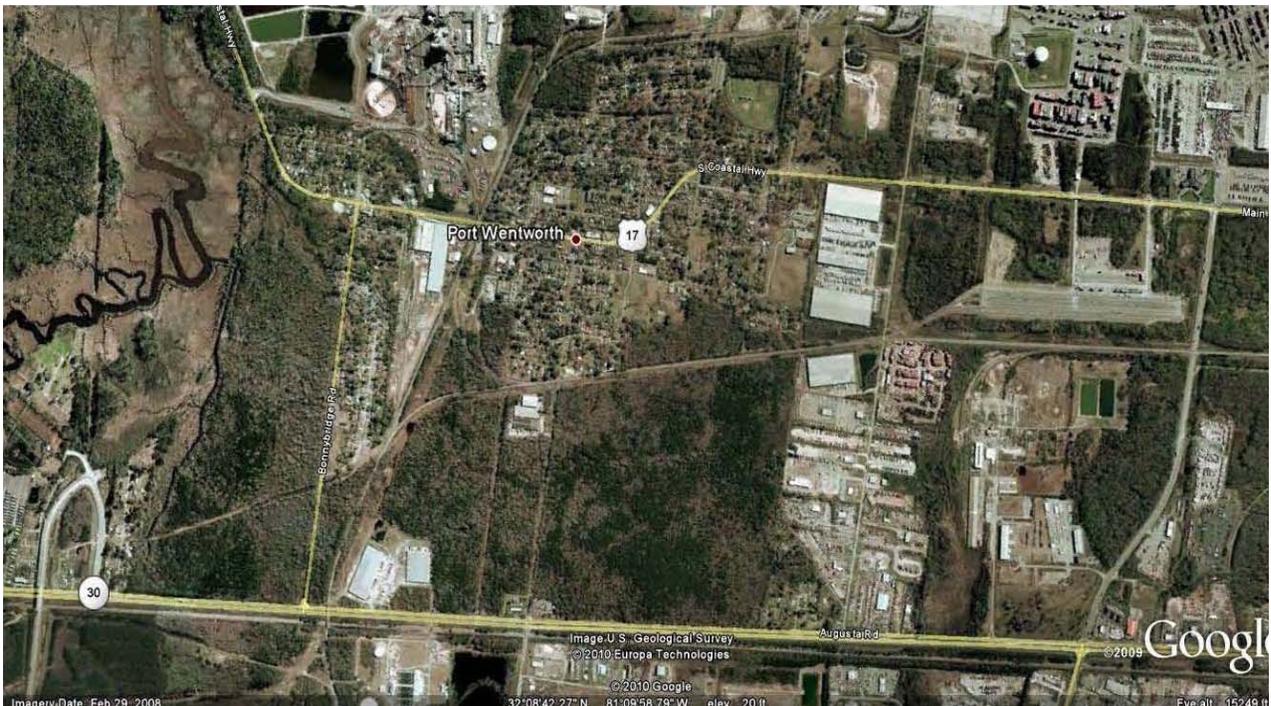


Value Engineering Study Report

Georgia Department of Transportation

CSMSL-0008-00(690) - P.I. No. 0008690
Jimmy Deloach Connector - from Bourne Ave./SR 307 to existing
Jimmy Deloach Parkway

Chatham County



Value Engineering Team



Design Team



PARSONS

February 2010



February 17, 2010

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
CSMSL-0008-00(690) - P.I. No. 0008690
Jimmy Deloach Connector - from Bourne Ave./SR 307 to existing
Jimmy Deloach Parkway
Chatham County

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our final Value Engineering Report for the Jimmy Deloach Connector from Bourne Avenue/SR 307 to existing Jimmy Delach Parkway.

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

- Nine (9) Alternatives recommended to improve the project value.

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

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

Yours truly,

PBS&J

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

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

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

Randy S. Thomas, CVS
Assistant Team Leader

Value Engineering Study Report

Georgia Department of Transportation

CSMSL-0008-00(690) - P.I. No. 0008690
Jimmy Deloach Connector - from Bourne Ave./SR 307 to existing
Jimmy Deloach Parkway

Chatham County

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- Agenda
- Pareto Charts
- Fast Diagram
- Attendance Sheet for Designers and VE Team Presentations
- Creative Idea Listing and Evaluation Worksheet

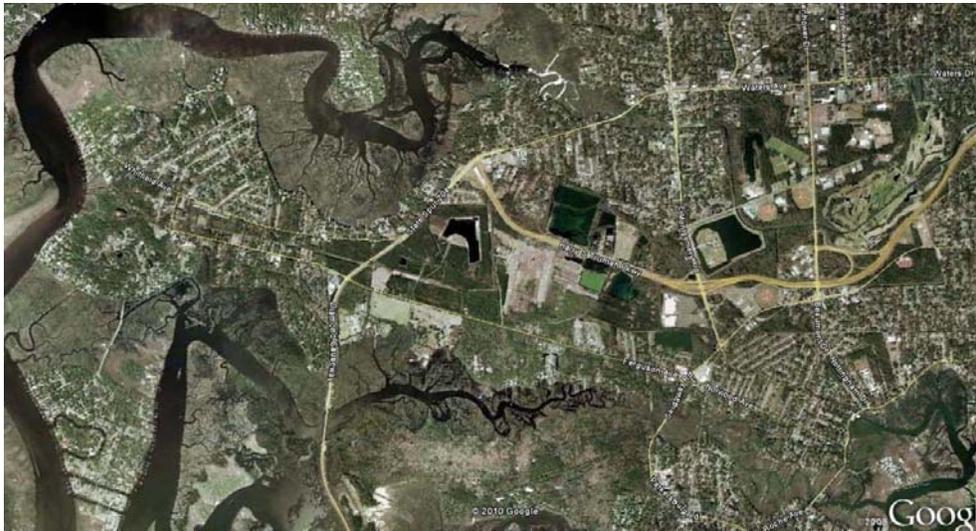
EXECUTIVE SUMMARY

INTRODUCTION

The subject of this Value Engineering study is project CSMSL-0008-00(690) – P.I. No. 0008690. This project is for the construction of the Jimmy Deloach Connector, a new roadway alignment that would begin at Bourne Avenue/SR 307 and terminate at the existing eastern end of the Jimmy Deloach Parkway. The length of the project is 3.1 miles.

PROJECT LOCATION:

This project is located near Port Wentworth, just north of downtown Savannah in Chatham County. The project will connect the existing Jimmy Deloach Parkway to the Savannah Port.



PROJECT DESCRIPTION

The project consists of a new limited access roadway utilizing four 12' wide travel lanes (two in each direction) with a 24 foot raised median and 6.5 foot paved outside shoulders. Exceptions to this typical section would begin just south of Crossgate Road and continue to north of Bonnybridge Road. It would include a median barrier with 4-foot inside shoulders. From north Bonnybridge Road to Jimmy Deloach Parkway, northbound and southbound lanes will be separated by a depressed median varying in width up to 350'. There will be three new intersections – Bourne Avenue, Grange Avenue and Pierce Ave. A detailed description is presented in the *Project Description* tabbed section.

PROJECT CONCERNS AND OBJECTIVES

The key concern and objective of the project is to provide a smooth, fast, and uninterrupted route for the trucks traveling between the Port of Savannah and I-95. Of secondary concern is the desire to construct the new connector in such a manner that it can be easily expanded in the future to serve other facilities being proposed in the area.

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 "expedite the movement of the trucks between the Port and I-95".

This led the team through the "Speculative" phase, wherein possible alternatives were identified. Following this, the VE Team moved to the Evaluation and Development Phases where the ideas were determined to either offer an improvement to the project value, or discarded.

Conclusions and Recommendations:

The VE Team concluded that the project generally meets the functional requirements of the project as proposed.

The VE Team observed the following items of the project which might warrant being considered:

1. The project terminus at Bourne Ave. does not appear to meet the project objective of a smooth and unobstructed flow into the port (new route dead ends into Bourne Ave. and traffic must wait for signal to move to port).
2. The existing Jimmy Deloach Parkway southerly terminus appears designed to be extended as is directly to the Port. However, the current design project revises that existing parkway to accommodate future extension in a different direction at an additional cost of approximately \$5,000,000.

The VE Team identified, developed and **recommends Nine (9) Design Alternatives** for implementation to improve the value of the project – see the following "*Summary of Alternatives and Design Suggestions*".

Summary of Alternatives & Design Suggestions



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector - from Bourne Ave./SR 307 to existing Jimmy Deloach Parkway Chatham County	SHEET NO.: 1 of 1
ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
	BRIDGE (BR)	
BR-1	Reduce shoulders on "Long Bridges"	\$ 545,952
BR-2	Modify span arrangement on wetland bridges	\$ 422,131
	ROADWAY (RD)	
RD-1	Use median barrier in-lieu of raised grassed median	\$ 856,196
RD-2	Construct a typical intersection at Bourne Ave.	\$610,500
RD-3	Construct a "SPUI" or "TUDI" at Grange Ave.	\$ 1,773,772
RD-4	Delete north bound (2A) exit and south bound (2D) entrances at Grange Ave.	\$ 3,896,420
RD-5	Reduce sum of the paved shoulder widths on ramps	\$ 434,209
RD-12	Use a "SPUI" or "TUDI" at Pierce Ave.	\$ 794,882
RD-21	Adjust profile to reduce borrow	\$ 1,169,124

STUDY RESULTS

INTRODUCTION

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

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

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

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
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
BR-1

DESCRIPTION: **Reduce shoulders on “Long Bridges”**

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

Original Design:

The original bridges (NB bridge and SB bridge) typical section for the Jimmy Deloach Connector over the Wetlands calls for the use of a 4'-0" and an 8'-0" shoulder.

The 528'-0" (eleven spans) long NB bridge will be 39'-3" wide and its CIP superstructure will be supported by five AASHTO Type II PSC beams.

The 600'-0" (twelve spans) long SB bridge will be 66'-10 1/2" wide and its CIP superstructure will be supported by eight AASHTO Type II PSC beams.

Alternative:

The alternative proposes reducing the shoulders width from 8'-0" to 4'-0". The proposed shoulder width reduction will be in compliance with the GDOT Policies and Procedures (Minimum Bridge Widths) and Exhibit 6-5, Page 425 (Minimum Width of Traveled Way and Shoulders) of the AASHTO Geometric Design of Highways and Streets (2004).

Opportunities:

- Potential cost savings
- Reduction of dead load

Risks:

- None apparent

Technical Discussion:

The use of 4'-0" outside shoulder between the travel lane and the bridge barrier is adequate for bridge lengths greater than 200'-0" (long bridges), per AASHTO Geometric Design of Highways and Streets (Page 447, Paragraph "Structures").

Replacing the 8'-0" shoulders with 4'-0" shoulders could potentially reduce the bridges out-to-out width by 4'-0".

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 7,362,729	\$ 0	\$ 7,362,729
ALTERNATIVE	\$ 6,197,070	\$ 0	\$ 6,197,070
SAVINGS	\$ 545,952	\$ 0	\$ 545,952

Illustration

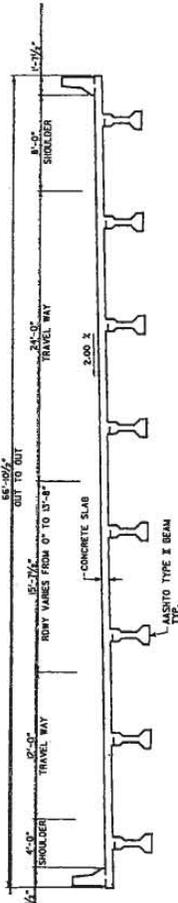
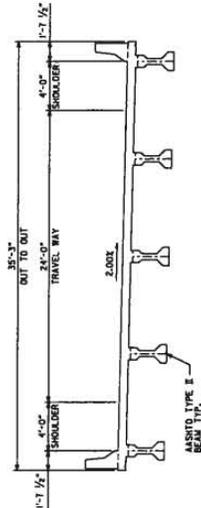
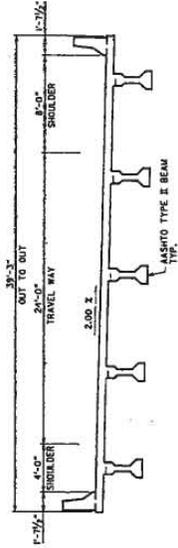


PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307
to existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
BR-1

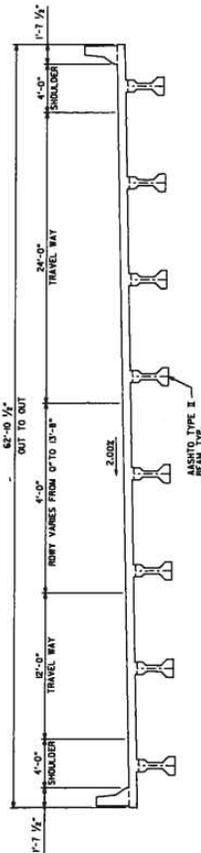
DESCRIPTION **Reduce shoulders on “Long Bridges”**

SHEET NO.: 2 of 4



TYPICAL SECTION
AT DIVIDED HWY BRIDGES
(LOOKING AHEAD)

TYPICAL SECTION - ORIGINAL DESIGN



TYPICAL SECTION - PROPOSED ALTERNATIVE

Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
BR-1

DESCRIPTION: **Reduce shoulders on “Long Bridges”**

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

NB Bridge:

Length = 528'-0"

Width = 39'-3"

Bridge deck area = $(528 \times 39.25) = 20,724$ SF

SB Bridge:

Length = 600'-0"

Width = 66'-10 1/2"

Bridge deck area = $(600 \times 66.875) = 40,125$ SF

Total Area (as proposed) = 60,849 SF

=====

NB Bridge:

Length = 528'-0"

Width = 35'-3"

Bridge deck area = $(528 \times 35.25) = 18,612$ SF

SB Bridge:

Length = 600'-0"

Width = 62'-10 1/2"

Bridge deck area = $(600 \times 62.875) = 37,725$ SF

Total Area (alternative) = 56,337 SF

Deck Area Reduction = $60,849 - 56,337 = 4,512$ SF

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:	BR-1
DESCRIPTION:	Reduce shoulder width on "Long 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
Bridge Width Reduction				\$ -			\$ -
NB Bridge	SF	20,724	\$ 110.00	\$ 2,279,640	18,612.00	\$ 110.00	\$ 2,047,320
SB Bridge	SF	40,125	\$ 110.00	\$ 4,413,750	37,725.00	\$ 110.00	\$ 4,149,750
Sub-total				\$ 6,693,390			\$ 6,197,070
Mark-up at 10.00%				\$ 669,339			\$ 619,707
TOTAL				\$ 7,362,729			\$ 6,816,777

Estimated Savings: \$545,952

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: **1** of **8**

Original Design:

The 528'-0" (eleven equal spans) long NB bridge will be 39'-3" wide and its CIP superstructure will be supported by five AASHTO Type II PSC beams.

The 600'-0" (twelve equal spans) long SB bridge will be 66'-10 ½" wide and its CIP superstructure will be supported by eight AASHTO Type II PSC beams.

Alternative:

The alternative proposes the reduction of total number of spans for both bridges over the wetlands.

NB Bridge: Reduce span number from 11 spans to 6 equal spans (88'-0" long each). CIP superstructure supported by 6-AASHTO Type III PSC Beams.

SB Bridge: Reduce span number from 12 spans to 7 equal spans (85'-8 ½" long each). CIP superstructure supported by 6-AASHTO Type III PSC Beams.

Opportunities:

- Potential cost savings
- Reduction of wetland impact
- Reduction in pile driving

Risks:

- Use of deeper beams

Technical Discussion:

The reduction of number of spans at both locations will reduce potential impacts to the wetlands and provide a potential savings in construction cost.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,991,804	\$ 0	\$ 1,991,804
ALTERNATIVE	\$ 1,569,673	\$ 0	\$ 1,569,673
SAVINGS	\$ 422,131	\$ 0	\$ 422,131

Illustration

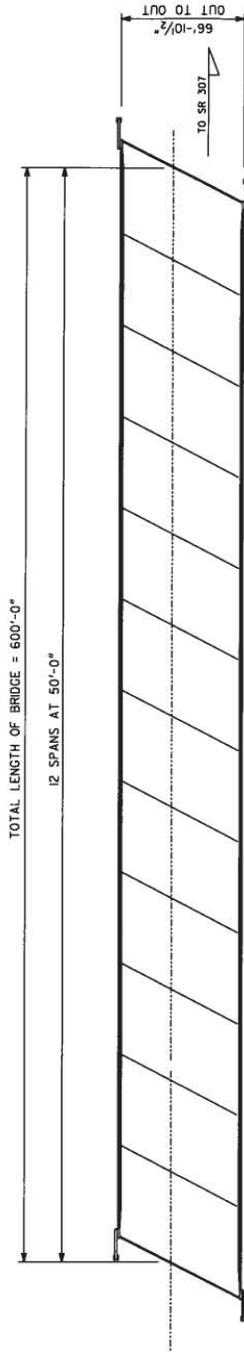


PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

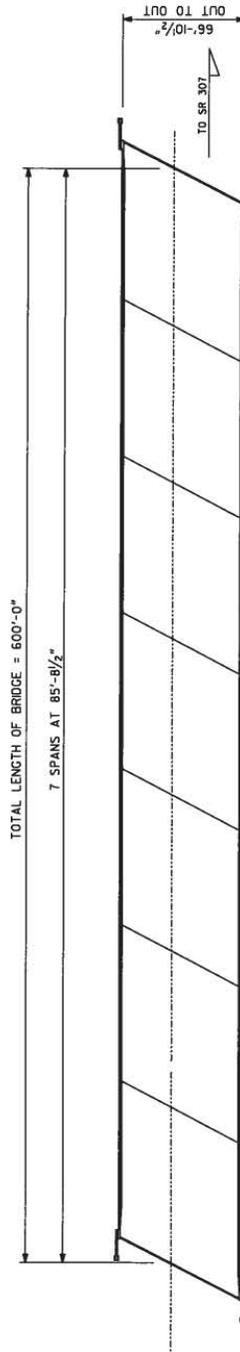
ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: **2** of **8**



S.B. PLAN - ORIGINAL DESIGN



S.B. PLAN - PROPOSED DESIGN

Illustration

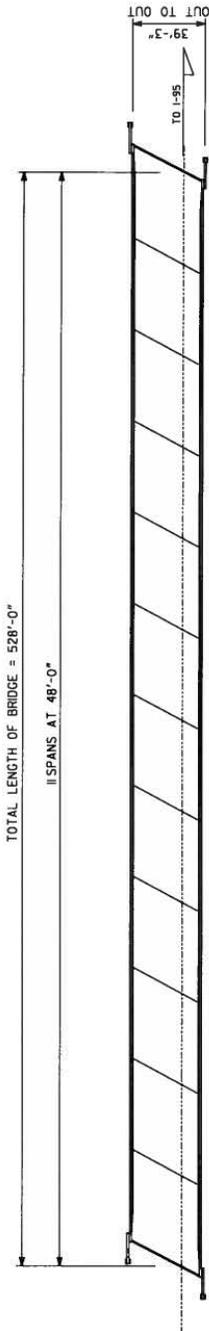


PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

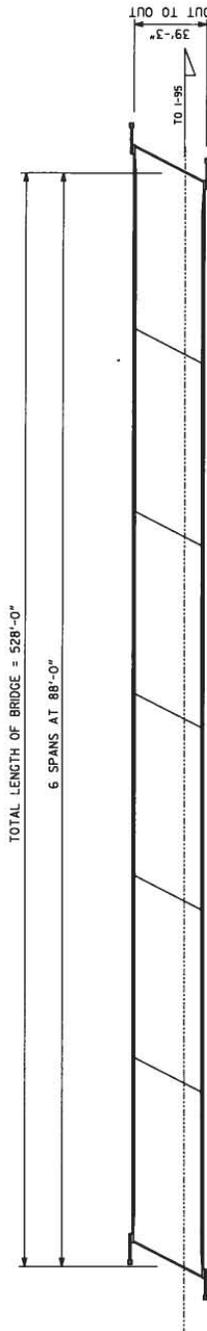
ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: **3** of **8**



N.B. PLAN - ORIGINAL DESIGN



N.B. PLAN - PROPOSED DESIGN

Calculations



PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: 4 of 8

BR-2

1/4

Reduction of number of spans.

