VALUE ENGINEERING REPORT

5 Lane Widening of SR 40
West of Grove Boulevard to East of Truss Plant Road
NHS00-0002-00(861)
Camden County
PI No. 0002861
June 24, 2009

OWNER AND DESIGN TEAM:

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

VALUE ENGINEERING CONSULTANT:

MACTEC Engineering and Consulting, Inc.
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144

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Camden County

June 9-12, 2009

EXECUTIVE SUMMARY

VALUE ENGINEERING REPORT

Executive Summary

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West of Grove Blvd to East of Truss Plant Rd.
NHS00-0002-00(861)
PI No. 0002861
Camden County

Introduction

This report presents the results of a Value Engineering (VE) study conducted on June 9 – 12, 2009, at GDOT General Offices in Atlanta, GA, by a three person VE team.

The project is the widening, reconstruction and rehabilitation of SR 40 from MP 13.77 to MP 15.00 for a total of 1.23 miles. The project will rehabilitate the existing roadway from MP 13.77 to 13.85. The remainder of the project will consist of 4-12 foot lanes with an additional 6 foot added and a 14 foot center turn lane with curb and gutter and 5 foot wide sidewalks on both sides. The side street intersection of North and South Grove Blvd. will be realigned to improve geometrics. The project will be designed to incorporate a future 20 foot raised median. Traffic will be maintained during construction. Environmental concerns include requiring a COE 404 permit. A Categorical Exclusion (CE) is anticipated.

SR 40 is a major east-west corridor in southeast Georgia connecting Folkston on the west with Kingsland, I-95 and St. Mary's on the east. For its entire length between Folkston and St. Mary's, SR 40 is identified for eventual widening due to its inclusion on the Governor's Road Improvement Program (GRIP) as a truck access route. SR 40 in this area is classified as an urban principal arterial. Existing AADT (2006) is 11,000 VPD, base year (2012) is 14,200 and projected design year AADT (2032) is 23,000. The collision data for years 2002 through 2005 indicate a high rate of angle and rear end crashes. Improving SR 40 to a multi-lane facility with separate turning lanes will remove turning conflicts by providing refuge from the through traffic and should increase safety.

The total estimated project cost is $17,421,223; $10,239,300 for R/W, $803,050 for utilities and $6,378,873 for the construction items. The total project cost includes an estimated 8% factor for Engineering, Inspection and Contingency applied to only the construction items. Right of way and utilities have no markup applied to the base costs. Please refer to the Cost Distribution Model in the Appendix for additional detailed information and a breakdown of the estimate.

The revised concept report was approved on September 10, 2008. The proposed funding is for Right of Way, 2011 and Construction, 2017.

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

The VE team generated 39 ideas in the creative phase and presented 12 recommendations and 4 design considerations to GDOT for consideration. The recommendations involved narrowing the typical section template to reduce the right of way costs and realigning Grove Blvd. Neglecting the overlapping nature of some of the elements of each recommendation to the extent possible, the net total of the recommendations have the potential to reduce the project costs up to $4,300,000. On Friday, June 12, the VE team presented the following recommendations and design considerations. In attendance were Lisa Myers and Matt Sanders of Engineering Services and Rebecca Thigpen and Billy Smith from District 5, by video-conference.

Recommendations:

Idea A-2; Use standard width R/W with slope easements

The current plans provide for right of way acquisition for the full width required up to the limits of grading with widths varying from 140 up to 210 ft.

This recommendation combines several ideas developed during the creative phase and provides a standard width R/W of 100 ft with slope easement acquisition for the remaining required right of way. The existing right of way width is 100 ft and would accommodate the 76 ft required roadway width along with 2-12 ft shoulders.

The total potential savings if accepted is $3,400,000.

Idea B1.1; Use 11 foot lanes

The current 12 foot standard lane will be reduced to 11 ft providing a similar project function while narrowing the roadway template and saving construction and right of way costs.

The total potential savings if accepted is $872,000

Idea B1.2; Use 11 foot inside lanes only

The current 12 foot standard lane will be reduced to 11 ft for the inside lane while maintaining the 12 foot outside lane width for trucks. Similar to the previous recommendation this will provide the same project function while narrowing the roadway template and saving

construction and right of way costs, however it will better accommodate trucks in the right lane.

The total potential savings if accepted is $436,000

Idea B-3; Eliminate the widening for the future 20 ft raised median.

The current plans provide for additional widening to provide space for a future 20 ft median.

This recommendation would eliminate the additional 6 ft of widening required for a potential future 20 ft raised median. The 5-lane section is adequate for the projected traffic volumes. From the interstate, travelling west to Kingsland, the SR 40 would transition from a section with a raised median to a flush 14 ft center turn lane to a 4 lane section with no median. A future 20 ft raised median is not warranted. Also, there is a proposed by-pass project that is anticipated to reduce the projected volumes on SR 40 when constructed. By eliminating the additional space and pavement construction for a future 20 ft median, there will be a reduction in material costs and R/W taking.

The total potential savings if accepted is $3,400,000.

Idea B4.1; Move the bike lanes behind the curb and combine with sidewalk

The current plans provide for 4 foot wide bike lanes within the roadway on each side.

This recommendation would remove the bike lane from the travelled way and construct a 10 ft wide sidewalk that can be used as a multi-use trail eliminating the need for dedicated bike lanes. Shifting the bike lanes out of the roadway will create a safer place for the cyclist and eliminate 8 ft of full depth pavement construction. Safe and protected crossings will be provided at the signalized intersections at Grove Blvd and Truss Plant Road.

The total potential savings if accepted is $155,000

Idea B4.2; Shift the sidewalk / trail to one side only

The current plans provide for 4 ft wide bike lanes and 5 ft wide sidewalks along both sides of SR 40.

This recommendation is similar to the previous one except that it provides a wider sidewalk / multi-use trail on only one side of the road. Additional savings include reduced construction costs.

The total potential savings if accepted is $255,000

Idea B-7; Use 16 ft median instead of 20 ft

The current plans provide for a future 20 ft median.

This recommendation will reduce the median width to 16 ft providing adequate space for a left turn lane with a 4 ft offset / raised median separation at the openings.

The total potential savings if accepted is $872,000.

Idea B-9; Use 12 ft center turn lane instead of 14 ft

The current plans provide for a 14ft center turn lane.

This recommendation will reduce the width of the center turn lane to 12 ft. The 12 ft turn lane will provide the same function with reduced construction and right of way costs.

The total potential savings if accepted is $436,000.

Idea B11.1; Realign the Grove Blvd intersection and eliminate the right in / right out

The current alignment at this intersection does not adequately address the sharp skew angle, the side street tie-in and the overall poor existing alignment.

This recommendation is to realign the Grove Blvd intersection to provide an improved and safer layout. This will also eliminate the right in / right out condition at E. William Avenue. This recommendation will increase the project costs however it is required to provide a more efficient intersection layout.

The total potential cost increase if accepted is $980,000

Idea B11.2; Eliminate the right in / right out

This recommendation is only to eliminate the right in / right out condition at the Grove Blvd / E William Avenue intersection. It will increase project costs but provide a safer alignment. Local access to SR 40 is available about 1,500 feet further west.

The total potential cost increase if accepted is $380,000

Idea B-13; Use 12 ft shoulder instead of 16 ft

The original concept and the current plans were developed using a 16 ft urban shoulder.

This recommendation will reduce the shoulder width to 12 ft providing adequate space for a sidewalk and utility zone while reducing the right of way impacts.

The total potential savings if accepted is $1,600,000.

Idea B-6; Construct the 20 ft raised median

The current plans provide for a flush 14 ft wide, center turn lane with the potential of a future 20 ft median.

This recommendation proposes to construct the full 20 ft raised median as part of this project rather than waiting until the traffic conditions warrant. While the actual construction costs will be slightly increased, the overall project costs will be reduced if the 20 ft median will be constructed as part of a stand alone future project. Additionally, there will be much less disruption and local opposition if it will be constructed concurrently with this project.

The total potential savings if accepted is $217,000.

Design Considerations:

Idea B-17; Shorten the project limits

The current plans provide for widening and improvements beyond the transitions needed for a reasonable tie-in. Even though both project termini are on curves and transitioning roadways, every effort should be made to minimize the work in keeping with the project's intent and not addressing current undesirable or substandard conditions, especially if this will require further encroachment onto adjacent properties; the fire station on the west end and the raised median, gas stations and interchange ramps on the east end. This design consideration will reduce the construction costs and minimize coordination concerns by not extending the project limits beyond the required limits.

Idea D-2; Re-use the existing water line

The cost estimate for the water line work is listed at $440,000 which would include a completely new waterline for the entire length of the project. A study and determination should be made to use the existing water line assuming it is in reasonable condition and only reset / relocate the valves and hydrants. This will significantly reduce the cost estimate for this work. Additionally, this work should be reimbursed to GDOT by the owner, the City of Kingsland unless otherwise agreed.

Idea E-1; Recalculate the earthwork quantities and estimate.

The current plans and preliminary estimate seem excessive in the amount and cost for all earthwork items. This is only a 1.2 mile long project along flat and open terrain. Earthwork does not seem to be a significant project element.

Idea I-3; Eliminate roadway widening on both sides of the existing road

The current plans provide for widening and full depth pavement construction on both sides of the existing road to develop the required ultimate roadway width. Shifting the alignment to one side to eliminate the full depth construction on both sides will allow the construction staging and maintenance of traffic to operate at a safer and more efficient level. While Right of Way impacts should be similar from an affected area standpoint, the number of parcels should be reduced. The affected businesses appear to be far enough from the existing road to facilitate this shift however a final determination will need to be made.

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL COST	PROPOSED COST	COST SAVINGS	COMMENTS
A-2	Minimize R/W and use slope easements	8,400,000	5,000,000	3,400,000	100 ft wide R/W
B-1.1	Use 11 foot lanes	872,000	0	872,000	
B-1.2	Use 11 foot lanes for inside only; 12 foot outside lanes for trucks	436,000	0	436,000	
B-3	Eliminate additional widening for future 20 foot raised median	1,308,000	0	1,308,000	Future by-pass to reduce traffic on SR 40
B-4.1	Move bike lanes to behind curb. Combine with sidewalk	370,000	215,000	155,000	
B-4.2	Shift sidewalk / trail to only one side	370,000	115,000	255,000	
B-7	Use 16 foot median in lieu of 20 ft	872,000	0	872,000	
B-9	Use 12 ft center turn lane in lieu of 14 ft	436,000	0	436,000	
B-11.1	Re-align Grove Street intersection and eliminate right in – right out	0	980,000	(980,000)	
B-11.2	Eliminate right in – right out	0	380,000	(380,000)	
B-13	Use 12 ft shoulder in lieu of 16 ft	1,600,000	0	1,600,000	Design variance prepared
B-16	Construct 20 ft raised median	346,000	129,000	217,000	Original cost includes $283,000 for future construction

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL COST	PROPOSED COST	COST SAVINGS	COMMENTS
	DESIGN CONSIDERATIONS				
B-17	Shorten project limits / transition lengths west side, stay away from fire station east side, minimize work in curve, divided roadway approaching interchange / ramps				
D-2	Re-use existing water line, relocate valves and hydrants. Costs seem excessive				
E-1	Recalculate earthwork estimate and quantities				
I-3	Shift alignment to the north to eliminate roadway widening on both sides of existing road.				Additional impacts should be minimal. An assessment of the required environmental document should be made.

STUDY IDENTIFICATION

Study Identification

Project: 5 Lane Widening of SR 40 Camden County	**Date: June 9 – 12, 2009**
Location: GDOT General Offices, Atlanta, GA Room 406	

VE Team Members

Name:	Discipline:	Organization:	Contact:
Alex Wiley	Roadway Design	MACTEC	770-421-3481
Steve Bitney	Roadway / Construction	StreetSmarts	770-813-0882
George Obaranec	VE Team Facilitator	MACTEC	770-421-3346

Project Description

SR 40 is a major east-west corridor in southeast Georgia connecting Folkston on the west with Kingsland, I-95 and St. Mary's on the east. For its entire length between Folkston and St. Mary's, SR 40 is identified for eventual widening due to its inclusion on the Governor's Road Improvement Program (GRIP) as a truck access route. SR 40 in this area is classified as an urban principal arterial. Existing AADT (2006) is 11,000 VPD, base year (2012) is 14,200 and projected design year AADT (2032) is 23,000.

The project is the widening, reconstruction and rehabilitation of SR 40 from MP 13.77 to MP 15.00 for a total of 1.23 miles. The project will rehabilitate the existing roadway from MP 13.77 to 13.85. The remainder of the project will consist of 4-12 foot lanes with an additional 6 foot added and a 14 foot center turn lane with curb and gutter and 5 foot wide sidewalks on both sides. The side street intersection of North and South Grove Blvd. will be realigned to improve geometrics. The project will be designed to incorporate a future 20 foot raised median. Traffic will be maintained during construction. Environmental concerns include requiring a COE 404 permit. A Categorical Exclusion (CE) is anticipated however an Environmental Assessment (EA) is possible. As the design progresses and impacts are assessed, a determination will be made.

