

VALUE ENGINEERING REPORT

SR 20 Widening
Forsyth and Gwinnett Counties
STP-0002-00(392); PI No.: 0002392
BRST-054-1(63); PI No.: 132985
MLS-000-00(430); PI No.: 0004430

December 18, 2007

OWNER:



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EXECUTIVE SUMMARY

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Introduction

This report summarizes the results of a value engineering (VE) study conducted on the three sequential contracts for the widening and improvements to SR 20 in Forsyth and Gwinnett Counties. It is located approximately 18 miles northeast of Atlanta. In essence, each contract includes the widening of SR 20 from a two lane rural section to a four lane urban section. The existing typical section is two-twelve foot lanes, two-two foot paved shoulders, two foot to six foot grassed shoulders and a one hundred foot existing right of way. The proposed typical section includes two lanes in each direction with a 44 foot median. This section includes two 12 foot travel lanes in each direction, 4 foot paved inside shoulders, and a 16 foot outside shoulder which includes curb and gutter. A 5 foot sidewalk will be included on both sides of SR 20. Type "B" median crossovers will be utilized for left turns where applicable.

The estimated construction cost including Right of Way for all three sections is \$94.0 million. The design is currently 30% complete with the EIS due to be submitted in March 2008 and the R/W Phase to begin in June 2008. The study was conducted December 4-7 at the GDOT offices in Atlanta using a four person VE team. The design team included Moreland Altobelli Assoc. of Norcross, GA (the Forsyth County Project STP-0002-00(392); Lowe Engineers of Atlanta, GA (the bridge over the Chattahoochee River Project BRST-054-1(63), and Precision Planning of Lawrenceville, GA (the Gwinnett County Project MLS-000-00(430).

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

Considerations

The VE team was instructed that one constraint exists: The bridge crossing infringes on National Park Service property, and the Park Service has asked for numerous concessions to allow the project to proceed. The major items include:

- No piers will be constructed in the river thus requiring a clear span of the river, as well as a proposed trail along the east bank
- Construct a stormwater quality pond in the northwest quadrant
- Construct a proposed driveway and parking area for 15 cars in the northeast quadrant with kiosk and picnic site
- Complete a baseline aquatics survey ½ mile above and below the bridge location

Results Obtained

The VE Team generated 36 ideas and presented twenty-three recommendations for consideration by GDOT. The recommendations involve reductions in right of way by reducing shoulder width, lane width and changing right of way for easements; revising bridge alignment; shortening bridge span; reducing bridge width; revise side road layouts; and optimizing storm drainage.

The numbering system for the recommendations reflects the contract under evaluation. For example, Idea A-2 is composed of three components, A-2.1, A-2.2 and A-2.3. The “.1” reflects the Forsyth County project (PI# 0002392), the “.2” reflects the bridge project (PI#132985) and the “.3” the Gwinnett County project (PI#0004430).

Neglecting the overlapping nature of the recommendations as much as possible, the total of all the recommendations have the potential to reduce project costs by as much as \$19.3 million while continuing to provide the required functionality. This is shown in the last column of the Summary Table that follows the summary description below.

A brief presentation of these recommendations was conducted on December 7th, with the following in attendance: Steve Carter, GDOT Engineering Services; Nasser Rad, GDOT design team; Asad Hadadzadeh, Precision Planning; ; and the VE Team: Dave Wohlscheid, George Obaranec, Steven Gaines and Loai El-Gazairly.

Recommendation Highlights

A-2.1 Reduce the right of way to the back of the shoulder

This idea is to hold the right of way to a firm location on the plans and use easements for the remainder of the land needed. The savings reflect the difference in cost between the two categories of land.

For 2.1, Potential savings is \$2,414,000;

For 2.2 not including the bridge, the potential savings is \$339,200; and

For 2.3, Potential savings is \$4,973,000

A-4.1 Reduce the width of the outside shoulder

This concept reduced the shoulder from 16 feet to 12 feet by reducing the grass strip from 6 feet to 2 feet. The savings resulted in reduced right of way and embankment.

For 4.1, Potential savings is \$1,868,000

For 4.2 not including the bridge, the potential savings is \$260,000; and

For 4.3, Potential savings is \$2,371,000

B-1.1 Reduce the lane widths from 12 to 11 feet on the new pavement construction, not the overlay construction.

The concept is to use 11 foot lanes because of the projected traffic volumes, the posted speed limit of 45 mph and the low percentage of trucks projected for this route. Savings are in pavement, embankment and right of way.

For 1.1, Potential savings is \$724,600

For 1.2 not including the bridge, the potential savings is \$96,700; and

For 1.3, Potential savings is \$923,300

B-2.1 Realign Burnette Trail

This concept is to build a realignment of Burnette Trail that is 830 feet long with a maximum slope of 11.3% to match the existing slope of 18%. The proposed change shortens this realignment to 530 feet using a maximum grade of 15%. The GDOT design manual allows for a 15% max. at a 25 mph design speed in mountainous terrain. Savings results from right of way, pavement, embankment, and drainage.

Potential savings is \$258,800

B-3.1 Retain Echols Road / Holly Court alignment

The original design revises the two roads to attain a 90 degree intersection with the main line. The proposed concept retains Echols Road and shifts the proposed median opening to the west. Holly Court will tie into SR 20 widening at an improved 90 degree intersection.

Potential savings for this item is \$610,000

C-1 Optimize the SR 20 bridge alignment to reduce span length

The original concept replaces the bridge along the existing alignment which is a skewed angle less than 60 degrees. The proposed change realigns the bridge to provide a more perpendicular crossing which shortens the bridge by about 65 feet.

Potential savings is \$110,000

C-2 Reduce travel lane width from 12 to 11 feet

This concept shows a savings from the reduced width of bridge by 4 feet.

Potential savings is \$ 301,000

C-3A Reduce the sidewalk width to 6 feet on the bridge from the 10 feet shown on the plans

This concept reduces the width of the bridge by 8 feet total resulting in substantial savings.

Potential savings is \$602,000

C-3B Eliminate the sidewalk on one bridge and reduce it to 6 feet on the other

These options reduce the width of the bridge by 14 feet. The VE team is questioning the necessity of having sidewalk on both sides of this project.

Potential savings is \$1,053,000

C-5 Reduce / eliminate spanning the flood plain

The original bridge was built prior to the construction of the dam which is located about 1 mile upstream. The flood plain has changed dramatically since the dam was completed. The proposed new bridges span the old flood plain as well as the river. This concept questions whether the old flood plain is flood plain at all as the dam controls all discharge. The bridge could be cut almost in half if this were the case.

Proposed savings is \$2,200,000

C-7 Use high strength concrete girders

The original bridge concept must use steel to span the river and it is assumed steel would

continue for the remainder of the bridge. This idea suggests using concrete girders in lieu of steel for the remainder of the bridge.

Proposed savings is \$1,209,000

C-8A Reduce the inside shoulder width to 4 feet from the original 10 feet and retain the two sidewalks at 6 feet

This reduces the overall width of the bridge by 20 feet.

Potential savings \$1,505,000

C-8B Reduce the inside shoulder to 2 feet and remove sidewalks from both bridges

This idea reduces the bridge width by 36 feet.

Proposed savings is \$2,709,000

C-11 Lower road profile at bridge location

Lowering the profile will reduce embankment costs as well as the total height of the substructure which may also reduce the foundations.

Proposed savings is \$288,800

C-13 Use drain scuppers where allowed

The original concept indicates an enclosed drainage system for the entire length draining off both ends of the bridge. This idea allows scuppers to be used on the west half over the old flood plain area. Savings in drain piping occurs.

Proposed savings is \$232,000

G1.1 and G1.3 Optimize storm drain layout.

Six separate areas of the project were evaluated to economize on the storm drain piping either by shortening runs, eliminating pipe or combining elements.

Proposed savings is \$569,400

G-2.3 Do not use a bottomless culvert

It does not appear this type of structure is needed but it is still under investigation. It is not desirable because of foundation issues and should be avoided if possible. No cost savings determined.

**SR 20 Widening
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	Maximum Savings in Combination with other VE proposals
A	Right of Way						
A-2.1	Reduce right of way to back of shoulder (PI 0002392)	3,451,000	1,037,000	2,414,000	-0-	2,414,000	2,414,000
A-2.2	Reduce right of way to back of shoulder (PI 132985)	484,900	145,700	339,200	-0-	339,200	339,200
A-2.3	Reduce right of way to back of shoulder (PI 0004430)	7,110,000	2,137,000	4,973,000	-0-	4,973,000	4,973,000
A-4.1	Reduce Shoulder Width (PI 0002392)	1,868,000	-0-	1,868,000	-0-	1,868,000	1,868,000
A-4.2	Reduce Shoulder Width (PI 132985)	260,000	-0-	260,000	-0-	260,000	260,000
A-4.3	Reduce Shoulder Width (PI 0004430)	2,371,000	-0-	2,371,000	-0-	2,371,000	2,371,000
B	AC Pavement						
B-1.1	Reduce lane widths (PI 0002392)	724,600	-0-	724,600	-0-	724,600	724,600
B-1.2	Reduce lane widths (PI 132985)	96,700	-0-	96,700	-0-	96,700	96,700
B-1.3	Reduce lane widths (PI 0004430)	923,300	-0-	923,300	-0-	923,300	923,300

**SR 20 Widening
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	Maximum Savings in Combination with other VE proposals
B-2.1	Realign Burnette Trail	258,800	-0-	258,800	-0-	258,800	258,800
B-3.1	Retain Echols Road / Holly Court alignment	610,000	-0-	610,000	-0-	610,000	610,000
C	Bridge						
C-1	Optimize the SR 20 bridge alignment to reduce bridge length	607,800	497,800	110,000	-0-	110,000	110,000
C-2	Reduce travel lane width from 12 to 11 feet	7,524,000	7,223,000	301,000	-0-	301,000	150,500
C-3A	Reduce sidewalk width to 6 feet on the bridge	7,524,000	6,922,000	602,000	-0-	602,000	-0-
C-3B	Eliminate the sidewalk on one bridge and reduce it to 6 feet on the other	7,524,000	6,471,000	1,053,000	-0-	1,053,000	526,500
C-5	Reduce / eliminate spanning the flood plain	3,740,000	1,540,000	2,200,000	-0-	2,200,000	2,200,000
C-7	Use high strength concrete girders	7,524,000	6,315,000	1,209,000	-0-	1,209,000	-0-

**SR 20 Widening
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	Maximum Savings in Combination with other VE proposals
C-8A	Reduce inside shoulder width to 4 feet, retain the two sidewalks at 6 feet	7,524,000	6,019,000	1,505,000	-0-	1,505,000	752,500
C-8B	Reduce inside shoulder to 2 feet and remove sidewalks on both bridges	7,524,000	4,815,000	2,709,000	-0-	2,709,000	-0-
C-11	Lower road profile at bridge location	288,800	-0-	288,800	-0-	288,800	144,400
C-13	Use drain scupper where allowed	465,000	233,000	232,000	-0-	232,000	-0-
G	Drainage						
G-1.1 G-1.3	Optimize storm drainage layout	913,300	343,900	569,400	-0-	569,400	569,400
G-2.3	Do not use a bottomless culvert	TBD	TBD	TBD		TBD	-0-
	TOTAL POTENTIAL SAVINGS						19,292,000

STUDY IDENTIFICATION

STUDY IDENTIFICATION

Project: SR 20 Widening	Dates: December 4-7, 2007
Location: GDOT HQ - Atlanta	

VE Team Members

Name:	Discipline:	Organization:	Telephone:
David Wohlscheid	VE Team Leader	MACTEC	703-471-8383
George Obaranec	Highway Design	MACTEC	770-421-3346
Loai El-Gazairly	Structural – Bridges	Parsons Transportation Group	678-969-2348
Steven Gaines	Construction	Wolverton	770-447-8999

Project Description

This value engineering effort includes three sequential contracts on the widening and improvements to SR 20 in Forsyth and Gwinnett Counties. It is located approximately 18 miles northeast of Atlanta. In essence, each contract includes the widening of SR 20 from a two lane rural section to a four lane urban section. The purpose of the projects is to improve east-west mobility along SR 20 which is classified as an Urban Minor or Principal Arterial and is designated by the FHWA as part of the National Highway System from I-75 in Bartow County to SR 16 in Gwinnett County. The existing typical section is two-twelve foot lanes, two-two foot paved shoulders, two foot to six foot grassed shoulders and a one hundred foot existing right of way.

Proposed typical section includes two lanes in each direction with a 44 foot median. This section includes two 12 foot travel lanes in each direction, 4 foot paved inside shoulders, and a 16 foot outside shoulder which includes curb and gutter. A 5 foot sidewalk will be included on both sides of SR 20. Type “B” median crossovers will be utilized for left turns where applicable. The roadways are designed for future widening to three lanes in each direction.

The existing bridge section over the Chattahoochee River is two twelve foot lanes with two foot shoulders. The proposed crossing will be two parallel bridges with a typical section of two twelve foot lanes, a ten foot inside shoulder and a twelve foot outside shoulder on each single direction bridge. The bridges are designed for future widening to three lanes in each direction.

The first project is in Forsyth County from Samples Road to James Burgess Road for a total length of 2.68 miles. This route has a continuous center two-way left turn lane south of SR 400 to just north of Windermere Parkway. The concept report discusses further widening of SR 20 to six lanes by 2010 and provisions have been included for future widening. The SR 20 in this area is classified as an urban minor arterial. The projected AADT in 2028 is 45,375. The proposed design includes a Right of Way width of 140 feet. The posted speed limit is proposed

to be 45 mph. There are no bridges on the project and one 6 X 6 box culvert that is 90 feet long. This project has an estimated construction cost including right of way of \$35.6 million.

The second project includes the approaches and bridge over the Chattahoochee River. The project starts at James Burgess Road in Forsyth County and continues to east of Burnette Trail in Gwinnett County for a total length of 0.73 miles. The proposed minimum Right of Way width is 140 feet. The projected AADT is 43,085 in 2028 and the road is classified as an Urban Principal Arterial. The posted speed limit will be 45 mph (current limit is 55 mph). The bridges are proposed to be constructed on a pier configuration similar to the existing bridge that would allow for the future widening of the bridges to three lanes in each direction. The bridges are each sized at 800 feet long and 52 feet wide. The estimated construction cost for this project is \$11.3 million.

The third project begins east of Burnette Trail to Peachtree Industrial Boulevard (PIB) in Gwinnett County for a distance of 3.71 miles. The existing lane configuration of SR 20 at the PIB is two through lanes in each direction, dual lefts to the north and southbound of PIB, and an eight foot raised median. Since the existing and proposed lane configuration consists of two through lanes in each direction and are within the 68 foot wide existing bridge over the Southern Railroad tracks on the east side of the intersection, this allows only two through lanes in each direction on SR 20. Future expansion will require a new bridge over the Southern Railroad. The proposed minimum right of way is 150 feet. Projected AADT is 43,665 and the road is classified as an Urban Principal Arterial. The proposed design speed is 45 mph. There are no bridges on the project but there are three box culverts. There are four intersections along this route and all are signalized. Proposed construction costs including right of way amount to \$47.1 million.

Please refer to the Cost Distribution Models contained in the Appendix for a breakdown of the estimates for these projects.

Kick off Meeting/Design Presentation

In addition to the VE Team, the following personnel attended this meeting which was held at the outset of the VE study:

Lisa Myers	GDOT Engineering Services
Brad McManus	GDOT Road Design Project Manager
Ken Werho	GDOT TS&D Design Review
Jack Muirhead	GDOT Bridge Design
Jerry Milligan	GDOT Right of Way
James Magnus	GDOT Construction
Paul Alimia	GDOT Environmental
Shrujal Amin	MAAI, Project Manager
Asad Hadadzadeh	Precision Planning, Project Manager
Adam Smith	Precision Planning, Project Engineer
Richard Meehan	Lowe Engineers, Project Manager

The VE Team appreciated the project overview given by Brad McManus and the consultant project managers. Highlights included:

- The EIS for all three projects is being prepared and is due to be submitted in March 2008
- Right of way is a major project element (approx. 30-40% total costs)
- Purchase of right of way to begin June, 2008
- Environmental commitments have been made around the bridge to the National Park Service
- Each project is in a borrow earthwork situation (substantial quantities)
- The Forsyth County project: will be widened on the south side of the existing road
 - 1 historic property but it is not affected by the project
 - major land developments submitted daily
 - two signalized intersections
- The Bridge project: a new span will be added on the south side of the existing bridge, the existing bridge will then be demolished, a second new span will be added where the existing span is today
 - shoulders will be included on the new bridge
 - the NPS has required a clear span over the river portion of the project
 - space is provided for future widening to 6 lanes on the inside with a raised concrete median
- The Gwinnett County Project: widening will occur on both the north and the south sides to avoid development or environmental issues
 - four signalized intersections are proposed
 - intersections were straightened as much as possible
 - bottomless culvert used to avoid environmental issues
 - most side roads posted speed is 25 mph
 - trying to save existing pavement if transition is not used

The following presents the project vicinity and location maps and project cost information used in this VE effort to present a more complete project description.

**Figure 1
Project Vicinity Map**

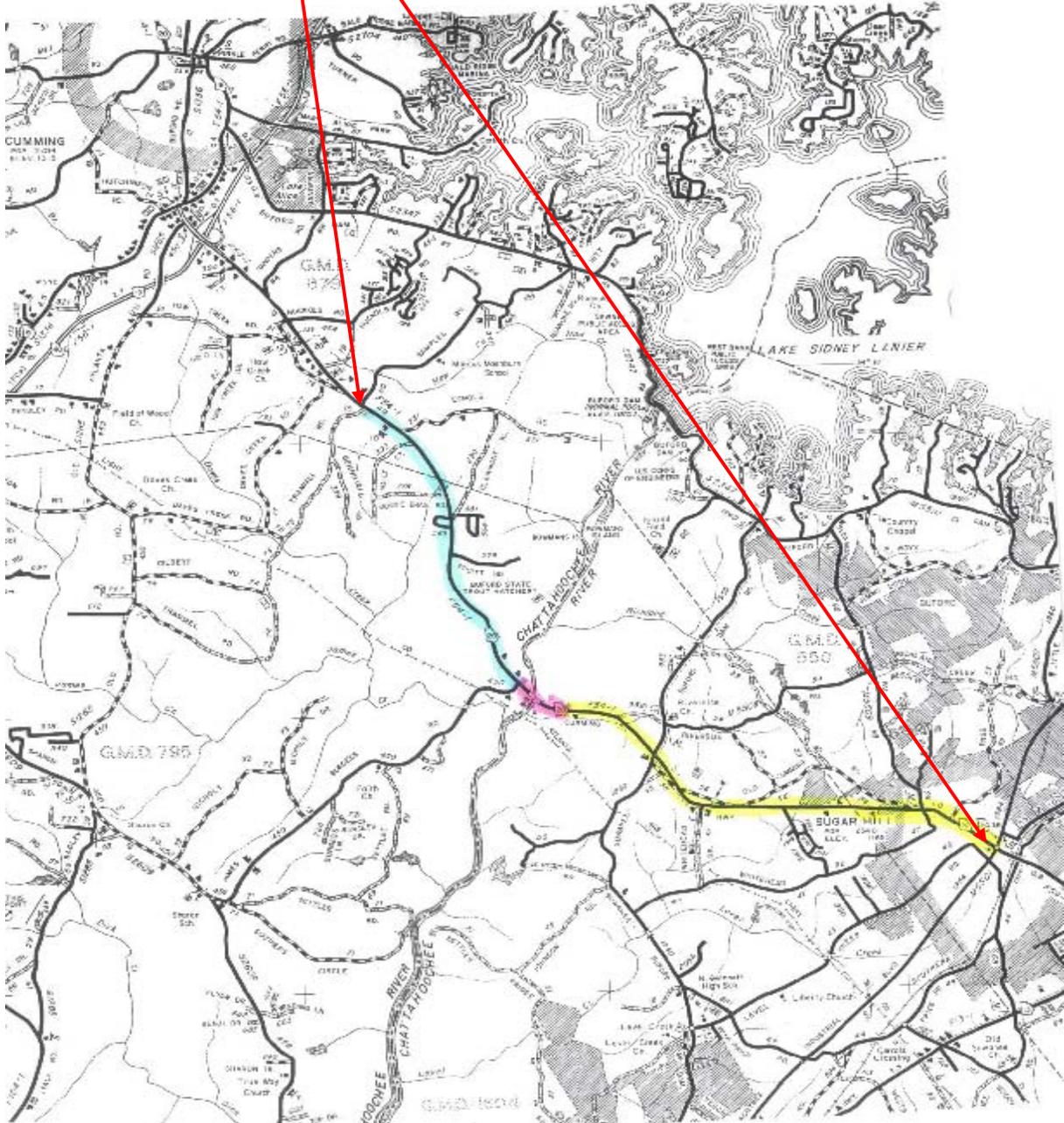


County Map of Georgia

Figure 2

Project Location Map

Project Location



Legend:

- Blue – Project 0.1
- Red – Project 0.2
- Yellow – Project 0.3

Concept Cost Estimate

Project: S.R. 20 from Samples Rd to James Burgess Rd Date: Aug-07
Project No.: STP-0002-00(392) Length 2.67
County: Forsyth Phase: Preliminary

SUMMARY OF PROJECT COSTS

Non-Construction Costs

A.	RIGHT OF WAY	\$19,960,000
B.	REIMBURSABLE UTILITIES	\$1,102,600

Total Non-Construction Cost	\$21,062,600
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C. CONSTRUCTION COST