Assumptions for ALTERNATIVE

- 1 - USING 3.50' x 3.50' CAPS
- 2 - CAP LENGTH NB = $39.25 / \sin 59^{\circ}14'46'' \approx 46'-0''$
SB = $66.875 / \sin 55^{\circ}13'11.58'' \approx 82'-0''$
- 3 - FOR NB BRIDGE \Rightarrow USING ONE PILE CAP w/ 4 PSC PILES
(PILES @ EQ. SPACES)
- 4 - FOR SB BRIDGE \Rightarrow USING TWO PILE CAPS w/ 4 PSC PILES
(PILES @ EQ. SPACES)
- 5 - ALL PILES ARE 20" SQ. PSC AND 45'-0" LONG.

CAP CONC Qty.

NB BRIDGE \Rightarrow 6 SPANS @ 88'-0" USING TYPE III PSC BEAMS

TOTAL # of INT CAPS = 5

TOTAL CONC Qty = $5 \times 3.5 \times 3.5 \times 46 \approx 313$ CY

SB BRIDGE \Rightarrow 7 SPANS @ 85'-8 1/2" USING TYPE III PSC BEAMS

TOTAL # of INT CAPS = 6

TOTAL CONC Qty = $6 \times 3.5 \times 3.5 \times 82 \approx 670$ CY

Calculations



PROJECT: Georgia Department of Transportation
 CSMSL-0008-00(690) – P.I. No. 0008690
 Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
 existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: 5 of 8

BR-2 CONTINUE. (ALTERNATIVE)

2/4

TYPE III PSC B Qty

NB BRIDGE ⇒ 6-TYPE III /SPAN . BEAM $\approx 88'-0"$ Long

$$LF = 6 \times 6 \times 88 = \underline{3168 \text{ LF TYPE III PSC B}}$$

SB BRIDGE ⇒ 6-TYPE III /SPAN . BEAM $\approx 85'-10\frac{1}{2}"$ Long

$$LF = 6 \times 6 \times 85.875 = \underline{3091.50 \text{ LF TYPE III PSC B}}$$

20" PSC PILES

NB BRIDGE ⇒ 4 PILES / INT CAP . TOTAL of INT CAP = 5

$$LF = 4 \times 5 \times 45 = \underline{900 \text{ LF } 20" \text{ PSC PILE}}$$

SB BRIDGE ⇒ 8 PILES / INT CAP . TOTAL of INT CAP = 6

$$LF = 8 \times 6 \times 45 = \underline{2160 \text{ LF } 20" \text{ PSC PILE}}$$

ALTERNATIVE Quantities Summary

	NB	SB	
INT CAP CONC \approx	313	+ 670	<u>= 983 CY</u>

TYPE III PSC B \approx	3168	+ 3092	<u>= 6260 LF</u>
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24" PSC PILES \approx	900	+ 2160	<u>= 3060 LF</u>
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Calculations



PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: 6 of 8

BR-2

3/9

ORIGINAL DESIGN

Assumptions for Original Design

1.- USING 3.5' x 3.5' CAPS

2.- CAP LENGTH NB = 46'-0"

SB = 82'-0"

3.- FOR NB BRIDGE \Rightarrow USING ONE PILE CAP w/ 4 PSC PILES.

4.- FOR SB BRIDGE \Rightarrow USING TWO PILE CAPS w/ 4 PSC PILES
(EACH)

5.- ALL PILES ARE 20" SQ PSC AND 35'-0" LONG.

Cap Conc Qty

NB BRIDGE \Rightarrow 11 SPANS @ 46'-0" USING TYPE II PSC BEAMS

TOTAL # of INT CAPS = 10

TOTAL Conc Qty = $10 \times 3.5 \times 3.5 \times 46 \approx$ 626 CY

SB BRIDGE \Rightarrow 12 SPANS @ 50'-0" USING TYPE II PSC BEAMS

TOTAL # of INT CAPS = 11

TOTAL Conc Qty = $11 \times 3.5 \times 3.5 \times 82 \approx$ 1228 CY

Calculations



PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Modify span arrangement on wetland bridges**

SHEET NO.: 7 of 8

BL 2 Continue (ORIGINAL DESIGN)

4/1

TYPE II PSCB Qty

NB BRIDGE \Rightarrow 5-TYPE II / SPAN. BEAM \approx 48'0" long

$$LF = 5 \times 11 \times 48 = \underline{2640 \text{ LF TYPE II PSCB}}$$

SB BRIDGE \Rightarrow 8-TYPE II / SPAN BEAM \approx 50'0" long

$$LF = 8 \times 12 \times 50 = \underline{4800 \text{ LF TYPE II PSCB}}$$

20" PSC PILES

NB BRIDGE \Rightarrow 4 PILES / INT CAP total INT CAP = 10

$$LF = 4 \times 10 \times 35 = \underline{1400 \text{ LF } 20" \text{ PSC PILE}}$$

SB BRIDGE \Rightarrow 8 PILES / INT CAP total INT CAP = 11

$$LF = 8 \times 11 \times 35 = \underline{3080 \text{ LF } 20" \text{ PSC PILE}}$$

ORIGINAL DESIGN Quantities Summary

	NB	SB	
INT CAP CONC \approx	626	1228	= 1854 CY
TYPE II PSCB \approx	2640	4800	= 7440 LF
20" PSC PILES \approx	1400	3080	= 4480 LF

NOTE: A more detailed cost analysis may be performed on sufficiently developed alternative bridge plans to be able to itemize major components and realize greater cost savings than that shown in this study. Examples: Reduction in reinforcing, diaphragm concrete, etc.

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:
		BR-2
DESCRIPTION:	Modify span arrangement on wetland bridges	SHEET NO.: 8 of 8

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Number of Spans Reduction							
NB Bridge							
Int. Cap Concrete (Class A)	CY	626	\$ 246.73	\$ 154,453	313	\$ 246.73	\$ 77,226
20" PSC Piles	EA	1,400	\$ 95.00	\$ 133,000	900	\$ 95.00	\$ 85,500
AASHTO Type II PSC Beam	EA	2,640	\$ 124.69	\$ 329,182	0	\$ 124.69	\$ -
AASHTO Type III PSC Beam	EA	0	\$ 142.77	\$ -	3168	\$ 142.77	\$ 452,295
SB Bridge							
Int. Cap Concrete (Class A)	CY	1,228	\$ 246.73	\$ 302,984	670	\$ 246.73	\$ 165,309
20" PSC Piles	EA	3,080	\$ 95.00	\$ 292,600	2160	\$ 95.00	\$ 205,200
AASHTO Type II PSC Beam	EA	4,800	\$ 124.69	\$ 598,512	0	\$ 124.69	\$ -
AASHTO Type III PSC Beam	EA	0	\$ 142.77	\$ -	3092	\$ 142.77	\$ 441,445
Sub-total				\$ 1,810,731			\$ 1,426,976
Mark-up at 10.00%				\$ 181,073			\$ 142,698
TOTAL				\$ 1,991,804			\$ 1,569,673

Estimated Savings:	\$422,131
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Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) – P.I. No. 0008690 Jimmy Deloach Connector- from Bourne Ave./ SR 307 to existing Jimmy Deloach Parkway	ALTERNATIVE NO.:	RD-1
DESCRIPTION:	Use median barrier in-lieu of raised grassed median section	SHEET NO.:	1 of 4

Original Design:

The original design proposes a section of raised grassed median with curb & gutter from Sta. 162+00 to Sta. 230+00. (See Section 1 in Illustrations).

Alternative Design:

The alternative design would replace the raised grassed median with the median barrier section. (Section 2 in Illustrations).

Opportunities:

- Creates consistent design section
- Reduces construction costs and duration
- Reduces amount of ROW acquisitions
- Reduces impacts to wetlands
- Reduces maintenance requirements

Risks:

- None apparent

Technical Discussion:

The Original Design has a transition in the design section at 230+00 from a raised grassed median section to a median barrier section. Since both design sections are acceptable, the alternative design proposed to use the less costly design for the entire length of the project. The advantages of the alternate design require a smaller footprint, resulting in less impact to the wetlands and less required ROW. In construction terms the alternate design requires less earthwork, less structures (bridge and MSE wall), but requires more pavement area. The drainage requirements will be equal. An additional advantage of the alternative design of the median barrier is the elimination of the maintenance of the raised grassed median (mowing).

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,408,187	\$ 0	\$ 1,408,187
ALTERNATIVE	\$ 551,991	\$ 0	\$ 551,991
SAVINGS	\$ 856,196	\$ 0	856,196

Illustrations

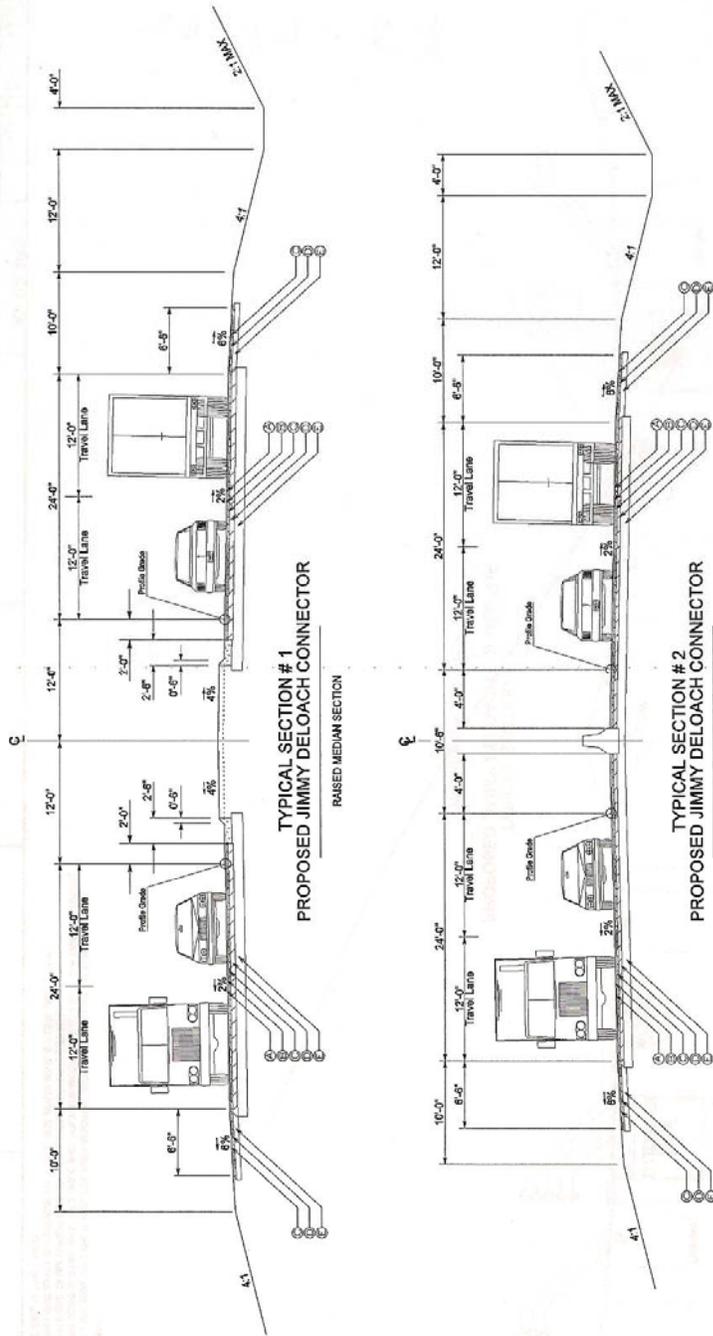


PROJECT: Georgia Department of Transportation
 CSMSL-0008-00(690) – P.I. No. 0008690
 Jimmy Deloach Connector- from Bourne Ave./ SR 307
 to existing Jimmy Deloach Parkway

DESCRIPTION: Use median barrier in-lieu of raised grassed median section

ALTERNATIVE NO.: RD-1

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-1

DESCRIPTION: **Use median barrier in-lieu of raised grassed median
section**

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

Original Design:

Use raised grassed median from Sta. 162+00 to Sta. 230+00.

$$\text{Length} = 23000 - 16200 = 6,800'$$

$$\text{Curb \& Gutter} = 6,800 (\text{length}) \times 2 (\text{each side}) = 13,600 \text{ LF}$$

Alternative Design:

Replace raised grassed median with concrete median barrier from Sta. 162+00 to Sta. 230+00.

$$\text{Concrete Barrier} = 6,800 \text{ LF}$$

$$\text{Additional Pavement Area} = 8' - 4' = 4' (\text{width}) \times 6,800 (\text{length}) = 27,200 \text{ SF} = 3,033 \text{ SY}$$

$$-12.5 \text{ mm PEM} = 3,033 \text{ SY} \times 82.5 \text{ lbs/SY} = 250,220 \text{ lbs} = 125 \text{ TN}$$

$$-12.5 \text{ mm SMA} = 3,033 \text{ SY} \times 165 \text{ lbs/SY} = 500,445 \text{ lbs} = 250 \text{ TN}$$

$$-19 \text{ mm Superpave} = 3,033 \text{ SY} \times 330 \text{ lbs/SY} = 1,000,890 \text{ lbs} = 500 \text{ TN}$$

$$-25 \text{ mm Superpave} = 3,033 \text{ SY} \times 660 \text{ lbs/SY} = 2,001,780 \text{ lbs} = 1,000 \text{ TN}$$

$$- \text{GAB} = 3,033 \text{ SY}$$

Reduced items:

$$\text{Reduced Borrow} = 24' - 10.5' (\text{median width}) \times 12' (\text{avg. fill height}) \times 6,800' (\text{length}) = 1,101,600 \text{ CF} \\ = 40,800 \text{ CY}$$

$$\text{Reduced Bridge Area (Grange Rd.)} = 24' - 10.5' (\text{median width}) \times 112' (\text{bridge length}) = 1,512 \text{ SF}$$

$$\text{Reduced MSE Wall (Grange Rd.)} = 24' - 10.5' (\text{median width}) \times 15' (\text{height}) \times 2 (\text{each side}) = 405 \text{ SF}$$

$$\text{Reduced Right of Way requirements} = 24' - 10.5' (\text{median width}) \times 6,800' (\text{length}) = 91,800 \text{ SF} = 2.1 \text{ AC}$$

(assume 1.1 ac. Industrial 1.0 ac. Commercial R/W)

$$1.1 \text{ acre} \times \$25,000/\text{acre} + 1.0 \text{ acre} \times \$200,000 \Rightarrow \$227,500$$

$$\text{Right of way: Net cost} = \$227,500$$

$$\text{Scheduling @ 55\%} = \$125,125$$

$$\text{Court cost @ 60\%} = \$136,500$$

$$\text{Total} = \$489,125$$

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-2

DESCRIPTION: **Construct a typical intersection at Bourne Avenue**

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

Original Design:

The original design proposes constructing a “split” intersection at Bourne Avenue that allows future construction of a Diamond Interchange.

Alternative Design:

The alternative design would propose constructing a conventional intersection at Bourne Avenue.

Opportunities:

- Reduces ROW cost
- Reduces wetland impacts and mitigation costs.

