Value Engineering Study Report

Georgia Department of Transportation
NHS00-0000-00(763) _ P.I. No. 0000763
I-75 from Lowndes County line to SR 37
Phase II
Cook County

Value Engineering Team

Design Team

December 4, 2009

December 4, 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
NHS00-0000-00(763) – P.I. No. 0000763
I-75 from Lowndes County line to SR 37 – Phase II
Cook County

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our final Value Engineering Report for I-75 from Lowndes County line to SR 37 including new bridges at CR 240 intersection and CR 216 intersection.

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

- Project goal to be "Improve Safety"
- Seven (7) Alternatives to improve the project safety and value of 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

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

Randy S. Thomas, CVS
Assistant Team Leader

Value Engineering Study Report

NHS00-0000-00(763)
P.I. No. 0000763

I-75 from Lowndes County line to SR 37 – Phase II

Cook County

Table of Contents

EXECUTIVE SUMMARY

INTRODUCTION

The subject of the Value Engineering study is project NHS00-0000-00(763) – P.I. No. 0000763, I-75 from Lowndes County line to SR 37 – Phase II, which consists of the reconstruction of the I-75 interchanges at CR/240 Old Coffee Road (exit 32) and CR 216 – the Adel Quitman Road (exit 37).

PROJECT DESCRIPTION

The existing interchange at CR 240 Old Coffee Road (exit 32), which does not provide the required 17'-0" clearance above I-75, will be re-constructed as a diamond interchange, to provide the required clearance. The improved interchange will also be designed to accommodate the future widening of I-75 to an 8-lane typical section. The CR/240 - Old Coffee Road, will be two 12' lanes, with a 14' flush median, and 10' inside and outside shoulders.

Existing CR 240

Existing CR 216

The existing interchange at CR 216 Adel Quitman Road (exit 37), which does not provide the required 17'-0" clearance above I-75, will be re-constructed, as a compressed diamond interchange, to provide the required clearance. The improved interchange will also be designed to accommodate the future widening of I-75 to an 8-lane typical section. CR 216 – the Adel Quitman Road (exit 37), will be two 12' lanes, with a 14' flush median, and 10' inside and outside shoulders.

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

The estimated construction cost for the project is $16,735,069. In addition, Right-of-Way costs are anticipated to be $12,279,000 with reimbursable utilities cost estimated to be $833,066. The projected total cost for the project is $29,847,135.

PROJECT CONCERNS AND OBJECTIVES

- The accident injury rate in these sections is above the state average
- Accommodate future widening of I-75
- Accommodate new height clearance requirements for I-75
- Improve operational conditions
- Minimize historic property impacts
- Minimize impacts to the environment
- Minimize construction impacts

VALUE ENGINEERING PROCESS

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

Using the first two steps of the Value Engineering Job Plan - Investigation & Analysis (*Function Analysis)*; the VE Team identified the goal of this project to be “improve safety”.

This led the team through the “Speculative” Phase, wherein 19 possible alternatives were identified.

Following this, the VE Team moved to the Evaluation and Development Phases.

During these Phases, the VE Team selected alternatives that appeared to offer the best value improvements for the project. The VE Team identified the advantages and disadvantages. As a result, the VE Team recommends ***seven (7) design alternatives*** for implementation – see ***Study Results.***

Summary of Alternatives & Design Suggestions

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) – P.I. No. 0000763
I-75 from Lowndes County line to SR 37 – Phase II
Cook County

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

ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
	BRIDGE (BR)	
BR-1	Use an 8’-0” in-lieu of 10’-0” shoulder on the bridges	$300,229
BR-2	Use two-span structure with concrete beams and MSE walls	$393,630
BR-3	Use 12’-0” turn lanes on bridges	$150,271
	ROADWAY (RD)	
RD-1	Reduce “sum” of ramp shoulder width by 2’-0”	$231,542
RD-2	Use 4’-0” in-lieu-of 6’-6” paved shoulder	$78,064
RD-13	Build Tight Urban Diamonds at both intersections	$3,476,049
RD-14	Realign CR 216 ramp “D” and relocate stream	$1,007,237

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, descriptions 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.

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.

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.***

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.:	**BR-1**
DESCRIPTION:	**Use an 8'- 0" shoulder in-lieu of 10-0" shoulder on the bridges**	SHEET NO.:	**1** of **4**

Original Design:

The original design calls for an overall out-to-out width of 61'-3". The original bridge out-to-out width will provide two 12'-0" traffic lanes (two in each direction), a flush median with one 14'-0" inside turning lane and two 10'-0" shoulders.

Alternative:

The proposed alternative calls for an overall out-to-out width of 57'-3". The proposed out-to-out width will provide two 12'-0" traffic lanes (two in each direction), a flush median with one 12'-0" inside turning lane and two 8'-0" shoulders.

Opportunities:

- Reduction of bridge width
- Potential cost savings
- Reduction of beam spacing
- Reduction of a beam line
- Potential slab thickness reduction

Risks:

- None apparent

Technical Discussion:

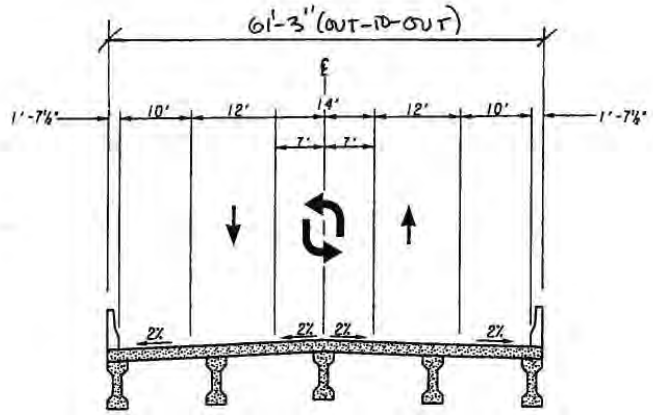
The 8'-0" outside shoulders will be more than adequate and within requirements for bridges of this length, per AASHTO Geometric Design of Highways and Streets (pgs. 224, 315, 412, 455 & etc.).

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,597,373	$ 0	$ 4,597,373
ALTERNATIVE	$ 4,297,145	$ 0	$ 4,297,145
SAVINGS	$ 300,229	$ 0	$ 300,229

Illustration

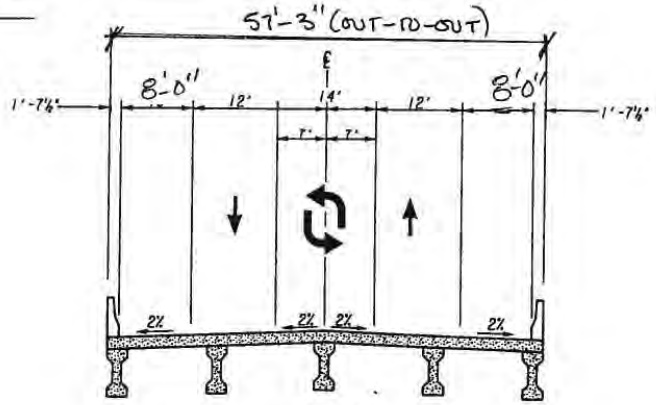
PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.:	**BR-1**
DESCRIPTION:	**Use an 8'- 0" shoulder in-lieu of 10-0" shoulder on the bridges**	SHEET NO.:	**2** of **4**

CURRENT DESIGN



T-02
TYPICAL SECTION-BRIDGE
(CR216/ADEL QUITMAN ROAD) (CR240/OLD COFFEE ROAD)

ALT DESIGN



T-02
TYPICAL SECTION-BRIDGE
(CR216/ADEL QUITMAN ROAD) (CR240/OLD COFFEE ROAD)

Calculations

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.: **BR-1**
DESCRIPTION:	**Use an 8'- 0" shoulder in-lieu of 10-0" shoulder on the bridges**	SHEET NO.: **3** of **4**

Assumptions:

Reduce shoulder width on bridge structures on CR 240 and CR 216 from 10' w to 8' w.

CR 240 structure length = 363.75'

CR 216 structure length = 354.5'

CR 240 = 363.75' x 2' width reduction x 2 sides = 1455 SF reduction

CR 216 = 354.5' x 2' width reduction x 2 sides = 1418 SF reduction

1455SF +1418SF = 2873 SF total reduction for both structures.

Average cost per SF for PSC beams on concrete bents = $95/SF(per GDOT Bridge and Structures Design Policy Manual 7/2009 revision)

2873SF x $95/SF = $272,935 saved

CR 216 = 1418 x $95 = $134,710

CR240 = 1455 x $95 = $138,225

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37-
Phase II
Cook County

ALTERNATIVE NO.: **BR-1**

DESCRIPTION: **Use an 8'-0" shoulder in-lieu of 10'0" shoulder on bridges**

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
CR 240 Bridge	SF	22,280	$ 95	$ 2,116,600	20,825	$ 95	$ 1,978,375
CR 216 Bridge	SF	21,714	$ 95	$ 2,062,830	20,296	$ 95	$ 1,928,120
Sub-total				$ 4,179,430			$ 3,906,495
Mark-up at 10.00%				$ 417,943			$ 390,650
TOTAL				**$ 4,597,373**			**$ 4,297,145**
Estimated Savings:							$300,229

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION:	**Use two-span structures with MSE walls in-lieu of four span structures**	SHEET NO.: **1** of **12**

Current Design:

The current design calls for a four span 363.75' (CR240) long and 354.50' (CR 216) long bridge structure over I-75. The two bridges will have a CIP superstructure supported by PSC 63" Bulb Tee beams. The overall out-to-out width is 61'-3" and it will provide two 12'-0" traffic lanes (one in each direction), a flush median with one 14'-0" inside turning lane and two 10'-0" shoulders. The bridges will be skewed with all bents parallel to the CL of I-75.

Alternative:

The alternative calls for the reduction in length for the proposed bridge structures by the use of a two span bridge with MSE walls at the end bents. The proposed CIP superstructure will be supported by 8 - PSC 63" Bulb Tee beams spaced at 7'-6". The typical section for proposed structures will match the original design. The bridges will be skewed with all bents parallel to the CL of I-75.

Opportunities:

- Potential cost savings
- Reduction of number of beams
- Same stage construction
- Reduction of construction duration

Risks:

- None apparent

Technical Discussion:

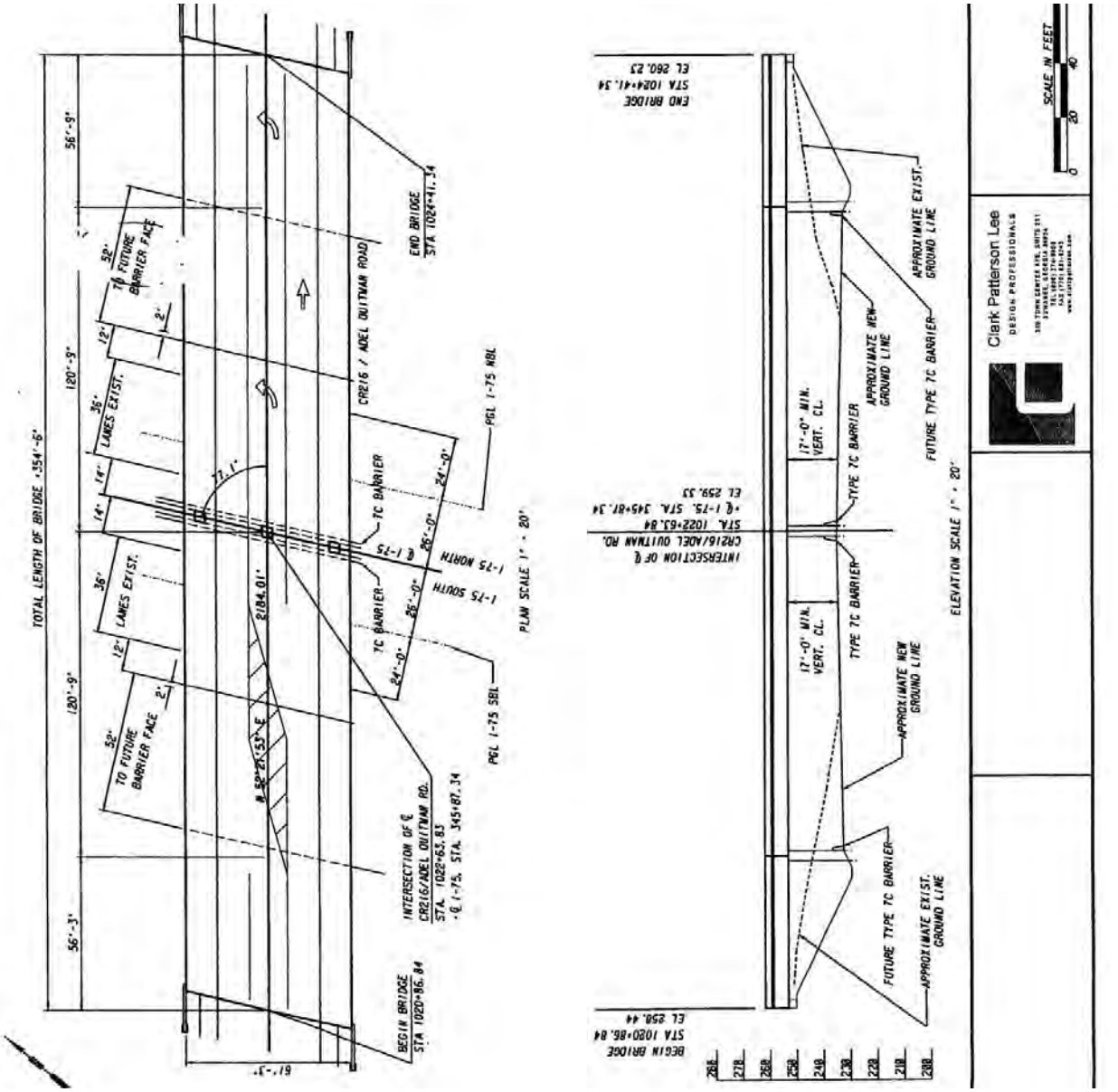
The proposed alternative will reduce the overall bridge length from 363.75' to 254.50' at CR 240 and from 354.50' to 246.50' at CR 216. End bent protection barriers used in the current design will be used to protect the MSE Walled abutments as well, thus offsetting the costs for this item. Both the current design and this alternative design will accommodate all future widening of I-75.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,385,713	$ 0	$ 4,385,713
ALTERNATIVE	$ 3,559,593	$ 0	$ 3,559,593
SAVINGS	$ 826,120	$ 0	$ 826,120

Illustration

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION	**Use a two-span structure with MSE walls in-lieu of four span structures**	SHEET NO.: **2** of **12**