1. Major Structures	\$675,000
2. Grading and Drainage	\$2,000,000
3. Base and Paving	\$4,589,018
4. Concrete Work	\$1,887,600
5. Signing, Striping, and Signals	\$450,000
6. Guardrail	\$75,000
7. Traffic Control & Mobilization	\$328,000
8. Landscaping and Erosion Control	\$1,362,000
9. Miscellaneous	\$199,000
Construction Cost Subtotal	\$11,565,618
Inflation (5%)	\$1,823,031
E & C (10%)	\$1,156,562

Number of years - 3

Total Construction Cost	\$14,545,210
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Total Project Cost	\$35,607,810
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Concept Cost Estimate

Project: S.R. 20 from Samples Rd to James Burgess Rd
 Project No.: STP-0002-00(392)
 County: Forsyth

Date: Aug-07
 Length: 2.67
 Phase: Preliminary

Project Cost

A. Right of Way (Easements)

B. Reimbursable Utilities

Construction:

1. Major Structures

a. Bridges	0	SF	\$65.00	\$0
b. Retaining walls	1	LS	\$125,000.00	\$125,000
c. Concrete Box Culverts	1	LS	\$550,000.00	\$550,000
				\$675,000

2. Grading and Drainage

a. Unclassified Earthwork	1	LS	\$1,400,000.00	\$1,400,000
b. Drainage - Longitudinal System	1	LS	\$600,000.00	\$600,000
			Subtotal	\$2,000,000

3. Base & Paving

a. Graded Aggregate Base	47,681	TN	\$25.00	\$1,192,013
b. Asphalt Concrete 9.5 mm	8,561	TN	\$90.00	\$770,499
c. Asphalt Concrete 12.5 mm	9,621	TN	\$90.00	\$865,860
d. Asphalt Concrete 19 mm	7,770	TN	\$90.00	\$699,314
e. Asphalt Concrete 25 mm	11,655	TN	\$90.00	\$1,048,971
f. Bituminous tack coat	4,945	GAL	\$2.50	\$12,362
			Subtotal	\$4,589,018

4. Concrete Work

a. Sidewalk	23,320	SY	\$40.00	\$932,800
b. Curb and gutter, type 2	31,540	LF	\$20.00	\$630,800
c. Curb and Gutter, type 7	800	LF	\$15.00	\$12,000
d. Raised Median	240	SY	\$50.00	\$12,000
e. Class B Pavement Widening	1,500	CY	\$200.00	\$300,000
			Subtotal	\$1,887,600

5. Signing, Striping, and Signals

a. Signs	1	LS	\$40,000.00	\$40,000
b. Signal Retiming	2	EA	\$30,000.00	\$60,000
c. New Signals	4	EA	\$65,000.00	\$260,000
d. Striping	1	LS	\$90,000.00	\$90,000
			Subtotal	\$450,000

6. Guardrail

a. Guardrail and Anchors	1	LS	\$75,000.00	\$75,000
			Subtotal	\$75,000

7. Traffic Control & Mobilization

a. Traffic Control	24	MTS	\$12,000.00	\$288,000
b. Mobilization	1	LS	\$40,000.00	\$40,000
			Subtotal	\$328,000
8. Landscaping and Erosion Control				
a. Clearing & Grubbing	64	AC	\$5,500.00	\$352,000
b. Grassing	24	AC	\$2,500.00	\$60,000
c. Erosion Control	1	LS	\$950,000.00	\$950,000
			Subtotal	\$1,362,000
9. Miscellaneous				
a. Field Engineers Office	1	LS	\$46,000.00	\$46,000
b. Misc. Removal	1	LS	\$28,000.00	\$28,000
c. Misc. Construction Items	1	LS	\$55,000.00	\$125,000
			Subtotal	\$199,000

Project Costs
BRST-054-1(63) Forsyth/Gwinnett Counties, PI No 132985
Estimate Report for file "132985_2007-10-31"

Section Major Structures					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
543-1100	1	LS	6240000.00	CONSTR OF BRIDGE - COMPLETE - TO BOTTOM OF CAP	6240000.00
Section Sub Total:					\$6,240,000.00

Section Grading and Drainage					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
208-0100	21300	CY	4.90	IN PLACE EMBANKMENT	104370.00
441-6222	6860	LF	18.91	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	129722.60
500-3800	5	CY	765.72	CLASS A CONCRETE, INCL REINF STEEL	3828.60
550-1180	1760	LF	46.84	STORM DRAIN PIPE, 18 IN, H 1-10	82438.40
550-1181	243	LF	57.09	STORM DRAIN PIPE, 18 IN, H 10-15	13872.87
550-1240	282	LF	53.16	STORM DRAIN PIPE, 24 IN, H 1-10	14991.12
550-1241	212	LF	61.20	STORM DRAIN PIPE, 24 IN, H 10-15	12974.40
550-1300	327	LF	71.61	STORM DRAIN PIPE, 30 IN, H 1-10	23416.47
550-1301	362	LF	82.23	STORM DRAIN PIPE, 30 IN, H 10-15	29767.26
550-1360	12	LF	87.01	STORM DRAIN PIPE, 36 IN, H 1-10	1044.12
550-1361	171	LF	97.64	STORM DRAIN PIPE, 36 IN, H 10-15	16696.44
550-2180	56	LF	32.85	SIDE DRAIN PIPE, 18 IN, H 1-10	1839.60
550-4118	2	EA	273.85	FLARED END SECTION 18 IN, SIDE DRAIN	547.70
550-4218	1	EA	666.57	FLARED END SECTION 18 IN, STORM DRAIN	666.57
550-4224	3	EA	776.50	FLARED END SECTION 24 IN, STORM DRAIN	2329.50
550-4230	2	EA	951.37	FLARED END SECTION 30 IN, STORM DRAIN	1902.74
550-4236	3	EA	1251.52	FLARED END SECTION 36 IN, STORM DRAIN	3754.56
573-2006	500	LF	19.27	UNDDR PIPE INCL DRAINAGE AGGR, 6 IN	9635.00
668-1100	21	EA	2745.73	CATCH BASIN, GP 1	57660.33
668-1110	33	LF	280.21	CATCH BASIN, GP 1, ADDL DEPTH	9246.93
668-1200	10	EA	4010.77	CATCH BASIN, GP 2	40107.70
668-1210	48	LF	346.09	CATCH BASIN, GP 2, ADDL DEPTH	16612.32
668-2100	5	EA	3010.82	DROP INLET, GP 1	15054.10
668-2105	1	EA	2851.74	DROP INLET, GP 1, SPCL DES	2851.74
668-2200	3	EA	4722.71	DROP INLET, GP 2	14168.13
668-2210	5	LF	360.25	DROP INLET, GP 2, ADDL DEPTH	1801.25
668-4300	1	EA	2545.56	STORM SEWER MANHOLE, TP 1	2545.56
668-4311	15	LF	294.78	STORM SEWER MANHOLE, TP 1, ADDL DEPTH, CL 1	4421.70
Section Sub Total:					\$618,267.71

Section Base and Paving					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
310-5060	5085	SY	13.27	GR AGGR BASE CRS, 6 INCH, INCL MATL	67477.95
310-5120	17205	SY	21.12	GR AGGR BASE CRS, 12 INCH, INCL MATL	363369.60
402-3112	3400	TN	86.59	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	294406.00
402-3121	3680	TN	63.86	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	235004.80
402-3130	1764	TN	65.35	RECYCLED ASPH CONC 12.5 MM	115277.40

Project Costs

BRST-054-1(63) Forsyth/Gwinnett Counties, PI No 132985

				SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	
413-1000	24500	GL	1.96	BITUM TACK COAT	48020.00
433-1100	500	SY	77.40	REINF CONC APPROACH SLAB, INCL CURB	38700.00
441-0014	380	SY	37.54	DRIVEWAY CONCRETE, 4 IN TK	14265.20
441-0104	3810	SY	33.72	CONC SIDEWALK, 4 IN	128473.20
441-4020	210	SY	44.63	CONC VALLEY GUTTER, 6 IN	9372.30
441-4050	500	SY	84.43	CONC VALLEY GUTTER WITH CURB, 8 IN	42215.00
441-7011	8	EA	668.49	CURB CUT WHEELCHAIR RAMP, TYPE A	5347.92
Section Sub Total:					\$1,361,929.37

Section Miscellaneous

Item Number	Quantity	Units	Unit Price	Item Description	Cost
634-1200	20	EA	101.14	RIGHT OF WAY MARKERS	2022.80
636-1020	200	SF	15.11	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	3022.00
636-1029	40	SF	15.52	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	620.80
636-2070	550	LF	8.09	GALV STEEL POSTS, TP 7	4449.50
639-4004	4	EA	7226.82	STRAIN POLE, TP IV	28907.28
641-1200	3300	LF	16.01	GUARDRAIL, TP W	52833.00
641-5001	5	EA	635.33	GUARDRAIL ANCHORAGE, TP 1	3176.65
641-5005	8	EA	2000.00	GUARDRAIL ANCHORAGE, TP 5	16000.00
641-5012	9	EA	1778.08	GUARDRAIL ANCHORAGE, TP 12	16002.72
647-1000	1	LS	49704.73	TRAFFIC SIGNAL INSTALLATION NO -	49704.73
653-0120	18	EA	72.77	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	1309.86
653-0170	8	EA	84.39	THERMOPLASTIC PVMT MARKING, ARROW, TP 7	675.12
653-1501	2500	LF	0.69	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	1725.00
653-1502	9000	LF	0.65	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	5850.00
653-1704	120	LF	4.19	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	502.80
653-1804	1500	LF	2.11	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, WHITE	3165.00
653-3501	10000	GLF	0.56	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	5600.00
653-6004	3000	SY	2.84	THERMOPLASTIC TRAF STRIPING, WHITE	8520.00
653-6006	200	SY	3.06	THERMOPLASTIC TRAF STRIPING, YELLOW	612.00
654-1001	120	EA	3.12	RAISED PVMT MARKERS TP 1	374.40
654-1003	300	EA	3.66	RAISED PVMT MARKERS TP 3	1098.00
Section Sub Total:					\$206,171.66

Section Special Features

Item Number	Quantity	Units	Unit Price	Item Description	Cost
540-1102	1	LS	431256.76	REMOVAL OF EXISTING BR, BR NO -	431256.76
Section Sub Total:					\$431,256.76

Section Erosion Control

Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	256467.13	TRAFFIC CONTROL -	256467.13
163-0232	4	AC	703.86	TEMPORARY GRASSING	2815.44
163-0240	16	TN	159.79	MULCH	2556.64
163-0300	4	EA	1676.23	CONSTRUCTION EXIT	6704.92
163-0503	2	EA	529.89	CONSTRUCT AND REMOVE SILT	1059.78

Project Costs
BRST-054-1(63) Forsyth/Gwinnett Counties, PI No 132985

163-0504	41	EA	425.00	CONTROL GATE, TP 3 CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 4	17425.00
163-0520	500	LF	17.45	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	8725.00
163-0521	50	EA	218.40	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS	10920.00
163-0531	1	EA	8644.69	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO -	8644.69
165-0010	2500	LF	0.81	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	2025.00
165-0030	1300	LF	1.63	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	2119.00
165-0040	50	EA	66.12	MAINTENANCE OF EROSION CONTROL CHECKDAMS/DITCH CHECKS	3306.00
165-0060	1	EA	1394.03	MAINTENANCE OF TEMPORARY SEDIMENT BASIN, STA NO -	1394.03
165-0087	2	EA	168.29	MAINTENANCE OF SILT CONTROL GATE, TP 3	336.58
165-0088	41	EA	100.00	MAINTENANCE OF SILT CONTROL GATE, TP 4	4100.00
165-0101	4	EA	592.87	MAINTENANCE OF CONSTRUCTION EXIT	2371.48
167-1000	24	EA	1207.94	WATER QUALITY MONITORING AND SAMPLING	28990.56
167-1500	24	MO	953.53	WATER QUALITY INSPECTIONS	22884.72
171-0010	2500	LF	1.81	TEMPORARY SILT FENCE, TYPE A	4525.00
171-0030	1300	LF	4.04	TEMPORARY SILT FENCE, TYPE C	5252.00
201-1500	17	LS	8000.00	CLEARING & GRUBBING -	136000.00
603-2024	80	SY	53.91	STN DUMPED RIP RAP, TP 1, 24 IN	4312.80
603-7000	80	SY	4.75	PLASTIC FILTER FABRIC	380.00
610-2705	110	SY	363.00	REM CONC APPROACH SLAB	39930.00
622-1070	750	LF	118.73	PRECAST CONCRETE MEDIAN BARRIER, METHOD 5	89047.50
700-6910	8	AC	1063.20	PERMANENT GRASSING	8505.60
700-7010	36	GL	22.95	LIQUID LIME	826.20
700-8000	10	TN	286.72	FERTILIZER MIXED GRADE	2867.20
700-8100	750	LB	2.32	FERTILIZER NITROGEN CONTENT	1740.00
716-2000	12800	SY	1.20	EROSION CONTROL MATS, SLOPES	15360.00
Section Sub Total:					\$691,592.27

Total Estimated Cost: \$9,549,217.77

Subtotal Construction Cost \$9,549,217.77

E&C Rate 10 % \$954,921.78

Inflation Rate 0 % @ 0 Years \$0.00

Total Construction Cost \$10,504,139.55

Right Of Way \$700,000.00

ReImb. Utilities \$100,000.00

Grand Total Project Cost \$11,304,139.55

Estimate Report for file "MLS-000-00(430)_2007-10-31"

Section ROADWAY ITEMS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	200000.00	TRAFFIC CONTROL -	200000.00
151-1000	1	LS	160000.00	MOBILIZATION -	160000.00
153-1300	1	EA	75708.85	FIELD ENGINEERS OFFICE TP 3	75708.85
210-0100	1	LS	2500000.00	GRADING COMPLETE -	2500000.00
310-5120	167911	SY	20.89	GR AGGR BASE CRS, 12 INCH, INCL MATL	3507660.79
318-3000	5250	TN	18.83	AGGR SURF CRS	98857.50
402-1802	600	TN	101.69	RECYCLED ASPH CONC PATCHING, INCL BITUM MATL & H LIME	61014.00
402-1812	1800	TN	80.00	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	144000.00
402-3121	36940	TN	70.00	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	2585800.00
402-3130	13853	TN	80.00	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	1108240.00
402-3190	18470	TN	75.00	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1385250.00
413-1000	11754	GL	2.01	BITUM TACK COAT	23625.54
441-0016	7350	SY	41.21	DRIVEWAY CONCRETE, 6 IN TK	302893.50
441-0104	25000	SY	31.80	CONC SIDEWALK, 4 IN	795000.00
441-0204	2520	SY	33.35	PLAIN CONC DITCH PAVING, 4 IN	84042.00
441-0748	1100	SY	45.52	CONCRETE MEDIAN, 6 IN	50072.00
441-4030	5000	SY	53.56	CONC VALLEY GUTTER, 8 IN	267800.00
441-6222	47315	LF	18.43	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	872015.45
500-3101	380	CY	574.83	CLASS A CONCRETE	218435.40
500-3115	1987	LF	475.00	CLASS A CONCRETE, TYPE P2, RETAINING WALL	943825.00
500-3201	150	CY	481.02	CLASS B CONCRETE, RETAINING WALL	72153.00
500-9999	500	CY	160.74	CLASS B CONC, BASE OR PVMT WIDENING	80370.00
511-1000	56438	LB	0.94	BAR REINF STEEL	53051.72
634-1200	120	EA	99.14	RIGHT OF WAY MARKERS	11896.80
641-1200	2500	LF	17.88	GUARDRAIL, TP W	44700.00
641-5001	15	EA	655.43	GUARDRAIL ANCHORAGE, TP 1	9831.45
641-5012	10	EA	1809.04	GUARDRAIL ANCHORAGE, TP 12	18090.40
Section Sub Total:					\$15,674,333.40

Section DRAINAGE					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
207-0203	142	CY	57.25	FOUND BKFILL MATL, TP II	8129.50
550-1180	16062	LF	43.65	STORM DRAIN PIPE, 18 IN, H 1-10	701106.30
550-1240	4788	LF	55.99	STORM DRAIN PIPE, 24 IN, H 1-10	268080.12
550-1300	1924	LF	71.89	STORM DRAIN PIPE, 30 IN, H 1-10	138316.36
550-1360	1532	LF	88.36	STORM DRAIN PIPE, 36 IN, H 1-10	135367.52
550-1420	319	LF	119.61	STORM DRAIN PIPE, 42 IN, H 1-10	38155.59
550-1480	590	LF	132.71	STORM DRAIN PIPE, 48 IN, H 1-10	78298.90
550-1723	225	LF	435.00	STORM DRAIN PIPE, 72 IN, H 20-25	97875.00
550-2180	1200	LF	36.01	SIDE DRAIN PIPE, 18 IN, H 1-10	43212.00
550-3618	60	EA	684.14	SAFETY END SECTION 18 IN, SIDE DRAIN, 6:1 SLOPE	41048.40
550-4218	27	EA	672.21	FLARED END SECTION 18 IN, STORM DRAIN	18149.67
550-4224	3	EA	785.94	FLARED END SECTION 24 IN, STORM DRAIN	2357.82
550-4230	2	EA	914.40	FLARED END SECTION 30 IN, STORM DRAIN	1828.80
550-4236	2	EA	1217.68	FLARED END SECTION 36 IN, STORM DRAIN	2435.36
550-4242	2	EA	1616.72	FLARED END SECTION 42 IN, STORM DRAIN	3233.44
573-2006	1800	LF	19.67	UNDDR PIPE INCL DRAINAGE AGGR, 6 IN	35406.00
668-1100	91	EA	2746.07	CATCH BASIN, GP 1	249892.37
668-2100	52	EA	4070.34	DROP INLET, GP 1	211657.68
Section Sub Total:					\$2,074,550.83

Section EROSION CONTROL					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
162-1300	50	EA	875.00	EROSION CONTROL CHECK DAM, TP -	43750.00
163-0232	180	AC	737.55	TEMPORARY GRASSING	132759.00

163-0240	3000	TN	161.05	MULCH	483150.00
163-0520	2275	LF	16.91	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	38470.25
163-0531	12	EA	7960.46	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO -	95525.52
163-0550	245	EA	302.10	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	74014.50
165-0030	28372	LF	1.65	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	46813.80
165-0105	245	EA	101.51	MAINTENANCE OF INLET SEDIMENT TRAP	24869.95
167-1000	2	EA	1287.42	WATER QUALITY MONITORING AND SAMPLING	2574.84
167-1500	18	MO	936.29	WATER QUALITY INSPECTIONS	16853.22
171-0030	56744	LF	4.05	TEMPORARY SILT FENCE, TYPE C	229813.20
603-2024	160	SY	51.01	STN DUMPED RIP RAP, TP 1, 24 IN	8161.60
603-2181	200	SY	46.41	STN DUMPED RIP RAP, TP 3, 18 IN	9282.00
603-7000	360	SY	4.67	PLASTIC FILTER FABRIC	1681.20
700-6910	120	AC	1061.33	PERMANENT GRASSING	127359.60
700-7000	20	TN	71.92	AGRICULTURAL LIME	1438.40
700-8000	108	TN	346.89	FERTILIZER MIXED GRADE	37464.12
716-2000	303333	SY	1.23	EROSION CONTROL MATS, SLOPES	373099.59
Section Sub Total:					\$1,747,080.79

Section SIGNING & MARKING					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1020	200	SF	14.93	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	2986.00
636-1031	300	SF	19.00	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING TP 6	5700.00
636-2030	1625	LF	9.20	GALV STEEL POSTS, TP 3	14950.00
652-9001	15019	SY	2.23	TRAFFIC STRIPE, WHITE	33492.37
652-9002	2554	SY	1.74	TRAFFIC STRIPE, YELLOW	4443.96
653-0120	127	EA	68.73	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	8728.71
653-0160	21	EA	150.56	THERMOPLASTIC PVMT MARKING, ARROW, TP 6	3161.76
653-0170	15	EA	79.53	THERMOPLASTIC PVMT MARKING, ARROW, TP 7	1192.95
653-1501	52022	LF	0.67	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	34854.74
653-1502	39000	LF	0.64	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	24960.00
653-3501	39000	GLF	0.49	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	19110.00
654-1001	170	EA	3.17	RAISED PVMT MARKERS TP 1	538.90
654-1003	1139	EA	3.62	RAISED PVMT MARKERS TP 3	4123.18
Section Sub Total:					\$158,242.57

Section TRAFFIC SIGNAL					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
647-1000	4	LS	52329.39	TRAFFIC SIGNAL INSTALLATION NO -	209317.56
Section Sub Total:					\$209,317.56

Total Estimated Cost: \$19,863,525.15

Subtotal Construction Cost	\$19,863,525.15
E&C Rate 10.0 %	\$1,986,352.52
Inflation Rate 5.0 % @ 3.0 Years	\$3,444,086.97
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Total Construction Cost	\$25,293,964.63

Right Of Way	\$19,281,881.00
ReImb. Utilities	\$2,500,000.00

Grand Total Project Cost	\$47,075,845.63
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VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: A-2.1	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce ROW to Back of Shoulder – Use Easements (PI# 0002392)
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Comp By: SWG Date: 12-7-07 Checked By: DW Date: 12-7-07

Original Concept:

The minimum proposed right-of-way width in the concept report is 140 feet.

Proposed Change:

Revise the proposed right-of-way width to include only the area in between the two outside shoulder breakpoints (124') and use easements for the remaining 16 feet.