Risks:

- Would require reconstruction if an interchange were built in the future

Technical Discussion:

The alternative dramatically reduces the footprint of the intersection. While accommodating future improvement is generally good practice, the possibility of future improvements actually being built should be taken into account. It should be taken into consideration whether a direct connection to SR 21 serves any compelling function. The primary function of the roadway is to serve the port and it provides three points of access to SR 21 traffic wishing to access facilities served by Jimmy Deloach Parkway. It should be noted that accommodating a future connection to SR 21 may have some value with respect to providing “system connectivity” between I-516 and existing Jimmy Deloach Parkway and the proposed southern extension of Jimmy Deloach Parkway.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 610,500	\$ 0	\$ 610,500
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 610,500	\$ 0	\$ 610,500

Illustration

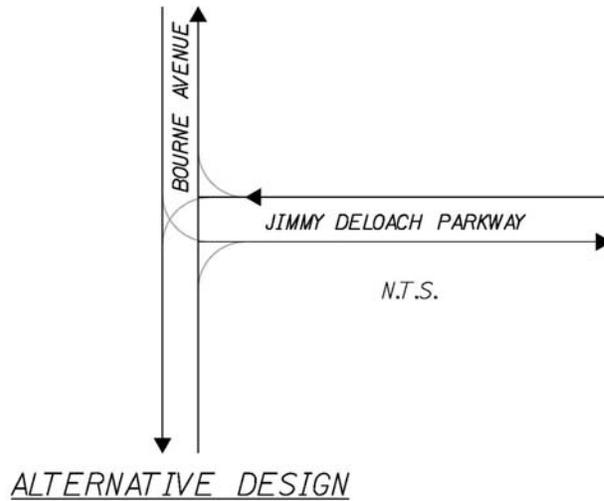
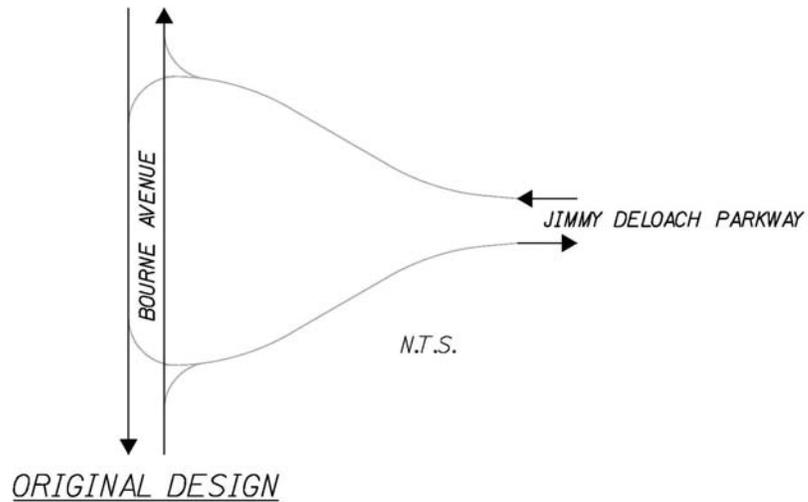


PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-2

DESCRIPTION: **Construct a Typical Intersection at Bourne Avenue**

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



Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-2

DESCRIPTION: **Construct a Typical Intersection at Bourne Avenue**

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

Original Design Area:

A trapezoid 650' x 1,200' x 200' => $[(650'+200')/2] \times 1,200' = 510,000 \text{ SF} = 11.71 \text{ Acres}$

Alternative Design Area:

A trapezoid 220' x 1,200' x 200' => $[(220'+200')/2] \times 1,200' = 252,000 \text{ SF} = 5.79 \text{ Acres}$

$(11.71 \text{ AC} - 5.79 \text{ AC}) = 5.92 \text{ Acres}$

Wetland Mitigation:

Assume \$5,000/Credit and Exchange rate of 8:1 and 100% wetland.
 $(5.92 \text{ Acres}) \times (8 \text{ credit/acre}) \times \$5,000 = \$236,800$

Right of Way:

Net cost 5.92 ac x \$25,000	=	\$ 148,000
Scheduling @ 55%	=	\$ 81,400
Court cost @ 60%	=	<u>\$ 88,800</u>
Total	=	\$ 318,200

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:	RD-2
DESCRIPTION:	Construct a Typical Intersection at Bourne Avenue	SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
				\$ -			
Right of Way	LS	1	\$ 236,800	\$ 236,800	0	\$ -	\$ -
Wetland Mitigation	LS	1	\$ 318,200	\$ 318,200	0	\$ -	\$ -
Sub-total				\$ 555,000			\$ -
Mark-up at 10.00%				\$ 55,500			\$ -
TOTAL				\$ 610,500			\$ -

Estimated Savings: \$610,500

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) – P.I. No. 0008690 Jimmy Deloach Connector- from Bourne Ave./ SR 307 to existing Jimmy Deloach Parkway	ALTERNATIVE NO.:	RD-3
DESCRIPTION:	Construct a Tight Urban Diamond or Single Point Urban Interchange at Grange Avenue	SHEET NO.:	1 of 4

Original Design:

The original design proposes a constructing a Spread Diamond at Grange Avenue.

Alternative Design:

The alternative design would propose constructing a Tight Urban Diamond or a Single Point Urban Interchange at Grange Avenue.

Opportunities:

- Reduces R.O.W. cost
- Reduces displacements
- Reduces wetland impacts and mitigation costs.

Risks:

- None apparent

Technical Discussion:

The alternative dramatically reduces the footprint of the intersection in an area with heavy industrial/commercial development. It would require addition of retaining walls and additional roadway barrier. The proposed alternative should provide a similar level of service with no drop in operational efficiency.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 4,525,422	\$ 0	\$ 4,525,422
ALTERNATIVE	\$ 2,751,650	\$ 0	\$ 2,751,650
SAVINGS	\$ 1,773,772	\$ 0	\$ 1,773,772

Illustration

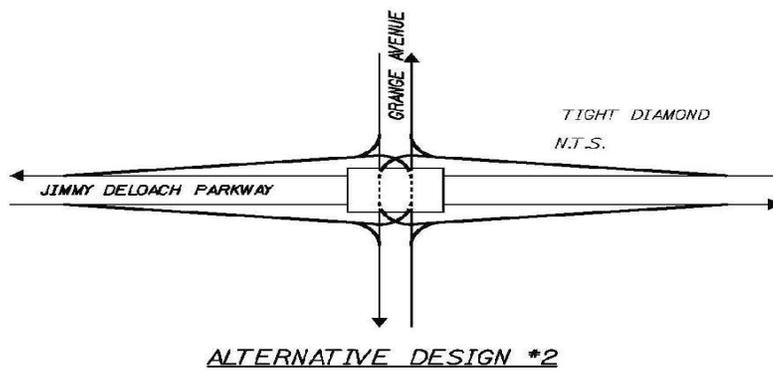
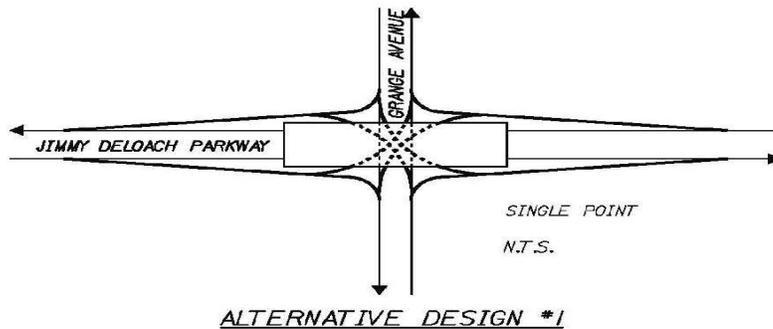
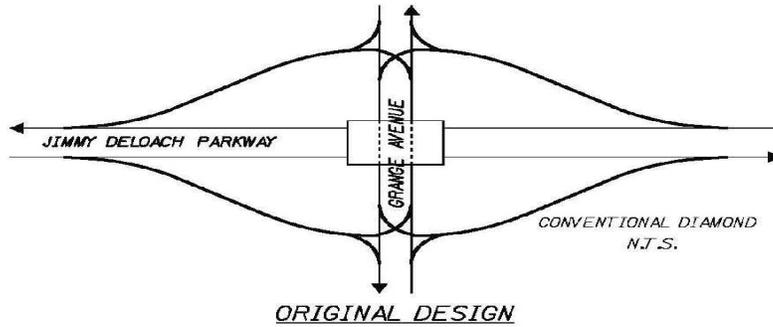


PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR
307 to existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
RD-3

DESCRIPTION: Construct a Tight Urban Diamond or Single Point
Urban Interchange at Grange Avenue

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-3

DESCRIPTION: **Construct a Tight Urban Diamond or Single Point Urban
Interchange at Grange Avenue**

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

Original Design Area:

A trapezoid 650'(w1) x 2,300'(l) x 200'(w2) => $[(650'+200')/2] \times 2,300' = 977,500 \text{ SF} = 22.44 \text{ Acres}$

Alternative Design Area:

A trapezoid 350'(w1) x 2,300'(l) x 200'(w2) => $[(350'+200')/2] \times 2,300' = 632,500 \text{ SF} = 14.52 \text{ Acres}$

$(22.44 \text{ AC} - 14.52 \text{ AC}) => 7.92 \text{ Acres}$

Right of Way:

Land	7.92 AC x \$200,000	=	\$1,548,000
Improvements		=	\$ 100,000
Relocation (Commercial-2)		=	\$ 50,000
Net cost		=	\$1,698,000
Scheduling @ 55%		=	\$ 933,900
Court cost @ 60%		=	\$ 1,018,800
Total		=	\$3,650,700

Wetland Mitigation: Assume \$5,000/Credit and Exchange rate of 8:1 and 15% wetland.

$(7.92 \text{ AC}) \times (8 \text{ credit/acre}) \times \$5,000 \times 0.15 = \$46,520$

Retaining Walls (MSE): Assume none required for bridge abutments. Average 750' long, 0' to 25' high.

$((25' + 0') / 2) \times (750') \times 4 \text{ each} = 37,500 \text{ SF}$

Roadway Barrier: Assume use as wall coping.

$750' \times 4 \text{ each} = 3,000 \text{ LF}$

Reduction in Earthwork: Average 750' long, 0' to 25' high, 3 to 1 side slope, Borrow.

$(((25' + 0') / 2) \times ((75' + 0') / 2) \times (750') \times 4 \text{ each}) / (27 \text{ CF} / \text{CY}) => 52,100 \text{ CY}$

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:	RD-3
DESCRIPTION:	Construct a Tight Urban Diamond or Single Point Urban Interchange at Grange Avenue	SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Right of Way	LS	1	\$ 3,650,700.00	\$ 3,650,700	0	\$ -	\$ -
Wetland Mitigation	LS	1	\$ 46,520.00	\$ 46,520	0	\$ -	\$ -
Earthwork(borrow)	CY	52,100	\$ 8.00	\$ 416,800	0	\$ 8.00	\$ -
Concrete Barrier	LF	0	\$ 43.00	\$ -	3,000	\$ 43.00	\$ 129,000
MSE wall	SF	0	\$ 65.00	\$ -	36,500	\$ 65.00	\$ 2,372,500
Sub-total				\$ 4,114,020			\$ 2,501,500
Mark-up at 10.00%				\$ 411,402			\$ 250,150
TOTAL				\$ 4,525,422			\$ 2,751,650
Estimated Savings:							\$1,773,772

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) – P.I. No. 0008690 Jimmy Deloach Connector- from Bourne Ave./ SR 307 to existing Jimmy Deloach Parkway	ALTERNATIVE NO.:	RD-4
DESCRIPTION:	Delete northbound exit and southbound entrance at Grange Avenue	SHEET NO.:	1 of 4

Original Design:

The original design requires a full-diamond interchange at Grange Road.

Alternative Design:

The alternative design removes the Northbound Exit (Ramp 2A) and Southbound Entrance (Ramp 2D), making the interchange a half-diamond.

Opportunities:

- Reduces construction costs and duration
- Reduces amount of ROW acquisitions
- Reduces impacts to Wetlands

Risks:

- Limits access from Grange Rd. to Jimmy Deloach Connector

Technical Discussion:

The Original Design calls for a full diamond interchange at Grange Rd. / Jimmy Deloach Connector. The stated purpose of the project is to provide clear access for trucks from existing Jimmy Deloach Pkwy. to the Main Gate of the port. The traffic projections show relatively low volumes for the Design Year 2032 for the NB Exit Ramp and the SB Entrance Ramp. The Alternative Design proposes to eliminate the NB Exit Ramp and the SB Entrance Ramp since they are not a project priority and have low traffic volumes. There are alternate routes readily available, greatly reducing the needs and benefits for the ramps.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,896,420	\$ 0	\$ 3,896,420
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 3,896,420	\$ 0	\$ 3,896,420

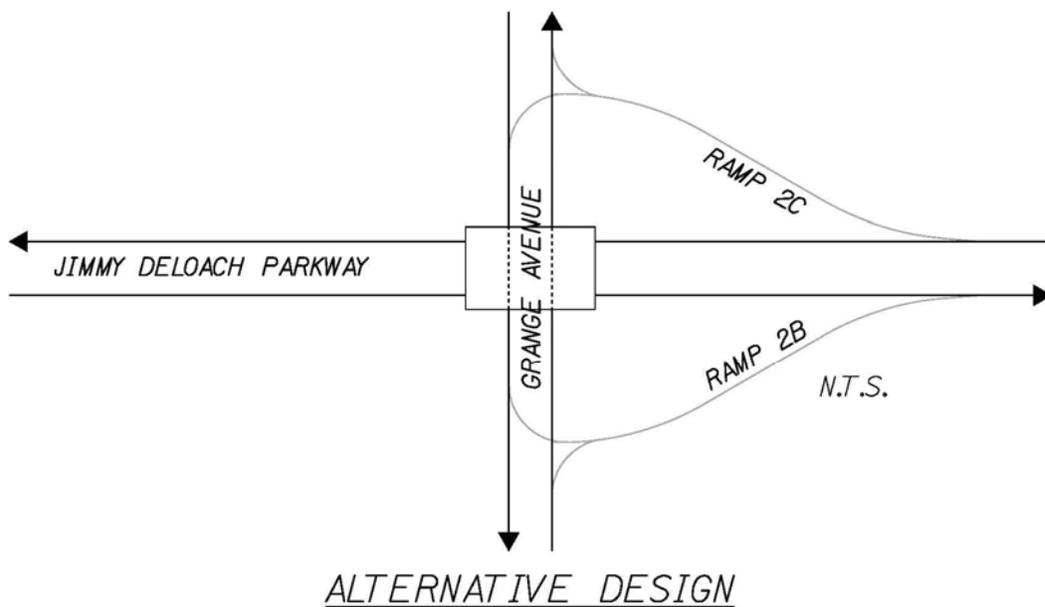
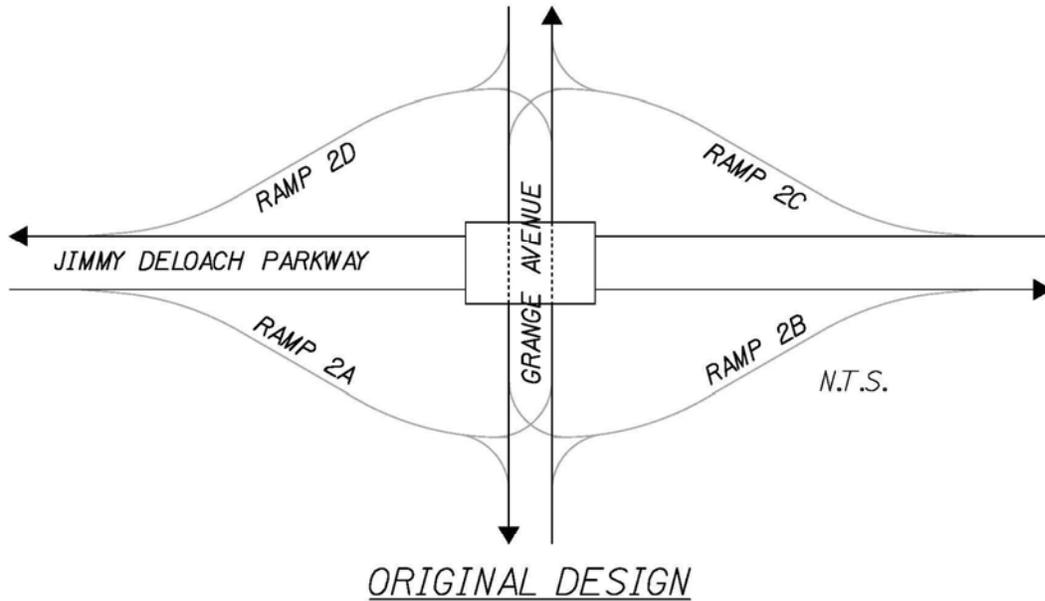
Illustrations

PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
RD-4

DESCRIPTION: Delete northbound exit and southbound entrance at
Grange Avenue

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-4

DESCRIPTION: **Delete northbound exit and southbound entrance at
Grange Avenue**

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

Original Design:

Use full-diamond interchange at Grange Rd. / Jimmy Deloach Connector.

NB exit ramp (Ramp 2A): Length = 1500', Pavement Width = 16' + 10' + 4' = 30'

Pavement Area = 1500'(length) x 30'(width) = 45,000 SF = 5,000

SB entrance ramp (Ramp 2D): Length = 1900', Pavement Width = 16' + 10' + 4' = 30'

Pavement Area = 1900'(length) x 30'(width) = 57,000 SF = 6,333 SY

Total Pavement Area = 5,000 (Ramp 2A) + 6,333 (Ramp 2D) = 11,333 SY

-Concrete Pavement = 11,333 SY

-25 mm Superpave = 11,333 SY x 440 lbs/SY = 4,986,500 lbs = 2,493 TN

- GAB 12" = 11,333 SY

Borrow = 30' + 16'(avg. width) x 8'(avg. fill height) x 1500' + 1900 (length) = 1,251,200 CF = 46,340 CY

Reduced Right of Way requirements = 80,000 SF x 2 (each ramp) = 160,000 SF = 3.7 AC

(assume all Commercial R/W)

3.7 acre x \$200,000/acre => \$740,000 + 25,000 (1-reloc.) + 50,000 (1-cost to cure)

Right of way: Net cost = \$815,000

Alternative Design:

Eliminate the NB exit ramp and the SB entrance ramp, making it a half-diamond interchange.