The total estimated project cost is $17,421,223; $10,239,300 for R/W, $803,050 for utilities and $6,378,873 for the construction items. The total project cost includes an estimated 8% factor for Engineering, Inspection and Contingency applied to only the construction items. Right of way and utilities have no markup applied to the base costs. Please refer to the attached Cost Distribution Model for additional detailed information and a breakdown of the estimate.

Kick-off Meeting / Design Presentation

On Tuesday morning, the design team gave a project presentation. In addition to the VE team members, the following were in attendance:

Lisa Myers	GDOT Engineering Services
Matt Sanders	GDOT Engineering Services
James Magnus	GDOT Construction
Nabil Raad	GDOT Traffic Operations

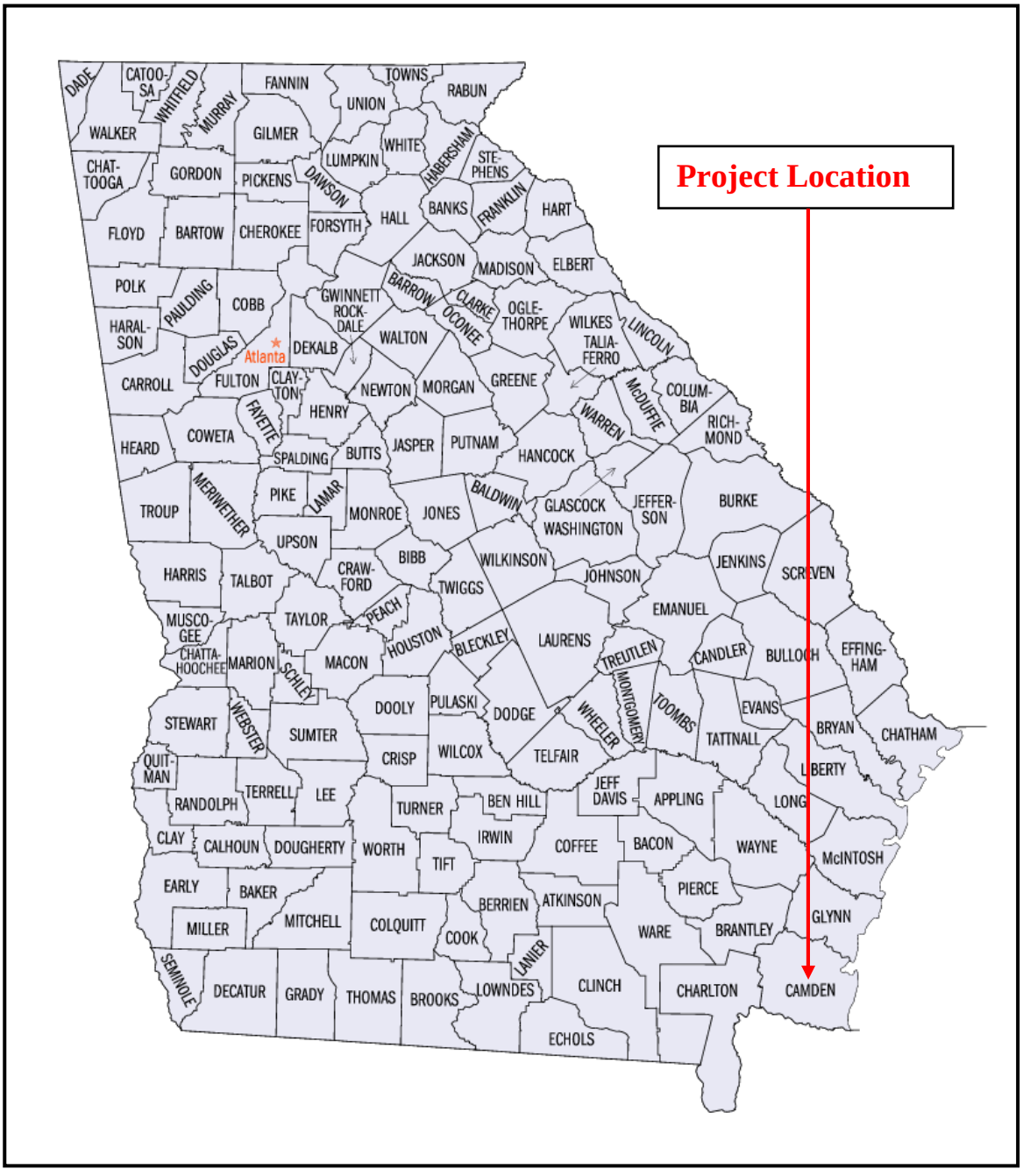
By video-conference:

Bryan Czech	GDOT District 5
Dennis Odom	GDOT District 5 - Design
Cassius Edwards	GDOT District 5 - Design
Sheree Smart	GDOT District 5 – Environmental
Quinten McPhatter	City of Kingsland
Ken Kessler	City of Kingsland

Cassius Edwards, the GDOT project designer gave a project overview. He presented the scope, limits and intent of the project. The following items were presented and discussed:

- The current typical section consists of widening to an urban 5-lane section with a 14 ft flush median and 16 ft shoulders that incorporates a future 20 ft raised median.
- The proposed typical section incorporates a 4 ft bike lane on both sides. This corridor is part of Camden County's Bicycle and Pedestrian Plan although there are no existing or planned connections proposed as part of this project.
- The district is considering and has prepared, but not submitted, a request for a design variance to use 12 ft shoulders.
- The terrain is flat and open with roadside ditches. The western section of the project has curb and gutter although resurfacing over the years has covered the curb reveal.
- There are no serious drainage issues except a ponding concern at the East William Avenue intersection.
- Grove Blvd. will be realigned to provide a 70 deg skew angle. The side street, East William Avenue, will be converted to a right in / right out. A new traffic signal is proposed at this intersection. There is some ongoing and planned residential developments both north and south on Grove Blvd.
- The City's representative informed us of 2 potential large developments in the early planning and permitting stages. One north at Truss Plant Road the other is south on Truss Plant Road.
- At this point, the district expects the environmental document to be a CE however it could be close to becoming an EA. There were no stated environmental restrictions.

Figure 1
Project Vicinity Map

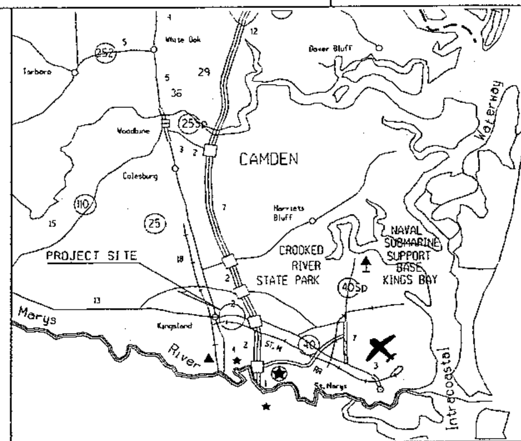


County Map of Georgia

DATE$$$ $USER$	PRF $$PENTABLE$$	DGN GRWCOV	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
			GA	NHS00-0002-00(861)	1	

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN AND PROFILE OF PROPOSED
5 LANE WIDENING OF SR 40 FM WEST OF CS 481 / GROVE BLVD TO EAST OF PR 718 / TRUSS PLANT ROAD
NHS00-0002-00(861)
CAMDEN COUNTY
FEDERAL AID PROJECT



LOCATION SKETCH

DESIGN DATA:
TRAFFIC A.D.T.: 16250 (2015)
TRAFFIC A.D.T.: 24150 (2035)
TRAFFIC D.H.V.: 2415
DIRECTIONAL DIST: 57%
% TRUCKS: 9%
24 HR.TRUCKS %: 7%
SPEED DESIGN: 45 & 35 MPH

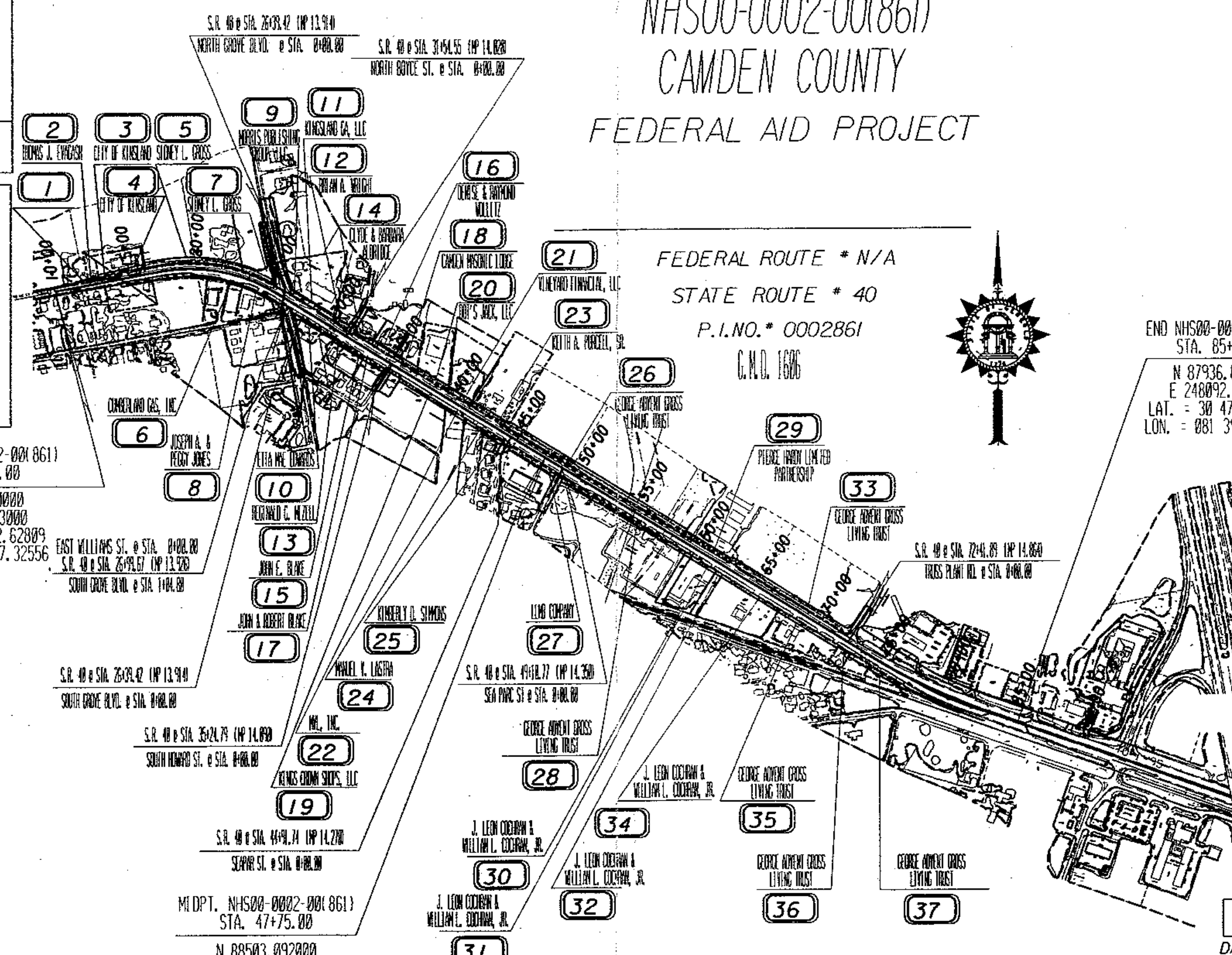
LOCATION & DESIGN
APPROVAL DATE: January 18, 2008

FUNCTIONAL CLASS:
PRINCIPLE ARTERIAL / URBAN

THIS PROJECT IS 100% IN CAMDEN COUNTY AND IS 100% IN CONG. DIST. NO. 1.

PROJECT DESIGNATION: EXEMPT
DESIGNED IN ENGLISH UNITS.

THIS PROJECT HAS BEEN PREPARED USING THE HORIZONTAL GEORGIA COORDINATE SYSTEM OF 1984 (NAD 1983)/94 WEST ZONE, AND THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.



FEDERAL ROUTE # N/A
STATE ROUTE # 40
P.I.NO.# 0002861
G.M.D. 1606

NOTE :
ALL REFERENCES IN THIS DOCUMENT, WHICH INCLUDES ALL PAPERS, WRITINGS, DOCUMENTS, DRAWINGS, OR PHOTOGRAPHS USED, OR TO BE USED IN CONNECTION WITH THIS DOCUMENT, TO "STATE HIGHWAY DEPARTMENT OF GEORGIA", "STATE HIGHWAY DEPARTMENT", "GEORGIA STATE HIGHWAY DEPARTMENT", "HIGHWAY DEPARTMENT", OR "DEPARTMENT" WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA, AND SHALL BE DEEMED TO MEAN THE DEPARTMENT OF TRANSPORTATION.