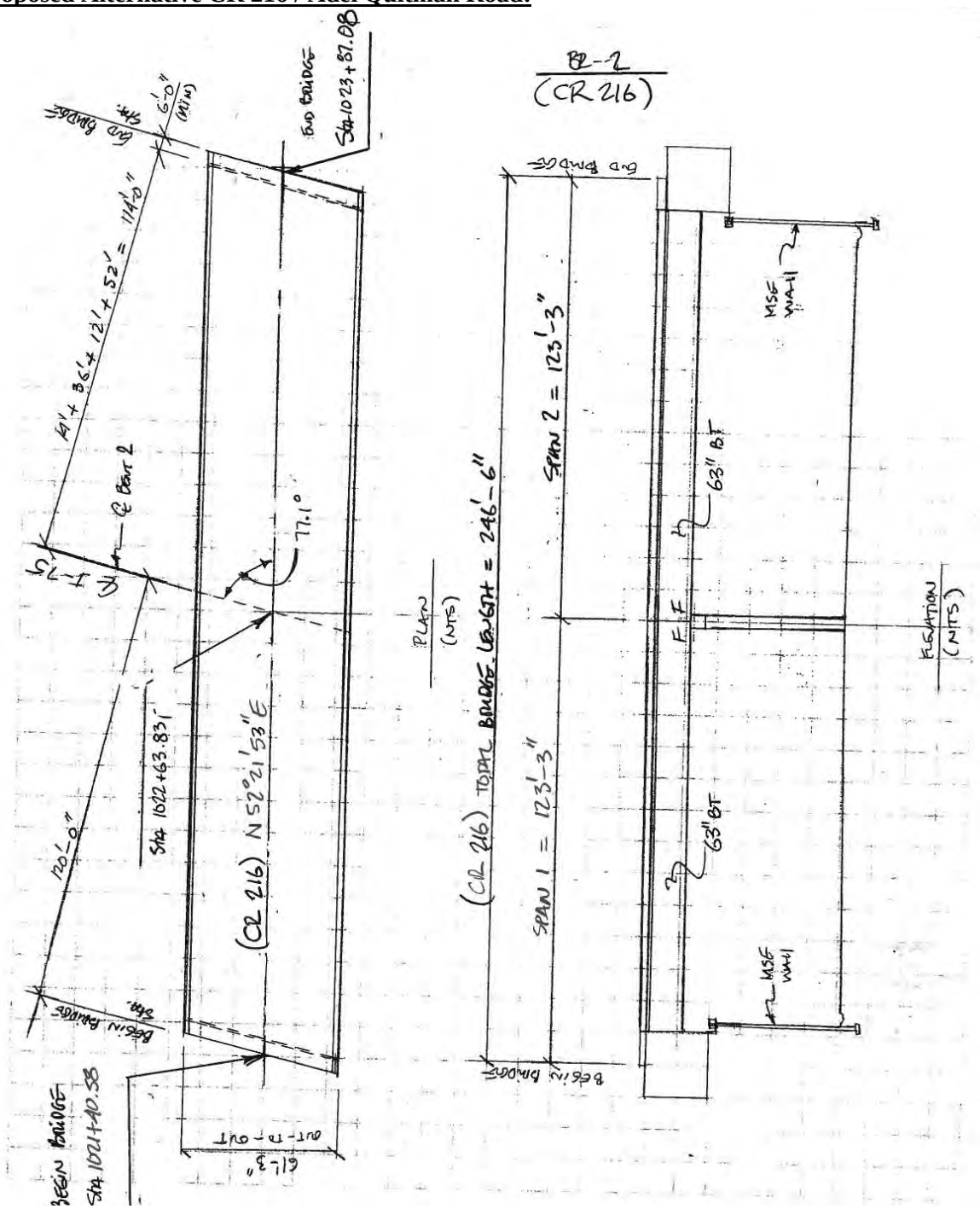
Current Design CR 216 / Adel Quitman Road



Illustration

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION	**Use a two-span structure with MSE walls in-lieu of four span structures**	SHEET NO.: **3** of **12**

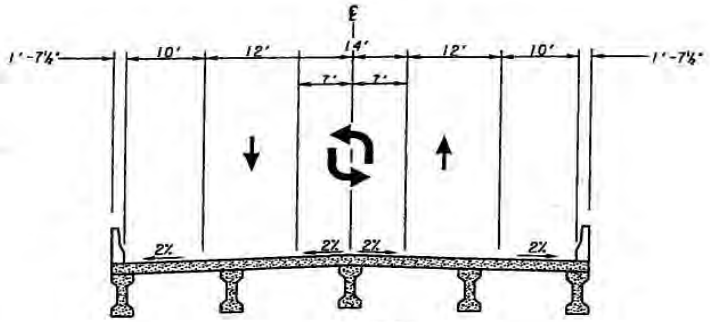
Proposed Alternative CR 216 / Adel Quitman Road:



Illustration

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION:	**Use a two-span structure with MSE walls in-lieu of four span structures**	SHEET NO.: **4** of **12**

CURRENT DESIGN



T-02
TYPICAL SECTION-BRIDGE
(CR216/ADEL QUITMAN ROAD)

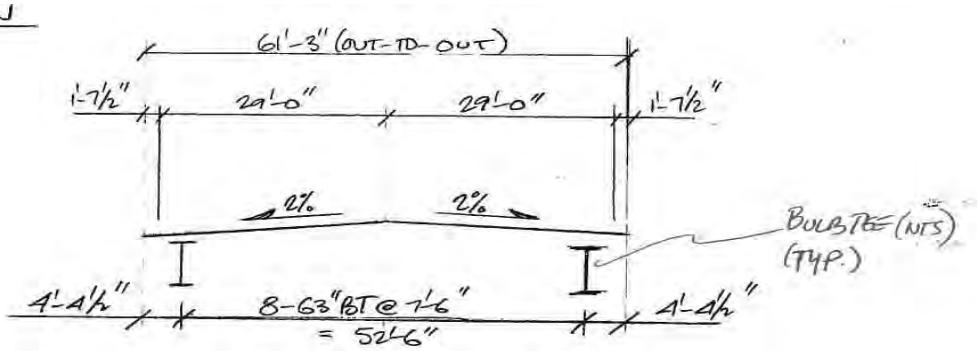
BRIDGE CONSISTS OF

2 - PILE END BENTS	SPECIAL DESIGN
3 - CONCRETE INTERMEDIATE BENTS	SPECIAL DESIGN
2 - 120'-9" SPANS, BULB TEE, 65 INCH, PSC BEAM	SPECIAL DESIGN
1 - 56'-3" SPANS, BULB TEE, 65 INCH, PSC BEAM	SPECIAL DESIGN
1 - 56'-9" SPANS, BULB TEE, 65 INCH, PSC BEAM	SPECIAL DESIGN

63

P. I. NO.	0000763
STRUCTURE I. D. NO.	075-00216X-003.60N
EXISTING BRIDGE SERIAL NO.	075-0018-0

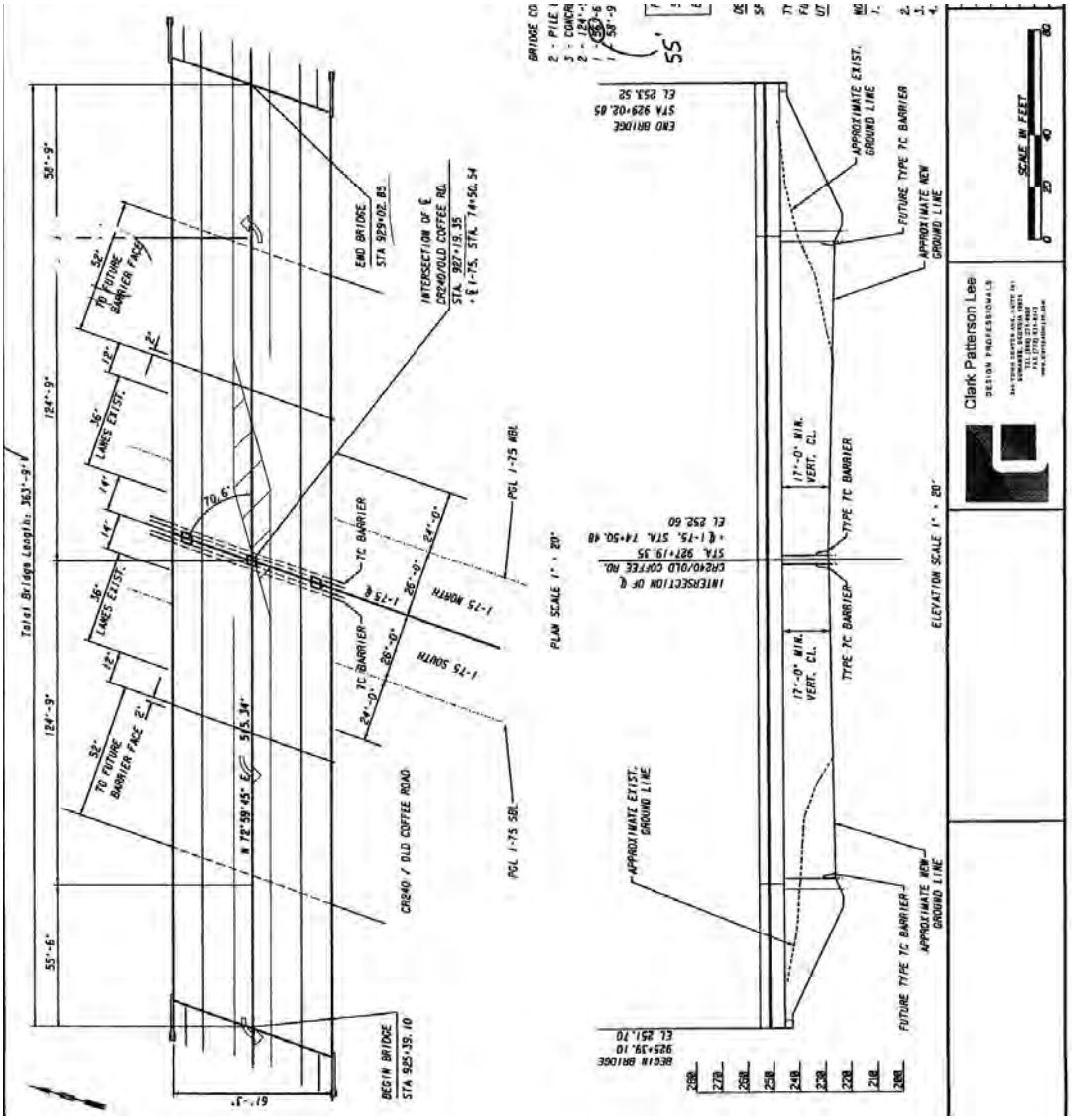
ALT. DESIGN



Illustration

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION	**Use a two-span structure with MSE walls in-lieu of four span structures**	SHEET NO.: **5** of **12**

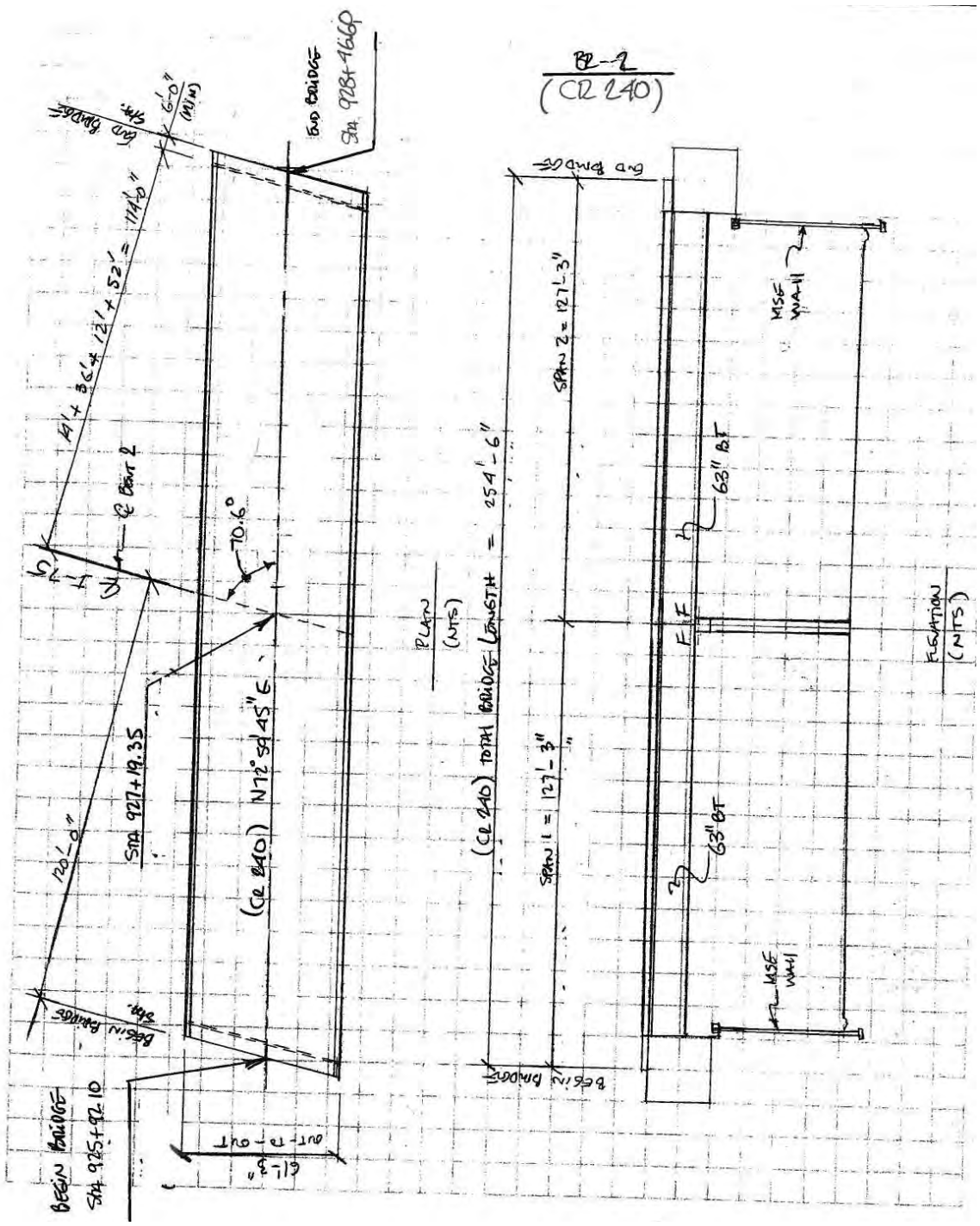
Current Design CR 240 / Old Coffee Road



Illustration

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION	**Use a two-span structure with MSE walls in-lieu of four span structures**	SHEET NO.: **6** of **12**

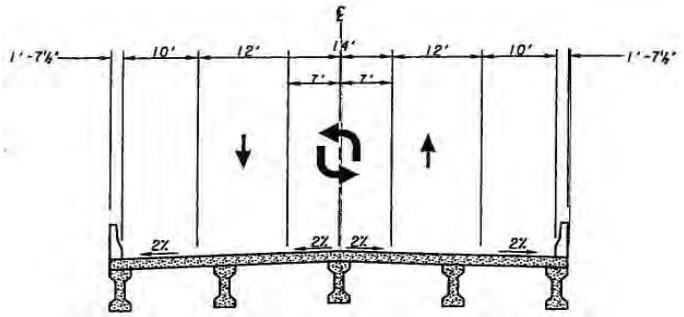
Proposed Alternative CR 240 / Old Coffee Road:



Illustration

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-2**
DESCRIPTION:	**Use a two-span structure with MSE walls in-lieu of four span structures**	SHEET NO.: **7** of **12**

CURRENT DESIGN



T-02
TYPICAL SECTION-BRIDGE
(CR240/OLD COFFEE ROAD)

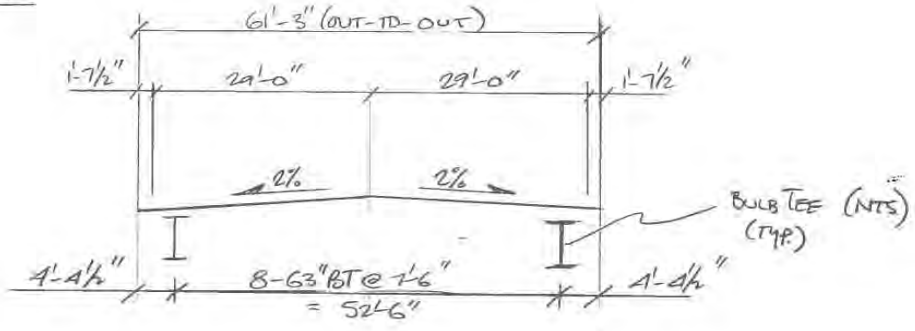
BRIDGE CONSISTS OF

2 - PILE END BENTS	SPECIAL DESIGN
3 - CONCRETE INTERMEDIATE BENTS	SPECIAL DESIGN
2 - 124'-9" BULB TEE, 65 IN., PSC BEAM SPANS	SPECIAL DESIGN
1 - 56'-6" BULB TEE, 65 IN., PSC BEAM SPAN	SPECIAL DESIGN
1 - 58'-9" BULB TEE, 65 IN., PSC BEAM SPAN	SPECIAL DESIGN