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:	RD-4
DESCRIPTION:	Delete northbound exit ramp and southbound entrance ramp at Grange Rd.	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
Ramps 2A & 2D							
Pavement Area							
Concrete Pavement	SY	11,333	\$ 65.00	\$ 736,645	0	\$ 80.00	\$ -
25 mm Superpave	TN	2493	\$ 75.00	\$ 186,975	0	\$ 75.00	\$ -
GAB	SY	11,333	\$ 20.00	\$ 226,660	0	\$ 20.00	\$ -
Earthwork							
Borrow Excavation	CY	46,340	\$ 8.00	\$ 370,720	0	\$ 8.00	\$ -
ROW							
Net Cost	LS	1	\$ 815,000.00	\$ 815,000	0		\$ -
Scheduling Contingency		55%	\$ 815,000	\$ 448,250	55%	\$ -	\$ -
Adm/Court Cost		60%	\$ 1,263,250	\$ 757,950	60%	\$ -	\$ -
Sub-total				\$ 3,542,200			\$ -
Mark-up at 10.00%				\$ 354,220			\$ -
TOTAL				\$ 3,896,420			\$ -

Estimated Savings:	\$3,896,420
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Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-5

DESCRIPTION: **Reduce the sum of the paved shoulders on ramps from
14' to 12'**

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

Original Design:

The original design proposes a 4' left shoulder and a 10' right shoulder on all exit and entrance ramps for a sum total of 14'.

Alternative Design:

The alternative design would propose utilizing either a 2' left shoulder and a 10' right shoulder, a 4' left shoulder and an 8' right shoulder or another combination whose sum is equal to 12'.

Opportunities:

- Reduces paving costs
- Complies with AASHTO policy

Risks:

- None apparent

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 to 12 feet".

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,456,911	\$ 0	\$ 2,456,911
ALTERNATIVE	\$ 2,022,722	\$ 0	\$ 2,022,722
SAVINGS	\$ 434,209	\$ 0	\$ 434,209

Illustration

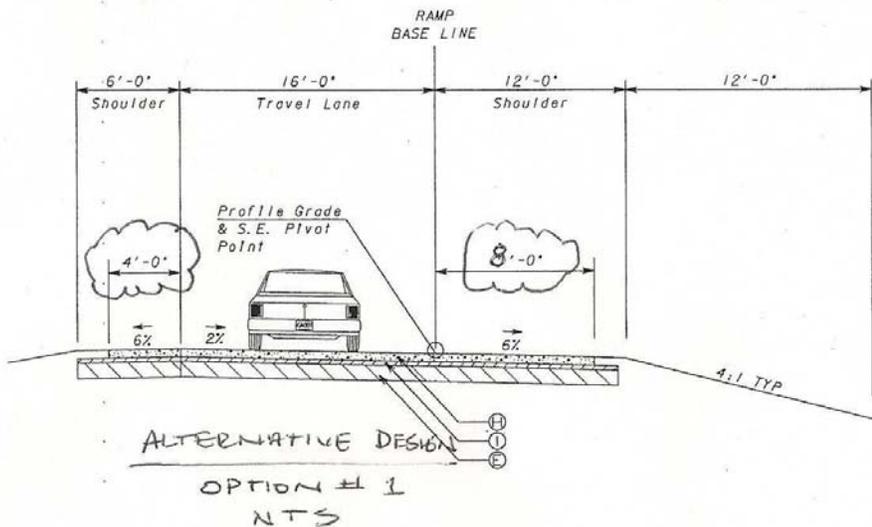
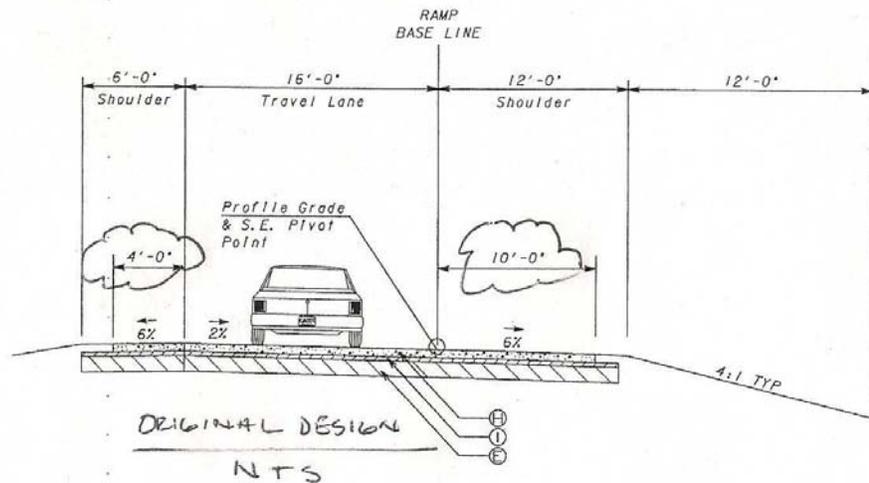


PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
RD-5

DESCRIPTION: Reduce the sum of the paved shoulders on ramps from
14' to 12'

SHEET NO.: 2 of 4



Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:
		RD-5
DESCRIPTION:	Reduce the sum of the paved shoulders on ramps from 14' to 12'	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
				\$ -			\$ -
PCC 12"	SY	13,923	\$ 65.00	\$ 904,995	11,933	\$ 65.00	\$ 775,645
Superpave 12.5 mm	TN	715	\$ 80.00	\$ 57,200	572	\$ 80.00	\$ 45,760
Superpave 19.0 mm	TN	1,430	\$ 75.00	\$ 107,250	1,144	\$ 75.00	\$ 85,800
Superpave 25.0 mm	TN	3,062	\$ 75.00	\$ 229,650	2,325	\$ 75.00	\$ 174,375
12" GAB	TN	13,723	\$ 20.00	\$ 274,460	11,462	\$ 20.00	\$ 229,240
Bridge	SF	6,000	\$ 110.00	\$ 660,000	4,800	\$ 110.00	\$ 528,000
Sub-total				\$ 2,233,555			\$ 1,838,820
Mark-up at 10.00%				\$ 223,356			\$ 183,882
TOTAL				\$ 2,456,911			\$ 2,022,702

Estimated Savings:	\$434,209
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Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) – P.I. No. 0008690 Jimmy Deloach Connector- from Bourne Ave./ SR 307 to existing Jimmy Deloach Parkway	ALTERNATIVE NO.:	RD-12
DESCRIPTION:	Construct a Tight Urban Diamond or Single Point Urban Interchange at Pierce Avenue	SHEET NO.:	1 of 4

Original Design:

The original design proposes a constructing a Spread Diamond at Grange Avenue.

Alternative Design:

The alternative design would propose constructing a Tight Urban Diamond or a Single Point Urban Interchange at pierce Avenue.

Opportunities:

- Reduced R.O.W. cost
- Reduced displacements
- Reduced wetland impacts and Mitigation costs.

Risks:

- Increased retaining wall cost
- Increased roadway barrier cost

Technical Discussion:

The alternative dramatically reduces the footprint of the intersection. It would require addition of retaining walls and additional roadway barrier.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,241,612	\$ 0	\$ 3,241,612
ALTERNATIVE	\$ 2,446,730	\$ 0	\$ 2,446,730
SAVINGS	\$ 794,882	\$ 0	\$ 794,882

Illustration

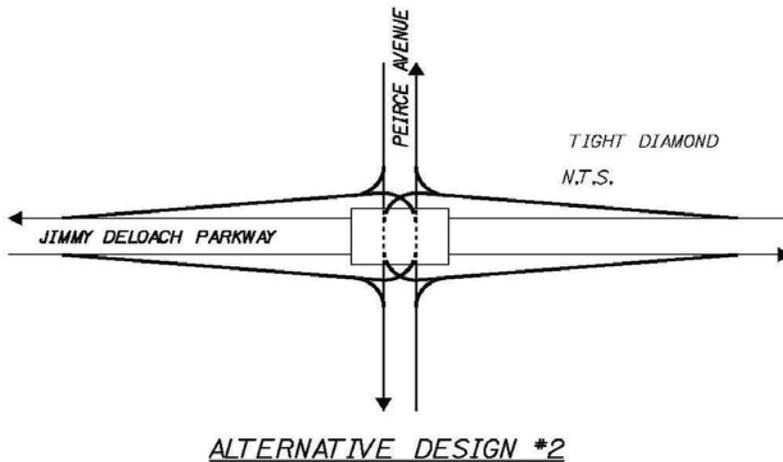
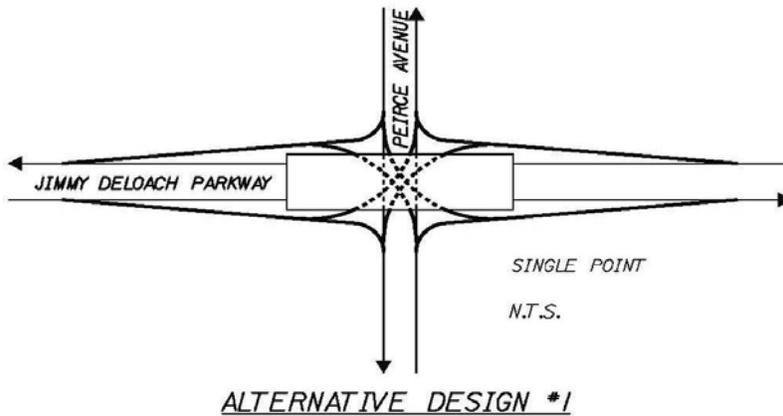
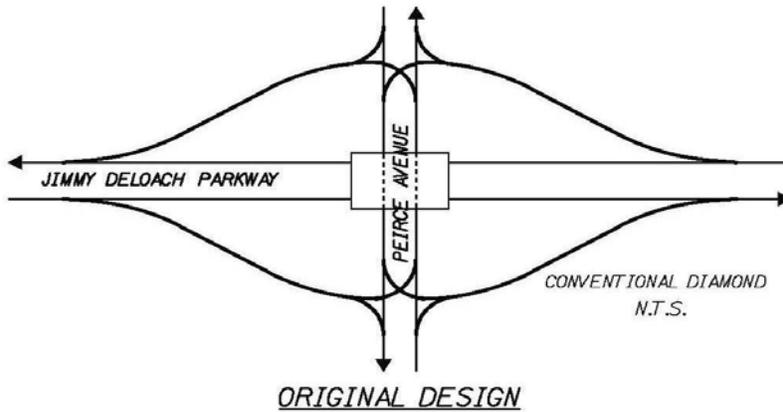


PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
RD-12

DESCRIPTION: Construct a Tight Urban Diamond or Single Point Urban
Interchange at Pierce Avenue

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-12

DESCRIPTION: **Construct a Tight Urban Diamond or Single Point Urban
Interchange at Pierce Avenue**

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

Original Design Area:

A trapezoid 300'(w1) x 3,000'(l) x 700'(w2) => $[(300'+700')/2] \times 3,000' = 1,500,000$ SF

A trapezoid 0'(w1) x 1,700'(l) x 250'(w2) => $[(0'+250')/2] \times 1,700' = 212,500$ SF

$(1,500,000$ SF + $212,500$ SF) / $43,560$ SF / AC => 39.32 AC

Alternative Design Area:

A trapezoid 300'(w1) x 3,000'(l) x 400'(w2) => $[(300'+400')/2] \times 3,000' = 1,050,000$ SF

A trapezoid 0'(w1) x 1,700'(l) x 100'(w2) => $[(0'+100')/2] \times 1,700' = 85,000$ SF

$(1,050,000$ SF + $85,000$ SF) / $43,560$ SF / AC => 26.06 AC

$(39.32$ AC – 26.06 AC) => 13.26 Acres

Right of Way:

Land	13.26 AC x \$25,000	=	\$331,500
Improvements		=	\$300,000
Relocation (residential-3)		=	\$180,000
Net cost		=	\$811,500

Wetland Mitigation: Assume \$5,000/Credit and Exchange rate of 8:1 and 40% wetland.

$(13.26$ AC) x $(8$ credit/acre) x $\$5,000$ x $0.4 = \$212,160$

Retaining Walls (MSE): Assume none required for bridge abutments. Average 650' long, 0' to 25' high.

$((25' + 0') / 2) \times (650') \times 4$ each = $32,500$ SF

Roadway Barrier: Assume use as wall coping.

$650' \times 4$ each = $2,600$ LF

Reduction in Earthwork: Average 650' long, 0' to 25' high, 3 to 1 side slope, Borrow.

$(((25' + 0') / 2) \times ((75' + 0') / 2) \times (650')) \times 8$ each] / $(27$ CF / CY) => $90,280$ CY

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.:	RD-12
DESCRIPTION:	Construct a Tight Urban Diamond or Single Point Urban Interchange at Pierce Avenue	SHEET NO.:	4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Right of Way							
Net Cost	LS	1	\$ 811,500	\$ 811,500	0	\$ 811,500	\$ -
Scheduling Contingency		55%	\$ 811,500	\$ 446,325	55%	\$ -	\$ -
Adm/Court Cost		60%	\$ 1,257,825	\$ 754,695	60%	\$ -	\$ -
Total ROW				\$ 2,012,520			
Wetland Mitigation	LS	1	\$ 212,160	\$ 212,160	0	\$ -	\$ -
Earthwork(borrow)	CY	90,280	\$ 8.00	\$ 722,240	0	\$ 8.00	\$ -
Concrete Barrier	LF	0	\$ 43.00	\$ -	2,600	\$ 43.00	\$ 111,800
MSE Wall	SF	0	\$ 65.00	\$ -	32,500	\$ 65.00	\$ 2,112,500
Sub-total				\$ 2,946,920			\$ 2,224,300
Mark-up at 10%				\$ 294,692			\$ 222,430
TOTAL				\$ 3,241,612			\$ 2,446,730

Estimated Savings: \$794,882

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-21

DESCRIPTION: **Adjust profile to reduce borrow**

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

Original Design:

The original design has a preliminary design profile based on bridge clearances at cross roads and wetland considerations.

Alternative Design:

The alternative design makes revisions to the design profile to reduce the amount of borrow excavation.

Opportunities:

- Reduces construction costs and duration
- Reduces amount of ROW acquisitions
- Reduces impacts to Wetlands

Risks:

- Requires re-design of profile grade

Technical Discussion:

The Original Design proposed a preliminary design profile grade based on bridge clearances at cross roads, wetland avoidance and various other design factors. The vertical clearances are as follows: Grange Rd.=20', Crossgate Rd.=18', Norfolk Southern RR=27', Bonnybridge Rd.=29', Pierce Rd.=20'. The AASHTO Green Book lists a minimum roadway vertical clearance of 16'. The Alternative Design proposes to lower the design profile grade as much as possible based on actual bridge girder depths. It appears the entire length of the project can be lowered 1' (or more at many locations). Additionally, the PI for the vertical curve over Crossgate Rd. should be relocated to put the crest at the bridge. This will reduce the fill requirements by up to 5' for a portion of the approach.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,169,124	\$ 0	\$ 1,169,124
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 1,169,124	\$ 0	\$ 1,169,124

Illustration

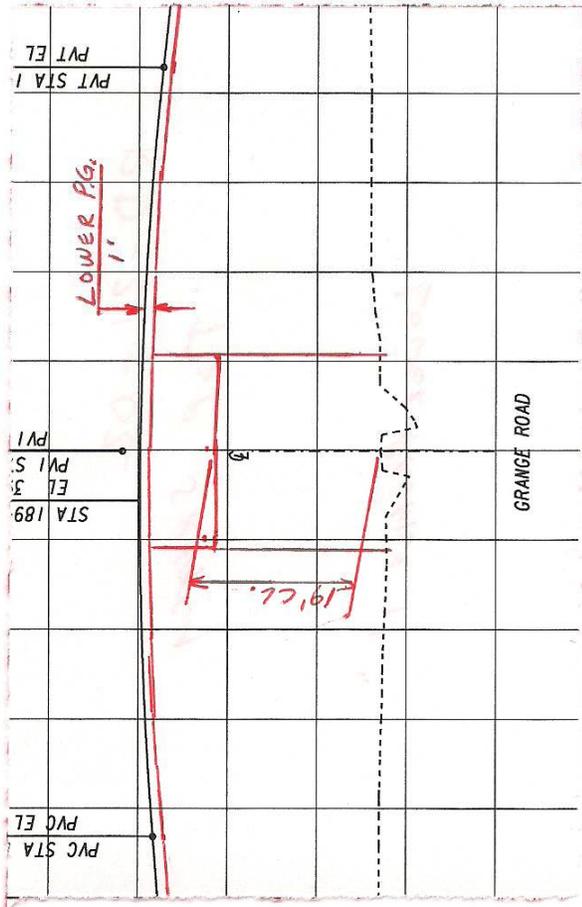


PROJECT: Georgia Department of Transportation
 CSMSL-0008-00(690) – P.I. No. 0008690
 Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
 existing Jimmy Deloach Parkway

ALTERNATIVE NO.:
RD-21

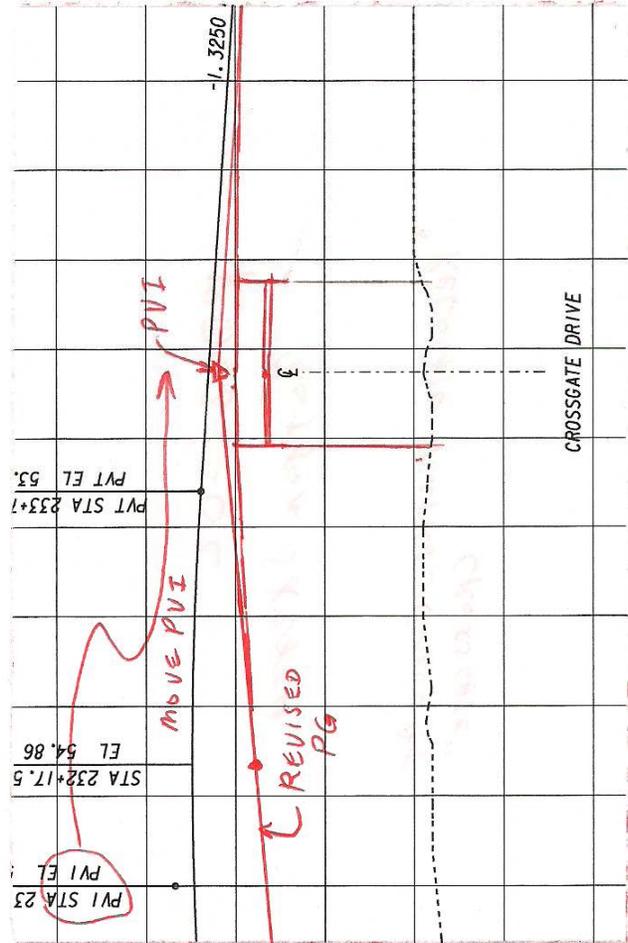
DESCRIPTION: Adjust profile to reduce borrow

SHEET NO.: 2 of 4



Original Design for Grange in Black

Alternative Design for Grange in Red



Original Design for Crossgate

Alternative Design for Crossgate in Red

Calculations



PROJECT: **Georgia Department of Transportation
CSMSL-0008-00(690) – P.I. No. 0008690
Jimmy Deloach Connector- from Bourne Ave./ SR 307 to
existing Jimmy Deloach Parkway**

ALTERNATIVE NO.:
RD-21

DESCRIPTION: **Adjust profile to reduce borrow**

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

Original Design:

Preliminary design profile grade.