PREPARED BY: CASSIUS O. EDWARDS
DESIGN

RECOMMENDED FOR SUBMISSION BY:
DESIGN

SUBMITTED BY:
STATE DESIGN ENGINEER

DATE	CHIEF ENGINEER

PLANS COMPLETED - -	
REVISIONS	

LENGTH OF PROJECT	CAMDEN COUNTY COUNTY No.: 039 Project No.: NHS00-0002-00(861)
	MILES
NET LENGTH OF ROADWAY	1.430
NET LENGTH OF BRIDGES	0.000
NET LENGTH OF PROJECT	1.430
NET LENGTH OF EXCEPTIONS	0.000
GROSS LENGTH OF PROJECT	1.430

THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS OR IN ANYWAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED, AND DO NOT BIND THE DEPARTMENT OF TRANSPORTATION IN ANY WAY. THE ATTENTION OF BIDDER IS SPECIFICALLY DIRECTED TO SUBSECTIONS 102.04, 102.05, AND 104.03 OF THE SPECIFICATIONS.

3/1/2007

PRELIMINARY PLAN

1 - 1

RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:**
A- 2	1 of 5	Use standard width R/W with slope easements

Prepared By: GAO **Date:** 6-11-09 **Checked By:** AW **Date:** 6-12-09

Original Concept:

The proposed R/W width varies depending on the extent of the grading

limit. The plans show R/W widths from 140 to 170 feet and up to 210 ft at the eastern section of the project.

Proposed Change:

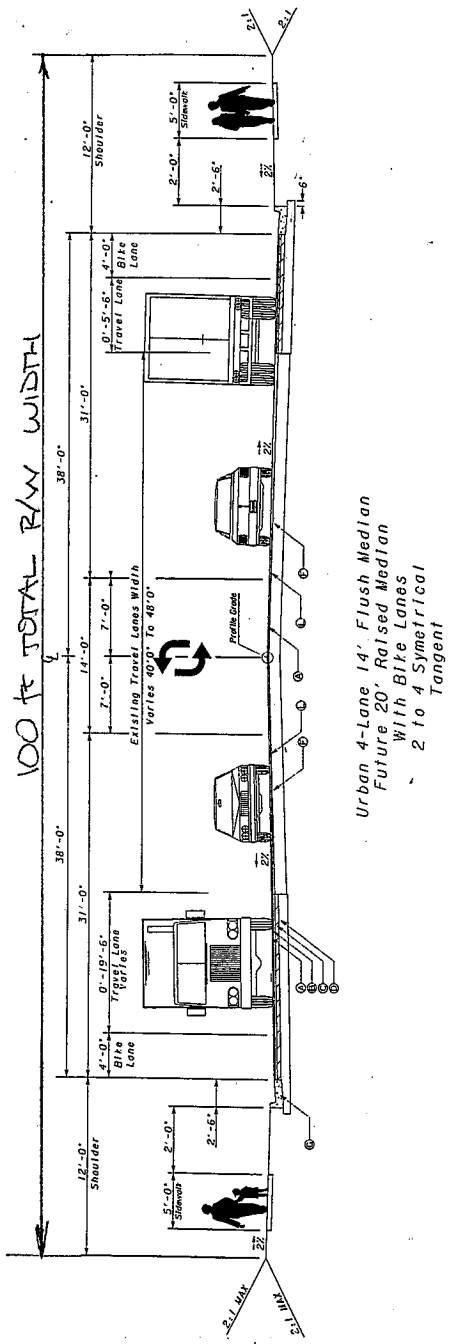
Provide a consistent width R/W and acquire the remaining needed areas as slope easements. This recommendation assumes a 12 foot shoulder however it will also be valid with 16 ft shoulders.

Justification:

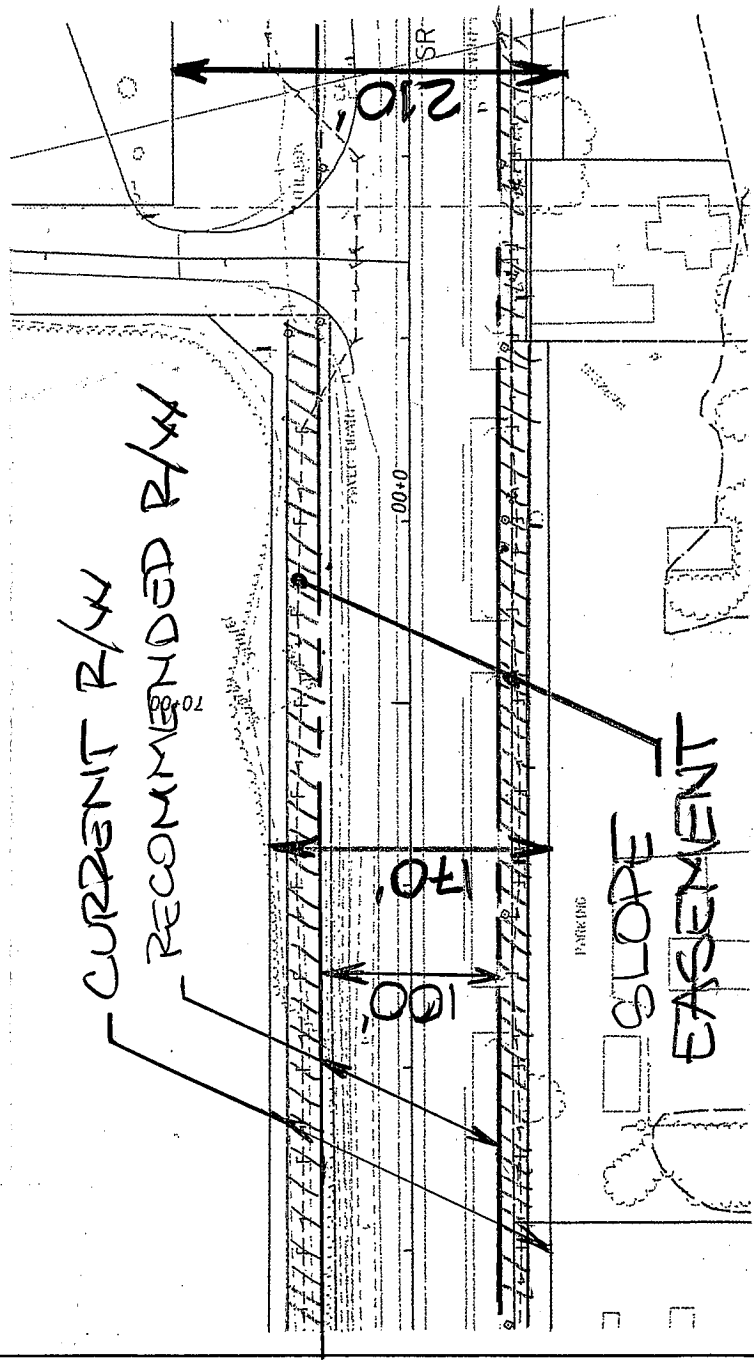
The existing R/W width is 100 feet which is adequate for a 5 lane section with 12 foot urban shoulders This includes the total width of the required typical section between shoulder break points. The remaining areas required can be secured as slope easements which are generally less expensive than full R/W acquisition.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	8,400,000		
- Proposed	5,000,000		
- Savings	3,400,000		3,400,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**3,400,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: A-2
	Sheet 2 of 5



SKETCH	
Project Name: SR 40 Widening	IDEA No: A-2
	Sheet 3 of 5



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: A-2		
					Sheet 4 of 5		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNIT	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST / UNIT	TOTAL COST
Right of Way	SF	293,300	28.59	8,385,447			
Slope easement	SF				293,300	17.15	5,030,095
SUBTOTAL				8,385,447			5,030,095
MARK-UP (8%)							
TOTAL							
TOTAL ROUNDED				8,400,000			5,000,000

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: A-2
	Sheet 5 of 5

Approximate ranges and R/W reductions

Sta 16+80 to Sta 25+00; L=820 / 140 ft - 100 ft = 40ft
Sta 27+00 to Sta 44+50; L=1750 / 150 ft - 100 ft = 50ft
Sta 44+50 to Sta 52+50; L=800 / 170 ft - 100 ft = 70ft
Sta 52+50 to Sta 72+00; L=1950 / 160 ft - 100 ft = 60ft

(820 x 40) + (1750 x 50) + (800 x 70) + (1950 x 60) = 293,300 sf

Total cost of R/W for project $10,239,300
Total R/W required; comm. and residential - 358, 150.32 sf

10,239,300 / 358,150.32 = $28.59 per sf

Assume slope easement is 60% cost of R/W

293,300 sf x 28.59 per sf x 60% = $5,031,268

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Use 11' thru lanes instead of 12'
B-1.1	1 of 4	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-12-09

Original Concept:

Use 12' thru lanes in each direction.

Proposed Change:

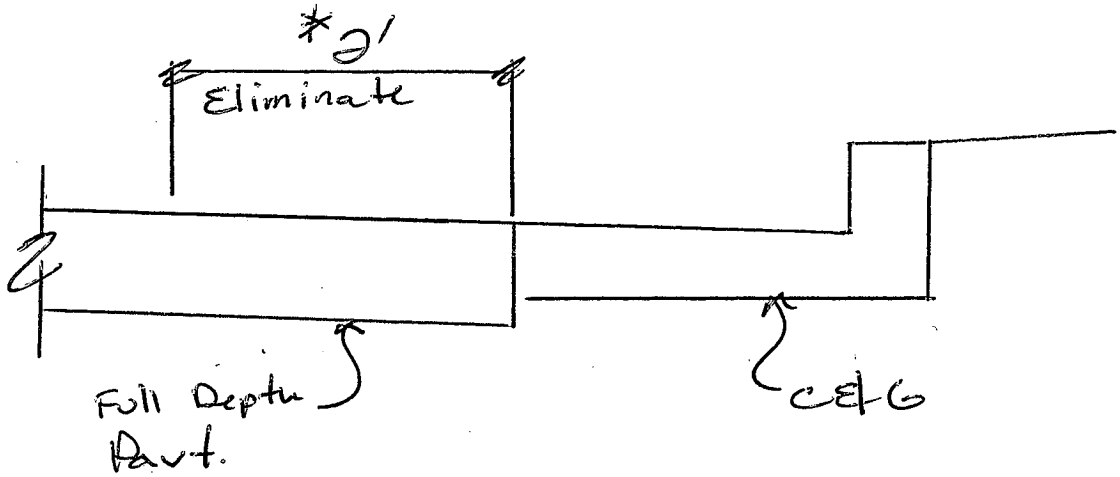
Use 11' thru lanes in each direction.

Justification:

11' lanes will function as well as the 12' lanes and are in compliance with AASHTO guidelines. Due to the proposed curb and gutter, there will be an additional 2 ft offset to the face of the curb which will provide suitable space for trucks and busses. This recommendation will reduce material costs and R/W acquisition. In addition to the calculated cost savings, there are other miscellaneous savings including earthwork, lateral pipes and tack coat. Overall, the impervious areas are also reduced.

12LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	872,000		
- Proposed	0		
- Savings	872,000		872,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**872,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-1.1
	Sheet 3 of 4



* Save 2' full-depth widening in Each Direction for a total of 4'

COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-1.1		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
GAB 10”	SY	2,772	16.10	44,629			
12.5 mm Superpave	TN	228.69	94.00	21,497			
19 mm Superpave	TN	304.92	94.00	28,663			
25 mm Superpave	TN	609.84	85.00	51,837			
R/W	SF	24,948	28.59	713,264			
SUBTOTAL				859,890			0
MARK-UP (8%)				11,730			0
TOTAL				871,620			0
TOTAL ROUNDED				872,000			

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-1.1
	Sheet 4 of 4

Full Depth Pavement –
Sta 11+87 to Sta 74+24
Length = 6,237'

6,237' x 4 / 9 = 2,772 SY

GAB 10" – 2,772 x 16.10 = $44,629

12.5 mm – (2,772 x 165# / 2000) (94.00) = $21,497

19 mm – (2,772 x 220# / 2000) (94.00) = $28,663

25 mm – (2,772 x 440# / 2000) (85.00) = $51,837

R/W – 4 x 6,237 = 24,948 SF, 24,948 x 28.59 = $713,264

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Use 11' inside lanes and 12' outside lanes
B-1.2	1 of 4	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-12-09

Original Concept:

Use 2-12' thru lanes in each direction.