55' 63

P. I. NO.	0000763
STRUCTURE I. D. NO.	075-00240X-001. B4N
EXISTING BRIDGE SERIAL NO.	075-0019-0

ALT. DESIGN



Average cost per SF for PSC beams on concrete bents =$95/SF(per GDOT Bridge and Structures Design Policy Manual 7/2009 revision)

ORIGINAL DESIGN:

BR#1 (CR 240)

BRIDGE LENGTH = 363.75’
BRIDGE WIDTH = 61.25’
BRIDGE AREA = (363.75’) x (61.25’) = 22,279.6875 SF

BR#2 (CR 216)

BRIDGE LENGTH = 354.5’
BRIDGE WIDTH = 61.25’
BRIDGE AREA = (354.5’) x (61.25’) = 21,713.125 SF

TOTAL BRIDGE AREA = 43,993 SF

AS PROPOSED:

BR#1 (CR 240)

BRIDGE LENGTH = 254.5’
BRIDGE WIDTH = 61.25’
BRIDGE AREA = (254.5’) x (61.25’) = 15,588.125 SF

BR#2 (CR 216)

BRIDGE LENGTH = 246.5’
BRIDGE WIDTH = 61.25’
BRIDGE AREA = (246.5’) x (61.25’) = 15,098.125 SF

TOTAL BRIDGE AREA = 30,687 SF

COST SAVINGS (BRIDGE STRUCTURE ONLY):

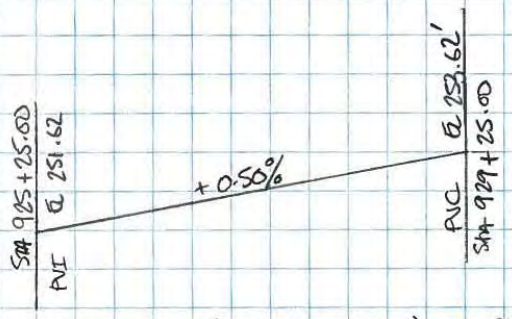
BR#1 = (22,280 – 15,5889) x $95/SF = $635,740

BR#2 = (21,714 – 15,090) x $95/SF = $629,280

BR-2

FINISH GRADE

BR#1 (CR 240)



BEGIN BRIDGE Sta 925+92.10 ℄ = (92592.10 − 92525) × 0.50% + 251.62 ≅ 251.955'

Ext BM = 251.955 − 2% (26.25) = 251.43'

END BRIDGE Sta 928+46.60 ℄ = 251.955 + 254.50 × 0.50% = 253.228'

Ext BM = 253.228' − 2% (26.25) = 252.703'

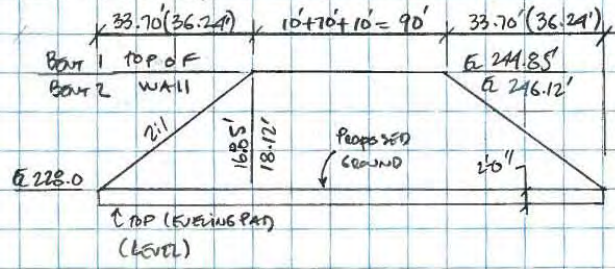
TOP of CAP ℄

BM Deck Bup Brg Pad

CR 240 ⇒ ℄ = 251.43 − (63" + 8" + 4" + 4") ≅ 244.847' ≅ 244.85' (BENT No. 1)

℄ = 252.703' − 6.583' ≅ 246.119 ≅ 246.12' (BENT 3)

MSE WALL Qty



WALL AREA = 2084.35 + 2287.47

SF = 4371.82

COPING = 157.64' + 162.18'

LF = 4371.82

BR#1 (CR 240)

Bridge out-to-out width = 61.25’

Bridge length reduction = 109.25’

Ave. fill height = 24.50’

Asphalt buildup = 1.50’

Soil Backfill = (109.50’ x (24.50’-1.50’) x 61.25) / 27 cf / cy = 5,700 CY MSE Wedge

Earthwork reduction = (25.23’ x (0.7 x 25.23’) x 2.868’) / (2 x 27) = 24 CY Wall No. 1

Earthwork reduction = (23.96’ x (0.7 x 23.96’) x 2.857’) / (2 x 27) = 21 CY Wall No. 2

Total earthwork = 5,700 - 24 - 21 = 5,655 CY

GAB – 10” = 6691 SF x (10” / 12) X (135 pcf / 2000) = 376 TN

12.5 mm – 1.5” Superpave = 56 TN

19.0 mm – 2.5” Superpave = 93 TN

25.0 mm – 4” Superpave = 149 TN

BR#2 (CR 216)

Bridge out-to-out width = 61.25’

Bridge length reduction = 108.00’

Ave. fill height = 23.50’

Asphalt buildup = 1.50’

Soil Backfill = (108.00’ x (23.50’-1.50’) x 61.25) / 27 cf / cy = 5,390 CY MSE Wedge

Earthwork reduction = (24.30’ x (0.7 x 24.30’) x 2.858’) / (2 x 27) = 22 CY Wall No. 1

Earthwork reduction = (23.00’ x (0.7 x 23.00’) x 2.857’) / (2 x 27) = 20 CY Wall No. 2

Total earthwork = 5,390 - 22 - 20 = 5,348 CY

GAB – 10” = 6,615 SF x (10” / 12) X (135 pcf / 2000) = 373 TN

12.5 mm – 1.5” Superpave = 55 TN

19.0 mm – 2.5” Superpave = 92 TN

25.0 mm – 4” Superpave = 147 TN

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37 -Phase II

Cook County

ALTERNATIVE NO.: **BR-2**

DESCRIPTION: **Use a two-span structure with MSE walls in-lieu of four span structures**

SHEET NO.: **12 of 12**

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
CR 240 Bridge	SF	22,280	$95.00	$2,116,600	15,189	$95.00	$1,442,955
MSE Walls	SF	0	$45.00	$0	4,372	$45.00	$196,740
Coping (MSE Wall)	LF	0	$72.00	$0	320	$72.00	$23,040
Barrow Exc.	CY	0	$3.78	$0	5,655	$3.78	$21,376
12.5 mm Superpave	TN	0	$76.18	$0	56	$76.18	$4,266
19.0 mm Superpave	TN	0	$58.58	$0	93	$58.58	$5,448
25.0 mm Superpave	TN	0	$52.92	$0	149	$52.92	$7,885
GAB	TN	0	$14.99	$0	376	$14.99	$5,636
CR 216 Bridge	SF	21,714	$95.00	$2,062,830	15,099	$95.00	$1,434,405
MSE Walls	SF	0	$45.00	$0	4,076	$45.00	$183,420
Coping (MSE Wall)	LF	0	$72.00	$0	312	$72.00	$22,464
Barrow Exc.	CY	0	$3.78	$0	5,348	$3.78	$20,215
12.5 mm Superpave	TN	0	$76.18	$0	55	$76.18	$4,190
19.0 mm Superpave	TN	0	$58.58	$0	92	$58.58	$5,389
25.0 mm Superpave	TN	0	$52.92	$0	147	$52.92	$7,779
GAB	TN	0	$14.99	$0	373	$14.99	$5,591
Sub-total				$ 4,179,430			$ 3,390,800
Cons't Mark-up 10.00%				$ 206,283			$ 168,793
TOTAL				**$ 4,385,713**			**$ 3,559,593**
Estimated Savings:							$826,120

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-3**
DESCRIPTION:	**Use 12' turn lanes on the bridges**	SHEET NO.: **1** of **4**

Original Design:

The original design calls for an overall out-to-out width of 61'-3". The current bridge out-to-out width will provide two 12'-0" traffic lanes (two in each direction), a flush median with one 14'-0" inside turning lane and two 10'-0" shoulders.

Alternative:

The proposed alternative calls for an overall out-to-out width is 59'-3". The proposed out-to-out width will provide two 12'-0" traffic lanes (two in each direction), a flush median with one 12'-0" inside turning lane and two 10'-0" shoulders.

Opportunities:

- Reduction in bridge width
- Reduction in beam spacing
- Possible reduction of a beam line
- Possible reduction in deck thickness
- Potential cost savings

Risks:

- None anticipated

Technical Discussion:

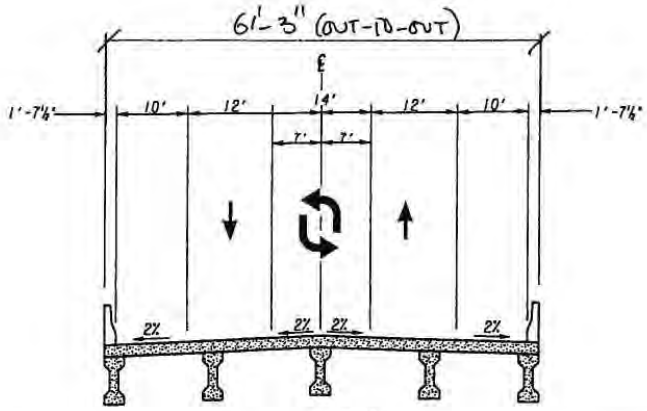
In consideration of the nominal traffic load, it appears reasonable to only construct a 12'-0" turn lane in-lieu of the 14'-0" turn lane proposed. Additionally, there is not a significant truck volume. Also, as this project is only for a two lane with turn lanes, it would be easy in the future, should traffic volumes require a four lane section to provide additional width at that time. It is noted that current designs typically only require 11' through lanes and 12' turn lanes and that with such low traffic volumes, 12' should be responsible.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,597,373	$	$ 4,597,373
ALTERNATIVE	$ 4,447,102	$	$ 4,447,102
SAVINGS	$ 150,271	$	$ 150,271

Illustration

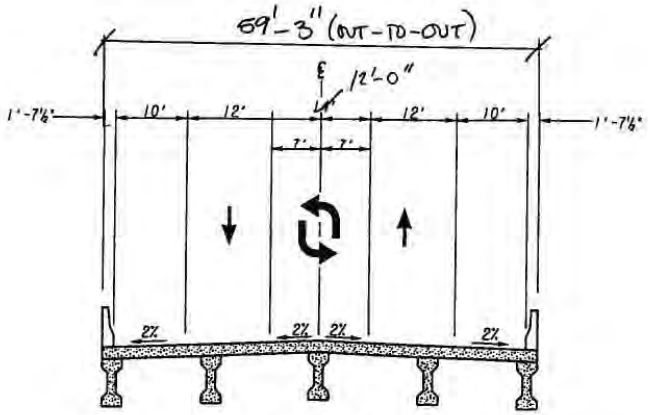
PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-3**
DESCRIPTION:	**Use 12' turn lanes on bridges**	SHEET NO.: **2** of **4**

CURRENT DESIGN



T-02
TYPICAL SECTION-BRIDGE
(CR216/ADEL QUITMAN ROAD) (CR240/OLD COFFEE ROAD)

ALT. DESIGN



T-02
TYPICAL SECTION-BRIDGE
(CR216/ADEL QUITMAN ROAD) (CR240/OLD COFFEE ROAD)

Calculations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **BR-3**
DESCRIPTION:	**Use 12' turn lanes**	SHEET NO.: **3** of **4**

Assumptions:

Reduce turn lane width on bridge structures on CR 240 and CR 216 from 14' w to 12' w.

CR 240 structure length=363.75'
CR 216 structure length=354.5'

CR 240= 363.75' x 2' width reduction=727.5 SF reduction
CR 216= 354.5' x 2' width reduction=709 SF reduction

727.5SF +709 SF= 1436.5 SF total reduction for both structures.

Average cost per SF for PSC beams on concrete bents =$95/SF(per GDOT Bridge and Structures Design Policy Manual 7/2009 revision)

CR 216=709 x $95=$67,355
CR240=727.5 x $95=$69,112.50

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37-Phase II
Cook County

ALTERNATIVE NO.: **BR-3**

DESCRIPTION: **Use 12' turn lanes on the bridges**

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
CR 240 Bridge	SF	22,280	$ 95	$ 2,116,600	21,552	$ 95	$ 2,047,440
CR 216 Bridge	SF	21,714	$ 95	$ 2,062,830	21,004	$ 95	$ 1,995,380
Sub-total				$ 4,179,430			$ 4,042,820
Mark-up at 10.00%				$ 417,943			$ 404,282
TOTAL				**$ 4,597,373**			**$ 4,447,102**
Estimated Savings:							$150,271

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.:	**RD-1**
DESCRIPTION:	**Reduce the sum of the ramp shoulders from 14'-0" to 12'-0"**	SHEET NO.:	**1** of **4**

Original Design:

The original design proposes a 4'-0" left shoulder and a 10'-0" right shoulder for a sum total of 14'-0".

Alternative:

The alternative design would propose utilizing either a 2'-0" left shoulder and a 10'-0" right shoulder or a 4'-0" left shoulder and an 8'-0" right shoulder.

Opportunities:

- Reduction in paving costs
- Comply with AASHTO policy

Risks:

- None

Technical Discussion:

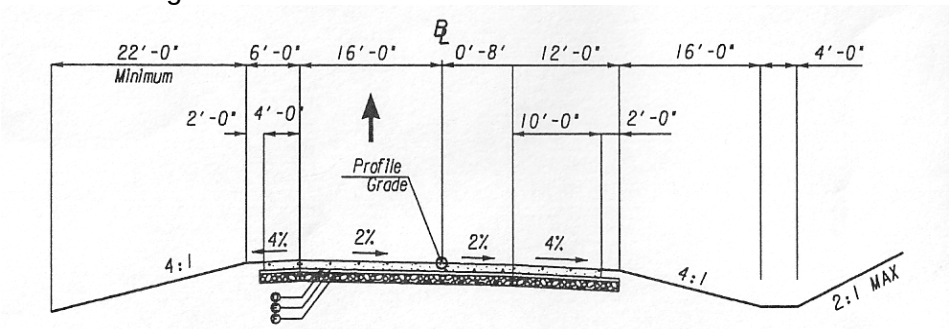
According to AASHTO's Policy on Geometric Design of Highways and Streets (Page 838), for one way ramps, " the sum of the left and right shoulder widths should not exceed 10'-0" to 12-'0" feet". While a 4'-0" inside shoulder or a 10'-0" outside shoulder is acceptable under the guidelines combining the two maximum allowable values exceeds the value recommended by AASHTO.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,619,701	$ 0	$ 1,619,701
ALTERNATIVE	$ 1,388,159	$ 0	$ 1,388,159
SAVINGS	$ 231,542	$ 0	$ 231,542

Illustrations

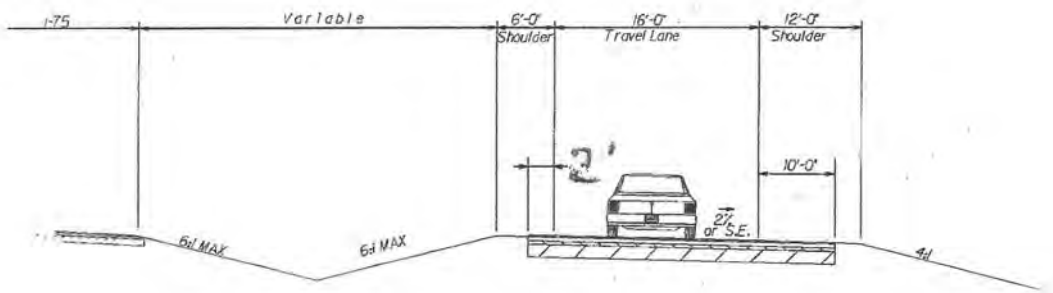
PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-1**
DESCRIPTION:	**Reduce the sum of the ramp shoulders from 14'-0" to 12'-0"**	SHEET NO.: **2** of **4**