Alternative Design:

Lower entire profile grade 1' (minimum).

Reduced Borrow = $10' + 24' + 10.5' + 24' + 10'$ (roadbed width) x 1' (height) x 14,600' (total length) =
1,146,100 CF = 42,500 CY

Redesign Vertical Curve at Crossgate Rd.

Reduce Borrow = $10' + 24' + 10.5' + 24' + 10'$ (roadbed width) x 5' (avg. height) x 900' (length) = 353,250 CF
= 13,000 CY

Total reduced Borrow = 42,500 (lowered roadway) + 13,000 (Crossgate Rd.) = 55,500 CY

Reduced MSE Wall = 78' (roadway width) x 1' (height) x 12 (locations) = 936 SF

Reduced Right of Way requirements = 1' (height) @ 4:1 = 4' (reduced width) x 2 (each side) x 14,600 (total length) = 116,800 SF = 2.7 AC

(assume 0.9 acre Industrial, 0.9 Residential and 0.9 acre Commercial R/W)

$(0.9 + 0.9)$ acre x \$25,000/acre + 0.9 acre x \$200,000 => \$225,000

Right of way: Net cost = \$225,000

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSMSL-0008-00(690) - P.I. No. 0008690 Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy. Chatham County	ALTERNATIVE NO.: RD-21
DESCRIPTION:	Adjust profile to reduce borrow	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
Lower Profile 1'							
ROW							
Net Cost	LS	1	\$ 225,000	\$ 225,000	0	\$ 225,000	\$ -
Scheduling Contingency		55%	\$ 225,000	\$ 123,750	55%	\$ -	\$ -
Adm/Court Cost		60%	\$ 348,750	\$ 209,250	60%	\$ -	\$ -
Total ROW				\$ 558,000			\$ -
Reduced from Orig. Design							
Borrow Excavation	CY	55,500	\$ 8.00	\$ 444,000	0	\$ 8.00	\$ -
MSE Wall Face	SF	936	\$ 65.00	\$ 60,840	0	\$ 65.00	\$ -
Sub-total				\$ 1,062,840			\$ -
Mark-up at 10.00%				\$ 106,284			\$ -
TOTAL				\$ 1,169,124			\$ -

Estimated Savings:	\$1,169,124
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PROJECT DESCRIPTION

INTRODUCTION

The subject of this Value Engineering study is project CSMSL-0008-00(690) – P.I. No. 0008690. This project is for the construction of the Jimmy Deloach Connector, a new roadway alignment that would begin at Bourne Avenue/SR 307 and terminate at the existing eastern end of Jimmy Deloach Parkway. The project is primarily located in Port Wentworth, Chatham County, Georgia. The length of the project is 3.1 miles.

PROJECT DESCRIPTION

New interchanges are to be constructed at both Grange Road and Jimmy Deloach Parkway. The proposed typical section of the proposed limited access roadway would consist of four 12' wide travel lanes (two in each direction) with a 24 foot raised median and 6.5 foot paved outside shoulders. Exceptions to this typical section would begin just south of Crossgate Road and continue to north of Bonnybridge Road. It would include a median barrier with 4-foot inside shoulders. From north Bonnybridge Road to Jimmy Deloach Parkway, northbound and southbound lanes will be separated by a depressed median varying in width up to 350'.

The new location roadway would bypass approximately three miles of existing SR 21 mainline beginning at Jimmy Deloach Parkway and allow direct access into the Savannah Port to I-95.

Along SR 21 in the vicinity of the proposed project, current traffic volumes are currently estimated at 24,400 vehicles per day of which 65 % are passenger vehicles and 35% are trucks. Approximately 76% of the trucks are in route to/from the Savannah Port.

Thirty-eight properties will be affected with 6 proposed business displacements and 5 residence displacements.

There are nine bridges on the proposed project:

- Bridge carrying proposed Jimmy Deloach Connector over Grange Road
- Bridge carrying proposed Jimmy Deloach Connector over Crossgate Road
- Bridge carrying proposed Jimmy Deloach Connector over Norfolk Southern Railroad
- Bridge carrying proposed Jimmy Deloach Connector over Bonnybridge Road/SR 30
- Bridge carrying proposed Jimmy Deloach Connector (southbound) over wetlands
- Bridge carrying proposed Jimmy Deloach Connector (northbound) over wetlands
- Bridge carrying proposed Jimmy Deloach Connector (southbound/ over existing Jimmy Deloach Parkway
- Bridge carrying proposed Jimmy Deloach Connector (northbound) over existing Jimmy Deloach Parkway
- Existing Jimmy Deloach Parkway bridge over SR 21 and CSX Railroad

The project has four major intersections, interchanges, and signal locations:

- Jimmy Deloach Connector southbound entrance ramp at Bourne Avenue-signalized intersection
- Jimmy Deloach Connector northbound entrance ramp at Bourne Avenue-signalized intersection
- Jimmy Deloach Connector at Grange Road
- Jimmy Deloach Connector at Jimmy Deloach Parkway

Functional classification of this road is rural principal arterial with full limited access. The posted speed limit will be 55mph.

NEED AND PURPOSE

The proposed project is primarily needed to provide faster truck movement into and out of the Savannah Port from I-95 to SR 21. The Georgia Ports Authority is interested in the construction of a project from the I-95/Jimmy Deloach interchange south to the Savannah Port gates that would provide direct access to the Port. As a result, GDOT and Georgia Ports Authority have been working together to develop a project that would bypass SR 21 and provide direct truck access.

By constructing the Jimmy Deloach Connector, 4,890 vpd in the build year (2012) and 6,980 vpd in the design year (2032) would be shifted from SR 21 to the proposed project. This represents an overall reduction in traffic on SR 21 of 15% and a reduction in truck traffic of 76%.

Currently Level of Service on SR 21 is Level C in the AM peak period and LOS B in the PM peak period, however, the intersection of SR 21 and Bourne Avenue which is the mail road currently used to access the Port fails with an LOS of F in the AM peak period.



Intersection at SR 21 and Bourne Avenue

CONSTRUCTION COSTS

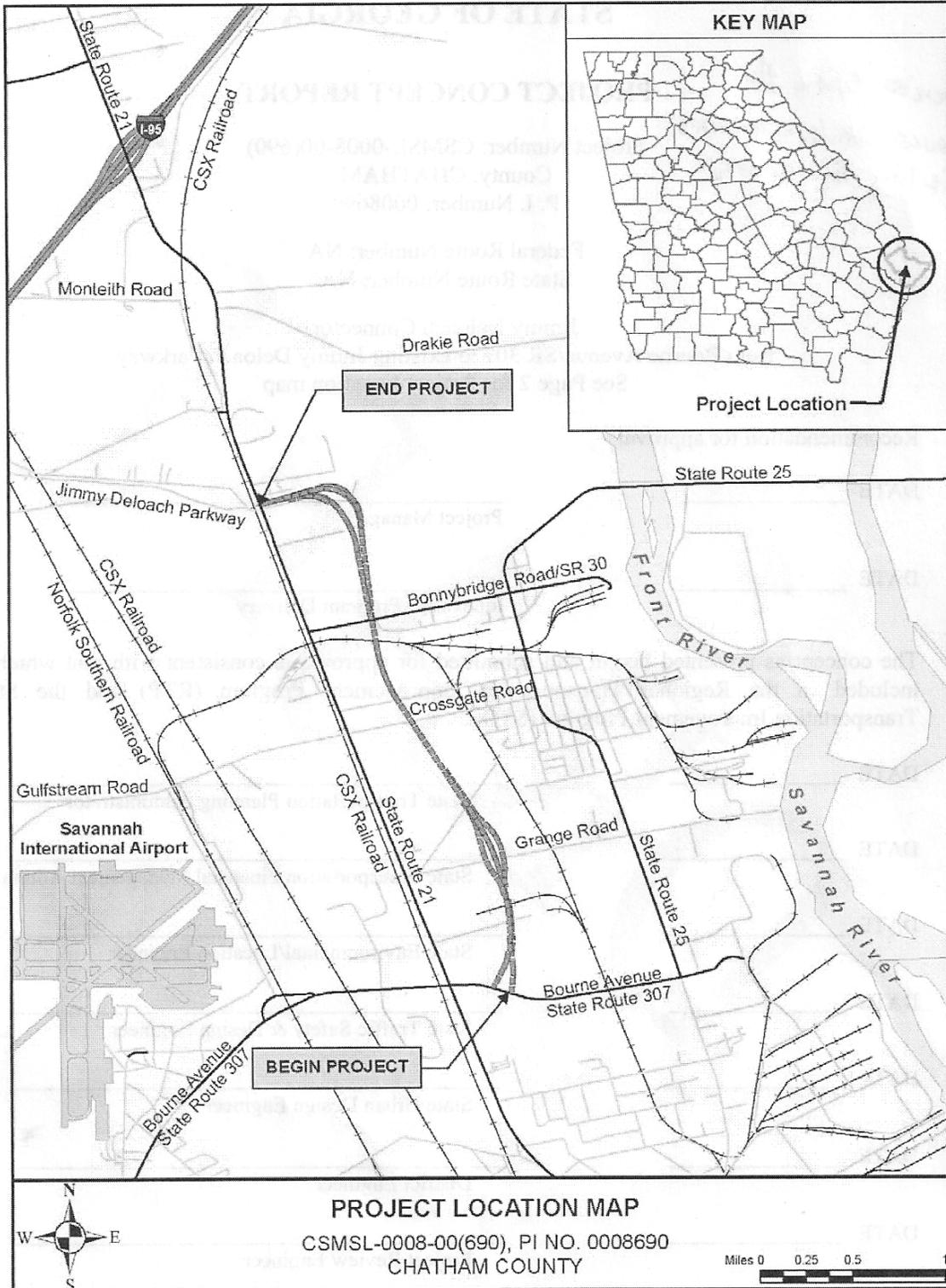
The estimated construction cost for the project is projected at \$68,291,988. In addition, Right-of-Way costs are projected at \$31,229,300 and reimbursable utilities at \$8,388,403. The projected total cost for the project is \$107,909,691.

The design for the project has been prepared by **Parsons**.

REPRESENTATIVE DOCUMENTS

- Georgia Department of Transportation
 - Construction Cost Estimate
 - Right-of-Way Cost Estimate
 - Concept Report
 - Project Location Map
 - Traffic Analysis
 - Typical Road Section

The VE Team utilized the GDOT supplied project materials noted above plus the preliminary plans provided by Parsons.



NEED AND PURPOSE

Introduction

Project CSMSL-0008-00(690) proposes the construction of the Jimmy Deloach Connector, a new roadway alignment that would begin at Bourne Avenue/SR 307 and terminate at the existing eastern end of Jimmy Deloach Parkway. The project is primarily located in Port Wentworth, Chatham County, Georgia. New interchanges would be constructed at both Grange Road and Jimmy Deloach Parkway. The proposed project would be approximately 3.1 miles in length. The typical section of the proposed limited access roadway would consist of four 12-foot wide travel lanes (two in either direction) separated by a 24 foot-wide raised median and 6.5 foot wide paved outside shoulders. Exceptions to this typical section would begin just south of Crossgate Road and continue to north of Bonnybridge Road and would include a median barrier with 4-foot wide inside shoulders. From north of Bonnybridge Road to Jimmy Deloach Parkway, northbound and southbound lanes will be separated by a depressed median varying in width up to 350 feet. The posted speed limit would be 55 miles per hour (mph).

In the vicinity of the proposed project, SR 21 is a four-lane divided highway (two lanes in either direction) with a variable 16-42 foot wide median, and 10-foot paved outside shoulders. The existing right-of-way varies from approximately 175 to 200 feet.

The new location roadway would bypass approximately three miles of existing SR 21 mainline beginning at Jimmy Deloach Parkway and allow direct access into the Savannah Port gates. The purpose of the project is to improve travel time from the Savannah Port to I-95 and accommodate the increasing truck traffic entering and exiting the Savannah Port.

The proposed project is primarily needed to provide faster truck movement into and out of the Savannah Port from I-95 and SR 21. The project is also needed to accommodate the increase in truck traffic that will result from the expansion of the Savannah Port and the deepening of the Savannah River Channel, and maintain the economic viability of the Port and southeast region.

Planning Basis for the Action

The proposed project stemmed from the Georgia DOT's Statewide Truck Lanes Identification Study (2007). Within this study, Savannah, a sub-area of Chatham County was studied for potential truck lanes and other truck travel improvements due to the Savannah Port. The Georgia Ports Authority was interested in the construction of a project from the I-95/Jimmy Deloach interchange south to the Savannah Port gates that would provide direct access to the Port. As a result, the Georgia DOT and the Georgia Ports Authority have been working together to develop a project that would bypass SR 21 and provide direct truck access into the Savannah Port.

Deficiencies in the System

Traffic Volumes

Along SR 21 in the vicinity of the proposed project, traffic volumes are currently estimated at 24,400 vehicles per day of which 65 percent are passenger vehicles and 35 percent are trucks. Approximately 76 percent of the trucks are destined for the Savannah Port. Table 1 shows the Average Annual Daily Traffic (AADT) and percentage of trucks on the corridors that connect to SR 21 and the Savannah Port.

Roadway Names	ADT (vpd)		Truck Volume (vpd)		Percentage of Trucks	
	EB	WB	EB	WB	EB	WB
Bourne Avenue	3920	3820	2130	2260	54 %	59 %
Grange Road	2440	2550	910	890	37 %	35 %
Crossgate Drive	2240	2240	70	90	3 %	4 %
Bonnybridge Road	3690	2240	1330	1060	36 %	39 %
Jimmy Deloach Pkwy	2840	3700	850	1760	30 %	47 %

The build year 2012 traffic volumes on SR 21 without the Jimmy Deloach Connector project would be 31,680 vehicles per day, 61 percent passenger vehicles and 39 percent trucks. In the design year 2032, traffic volumes are projected to be 45,250 vehicles per day, 61 percent passenger vehicles and 39 percent trucks.

By constructing the Jimmy Deloach Connector project, 4,890 vpd in the build year and 6,980 vpd in the design year would be shifted from SR 21 to the proposed facility, thereby reducing the AADT of SR 21 from 31,680 vpd to 26,790 vpd in the build year and from 45,250 vpd to 38,270 vpd in the design year (see Table 2 below). This represents an overall reduction in traffic on SR 21 of 15%, with a reduction in truck traffic of 76%, for both the build year and design year.

Year		ADT (vpd)	Truck Traffic (vpd)	
Existing Conditions (Year 2008)		24,400	8,540	
Build Year (Year 2012)	Without Project (vpd)	31,680	12,310	
	With Project (vpd)	26,790	2,950	
	Reduction in Traffic	(vpd)	-4,890	-9,360
		(%)	-15%	-76%
Design Year (Year 2032)	Without Project (vpd)	45,250	17,580	
	With Project (vpd)	38,270	4,210	
	Reduction in Traffic	(vpd)	-6,980	-13,370
		(%)	-15%	-76%

Level of Service

As shown in Table 3 below, SR 21 is currently operating at a Level of Service (LOS) C in the AM peak period and LOS B in the PM peak period, respectively.

Year	A.M. Peak		P.M. Peak	
	Speed (mph)	LOS	Speed (mph)	LOS
2008	23.5	C	33.0	B

As shown in Table 4 below, the intersection of SR 21 and Bourne Avenue (which is the main road currently used to access the Savannah Port from SR 21) fails (LOS F) in the AM peak. Therefore, without improvements to SR 21 (which does not provide direct access to and from the Savannah Port from I-95) or the construction of the Jimmy Deloach Connector, the intersection LOS shown below in Table 4 would further deteriorate.

Intersection	A.M. Peak		P.M. Peak	
	Delay (sec)	LOS	Delay (sec)	LOS
SR 21 at Bourne Avenue	119.5	F	56.0	E
SR 21 at Grange Road	46.9	E	28.6	D
SR 21 at Crossgate Drive	53.7	D	28.8	C
SR 21 at Bonnybridge Road	19.0	B	15.3	B
SR 21 at Jimmy Deloach Parkway	22.3	C	14.5	B

SR 21, without additional improvements, would not accommodate the projected traffic increase of 20,850 passenger vehicles and trucks per day in the design year (2032). Therefore, the LOS on SR 21 would be F during the AM peak period in both the build year and design year, and LOS C and E during the PM peak period in build year and design year respectively as shown in Table 5 below.