Proposed Change:

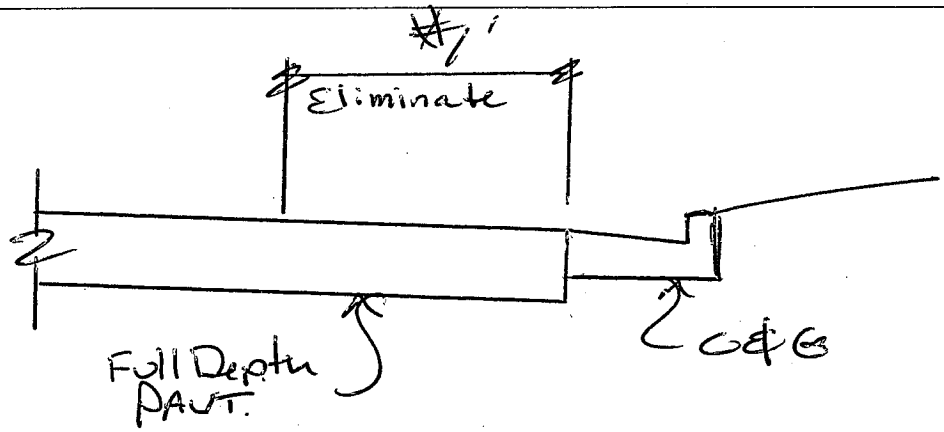
Use 11' inside lanes and 12' outside lanes.

Justification:

This recommendation would function similar to 2-12' lanes in each direction and is in compliance with AASHTO guidelines. The 12' outside lanes would accommodate the 7% truck traffic. There will be a reduction in material costs and R/W acquisition. In addition to the calculated cost savings, there are other miscellaneous cost savings such as earthwork, lateral pipe lengths, tack coat, etc.

12LIFE CYCLE COST SUMMARY	**CAPITAL COST**	**FUTURE COST**	**TOTAL COST**
INITIAL COST - Original	436,000		
- Proposed	0		
- Savings	436,000		436,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**436,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-1.2
	Sheet 2 of 4



* Save 12" full-depth Pavt in Each Direction for a total of 2'

COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-1.2		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
GAB 10”	SY	1,386	16.10	22,315			
12.5 mm Superpave	TN	114.35	94.00	10,749			
19 mm Superpave	TN	152.46	94.00	14,351			
25 mm Superpave	TN	304.92	85.00	25.918			
R/W	SF	12,474	28.59	356,632			
SUBTOTAL				429,965			0
MARK-UP (8%)				5,867			0
TOTAL				435,832			0
TOTAL ROUNDED				436,000			

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-1.2
	Sheet 4 of 4

Full Depth Pavement –
Sta 11+87 to Sta 74+24
Length = 6,237'

6,237' x 2 / 9 = 1,386 SY = 12,474 SF

GAB 10" – 1,386 x 16.10 = $22,315

12.5 mm – (1,386 x 165# / 2000) (94.00) = $10,749

19 mm – (1,386 x 220# / 2000) (94.00) = $14,351

25 mm – (1,386 x 440# / 2000) (85.00) = $35,918

R/W – 2 x 6,237 = 12,474 SF, 12,474 x 28.59 = $356,632

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Eliminate the 6' widening for the future 20' raised median.
B-3	1 of 4	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-15-09

Original Concept:

Add 6' full-depth pavement to accommodate a future 20' raised median.

Proposed Change:

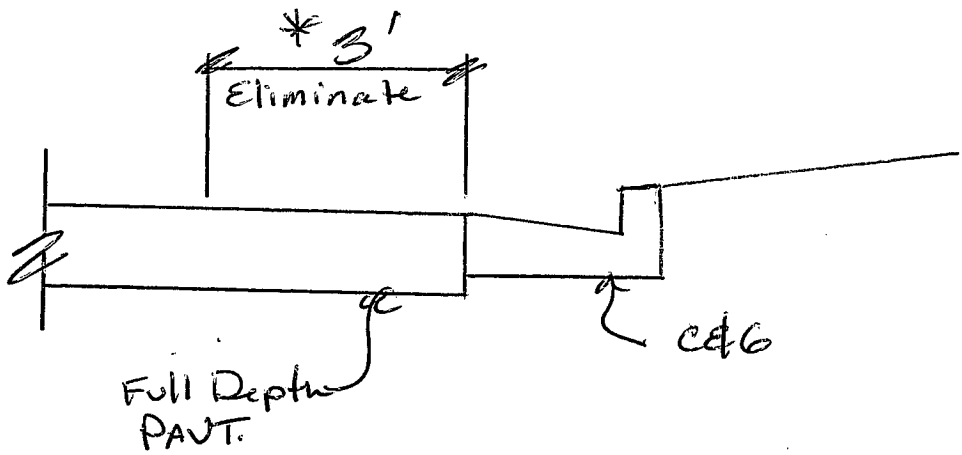
Eliminate the 6' widening for the future 20' raised median.

Justification:

This recommendation would provide a similar function as the current design. The 5-lane section is adequate for the projected traffic volumes. From the interstate, travelling west to Kingsland, the SR 40 would transition from a section with a raised median to a flush 14 ft center turn lane to a 4 lane section with no median. A future 20 ft raised median is not warranted. Also, there is a proposed by-pass project that is anticipated to reduce the projected volumes on SR 40 when constructed. By eliminating the additional space and pavement construction for a future 20 ft median, there will be a reduction in material costs and R/W taking. In addition to the calculated cost savings, there are other miscellaneous cost savings such as earthwork, lateral pipe lengths, tack coat, etc.

12LIFE CYCLE COST SUMMARY	**CAPITAL COST**	**FUTURE COST**	**TOTAL COST**
INITIAL COST - Original	1,308,000		
- Proposed	0		
- Savings	1,308,000		1,308,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**1,308,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-3
	Sheet 2 of 4



* Save 3' full-depth widening in Each Direction for a Total of 6'

COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-3		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	№ UNITS	COST/ UNIT	TOTAL COST	№ UNITS	COST / UNIT	TOTAL COST
GAB 10”	SY	4,158	16.10	66,944			
12.5 mm Superpave	TN	343.04	94.00	32,245			
19 mm Superpave	TN	457.38	94.00	42,994			
25 mm Superpave	TN	914.76	85.00	77,755			
R/W	SF	37,422	28.59	1,069,895			
SUBTOTAL				1,289,833			0
MARK-UP (8%)				17,595			0
TOTAL				1,307,428			0
TOTAL ROUNDED				1,308,000			

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-3
	Sheet 4 of 4

Full Depth Pavement –
Sta 11+87 to Sta 74+24
Length = 6,237'

6,237' x 6 / 9 = 4,158 SY = 37,422 SF

GAB 10" – 4,158 x 16.10 = $66,944

12.5 mm – (4,158 x 165# / 2000) (94.00) = $32,245

19 mm – (4,158 x 220# / 2000) (94.00) = $42,994

25 mm – (4,158 x 440# / 2000) (85.00) = $77,755

R/W – 6 x 6,237 = 37,422 SF, 37,422 x 28.59 = $1,069,985

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd. to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:**
B-4.1	1 of 4	Move the bicycle lanes behind the curb and incorporate with sidewalks as a multi-use trail

Prepared By: AW **Date:** 06/10/09 **Checked By:** GAO **Date:** 6-15-09

Original Concept:
The original concept calls for 4' bike lanes on each side of SR 40.

Proposed Change:
The current shoulder section is 16' wide and calls for a 5' sidewalk. This leaves 8.5' of grassed area that could be used for a 10' sidewalk and leave 2' between the back of curb and sidewalk and 1.5' between the sidewalk and shoulder break line. These wide sidewalks can be used as multi-use trails which would eliminate the need for the bike lanes on SR 40.

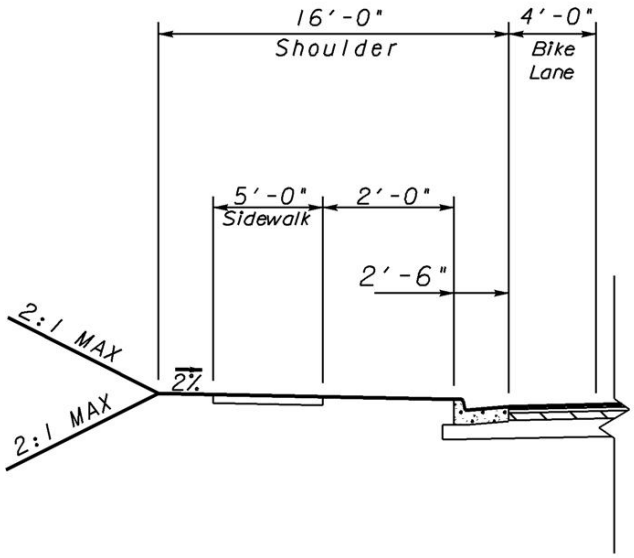
Justification:
By shifting the bike lanes out of the roadway, this will create a safer place for the cyclist and eliminate the need for some full depth asphalt. Safe and protected crossings are provided at the signalized intersections at Grove Blvd and Truss Plant Road.

Right of way savings due to the reduced typical section are not included in the cost savings since the potential 12 ft shoulder would have to be widened to 16 ft. If the 12 ft shoulder is not considered, additional R/W savings could be achieved.

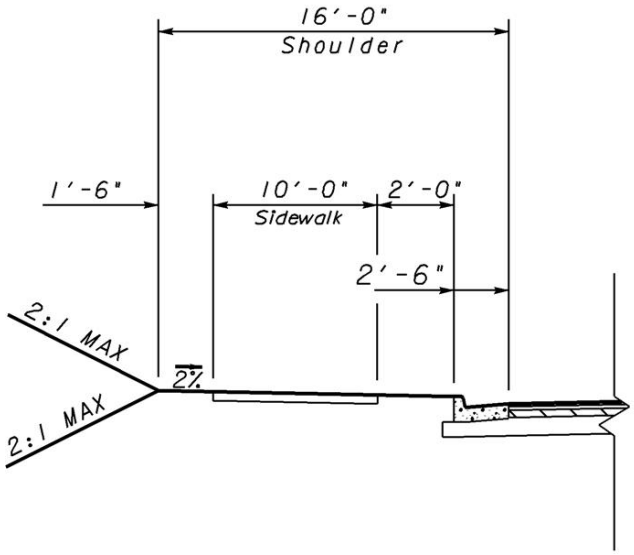
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	370,000		
- Proposed	215,000		
- Savings	155,000		155,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**155,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-4.1
	Sheet 2 of 4

ORIGINAL SECTION



PROPOSED SECTION



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-4.1		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
Borrow	CY	4000	5.50	22000			
Pavement:							
12.5 mm Superpave	TN	495	94.00	46530			
19 mm Superpave	TN	660	94.00	62040			
25 mm Superpave	TN	1320	85.00	112200			
8” Graded Aggregate Base Course	SY	6000	16.10	96600			
4” Concrete Sidewalk	SY				7500	26.00	195000
SUBTOTAL				339370			195000
MARK-UP (8%)				27150			15600
TOTAL				366520			210600
TOTAL ROUNDED				370000			215000

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-4.1
	Sheet 4 of 4

Assume length:

Sta. 12+00.00 to Sta. 81+00.00 = 6900 LF Left
Sta. 15+00.00 to Sta. 77+44.54 = 6245 LF Right

Total 13,145 LF

Earthwork:

(13,145 LF x 4' x 2') / 27 CF/CY = 3895 CY Use 4000 CY
Borrow Unit Cost: 2008 GDOT Item = $5.43/CY Use $5.50/CY

Asphalt Paving (Assume full depth)

13,145 LF x 4' / 9 SF/SY = 5842 SY Use 6000 SY

12.5 mm Superpave: 165 LB/SY x 6000 SY / 2000 LB/TON = 495 TONS
19 mm Superpave: 220 LB/SY x 6000 SY / 2000 LB/TON = 660 TONS
25 mm Superpave: 440 LB/SY x 6000 SY / 2000 LB/TON = 1320 TONS
8" Graded Aggregate Base: 6000 SY

Additional Sidewalk Area:

13,145 LF x 5' / 9 SF/SY = 7,303 SY Use 7,500 SY

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd. to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:**
B-4.2	1 of 4	Eliminate bicycle lanes and widen one sidewalk to 10’ on one side of the street for use as a multi-use trail

Prepared By: AW **Date:** 06/10/09 **Checked By:** GAO **Date:** 6-15-09

Original Concept:
The original concept calls for 4’ bike lanes on each side of SR 40.

Proposed Change:
The current shoulder section is 16’ wide and calls for a 5’ sidewalk. This leaves 8.5’ of grassed area that could be used for a 10’ sidewalk and leave 2’ between the back of curb and sidewalk and 1.5’ between the sidewalk and shoulder break line. If one of the sidewalks on one side of the street is widened to 10’ it can be used as a multi-use trail which would eliminate the need for the bike lanes on SR 40.