Current Design – 4' and 10' = 14'



T-10
TANGENT SECTION - RAMP

Alternative Design – 2' and 10' = 12' total



Ramp Typical Section

Calculations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-1**
DESCRIPTION:	**Reduce the sum of the ramp shoulders from 14'-0" to 12'-0"**	SHEET NO.: **3** of **4**

CR-216
Ramp 'A' – 2500 lf
Ramp 'B' – 1450 lf
Ramp 'C' – 2250 lf
Ramp 'D' – 2500 lf
CR-240
Ramp 'A' – 1950 lf
Ramp 'B' – 1600 lf
Ramp 'C' – 2200 lf
Ramp 'D' – 2500 lf

Total Length = 16,950 FT

Original Design:
Area = (16,950 FT x 14.0 FT) / (9 SF/SY) => 26,370 SY
8" PCC = 26,370 SY
Superpave 19.0mm = [26,370 SY x 330 #/SY-IN / (2000#/TN)] = >4,351 TN
6" GAB = [16,950 FT x 14.0 FT x 0.5 FT x 135 #/CF / (2000#/TN)] = >8,009 TN
Alternative Design:
Area = (16,950 FT x 12.0 FT) / (9 SF/SY) = 22,600 SY
8" PCC = 22,600 SY
Superpave 19.0mm = [22,600 SY x 330 #/SY-IN / (2000#/TN)] = >3,729 TN
6" GAB = = [16,950 FT x 12.0 FT x 0.5 FT x 135 #/CF / (2000#/TN)] = >6,865 TN

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37-
Phase II
Cook County

ALTERNATIVE NO.: **RD-1**

DESCRIPTION: **Reduce the sum of the the ramp shoulders from 14'-0" to 12'-0"**

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
8" PCC	SY	26,370	$ 41.62	$ 1,097,519	22,600	$ 41.62	$ 940,612
19.0mm Superpave	TN	4,351	$ 58.58	$ 254,882	3,729	$ 58.58	$ 218,445
6" GAB	TN	8,009	$ 14.99	$ 120,055	6,865	$ 14.99	$ 102,906
Sub-total				$ 1,472,456			$ 1,261,963
Mark-up at 10.00%				$ 147,246			$ 126,196
TOTAL				**$ 1,619,701**			**$ 1,388,159**
Estimated Savings:							$231,542

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.:	**RD-2**
DESCRIPTION:	**Use a 4'-0" paved shoulder in lieu of a 6'-6" paved shoulder**	SHEET NO.:	**1** of **5**

Original Design:

The original design provides a 6'-6" paved shoulder on CR-216 and CR-240.

Alternative:

The alternative design would provide a 4'-0" paved shoulder on CR-216 and CR-240.

Opportunities:

- Reduced paving costs

Risks:

- None

Technical Discussion:

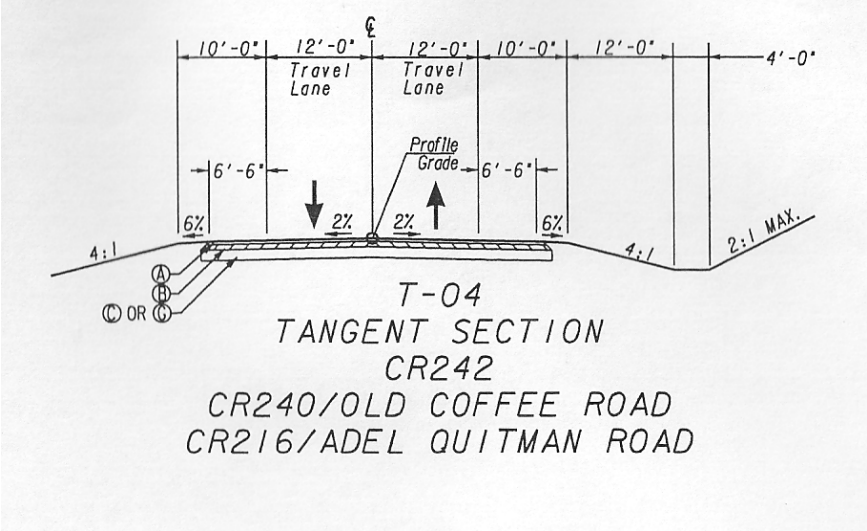
AASHTO Policy on Geometric Design of Highways and Streets would allow the use of a 4'-0" shoulder. This would be the minimum to accommodate bike traffic as outlined On Page 16 of AASHTO's guide for development of bicycle facilities. Since the subject road is a "low speed" facility and classified as a Minor Rural Arterial the use of rumble strips on the shoulders would not be recommended under the FHWA implementation guidelines.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 223,3939	$ 0	$ 223,3939
ALTERNATIVE	$ 145,329	$ 0	$ 145,329
SAVINGS	$ 78,064	$ 0	$ 78,064

Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-2**
DESCRIPTION:	**Use a 4’-0” paved shoulder in lieu of a 6’-6” paved shoulder**	SHEET NO.: **2** of **5**

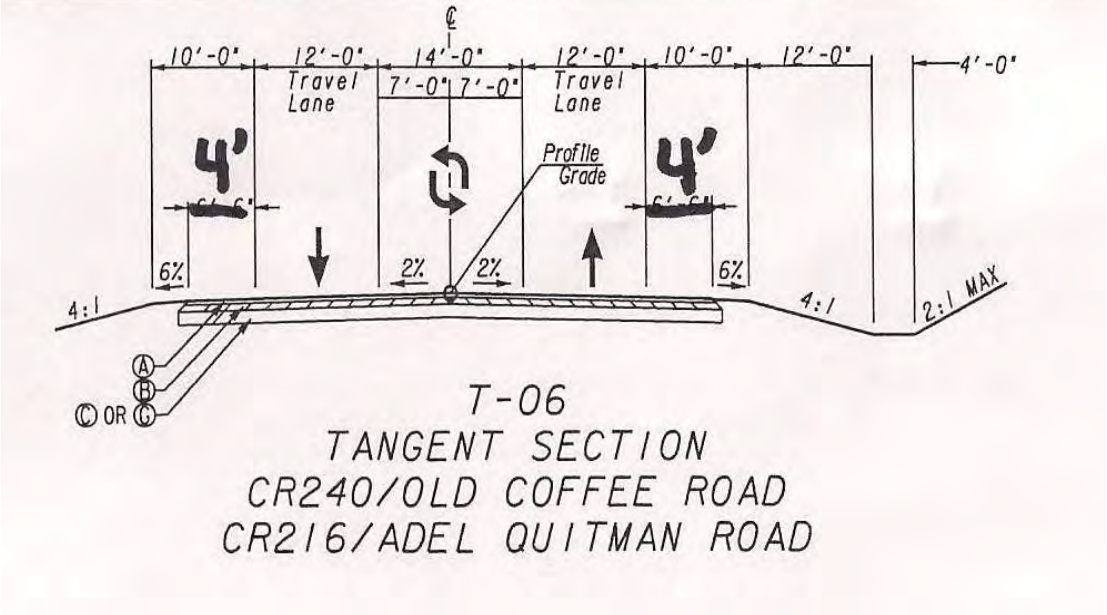
Current Design:



Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-2**
DESCRIPTION:	**Use a 4'-0" paved shoulder in lieu of a 6'-6" paved shoulder**	SHEET NO.: **3** of **5**

Alternative Design:



Calculations

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.: **RD-2**
DESCRIPTION:	**Use a 4'-0" paved shoulder in lieu of a 6'-6" paved shoulder**	SHEET NO.: **4** of 5

Length of the roadway:

CR-240	= 1,750	LF
CR-216	= 3,100	LF
M.J. Taylor	= 2,500	LF
Total	7,350	LF

Original 6.5' shoulders

Total Area of Paved Shoulder = (7,350 LF x13.0') / (9 SF / SY) = 10,616.7 SY => 10,617 SY

Superpave 9.5mm = [(10,617 SY x 138#/SY-IN) / (2000#/Ton)] => 733 TN

Superpave 25.0mm = [(10,617 SY x 330#/SY-IN) / (2000#/Ton)] => 1,752 TN

8" GAB = (7,350 LF x13.0' x (8"/12") x 135#/ CF) / (2000#/Ton) =>4,300 TN

Alternative 4.0' shoulders

Total Area of Paved Shoulder = (7,350 LF x8.0') / (9 SF / SY) = 6,533.3 SY => 6,534 SY

Superpave 9.5mm = [(6,534 SY x 138#/SY-IN) / (2000#/Ton)] => 451 TN

Superpave 25.0mm = [(6,534 SY x 330#/SY-IN) / (2000#/Ton)] => 1,078 TN

8" GAB = (7,350 LF x 8.0' x (8"/12") x 135#/ CF) / (2000#/Ton) =>2,646 TN

Fill = (7,350 LF x8.0'x1') / (27 CF / CY) => 2,178 CY

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37-Phase II
Cook County

ALTERNATIVE NO.: **RD-2**

DESCRIPTION: **Use a 4'-0" paved shoulder in lieu of a 6'-6" paved shoulder**

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

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
9.5mm Superpave	SY	733	$ 60.25	$ 44,163	451	$ 60.25	$ 27,173
25.0mm Superpave	TN	1,752	$ 52.92	$ 92,716	1,078	$ 52.92	$ 57,048
8" GAB	TN	4,300	$ 14.99	$ 64,457	2,646	$ 14.99	$ 39,664
Borrow	CY	0	$ 3.78	$ -	2,178	$ 3.78	$ 8,233
Rumble Strips	GLM	2	$ 874.19	$ 1,748	0	$ 874.19	$ -
Sub-total				$ 203,084			$ 132,117
Mark-up at 10.00%				$ 20,308			$ 13,212
TOTAL				**$ 223,393**			**$ 145,329**
Estimated Savings:							$78,064

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.:	**RD-13**
DESCRIPTION:	**Build a tight urban diamond at both interchanges**	SHEET NO.:	**1** of **8**

Original Design:

The original design proposes compressed diamonds.

Alternative:

The alternative design would propose utilizing a shorter two span bridge and build a tight urban diamond.

Opportunities:

- Significantly Reduces R.O.W. costs
- Reduced overall bridge cost
- Improved "future" traffic operations

Risks:

- Potential required signalization
- Additional lanes required between ramps

Technical Discussion:

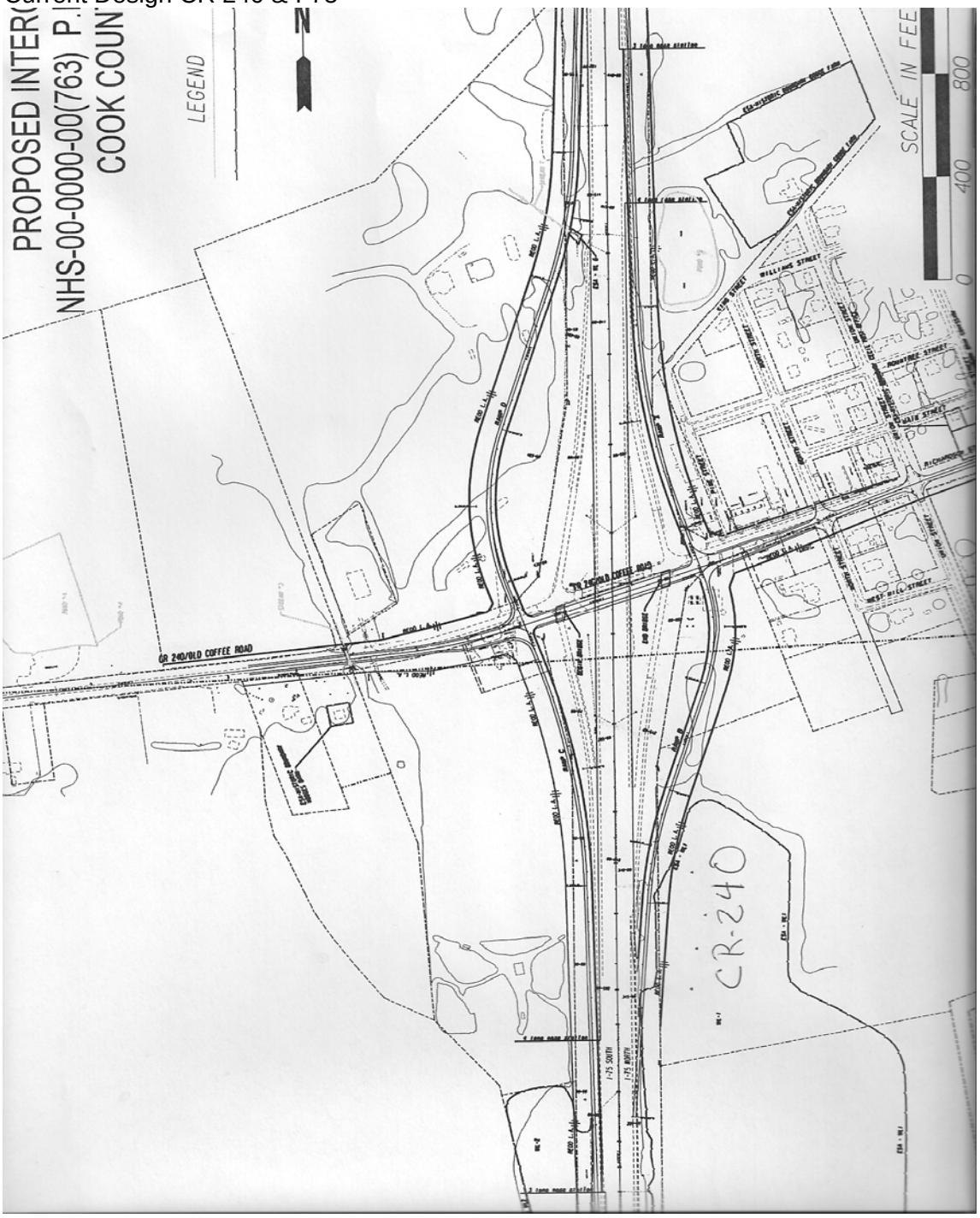
By constructing a shorter two span bridge and moving the ramp terminals closer together a number of cost savings can be realized with a minimum of negative impacts. From an operational perspective a spacing of ~350' will allow the interchange ramps to be timed as a single intersection in the future. However, the projected growth and the current arrangement will probably result in signals being necessary in about the same time as this arrangement. The reduction in adverse impacts, increased savings and local acceptance makes this alternative a very attractive option.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,485,063	$ 0	$ 4,485,063
ALTERNATIVE	$ 759,770	$ 249,244	$ 1,009,014
SAVINGS	$ 3,725,293	$ 0	$ 3,476,049

Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-13**
DESCRIPTION:	**Build a tight urban diamond at both interchanges.**	SHEET NO.: **2** of **8**

