VALUE ENGINEERING CONSTRUCTABILITY STUDY

OF

US 441 WIDENING AND RECONSTRUCTION

PROJECT NUMBER: EDS-441(40)

ATLANTA, GEORGIA

MARCH 20, 2006

Prepared by:

VE GROUP, L.L.C.

In Association With:

Georgia Department of Transportation

VALUE ENGINEERING STUDY
TEAM LEADER

_____

William F. Ventry, P.E., C.V.S.
C.V.S. Registration No. 840603(LIFE)

Date: _____

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I. INTRODUCTION

GENERAL

This Value Engineering report summarizes the results of the Value Engineering study performed by VE GROUP for the Georgia Department of Transportation. The study was performed on March 20, 2006.

VALUE ENGINEERING METHODOLOGY

The Value Engineering Team followed the basic Value Engineering procedure for conducting this type of analysis.

This process included the following phases:

1. Investigation
2. Speculation
3. Evaluation/Development
4. Report Preparation

Evaluation criteria identified as a basis for the comparison of alternatives included the following:

- Constructability
- Future Maintenance
- Impact to Local Traffic
- Construction Time
- Construction Cost
- Right of Way Cost

I. INTRODUCTION

SUMMARY OF RECOMMENDATIONS

It is the recommendation of the Value Engineering Team that the following Value Engineering Alternatives be carried into the Project Development process for the final plans and specifications.

RECOMMENDATION NUMBER 1- CONSTRUCTABILITY

The Value Engineering Team recommends that the following Value Engineering Alternatives be implemented.

A. LAKE SINCLAIR BOX CULVERTS

Value Engineering Alternative Number 1 - Leave existing structures in place and extend to needed length.

If this recommendation can be implemented, there is a possible savings ***$329,641.***

If this Value Engineering Alternative Number 1 cannot be implemented, the Value Engineering Team recommends Value Engineering Alternative Number 2.

Value Engineering Alternative Number 2 - Remove existing structures and replace with pipes.

If this recommendation can be implemented, there is a possible savings ***$347,785.***

B. MEDIAN DRAINS

Value Engineering Alternative - Lower pipes to avoid roadway base.

C. CROSSDRAIN PIPES

Value Engineering Alternative - Utilize the same grade across roadway with a redesigned slope drain for the outfall.

If this recommendation can be implemented, there is a possible savings ***$2,184.*** (per location)

D. RAILROAD BRIDGE

Value Engineering Alternative - Use MSE walls with vertical abutments.

If this recommendation can be implemented, there is a possible savings ***$223,808.***

SUMMARY OF RECOMMENDATIONS *(continued)*

RECOMMENDATION NUMBER 2- MATERIALS

The Value Engineering Team recommends that the following Value Engineering Alternatives be implemented.

A. IN-PLACE EMBANKMENT

Value Engineering Alternative Number 1 - Reduce the amount required by eliminating the proposed railroad grade separation, if possible.

If this recommendation can be implemented, there is a possible savings ***$2,843,410.***

Value Engineering Alternative Number 2 - Reduce the amount required by eliminating the proposed realignment and railroad grade separation, if possible.

If this recommendation can be implemented, there is a possible savings ***$21,674,993.***

B. PAVEMENT

Value Engineering Alternative - Use "Best Fit" as much as possible.

SUMMARY OF RECOMMENDATIONS *(continued)*

RECOMMENDATION NUMBER 3- TRAFFIC CONTROL/MAINTENANCE OF TRAFFIC

The Value Engineering Team recommends that the Value Engineering Alternatives be implemented.

A. LITTLE CREEK BOX CULVERT

Value Engineering Alternative Number 1 - Build low side first.

Value Engineering Alternative Number 2 - Consider short bridge or a pre-cast bottomless culvert.

If these alternatives can be implemented, there is a possible savings ***$239,985.***

RECOMMENDATION NUMBER 4- CONSTRUCTION TIME

The Value Engineering Team recommends that the following Value Engineering Alternatives be implemented.