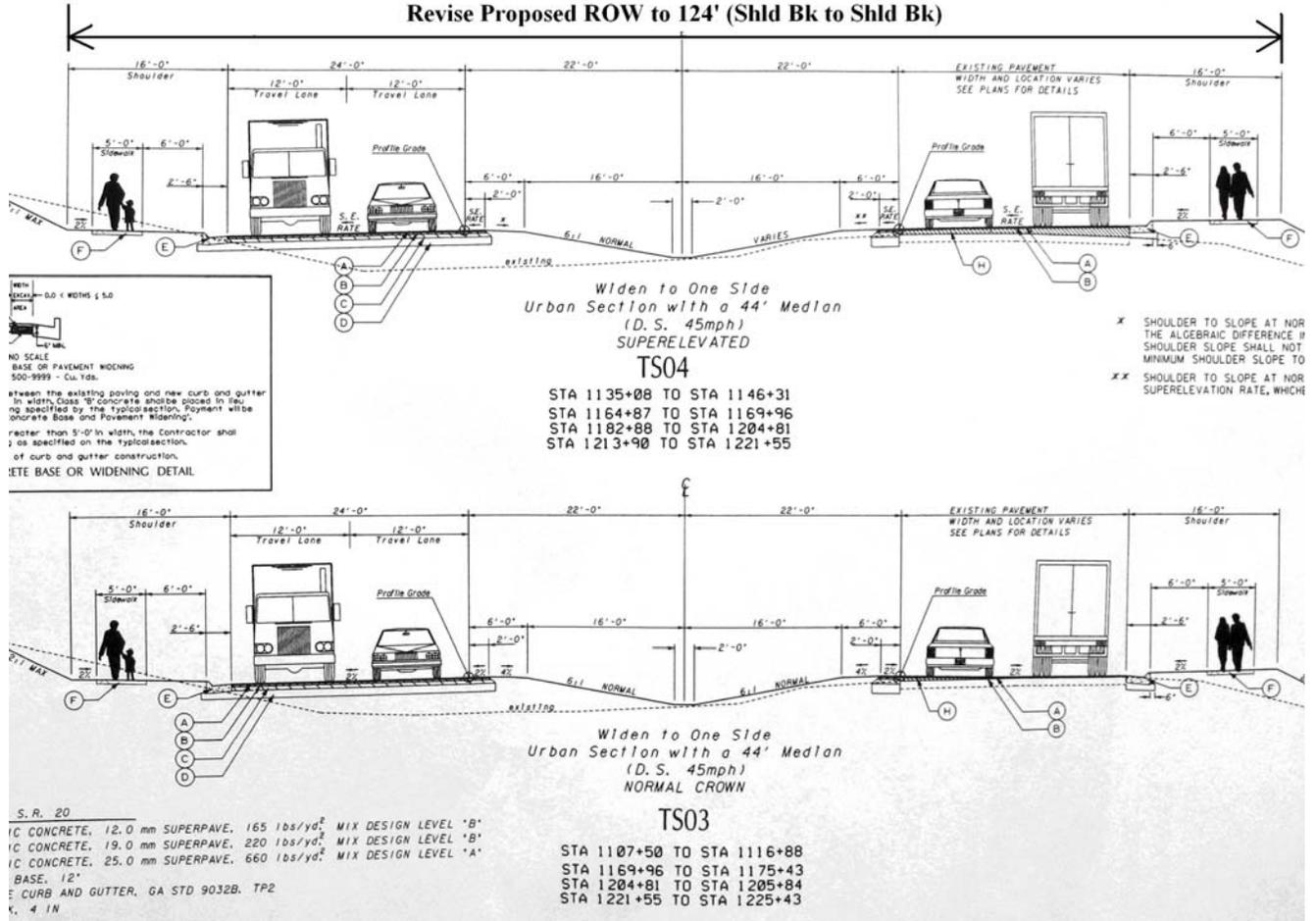
Justification:

The change from right-of-way to easement will not impede the function of the project and will result in significant cost savings.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	3,451,000		
- Proposed	1,037,000		
- Savings	2,414,000		2,414,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			2,414,000

SR 20 Widening

ITEM N^o: A-2.1
 CLIENT: GDOT
 Sheet 2 of 4



CALCULATIONS**SR 20 Widening**ITEM N^o: A-2
CLIENT: GDOT
Sheet 4 of 4**R/W & Easement Costs**

Average ROW Cost = (Total ROW Cost/Total ROW Area)
=(\$730,000+\$1,083,750+131,000+1,085,000+94,600+401,100)/(73,000+144,500+26,200+310,000+47,300+267,400) = \$4.06/SF

Average Easement Cost = (Average ROW Cost *.30) = (4.06 * 0.30) = \$1.22/SF

Original Concept

Additional Area of ROW beyond Shoulder Breakpoint (Based on Minimum ROW Width of 140') = (140-124)(1250+00-1097+00) = 244,800 SF

Proposed Concept

Additional Area of ROW beyond Shoulder Breakpoint (Based on Minimum ROW Width of 124') = 0 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:

A-2.2

PAGE No.:

1 of 4

CREATIVE IDEA:

Reduce ROW to Back of Shoulder – Use Easements
(PI# 132985)

Comp By: SWG

Date: 12-7-07

Checked By: DW

Date: 12-7-07

Original Concept:

The minimum proposed right-of-way width in the concept report is 140 feet.

Proposed Change:

Revise the proposed right-of-way width to include only the area in between the two outside shoulder breakpoints (124') and use easements for the remaining 16 feet.

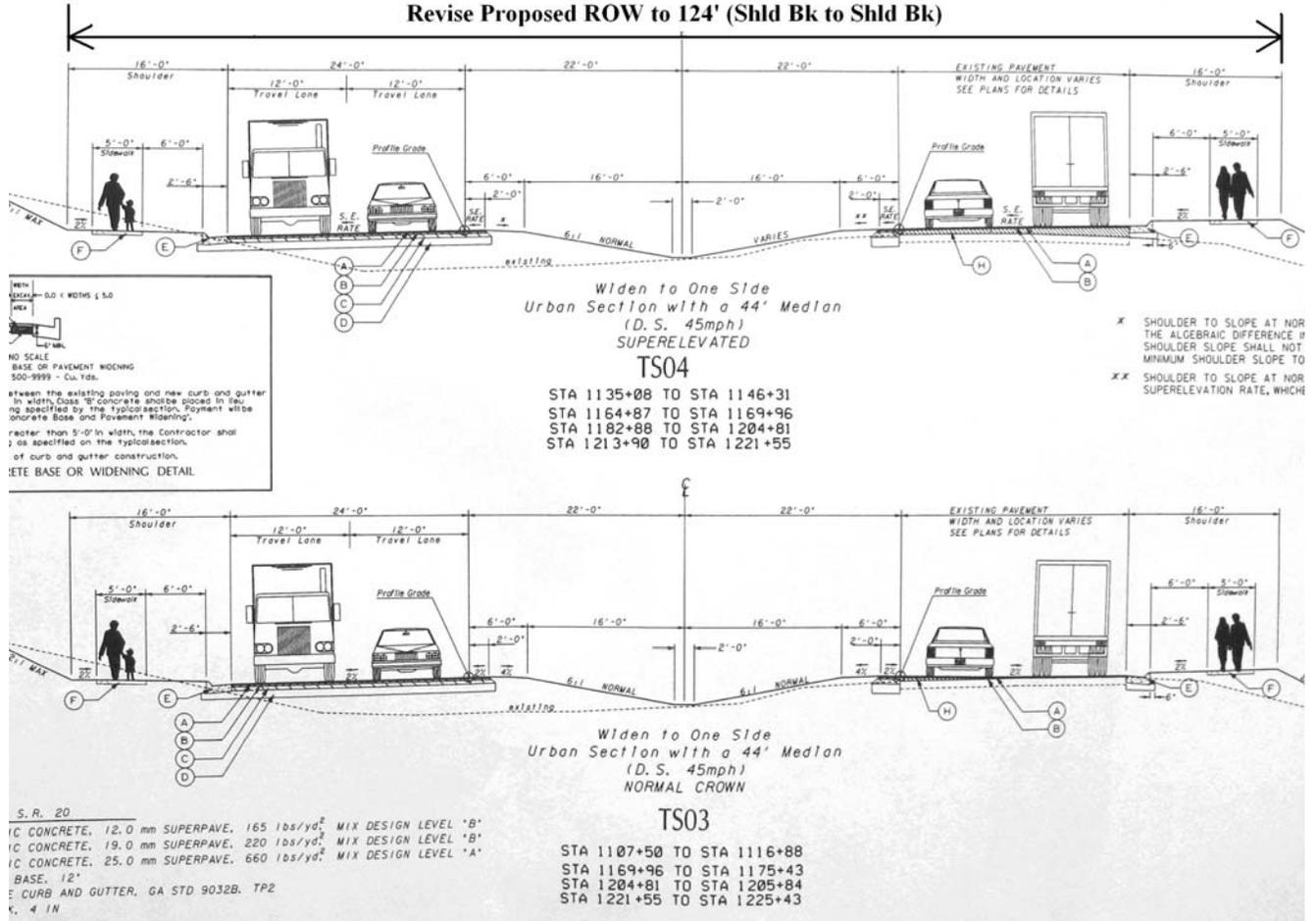
Justification:

The change from right-of-way to easement will not impede the function of the project and will result in significant cost savings.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	484,900		
- Proposed	145,700		
- Savings	339,200		339,200
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			339,200

SR 20 Widening

ITEM N^o: A-2.2
 CLIENT: GDOT
 Sheet 2 of 4



CALCULATIONS**SR 20 Widening**ITEM N^o: A-2.2

CLIENT: GDOT

Sheet 4 of 4

R/W & Easement Costs

Average ROW Cost = \$4.06/SF (Taken from A-2.1)

Average Easement Cost = (Average ROW Cost *.30) = (4.06 * 0.30) = \$1.22/SF

Original Concept

Additional Area of ROW beyond Shoulder Breakpoint (Based on Minimum ROW Width of 140') = (140-124)(1280+00-1258+50) = 34,400 SF

Proposed Concept

Additional Area of ROW beyond Shoulder Breakpoint (Based on Minimum ROW Width of 124') = 0 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: A-2.3	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce ROW to Back of Shoulder – Use Easements (PI# 0004430)
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Comp By: SWG Date: 12-7-07 Checked By: DW Date: 12-7-07

Original Concept:

The minimum proposed right-of-way width in the concept report is 150 feet.

Proposed Change:

Revise the proposed right-of-way width to include only the area in between the two outside shoulder breakpoints (124') and use easements for the remaining 26 feet.

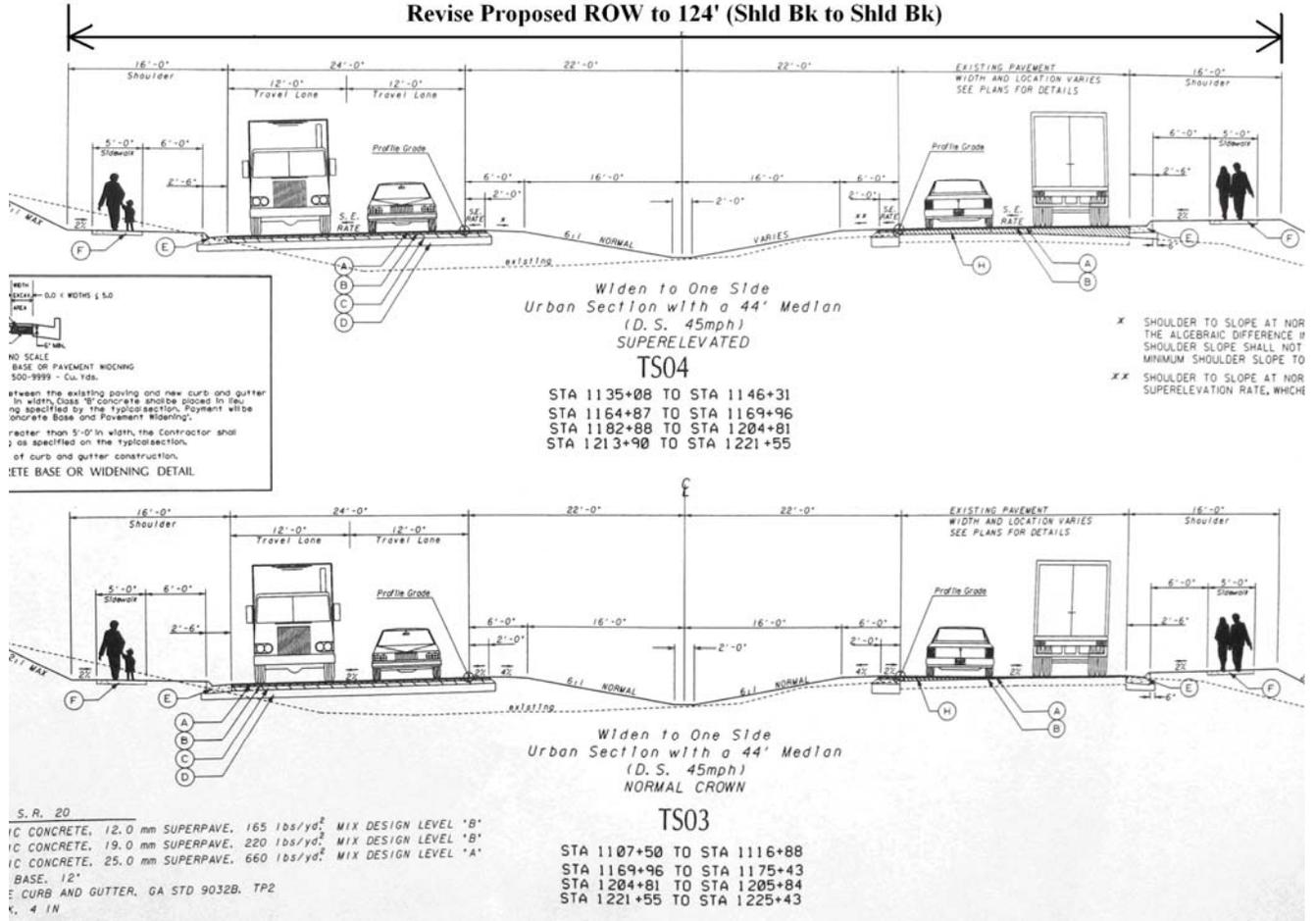
Justification:

The change from right-of-way to easement will not impede the function of the project and will result in significant cost savings.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	7,110,000		
- Proposed	2,137,000		
- Savings	4,973,000		4,973,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			4,973,000

SR 20 Widening

ITEM N^o: A-2.3
 CLIENT: GDOT
 Sheet 2 of 4



CALCULATIONS**SR 20 Widening**ITEM N^o: A-2.3

CLIENT: GDOT

Sheet 4 of 4

R/W & Easement Costs

Average ROW Cost = \$4.06/SF (Taken from A-2.1)

Average Easement Cost = (Average ROW Cost *.30) = (4.06 * 0.30) = \$1.22/SF

Original Concept

Additional Area of ROW beyond Shoulder Breakpoint (Based on Minimum ROW Width of 150') = (150-124)(1474+00-1280+00) = 504,400 SF

Proposed Concept

Additional Area of ROW beyond Shoulder Breakpoint (Based on Minimum ROW Width of 124') = 0 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: A-4.1	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce Shoulder Width (PI# 0002392)
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Comp By: SWG Date: 12-7-07 Checked By : DW Date: 12-7-07

Original Concept:

The proposed typical section for SR 20 includes a 16' outside urban shoulders (30" curb & gutter, 6' grass strip, 5' sidewalk) on both sides of the road.

Proposed Change:

Revise the typical section for SR 20 to include 12' outside urban shoulder (30" curb & gutter, 2' grass strip, 5' sidewalk) on both sides of the road.

Justification:

The reduction of shoulder width will not impede the function of the project and will result in significant cost savings.

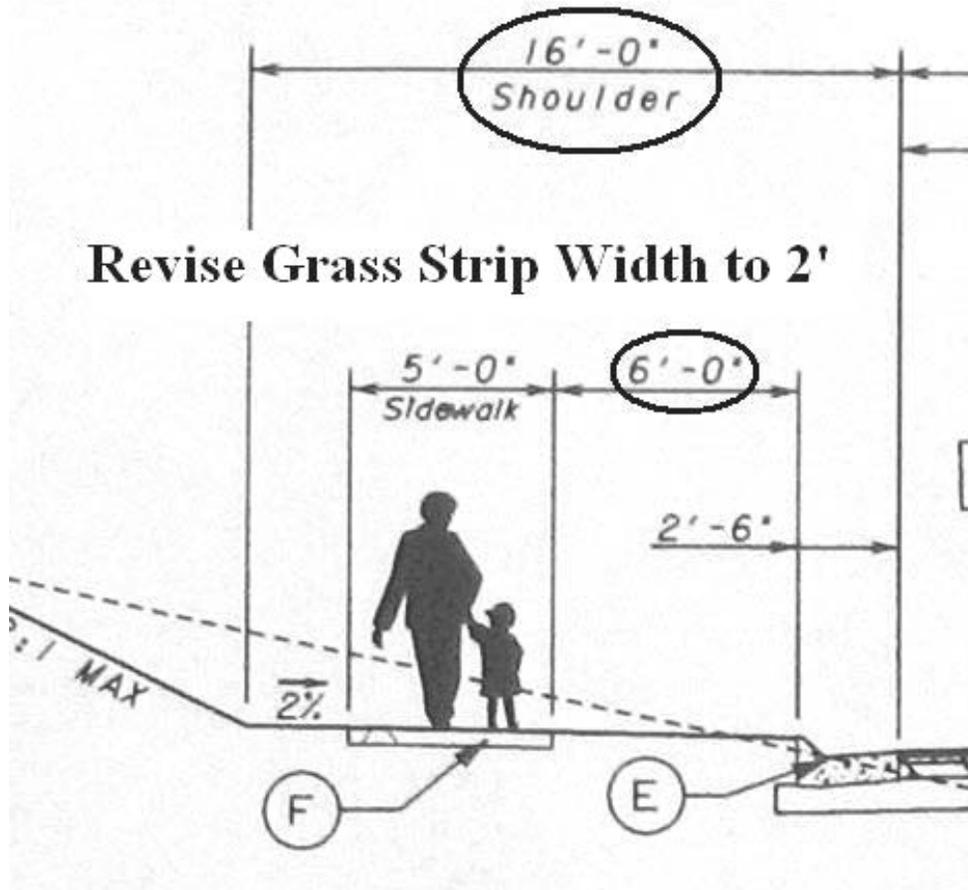
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,868,000		
- Proposed	0		
- Savings	1,868,000		1,868,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			1,868,000

SR 20 Widening

ITEM N^o: A-4.1
CLIENT: GDOT
Sheet 2 of 4

Revise Shoulder Width to 12'

Revise Grass Strip Width to 2'



COST WORKSHEET

PROJECT: SR 20 Widening	ITEM No: A-4.1
	CLIENT: GDOT
	Sheet 3 of 4

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
Embankment	CY	22,667	\$5.00	\$113,335	0	\$5.00	\$0
SUBTOTAL				113,335			0
Markup @ 25.76%				29,195			0
Construction Total				142,530			0
Right-of-Way	SF	122,400	4.06	496,944	0	4.06	0.00
Markup @ 247.20%				1,228,446			0
ROW Total				1,725,390			0
TOTAL ROUNDED				1,868,000			0



CALCULATIONS**SR 20 Widening**ITEM N^o: A-4.1
CLIENT: GDOT
Sheet 4 of 4

Average ROW Cost = \$4.06/SF (See A.2.1 Calculations)

Average Height of Embankment = 5 feet

Original ConceptAdditional ROW for 16' Shoulder = $(2)(16-12)(1250+00-1097+00) = 122,400$ SFAdditional Earthwork for 16' Shoulder = $(2)(1250+00-1097+00)(16-12)(5)/27 = 22,667$ CY**Proposed Concept**

Additional ROW for 12' Shoulder = 0 SF

Additional Earthwork for 12' Shoulder = 0 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: A-4.2	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce Shoulder Width (PI# 132985)
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Comp By: SWG Date: 12-7-07 Checked By : DW Date: 12-7-07

Original Concept:

The proposed typical section for SR 20 includes a 16' outside urban shoulders (30" curb & gutter, 6' grass strip, 5' sidewalk) on both sides of the road.

Proposed Change:

Revise the typical section for SR 20 to include 12' outside urban shoulder (30" curb & gutter, 2' grass strip, 5' sidewalk) on both sides of the road.

Justification:

The reduction of shoulder width will not impede the function of the project and will result in significant cost savings.