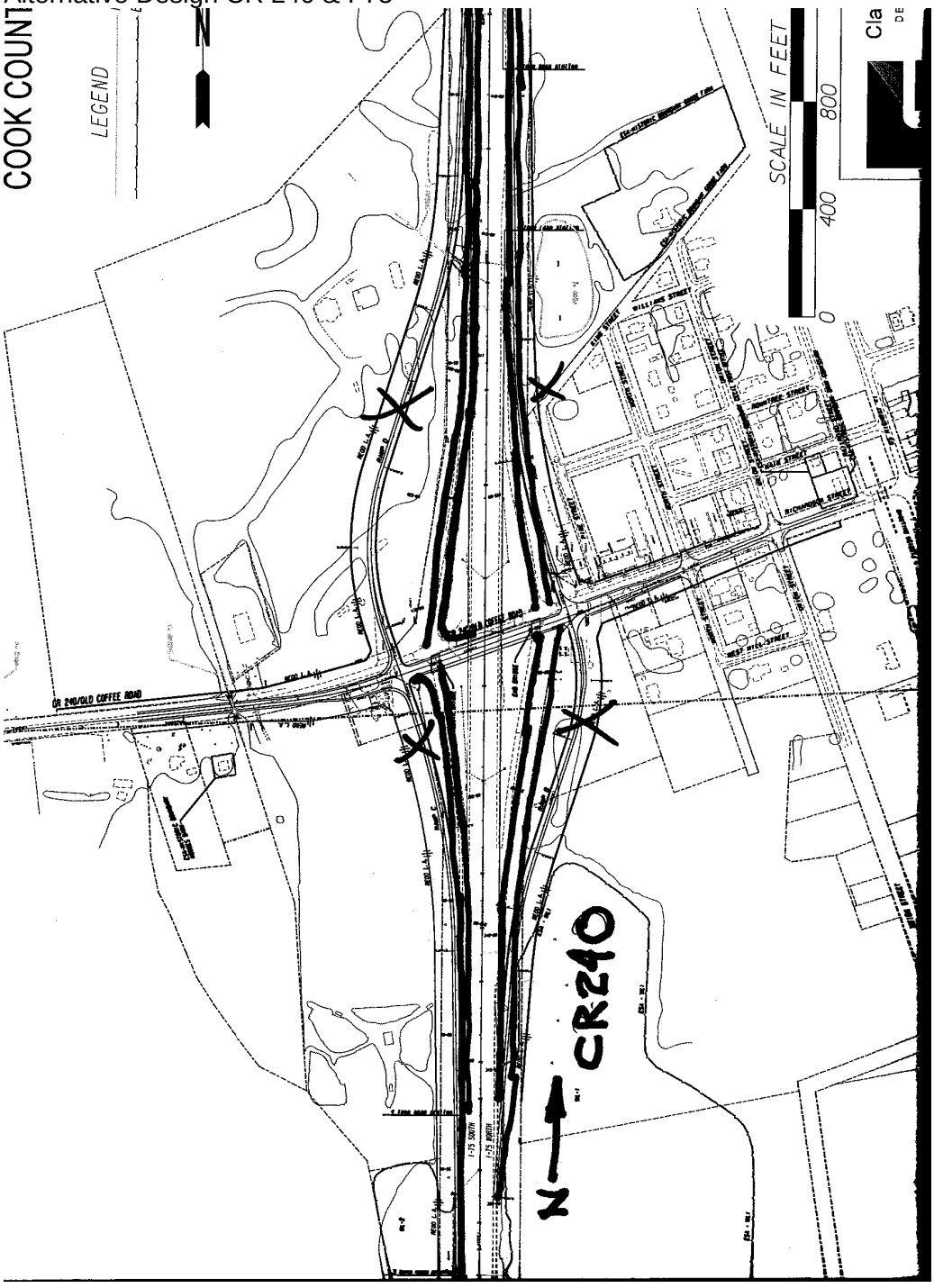
Current Design CR 240 & I-75



Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-13**
DESCRIPTION:	**Build a tight urban diamond at both interchanges.**	SHEET NO.: **3** of **8**

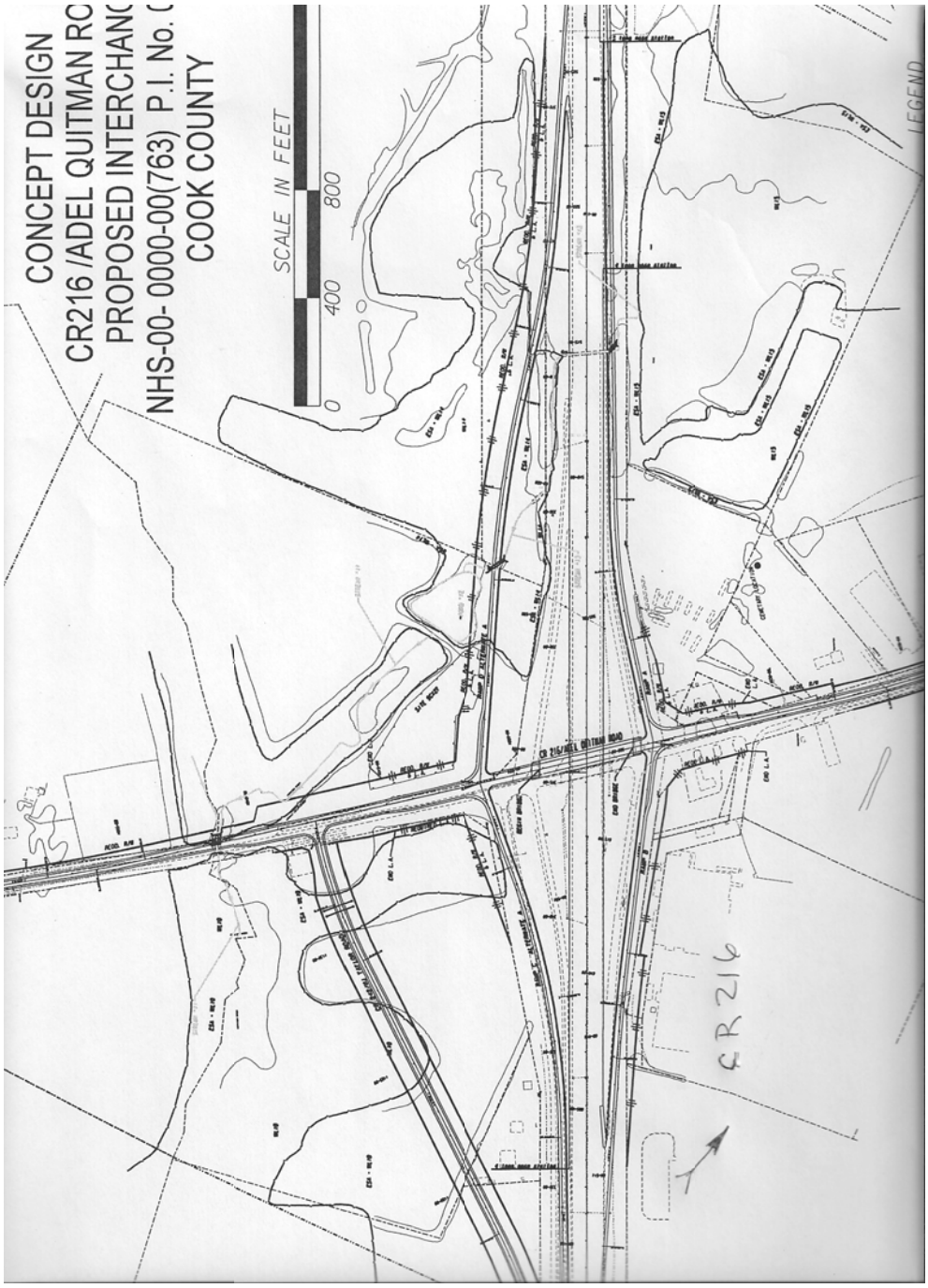
Alternative Design CR 240 & I-75



Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-13**
DESCRIPTION:	**Build a tight urban diamond at both interchanges.**	SHEET NO.: **4** of **8**

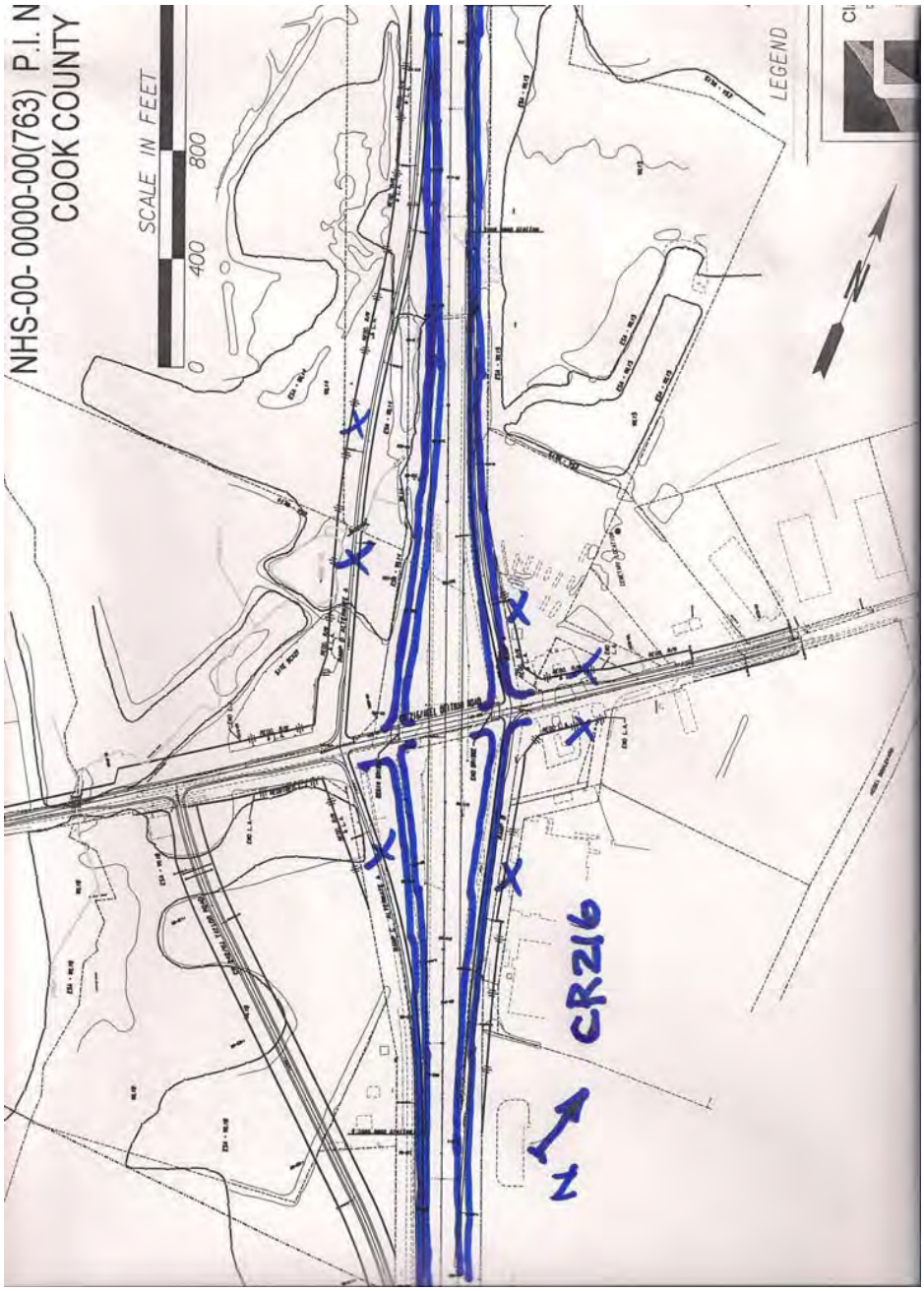
Current Design CR 216 & I-75



Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-13**
DESCRIPTION:	**Build a tight urban diamond at both interchanges.**	SHEET NO.: **5** of **8**

Alternative Design CR 216 & I-75



Bridge Cost:

Additional cost of the original design versus the use of a 2 span bridge and MSE walls => $393,630 (See BR-2)

Cost of additional turn lane for the alternative design 12FT width x 255 LF x $95/SF => $290,7000

Signals:

4 ramps x 100,000 each => $400,000

Yearly maintenance cost => 10,000/year for 20 years (See Sheet 5)

Right of Way:
Assume an overall reduction in ROW cost of 30%

$12,279,000 x 0.30 => $3,683,700

Assume paving and earthwork cost differential is insignificant.

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37- Phase II
Cook County

ALTERNATIVE NO.: **RD-13**

DESCRIPTION: **Build Tight Urban Diamonds at both intersections**

SHEET NO.: **7** of **8**

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Signalization	LS	0	$ -	$ -	1	$ 400,000	$ 400,000
Bridge Costs	LS	1	$ 393,630	$ 393,630	1	$ 290,700	$ 290,700
ROW	LS	1	$ 3,683,700	$ 3,683,700	0	$ -	$ -
Sub-total				$ 4,077,330			$ 690,700
Mark-up at 10.00%				$ 407,733			$ 69,070
TOTAL				**$ 4,485,063**			**$ 759,770**
Estimated Savings:							$3,725,293

LIFE CYCLE COST WORKSHEET

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) – P.I. No. 0000763
I-75 from Lowndes County line to SR 37 – Phase II
Cook County

ALTERNATIVE NO. **RD-13**

SHEET NO. **8 of 8**

LIFE CYCLE PERIOD:	20	**years**					**No Signals**	**Signals (4)**
INTEREST RATE:	5.00%	**ESCALATION RATE:**	0.00%				**ORIGINAL**	**PROPOSED**
A.	**INITIAL COST**						$4,485,063	$400,000
	Useful Life (Years)						20	20
						INITIAL COST SAVINGS		
B.	**RECURRENT COSTS (Annual Expenditures)**							
	1.	**Maintenance**	Signalization				$ 20,000	
	2.							$ -
	3.	**Energy**						
	4.							
	5.							
	6.							
						Total Annual Costs	20,000	-
						Present Worth Factor	12.4622	12.4622
						Present Worth of RECURRENT COSTS	249,244	-
C.	**SINGLE EXPENDITURES**			**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	**< Put "x" in appropriate box (original design or proposed design)**						
	x	**1.**			$0	1.0000	$ -	$ -
x		**2.**			$0	1.0000	$ -	$ -
x		**3.**			$0	1.0000	$ -	$ -
	x	**4.**			$0	1.0000	$ -	$ -
x		**4.**			$0	1.0000	$ -	$ -
x		**5.**			$0	1.0000	$ -	$ -
		6.				1.0000	$ -	$ -
		7.				1.0000	$ -	$ -
		8.				1.0000	$ -	$ -
D.	**SALVAGE VALUE**			**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
	x	**1.**				1.0000	-	-
		2.				1.0000	-	-
						Present Worth of SINGLE EXPENDITURES	$0	$0
E.	**Total Recurrent Costs & Single Expenditures (B + C + D)**						$249,244	$0
						RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		$249,244
						TOTAL PRESENT WORTH COST (A + E)	$4,734,307	$400,000
						TOTAL LIFE CYCLE SAVINGS		**$4,334,307**

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation NHS00-0000-00(763) – P.I. No. 0000763 I-75 from Lowndes County line to SR 37 – Phase II Cook County**	ALTERNATIVE NO.:	**RD-14**
DESCRIPTION:	**Re-align CR-216 Ramp 'D' and relocate longitudinal stream**	SHEET NO.:	**1** of **5**

Original Design:

The original design proposes relocating Ramp 'D' toe west and lengthening it to avoid a longitudinal stream relocation

Alternative:

The alternative design would propose constructing Ramp 'D' similarly to Ramp 'B'

Opportunities:

- Reduction in ROW cost
- Reduction in paving cost
- Reduction in environmental impacts

Risks:

- Required stream re-location

Technical Discussion:

The current design will require approximately 6.0 acres of wetland and will impact approximately 125 feet of previously un-impacted streambed.

