P.I. No. 721310-			
Idea No.: F-1	Sheet No.: of	CREATIVE IDEA/PLAN MODIFICATION: Remove and replace exist. Design 1 culvert sections	
Comp By: WEI Date: 1/29/09		Checked By: Date:	
<p><u>Original Concept:</u> Extend existing quadruple 10x10 Bridge Culvert 26 feet left and 31 feet right to accommodate additional widening.</p> <p><u>Proposed Change:</u> Remove the Design 1 section (approximately 20 feet) at each end and rebuild the bridge culvert to the required length Design 2. <i>with</i></p> <p><u>Justification:</u> The proposed road widening will place ^{60 Feet} 16 feet of additional fill on a Design 1 section which will produce a 60% overstress in the original Design 1 section. In order for the bridge culvert design to be adequate for the proposed fill height, it will be necessary to remove the Design 1 section and rebuild with a Design 2 section (20 feet fill height).</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$250,000		
Proposed	\$500,000		
Savings	(\$250,000)		
FUTURE COST: Savings			N/A
TOTAL PRESENT WORTH SAVINGS			(\$250,000)

SKETCH

Project: **WIDEN SR 120 FROM SR 120
LOOP TO BRIDGE GATE DR.**

Idea No.: **F-1**
Client:
Sheet/ of 1



TO BE REMOVED

DRAINAGE CROSS SECTION
STA. 17+00.00, 90'-00" RT.



REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION
	OFFICE URBAN DESIGNER
	DRAINAGE CROSS SECTION
	SR 120/ROSWELL ROAD WIDENING
	SHEET 1 OF 2

CALCULATIONS	
Project: WIDEN SR 120 FROM SR 120 LOOP TO BRIDGEGATE	Idea No.: F-1 Client: Sheet/of 1
PROPOSED CULVERT EXTENSION =	31 + 26 = 57 FT
ADDITION CULVERT LENGTH =	40 FT
REQ'D AFTER REMOVAL	<u>40 FT</u>
TOTAL REBUILT LENGTH	97 FT
COST OF REBUILT SECTION	
(97/57) \$250,000	= \$425,000
COST OF CULVERT EXTENSION AS PROPOSED	
	= <u>(\$250,000)</u>
COST OF ADDITIONAL 40 FT REQ'D = \$175,000	
ESTIMATED COST OF REMOVAL	
1/2 REQUIRED SHORING (APPROX 15%)	= \$75,000
TOTAL COST OF ADDITIONAL 40 FT = <u>\$250,000</u>	

APPENDIX

INFORMATION PHASE - SOURCES Approving/Authorizing Persons

Name:	Position:	Telephone:
Gerald Ross	Chief Engineer	404-631-1004
Mike Wright	Cobb County	770-528-4375

Personal Contacts

Name:	Telephone:	Notes:
Butch Welch	GDOT- Urban	404-631-1690
Scott Dubord	PBS&J	770-933-0280
Andrew Hoenig	GDOT- Urban	404-631-1691

Documents/Abstracts

Reference:	Notes:
Plans	
Revised Concept Report	
Layout	
Drainage Area Map	
Updated Cost Estimate	