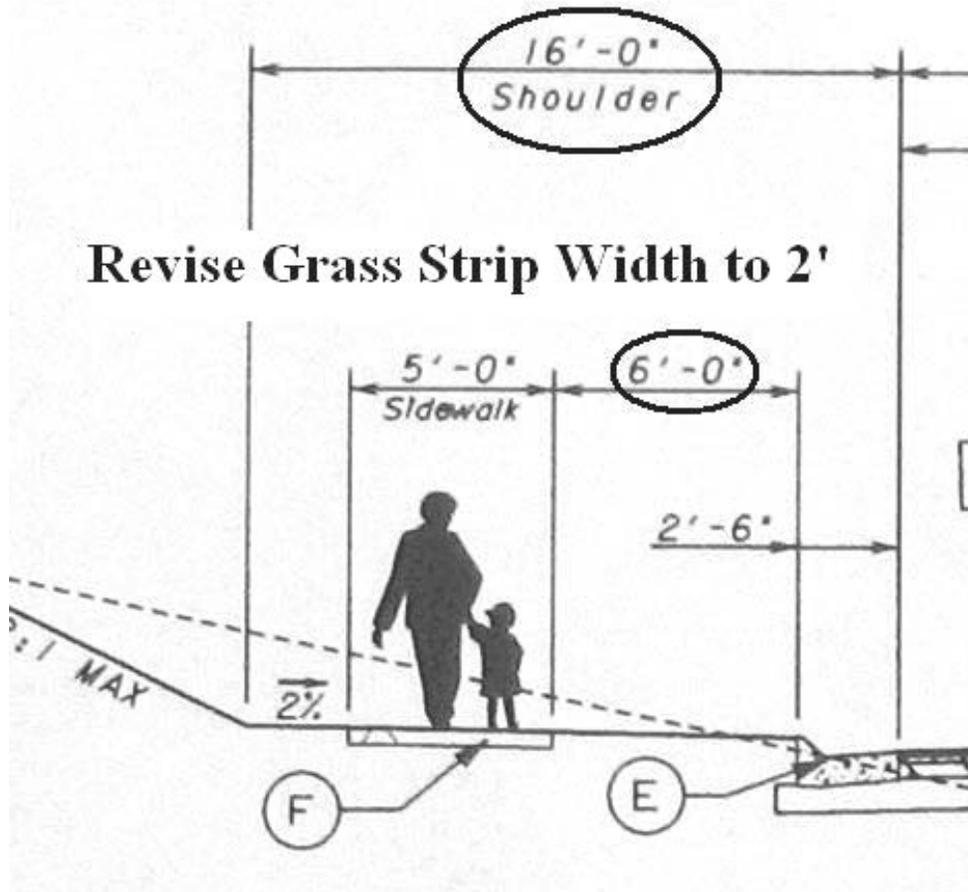
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	260,000		
- Proposed	0		
- Savings	260,000		260,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			260,000

SR 20 Widening

ITEM N^o: A-4.2
CLIENT: GDOT
Sheet 2 of 4

Revise Shoulder Width to 12'

Revise Grass Strip Width to 2'



COST WORKSHEET

PROJECT: SR 20 Widening	ITEM No: A-4.2
	CLIENT: GDOT
	Sheet 3 of 4

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
Embankment	CY	3,185	\$5.00	\$15,925	0	\$5.00	\$0
SUBTOTAL				15,925			0
Markup @ 10.00%				1,593			0
Construction Total				17,518			0
Right-of-Way	SF	17,200	4.06	69,832	0	4.06	0.00
Markup @ 247.20%				172,625			0
ROW Total				242,457			0
TOTAL ROUNDED				260,000			0

CALCULATIONS**SR 20 Widening**ITEM N^o: A-4.2

CLIENT: GDOT

Sheet 4 of 4

Average ROW Cost = \$4.06/SF (See A.2.1 Calculations)

Average Height of Embankment = 5 feet

Original Concept

Additional ROW for 16' Shoulder = $(2)(16-12)(1280+00-1258+50) = 17,200$ SF

Additional Earthwork for 16' Shoulder = $(2)(1280+00-1258+50)(16-12)(5)/27 = 3,185$ CY

Proposed Concept

Additional ROW for 12' Shoulder = 0 SF

Additional Earthwork for 12' Shoulder = 0 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: A-4.3	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce Shoulder Width (PI# 0004430)
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Comp By: SWG Date: 12-7-07 Checked By : DW Date: 12-7-07

Original Concept:

The proposed typical section for SR 20 includes a 16' outside urban shoulders (30" curb & gutter, 6' grass strip, 5' sidewalk) on both sides of the road.

Proposed Change:

Revise the typical section for SR 20 to include 12' outside urban shoulder (30" curb & gutter, 2' grass strip, 5' sidewalk) on both sides of the road.

Justification:

The reduction of shoulder width will not impede the function of the project and will result in significant cost savings.

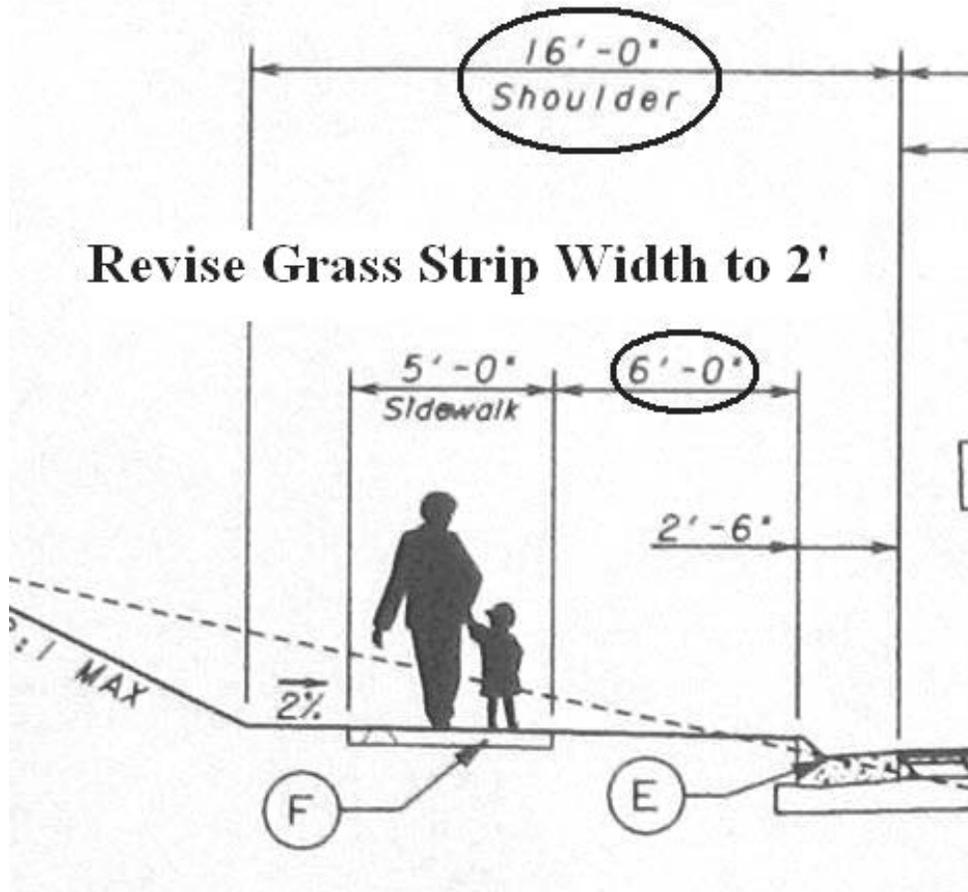
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	2,371,000		
- Proposed	0		
- Savings	2,371,000		2,371,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			2,371,000

SR 20 Widening

ITEM N^o: A-4.3
CLIENT: GDOT
Sheet 2 of 4

Revise Shoulder Width to 12'

Revise Grass Strip Width to 2'



COST WORKSHEET

PROJECT: SR 20 Widening	ITEM No: A-4.3
	CLIENT: GDOT
	Sheet 3 of 4

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
Embankment	CY	28,740	\$5.00	\$143,700	0	\$5.00	\$0
SUBTOTAL				143,700			0
Markup @ 27.34%				39,288			0
Construction Total				182,988			0
Right-of-Way	SF	155,200	4.06	630,112	0	4.06	0.00
Markup @ 247.20%				1,557,637			0
ROW Total				2,187,749			0
TOTAL ROUNDED				2,371,000			0



CALCULATIONS**SR 20 Widening**ITEM N^o: A-4.3

CLIENT: GDOT

Sheet 4 of 4

Average ROW Cost = \$4.06/SF (See A.2.1 Calculations)

Average Height of Embankment = 5 feet

Original Concept

Additional ROW for 16' Shoulder = $(2)(16-12)(1474+00-1280+00) = 155,200$ SF

Additional Earthwork for 16' Shoulder = $(2)(1474+00-1280+00)(16-12)(5)/27 = 28,740$ CY

Proposed Concept

Additional ROW for 12' Shoulder = 0 SF

Additional Earthwork for 12' Shoulder = 0 SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:

B-1.1

PAGE No.:

1 of 4

CREATIVE IDEA:

Reduce Lane Widths (PI# 0002392)

Comp By: SWG

Date: 12-7-07

Checked By: DW

Date: 12-7-07

Original Concept:

The typical section for SR 20 includes 4 – 12 foot travel lanes.

Proposed Change:

Revise the typical section for SR 20 to utilize 2 – 11 foot travel lanes for the widening section.

Justification:

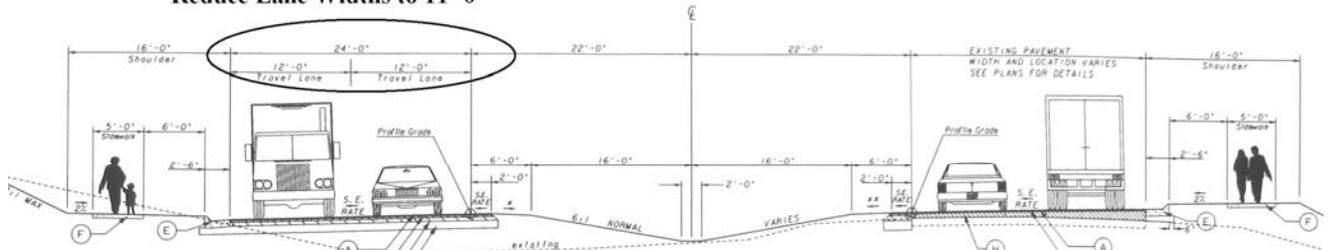
The reduction in lane widths will not impede the function of the project and will provide significant cost savings in right-of-way and pavement quantities.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	724,600		
- Proposed	0		
- Savings	724,600		724,600
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			724,600

SR 20 Widening

ITEM N^o: B1.1
 CLIENT: GDOT
 Sheet 2 of 4

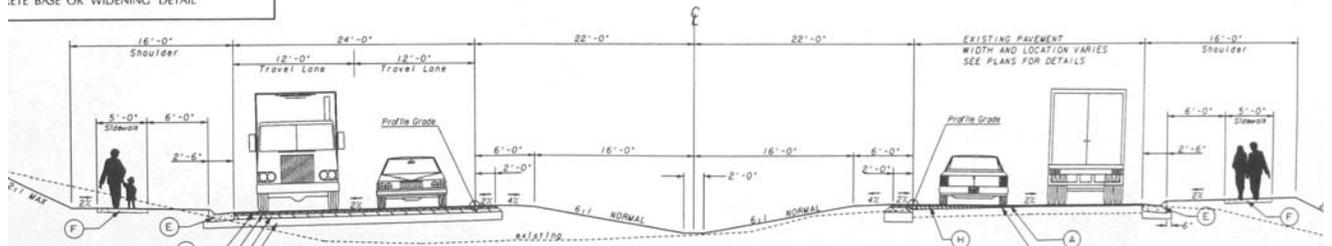
Reduce Lane Widths to 11'-0"



NOTE: 1.00' ± WIDTHS ± 3.0"
 1/4" MAX
 1/4" MIN
 NO SCALE
 BASE OR PAVEMENT WIDENING
 500-9999 - Cu. Yds.
 between the existing paving and new curb and gutter in width, Class 'B' concrete should be placed in widening specified by the typical section. Payment will be concrete base and pavement widening.
 greater than 5'-0" in width, the Contractor shall specify on the typical section, the type of curb and gutter construction, and the base or widening detail.
 IETE BASE OR WIDENING DETAIL

Widen to One Side
 Urban Section with a 44' Median
 (D. S. 45mph)
 SUPERELEVATED
TS04
 STA 1135+08 TO STA 1146+31
 STA 1164+87 TO STA 1169+96
 STA 1182+88 TO STA 1204+81
 STA 1213+90 TO STA 1221+55

X SHOULDER TO SLOPE AT NORMAL CROWN
 THE ALGEBRAIC DIFFERENCE IF SHOULDER SLOPE SHALL NOT BE LESS THAN MINIMUM SHOULDER SLOPE TO SLOPE TO SLOPE AT NORMAL CROWN
 XX SHOULDER TO SLOPE AT NORMAL CROWN
 THE ALGEBRAIC DIFFERENCE IF SHOULDER SLOPE SHALL NOT BE LESS THAN MINIMUM SHOULDER SLOPE TO SLOPE TO SLOPE AT NORMAL CROWN



S. R. 20
 IC CONCRETE, 12.0 mm SUPERPAVE, 165 lbs/yd³ MIX DESIGN LEVEL 'B'
 IC CONCRETE, 19.0 mm SUPERPAVE, 220 lbs/yd³ MIX DESIGN LEVEL 'B'
 IC CONCRETE, 25.0 mm SUPERPAVE, 660 lbs/yd³ MIX DESIGN LEVEL 'A'
 BASE, 12"
 CURB AND GUTTER, GA STD 9032B, TP2
 V, 4 IN

Widen to One Side
 Urban Section with a 44' Median
 (D. S. 45mph)
 NORMAL CROWN
TS03
 STA 1107+50 TO STA 1116+88
 STA 1169+96 TO STA 1175+43
 STA 1204+81 TO STA 1205+84
 STA 1221+55 TO STA 1225+43

COST WORKSHEET

PROJECT: SR 20 Widening	ITEM No: B-1.1
	CLIENT: GDOT
	Sheet 3 of 4

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
Embankment	CY	5,667	5	28,335	0	5	0
12.5mm	TN	281	90	25,290	0	90	0
19mm	TN	374	90	33,660	0	90	0
25mm	TN	1,122	90	100,980	0	90	0
GAB	TN	2,244	20	44,880	0	90	0
SUBTOTAL				233,145			0
Markup @ 25.76%				60,058			0
Construction Total				293,203			0
Right-of-Way	SF	30,600	4.06	124,236	0.00	4.06	0
Markup @ 247.20%				307,111			0
ROW Total				431,347			0
TOTAL ROUNDED				724,600			0



CALCULATIONS**SR 20 Widening**ITEM N^o: B-1.1

CLIENT: GDOT

Sheet 4 of 4

Average ROW Cost = \$4.06/SF (See A-2.1 Calculations)

Average Height of Embankment = 5 feet

Pavement Section

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 660#/SY

GAB – 1320#/SY

Original Concept

Additional ROW for 2-12' Lanes = $(24-22)(1250+00-1097+00) = 30,600$ SF

Additional Earthwork for 2-12' Lanes = $(1250+00-1097+00)(48-46)(5)/27 = 5,667$ CY

Additional Pavement for 2-12' Lanes:

12.5mm = $[(1250+00-1097+00)(24-22)/9] \times (165/2000) = 281$ tons

19 mm = $[(1250+00-1097+00)(24-22)/9] \times (220/2000) = 374$ tons

25 mm = $[(1250+00-1097+00)(24-22)/9] \times (660/2000) = 1,122$ tons

GAB = $[(1250+00-1097+00)(24-22)/9] \times (1320/2000) = 2,244$ tons

Proposed Concept

Additional ROW for 2-11' Lanes = 0 SF

Additional Earthwork for 2-11' Lanes = 0 CY

Additional Pavement for 2-11' Lanes:

12.5mm = 0 tons

19 mm = 0 tons

25 mm = 0 tons

GAB = 0 tons

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: B-1.2	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce Lane Widths (PI# 132985)
Comp By: SWG	Date: 12-7-07	Checked By: DW Date: 12-7-07

Original Concept:

The typical section for SR 20 includes 4 – 12 foot travel lanes.

Proposed Change:

Revise the typical section for SR 20 to utilize 2 – 11 foot travel lanes for the widening section.

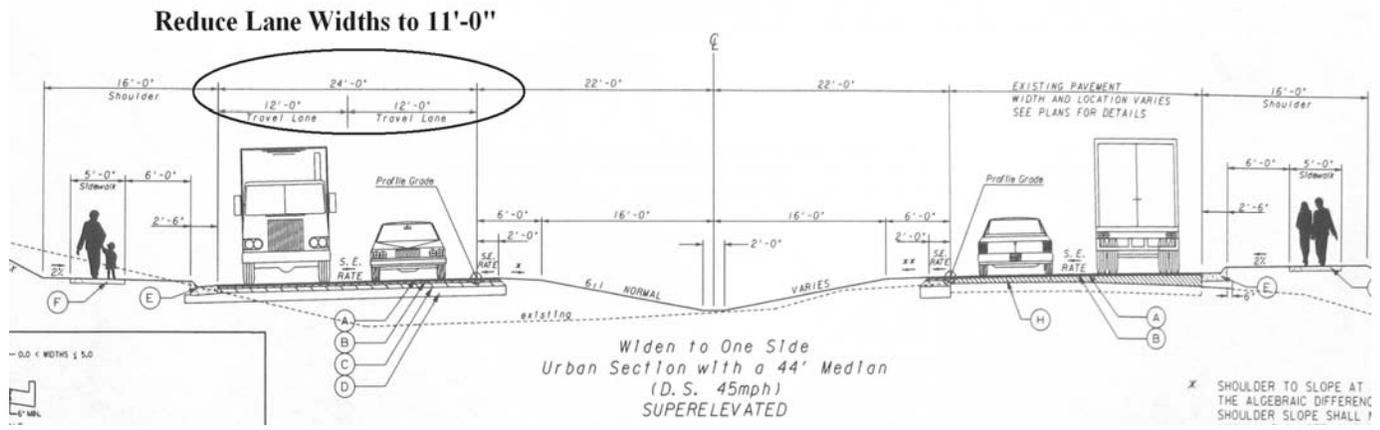
Justification:

The reduction in lane widths will not impede the function of the project and will provide significant cost savings in right-of-way and pavement quantities.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	96,700		
- Proposed	0		
- Savings	96,700		96,700
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			96,700

SR 20 Widening

ITEM N^o: B-1.2
CLIENT: GDOT
Sheet 2 of 4



CALCULATIONS**SR 20 Widening**ITEM N^o: B-1.2

CLIENT: GDOT

Sheet 4 of 4

Average ROW Cost = \$4.06 (See A-2.1 Calculations)

Average Height of Embankment = 5 feet

Pavement Section (Taken from PI 0002392)

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 660#/SY

GAB – 1320#/SY

Original Concept

Additional ROW for 2-12' Lanes = $(24-22)(1280+00-1258+50) = 4300$ SF

Additional Earthwork for 2-12' Lanes = $(1280+00-1258+50)(24-22)(5)/27 = 797$ CY

Additional Pavement for 2-12' Lanes:

12.5mm = $[(1280+00-1258+50)(24-22)/9] \times (165/2000) = 39$ tons

19 mm = $[(1280+00-1258+50)(24-22)/9] \times (220/2000) = 53$ tons

25 mm = $[(1280+00-1258+50)(24-22)/9] \times (660/2000) = 158$ tons

GAB = $[(1280+00-1258+50)(24-22)/9] \times (1320/2000) = 316$ tons

Proposed Concept

Additional ROW for 2-11' Lanes = 0 SF

Additional Earthwork for 2-11' Lanes = 0 CY

Additional Pavement for 2-11' Lanes:

12.5mm = 0 tons

19 mm = 0 tons

25 mm = 0 tons

GAB = 0 tons

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:

B-1.3

PAGE No.:

1 of 4

CREATIVE IDEA:

Reduce Lane Widths (PI# 0002392)

Comp By: SWG

Date: 12-7-07

Checked By: DW

Date: 12-7-07

Original Concept:

The typical section for SR 20 includes 4 – 12 foot travel lanes.

Proposed Change:

Revise the typical section for SR 20 to utilize 2 – 11 foot travel lanes for the widening section.

Justification:

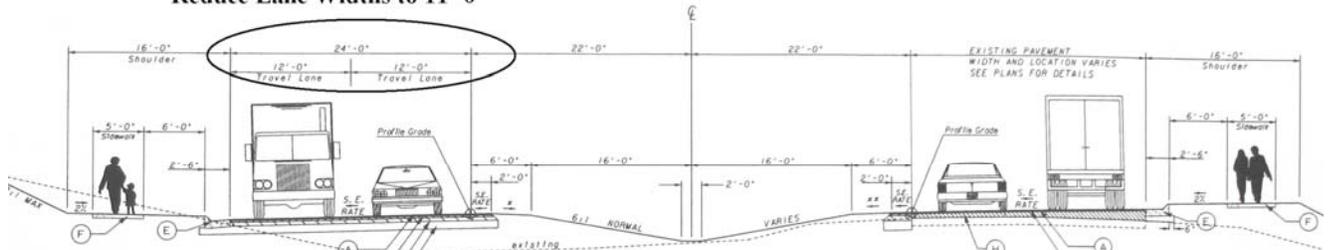
The reduction in lane widths will not impede the function of the project and will provide significant cost savings in right-of-way and pavement quantities.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	923,300		
- Proposed	0		
- Savings	923,300		923,300
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			923,300

SR 20 Widening

ITEM N^o: B1.3
 CLIENT: GDOT
 Sheet 2 of 4

Reduce Lane Widths to 11'-0"



NOTE: 1.00' < WIDTHS ≤ 3.0'
 1/4" = 1'-0"

NO SCALE
 BASE OR PAVEMENT WIDENING
 500-9999 - Cu. Yds.

Between the existing paving and new curb and gutter in width, Class 'B' concrete shall be placed in widening specified by the typical section. Pavement will be concrete base and pavement widening.