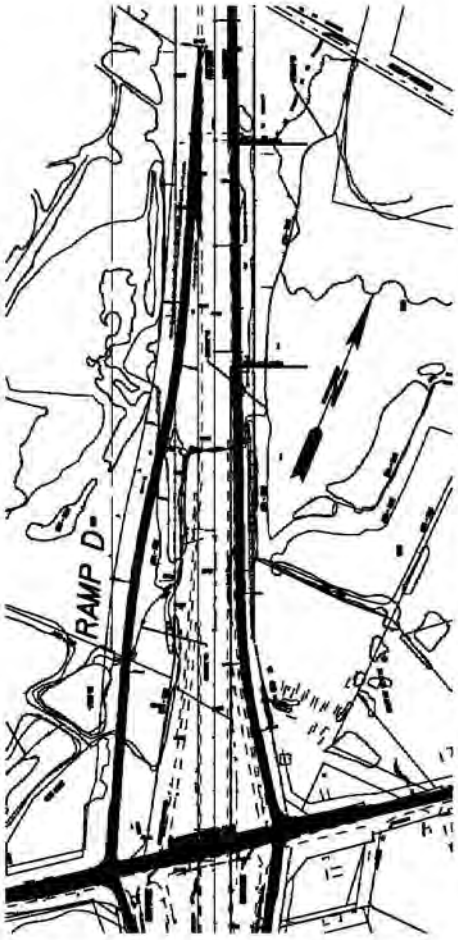
By utilizing a tighter alignment, that will require relocating the longitudinal stream, you can reduce the ramp length and lessen the environmental impacts. Relocating the stream will allow you to reduce the amount of currently forested wetlands that will need to be acquired to about 2.5 acres Additionally, this will avoid segregating the stream from the wetland. Having the stream adjacent to the wetland will divert less water away from the wetland and allow more recharge and overtopping flow to feed the wetland. About 600 feet of stream will need to be relocated. The relocated portion will include approximately 100 of natural previously un-impacted streambed. It also includes approximately 500 feet of streambed that was previously relocated for the construction of I-75 and is now "maintained" as longitudinal drainage within I-75 ROW.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,304,175	$ 0	$ 1,304,175
ALTERNATIVE	$ 296,938	$ 0	$ 296,938
SAVINGS	$ 1,007,237	$ 0	$ 1,007,237

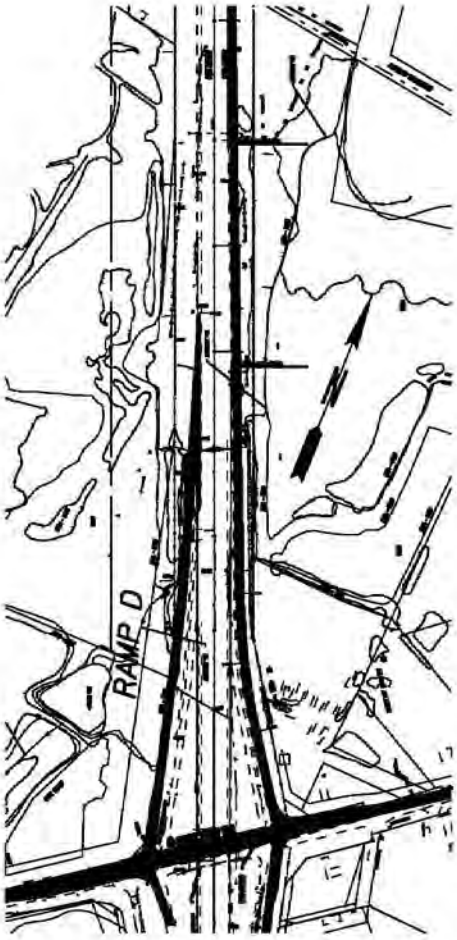
Illustrations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-14**
DESCRIPTION:	Realign CR 216 ramp "D" and relocate stream	SHEET NO.: **2** of **4**

Current Design CR 240 & I-75



ORIGINAL DESIGN
CR216 /ADEL QUITMAN ROAD



ALTERNATIVE DESIGN
CR216 /ADEL QUITMAN ROAD

Calculations

PROJECT:	**Georgia Department of Transportation** **NHS00-0000-00(763) – P.I. No. 0000763** **I-75 from Lowndes County line to SR 37 – Phase II** **Cook County**	ALTERNATIVE NO.: **RD-14**
DESCRIPTION:	**Re-align CR-216 Ramp 'D' and relocate longitudinal stream**	SHEET NO.: **3** of **4**

CR-216
Ramp 'D' – 1450 FT (modified)
Ramp 'D' – 2500 FT

Original Design:
Area = (2,500 FT x 30.0 FT) / (9 SF/SY) => 8,334 SY
8" PCC = 8,334 SY
Superpave 19.0mm = [8,334 SY x 330 #/SY-IN / (2000#/TN)] = >1,375TN
6" GAB = [2,500 FT x 30.0 FT x 0.5 FT x 135 #/CF / (2000#/TN)] = >2,532 TN
Alternative Design:
Area = (1,450 FT x 30.0 FT) / (9 SF/SY) = 4,834 SY
8" PCC = 4,834 SY
Superpave 19.0mm = [4,834 SY x 330 #/SY-IN / (2000#/TN)] = >798 TN
6" GAB = = [1,450 FT x 30.0 FT x 0.5 FT x 135 #/CF / (2000#/TN)] = >1,468 TN

Right of Way-
Improvements- 3billboards x $100,000 = $300,000
Agricultural 3.5 acres x $10,000/acre = $35,000

Net cost	= $335,000
Scheduling @ 55%	= $184,250
Court cost @ 60%	= $201,000
Total	= $720,250

Assume the differential in the culvert cost and earthwork will be minimal.

Cost Worksheet

PBS&J

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) - P.I. No. 0000763
I-75 from Lowndes County line to SR 37- Phase II
Cook County

ALTERNATIVE NO.: **RD-14**

DESCRIPTION: **Re-align CR-216 Ramp 'D' and relocate longitudinal stream**

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
8" PCC	SY	8,334	$ 41.62	$ 346,861	4,834	$ 41.62	$ 201,191
19.0mm Superpave	TN	1,375	$ 58.58	$ 80,548	798	$ 58.58	$ 46,747
6" GAB	TN	2,532	$ 14.99	$ 37,955	1,468	$ 14.99	$ 22,005
ROW	LS	1	$ 720,250.00	$ 720,250	0	$ -	$ -
Sub-total				$ 1,185,613			$ 269,943
Mark-up at 10%				$ 118,561			$ 26,994
TOTAL				**$ 1,304,175**			**$ 296,938**
Estimated Savings:							$1,007,237

PROJECT DESCRIPTION

INTRODUCTION

The subject of the Value Engineering study is project NHS00-0000-00(763) – P.I. No. 0000763, I-75 from Lowndes County line to SR 37 – Phase II, which consists of the reconstruction of the I-75 interchanges at CR/240 Old Coffee Road (exit 32) and CR 216 – the Adel Quitman Road (exit 37).

PROJECT DESCRIPTION

The existing interchange at CR 240 Old Coffee Road (exit 32), which does not provide the required 17'-0" clearance above I-75, will be re-constructed as a diamond interchange, to provide the required clearance. The improved interchange will also be designed to accommodate the future widening of I-75 to an 8-lane typical section. The CR/240 - Old Coffee Road, will be two 12'-0" lanes, with a 14'-0" flush median, and 10'-0" inside and outside shoulders.

Existing CR 240

Existing CR 216

The existing interchange at CR 216 Adel Quitman Road (exit 37), which does not provide the required 17'-0" clearance above I-75, will be re-constructed, as a compressed diamond interchange, to provide the required clearance. The improved interchange will also be designed to accommodate the future widening of I-75 to an 8-lane typical section. CR 216 – the Adel Quitman Road (exit 37), will be two 12'-0" lanes, with a 14'-0" flush median, and 10'-0" inside and outside shoulders.

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

The estimated construction cost for the project is $16,735,069. In addition, Right-of-Way costs are anticipated to be $12,279,000 with reimbursable utilities cost estimated to be $833,066. The projected total cost for the project is $29,847,135.

R**EPRESENTATIVE DOCUMENTS**

- Georgia Department of Transportation
    - Construction Cost Estimates
    - Preliminary Right-of-Way Cost Estimate
    - Concept Reports
    - Project Location Maps
    - Typical Road Section

The VE Team utilized the GDOT supplied project materials noted above plus the preliminary plans provided by Clark Patterson and Lee

Estimate Report for file "I-75 Interchanges at CR 216 & CR 240_2009-10-23"

Section Roadway

Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	750000.0	TRAFFIC CONTROL - NHS-000-00(763)	750000.0
150-5010	12	EA	7165.6	TRAFFIC CONTROL, PORTABLE IMPACT ATTENUATOR	85987.20
150-9011	750	HR	51.13	TRAFFIC CONTROL - WORKZONE LAW ENFORCEMENT (CONTRACTOR BIDS)	38347.5
153-1300	1	EA	61424.9	FIELD ENGINEERS OFFICE TP 3	61424.9
201-1500	1	LS	382600.0	CLEARING & GRUBBING - NHS-000-00(763)	382600.0
205-0001	55357	CY	2.66	UNCLASS EXCAV	147249.62
206-0002	236618	CY	3.78	BORROW EXCAV, INCL MATL	894416.03
207-0203	300	CY	31.48	FOUND BKFILL MATL, TP II	9444.0
310-1101	58500	TN	14.99	GR AGGR BASE CRS, INCL MATL	876915.0
318-3000	2000	TN	17.75	AGGR SURF CRS	35500.0
402-1812	8000	TN	59.67	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	477360.0
402-3102	2600	TN	60.25	RECYCLED ASPH CONC 9.5 MM SUPERPAVE, TYPE II, BLEND 1, INCL BITUM MATL & H LIME	156650.0
402-3113	2163	TN	76.18	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	164777.34
402-3121	6200	TN	52.92	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	328104.0
402-3190	14200	TN	58.58	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME	831836.0
413-1000	1200	GL	1.67	BITUM TACK COAT	2004.0
439-0018	85905	SY	41.62	PLAIN PC CONC PVMT, CL 3 CONC, 8 INCH THK	3575366.09
456-2015	10	GLM	874.19	INDENTATION RUMBLE STRIPS - GROUND-IN-PLACE (SKIP)	8741.90
573-2006	6000	LF	7.62	UNDDR PIPE INCL DRAINAGE AGGR, 6 IN	45720.0
610-9099	1	LS	6000.0	REM WINGWALLS & PARAPETS, STA -	6000.0
620-0100	7690	LF	24.6	TEMPORARY BARRIER, METHOD NO. 1	189174.0
621-3020	800	LF	52.42	CONCRETE BARRIER, TYPE 20	41936.0
624-0400	11775	SF	19.25	SOUND BARRIER, TYPE-	226668.75
632-0003	6	EA	6285.14	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	37710.84
634-1200	197	EA	83.88	RIGHT OF WAY MARKERS	16524.36
641-1100	163	LF	41.23	GUARDRAIL, TP T	6720.49
641-1200	11294	LF	15.01	GUARDRAIL, TP W	169522.94
641-5001	19	EA	663.4	GUARDRAIL ANCHORAGE, TP 1	12604.6
641-5012	19	EA	1755.69	GUARDRAIL ANCHORAGE, TP 12	33358.11
643-1171	14370	LF	29.83	CH LK FENCE, ZC COAT, 8 FT, 9 GA	428657.1
				Section Sub Total:	**$10,041,320.79**

Section Drainage

Item Number	Quantity	Units	Unit Price	Item Description	Cost
441-0204	1000	SY	26.54	PLAIN CONC DITCH PAVING, 4 IN	26540.0
500-3101	264	CY	364.21	CLASS A CONCRETE	96151.43
511-1000	31576	LB	0.63	BAR REINF STEEL	19892.88
550-1150	1057	LF	19.2	STORM DRAIN PIPE, 15 IN, H 1-10	20294.39
550-1180	1538	LF	28.35	STORM DRAIN PIPE, 18 IN, H 1-10	43602.3
550-1240	3076	LF	34.9	STORM DRAIN PIPE, 24 IN, H 1-10	107352.4
550-1301	1086	LF	47.74	STORM DRAIN PIPE, 30 IN, H 10-15	51845.64
550-1360	77	LF	55.15	STORM DRAIN PIPE, 36 IN, H 1-10	4246.55
550-1480	115	LF	80.63	STORM DRAIN PIPE, 48 IN, H 1-10	9272.44
550-4215	4	EA	357.4	FLARED END SECTION 15 IN, STORM DRAIN	1429.6
550-4218	8	EA	434.05	FLARED END SECTION 18 IN, STORM DRAIN	3472.4
550-4224	7	EA	560.85	FLARED END SECTION 24 IN, STORM DRAIN	3925.95
550-4230	4	EA	724.16	FLARED END SECTION 30 IN, STORM DRAIN	2896.64
550-4236	2	EA	988.09	FLARED END SECTION 36 IN, STORM DRAIN	1976.18
573-2006	1922	LF	7.62	UNDDR PIPE INCL DRAINAGE AGGR, 6 IN	14645.64

576-1010	96	LF	27.76	SLOPE DRAIN PIPE, 10 IN	2664.96
611-4001	6	EA	1805.0	RECONSTR MINOR DRAINAGE STR	10830.0
611-8055	12	EA	821.11	ADJUST MINOR STRUCTURE TO GRADE	9853.32
668-2100	8	EA	1748.17	DROP INLET, GP 1	13985.36
				Section Sub Total:	**$444,878.11**

Section Temporary Erosion Control

Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	93	AC	261.57	TEMPORARY GRASSING	24326.01
163-0240	1384	TN	142.78	MULCH	197607.52
163-0300	10	EA	996.97	CONSTRUCTION EXIT	9969.7
163-0501	5	EA	771.73	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 1	3858.65
163-0520	1000	LF	12.3	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	12300.0
163-0527	30	EA	177.28	CONSTRUCT AND REMOVE RIP RAP CHECK DAMS, STONE PLAIN RIP RAP/SAND BAGS	5318.4
163-0529	3500	LF	3.02	CONSTRUCT AND REMOVE TEMPORARY SEDIMENT BARRIER OR BALED STRAW CHECK DAM	10570.0
163-0531	12	EA	4717.11	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO -	56605.31
163-0541	10	EA	594.21	CONSTRUCT AND REMOVE ROCK FILTER DAMS	5942.1
163-0550	8	EA	153.21	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	1225.68
165-0030	34000	LF	0.66	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	22440.0
165-0041	1500	LF	2.88	MAINTENANCE OF CHECK DAMS - ALL TYPES	4320.0
165-0060	12	EA	1421.81	MAINTENANCE OF TEMPORARY SEDIMENT BASIN, STA NO -	17061.72
165-0071	2000	LF	0.82	MAINTENANCE OF SEDIMENT BARRIER - BALED STRAW	1640.0
165-0085	5	EA	238.09	MAINTENANCE OF SILT CONTROL GATE, TP 1	1190.45
165-0101	10	EA	494.91	MAINTENANCE OF CONSTRUCTION EXIT	4949.1
165-0110	10	EA	145.2	MAINTENANCE OF ROCK FILTER DAM	1452.0
167-1000	4	EA	415.46	WATER QUALITY MONITORING AND SAMPLING	1661.84
167-1500	24	MO	521.51	WATER QUALITY INSPECTIONS	12516.24
171-0030	68100	LF	2.88	TEMPORARY SILT FENCE, TYPE C	196128.0
				Section Sub Total:	**$591,082.73**

Section Permanent Erosion Control

Item Number	Quantity	Units	Unit Price	Item Description	Cost
603-2180	450	SY	43.54	STN DUMPED RIP RAP, TP 3, 12 IN	19593.0
603-7000	450	SY	3.13	PLASTIC FILTER FABRIC	1408.5
700-6910	100	AC	672.29	PERMANENT GRASSING	67229.0
700-7000	280	TN	55.58	AGRICULTURAL LIME	15562.4
700-7010	235	GL	19.03	LIQUID LIME	4472.05
700-8000	37	TN	402.52	FERTILIZER MIXED GRADE	14893.24
700-8100	4662	LB	2.31	FERTILIZER NITROGEN CONTENT	10769.22
710-9000	25500	SY	2.5	PERMANENT SOIL REINFORCING MAT	63750.0
716-2000	250000	SY	0.92	EROSION CONTROL MATS, SLOPES	230000.0
				Section Sub Total:	**$427,677.41**