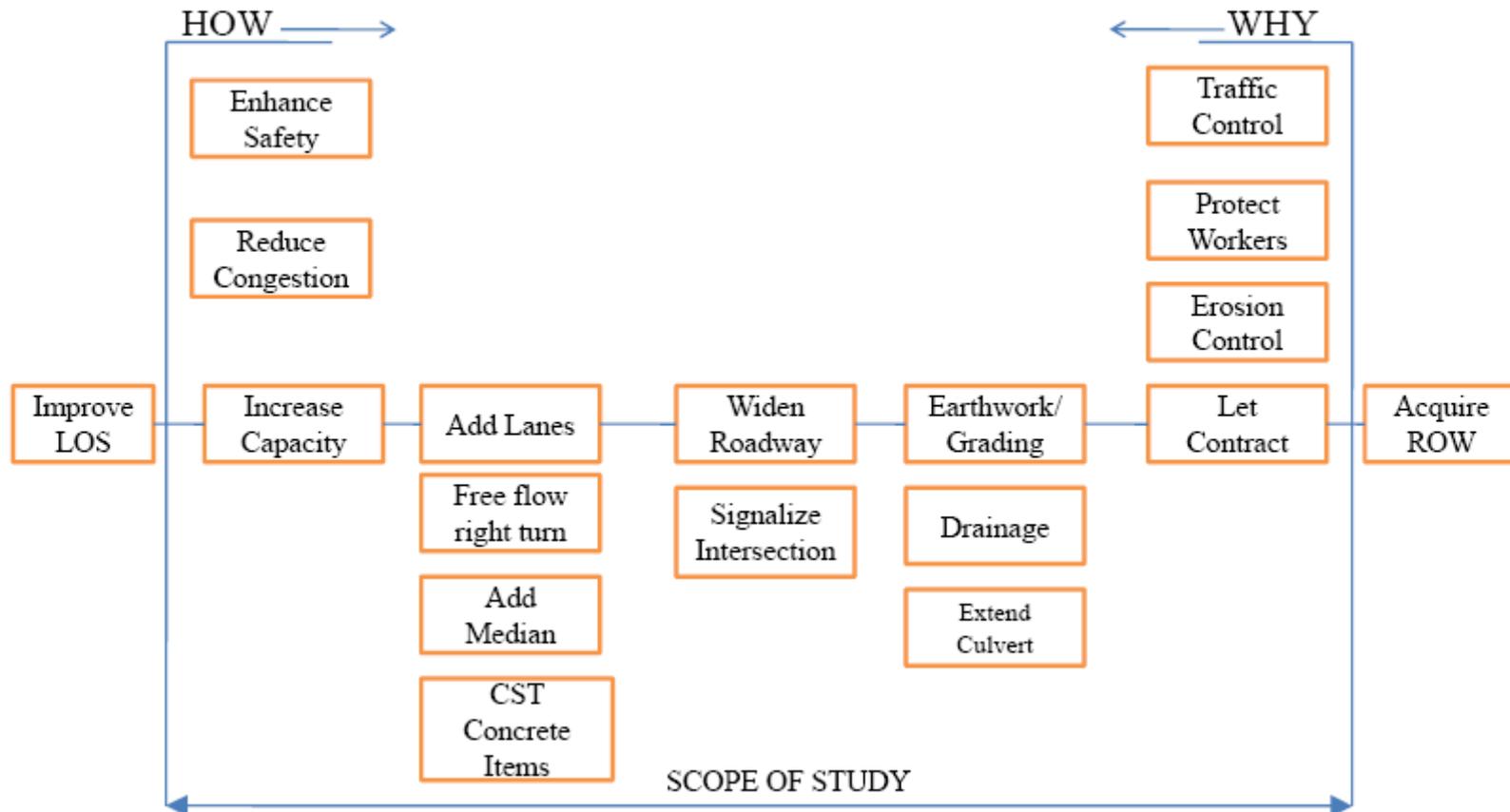
INFORMATION PHASE – FUNCTION ANALYSIS

Project: PI 721310 Project STP-114-1(72) Cobb CountyPI 721310

Function: Increase Capacity

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	Worth	Comments
	Pavement	Provide & Increase	Riding Surface	3050220	2300000	Reduce Depth
	Walls	Reduce Support	ROW Shoulder	1994000	1400000	Reduce total wall area
	Concrete Items	Channelize	Traffic	1183523	650000	Reduce median Curb and gutter
	Signals	Control	Traffic	1155000	700000	Eliminate Mast Arms and use Strain Poles
	Drainage Items	Convey	Water	940000	940000	No Change
	Traffic Control	Manages	Traffic	750000	675000	Use dowelled median for easier traffic maintenance
	Grading Complete	Prepare	Ground	500000	475000	Reduce shoulder to reduce earthwork
	Culvert Extension	Convey	Water	250000	500000	Underpriced will need design 2 throughout
	Erosion Control	Prevent	Erosion	205375	205375	No Change
	Signing and Marking	Delineate	Traffic	176692	176692	No Change
	Complete Construction	Finish	Job	399770	700000	Shoring quantity low ma

INVESTIGATION PHASE - FAST DIAGRAM
 SR 120/ROSWELL ROAD WIDENING FROM SR 120 ALT TO BRIDGEGATE DRIVE
 BASIC FUNCTION: INCREASE CAPACITY



CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Pavement		
A-1	Profile / Pavement Removal	Reduce pavement / earthwork / staging	6
A-2	Pavement Width	Reduce cost minimize impacts	4
A-3	Pavement Structure Type	Cost reduction in pay item type	4
A-4	Overall Pavement Depth	Cost reduction	8
A-5	Overlay / leveling / milling	Reduce pavement / staging / cost	8

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
B	Walls		
B-1	Type of Wall – Soldier pile	Easy to construct, reduce excavation, eliminate shoring, reduce cost	4
B-2	Slope %	Reduce ROW and wall height	8
B-3	Shoring	Cost low may be able to reduce amount	10
B-4	Shoulder width / Wall Location	May be able to reduce width in areas where it is 16' wide	10
B-5	Height	Reduce square foot of wall	10

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
C	Concrete Items		
C-1	Curb & Gutter , Length / Location	May be able to reduce length in median using doweled in place median.	10
C-2	Sidewalk	May be able to reduce width / depth and Location (location to minimize Wall & footprint)	4
C-3	Median Paving	Reduce concrete and use grass in wide median areas.	6
C-4	7 lane section – Flush Median	Reduce median / access with # of Driveways	2