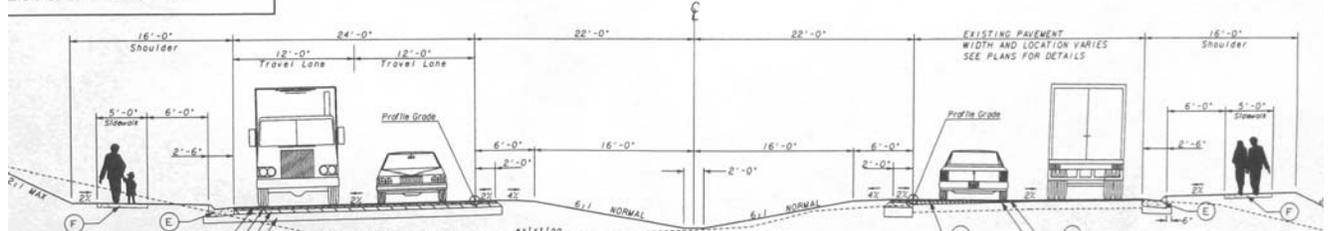
Greater than 5'-0" in width, the Contractor shall place as specified on the typical section of curb and gutter construction, concrete base and pavement widening.

SEE BASE OR WIDENING DETAIL

Widen to One Side
 Urban Section with a 44' Median
 (D. S. 45mph)
 SUPERELEVATED
 TS04
 STA 1135+08 TO STA 1146+31
 STA 1164+87 TO STA 1169+96
 STA 1182+88 TO STA 1204+81
 STA 1213+90 TO STA 1221+55

X SHOULDER TO SLOPE AT NORMAL CROWN
 THE ALGEBRAIC DIFFERENCE IF SHOULDER SLOPE SHALL NOT BE LESS THAN MINIMUM SHOULDER SLOPE TO SLOPE TO SLOPE AT NORMAL CROWN

XX SHOULDER TO SLOPE AT NORMAL CROWN
 THE ALGEBRAIC DIFFERENCE IF SHOULDER SLOPE SHALL NOT BE LESS THAN MINIMUM SHOULDER SLOPE TO SLOPE TO SLOPE AT NORMAL CROWN



S. R. 20
 IC CONCRETE, 12.0 mm SUPERPAVE, 165 lbs/yd³ MIX DESIGN LEVEL 'B'
 IC CONCRETE, 19.0 mm SUPERPAVE, 220 lbs/yd³ MIX DESIGN LEVEL 'B'
 IC CONCRETE, 25.0 mm SUPERPAVE, 660 lbs/yd³ MIX DESIGN LEVEL 'A'
 BASE, 12"
 CURB AND GUTTER, GA STD 9032B, TP2
 4 IN

Widen to One Side
 Urban Section with a 44' Median
 (D. S. 45mph)
 NORMAL CROWN
 TS03
 STA 1107+50 TO STA 1116+88
 STA 1169+96 TO STA 1175+43
 STA 1204+81 TO STA 1205+84
 STA 1221+55 TO STA 1225+43

COST WORKSHEET

PROJECT: SR 20 Widening	ITEM No: B-1.3
	CLIENT: GDOT
	Sheet 3 of 4

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
Embankment	CY	7,185	5	35,925	0	5	0
12.5mm	TN	356	90	32,040	0	90	0
19mm	TN	474	90	42,660	0	90	0
25mm	TN	1,423	90	128,070	0	90	0
GAB	TN	2,845	20	56,900	0	90	0
SUBTOTAL				295,595			0
Markup @ 27.34%				80,816			0
Construction Total				376,411			0
Right-of-Way	SF	38,800	4.06	157,528	0.00	4.06	0
Markup @ 247.20%				389,409			0
ROW Total				546,937			0
TOTAL ROUNDED				923,300			0



CALCULATIONS**SR 20 Widening**ITEM N^o: B-1.3

CLIENT: GDOT

Sheet 4 of 4

Average ROW Cost = \$4.06/SF (See A-2.1 Calculations)

Average Height of Embankment = 5 feet

Pavement Section

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 660#/SY

GAB – 1320#/SY

Original ConceptAdditional ROW for 2-12' Lanes = $(24-22)(1474+00-1280+00) = 38,800$ SFAdditional Earthwork for 2-12' Lanes = $(1474+00-1280+00)(24-22)(5)/27 = 7,185$ CY

Additional Pavement for 2-12' Lanes:

12.5mm = $[(1474+00-1280+00)(24-22)/9] \times (165/2000) = 356$ tons19 mm = $[(1474+00-1280+00)(24-22)/9] \times (220/2000) = 474$ tons25 mm = $[(1474+00-1280+00)(24-22)/9] \times (660/2000) = 1,423$ tonsGAB = $[(1474+00-1280+00)(24-22)/9] \times (1320/2000) = 2,845$ tons**Proposed Concept**

Additional ROW for 2-11' Lanes = 0 SF

Additional Earthwork for 2-11' Lanes = 0 CY

Additional Pavement for 2-11' Lanes:

12.5mm = 0 tons

19 mm = 0 tons

25 mm = 0 tons

GAB = 0 tons

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
B-2.1	1 of 4	Realign Burnette Trail

Comp By: SWG Date: 12-7-07 Checked By: DW Date: 12-7-07

Original Concept:

The current plans show realignment of Burnette Road for a total length of approximately 830 feet.

Proposed Change:

Revise the realignment of Burnette Road to a total length of approximately 580 feet.

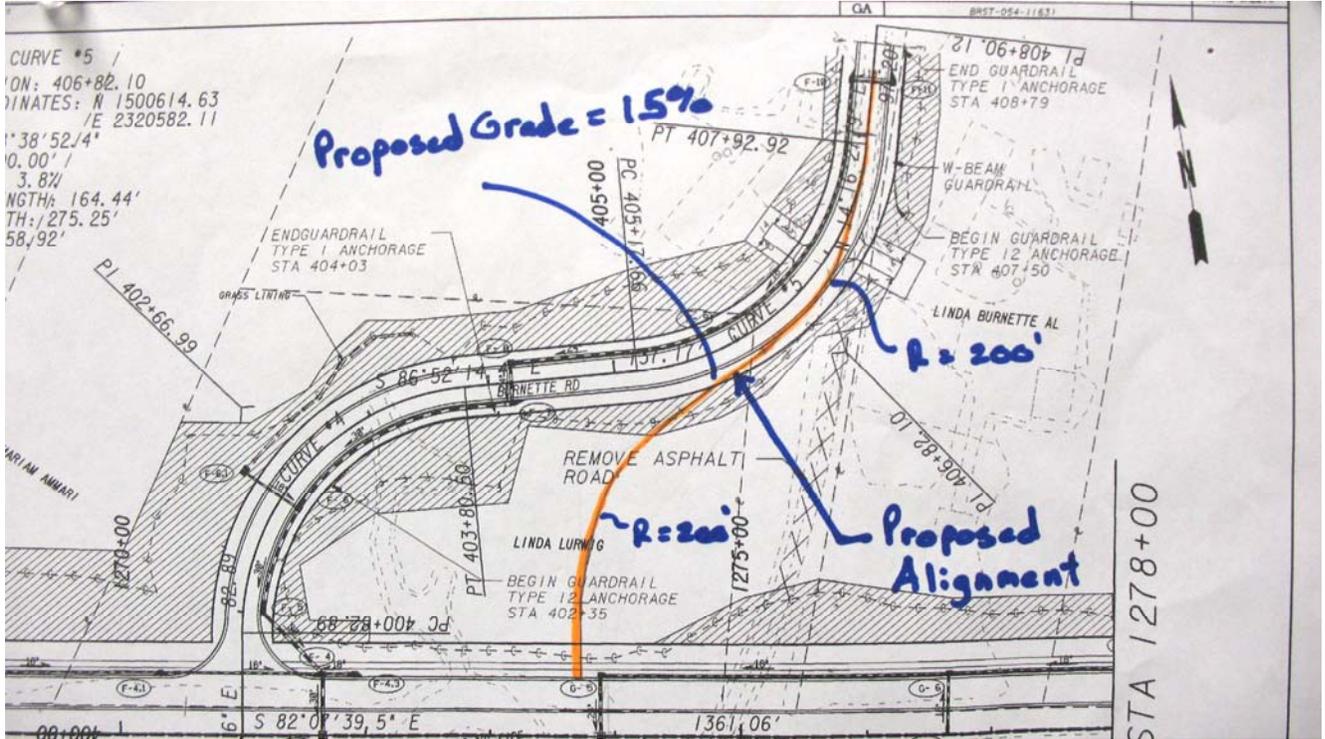
Justification:

The current plans show a realignment of the Burnette Trail due to the steep existing grade (18%) at the tie into SR 20. The proposed profile reduces the maximum grade to 11.3%. The GDOT Design Manual allows for a maximum vertical grade of 15% for a design speed of 25mph in mountainous terrain. The proposed change modifies the maximum grade to 15% to reduce the alignment length and provide savings in right-of-way, pavement and drainage quantities.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	258,800		
- Proposed	0		
- Savings	258,800		258,800
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			258,800

SR 20 Widening

ITEM N^o: B-2.1
CLIENT: GDOT
Sheet 2 of 4



CALCULATIONS**SR 20 Widening**ITEM N^o: B-2.1

CLIENT: GDOT

Sheet 4 of 4

R/W & Easement Costs

Average Residential ROW Cost = \$3.00/SF

Average Easement Cost = (Average ROW Cost *.30) = (3.00 * 0.30) = \$0.90/SF

Average Embankment Height = 10ft

Pavement Section

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 330#/SY

GAB – 1100#/SY

Original Concept

Additional R/W = (830-580)(50) = 12,500 SF

Additional Easements = (830-580)(40) = 10,000 SF

Additional Curb & Gutter = 2(830-580) = 500 LF

Additional 24" Pipe = (830-580) = 250 LF

Additional Embankment (830-580)(10)(50)/27 = 4630 CY

Additional Pavement Items:

12.5mm = [(830-580)(24)/9] x (165/2000) = 55 tons

19 mm = [(830-580)(24)/9] x (220/2000) = 73 tons

25 mm = [(830-580)(24)/9] x (330/2000) = 110 tons

GAB = [(830-580)(24)/9] x (1100/2000) = 367 tons

Proposed Concept

Additional R/W = 0 SF

Additional Easements = 0 SF

Additional Curb & Gutter = 0 LF

Additional 24" Pipe = 0 LF

Additional Embankment = 0 CY

Additional Pavement Items:

12.5mm = 0 tons

19 mm = 0 tons

25 mm = 0 tons

GAB = 0 tons

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:

B-3.1

PAGE No.:

1 of 5

CREATIVE IDEA:

Retain Echols Road / Holly Court alignment

Comp By: SWG

Date: 12-7-07

Checked By: DW

Date: 12-7-07

Original Concept:

The original design revises the intersection to align Echols Road and Holly Court at a 90 degree intersection with the main line. This was done due to the proposed development on the south side of the road.

Proposed Change:

Retain the existing alignment for this intersection.

Justification:

It appears that due to a proposed development on the south side at Holly Court, the intersection was realigned to provide a 4 leg perpendicular alignment with a median opening.

Our recommendation would maintain the existing alignment for Echols Road, which is a perpendicular crossing that aligns with the proposed development driveway and shift the median opening to the new location. The Holly Court alignment will tie into the widened SR 20 at an improved 90 degree intersection.

This recommendation will reduce construction and R/W along SR 20 which we consider to be commercial property. It will also eliminate a reverse curve alignment for the originally realigned Echols Road. (Continued next page)

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	610,000		
- Proposed	-0-		
- Savings	610,000		610,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			610,000

CONTINUATION

SR 20 Widening

ITEM N^o: B-3.1
CLIENT: GDOT
Sheet 2 of 5

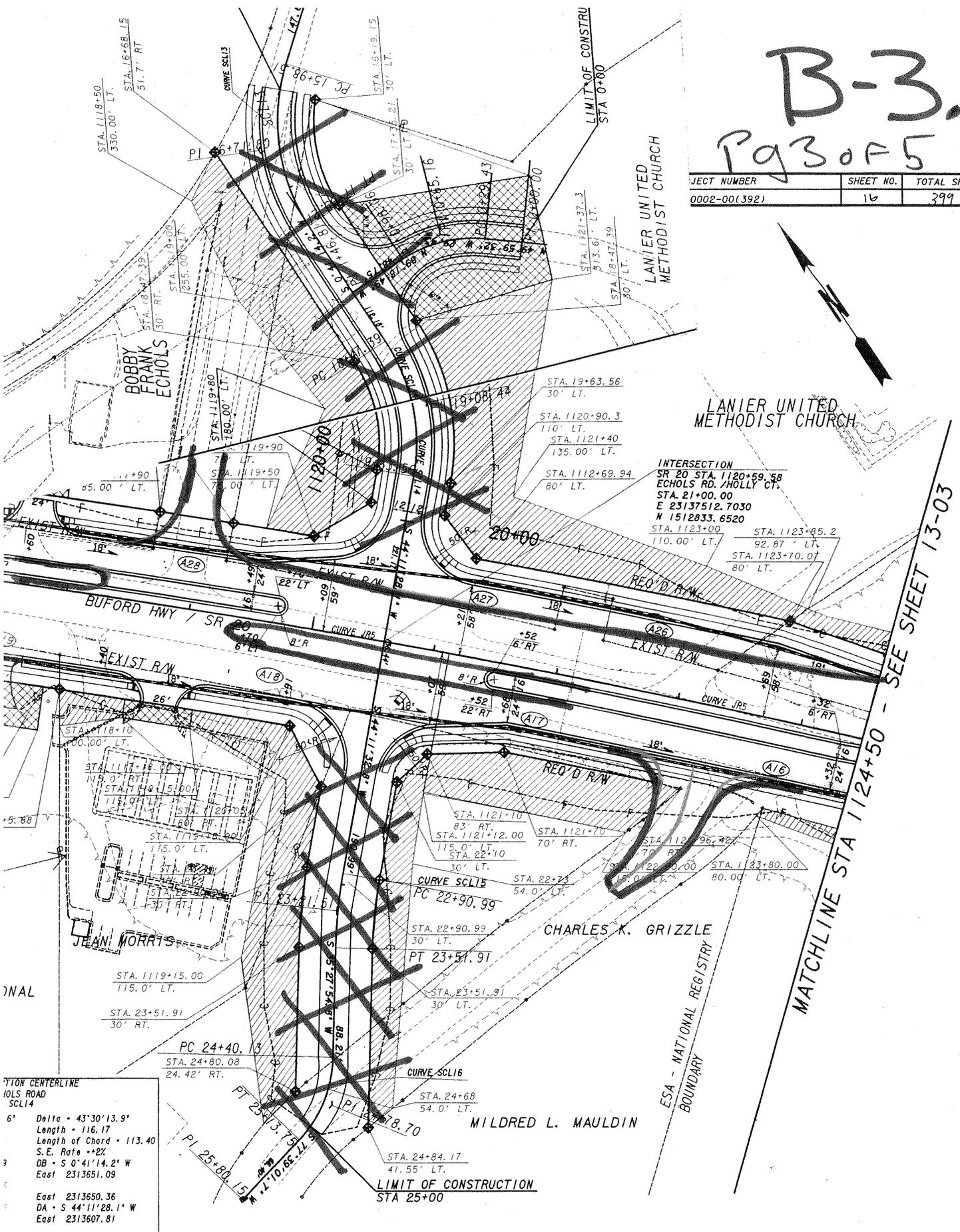
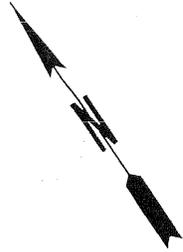
Both side roads appear to be low volume, no outlet roads from the latest County maps. There will be a median opening about 600 feet east of the Holly Court intersection for U-turns.

As a minimum, if the current side road alignment is maintained, the proposed development should tie into Holly Court rather than SR 20 to improve operations and safety.

B-3.1

Pg 3 of 5

PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
0002-00(392)	16	399



SECTION CENTERLINE
 HOLLS ROAD
 SCL14
 6' Delta = 43°30'13.9"
 Length = 116.17
 Length of Chord = 113.40
 S.E. Rate = 2X
 DB = S 0°41'14.2" W
 East 2313651.09
 East 2313650.36
 DA = S 44°11'28.1" W
 East 2313607.81

LANIER UNITED METHODIST CHURCH

INTERSECTION
 SR 20 STA. 1120+59.58
 ECHOLS RD. / HOLLY CT.
 STA. 21+00.00
 E 23137512.7030
 N 1512833.6520
 STA. 1123+00 110.00' LT.
 STA. 1123+85.2 92.87' LT.
 STA. 1123+70.07 80' LT.

CHARLES K. GRIZZLE

MILDRED L. MAULDIN

MATCHLINE STA 1124+50 - SEE SHEET 13-03

ESA - NATIONAL REGISTRY BOUNDARY

CALCULATIONS

SR 20 Widening

ITEM N^o: B-3.1

CLIENT: GDOT

Sheet 5 of 5

Echols Road

Current Length = 450 feet

Recommended Length = 100 feet

Overall reduced length = 350 feet X 24 feet = 8,400 sq. ft. = 933 sq. yds.

Holly Court

Current Length = 350 ft.

Recommended Length = 100 ft.

Overall Reduced Length = 250 feet X 24 feet = 6,000 sq. ft. = 667 sq. yds

Side Roads - 9.5 inches Asphalt
12 inches GAB

$9.5/12 (14,400 \text{ ft}^3)(150\# / \text{ft}^3)(1 \text{ Ton} / 2,000 \#) = 855 \text{ Tons asphalt}$

$12/12 (14,400 \text{ ft}^3) (135\# / 1 \text{ ft}^3) (1\text{Ton} / 2,000\#) = 972 \text{ Tons GAB}$

Sidewalk = $(350 \times 5) (2)(1/9) = 390 \text{ CY}$

R/W = 60 feet wide = $(350 + 250) \times 60 = 36,000 \text{ ft}^2 = 0.826 \text{ Acre}$

Land fronting SR 20 = assume commercial, use \$7.50 / SF

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-1	1 of 4	Optimize the SR 20 bridge alignment

Comp By: GO Date: 12-5-07 Checked By: DCW Date: 12-5-07

Original Concept:

Maintain the existing roadway and bridge alignment over the river. The current alignment is on a skewed angle, less than 60 degrees. The existing bridge length is 793 feet which includes spanning the river and the flood plain.

Proposed Change:

Realign the alignment to provide a more perpendicular crossing which will shorten the span and reduce the bridge length.

Justification:

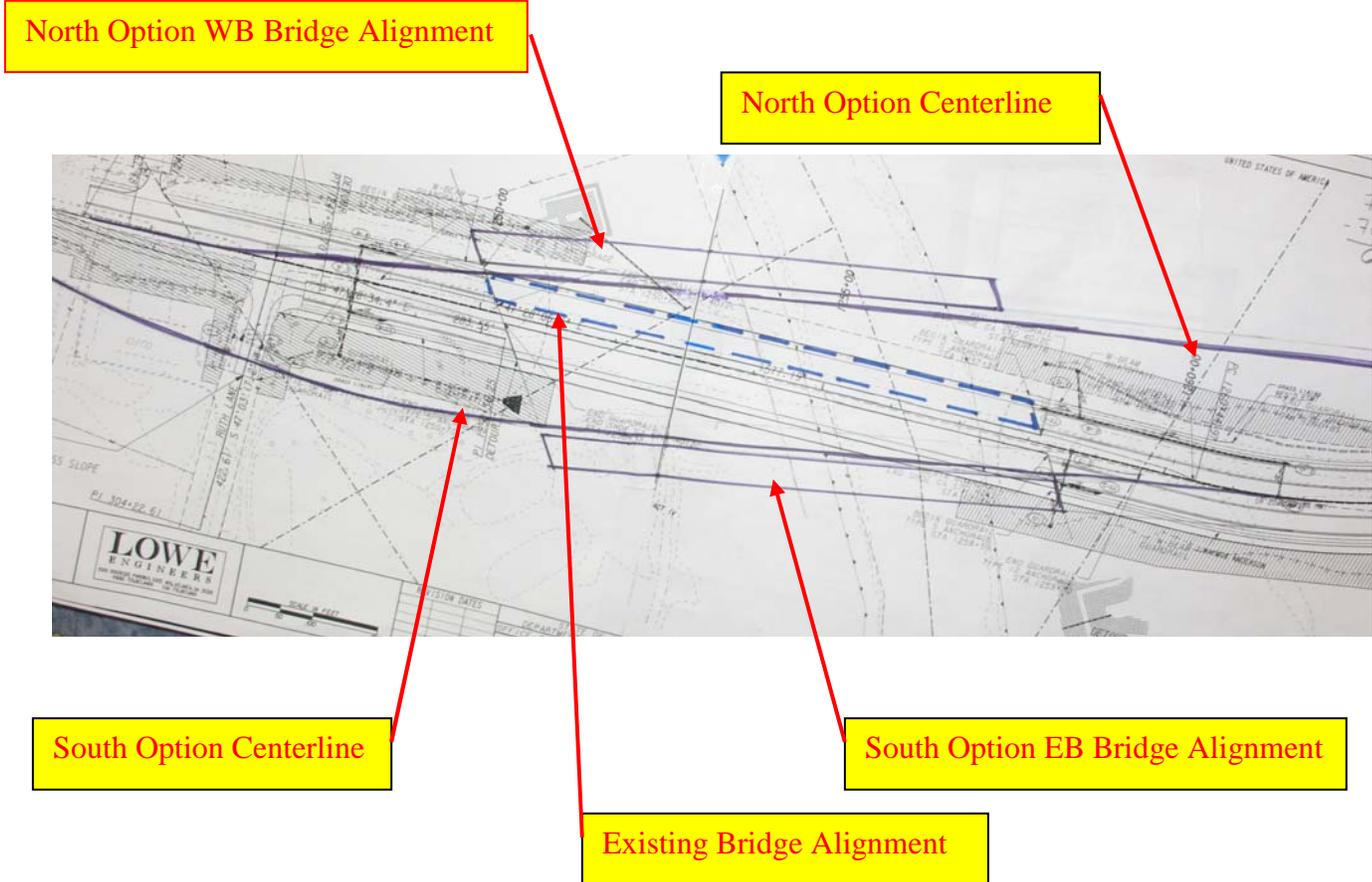
There are 2 alignments proposed; one to the north of the existing bridge and one to the south. Under both alignments, the bridges can be built “in the clear”. Each alignment shortens the bridge length from 793 feet to about 728 feet, a 65 foot savings. This recommendation will also provide a benefit of a shorter river span when selecting the main river span, which currently is about 400 feet to about 370 feet, 30 feet shorter. Even though 30 feet does not seem significant, it represents a 7.5% savings (30/400) which could be important in selecting the main crossing. Each realignment option will have additional property impacts. The southern alignment will actually reduce impacts to the park, potentially eliminating the 4f issue although it will affect the trout camp more severely. The north alignment will require additional 4f impacts and a large cut at the northeast quadrant. This is an opportunity to provide a better river crossing with fewer environmental impacts with a more perpendicular, shorter crossing, rather than just replacing in-kind with a parallel bridge. There will be a modest cost savings and an overall better crossing.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	607,800		
- Proposed	497,800		
- Savings	110,000		110,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			110,000

SR 20 Widening

ITEM N^o: C-1
CLIENT: GDOT
Sheet 2 of 4

PROPOSED BRIDGE LOCATIONS



CALCULATIONS

SR 20 Widening

ITEM N^o: C-1
CLIENT: GDOT
Sheet 4 of 4

Based on the project estimates, use \$85 per square foot for bridge costs. This cost is low especially for the type of bridge required for a 400 foot span.