Section Signing & Marking

Item Number	Quantity	Units	Unit Price	Item Description	Cost
610-6515	8	EA	19.88	REM HIGHWAY SIGN, STD	159.04
610-6520	15	EA	2650.0	REM HIGHWAY SIGN, SPCL ROADSIDE	39750.0
611-5551	10	EA	440.0	RESET SIGN	4400.0
636-1020	375	SF	13.23	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	4961.25
636-1029	375	SF	24.82	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	9307.5
636-1033	827	SF	18.31	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING,	15142.36

				TP 9	
636-1041	67	SF	30.95	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	2073.65
636-2070	3191	LF	7.11	GALV STEEL POSTS, TP 7	22688.01
636-2080	375	LF	8.9	GALV STEEL POSTS, TP 8	3337.5
636-2090	192	LF	7.94	GALV STEEL POSTS, TP 9	1524.48
638-1001	5	LS	80600.0	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA -	403000.0
653-0110	16	EA	69.67	THERMOPLASTIC PVMT MARKING, ARROW, TP 1	1114.72
653-1501	4037	LF	0.33	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	1332.21
653-1502	6248	LF	0.33	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	2061.84
653-1704	144	LF	3.53	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	508.32
653-3501	673	GLF	0.24	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	161.51
653-6004	721	SY	2.58	THERMOPLASTIC TRAF STRIPING, WHITE	1860.18
653-6006	1509	SY	2.67	THERMOPLASTIC TRAF STRIPING, YELLOW	4029.02
654-1001	308	EA	2.95	RAISED PVMT MARKERS TP 1	908.6
654-1003	2326	EA	3.05	RAISED PVMT MARKERS TP 3	7094.29
657-9110	490	LF	5.0	WET REFLECTIVE PREFORMED SOLID PAVEMENT MARKINGS, 5 INCH WIDE, WHITE	2450.0
				Section Sub Total:	**$527,864.52**

Section Bridge

Item Number	Quantity	Units	Unit Price	Item Description	Cost
433-1000	838	SY	130.67	REINF CONC APPROACH SLAB	109501.45
500-0100	5710	SY	4.65	GROOVED CONCRETE	26551.50
500-1006	1	LS	2215257.0	SUPERSTR CONCRETE, CL AA, BR NO - 1 (CR 240)	2215257.0
500-1006	1	LS	2166480.0	SUPERSTR CONCRETE, CL AA, BR NO - 2(CR 216)	2166480.0
540-1102	1	LS	75000.0	REMOVAL OF EXISTING BR, BR NO - 1	75000.0
540-1102	1	LS	75000.0	REMOVAL OF EXISTING BR, BR NO - 2	75000.0
621-4070	503	LF	68.5	CONCRETE SIDE BARRIER, TYPE 7C	34455.5
				Section Sub Total:	**$4,702,245.46**

Total Estimated Cost: $16,735,069.02

Subtotal Construction Cost	**$16,735,069.02**
E&C Rate 0.0 %	$0.00
Inflation Rate 0.0 % @ 0 Years	$0.00
Total Construction Cost	**$16,735,069.02**
Right Of Way	12279000.00
ReImb. Utilities	833066.00
Grand Total Project Cost	**$29,847,135.02**

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENTAL CORRESPONDENCE

FILE: NHS 00-0000-00 (763)
P.I. No. 0000763
Cook County

OFFICE: Consultant Design and Program Delivery

DATE:

FROM: Bobby Hilliard, Transportation Engineer Administrator Office of Program Delivery

TO: Genetha Rice-Singleton, Assist. Director of Preconstruction

SUBJECT: Revised Project Concept Report

Attached is the original copy of the revised Concept Report for your further handling for approval in accordance with the Plan Development Process (PDP).A concept report for this project was approved as part of P.I. No 410510; NH-75-1(204) Phase 1. In that concept report, the Phase 2 work was to widen I-75 from three lanes in each direction to four lanes in each direction for the entire project length of 7.90 miles and to reconstruct the interchanges at CR 240/Old Coffee Road (Exit 32) and CR 216/Adel Quitman Road (Exit 37) due to substandard lateral clearances from the edge of the existing I-75 lanes to the face of the bridge columns. In addition, the new interchanges would correct the intersection sight distance at the ramp terminals.

The proposed interchange cross road typical section in the approved concept of four 12' lanes with a 20' raised median and 4' rural shoulders is to be revised to reflect the low volumes of the design year traffic and to reduce the right of way costs. At CR 240/Old Coffee Road (Exit 32) and CR 216/Adel Quitman Road (Exit 37), the bridges are proposed to have two 12' travel lanes with a center 14' turn lane with the cross roads tapering back to two travel lanes outside the ramp terminals. Right turn deceleration lanes will be added on both cross roads as well as the exit ramps at the ramp terminals.

The CR 216/Adel Quitman Road interchange is to be revised from having a partial cloverleaf ramp and a partial diamond ramp in the northeast quadrant. The cloverleaf design which was originally proposed in 1999 was revised to a compressed diamond configuration because of the presence of a low income community (mobile home park) as well as the identification of gravestones located within the northeast quadrant of the CR 216/Adel Quitman Road and I-75 interchange. The cloverleaf design, as originally proposed, would displace many of the mobile homes located in the mobile home park as well as impact the gravestones. Therefore, the design was modified to a compressed diamond configuration in order to prevent these displacements as well as to avoid impact to the gravestones which have now been identified as dog burials.

The interchange at CR 240/Old Coffee Road is to be revised from having a rural diamond to a compressed diamond. The compressed diamond will have a lesser impact on the wetlands surrounding the interchange while still satisfying the need and purpose of this project

The work to be performed under project NHS-00-0000-00(763); P.I. 0000763 would consist of the interchange reconstruction at CR 240/Old Coffee Road and CR 216/Adel Quitman Road.

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

DATE _____

_____
State Transportation Planning Administrator

Distribution:

Ron Wishon – Assistant State Project Review Engineer
Glenn Bowman - State Environmental/Location Engineer
Keith Golden - State Traffic Safety and Design Engineer
Angela T. Alexander - State Transportation Planning Administrator
Jamie Simpson - State Transportation Financial Management Administrator
Paul Liles - State Bridge Design Engineer
Joe Sheffield – District 4 Engineer

REVISED PROJECT CONCEPT REPORT

Need and Purpose: See Attachment

Project location: The project is along I-75 and located in Cook County beginning just south of the County Road 240/ Old Coffee Road (MP 32) and ending just south of SR 37(MP 38.5) within the City of Adel for a total project length of 7.1 miles.

Description of the approved concept: The approved concept report for NHS-00-0000(763), PI 0000763** consists of the reconstruction of the interchanges at CR/240 Old Coffee Road(Exit 32) with a diamond interchange, CR 216-Adel Quitman Road (Exit 37) with a partial cloverleaf interchange having loop ramp in the northeast Quadrant. These interchanges will be designed to accommodate a future 8-lane typical section for I-75. The cross roads at each interchange will be widened to four 12' lanes with a 20' raised median and 4' rural shoulders at the interchange.

PDP Classification: Major X **Minor** ___

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

Functional Classification: Rural Principal Arterial

U. S. Route Number: Interstate 75 State Route Number: 401

Traffic (AADT) as shown in the approved concept:

Current Year (1996): 34,000 Design Year (2016): 57,000

Proposed features to be revised:

• The proposed interchange cross road typical section for CR 240/Old Coffee Road and CR 216/Adel Quitman Road in the approved concept of four 12' lanes with a 20' raised median and 4' rural shoulders is to be revised to reflect the low volumes of the design year traffic and to lessen right of way costs. The proposed typical section for the roadway within the limits of the ramps and the bridge is two 12' lanes with a 14' flush median and 10' shoulders.

• The CR 216/ Adel Quitman Road interchange is to be revised from having a partial cloverleaf ramp for the northbound off ramp and a partial diamond ramp in the northeast quadrant to a compressed diamond interchange design.

**Formerly Phase II of GDOT Project NH-75-1(204), PI 410510

• The CR 240/Old Coffee Road Interchange is to be revised from having a rural diamond interchange to having a compressed diamond interchange.

Describe the revised feature(s) to be approved:

• *The proposed interchange cross road typical section in the approved concept of four 12' lanes with a 20' raised median and 4' rural shoulders is to be revised to reflect the low volumes of the design year traffic and to reduce the right of way costs.* At CR 240/Old Coffee Road (Exit 32) and CR 216/Adel Quitman Road, the bridges are proposed to have two 12' travel lanes with a center 14' turn lane with the cross roads tapering back to two travel lanes outside the ramp terminals. Right turn deceleration lanes will be added on both cross roads as well as the exit ramps at the ramp terminals.

• *The CR 216/Adel Quitman Road interchange is to be revised from having a partial cloverleaf ramp and a partial diamond ramp in the northeast quadrant.* The cloverleaf design which was originally proposed in 1999 was revised to a compressed diamond configuration because of the presence of a low income community (mobile home park) as well as the identification of gravestones located within the northeast quadrant of the CR 216/Adel Quitman Road and I-75 interchange. The cloverleaf design, as originally proposed, would displace many of the mobile homes located in the mobile home park as well as impact the gravestones. Therefore, the design was modified to a compressed diamond configuration in order to prevent these displacements as well as to avoid impact to the gravestones which have now been identified as dog burials.

• *The CR 240/Old Coffee Road interchange is to be revised from having a rural diamond design to a compressed diamond design.* The original diamond would have a large impact on a wetland area located to the east of the I-75 northbound off ramp and a smaller impact to on a wetland to the I-75 southbound on ramp. The revised, compressed diamond's impacts are substantially less.

Updated traffic data (AADT):

Roadway I-75 / SR 401

Year (2008) 41,690, Year (2012) 44420, Year (2032) 61020

Roadway CR 240/Old Coffee Road

Year (2008) 2000, Year (2012) 2130, Year (2032) 2930

Roadway CR 216/Adel Quitman Road

Year (2008) 3750, Year (2012) 4000, Year (2032) 5490

Programmed/Schedule:

P.E.: 2006 R/W: 2009 Construction: Long Range

VE Study Required: Yes

Revised Cost Estimates:

Construction (Infl., E & C)	$16,735,069
Right-of-Way	$12,279,000
Utilities	$833,066

It is recommended that these changes to project termini and right-of-way limits be approved and that the project estimate be adjusted to reflect these changes.

Attachments:

1. Need and Purpose (including location sketch map)
2. Construction Cost Estimate
3. Right of way Cost Estimate
4. Utility Cost Estimate
5. Typical Sections
6. B/C Analysis
7. Traffic Diagrams
8. Interchange Layouts
9. Meeting Minutes
10. Original Concept Report

Concur:

_____
Director of Preconstruction

Approve:

_____
Division Administrator, FHWA

Approve:

_____
Chief Engineer

NEED and PURPOSE

Interchange Reconstruction of CR 240/Old Coffee Road and CR 216/Adel Quitman Road with Interstate 75 (I-75)

NHS00-0000-00(763), Cook County, PI No. 0000763

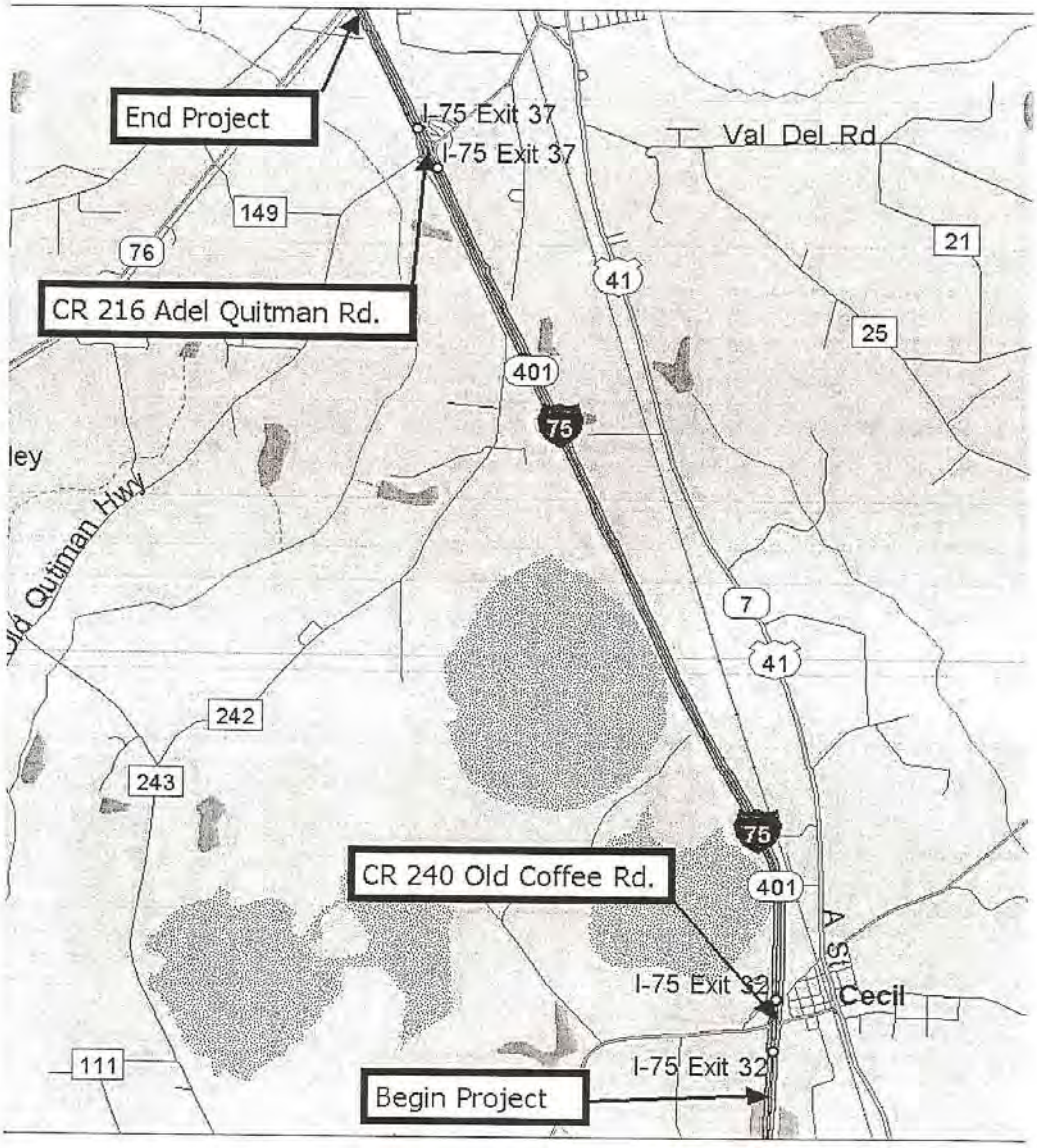
Introduction and Project History

Project NHS00-0000-00(763) consists of the reconstruction of the CR 240/Old Coffee Road and CR 216/Adel Quitman Road interchanges with I-75 (see **Figure 1**: Project Location Map). The proposed project was once included as Phase II of GDOT Project NH000-0075-01(204). Phase I of Project NH000-0075-01(204), which was completed in 2008, consisted of widening I-75 from two lanes in each direction to three lanes in each direction. The Phase I project required a design exception for narrow horizontal clear zone widths under the CR 240/Old Coffee Road and CR 216/Adel Quitman Road interchange bridge structures. The Department's original objective for the Phase II project was to increase the number of through lanes on I-75 from six lanes to eight lanes and reconstruct the two interchanges to accommodate the additional travel lanes. The proposal now includes only the reconstruction of the two interchanges under Project NHS00-0000-00(763).

The primary purpose of the Phase II project is to improve the intersection sight distance at the exit ramps, increase the clear zone widths under both interchanges to a desired 30 feet and to provide two new interchange bridge structures that could accommodate a future widening of the interstate roadway during the lifespan of the bridge structures.