Year	A.M. Peak		P.M. Peak	
	Speed (mph)	LOS	Speed (mph)	LOS
No-Build Conditions				
2012	12.9	F	27.8	C
2032	7.3	F	14.5	E

Safety

Safety analysis parameters, including total accident rates, fatality rates, and injury rates, were developed for the proposed limits near SR 21. A comparison was made of the rates along SR 21 with corresponding statewide averages for similar corridors. Table 6 below shows the accident and injury rates as compared to a similar facility for the years 2004-2006, the most recent data available.

Item/Year		Year		
		2004	2005	2006
Crash Type	Angle	24	54	33
	Rear-End	137	167	127
	Sideswipe – Same Direction	21	44	22
	Sideswipe – Opposite Direction	3	3	3
	Not a Collision with a Motor Vehicle	19	21	16
	Head-On	3	3	1
Total Accidents		207	292	202
Total Non-Fatal Injuries		92	123	90
Total Fatalities		1	1	0
Average Annual Daily Traffic (AADT)		32,176	26,900	27,360
Accident Rate (per 100 million vehicle miles traveled [mvmt])		331	558	380
Statewide Accident Rate (per 100 mvmt)		342	363	298
Non-Fatality Injury Rate (per 100 mvmt)		146.97	235.04	169.09
Statewide Non-Fatality Injury Rate (per 100 mvmt)		142	151	120
Fatality Rate (per 100 mvmt)		1.60	1.91	0.00
Statewide Fatality Rate (per 100 mvmt)		1.07	1.43	1.33

Table 6 above shows the following:

- The overall accident, injury, and fatality rates in the project area are higher than the corresponding statewide averages;
- On average, 234 accidents, 102 injuries, and 0.67 fatalities per year were observed in the project area;
- Rear-end crashes are the most predominant crashes in the project area, constituting 61 percent of the total accidents; and
- Angle crashes and sideswipe crashes account for approximately 16 percent and 14 percent of the total accidents, respectively;

Decreasing the mix of truck and passenger vehicle traffic on SR 21 within the project limits would facilitate improved traffic flow and therefore provide safer conditions along SR 21.

Travel Time

The primary benefit of implementing a congestion project is a reduction in delay. Reduction in delay, or delay benefit, can be defined as the difference between the peak hour travel time through the corridor without the proposed improvement and the peak hour travel time through the corridor with the proposed improvement. This delay benefit was factored to calculate the time benefit, which takes the value of time into account, and the commercial benefit, which takes the cost of delay to commercial vehicles into account. The travel time was estimated between Bourne Avenue east of the Jimmy Deloach Connector and the north end of Jimmy Deloach Parkway. Travel time was calculated for both corridors (SR 21 and the Jimmy Deloach Connector) individually, and then weighted average travel time was calculated taking volumes into account for both corridors. Travel time savings was determined for each alternative as listed in Table 7 below, by taking the difference between the weighted average travel time for each alternative and the travel time for the no-build conditions.

Scenario	Travel Time (min/veh)		Wt. Average Travel Time (min/veh)	Time Savings (min/veh)
	SR 21	JDC		
No-Build Conditions	19.66	---	19.66	---
Alternate 2A (T-Intersection at SR 307)	13.21	4.62	9.40	10.26
Alternate 2B (Half-diamond interchange at SR 307)	11.43	4.39	8.31	11.35
Alternate 2C (Flyover ramp at SR 307 interchange)	12.14	4.21	8.62	11.04
Alternate 2D (30 mph loop ramp at SR 307 interchange)	12.14	4.11	8.58	11.08

Economic Vitality

Georgia's deepwater ports and inland barge terminals support more than 275,000 jobs throughout the state annually and contribute \$10.8 billion in income, \$35.4 billion in revenue and some \$1.4 billion in state and local taxes to Georgia's economy.

The Savannah Port is the fourth largest container port in the nation and the sixth largest automobile port in the nation. In 2007, 2.6 million Twenty-Equivalent Unit containers (TEU's) were handled through the Port of Savannah, a 20.6 percent increase from previous years. Deepening of the Savannah River channel from 42 feet to 48 feet (to accommodate larger ships) will increase the throughput capacity of the port from 2.6 million TEU's to 6 million TEU's by 2018. The roadway network must be able to keep up with the growth of the port.

The Savannah Port is serviced by approximately 100 trucking companies. The Georgia Ports Authority has two aggressive capital investment programs, one to increase the capacity of an intermodal container transfer facility and the second to construct 42 acres of additional container storage within the Ports Authority property. Both of these improvement projects, according to the Ports Authority, will “continue to stimulate the growth of businesses throughout the state for many years to come.”

With this projected growth within the Savannah Port, freight transfer via trucks will greatly increase. The Jimmy Deloach Connector is needed to make ingress and egress of truck traffic to the Savannah Port efficient and be able to keep up with the increasing freight that will need to be distributed. Without the connector, congestion along SR 21 would further slow the ultimate distribution of goods from Georgia’s port and potentially decrease the desirability of this port for the shipping industry.

Logical Termini

Approximately 30-35% percent of the truck traffic heading for the Savannah Port is coming from the I-95 and the Jimmy Deloach interchange. Therefore, beginning the project at the SR 21 and existing Jimmy Deloach Parkway would allow for a continuous direct access to the Savannah Port without placing truck traffic onto SR 21. The terminus of Bourne Avenue was selected because this is the destination point at which the trucks head east into the Savannah Port gates. The proposed project would not require improvement to any other cross roads in the project corridor. This project would function with independent utility.

The impact of the proposed project on the I-95/SR-21 and I-95/Jimmy Deloach Parkway interchanges was studied by comparing the no-build and build volumes at both interchanges. Tables 8 and 9 below summarize this information for open year and design year conditions at these interchanges.

Year		ADT (vpd)	Truck Traffic (vpd)	
Existing Conditions (Year 2008)		24,890	9,710	
Open Year (Year 2012)	Without Project (vpd)	29,120	11,360	
	With Project (vpd)	26,490	2,920	
	Reduction in Traffic	(vpd)	-2,630	-8,440
		(%)	-9%	-74%
Design Year (Year 2032)	Without Project (vpd)	42,390	16,530	
	With Project (vpd)	37,840	4,160	
	Reduction in Traffic	(vpd)	-4,550	-12,370
		(%)	-11%	-75%

Table 8 indicates that in the design year daily volumes at I-95/SR-21 interchange under build conditions will be approximately 11% lower than that under no-build conditions. Additionally, SR-21 will experience a 75% reduction in truck volumes. This demonstrates that the operations at the I-95/SR-21 interchange under the build condition will be better than that under no-build conditions.

Since the project proposes a direct and uninterrupted connection between the Jimmy Deloach Connector and the Jimmy Deloach Parkway, the majority of the Port traffic will access I-95 (and vice versa) using the I-95/Jimmy Deloach Parkway interchange, thereby significantly increasing the traffic demand along Jimmy Deloach Parkway. Table 9 indicates that traffic volumes under the build condition will be approximately 96% higher than that under no-build conditions.

Table 9: Traffic Volume Along Jimmy Deloach Pkwy near the I-95 Interchange

Year		ADT (vpd)	Truck Traffic (vpd)	
Existing Conditions (Year 2008)		6,540	2,620	
Open Year (Year 2012)	Without Project (vpd)	16,060	6,420	
	With Project (vpd)	31,500	15,300	
	Increase in Traffic	(vpd)	15,440	8,880
		(%)	96%	138%
Design Year (Year 2032)	Without Project (vpd)	22,950	9,180	
	With Project (vpd)	45,000	21,860	
	Increase in Traffic	(vpd)	22,050	12,680
		(%)	96%	138%

The results of the operational analysis conducted in the “Statewide Truck Lanes Needs Identification Study” shows that the I-95/Jimmy Deloach Parkway interchange will operate at failing LOS in the design year no-build conditions. Construction of proposed Jimmy Deloach Connector will not change the failing level of service at this interchange. Therefore, improvements at the I-95/Jimmy Deloach Parkway interchange should be considered as part of separate future project in order to accommodate design year (2032) traffic volumes.

Traffic on I-95 destined for the Port in northbound direction and vice-versa would more likely access the new Jimmy Deloach Connector from the I-95/Jimmy Deloach Parkway interchange. By traveling through this interchange, there would be reduction in the travel distance by 1.5 miles when compared to the I-95/SR-21 interchange. Also, the traffic would not experience any delays as there are no traffic signals on Jimmy Deloach Parkway from I-95. However, traffic on I-95 destined for the Port in the southbound direction and vice-versa would have to travel an additional distance of 1.5 miles if they choose to use the I-95/Jimmy Deloach Parkway interchange rather than the I-95/SR-21 interchange.

The significant percentage of heavy vehicles having their origin and destination as the Port would have to experience five traffic signals if they chose to travel along SR-21 to access I-95. Therefore, the additional 1.5 miles of travel is less time consuming than the stop and go traffic conditions they would experience on SR 21 which ultimately increases the traffic volumes at I-95/Jimmy Deloach Parkway interchange and contributes to the failing conditions in the design year.

Functional Classification & Access Control

Jimmy Deloach Connector is proposed to have a functional classification of Rural Principal Arterial with full limited access. The need and purpose of this project is to increase mobility for truck and other users between the port and I-95. Driveway access to the proposed Jimmy Deloach Connector will be detrimental to this need and purpose and is not recommended. Access will be controlled via interchanges and ramps along the mainline at existing Jimmy Deloach Parkway, Grange Road & Bourne Avenue/SR 307.

Benefit/Cost (B/C)

A benefit/cost (B/C) analysis was performed to determine the total benefit of the project compared to the total cost incurred by the project. A B/C ratio, which is the ratio of the congestion benefit to the congestion cost, was determined for each alternative. A B/C ratio greater than 1.0 indicates that the calculated dollar value of congestion benefits exceeds the estimated dollar cost of the project. Table 10 below indicates that B/C ratios for all of the alternatives is comparable and range from 6.40 to 7.04.

Scenario	Travel Time (min/veh)		Wt. Average Travel Time (min/veh)	Time Savings (min/veh)	Benefit (\$)	Cost (\$)	B/C
	SR 21	JDC					
No-Build Conditions	19.66	---	19.66	---	---	---	---
Alternate 2A (T-Intersection at SR 307)	13.21	4.62	9.40	10.26	780,372,624	117,194,590	6.66
Alternate 2B (Half-diamond interchange at SR 307)	11.43	4.39	8.31	11.35	863,444,570	122,577,178	7.04
Alternate 2C (Flyover ramp at SR 307 interchange)	12.14	4.21	8.62	11.04	839,478,145	131,194,590	6.40
Alternate 2D (30 mph loop ramp at SR 307 interchange)	12.14	4.11	8.58	11.08	842,852,312	126,194,590	6.68

Description of the proposed project: Project CSMSL-0008-00(690) proposes the construction of Jimmy Deloach Connector, a new roadway alignment that would begin at Bourne Avenue/SR 307 and terminate at the existing eastern end of Jimmy Deloach Parkway. The project is primarily located in Port Wentworth, Chatham County, Georgia. New interchanges would be constructed at Grange Road and Jimmy Deloach Parkway. The proposed project would be approximately 3.1 miles in length. The typical section of the proposed limited access roadway would consist of four 12-foot wide travel lanes (two in either direction) separated by a 24-foot wide raised median and 6.5-foot wide paved outside shoulders. Exceptions to this typical section will begin just south of Crossgate Road and continue to north of Bonnybridge Road and would include a median barrier with 4-foot wide inside shoulders. From north of Bonnybridge Road to Jimmy Deloach Parkway, northbound and southbound lanes will be separated by a depressed median varying in width up to 350 feet. The posted speed limit would be 55 mph. Two diamond ramps are proposed at Bourne Avenue – one southbound exit ramp from Jimmy Deloach Connector and one northbound entrance ramp from Bourne Avenue.

Is the project located in a PM 2.5 Non-attainment area? _____ Yes X No

Is the project located in an Ozone Non-attainment area? _____ Yes X No

Project Concept Report page 13
Project Number: CSMSL-0008-00(690)
P. I. Number: 0008690
County: Chatham

State of Georgia
Department of Transportation

PDP Classification: Major X Minor _____

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

Functional Classification: Rural Principal Arterial with Full Limited Access

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

Traffic (AADT):

Base Year: (2008) N/A

Design Year: (2032) 30,520

Existing design features:

State Route 21

- Typical Section: Four 12 foot travel lanes with variable 16 – 42 foot depressed median and 10 foot paved outside shoulders.
- Posted speed: 55 mph Minimum radius for curve: 1,800 ft.
- Maximum super-elevation rate for curve: 6.00 %
- Maximum grade: Mainline: 3.5 % , Cross Roads: 1.7% , Driveways: 10%
- Width of right of way: varies from 175 ft. to 200 ft.
- Major structures:
 - Bridge carrying Jimmy Deloach Parkway over SR 21
(Structure ID 051-5060-0) Length = 273 ft, Width = 82.7 ft, Suff. Rating = 87.77
- Major interchanges or intersections along the project:
 - SR 21 at Bourne Avenue/SR 307 – signalized intersection
 - SR 21 at Grange Road – unsignalized intersection
 - SR 21 at Crossgate Road – signalized intersection
 - SR 21 at Bonnybridge Road/SR 30 – signalized intersection
 - SR 21 at Jimmy Deloach Parkway – signalized intersection
- Existing length of roadway segment: 2.7 miles along SR 21

Proposed Design Features:

Jimmy Deloach Connector

- Proposed typical section(s)
 - From begin project to south of Crossgate Road: Four 12-foot wide travel lanes with a 24-foot raised median and 6.5-foot wide paved outside shoulders. An urban median is recommended for this section as opposed to a 44-foot depressed median to minimize right-of-way impacts.
 - From south of Crossgate Road to north of Bonnybridge Road: Four 12-foot wide travel lanes separated by a median barrier, 4-foot wide inside shoulders and 6.5-foot wide paved outside shoulders. A median barrier is recommended for this section to reduce impacts and minimize structure costs for bridges over Crossgate Road, Norfolk Southern Railroad and Bonnybridge Road/SR 30.
 - From north of Bonnybridge Road to Jimmy Deloach Parkway: Four 12-foot wide travel lanes separated by a depressed median varying in width up to 350 feet, 4-foot wide paved inside shoulders and 6.5-foot wide paved outside

shoulders.

- Proposed Design Speed Mainline: 55 mph
- Proposed Maximum grade Mainline: 3.0 %
- Maximum grade allowable: 4.0 %
- Proposed Maximum grade Side Street: 3.0 %
- Maximum grade allowable: 6 %
- Proposed Maximum grade driveway: NA
- Proposed Minimum radius for curve: 1060 ft
- Minimum radius allowable: 1060 ft
- Proposed Maximum degree of curve: 5.41°
- Maximum degree allowable: 5.41°
- Maximum super-elevation rate: 6.00 %

Ramps

- Proposed typical section
 - Bourne Avenue/SR 307 Interchange: (3) 12-foot wide travel lanes, 10-foot wide paved outside shoulder and 4-foot wide paved inside shoulder.
 - Grange Road Interchange: (1) 16-foot wide travel lane on each ramp, additional (1) 12-foot wide right turn lane at each exit ramp-head, 10-foot wide paved outside shoulders and 4-foot wide paved inside shoulders.
 - Jimmy Deloach Parkway Interchange: (1) 16-foot wide travel lane on each ramp, additional (1) 12-foot wide right turn lane at each exit ramp-head, 10-foot wide paved outside shoulders and 4-foot wide paved inside shoulders.
- Proposed Design Speed Ramp : 45 mph
- Proposed Maximum grade Ramp: 4 %
- Maximum grade allowable: 5 %
- Proposed Minimum radius for curve: 700 ft
- Minimum radius allowable: 587 ft
- Proposed Maximum degree of curve: 8.19°
- Maximum degree allowable: 9.76°
- Proposed Maximum super-elevation rate: 8.00 %
- Right of Way:
 - Width: Varies from 200 feet along mainline, up to 800 feet at interchange locations
 - Easements: Temporary (X), Permanent (X), Utility (X), Other ().
 - Type of access control: Full (X), Partial (), By Permit (), Other ().
 - Number of parcels: 38 Number of displacements:
 - Businesses: 6
 - Residences: 5
- Structures:
 - Bridge carrying proposed Jimmy Deloach Connector over Grange Road – will approximately be 112 feet long by 88 feet wide, single span, concrete bridge with PSC Bulb-T 63" beams and MSE walls at begin and end bridge.
 - Bridge carrying proposed Jimmy Deloach Connector over Crossgate Road – will approximately be 103 feet long by 74.5 feet wide, single span, concrete bridge with PSC Bulb-T 63" beams and MSE walls at begin and end bridge.