Assume \$35 per square foot for roadway construction cost, total including earthwork, base and paving.

Additional right of way required: About 1 acre @ \$200,000 per acre for the trout farm. The cost of the parkland would most likely be a nominal fee, less than \$100 however other concessions would be required, potentially up to the cost of the property.
USE \$ 200,000

Additional roadway costs beyond the bridge include costs for the 65 feet of roadway vs. bridge. Other additional roadway costs are negligible since these areas require complete reconstruction with little, if no, salvage of existing pavements due to the transitions and accommodations for the bridge construction.
There will be some additional earthwork: say \$25,000.

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-2	1 of 3	Reduce travel lane width from 12 feet to 11 feet over the bridge

Comp By: LFE Date: 12/04/07 Checked By: DCW Date: 12/04/07

Original Concept:

Conceptual drawings show 12 foot travel lane width over the bridge.

Proposed Change:

The VE Team recommends reducing the travel lane width to 11 feet.

Justification:

SR 20 is considered an urban state route and it is not a major trucking corridor. The use of 11 feet travel lane can be justified especially with the proposed 45 mph posted speed limit.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	7,524,000		
- Proposed	7,223,000		
- Savings	301,000		301,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			301,000

CALCULATIONS

SR 20 Widening

ITEM N^o: C-2
CLIENT: GDOT
Sheet 3 of 3

Reduction = 1 foot X 4 lanes X 800 feet long = 3,200 square feet difference.

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: C-3A	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce sidewalk width to 6 feet on both bridges
Comp By: LFE Date: 12/04/07		Checked By: DCW Date: 12/04/07

Original Concept:

Conceptual drawings show 10 feet concrete sidewalks on both bridges.

Proposed Change:

The VE Team recommended reducing the width of the sidewalk to 6 feet.

Justification:

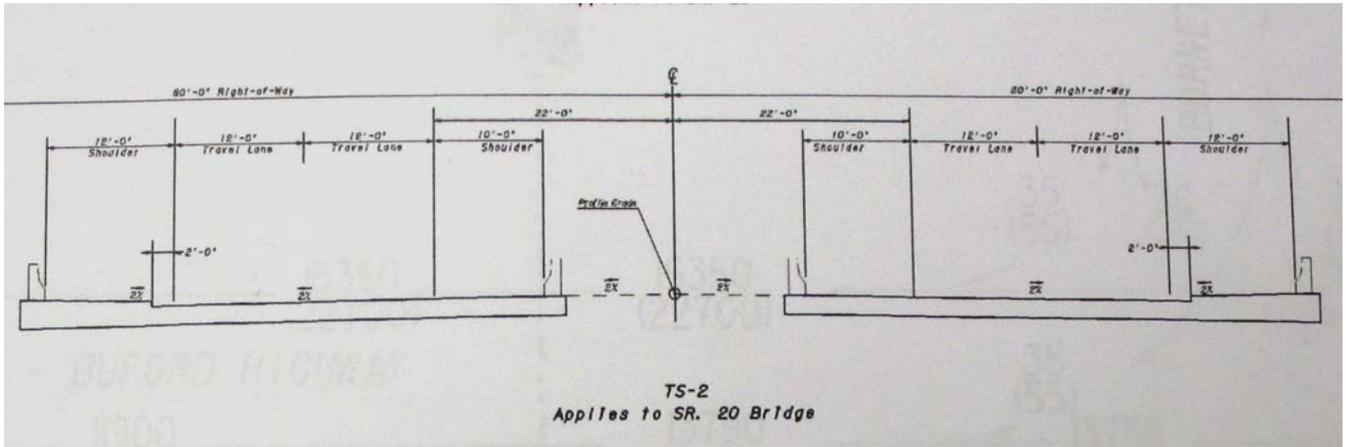
GDOT Bridge Design Manual, Section 2.9.1.1, allows for sidewalk width to be 6 feet. This results in overall width reduction of 8 feet

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	7,524,000		
- Proposed	6,922,000		
- Savings	602,000		602,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			602,000

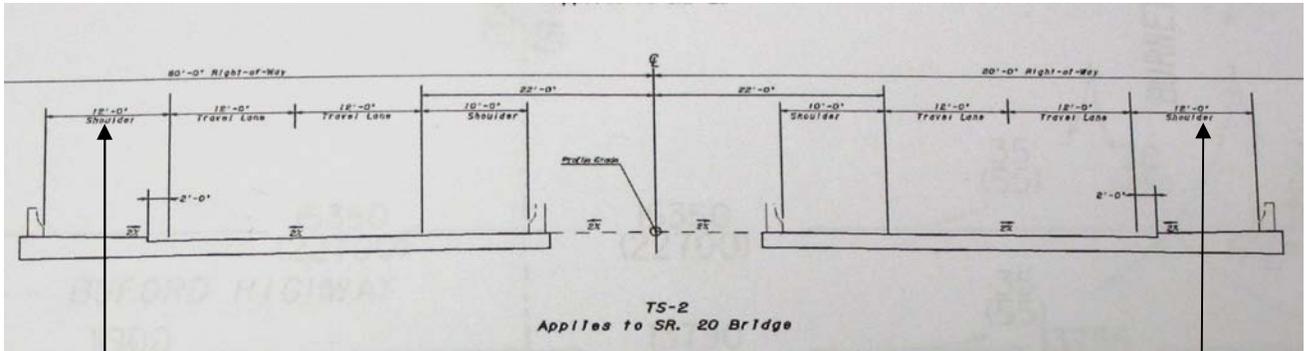
SR 20 Widening

ITEM N^o: C-3A
CLIENT: GDOT
Sheet 2 of 4

ORIGINAL DESIGN



PROPOSED CHANGE



Reduce to 8 feet (6 feet side walk)

CALCULATIONS

SR 20 Widening

ITEM N^o: C-3.A

CLIENT: GDOT

Sheet 4 of 4

Total Bridge Width= $2 * (50-4) = 92$ feet

Bridge Area= $800 * 92 = 73,600$ sq. feet

Construction cost = $73,000 * 85.5 = \$6,292,800$ + markups

Saving = $6,840,000 - 6,292,800 = \$547,200$ + markups

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-3B	1 of 4	Eliminate the sidewalk on one bridge while reducing the sidewalk width on the other to 6 feet

Comp By: LFE Date: 12/04/07 Checked By: DCW Date: 12/05/07

Original Concept:

Conceptual drawings show 10 feet concrete sidewalks on both bridges.

Proposed Change:

The VE Team recommended eliminating the sidewalk located on one bridge and reducing the sidewalk width on the other to 6 feet.

Justification:

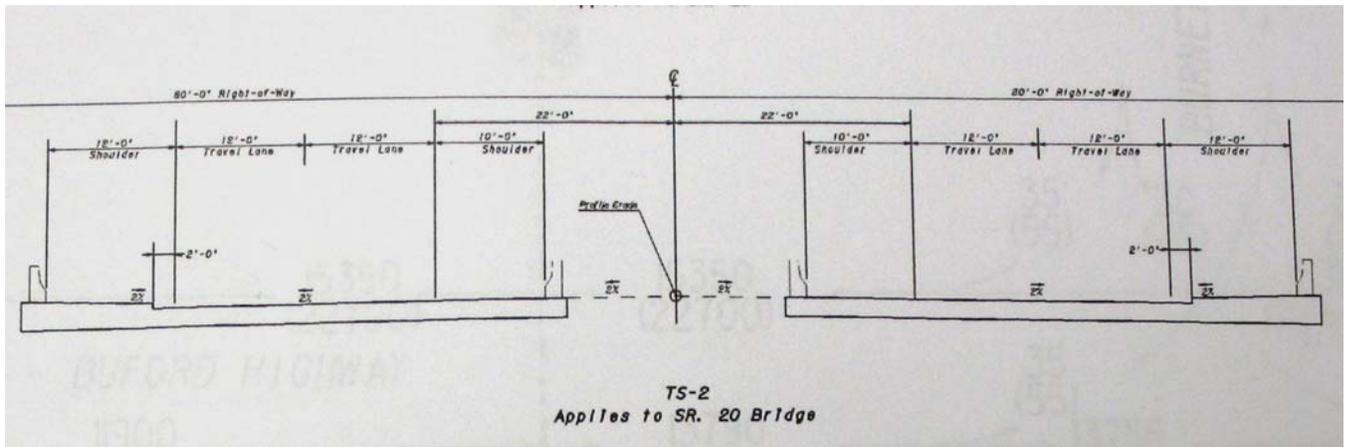
SR 20 is located in urban area and current land development does not warrant sidewalks at both bridges. Also, Section 2.9.1.1 of GDOT Bridge Design Manual allows for a 6 foot sidewalk width. This results in an overall width reduction of 14 feet

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	7,524,000		
- Proposed	6,471,000		
- Savings	1,053,000		1,053,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			1,053,000

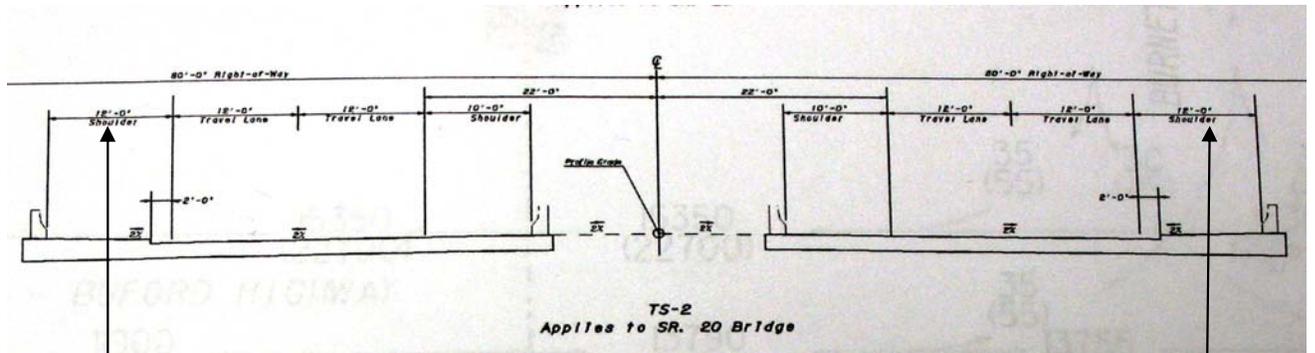
SR 20 Widening

ITEM N^o: C-3B
CLIENT: GDOT
Sheet 2 of 4

ORIGINAL DESIGN



PROPOSED CHANGE



Reduce to 2 feet (eliminate side walk)

Reduce to 8 feet (6 feet side walk)

CALCULATIONS**SR 20 Widening**

ITEM N^o: C-3B
CLIENT: GDOT
Sheet 4 of 4

Total Bridge Width= $(50-10) + (50-4) = 86$ feet

Bridge Area= $800 * 86 = 68,800$ sq. feet

Construction cost = $68,800 * 85.5 = \$5,882,400$ + markups

Saving = $6,840,000 - 5,882,400 = \$957,600$ + markups

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-5	1 of 4	Reduce / eliminate spanning the flood plain

Comp By: GO Date: 12-5-07 Checked By: DCW Date: 12-5-07

Original Concept:

Maintain the existing bridge span arrangement over the river. This includes about a 400 foot span over the river and a 400 foot span over the flood plain.

Proposed Change:

Reduce and / or eliminate the bridge span over the flood plain.

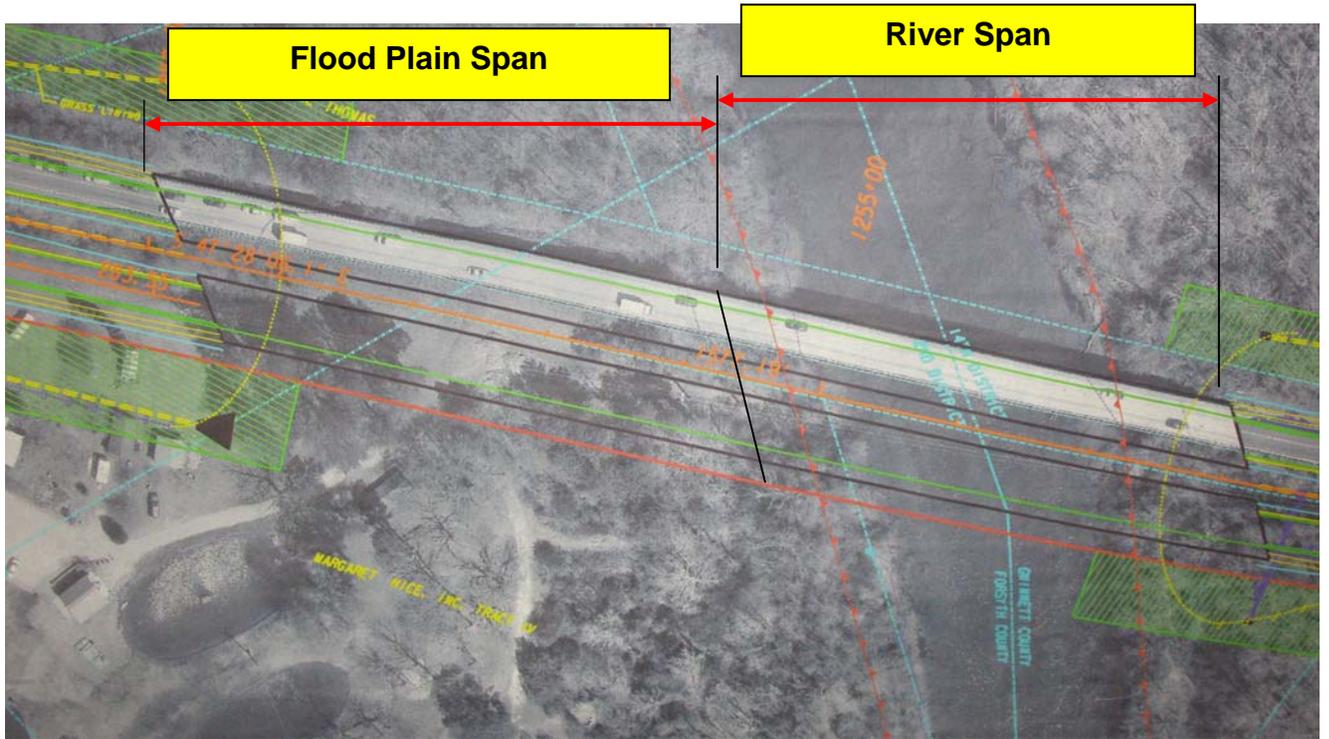
Justification:

This bridge is located about 1 mile south of the dam for Lake Lanier. As was stated in the information gathering meeting, the existing bridge was constructed prior to the dam and lake construction. The current hydrologic and flood conditions are significantly different that what the original bridge was designed for. This presents a good opportunity to review the hydrology and develop a realistic crossing based on current conditions. The dam represents the ultimate condition in flood control and significant cost savings can be realized by not spanning a flood plain that will most likely never be needed or used. A complete hydrologic analysis and coordination with the dam operations and release program will be required for this design effort.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	3,740,000		
- Proposed	1,540,000		
- Savings	2,200,000		2,200,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			2,200,000

SR 20 Widening

ITEM N^o: C-5
CLIENT: GDOT
Sheet 2 of 4



CALCULATIONS

SR 20 Widening

ITEM N^o: C - 5
CLIENT: GDOT
Sheet 4 of 4

Based on the project estimates, use \$85 per square foot for bridge costs. This cost is low for the type of bridge required for a 400 foot span.

Assume \$35 per square foot for roadway construction cost including earthwork, base and paving.

Reduce span by 400 feet; 100 foot wide structure required

$400 \times 100 = 40,000$ sq ft savings

CALCULATIONS**SR 20 Widening**

ITEM N^o: C-7
CLIENT: GDOT
Sheet 3 of 3

Assume 400 feet of PSC beams instead of steel girders

From GDOT Bridge Design Manual, Section 2.9.3, cost of PSC beams = \$95/SF while cost of steel beams = \$140/SF

Thus, % reduction in unit cost = $95/140=0.6786$ %

Construction Cost = $(400*100*85.5) + (400*100*85.5*0.6786) = \$5,740,712 + \text{markups}$

Saving = $6,840,000 - 5,740,712 = \$1,099,288 + \text{markups}$

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: C-8A	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce inside shoulder width to 4 feet while keeping the two sidewalks width at 6 feet
--------------------------	----------------------------	---

Comp By: LFE Date: 12/04/07 Checked By: DCW Date: 12/06/07

Original Concept:

Conceptual drawings show 10 foot concrete sidewalks on both bridges and 10 foot inside shoulders.

Proposed Change:

The VE Team recommends reducing the inside shoulder width to 4 feet, while keeping the two sidewalk widths at 6 feet.

Justification:

SR 20 is located in an urban area, and based on Section 2.9.1.1 of GDOT Bridge Design Manual 4 foot inside shoulders can be used. This results in overall width reduction of 20 feet

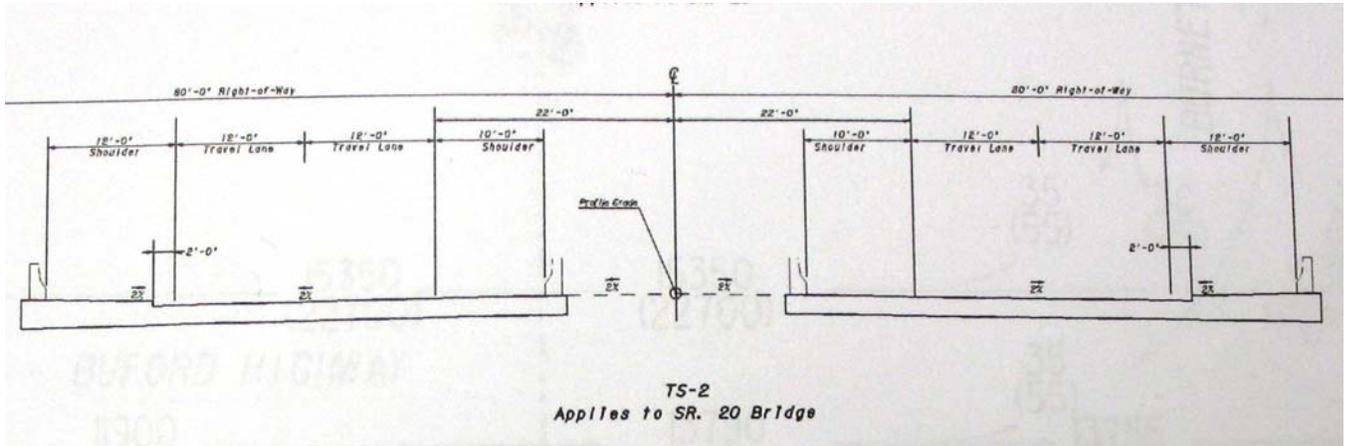
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	7,524,000		
- Proposed	6,019,000		
- Savings	1,505,000		1,505,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			1,505,000

SKETCH

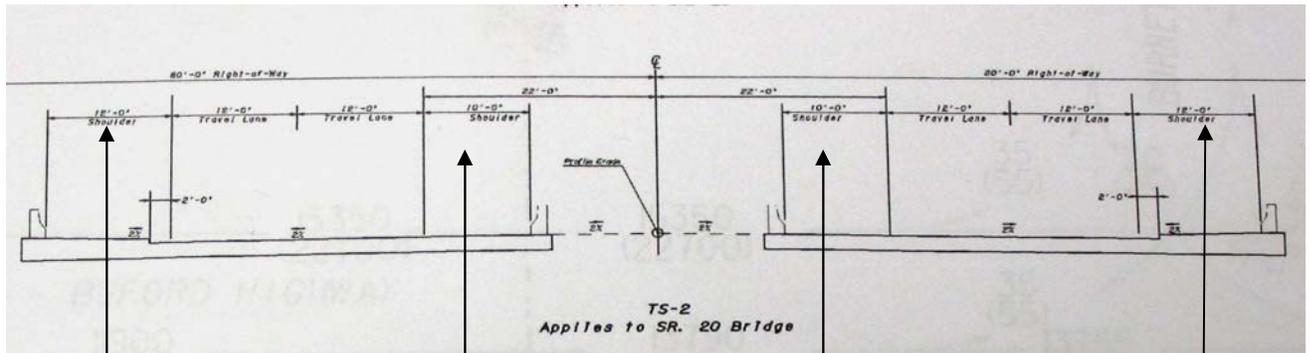
SR 20 Widening

ITEM N^o: C-8A
CLIENT: GDOT
Sheet 2 of 4

ORIGINAL DESIGN



PROPOSED CHANGE



Reduce to 4 foot
shoulders

Reduce to 8 feet (6 foot sidewalk)

CALCULATIONS**SR 20 Widening**

ITEM N^o: C-8A
CLIENT: GDOT
Sheet 4 of 4

Total Bridge Width= $2 * (50-6-4) = 80$ feet

Bridge Area= $800 * 80 = 64,000$ sq. feet

Construction cost = $64,000 * 85.5 = \$5,472,000$ + markups

Saving = $6,840,000 - 5,472,000 = \$1,368,000$ + markups

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-8B	1 of 4	Reduce inside shoulder width to 2 feet and remove sidewalks on both bridges.