Need & Purpose

The purpose of the proposed interchange reconstruction of CR 240/Old Coffee Road and CR 216/Adel Quitman Road with I-75 is to enhance safety at both I-75 interchanges as well as to enhance the safety and operations of traffic using the existing cross streets. The two reconstructed interchange bridges would also serve several secondary purposes. By replacing the existing bridges with longer bridges, the sight distances at the ramp termini intersections would be improved. Bridge deck widths and crash railings would be updated to current



LOCATION SKETCH

standards. The proposed project would also correct a vertical clearance deficiency on I-75 under the CR 240/Old Coffee Road interchange bridge. Currently, this bridge has a 16.6 foot clearance. According to GDOT policy guidelines, the vertical clearance should be 17 feet. For safety and operational purposes, the frontage road on the west side of I-75 would also be relocated farther from the southbound entrance and exit ramps as part of this interchange reconstruction project.

Crash Data

From 2004 to 2006, crash, injury and fatality rates were generally higher than the statewide averages for similar facilities. **Tables 1** and **2** below summarize both interchange crash statistics at CR 240/Old Coffee Road and CR 216/Adel Quitman Road:

Table 1: Crash, Injury, and Fatality Rates on CR 240/Old Coffee Road

	2004		2005		2006	
	Old Coffee Rd	State	Old Coffee Rd	State	Old Coffee Rd	State
Crashes	15	8,333	21	6,728	17	6,274
Crash Rate*	341	82	506	67	363	60
Injuries	15	4,364	10	3,642	19	3,328
Injury Rate*	341	43	241	36	406	32
Fatalities	3	142	1	118	0	102
Fatality Rate*	68.10	1.39	24.09	1.18	0.00	0.99

*Accident, injury and fatality rates were calculated in units of 100 million vehicles miles traveled.
Source: Georgia DOT Office of Traffic Safety & Design

Table 2: Crash, Injury and Fatality Rates on CR 216/Adel Quitman Road

	2004		2005		2006	
	Adel Quitman Rd	State	Adel Quitman Rd	State	Adel Quitman Rd	State
Crashes	12	38,668	17	41,983	31	40,552
Crash Rate*	211	190	317	206	508	200
Injuries	9	13,252	10	14,767	28	13,891
Injury Rate*	158	65	187	72	459	69
Fatalities	0	120	0	156	0	147
Fatality Rate*	0.00	0.59	0.00	0.77	0.00	0.73

*Accident, injury and fatality rates were calculated in units of 100 million vehicle miles traveled.
Source: Georgia DOT Office of Traffic Safety & Design

Traffic and Level-of-Service (LOS)

The Average Annual Daily Traffic (AADT) in terms of vehicles per day (vpd) along this portion of I-75 was 41,690 for the year 2008. Year 2032 traffic on I-75 is projected to be 61,020 vpd. Year 2008 vpd of CR 240/Old Coffee Road and CR 216/Adel Quitman Road in the project area is 2,130 and 3,750, respectively. Year 2032 traffic on CR 240/Old Coffee Road is projected to be 2,930 vpd. Year 2032 traffic on CR 216/Adel Quitman Road is projected to be 5,490 vpd. Truck traffic on I-75 at this location is estimated at 33 percent. (see **Table 3** – Average Annual Daily Traffic (AADT) and Level-of-Service (LOS)). Please note that all traffic volumes and Level-of-Service (LOS) presented in the text and **Table 3** assumes no-build conditions.

The overall LOS is "A" for the CR 240/Old Coffee Road and CR 216/Adel Quitman Road mainline in the year 2032. However, on the northbound and southbound off-ramps at these interchanges is "B" due to the large volume of vehicles making left turns in the AM and PM peak hours of year 2032.

Table 3: Average Annual Daily Traffic (AADT)* and Level-of-Service (LOS)

	YEAR 2008	YEAR 2012		YEAR 2032	
		No Build	No Build LOS	No Build	No Build LOS
CR 240/Old Coffee Road	2000	2130	A	2930	A
CR 216/Adel Quitman Road	3750	4000	A	5490	A**
I-75	41690	44420	N/A	61020	N/A

N/A: Not applicable

*AADT is calculated as vehicles per day (vpd).

**Intersection traffic modeled without signalization.

Logical Termini

Along the CR 240/Old Coffee Road facility, the logical western terminus consists of the distance necessary to tie in the proposed interchange improvements into the existing two-lane typical section just west of the proposed CR 240/Old Coffee Road and I-75 southbound entrance and exit ramps. The logical eastern terminus consists of the distance necessary to tie in the proposed interchange improvements into the existing two-lane typical section just east of the proposed CR 240/Old Coffee Road and I-75 northbound entrance and exit ramps. This distance is necessary to allow for the transition of the proposed improvements back into the existing two-lane typical section on either end of CR 240/Old Coffee Road. Therefore, both eastern and western termini are considered logical since the proposed improvements would not add capacity to the existing cross street but is of sufficient length to improve safety and operations at the CR 240/Old Coffee Road and I-75 interchange.

Along the CR 216/Adel Quitman Road facility, the logical western terminus consists of the distance necessary to tie in the proposed interchange improvements and realignment of the existing frontage road just west of the proposed CR 216/Adel Quitman Road and I-75 southbound entrance and exit ramps. The eastern terminus consist of the distance necessary to tie in the

proposed interchange improvements into the existing two-lane typical section just east of the proposed CR 216/Adel Quitman Road and I-75 northbound entrance and exit ramps. This distance is necessary to allow for the transition of the improvements associated with the interchange reconstruction back to the existing two-lane typical section on either end of CR 216/Adel Quitman Road. Therefore, both eastern and western termini are considered logical since the proposed improvements would not add capacity to the existing cross street but is of sufficient length improve the safety and operations at the CR 216/Adel Quitman Road and I-75 interchange.

Other Programmed Projects:

There are several projects currently programmed or under construction in the project area. These projects include:

- Project NH000-0075-01(204) - widening of approximately 7.9 miles of I-75 from four to six lanes from the Lowndes County line to just north of the SR 37 interchange. This project was scheduled for completion in 2008.
- Project NH000-0075-01(205) - widening and reconstruction of I-75 from two lanes in each direction to three lanes in each direction from just north of the SR 37 interchange to just north of the CR 246/Kinard Bridge Rd. interchange, a total of approximately 9.5 miles. This project was scheduled for completion in 2008.
- Project NHS00-0000-00(764) - reconstruction and improvements of the CR 251/Roundtree Bridge Road and CR 246/Kinard Bridge Road interchanges with I-75. This project is currently programmed in Long Range.
- Project NH000-0075-01(206) is the widening and reconstruction of I-75 from two lanes in each direction to three lanes in each direction from just north of the CR 246/Kinard Bridge Road interchange to the Cook/Tift County line, a total of approximately 3.79 miles. This project is currently under construction.

Summary

The existing diamond interchanges of CR 240/Old Coffee Road and CR 216/Adel Quitman Road with I-75 do not currently meet the American Association of State Highway Transportation Officials (AASHTO) standards for sight distance, clear zone requirements, or acceleration/deceleration distances.

The proposed interchange reconstruction project would correct sight distance deficiencies for vehicles on the ramps exiting I-75 and replace the bridge overpasses in order to accommodate any future widening of I-75 from six lanes to eight lanes. The existing crossroad vertical curve at the two interchange locations would be reconstructed to meet current design standards which would also improve safety.

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 November 16 through November 19, 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, PE, CVS-Life	Team Leader
Luke Clarke, PE, AVS	Senior Highway Design Engineer
Fabricio Quinonez, PE	Senior Bridge 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 Clark Patterson Lee Engineering Company. 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 operational conditions**
        - **Improve safety**
        - **Reduce injury accidents**
        - **Improve access**

    - **Project Basic Functions**

        - **Improve traffic access**
        - **Meet standards**
        - **Improve sight distance**

- **Speculation Phase -** The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:

    - **Eliminate non-functional work**
    - **Modify alignment**
    - **Reduce number of residential relocations**
    - **Reduce width of sidewalks**
    - **Reduce raised median width**

    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.

VALUE ENGINEERING STUDY AGENDA

for
Georgia Department of Transportation
Project No. NHS00-0000-00(763)
P.I. No. 0000763

I-75 from Lowndes County line to SR 37 – Phase II
Cook County

November 16-19, 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
- Visit project site if time permits

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

PARETO CHART - COST HISTOGRAM

PROJECT: **Georgia Department of Transportation**
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I-75 from Lowndes County line to SR 37-Phase II
Cook County

PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Right of Way	12,279,000	41.14%	41.14%
Bridges	4,702,245	15.75%	56.89%
Concrete Paving	3,575,366	11.98%	68.87%
Asphalt Paving	1,483,371	4.97%	73.84%
Excavation	1,051,110	3.52%	77.36%
Base	912,415	3.06%	80.42%
Traffic Control	874,335	2.93%	83.35%
Reimbursable Utilities	833,066	2.79%	86.14%
Temporary Erosion Control	591,083	1.98%	88.12%
Signing & Marking	527,865	1.77%	89.89%
Asphalt Leveling	477,360	1.60%	91.49%
Barriers	457,779	1.53%	93.02%
Drainage	444,878	1.49%	94.51%
Chain Link Fence	428,657	1.44%	95.95%
Permanent Erosion Control	427,677	1.43%	97.38%
Clearing & Grubbing	382,600	1.28%	98.67%
Guardrails	222,206	0.74%	99.41%
Miscellaneous Roadway Items	176,121	0.59%	100.00%
Construction Cost including ROW & Utilites	**$ 29,847,134**		
Construction Cost less ROW & Utilites	**$ 16,735,069**		
E & C Rate @10%	**$ 1,673,507**		
Total Construction Costs	**$ 18,408,576**		
Right-of-Way	**$ 12,279,000**		
Utilities Reimbursement	**$ 833,066.00**		
TOTAL	**$ 31,520,642**		

Project: NHS00-0000-00(763)
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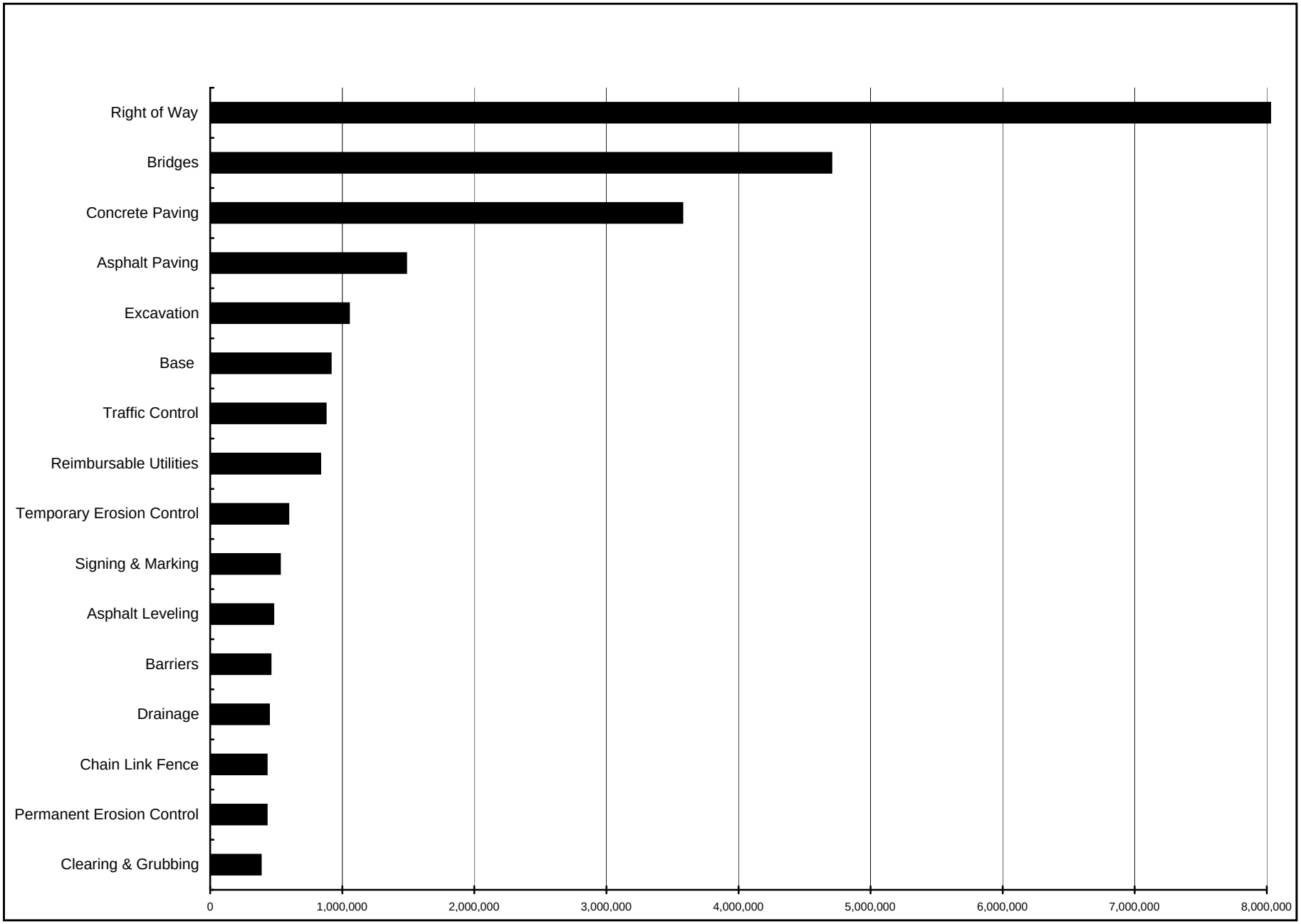
Cook County



DESIGNER PRESENTATION

MEETING PARTICIPANTS

Geogia Department of Transportation — **November 16, 2009**

NHS00-0000-00(763) -P.I. No. 0000763

Cook County

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VE TEAM PRESENTATION

MEETING PARTICIPANTS

Geogia Department of Transportation — **November 19, 2009**

NHS00-0000-00(763) -P.I. No. 0000763

Cook County

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CREATIVE IDEA LISTING

PROJECT: **Georgia Department of Transportation**
NHS00-0000-00(763) – P.I. No. 0000763
I-75 from Lowndes County line to SR 37 – Phase II
Cook County

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

NO.	IDEA DESCRIPTION	RATING
	BRIDGE (BR)	
BR-1	Use an 8’ shoulder	4
BR-2	Use a two span structure with MSE Walls in-lieu of a four span structure for CR 240 and CR 216 bridges	5
BR-3	Use 12’ turn lanes on the bridges	4
BR-4	Use MSE Walls and 246.5’ bridge (CR 216) and 254.5’ bridge (CR 240)	See BR-2
BR-5	Use two-span structure with steel plate girders and MSE walls	2
	ROADWAY (RD)	
RD-1	Reduce the sum of the ramp shoulders from 14’-0” to 12’-0”	4
RD-2	Use 4’ in-lieu-of 6’-6” paved shoulder	4
RD-3	Use 2’ in-lieu of 6’-6” paved shoulder	1
RD-4	Use 12’ in-lieu of 14’ turn lane	2
RD-5	Use ACC in-lieu of PCC	2
RD-6	Close CR 240 to construct bridge in current location	3
RD-7	Use a partial cloverleaf in northwest corner for south bound on ramp. Locate M.J. Taylor Road at this intersection	3
RD-8	Shift CR 216 off ramp east	3
RD-9	CR 240 bridge- use a vertical curve on the bridge	3
RD-10	CR 216 bridge –use a vertical curve	3
RD-11	Close CR 216 to construct new bridge in existing location	3
RD-12	Conduct traffic safety study to evaluate need for signals	3
RD-13	Build Tight Urban Diamond with signals	5
RD-14	Realign CR 216 ramp “D” and relocate longitudinal stream	5

Rating: 1→2 = Not to be Developed; 3 = Varying Degrees of Development Potential;
4→5 = Most likely to be Developed; DS = Design Suggestion; ABD = Already Being Done; OB= Observation