24
 11
 14
 2A
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- Bridge carrying proposed Jimmy Deloach Connector over Norfolk Southern Railroad – will approximately be 95 feet long by 74.5 feet wide, single span, concrete bridge with PSC Bulb-T 54" beams and MSE walls at begin and end bridge. One future track is assumed to be located on either side of existing track.
- Bridge carrying proposed Jimmy Deloach Connector over Bonnybridge Road/SR 30 – will approximately be 103 feet long by 78.25 feet constant width, single span, concrete bridge with Bulb-T 63" beams and MSE walls at begin and end bridge.
- Bridge carrying proposed Jimmy Deloach Connector (southbound lanes) over wetlands – the proposed concrete bridge will approximately be 600 feet long by 63.625 feet constant width, 12 equal spans with AASHTO Type 2 beams. *long bridge*
- Bridge carrying proposed Jimmy Deloach Connector (northbound lanes) over wetlands – the proposed concrete bridge will approximately be 528 feet long by 36 feet wide, 11 equal spans with AASHTO Type 2 beams. *long bridge*
- Bridge carrying proposed Jimmy Deloach Connector (southbound lanes) over existing Jimmy Deloach Parkway – will approximately consist of 122 feet long by 36 feet wide, single span, concrete bridge with PSC Bulb-T 72" beams and MSE walls at begin and end bridge.
- Bridge carrying proposed Jimmy Deloach Connector (northbound lanes) over existing Jimmy Deloach Parkway – will approximately consist of 123 feet long by 36 feet wide, single span, concrete bridge with PSC Bulb-T 72" beams and MSE walls at begin and end bridge.
- The existing Jimmy Deloach Parkway over SR 21 and CSX railroad will be widened in kind to accommodate proposed roadway width.
- Major intersections, interchanges median openings and signal locations:
 - Jimmy Deloach Connector southbound exit ramp at Bourne Avenue/SR 307 – signalized intersection.
 - Jimmy Deloach Connector northbound entrance ramp at Bourne Avenue/SR 307 – signalized intersection.
 - Jimmy Deloach Connector at Grange Road – grade separated, full diamond interchange with two signalized intersections.
 - Jimmy Deloach Connector at Jimmy Deloach Parkway – grade separated, full diamond interchange with two signalized intersections.
- For ITS projects identify physical limits of field device location, location of any control centers and/or brief explanation of new features: N/A
- Transportation Management Plan anticipated: Yes (X) No ()
- Design Exceptions to controlling criteria anticipated:

	<u>UNDETERMINED</u>	<u>YES</u>	<u>NO</u>
HORIZONTAL ALIGNMENT:	()	()	(X)
LANE WIDTH:	()	()	(X)
SHOULDER WIDTH:	()	()	(X)
VERTICAL GRADES:	()	()	(X)
CROSS SLOPES:	()	()	(X)
STOPPING SIGHT DISTANCE:	()	()	(X)
SUPERELEVATION RATES:	()	()	(X)

Other Alternates considered:

Alternate 1 – this alternate proposes the construction of Jimmy Deloach Connector, a new roadway alignment from State Route 21 (SR 21) near Smith Avenue to SR 21 near Interstate 95 in Savannah, Chatham County, Georgia. New interchanges would be constructed at SR 21 near Smith Avenue, Bourne Avenue/SR 307, Grange Road, Jimmy Deloach Parkway, and SR 21 near I-95. The proposed project would be approximately 5.6 miles in length. Construction of this alternative is expected to attract commuter traffic in large numbers in addition to truck traffic. Since the immediate need of the project is to ensure faster truck movement between the port's Garden City terminal and I-95, the two connections to SR 21 on the north & south ends are largely determined as unnecessary. Higher wetland impacts, impacts to cultural resources and project costs eliminated this alternative from consideration.

Alternate 2A – this alternate proposes the construction of the Jimmy Deloach Connector, a new roadway alignment that would begin at Bourne Avenue/SR 307 and terminate at the existing eastern end of Jimmy Deloach Parkway in Savannah, Chatham County, Georgia. New interchanges would be constructed at Grange Road and Jimmy Deloach Parkway. The proposed project would be approximately 3.1 miles in length and allow for future connections to SR 21. This alternate proposes a 'T' type intersection at Bourne Avenue. It was not selected as the preferred alternate due to impacts to cultural resources and smaller travel time savings in comparison to the preferred alternate.

Alternate 2C – this alternate is similar to Alternate 2A above, except that it proposes a flyover ramp from southbound Jimmy Deloach Connector to eastbound Bourne Avenue/SR 307. This alternate does not offer any additional travel time savings when compared to the preferred alternate and has higher construction costs associated with the flyover ramp. In addition it would cause impacts to cultural resources. Therefore, it is not selected as the preferred alternate.

Alternate 2D – this alternate is similar to Alternate 2A above, except that it proposes a 30 mph loop ramp from southbound Jimmy Deloach Connector to eastbound Bourne Avenue/SR 307 in the southwest quadrant of the interchange. This alternate does not offer any additional travel time savings when compared to the preferred alternate and has higher overall cost. In addition, it would cause impacts to cultural resources. Therefore, it is not selected as the preferred alternate.

SR 21 Widening – the existing SR 21 is a 5 lane section. Based on the current traffic data, SR 21 will not have the capacity to support future traffic volumes that are projected as a result of ongoing expansion associated with the Georgia Port. The already high truck traffic and commuter traffic along this route has resulted in safety concerns along this corridor. Many of the intersections along SR 21 are already showing failing levels of service. Consideration was given to widening SR 21, however this corridor is highly developed with both commercial and industrial developments. Many of the commercial developments support the local residents. Widening SR 21 would result in numerous displacements and community impacts. Therefore, widening of existing SR 21 corridor is eliminated from further consideration.

No Build Alternate – this alternate was not selected because it does not satisfy the project need and purpose.

Comments: None.

Attachments:

1. Cost Estimates:
 - a. Construction including E&C
 - b. Asphalt/Fuel Price Index Spreadsheet
 - c. Right of Way
 - d. Utilities
2. Typical Sections
3. Traffic Diagrams
4. Bridge Inventory Data
5. Initial Concept Team Meeting Minutes
6. Concept Team Meeting Minutes

Full Oversight Projects

Concur: _____
Director of Preconstruction

Concur: _____
Director of Program Delivery

Concur: _____
Division Administrator, FHWA

Concur: _____
Chief Engineer

Estimate Report for file "CSMSL-0008-00(690)"

Section Section 1 - Roadway Items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	107082.0	TRAFFIC CONTROL - CSMSL-0008-00(690)	107082.0
153-1300	1	EA	69892.0	FIELD ENGINEERS OFFICE TP 3	69892.0
201-1500	1	LS	3320741.0	CLEARING & GRUBBING - CSMSL-0008-00(690)	3320741.0
205-0001	350000	CY	4.0	UNCLASS EXCAV	1400000.0
206-0002	3061857	CY	8.0	BORROW EXCAV, INCL MATL	2.44
310-1101	167897	TN	20.0	GR AGGR BASE CRS, INCL MATL	3357940.0
400-3624	6000	TN	80.0	ASPH CONC 12.5 MM PEM, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	480000.0
402-3121	73243	TN	75.0	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	5493225.0
402-3190	32192	TN	75.0	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	2414400.0
402-3600	16096	TN	105.0	ASPH CONC 12.5 MM SMA, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	1690080.0
413-1000	20486	GL	2.0	BITUM TACK COAT	40972.0
430-0220	40268	SY	65.0	PLAIN PC CONC PVMT, CL 1CONC, 12 INCH THK	2617420.0
433-1000	3503	SY	146.0	REINF CONC APPROACH SLAB	511438.0
500-2100	4350	LF	43.0	CONCRETE BARRIER	187050.0
634-1200	87	EA	96.0	RIGHT OF WAY MARKERS	8352.0
641-1100	1000	LF	52.0	GUARDRAIL, TP T	52000.0
641-1200	31000	LF	18.0	GUARDRAIL, TP W	558000.0
641-5001	22	EA	675.0	GUARDRAIL ANCHORAGE, TP 1	14850.0
641-5012	28	EA	1864.0	GUARDRAIL ANCHORAGE, TP 12	52192.0
Section Sub Total:					\$46,870,490.00

Section Section 2 - Grading & Drainage					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
207-0203	300	CY	55.0	FOUND BK FILL MATL, TP II	16500.0
441-0301	20	EA	2034.0	CONC SPILLWAY, TP 1	40680.0
441-0303	12	EA	1901.0	CONC SPILLWAY, TP 3	22812.0
500-3101	1440	CY	294.0	CLASS A CONCRETE	423360.0
500-3201	1155	CY	554.0	CLASS B CONCRETE, RETAINING WALL	639870.0
511-1000	187428	LB	1.0	BAR REINF STEEL	187428.0
550-1180	4608	LF	38.0	STORM DRAIN PIPE, 18 IN, H 1-10	175104.0
550-1240	2115	LF	45.0	STORM DRAIN PIPE, 24 IN, H 1-10	95175.0
550-1241	1000	LF	48.0	STORM DRAIN PIPE, 24 IN, H 10-15	48000.0
550-1300	1209	LF	59.0	STORM DRAIN PIPE, 30 IN, H 1-10	71331.0
550-1301	850	LF	58.0	STORM DRAIN PIPE, 30 IN, H 10-15	49300.0
550-1302	400	LF	47.0	STORM DRAIN PIPE, 30 IN, H 15-20	18800.0
550-1360	3000	LF	66.0	STORM DRAIN PIPE, 36 IN, H 1-10	198000.0
550-1420	300	LF	86.0	STORM DRAIN PIPE, 42 IN, H 1-10	25800.0
550-1421	900	LF	84.0	STORM DRAIN PIPE, 42 IN, H 10-15	75600.0
550-1480	200	LF	104.0	STORM DRAIN PIPE, 48 IN, H 1-10	20800.0
550-2180	3500	LF	33.0	SIDE DRAIN PIPE, 18 IN, H 1-10	115500.0
550-2182	5000	LF	32.0	SIDE DRAIN PIPE, 18 IN, H 15-20	160000.0
550-3318	30	EA	551.0	SAFETY END SECTION 18 IN, STORM DRAIN, 4:1 SLOPE	16530.0
550-3324	24	EA	881.0	SAFETY END SECTION 24 IN, STORM DRAIN, 4:1 SLOPE	21144.0
550-3330	12	EA	1329.0	SAFETY END SECTION 30 IN, STORM DRAIN, 4:1 SLOPE	15948.0
550-3336	20	EA	1789.0	SAFETY END SECTION 36 IN, STORM DRAIN, 4:1 SLOPE	35780.0
550-3418	16	EA	545.0	SAFETY END SECTION 18 IN, SIDE DRAIN, 4:1 SLOPE	8720.0
550-4118	8	EA	413.0	FLARED END SECTION 18 IN, SIDE DRAIN	3304.0
550-4124	12	EA	530.0	FLARED END SECTION 24 IN, SIDE DRAIN	6360.0
550-4130	16	EA	500.0	FLARED END SECTION 30 IN, SIDE DRAIN	8000.0
550-4242	4	EA	1362.0	FLARED END SECTION 42 IN, STORM DRAIN	5448.0
577-1100	28	EA	1700.0	METAL DRAIN INLET - COMPLETE ASSEMBLY	47600.0
603-6006	50	SY	119.0	SAND-CEMENT BAG RIP RAP, 6 IN	5950.0
668-2200	8	EA	3135.0	DROP INLET, GP 2	25080.0
668-2231	18	EA	2116.0	DROP INLET, GP 1, MODIFIED TP M-1	38088.0
668-5000	5	EA	1898.0	JUNCTION BOX	9490.0
668-8012	52	SF	52.0	SAFETY GRATE, TP 2	2704.0

Section Sub Total:\$2,634,206.00

Section Section 3 - Erosion Control					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	150	AC	375.0	TEMPORARY GRASSING	56250.0
163-0240	3324	TN	165.0	MULCH	548460.0
163-0300	3	EA	1220.0	CONSTRUCTION EXIT	3660.0
163-0503	90	EA	454.0	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	40860.0
163-0520	3000	LF	15.0	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	45000.0
163-0522	1500	EA	93.0	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS - TYPE A SILT FENCE	139500.0
163-0523	1800	EA	144.0	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS - TYPE C SILT FENCE	259200.0
163-0550	32	EA	209.0	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	6688.0
165-0010	3000	LF	1.0	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	3000.0
165-0030	18000	LF	1.0	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	18000.0
165-0040	1200	EA	55.0	MAINTENANCE OF EROSION CONTROL CHECKDAMS/DITCH CHECKS	66000.0
165-0050	21000	LF	1.0	MAINTENANCE OF SILT RETENTION BARRIER	21000.0
165-0070	12000	LF	2.0	MAINTENANCE OF BALED STRAW EROSION CHECK	24000.0
165-0087	90	EA	112.0	MAINTENANCE OF SILT CONTROL GATE, TP 3	10080.0
165-0101	3	EA	500.0	MAINTENANCE OF CONSTRUCTION EXIT	1500.0
165-0105	32	EA	85.0	MAINTENANCE OF INLET SEDIMENT TRAP	2720.0
167-1000	36	EA	559.0	WATER QUALITY MONITORING AND SAMPLING	20124.0
167-1500	36	MO	746.0	WATER QUALITY INSPECTIONS	26856.0
170-1000	21500	LF	13.0	FLOATING SILT RETENTION BARRIER	279500.0
171-0010	6000	LF	2.0	TEMPORARY SILT FENCE, TYPE A	12000.0
171-0030	36000	LF	3.0	TEMPORARY SILT FENCE, TYPE C	108000.0
441-0204	1200	SY	38.0	PLAIN CONC DITCH PAVING, 4 IN	45600.0
603-2018	200	SY	43.0	STN DUMPED RIP RAP, TP 1, 18 IN	8600.0
603-2180	450	SY	25.0	STN DUMPED RIP RAP, TP 3, 12 IN	11250.0
603-2181	2000	SY	35.0	STN DUMPED RIP RAP, TP 3, 18 IN	70000.0
603-7000	2650	SY	4.0	PLASTIC FILTER FABRIC	10600.0
643-8200	9000	LF	2.0	BARRIER FENCE (ORANGE), 4 FT	18000.0
700-6910	300	AC	824.0	PERMANENT GRASSING	247200.0
700-7000	390	TN	65.0	AGRICULTURAL LIME	25350.0
700-7010	780	GL	22.0	LIQUID LIME	17160.0
700-8000	252	TN	458.0	FERTILIZER MIXED GRADE	115416.0
700-8100	25300	LB	2.0	FERTILIZER NITROGEN CONTENT	50600.0
715-2200	143883	SY	2.0	BITUMINOUS TREATED ROVING, WATERWAYS	287766.0
716-2000	136074	SY	1.0	EROSION CONTROL MATS, SLOPES	136074.0
Section Sub Total:					\$2,736,014.00

Section Section 4 - Signing & Marking					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1072	1314	SF	30.0	HIGHWAY SIGNS, ALUM EXTRUDED PANELS, REFL SHEETING, TP 3	39420.0
636-2080	250	LF	12.0	GALV STEEL POSTS, TP 8	3000.0
636-2090	150	LF	9.0	GALV STEEL POSTS, TP 9	1350.0
638-1001	2	LS	69600.0	STR SUPPORT FOR OVERHEAD SIGN, TP I, STA -	139200.0
638-1007	6	LS	18000.0	STR SUPPORT FOR OVERHEAD SIGN, TP VII, STA -	108000.0
647-1000	6	LS	60000.0	TRAFFIC SIGNAL INSTALLATION NO -	360000.0
653-0120	62	EA	75.0	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	4650.0
653-0140	6	EA	100.0	THERMOPLASTIC PVMT MARKING, ARROW, TP 4	600.0
653-1501	67898	LF	1.0	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	67898.0
653-1502	34425	LF	1.0	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	34425.0
653-3501	51398	GLF	1.0	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	51398.0
653-6004	18690	SY	2.0	THERMOPLASTIC TRAF STRIPING, WHITE	37380.0
654-1003	500	EA	3.0	RAISED PVMT MARKERS TP 3	1500.0
657-1085	4864	LF	5.0	PREFORMED PLASTIC SOLID PVMT MKG, 8 IN, CONTRAST (BLACK-WHITE), TP PB	24320.0
657-1244	204	LF	19.0	PREFORMED PLASTIC SOLID PVMT MKG, 24 IN,	3876.0

				WHITE, TP PB	
657-3085	4864	GLF	4.0	PREFORMED PLASTIC SKIP PVMT MKG, 8 IN, CONTRAST (BLACK-WHITE), TP PB	19456.0
657-6085	4864	LF	5.0	PREFORMED PLASTIC SOLID PVMT MKG, 8 IN, CONTRAST (BLACK-YELLOW), TP PB	24320.0
Section Sub Total:					\$920,793.00

Section Section 5 - Bridges & Walls

Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-9999	38325	SF	110.0	BRIDGE NO. 5 - SB JIMMY DELOACH CONN. OVER WETLANDS	4215750.0
500-9999	19008	SF	110.0	BRIDGE NO. 6 - NB JIMMY DELOACH CONN. OVER WETLANDS	2090880.0
500-9999	9856	SF	110.0	BRIDGE NO. 1 - GRANGE ROAD INTERCHANGE	1084160.0
500-9999	7674	SF	110.0	BRIDGE NO. 2 - CROSSGATE ROAD OVERPASS	844140.0
500-9999	7078	SF	110.0	BRIDGE NO. 3 - NORFOLK SOUTHERN RR OVERPASS	778580.0
500-9999	8060	SF	110.0	BRIDGE NO. 4 - BONNYBRIDGE ROAD OVERPASS	886600.0
500-9999	4428	SF	110.0	BRIDGE NO. 8 - NB JIMMY DELOACH PKWY. INTERCHANGE	487080.0
500-9999	4392	SF	110.0	BRIDGE NO. 7 - SB JIMMY DELOACH PKWY. INTERCHANGE	483120.0
500-9999	2750	SF	150.0	BRIDGE NO. 9 - BRIDGE WIDENING JDC OVER SR 21	412500.0
627-1000	29598	SF	65.0	MSE WALL FACE, 0 - 10 FT HT, WALL NO -	1923870.0
627-1010	29597	SF	65.0	MSE WALL FACE, 10 - 20 FT HT, WALL NO -	1923805.0
Section Sub Total:					\$15,130,485.00

Total Estimated Cost: \$68,291,988.00

Preliminary Right of Way Cost Estimate

LaShone B. Alexander

Phil Copeland
 Right of Way Administrator
 By: LaShone Alexander

Date: March 09, 2009
Project: CSMSL-0008-00(690) Chatham
Existing/Required R/W: Varies/Varies
Project Termini : Reconstruction of Jimmy Deloach Connector - ALT 2B
Project Description: Georgia Ports Authority Access Project Jimmy Deloach Connector

P.I. Number: 0008690
No. Parcels: 38

Land:		
Res. R/W: 30.92 acres @ \$ 25,000.00/acre		\$ 773,000.00
Comm. R/W: 45.68 acres @ \$200,000.00/acre		9,136,000.00
Indus. R/W: 34.21 acres @ \$ 25,000.00/acre		<u>855,250.00</u>
		\$10,764,250.00

Improvements : signs, fencing, residences, businesses, landscaping misc. site improvements		\$ 873,200
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Relocation: Residential (4)	\$ 240,000	
Commercial (13)	<u>325,000</u>	\$ 565,000

Damage : Proximity (4)	\$ 140,000	
Cost to Cure (5)	\$ 250,000	
		\$ <u>390,000</u>
Net Cost		\$ 12,592,450

Net Cost		\$ 12,592,450
Scheduling Contingency 55 %		6,925,847
Adm/Court Cost 60 %		<u>11,710,978</u>
		\$ 31,229,276

Total Cost \$ 31,229,300.00

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

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE CSMSL-0008-00(690) Chatham OFFICE Jesup
P.I. # 0008690
DATE 2/24/2009
FROM Karanvery
District Utilities Engineer
TO Rajeev Shah , Parsons Transportation
ATTN Greg Wiggins, GDOT Project Manager
SUBJECT PRELIMINARY UTILITY COST (ESTIMATE)

As requested by your office, we are furnishing you with a Preliminary Utility Cost estimate for each utility with facilities potentially located within the project limits.