Comp By: LFE Date: 12/04/07 Checked By: DCW Date: 12/06/07

Original Concept:

Conceptual drawings show 10 feet concrete sidewalks on both bridges and 10 feet inside shoulders.

Proposed Change:

The VE Team recommended reducing the inside shoulder width to 2 feet and removing the two side walks on both bridges.

Justification:

Reducing the inside shoulder width to 2 feet will match road way cross section. Also, SR 20 is located in an urban area and current land development does not warrant sidewalks on bridges. This results in overall width reduction of 36 feet

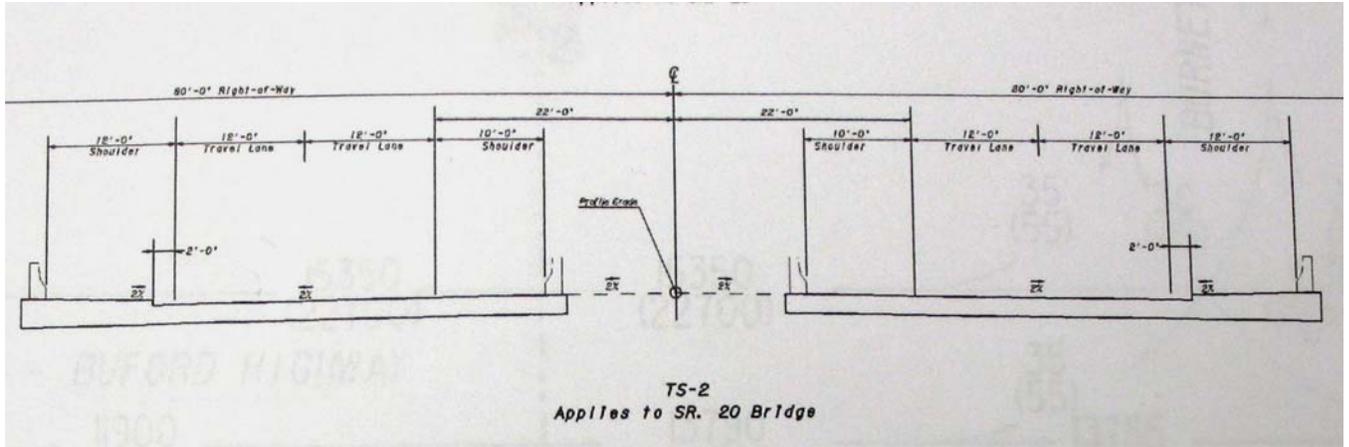
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	7,524,000		
- Proposed	4,815,000		
- Savings	2,709,000		2,709,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			2,709,000

SKETCH

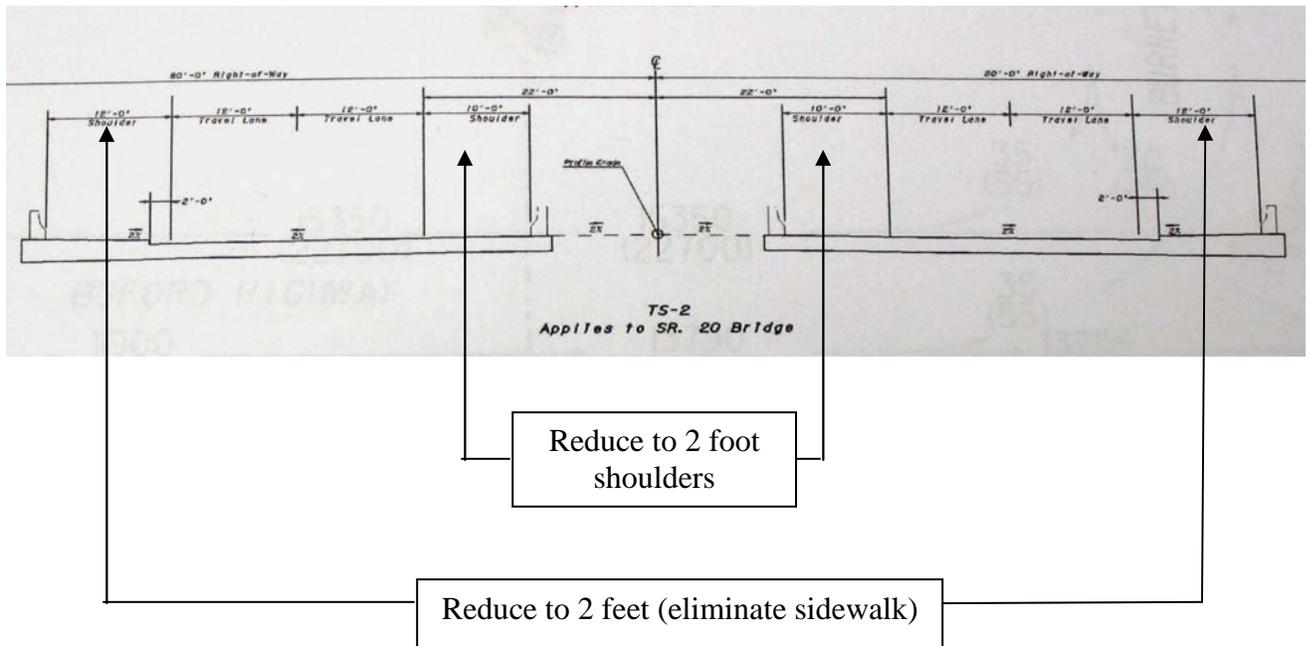
SR 20 Widening

ITEM N^o: C-8B
CLIENT: GDOT
Sheet 2 of 4

ORIGINAL DESIGN



PROPOSED CHANGE



CALCULATIONS**SR 20 Widening**ITEM N^o: C-8B

CLIENT: GDOT

Sheet 4 of 4

Total Bridge Width= $2 * (50-8-10) = 64$ feet

Bridge Area= $800 * 64 = 51,200$ feet²

Construction cost = $51,200 * 85.5 = \$4,377,600$ + markups

Saving = $6,840,000 - 4,377,600 = \$2,462,400$ + markups

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-11	1 of 3	Lower road profile at bridge location.

Comp By: LFE Date: 12/04/07 Checked By: DCW Date: 12/06/07

Original Concept:

Conceptual drawings show an approximate road elevation at the middle of the bridge of 940.

Proposed Change:

The VE Team recommends lowering the road profile, if vertical clearance is not an issue, so that a saving in substructure cost can be achieved.

Justification:

If the vertical clearance is not an issue, the road profile at the bridge location may be lowered. This will reduce the total height of the substructure, and consequently reduces the size of the bridge foundations. Usually substructure cost constitutes about 35% of total bridge cost. By lowering the road profile a saving of about 10% of substructure cost may be achieved, as well as extra savings in embankment cost.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	288,800		
- Proposed	-0-		
- Savings	288,800		288,800
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			288,800

CALCULATIONS**SR 20 Widening**

ITEM N^o: C-11
CLIENT: GDOT
Sheet 3 of 3

Total bridge cost= \$6,840,000

Assumed substructure cost = $0.35 * 6,840,000 = \$2,394,000$

Assumed saving in bridge cost due to lowering the road profile = $0.10 * 2,394,000 =$
 $\$239,400 + \text{markups}$

Assumed saving in embankment cost (4,630 CY)= \$23,150

Total Saving = \$262,550 + markups

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.:

PAGE No.:

CREATIVE IDEA:

C-13

1 of 3

Use drainage scupper where allowed

Comp By: LFE Date: 12/04/07 Checked By: DCW Date: 12/06/07

Original Concept:

Conceptual drawings show the bridge drainage would be by gravity from the center of the bridge by changing the grades from positive to negative at the center, then water will be collected at the start and the end of the bridge.

Proposed Change:

The VE Team recommends the use of drainage scuppers where allowed to reduce the volume of collected water at both ends of the bridge.

Justification:

Scupper drainage will not be allowed over the Chattahoochee River nor over the Park Land, otherwise scuppers may be used to drain the storm water over the flood plan.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	465,000		
- Proposed	233,000		
- Savings	232,000		232,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			232,000

CALCULATIONS**SR 20 Widening**ITEM N^o: C-13
CLIENT: GDOT
Sheet 3 of 3

Total cost of bridge drainage is \$423,000 for 800 feet of bridge length for a unit cost of 528.75/LF. It is assumed that 400 feet of bridge will be drained by the scuppers for a total saving of 50% (\$211,500) + markups.

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: G-1.1 G-1.3	PAGE No.: 1 of 9	CREATIVE IDEA: Optimize drainage layout
------------------------------------	----------------------------	---

Comp By: GO Date: 12-05-07 Checked By: DCW Date: 12/06/07

Original Concept:

Maintain current drainage design

Proposed Change:

At several locations throughout the project corridor, there could be some drainage design efficiencies developed to optimize the drainage design.

Justification:

Specific areas are listed on the calculations page.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	913,300		
- Proposed	343,900		
- Savings	569,400		569,400
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			569,400

CALCULATIONS

SR 20 Widening

ITEM N^o: G-1
CLIENT: GDOT
Sheet 2 of 9

Area 1

Project 1, PI 0002392, Forsyth County; nearly the entire project has a duplicate longitudinal drainage system. Only 4,000 feet of the total project length of 15,300 feet does not. Providing cross drains rather than 2 longitudinal systems could reduce the piping lengths by possibly 2/3; based on an inlet spacing of 200 feet vs. a cross drain of 60 feet.
 $15,300 - 4,000 = 11,300$ ft.

Area 2

Project 3, PI 0004430, Gwinnett County, sta 1289+00, Mountain Ridge Way.
At this location, there are 2-42 inch crossing pipes less than 100 feet apart. These could potentially be consolidated into one crossing. Most likely, the single pipe crossing would be larger to accommodate the flows but overall, it should be more efficient, cost less and be easier to construct and maintain. Some regrading on the upstream side could be required. The savings will also include fewer end treatments.
For equivalent areas, use 1-60 inch in lieu of 2-42 inch

Area 3

Project 3, PI 0004430, Gwinnett County, sta 1304+00.
At this location, a 36 RCP crosses at a severe skew angle. This crossing can be realigned to a more perpendicular crossing shortening it from 310 feet to 170 feet (140 feet savings). The longitudinal pipe will most likely need to be upgraded incurring additional costs however there will be some overall savings and a shorter crossing distance.

Area 4

Project 3, PI 0004430, Gwinnett County, sta 1381+00, Sugar Ridge Drive.
At this location, by slightly shifting the 36 inch crossing, we can eliminate the 18 in crossing while maintaining the roadway drainage inlets.

Area 5

Project 3, PI 0004430, Gwinnett County, sta 1446+00.
At this location, eliminate the drainage structure connecting 2-48 RCP. It does not appear this structure is required.

Area 6

Project 3, PI 0004430, Gwinnett County, sta 1467+00.
At this location, shifting the 18 crossing pipe and inlets and realigning the 48 inch outlet pipe can save a drainage structure and shorten the pipe run while providing a similar drainage scheme.

G-1.1
Pg 3/9

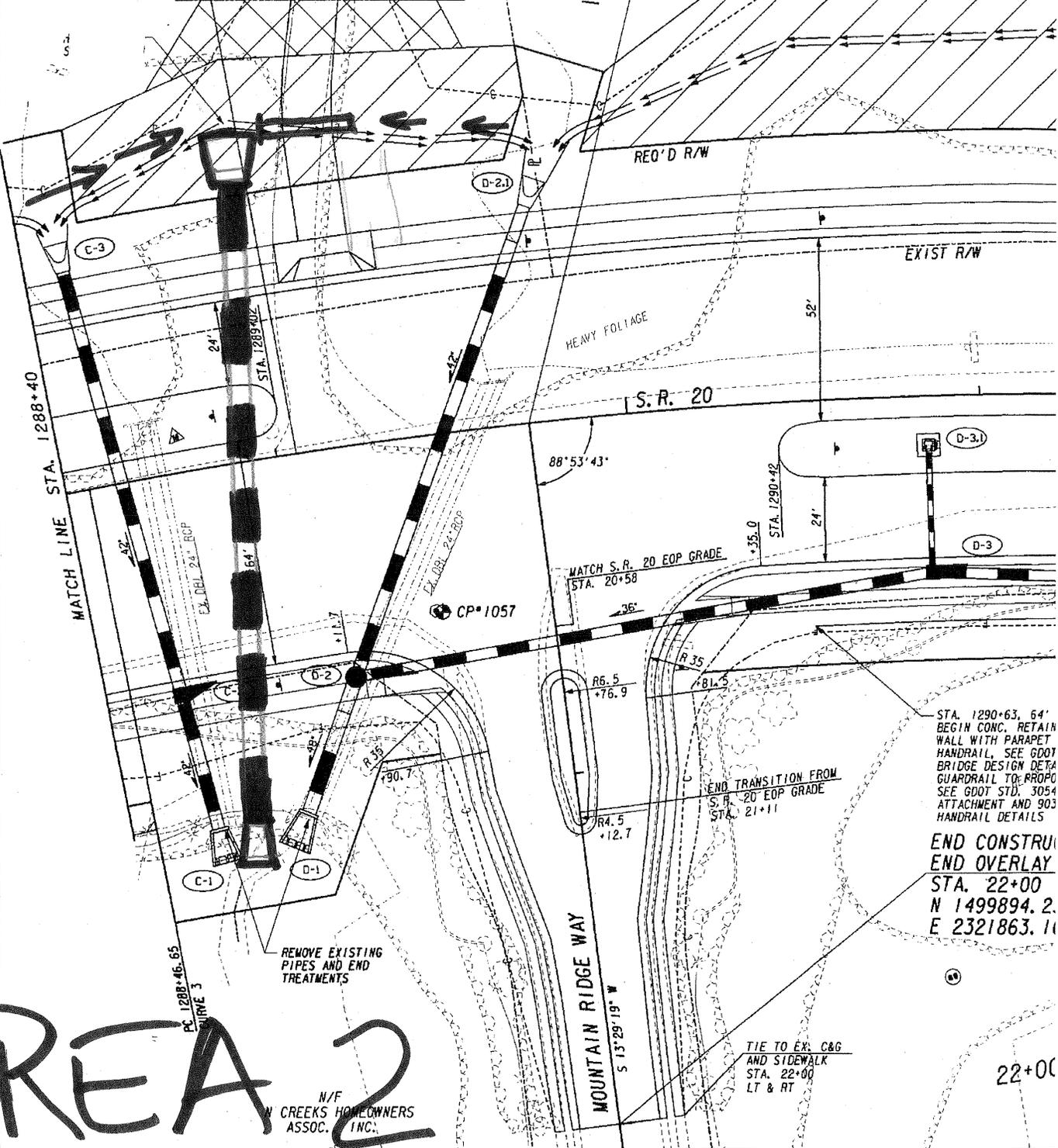
CONTI
1/2" RI
STAT
N 150
E 23
ELEV.

1057
AP
1.03, 50, 24' RIGHT.

N/F
MARRIS E.
THANSON

STA. 1289+72 S.R. 20
STA. 20+00 MOUNTAIN RIDGE WAY
N 1500088.71
E 2321909.81

SEE INSET 'A' DRAWING 13-04



AREA 2
N/F
CREEKS HOMEOWNERS
ASSOC. INC.

COUNTY
GWINNETT

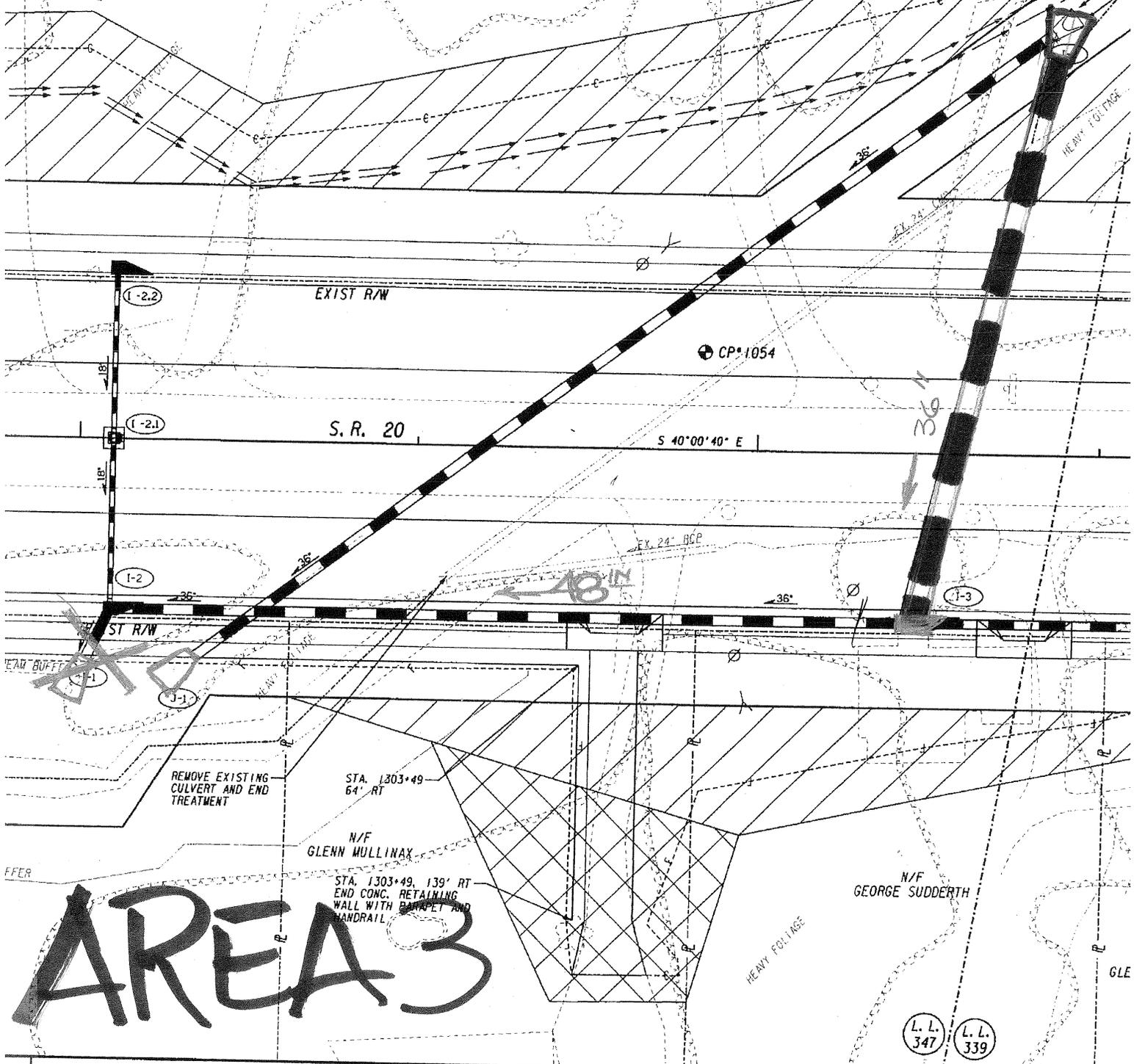
PROJECT NUMBER
MLS-000-00(430)

6-2.3
1949
L. L. DITCH
1305+03

N/F
VANRIETTE LAND
HOLDINGS LLC

1302+00

1304+00



AREA 3

REMOVE EXISTING
CULVERT AND END
TREATMENT

STA. 1303+49
64' RT

N/F
GLENN MULLINAX

STA. 1303+49, 139' RT
END CONC. RETAINING
WALL WITH PARAPET AND
HANDRAIL

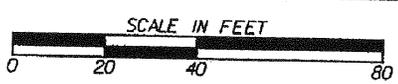
N/F
GEORGE SUDDERTH

L. L.
347

L. L.
339



PRECISION PLANNING, INC.
PLANNERS, ENGINEERS ARCHITECTS & SURVEYORS
400 PIKE BLVD, P.O. BOX 2210
LAWRENCEVILLE, GA 30046
(770) 339-0000