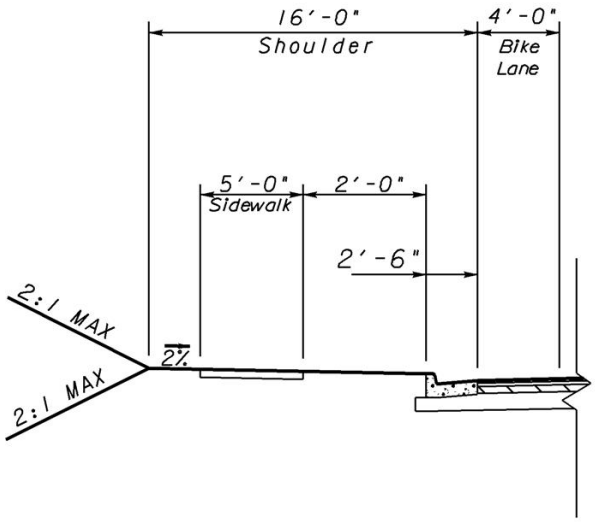
Justification:
By shifting the bike lanes out of the roadway, this will create a safer place for the cyclist and eliminate the need for some full depth asphalt. Safe and protected crossings are provided at the signalized intersections at Grove Blvd and Truss Plant Road.

Right of way savings due to the reduced typical section are not included in the cost savings since the potential 12 ft shoulder would have to be widened to 16 ft. If the 12 ft shoulder is not considered, additional R/W savings could be achieved.

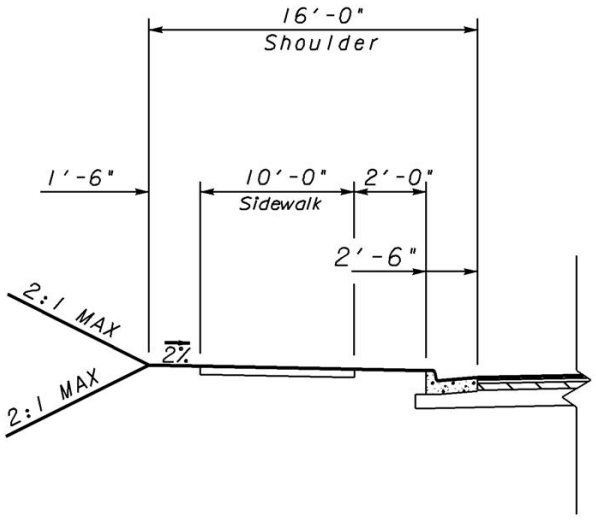
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	370,000		
- Proposed	115,000		
- Savings	255,000		255,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**255,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-4.2
	Sheet 2 of 4

ORIGINAL SECTION



PROPOSED SECTION



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-4.2		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
Borrow	CY	4000	5.50	22000			
Pavement:							
12.5 mm Superpave	TN	495	94.00	46530			
19 mm Superpave	TN	660	94.00	62040			
25 mm Superpave	TN	1320	85.00	112200			
8” Graded Aggregate Base Course	SY	6000	16.10	96600			
4” Concrete Sidewalk	SY				4000	26.00	104000
SUBTOTAL				339370			104000
MARK-UP (8%)				27150			8320
TOTAL				366520			112320
TOTAL ROUNDED				370000			115000

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-4.2
	Sheet 4 of 4

Assume length:

Sta. 12+00.00 to Sta. 81+00.00 = 6900 LF Left
Sta. 15+00.00 to Sta. 77+44.54 = 6245 LF Right

Total 13,145 LF (Use for Earthwork & Pavement)

Use longest side for length of additional sidewalk width = 6900 LF

Earthwork:

(13,145 LF x 4' x 2') / 27 CF/CY = 3895 CY Use 4000 CY
Borrow Unit Cost: 2008 GDOT Item = $5.43/CY Use $5.50/CY

Asphalt Paving (Assume full depth)

13,145 LF x 4' / 9 SF/SY = 5842 SY Use 6000 SY

12.5 mm Superpave: 165 LB/SY x 6000 SY / 2000 LB/TON = 495 TONS
19 mm Superpave: 220 LB/SY x 6000 SY / 2000 LB/TON = 660 TONS
25 mm Superpave: 440 LB/SY x 6000 SY / 2000 LB/TON = 1320 TONS
8" Graded Aggregate Base: 6000 SY

Additional Sidewalk Area:

6900 LF x 5' / 9 SF/SY = 3,833 SY Use 4,000 SY

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Use 16 foot median in lieu of 20 ft
B-7	1 of 4	

Prepared By: GAO **Date:** 6-11-09 **Checked By:** AW **Date:** 6-12-09

Original Concept:

Provide space for future 20 ft raised median

Proposed Change:

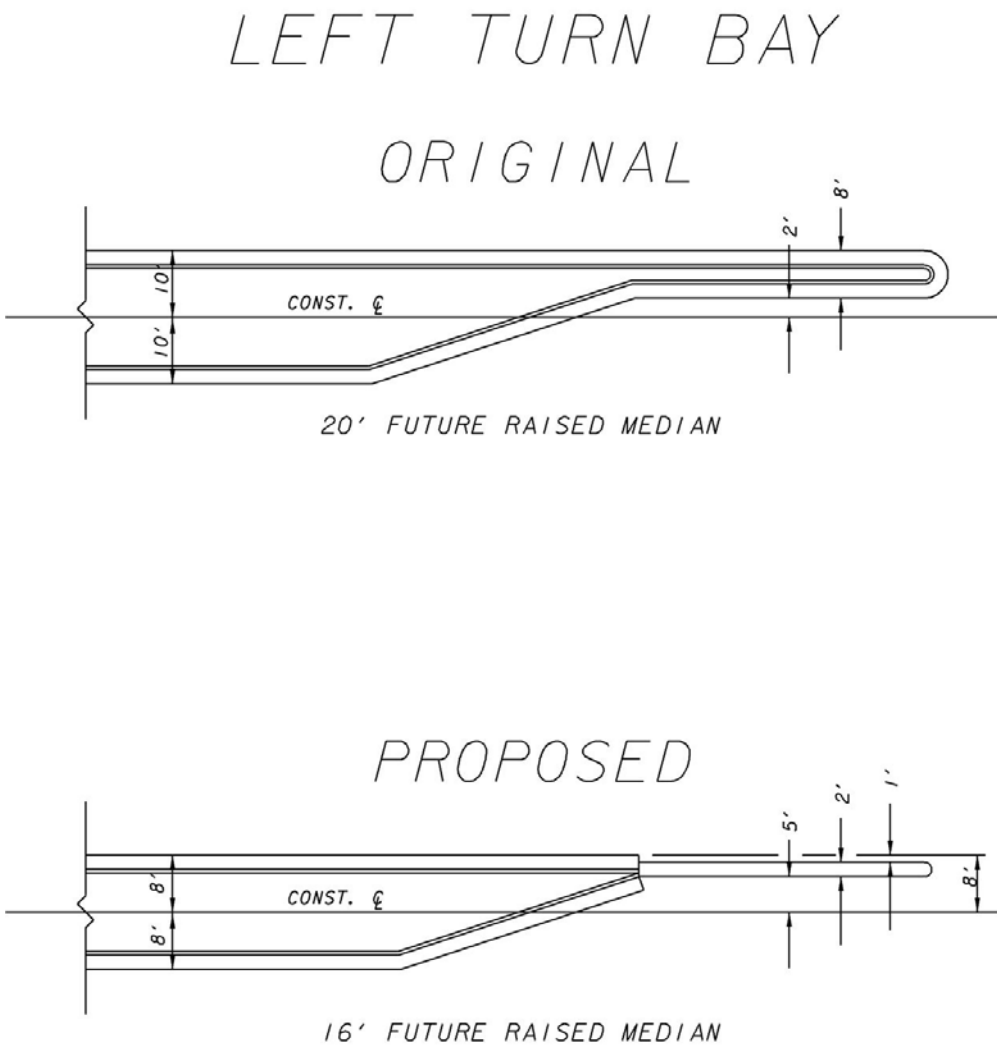
Use a 16 ft median

Justification:

A 16 foot median provides the same function as a 20 foot median with provisions for a 12 foot turn lane and a 4 foot offset at the median openings. The narrower section will provide reduced pavement construction and R/W costs. Additional future savings will be realized when the decision is made to construct a 16 median in lieu of a 20 foot.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	872,000		
- Proposed	0		
- Savings	872,000		872,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**872,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-7
	Sheet 2 of 4



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-7		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
GAB	sy	2772	16.10	44,629			
12.5 mm	ton	228.69	94	21,497			
19 mm	ton	304.92	94	28,663			
25 mm	ton	609.84	85	51,837			
R/W	sf	24,948	28.59	713,264			
SUBTOTAL				146,626			
MARK-UP (8%)				11,730			
				713,264			
TOTAL				871,620			
TOTAL ROUNDED				872,000			

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No:
	Sheet 4 of 4

For detailed calculations of 4 foot pavement reduction, see recommendation B-1.1

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Reduce the 14' center turn lane to a 12' center turn lane.
B-9	1 of 4	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-15-09

Original Concept:

Provide a 14' wide center left turn lane.

Proposed Change:

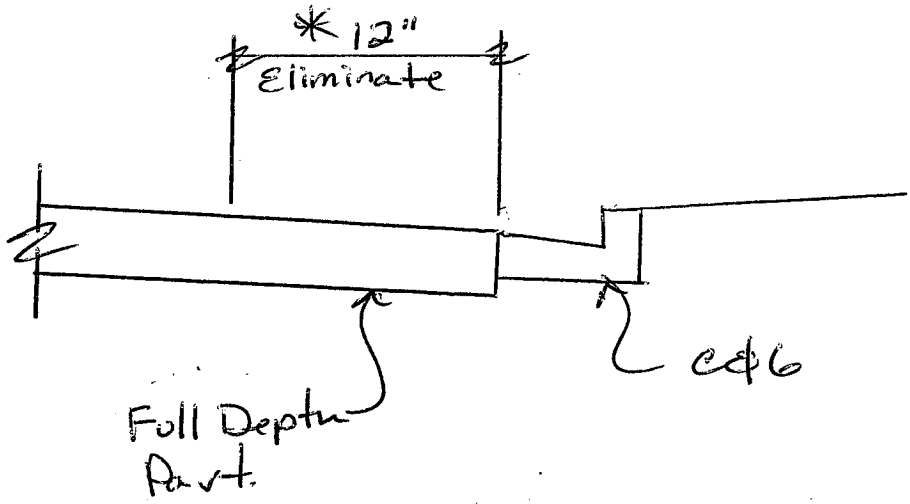
Change the center left turn lane to 12' wide.

Justification:

The 12' center left turn lane will function the same as the 14' lane. There will be a reduction in material costs and R/W taking. In addition to the calculated cost savings, there are other miscellaneous cost savings such as earthwork, lateral pipe lengths, tack coat, etc.

12LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	436,000		
- Proposed	0		
- Savings	436,000		436,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**436,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-9
	Sheet 2 of 4



* Save 12" full-Depth Pavt. in Each Direction for a total of 2'

COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-9		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	№ UNITS	COST/ UNIT	TOTAL COST	№ UNITS	COST / UNIT	TOTAL COST
GAB 10”	SY	1,386	16.10	22,315			
12.5 mm Superpave	TN	114.35	94.00	10,749			
19 mm Superpave	TN	152.46	94.00	14,351			
25 mm Superpave	TN	304.92	85.00	25,918			
R/W	SF	12,474	28.59	356,632			
SUBTOTAL				429,965			0
MARK-UP (8%)				5,867			0
TOTAL				435,832			0
TOTAL ROUNDED				436,000			

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-9
	Sheet 4 of 4

Full Depth Pavement –
Sta 11+87 to Sta 74+24
Length = 6,237'

6,237' x 2 / 9 = 1,386 SY = 12,474 SF

GAB 10" – 1,386 x 16.10 = $22,315

12.5 mm – (1,386 x 165# / 2000) (94.00) = $10,749

19 mm – (1,386 x 220# / 2000) (94.00) = $14,331

25 mm – (1,386 x 440# / 2000) (85.00) = $25,918

R/W – 2 x 6,237 = 12,474 SF, 12,474 x 28.59 = $356,632

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Realign Grove Blvd to match concept report and close E. Williams with a Cul-De-Sac.
B-11.1	1 of 4	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-15-09

Original Concept:

Provide a minimal shift on Grove Blvd and leave E. Williams open at the intersection at Groves.

Proposed Change:

Realign Grove Blvd and provide a better intersection angle. Close E. Williams at the Intersection of Grove Blvd with a cul-de-sac.