FACILITY OWNER	NON-REIMBURSABLE	REIMBURSABLE
Atlanta Gas Light	\$143,500	0
Bellsouth/ATT	\$51,900	0
Comcast	\$33,900	
City of Savannah	0	\$500,000
City of PortWentworth	\$174,800	0
Georgia Power-Dist.	\$95,000	0
Georgia Power-Transmission	0	\$598,000
Level 3 Communications	\$1,500	0
Southern Natural Gas	0	\$5,354,618
Totals	\$500,600	\$6,452,618
30% Utilities Contingency:		\$ 1,935,785
Total Reimbursement Cost:		\$ 8,388,403

Total reimbursable cost for the above project is \$ 8,388,403.00

If you have any questions, please contact Stephen Thomas at 912-427-5779.

C: Jeff Baker, State Utilities Engineer
Angela Whitworth, Office of Financial Management
Troy Pittman, Area Engineer
District Office File
Utility Office File

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 February 2 through February 5, 2010 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
Jeff Strickland, PE	Highway Construction Specialist
Fabricio Quinonez, PE	Bridge Design Engineer

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 its consultant. 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. A FAST diagram was prepared highlighting the projects required functions.

- The important functions of the project were identified as follows:
 - **Project Objective/Goals**
 - **Accommodate truck traffic**
 - **Create direct access to Savannah Port**
 - **Improve travel time**
 - **Project Basic Functions**
 - **Improve Level of Service**
 - **Increase capacity**
 - **Reduce conflicts for trucks**
 - **Satisfy User**
- **Speculation Phase** - The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
 - **Improve Intersections**
 - **Retain existing facility components**
 - **Reduce right of way required**
 - **Reduce impact to wetlands**

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:

- Will it help expedite the truck traffic?
- Will it help reduce the load on the existing highways?
- Will it improve the access?
- Will it reduce the initial construction cost?
- Will it improve the future maintainability?
- Can it be implemented?

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. CSMSL-0008-00(690 – P.I. No. 0008690

Jimmy Deloach Connector
From Bourne Avenue/SR 307 to existing Jimmy Deloach Parkway
Chatham County

February 2-5, 2010

Pre-Workshop Activities

VE Team Leader coordinates with the Owner and Designer to organize 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

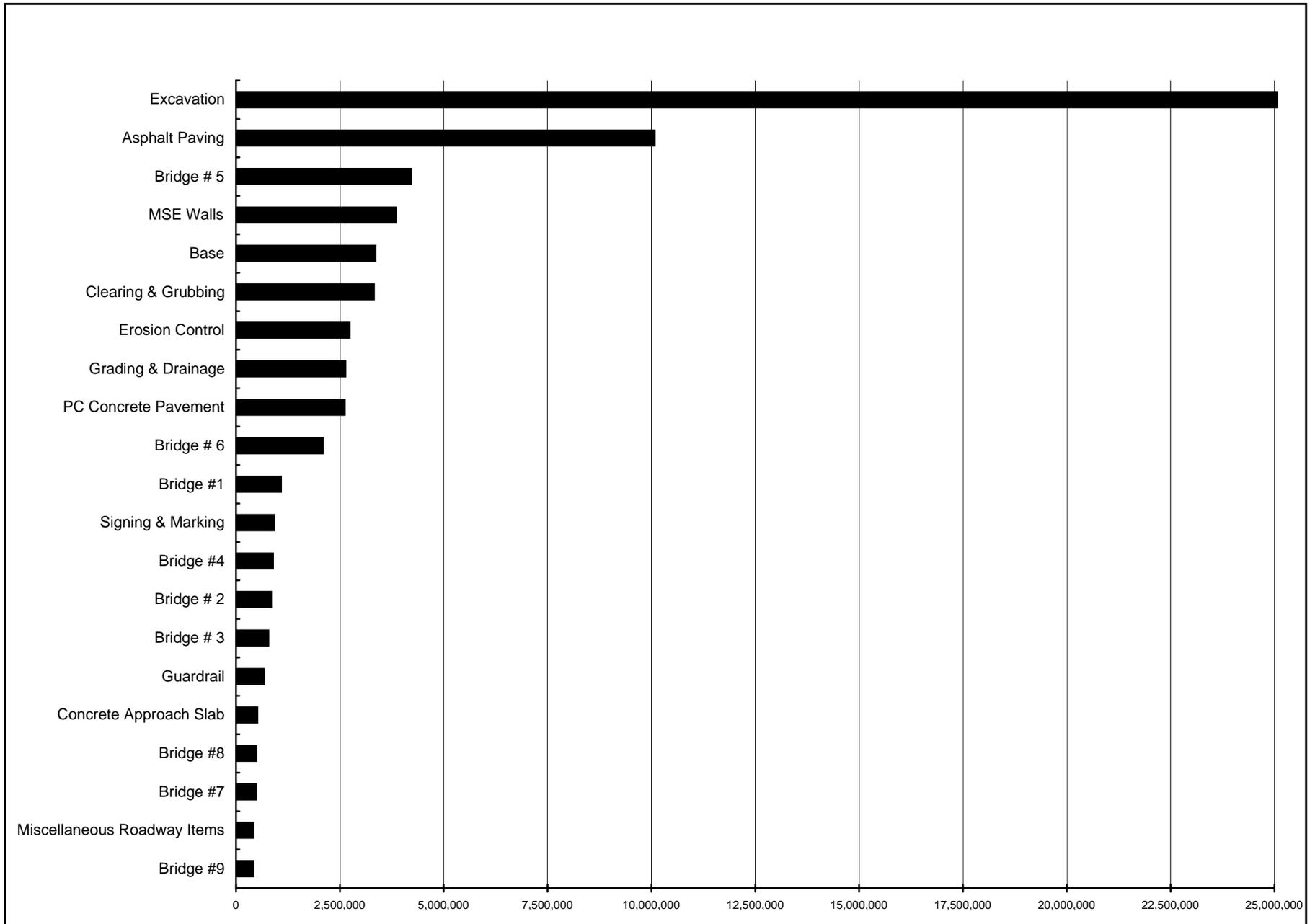
Day Four

8:00-9:00 Prepare Presentation

9:00-10:00 VE Team Presentation

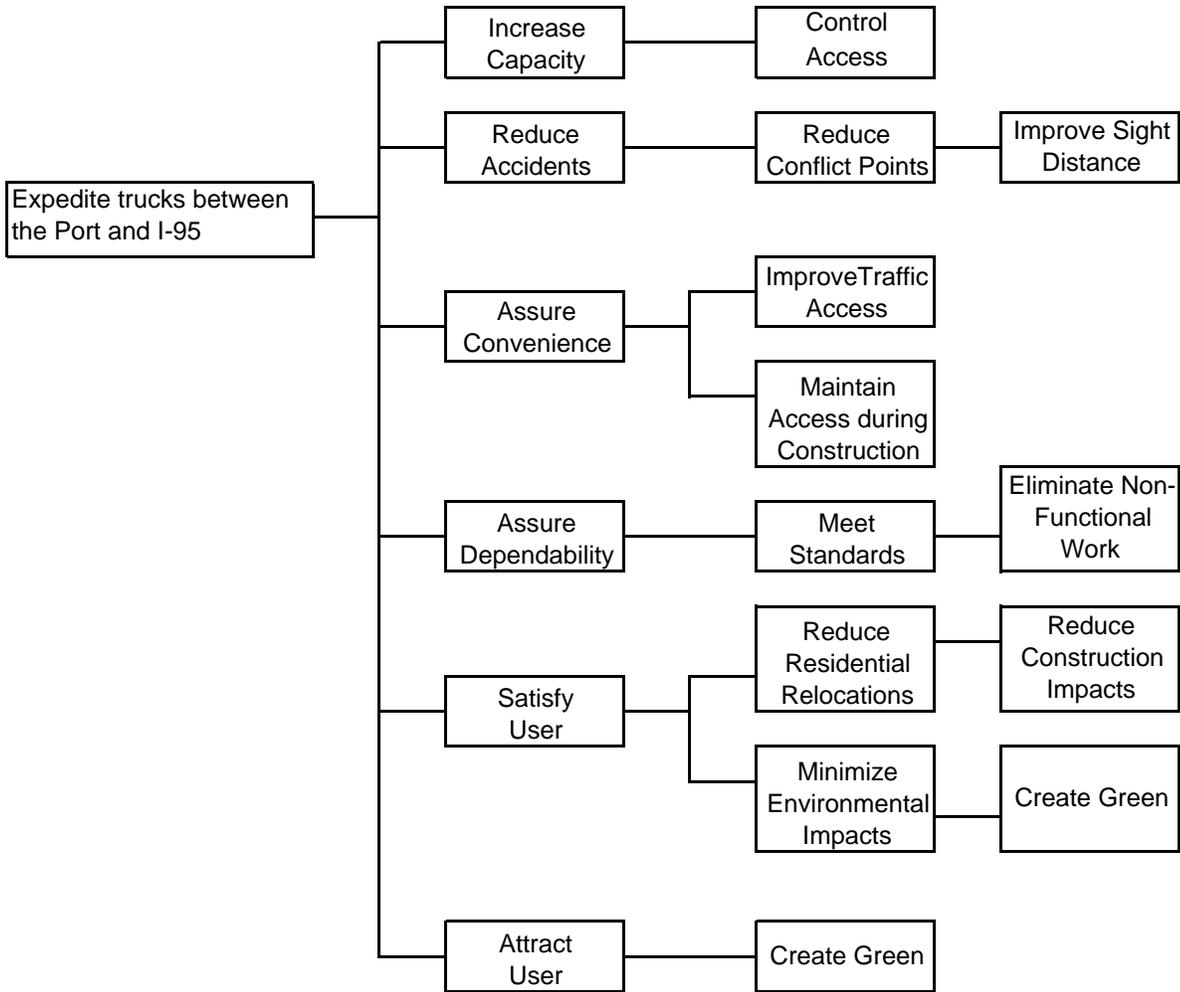
PARETO CHART - COST HISTOGRAM

PROJECT: Georgia Department of Transportation CSMSL-0008-00(690) - P. I. 0008690 Jimmy Deloach Connector from Bourne Ave./SR307 to existing Jimmy Deloach Parkway Chatham County			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Excavation	25,894,856	37.92%	37.92%
Asphalt Paving	10,077,705	14.76%	52.67%
Bridge # 5	4,215,760	6.17%	58.85%
MSE Walls	3,847,675	5.63%	64.48%
Base	3,357,940	4.92%	69.40%
Clearing & Grubbing	3,320,741	4.86%	74.26%
Erosion Control	2,736,004	4.01%	78.27%
Grading & Drainage	2,634,206	3.86%	82.13%
PC Concrete Pavement	2,617,420	3.83%	85.96%
Bridge # 6	2,090,880	3.06%	89.02%
Bridge #1	1,084,160	1.59%	90.61%
Signing & Marking	920,793	1.35%	91.96%
Bridge #4	886,600	1.30%	93.25%
Bridge # 2	844,140	1.24%	94.49%
Bridge # 3	778,580	1.14%	95.63%
Guardrail	677,042	0.99%	96.62%
Concrete Approach Slab	511,438	0.75%	97.37%
Bridge #8	487,080	0.71%	98.08%
Bridge #7	483,120	0.71%	98.79%
Miscellaneous Roadway Items	413,348	0.61%	99.40%
Bridge #9	412,500	0.60%	
Construction Cost less ROW & Utilites	\$ 68,291,988		
E & C Rate @10%	\$ 6,829,199		
Total Construction Costs	\$ 75,121,187		
Right-of-Way	\$ 31,229,300		
Utilities Reimbursement	\$ 8,388,403		
TOTAL	\$ 114,738,890		



CUSTOMER FUNCTION/TASK DIAGRAM
Project No. CSMSL-0008-00(690)
P.I. No. P.I. No. 0008690
Chatham County

Jimmy Deloach Connector- From Bourne Ave./SR 307 to exist. Jimmy Deloach Pkwy.



DESIGNER PRESENTATION



MEETING PARTICIPANTS

Geogia Department of Transportation		February 2, 2010		
CSMSL-0008-00(690) - P.I. No. 0008690				
Chatham County				
NAME	ORGANIZATION & TITLE		E-MAIL	PHONE
Lisa Myers		GDOT - Engineering Services	lmyers@dot.ga.gov	404-631-1770
Matt Sanders		GDOT-Engineering Services	msanders@dot.ga.gov	404-631-1752
Ken Werho		GDOT-Traffic Operations	kwerho@dot.ga.gov	404-635-8144
Ron Wishon		GDOT-Engineering Services	rwishon@dot.ga.gov	404-631-1753
Les Thomas, PE, CVS		PBS&J	lmthomas@pbsj.com	678-677-6420
Luke Clarke, PE, AVS		PBS&J	lwclarke@pbsj.com	205-746-4615
Jeff Strickland, PE		PBS&J	jpstrickland@pbsj.com	205-969-3776
Fabricio Quinonez, PE		Civil Services, Inc.	fquinonez@civilservicesinc.com	404-685-8001
Saurabh Bhattacharya		Parsons	saurabh.bhattacharya@parsons.com	678-969-2315
Bonnie Peacock		Arcadis	bonnie.peacock@arcadis-us.com	770-431-8666
Aykut Urgan		Parsons	aykut.urgan@parsons.com	678-969-2327
Mike Dover		GDOT-IPD	mdover@dot.ga.gov	404-631-1733
Darryl VanMeter		GDOT-IPD	dvanmeter2dot.ga.gov	404-631-1703
Philip Paul Alimia		GDOT-Environmental Services	palimia@dot.ga.gov	404-631-1353

VE TEAM PRESENTATION



MEETING PARTICIPANTS

Georgia Department of Transportation		February 5, 2010	
CSMSL-0008-00(690) - P.I. No. 0008690			
Chatham County			
NAME	ORGANIZATION & TITLE	E-MAIL	PHONE
Lisa Myers	 GDOT - Engineering Services	lm Myers@dot.ga.gov	404-631-1770
Matt Sanders	 GDOT-Engineering Services	msanders@dot.ga.gov	404-631-1752
Les Thomas, PE, CVS	 PBS&J	lmthomas@pbsj.com	678-677-6420
Luke Clarke, PE, AVS	 PBS&J	lwclarke@pbsj.com	205-746-4615
Jeff Strickland, PE	 PBS&J	jpstrickland@pbsj.com	205-969-3776
Fabricio Quinonez, PE	 Civil Services, Inc.	fquinonez@civilservicesinc.com	404-685-8001
Saurabh Bhattacharya	 Parsons	saurabh.bhattacharya@parsons.com	678-969-2315
Mike Dover	 GDOT-IPD	mdover@dot.ga.gov	404-631-1733
Darryl VanMeter	 GDOT-IPD	dvanmeter2dot.ga.gov	404-631-1703

CREATIVE IDEA LISTING



**PROJECT: Georgia Department of Transportation
CSMSL-0008-00(690) - P.I. No. 0008690
Jimmy Deloach Connector - from Bourne Ave./SR 307 to
existing Jimmy Deloach Parkway
Chatham County**

SHEET NO.: 1 of 2

NO.	IDEA DESCRIPTION	RATING
BRIDGE (BR)		
BR-1	Reduce shoulders on "Long Bridges"	4
BR-2	Modify span arrangement on wetland bridges	4
ROADWAY (RD)		
RD-1	Use median barrier instead of raised grassed median	5
RD-2	Construct a typical intersection at Bourne Ave.	4
RD-3	Construct a "SPUI"/ "TUDI" at Grange Ave.	4
RD-4	Delete north bound (2A) exit and south bound (2D) entrances at Grange Ave.	4
RD-5	Reduce sum of the paved shoulder widths on ramps	4
RD-6	Use PCC in-lieu of HMA	3
RD-7	Make Jimmy Deloach Parkway the primary route and directly connect to Bourne Ave. entrance	2
RD-8	Construct a minimum width section at Pierce Ave.	1
RD-9	Delete ramps 3A & 3B	2
RD-10	Route West bound Bourne Ave traffic north to a free flow "U" turn at Grange	2
RD-11	Use HMA in-lieu of PCC	2
RD-12	Use a "SPUI"/ "TUDI" at Pierce Ave.	4
RD-13	Use a "TUDI" at Pierce Ave.	1
RD-14	Leave existing JDP at Grade and elevate Pierce over JDP	2
RD-15	Construct RD-14 with only one way over JDP	2
RD-16	Eliminate Pierce road interchange	2
RD-17	Make Pierce RIRO and provide a partial clover for westbound traffic onto JDP	2
RD-18	Execute the project as a traditional construction bid	2
RD-19	Eliminate Grange Road Interchange	3

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