REVISION DATES

NO.	DATE	DESCRIPTION

STATE OF GA
DEPARTMENT OF TR
OFFICE: ROAD DESIGN
MAINLINE

S. R. 20 / CUMMING HW
WIDENING AND RECONST

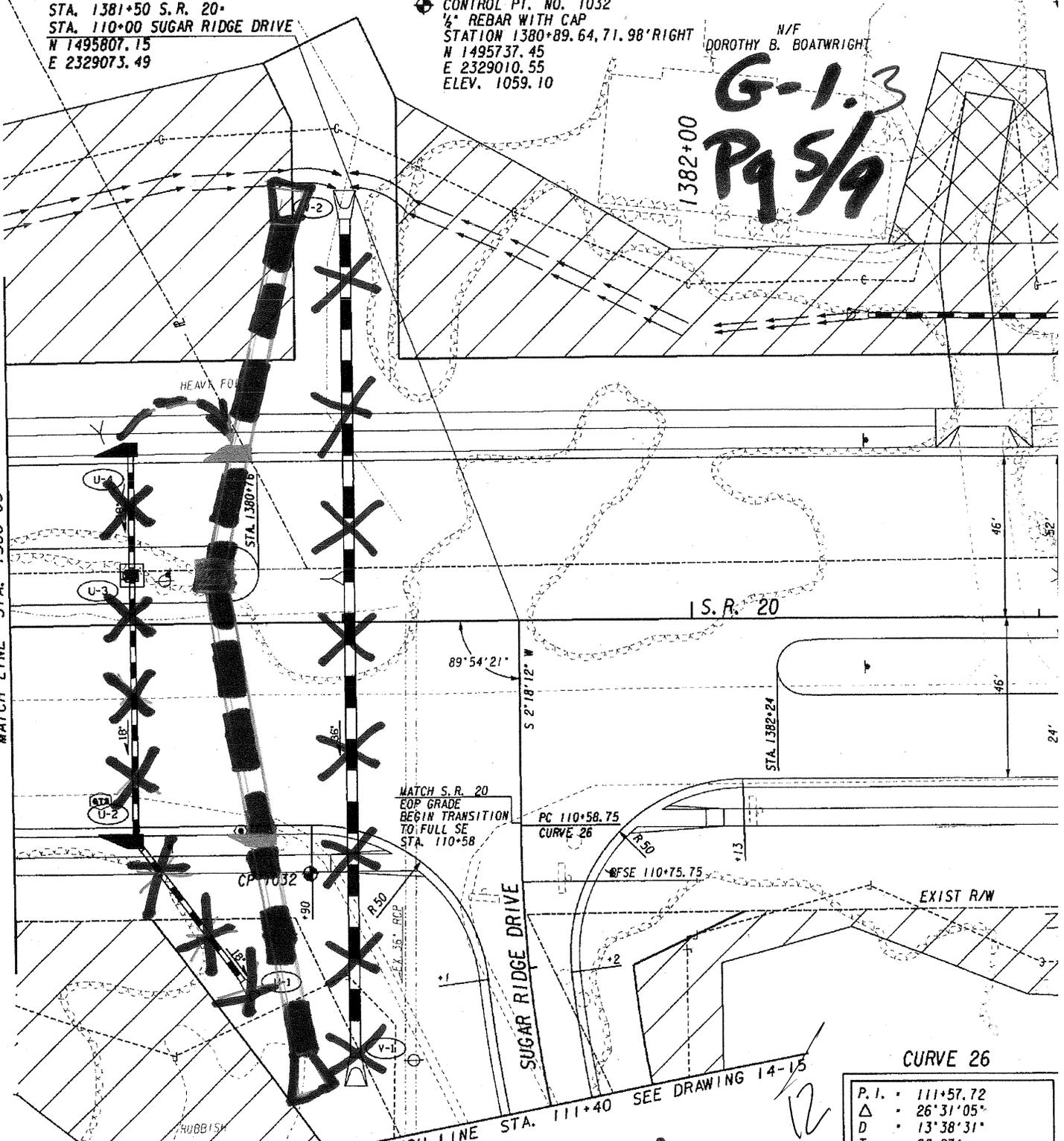
STA. 1381+50 S.R. 20+
 STA. 110+00 SUGAR RIDGE DRIVE
 N 1495807.15
 E 2329073.49

CONTROL PT. NO. 1032
 1/4" REBAR WITH CAP
 STATION 1380+89.64, 71.98" RIGHT
 N 1495737.45
 E 2329010.55
 ELEV. 1059.10

N/F
 DOROTHY B. BOATWRIGHT

G-1.3
P9 5/9

MATCH LINE STA. 1380+05



MATCH S.R. 20
 EOP GRADE
 BEGIN TRANSITION
 TO FULL SE
 STA. 110+58

PC 110+58.75
 CURVE 26

BFSE 110+75.75

CURVE 26

P. I.	111+57.72
Δ	26° 31' 05"
D	13° 38' 31"
T	98.97'
L	194.39'
SE	420.00'
R	NC
P. I. N	1495649.52
E	2329067.15

AREA 4

MATCH LINE STA. 111+40 SEE DRAWING 14-15

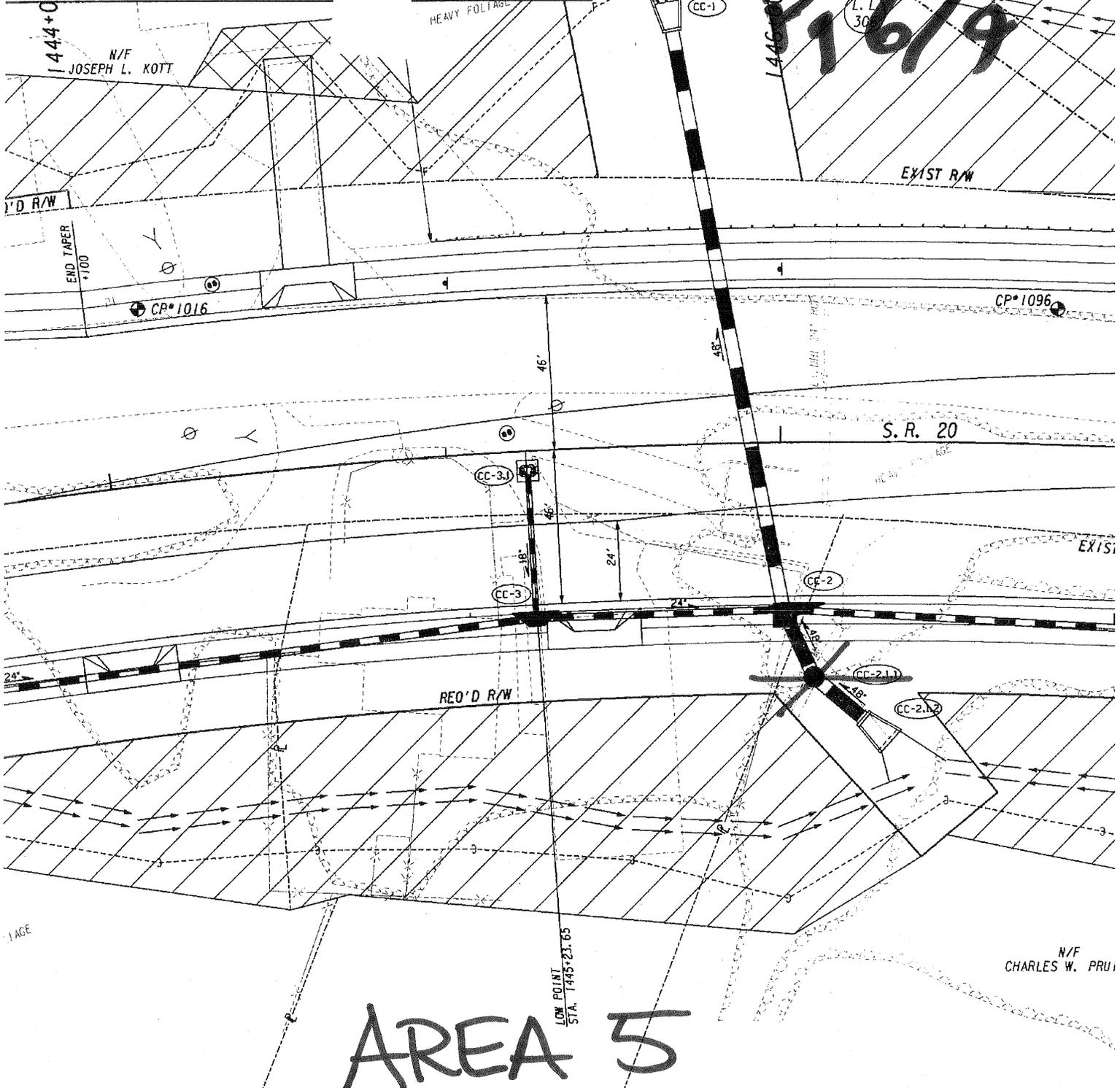


PRECISION PLANNING
 PLANNERS, ENGINEERS ARCHITECTS & S
 400 PIKE BLVD, P.O. BOX 2210
 LAWRENCEVILLE, GA 30046
 (770) 338-8000

52.22' LEFT
 CONTROL PT. NO. 1096
 1/2" REBAR WITH CAP
 STATION 1446+81.23, 40.
 N 1495399.07
 E 2335587.33
 ELEV. 1152.62
 SEE INSET 'L' DR

CONTROL PT. NO. 1097
 1/2" REBAR WITH CAP
 STATION 1448+92.48, 31.21' LEFT
 N 1495284.42
 E 2335769.83
 ELEV. 1161.68

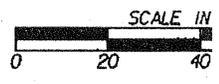
GL-2
P16/9



AREA 5



PRECISION PLANNING, INC.
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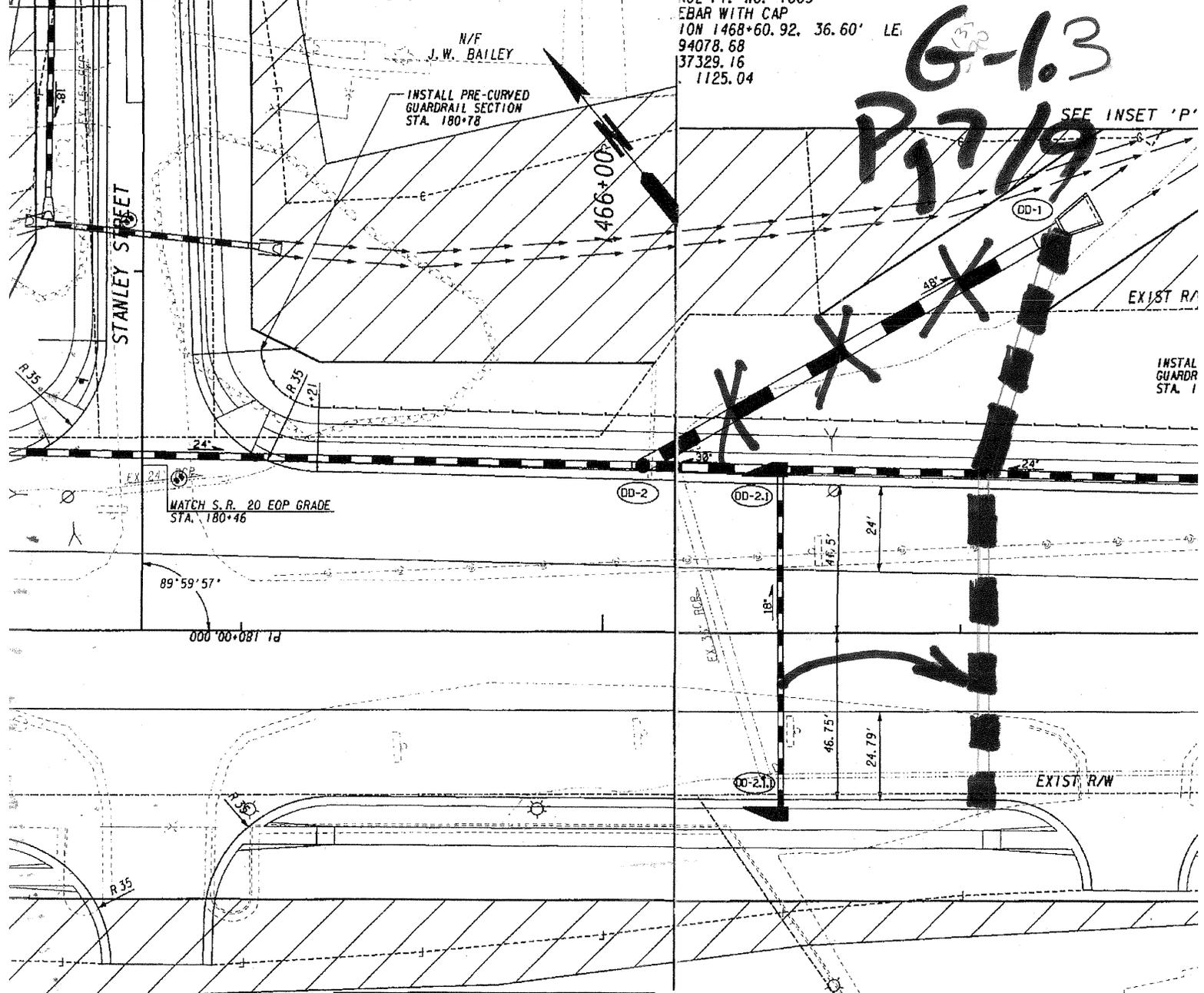


SEE INSET 'N' THIS DRAWING

HOL. PL. NO. 1009
EBAR WITH CAP
10N 1468+60.92, 36.60' LE.
94078.68
37329.16
1125.04

G-1.3
P 17/19

SEE INSET 'P'



MATCH S.R. 20 EOP GRADE
STA. 180+46

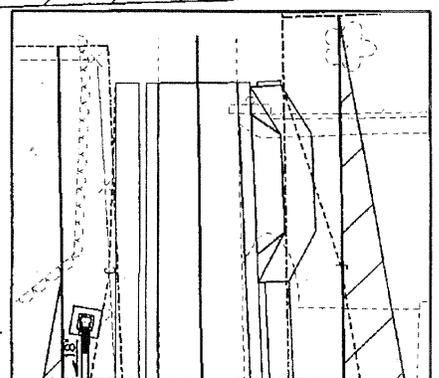
89°59'57"

PL 180+00.000

EXIST R/W

N/F
EDWIN DALE THOMPSON

AREA C



INSET 'N' MATCH LINE
THIS DRAWING

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: ROAD DESIGN

MAINLINE PLAN

S. R. 20 / CUMMING HWY.
WIDENING AND RECONSTRUCTION

1

80

COST WORKSHEET

PROJECT: SR 20 Widening	ITEM No: G-1
	CLIENT: GDOT
	Sheet 8 of 9

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
							0
AREA 1							
Long drainage	LS	1	600000	600,000	0.33	600000	198,000
SUBTOTAL				600,000			198,000
Markup @ 25.76%				154,560			51,005
TOTAL				754,560			249,005
TOTAL ROUNDED				754,600			249,000



COST WORKSHEET							
PROJECT: SR 20 Widening					ITEM No: G-1		
					CLIENT: GDOT		
					Sheet 9 of 9		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
AREA 2							
42 in rcp	LF	350	120	41,864			
42 FES	EACH	4	1616.72	6,467			
60 in RSP	LF				180	150	27,000
60 FES	EACH				2	1400	2,800
add. misc. pipe and grading	LS				1	15000	2,000
AREA 3							
36 in RCP	LF	560	88.36	49,482	170	88.36	15,021
36 FES	EACH	2	1217.68	2,435			
48 in RCP	LF		0		200	132.17	26,434
48 FES	EACH				1	1250	1,250
AREA 4							
18 in RCP	LF	160	43.65	6,984			
18 FES	EACH	1	672.21	672			
AREA 5							
drainage structure	EACH	1	4070.34	4,070			
AREA 6							
48 in RCP	LF	65	132.17	8,591	0	0	
drainage structure	EACH	1	4070.34	4,070			
SUBTOTAL							
				124,635			
Markup @ 27.34%				34,075			
TOTAL							
				158,711			
TOTAL ROUNDED							
				158,700			

DEVELOPMENT AND RECOMMENDATION PHASE

SR 20 Widening

IDEA No.: G-2.3	PAGE No.: 1 of 3	CREATIVE IDEA: DESIGN CONSIDERATION Do not use bottomless culvert
Comp By: GO	Date: 12-05-07	Checked By: DCW Date: 12/06/07

Original Concept:

A bottomless culvert is proposed for Sta. 1298+00

Proposed Change:

Use a standard culvert design in lieu of the bottomless type.

Justification:

Based on GDOT Bridge design manual, Section 6.3, it is “extremely rare” and generally undesirable to use a bottomless culvert. There are environmental circumstances that will require one, however in this case, the bottomless culvert is replacing an existing pipe system with no natural stream bottom. Also, immediately upstream from this location, there is a road crossing, Riverside Road, which is also, most likely an existing pipe.

There is no existing natural stream bottom to maintain and therefore a very weak environmental argument for its use. Using a conventional, standard box culvert design is recommended for this area.

DESIGN CONSIDERATION

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original			
- Proposed			
- Savings	TBD		
FUTURE COST - Savings			
TOTAL PRESENT WORTH SAVINGS			TBD

CONTINUATION

SR 20 Widening

ITEM N^o: G-2.3
CLIENT: GDOT
Sheet 2 of 3

There is no size or cost information submitted for this culvert. However, 3 sided culverts typically require more detailed and extensive foundations and scour protection. While a conventional box culvert will require more concrete and steel, overall there will be a savings due to less foundation work.

G-2.3
Pg 3 of 3

6.3 Three-Sided or Bottomless Culverts

Bottomless culverts are allowed only when no other practical solution (such as a bridge or standard box) will satisfy the project requirements. This may occur in extremely rare instances where the only way to obtain an environmental clearance is through the use of a bottomless culvert. In this case the detailed plans for the bottomless culvert must be included in the contract documents. The foundation design for the bottomless culvert must be included in these details and sealed by a Professional Engineer registered in the State of Georgia. In addition, the foundation design must detail how the bottomless culvert foundation will be protected from scour. In general, rip-rap is NOT considered satisfactory for protecting a spread footing from scour – footings must be keyed into solid rock or founded on piling embedded well below the scour line.

The provisions for the sizing of Bottomless culverts are outlined in the GDOT drainage manual.

APPENDIX

INFORMATION PHASE		FUNCTION ANALYSIS					
<i>SR 20 Widening – All Three Projects</i>							
System: Widen Roadway							
Function: Decrease Congestion							
ITEM No.	DESCRIPTION	FUNCTION			INITIAL DOLLARS (x 1,000)		
		Verb	Noun	Kind*	Cost	% of Total	Worth
A	Right of way	Provide	Space	B	39,942	42	34,000
B	AC pavement	Shed	Liquids	B	11,793	13	10,000
		Distribute	Load				
		Improve	Ride				
C	New Bridge	Cross	Waterway	B	6,840	7	5,500
D	Earthwork / Grading	Supports	Pavement	S	5,089	5	4,500
		Achieve	Grade				
E	Aggregate Base	Support	Pavement	S	6,566	7	5,800
		Drain	Sub base				
F	Erosion Control	Prevent	Runoff	S	3,899	4	3,500
G	Drainage	Transmit	Fluids	S	3,820	4	3,600
H	Reimbursable Utilities	Relocate	Services	S	3,703	4	3,600
I	Sidewalks	Support	Pedestrians	S	2,332	2	1,900
TOTALS					83,984	88	72,400

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
SR 20 Widening			
NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Right of Way		
A-1	Standardize right of way width		See Item A-2
A-2	Reduce right of way to back of shoulder – use easements		✓
A-3	Reduce median width		✓
A-4	Reduce shoulder width		✓
A-5	Reduce extent of work on side roads		See B-2
A-6	Reduce construction limits to save right of way, use retaining walls	No areas applicable	X
A-7	Increase fill side slopes	No areas applicable	X
A-8	Avoid displacements	Already being done cost effectively	X
B	AC Pavement		
B-1	Reduce lane widths		✓
B-2	Re-evaluate side road alignments		✓
B-3	Maximize re-use of pavement	Already being done in existing design	X
B-4	Eliminate unnecessary turn lanes	Already being done in existing design	X

NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
C	Bridge over Chattahoochee River		
C-1	Adjust alignment to reduce main span length		✓
C-2	Reduce lane width		✓
C-3	Reduce sidewalks		✓
C-4	Use one bridge not two	Not cost effective but would ease future construction.	X
C-5	Shorten bridge - - reduce flood storage		✓
C-6	Maximize capacity of bridge elements		See Item C-7
C-7	Use higher psi concrete		✓
C-8	Reduce shoulder width		✓
C-9	Build 1 bridge now, use existing bridge for near future	Not cost effective for future needs.	X
C-10	Use pier in river to reduce span	Not cost effective with increased pier costs and not environmentally desirable	X
C-11	Lower profile		✓
C-12	Drain bridge from center	Already being done in current design	X
C-13	Use scuppers where allowed		✓
C-14	Evaluate bridge demolition method	Insufficient information to evaluate	X
D	Earthwork / Grading		
D-1	Adjust profile to reduce borrow	Minimal opportunities exist in this project.	X

NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
E	Aggregate Base		
E-1	Evaluate pavement section	Pavement analysis not yet completed in this design	X
F	Erosion Control		
	No ideas generated		
G	Drainage		
G-1	Optimize storm drainage		✓
G-2	Eliminate bottomless culvert		✓
H	Reimbursable Utilities		
H-1	Salvage pump station by Sycamore Road	Insufficient information to evaluate	X
I	Sidewalks		
I-1	Eliminate on one side, grade other for future use	Insufficient time to evaluate	X
I-2	Use AC walks	Insufficient time to evaluate	X
I-3	Use reinforcing mesh	Prevents cracking in lieu of control cracking	X
J	Other		
J-1	Use alternate type retaining walls	Insufficient information to evaluate	X