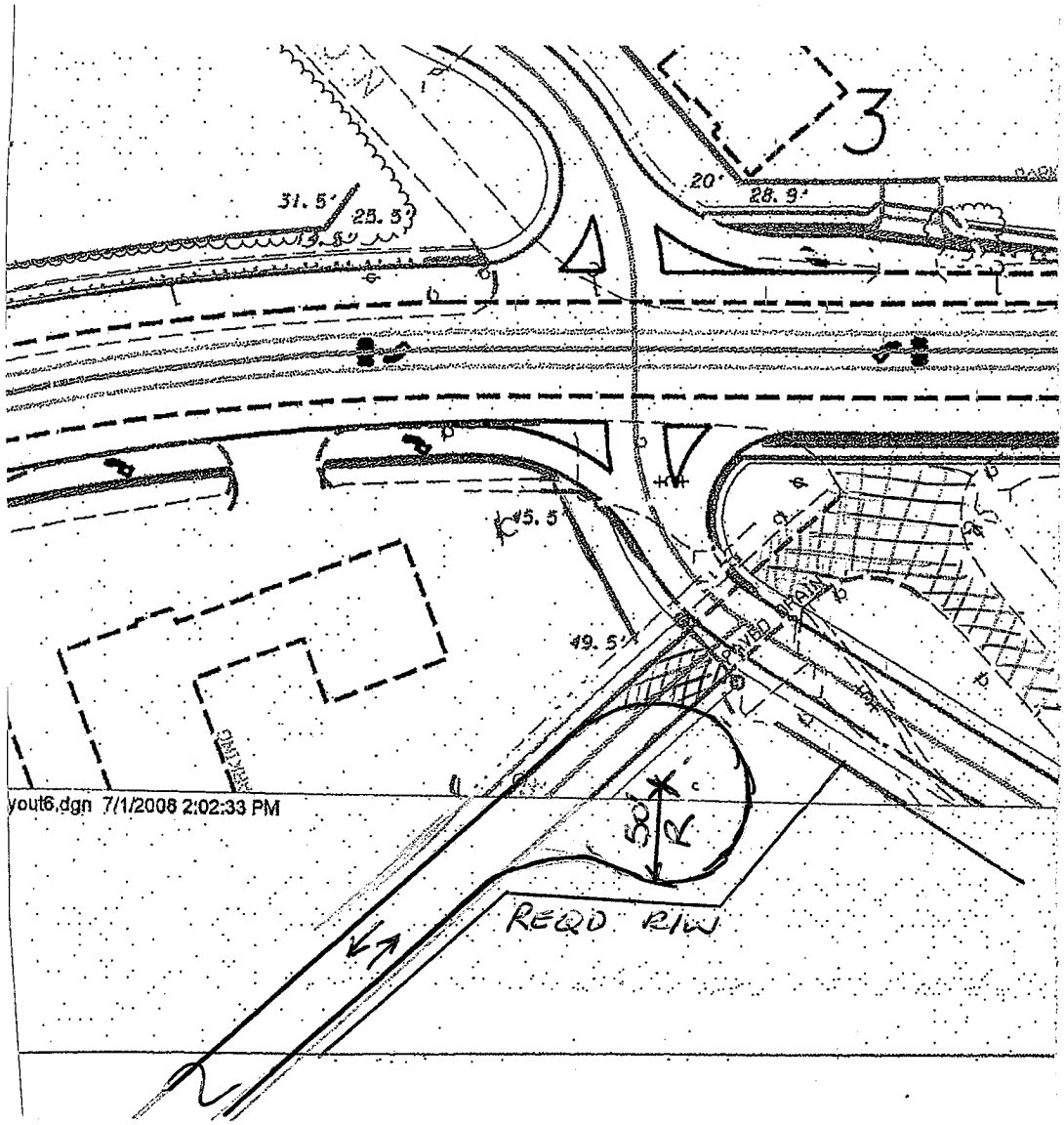
Justification:

This intersection is at a very poor skew angle and location on SR 40, on a horizontal curve. The project improvements for the SR 40 widening should address this intersection. The proposed realignment shown for Grove Blvd indicates a 70 degree skew angle, which is acceptable however, the intersection would not operate as such due to the very short tangent section between the 2 approaching curves. The effects of the realignment would not be achieved once the striping plans are developed. Most likely, opposing direction traffic will be in conflicting lanes and the operations and safety of this intersection will be affected. Even though there will be a cost increase, the realignment should match a layout found in an earlier concept report as shown on the sketch. This would provide much better operations and safety at the intersection.

This recommendation also includes eliminating the access on E William Avenue which is further detailed and discussed in recommendation B11-2.

12LIFE CYCLE COST SUMMARY	**CAPITAL COST**	**FUTURE COST**	**TOTAL COST**
INITIAL COST - Original	0		
- Proposed	980,000		
- Savings	0		(980,000)
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**(980,000)**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-11.1
	Sheet 2 of 4



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-11.1		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
GAB 10”	SY				1,955	16.10	31,476
12.5 mm Superpave	TN				161.29	94.00	15,161
19 mm Superpave	TN				215.05	94.00	20,215
25 mm Superpave	TN				430.10	85.00	36,559
R/W	SF				29,200	28.59	834,828
Unclassified Exc.	CY				1,200	6.50	7,800
Borrow Exc.	CY				1,000	5.50	5,500
Drainage Inlets	EA				2	2,000	4,000
Storm Drain Pipe 18”	LF				150	38.00	5,700
Conc. Curb and Gutter	LF				325	23.00	7,475
SUBTOTAL				0			968,714
MARK-UP (8%)				0			10,711
TOTAL				0			979,425
TOTAL ROUNDED							980,000

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-11.1
	Sheet 4 of 4

R/W – 29,200 SF x 28.59 = $834,828

Pavement -

500 x 24 = 12,000 SF, 1,333 SY
70 x 80 = 5,600 SF, 622 SY, Total SY = 1,955 SY

GAB 10" – 1,955 x 16.10 = $31,476

12.5 mm – (1,955 x 165# / 2000) (94.00) = $15,161

19 mm – (1,955 x 220# / 2000) (94.00) = $20,215

25 mm – (1,955 x 440# / 2000) (85.00) = $36,559

Earthwork -

Unclass. Exc. = 1,200 CY, Fill = 1,300 CY, Borrow = 1,000 CY

Curb and Gutter –

= 325 LF

Drainage -

2 Structures @ 2,000 = $4,000, Assume 150 LF of 18" RCP @ 38.00 = $5,700

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Close E. William Avenue with a cul-de-sac.
B-11.2	1 of 4	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-15-09

Original Concept:

Tie E William Ave. at Grove Blvd and convert to a right in / right out condition.

Proposed Change:

Close E. William Ave. at the intersection of Grove Blvd and eliminate the right in / right out with a cul-de-sac.

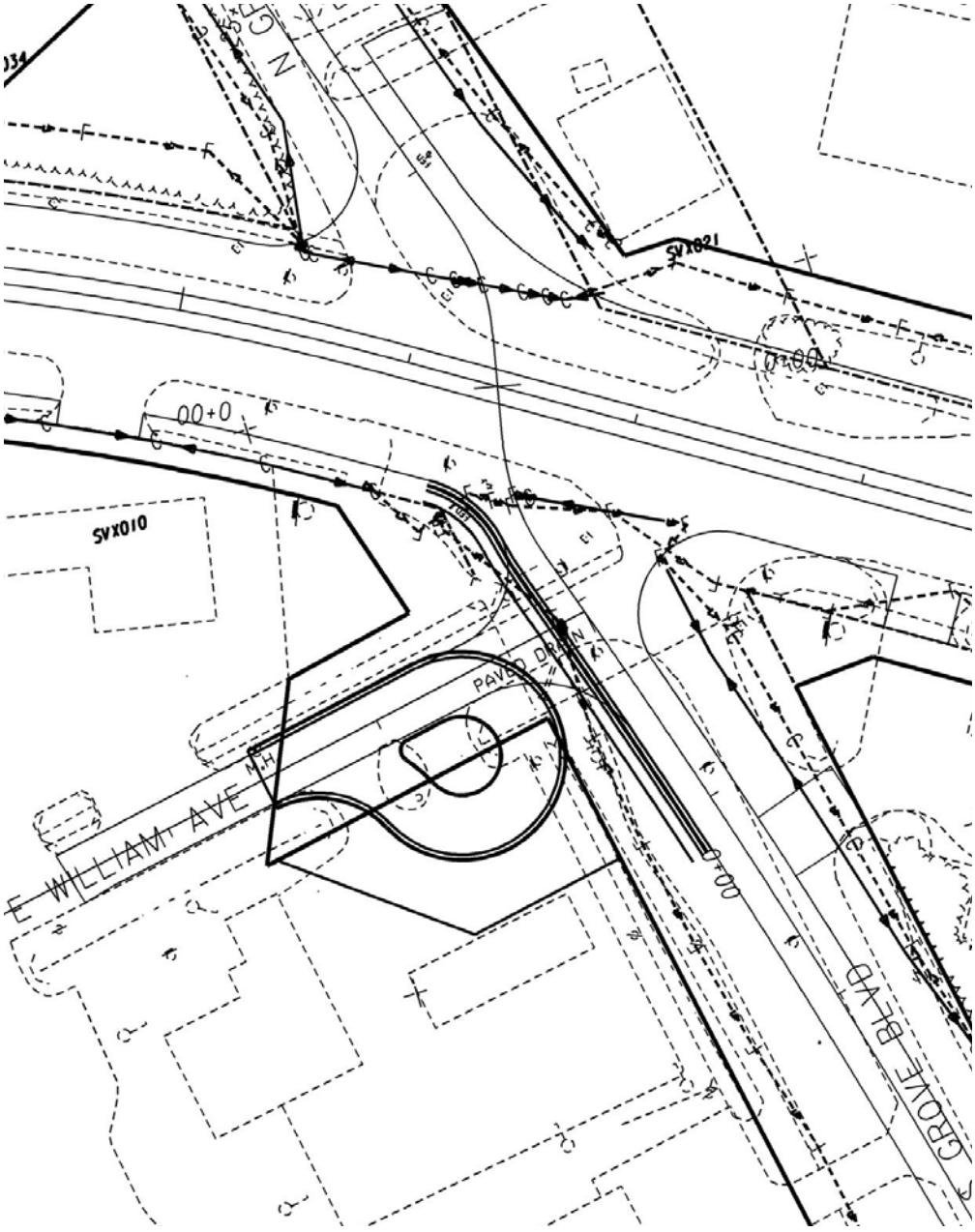
Justification:

This is a poorly aligned and problematic intersection as discussed under recommendation B11.1. It is further exacerbated by the E William Ave. intersection. Even though the current design is to convert it to a right in / right out condition, its proximity to SR 40 would still continue to be an unsafe condition. Traffic accessing E William Ave. could potentially back onto SR 40. From the aerial photography and after review of the video inventory for the area, this appears to be a low volume road with convenient access to SR 40 at East Street, about 1,500 feet west of Grove Blvd.

Eliminating E. William Ave. access to Grove Blvd at the intersection would add project costs however it would provide much better operations and safety at the intersection. The affected property would not require a total taking and therefore should not require an EA document. This recommendation can be implemented independently from the Grove Blvd alignment.

12LIFE CYCLE COST SUMMARY	**CAPITAL COST**	**FUTURE COST**	**TOTAL COST**
INITIAL COST - Original	0		
- Proposed	380,000		
- Savings	0		(380,000)
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**(380,000)**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-11.2
	Sheet 2 of 4



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-11.2		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
GAB 10”	SY				622	16.10	10,014
12.5 mm Superpave	TN				51.32	94.00	4,824
19 mm Superpave	TN				68.42	94.00	6,432
25 mm Superpave	TN				145.20	85.00	12,342
R/W	SF				11,200	28.59	320,208
Borrow Exc.	CY				1,000	5.50	5,500
Drainage Inlets	EA				2	2,000	4,000
Storm Drain Pipe 18”	LF				150	38.00	4,200
Conc. Curb and Gutter	LF				325	23.00	7,475
SUBTOTAL				0			374,995
MARK-UP (8%)				0			4,383
TOTAL				0			379,378
TOTAL ROUNDED							380,000

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-11.2
	Sheet 4 of 4

R/W – 140 x 80 = 9,200 SF

Pavement -

622 SY

GAB 10" – 622 x 16.10 = $10,014

12.5 mm – (622 x 165# / 2000) (94.00) = $15,161

19 mm – (622 x 220# / 2000) (94.00) = $6,432

25 mm – (622 x 440# / 2000) (85.00) = $11,632

Earthwork -

Fill = Borrow = 100 x 40 / 27 = 148 CY

Curb and Gutter –

= 325 LF

Drainage -

2 Structures @ 2,000 = $4,000, Assume 150 LF of 18" RCP @ 38.00 = $5,700

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd. to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:**
B-13	1 of 4	Reduce urban shoulders from 16’ to 12’

Prepared By: AW **Date:** 06/10/09 **Checked By:** GAO **Date:** 6-15-09

Original Concept:
The original concept calls for 16’ wide urban shoulders from normal edge of pavement to shoulder break.

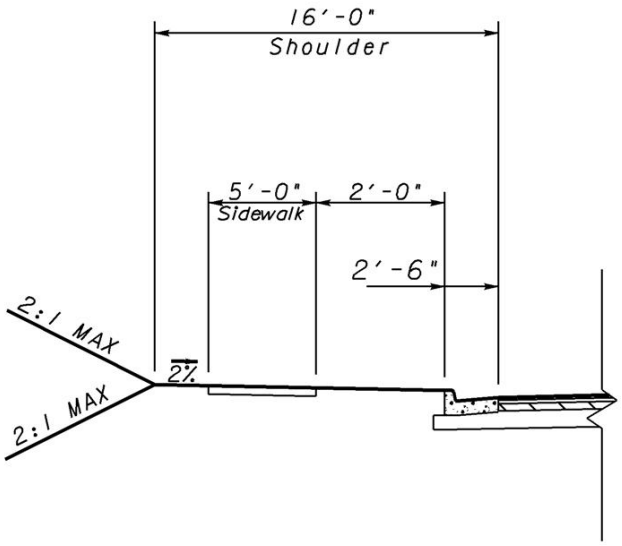
Proposed Change:
Use 12’ wide urban shoulders in lieu of 16’ wide. This will accommodate the 2 ½’ wide curb and gutter, the 5’ sidewalk, the 2’ grassed buffer between the curb and the sidewalk, and the 2 ½’ shoulder from the back of the sidewalk to shoulder break.

Justification:
The right of way costs are nearly 60% of the total project budget. Narrowing the shoulder width will reduce this cost while providing a similar function. 12 foot shoulders will provide ample room for the utility zone and full width sidewalks.

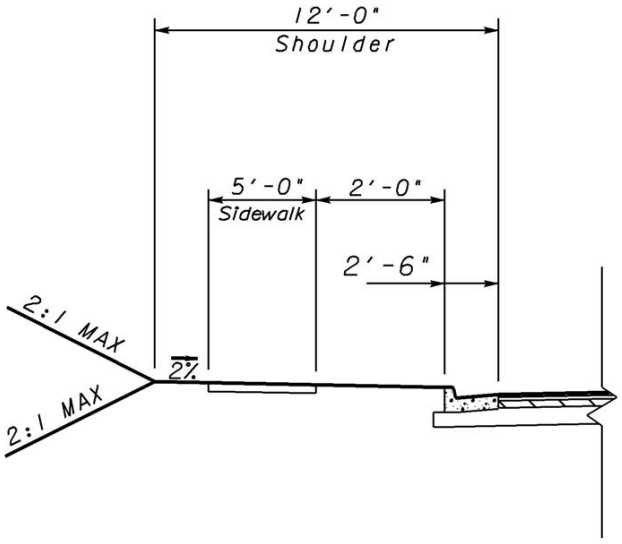
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	1,600,000		
- Proposed	0		
- Savings	1,600,000		1,600,000
FUTURE COST – Savings			0
TOTAL PRESENT WORTH SAVINGS			**1,600,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-13
	Sheet 2 of 4

ORIGINAL SECTION



PROPOSED SECTION



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-13		
					Sheet 3 of 4		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
Borrow	CY	4000	5.50	22000			
Right-of-way	SF	52600	28.59	1503834			
SUBTOTAL				22000			
MARK-UP (8%)				1760			
(Right-of-Way)				1503834			
TOTAL				1527594			
TOTAL ROUNDED				1600000			

ASSUMPTIONS / CALCULATIONS

Project Name: SR 40 Widening	ITEM No: B-13
	Sheet 4 of 4

Assume length:

Sta. 12+00.00 to Sta. 81+00.00 = 6900 LF Left
Sta. 15+00.00 to Sta. 77+44.54 = 6245 LF Right

Total 13,145 LF

Earthwork:

(13,145 LF x 4' x 2') / 27 CF/CY = 3895 CY Use 4000 CY
Borrow Unit Cost: 2008 GDOT Item = $5.43/CY Use $5.50/CY

Right-of-Way:

13,145 LF x 4' = 52,580 SF Use 52,600 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA:** Construct 20 ft raised median
B-16	1 of 5	

Prepared By: GAO **Date:** 6-11-09 **Checked By:** AW **Date:** 6-11-09

Original Concept:

Construct the 5 lane, flush median with provisions for a 20 foot raised median in the future, when traffic conditions warrant.

Proposed Change:

Construct the 20 ft raised median as part of this project.

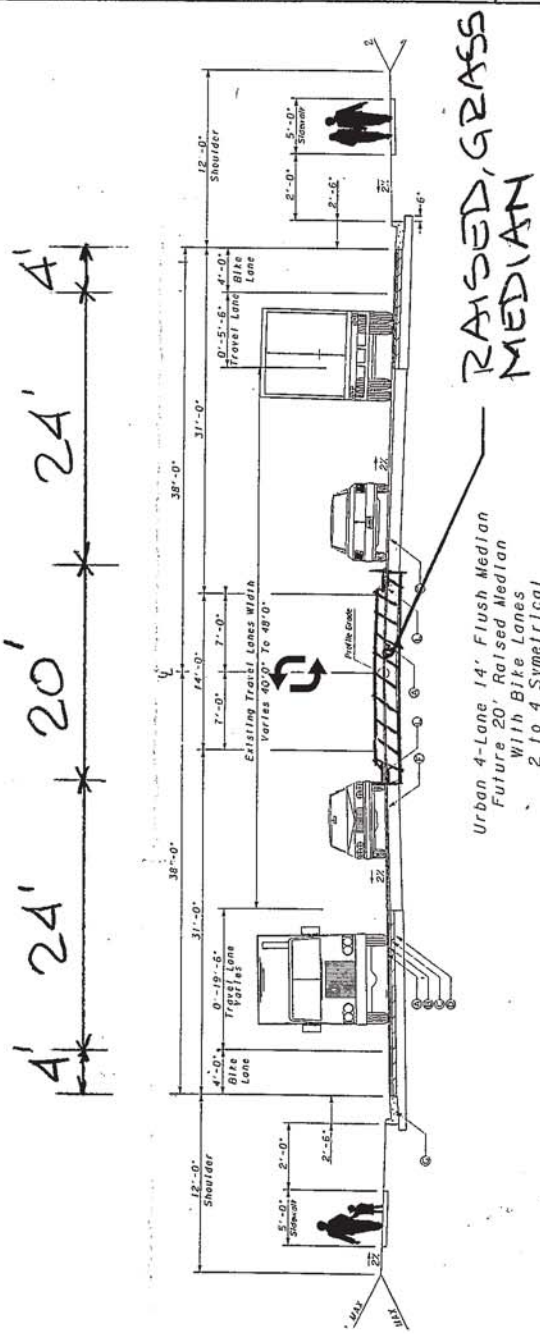
Justification:

The project is being developed to incorporate a future 20 foot raised median with the expectation that future traffic conditions and continued corridor development will warrant it. Constructing the raised median as part of this project should be considered. Even though it will be slightly more costly in the short term, it will be much less problematic and more cost efficient in the long term. Incorporating a raised median with a center turn lane in place can be problematic and is usually met with strong opposition from the local business owners. The additional costs, traffic disruption and local community involvement, approvals and coordination can be eliminated if it is constructed as part of this project, especially if this is expected to occur in the reasonably near future, say 5 years.

Revisiting the issue at a later date with the public, developing a new construction project with design drawings, and progressing through the bid and letting process will incur higher overall future project costs and involve more significant efforts.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original	63,000	243,000	
- Proposed	129,000		
- Savings	(66,000)		(66,000)
FUTURE COST – Savings		243,000	243,000
TOTAL PRESENT WORTH SAVINGS			**177,000**

SKETCH	
Project Name: SR 40 Widening	IDEA No: B-16
	Sheet 2 of 5



COST WORKSHEET							
Project Name: SR 40 Widening					IDEA No: B-16		
					Sheet 3 of 5		
CONSTRUCTION ELEMENT		**ORIGINAL ESTIMATE**			**NEW ESTIMATE**		
ITEM	UNITS	Nº UNITS	COST/ UNIT	TOTAL COST	Nº UNITS	COST/ UNIT	TOTAL COST
Asphalt, 12.5 mm	ton	620	94	58,280			
Rdwy ex, remove exist pavement & backfill	cy				1,833	5	9,165
Type 7 curb	lf				6,600	15	99,000
Grassing, surface treatment	sy				5,500	2	11,000
FUTURE COSTS							
Median construction	LS			129,000			
Traffic control	LS			25,000			
Administer project, engineering, construction inspection	LS			100,000			
SUB-TOTAL				283,000			
SUBTOTAL				58,280			119,165
MARK-UP (8%)				4,660			9,530
TOTAL				62,940			128,695
TOTAL ROUNDED				63,000			129,000

ASSUMPTIONS / CALCULATIONS	
Project Name: SR 40 Widening	ITEM No: B-16
	Sheet 4 of 5

Assume raised median from Grove St to North Truss Road; approx sta 30+00 to 69+00; this accounts for left turn bays at the intersections. Also assume one median opening in the vicinity of the side street at sta 49+00; about 600 feet long.

(6,900 – 3,000) - 600 = 3,300 lf

[3300 ft (20 ft) (1.5/12 ft)] x 150 #/cf x 1 ton / 2000 # = 618.75 tons

3,300 x 15 ft = 49,500 sf = 5,500 sy

Roadway excavation; assume 1 ft deep

49,500 sf x 1 ft = 49,500 cf = 1,833 cy

Life Cycle Cost Analysis – Present Worth Method
Future Cost Calculation

PROJECT: SR 40 Widening

Creative Idea No. B-16 Sheet: 5 of 5

Discount Rate: 3% Economic Life: 5 Years

	A	B	C	D
	Original Design		**Alternate Design**	
	Cost	PW	Cost	PW
1. Single Expenditures: (i.e., stage Construction, Major Maintenance)				
a. Year _5_ PWF 0.8587	283,000	243,012		
b. Year ___ PWF _____				
c. Year ___ PWF _____				
d. Salvage / Unused Service Life Year ____ PWF _____				
1. Total Future Single Costs:		243,012		0
2. Annual Costs:				
a. General Maintenance PWF' =				
b. Other Annual Costs PWF' =				
2. Total Future Annual Costs		0		0
3. Total Future Costs: (1 + 2)		243,012		0
4. Total Future Cost Savings on a Present Worth Basis (3B-3D)				
5. Total Future Cost Savings on an Annual Basis (4B X crf_)				

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA: Design Consideration:** Utilize existing water main as much as possible.
D-2	1 of 1	

Prepared By: SSB **Date:** 6/10/2009 **Checked By:** GAO **Date:** 6-15-09

Original Concept:
Based on the total cost of water line work, it appears that a new water line will be constructed for the entire project length.

Proposed Change:
Review the adequacy of the existing water line. Utilize the existing water main as much as possible.

Justification:
A cost of $440,800 was shown in the Preliminary Utility Cost Estimate for the water line impacts and on some notes, it appeared even higher up to $600,000. Since this project consists of resurfacing the existing pavement wherever possible, this cost seems excessive and we assumed that it includes a new waterline for the entire project length. Verify the scope of the water main system work and utilize as much of the existing main as feasible. Relocate, adjust and/ or reconstruct the existing hydrants, valves and appurtenances however if the system is in adequate condition, consider its re-use. This will significantly reduce the overall costs of the waterline work.

DESIGN CONSIDERATION

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original			
- Proposed			
- Savings			
FUTURE COST – Savings			
TOTAL PRESENT WORTH SAVINGS			**N/A**

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd. to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA: Design Consideration:** Recalculate earthwork estimate and quantities.
E-1	1 of 1	

Prepared By: AW **Date:** 06/11/09 **Checked By:** GAO **Date:** 6-15-09

Original Concept:

The earthwork costs in the preliminary estimate are as follows:

Grading Complete	$320,000
Unclassified Excavation	$ 35,000
Borrow	$351,000
Total	$706,000

The earthwork calculations provided show the following:

Excavation	3,216.44 CY
Embankment	16,912.97 CY

Unit Costs Based on above:

Unclassified Excavation = $35,000/3,216.44 = $10.88/CY

Embankment = $351,000/16,912.97CY = $20.75/CY

These unit costs do not include the $320,000 for Grading Complete. If this is added to the above, the unit costs will nearly double. These costs are quite higher than the statewide averages.

Proposed Change: Based on GDOT 2008, pay item index:

Unclassified Excavation	$2.90 to $6.41/CY	Use $7.00/CY
Borrow Excavation	$5.43/CY	Use $5.50/CY

Justification:

The suggested unit costs are more in line with the state average.

DESIGN CONSIDERATION

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original			
- Proposed			
- Savings			
FUTURE COST – Savings			
TOTAL PRESENT WORTH SAVINGS			**N/A**

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd. to East of Truss Plant Rd.

IDEA No.:	Sheet No.:	CREATIVE IDEA: Design Consideration
I-3	1 of 1	Shift all widening to one side of SR 40

Prepared By: AW **Date:** 06/11/09 **Checked By:** GAO **Date:** 6-15-09

Original Concept:
The original concept calls for roadway widening and full depth pavement construction of up to 23.5' on the north side and 9.5' on the south side.

Proposed Change:
Shift the widening to one side to eliminate full depth construction on both sides.

Justification:
Construction costs will be essentially the same. However, widening to one side will minimize the number of parcels involved in the right-of-way acquisition. It will affect the northern properties more severely however, most of the structures look to be far enough away where displacements should not be a concern. The overhead utilities along the southern side will not be affected. Shifting the alignment all to one side will also allow an easier and streamlined construction staging scheme and safer and more efficient maintenance of traffic patterns.

DESIGN CONSIDEREATION

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	TOTAL COST
INITIAL COST - Original			
- Proposed			
- Savings			
FUTURE COST – Savings			
TOTAL PRESENT WORTH SAVINGS			N/A

DEVELOPMENT AND RECOMMENDATION PHASE

SR 40 Widening, West of Grove Blvd. to East of Truss Plant Rd.

IDEA No.:	**Sheet No.:**	**CREATIVE IDEA: Design Consideration**
B-17	1 of 1	Shorten the project limits

Prepared By: GAO **Date:** 06/11/09 **Checked By:** AW **Date:** 6-15-09

Original Concept:
The current plans call for transitions well beyond the signalized intersections at Grove Blvd and Truss Plant Road.

Proposed Change:
Shorten both project limits to the requirements of this project.

Justification:
Both project limits are in locations where the roadway typical section is transitioning. They are also located within horizontal curves and super-elevated sections. These are difficult locations to design proper transitions. Due to this, there is a tendency to extend the limits by constructing improvements through the curves and extending the limits more than required. This produces additional work not intended as part of the original project and often causes project scope creep, extending the project to solve the next concern.

West limit: there is a fire station in the vicinity of this limit where impacts should be minimized and avoided if possible. Fire stations require detailed design and coordination with specific signing and signalization. There also appears to be a water line conflict in this area. The project improvements should provide adequate lane capacity at the Grove Blvd intersection and transition to the 4 lane flush section moving westward to Kingsland, as expeditiously as possible avoiding unnecessary impacts to the fire station. As part of the comprehensive design however, a review of the fire station's layout and conformity to current standards should be addressed.

East Limit: at this location, the roadway is approaching the I-95 interchange as a divided roadway with a raised median. The limits should match this section and not extend into the ramp areas of the interchange. The farther the limit is extended, the more impacts there will be to not only the adjacent businesses but also the railroad, ramps and signals which could affect FHWA and railroad jurisdiction and reviews. Ideally, improvements to the intersection should be designed and tied into the existing section as quickly as design guidelines allow.

DESIGN CONSIDERATION

LIFE CYCLE COST SUMMARY	**CAPITAL COST**	**FUTURE COST**	**TOTAL COST**
INITIAL COST - Original			
- Proposed			
- Savings			
FUTURE COST – Savings			
TOTAL PRESENT WORTH SAVINGS			**N/A**

APPENDIX

Sources

Approving/Authorizing Persons

Name:	Position:	Telephone:
Ronald E. Wishon	Project Review Engineer	404-631-1770
Cassius Edwards	Project Engineer	912-427-5717

Personal Contacts

Name:	Telephone:	Notes:
Cassius Edwards	912-427-5717	

Documents Used During Study

Document:	Source:
Concept Report and supporting documentation	
Preliminary Cost Estimate including R/W and Utilities	
Concept layout with preliminary cross-sections	
Pavement design - draft	

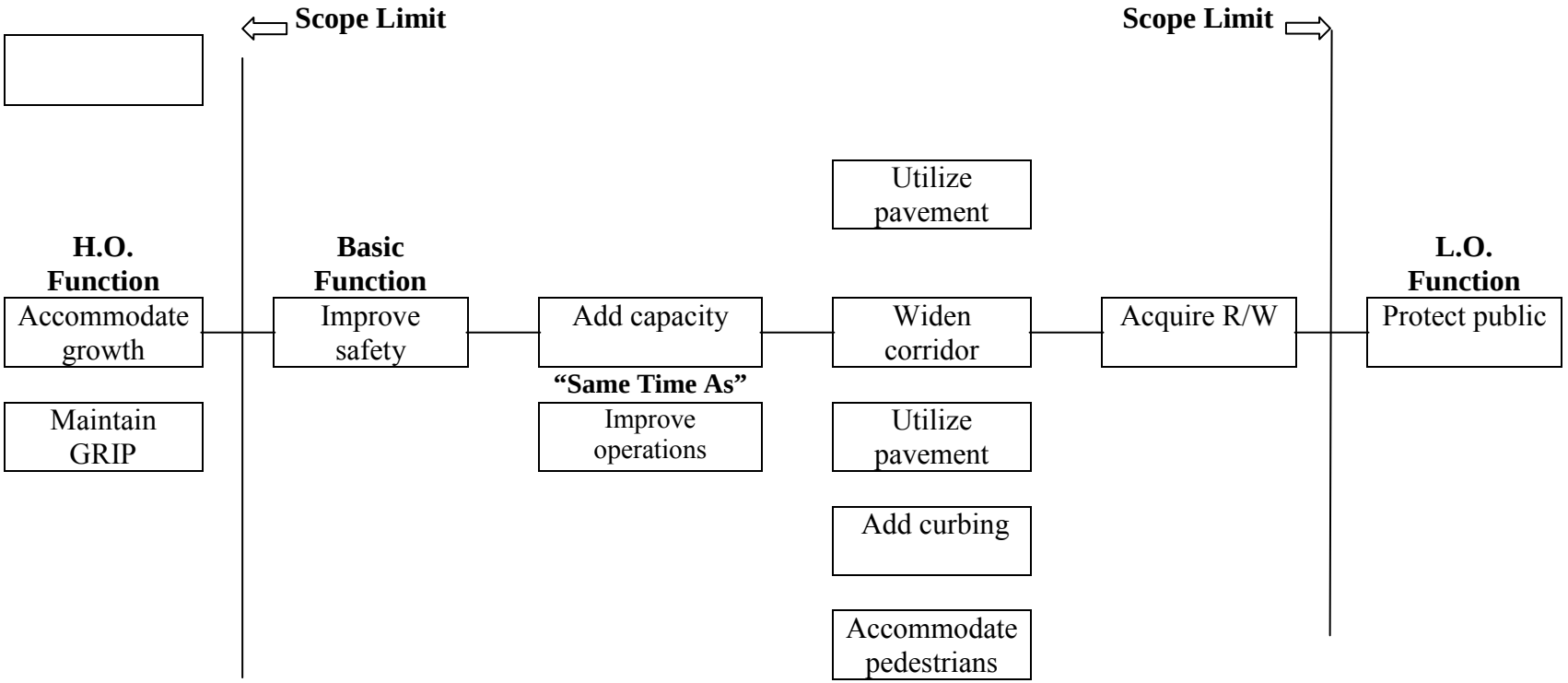
SR 40 Widening

Cost Distribution Model

Item	Description	$ Amount	% of Total Project
	Right of Way	10,239,300	59
	Land Cost- $3M		
	* Pavement, Base and Milling	3,496,147	20
	* Drainage	1,235,651	8
87 % Line			
	Utilities	803,050	5
	Water and Sewer - $0.4M		
	* Earthwork	762,480	4
	Borrow - $0.4M		
	* Curb and Gutter	358,992	2
	* Traffic Signal	194,400	1
	* Concrete Sidewalk	169,743	< 1
	* Miscellaneous	161,460	< 1
	Based on the Preliminary Cost		
	Estimate dated 5/14/09		
*	8% mark-up on Construction Items		
	No mark-up on R/W and Utilities		
	TOTAL	**$17,421,223**	**100**

F.A.S.T. DIAGRAM

Project Name: SR 40 Widening



INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 40
Basic Function:

ITEM No.	DESCRIPTION	FUNCTION		COST/COMPLEXITY		
		Verb	Noun	Const. Cost	O&M Imp.	Complexity
A	Right of Way	store	project			
		accommodate	growth			
		avoid	impacts			
B	Pavement, milling and base	support	vehicles			
		add	capacity			
		improve	safety			
C	Drainage	control	runoff			
		protect	properties			
D	Utilities	provide	services			
E	Earthwork	support	pavement			
		support	sidewalk			
		establish	clear zone			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: SR 40
Basic Function:

ITEM No.	DESCRIPTION	FUNCTION		COST/COMPLEXITY		
		Verb	Noun	Const. Cost	O&M Imp.	Complexity
F	Curb & Gutter	convey	runoff			
		delineate	roadway			
		control	traffic			
G	Traffic Signal	control	traffic			
		accommodate	pedestrians			
H	Concrete Sidewalk	accommodate	pedestrians			

CREATIVE PHASE Creative Idea Listing		EVALUATION PHASE Idea Evaluation	
No.	**CREATIVE IDEA**	**ADVANTAGES/DISADVANTAGES**	**IDEA RATING**
A-1	Provide consistent width R/W		✓
A-2	Use slope easements		✓
A-3	Reduce R/W width		✓
A-4	Construct retaining walls to minimize slopes	D – long term maintenance issue	X
B-1	Use 11 ft lanes	A - narrower template	✓
B-2	Use 11 foot inside lanes; 12 ft outside	A – accommodates trucks in outside lane	✓
B-3	Eliminate additional widening for future 20 median	A - narrower template	✓
B-4	Move bike lanes behind curb, combine with sidewalk		✓
B-5	Use asphalt for sidewalk / trail		X
B-6	Shift sidewalk and trail to one side		✓
B-7	Use 16 foot median instead of 20 ft	A - narrower template	✓
B-8	Use 12 foot median instead of 20 ft		X
B-9	Use 12 foot center turn lane instead of 14 ft	A - narrower template	✓
B-10	Use rural shoulder	D – requires additional R/W	X
✓ = Recommendation; X = will be dropped; DS = Design suggestion A = Advantage D = Disadvantage			

CREATIVE PHASE Creative Idea Listing		EVALUATION PHASE Idea Evaluation	
No.	**CREATIVE IDEA**	**ADVANTAGES/DISADVANTAGES**	**IDEA RATING**
B-11	Realign Grove Street	A – Current alignment needs revision	✓
B-12	Eliminate right in/right out	A – eliminates unsafe condition	✓
B-13	Use 12 foot shoulder instead of 16 ft	A – Design Variance request prepared	✓
B-14	Eliminate 20 ft future median	A – narrower template	✓
B-15	Eliminate 2 ft utility strip		X
B-16	Construct 20 ft raised median	A - eliminates future work and disruptions	✓
B-17	Shorten project limit on east side		DS
C-1	Use existing drainage system		
C-2	Construct trunk line in phase 1	Insufficient information on drainage and phasing	
C-3	Consider alternate pipe material	Part of plan development process	X
D-1	Minimize utility conflicts		X
D-2	Re-use existing water line		DS
D-3	Keep waterline in pavement	A – use existing infrastructure	DS
✓ = Recommendation; X = will be dropped; DS = Design suggestion A = Advantage D = Disadvantage			

CREATIVE PHASE Creative Idea Listing		EVALUATION PHASE Idea Evaluation	
No.	**CREATIVE IDEA**	**ADVANTAGES/DISADVANTAGES**	**IDEA RATING**
E-1	Verify / clarify earthwork estimate / quantities		DS
F-1	Use 24 inch curb and gutter	D – will require moving inlets out	X
F-2	Use header curb		X
F-3	Use asphalt lip curb	D – long term maintenance	X
G-1	Use roundabout at Grove St.	D – traffic volumes too high	X
H-1	Use asphalt	D – potential maintenance concern	X
H-2	Eliminate sidewalk on one side		X
H-3	Eliminate sidewalk on north side between sta 45 and 72		X
H-4	Eliminate all sidewalk		X
I-1	Use 3 lanes for construction	D – does not provide 2 lanes in each direction	X
I-2	Substitute material for GAB		X
I-3	Shift road alignment to north. Eliminate widening on both sides		DS
✓ = Recommendation; X = will be dropped; DS = Design suggestion A = Advantage D = Disadvantage			