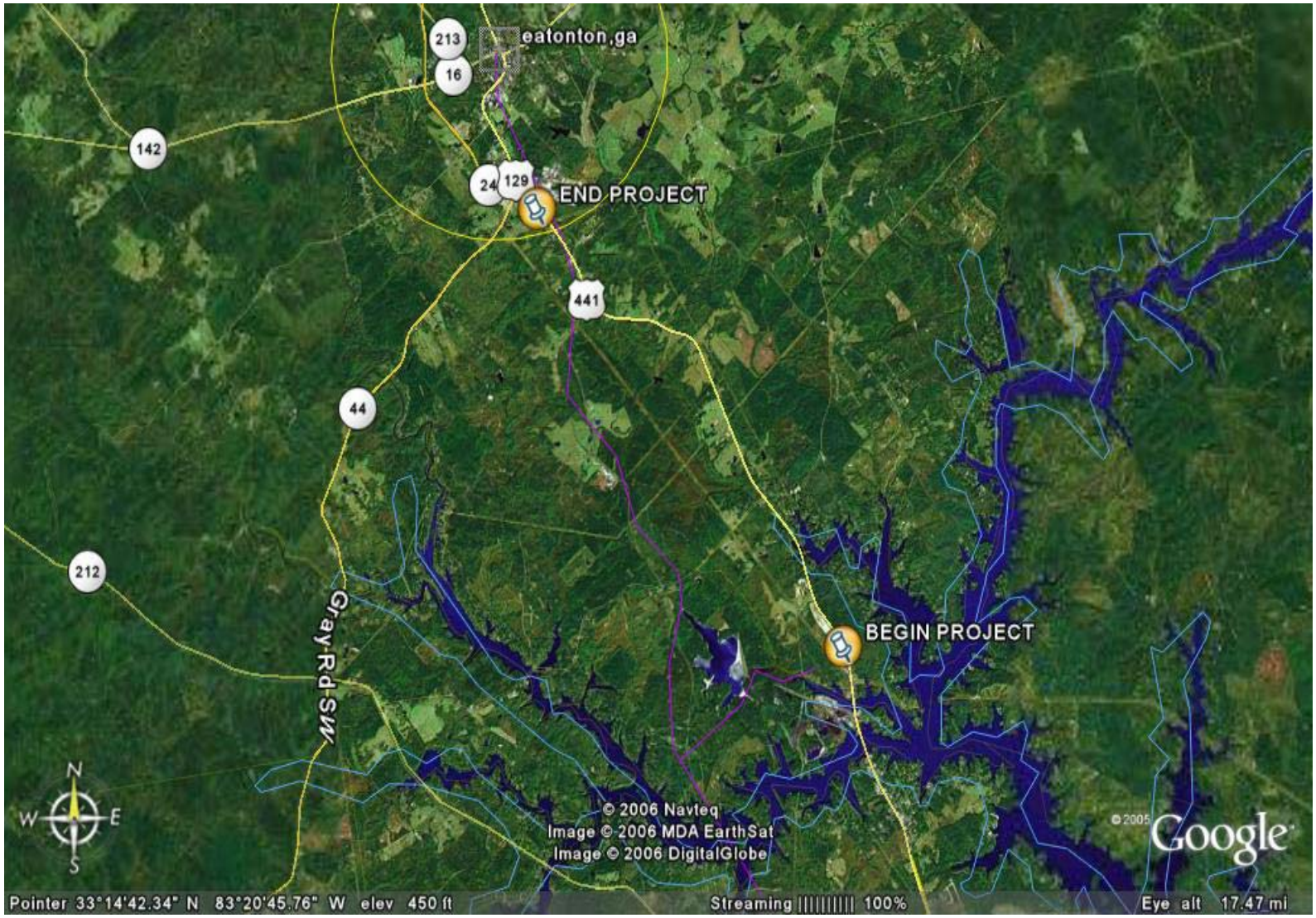
A. LENGTH OF TIME

Value Engineering Alternative - Set time for project at 24 months.

B. LANE CLOSURES

Value Engineering Alternative - No lane closures during UG football games.

II. LOCATION OF PROJECT



III. TEAM MEMBERS AND PROJECT DESCRIPTION

TEAM MEMBERS

NAME	AFFILIATION	EXPERTISE	PHONE
William F. Ventry, P.E., C.V.S.	VE Group	Team Leader	850/627-3900
Bruce Nicholson	VE Group	Construction	850-627-3900
Tom Hartley, P.E., C.V.S.	VE Group	Roadway Design/Traffic	850/627-3900
John Ledbetter, Jr., P.E., R.L.S.	VE Group	Structures	850/627-3900

PROJECT DESCRIPTION

This project involves the widening and reconstruction of US 441 (SR 24) beginning just north of CR 245/Clay Road and ending at US 129/SR 44 in Putnam County. The existing two-lane highway will be replaced with a four-lane divided highway and include two miles on a new alignment which crosses over the existing Norfolk Southern Railway tracks.

IV. INVESTIGATION PHASE

VALUE ENGINEERING STUDY BRIEFING

US 441 Widening and Reconstruction **March 20, 2006**		
NAME	**AFFILIATION**	**PHONE**
William F. Ventry, P.E., C.V.S.	VE Group	850/627-3900
Bruce Nicholson	VE Group	850/627-3900
Tom Hartley, P.E., C.V.S.	VE Group	850/627-3900
John Ledbetter, Jr., P.E., R.L.S.	VE Group	850/627-3900
Lisa Myers	GDOT	404/651-7468
James Smith	GDOT	478/553-2331
Kraig Collins	GDOT	478/445-5130
Richard Marshall	GDOT	706/656-5306
Chris Rideout	Greenhorne & O'mara	678/987-3916
Clayton Bennett	GDOT	404/656-5283
Otis Clark	GDOT	404/463-6265
Charity Belford	GDOT	404/635-8154

IV. INVESTIGATION PHASE

STUDY RESOURCES

US 441 Widening and Reconstruction **March 20, 2006**		
NAME	**AFFILIATION**	**PHONE**
Wade Harris	GDOT	404/656-6844
Mitch Pearson	GDOT	404/656-6844
Troy Patterson	GDOT	404/656-6844
Tim Smith	GDOT Management Center	404/635-8121
John Alford	Ralph Whitehead Associates	919/791-0108

IV. INVESTIGATION PHASE

The following areas have been identified by the Value Engineering Team as areas of focus and investigation for the Value Engineering process:

I. CONSTRUCTABILITY

- **A. LAKE SINCLAIR BOX CULVERTS**
- **B. MEDIAN DRAINS**
- **C. CROSSDRAIN PIPES**
- **D. RAILROAD BRIDGE**

II. MATERIALS

- **A. IN-PLACE EMBANKMENT**
- **B. PAVEMENT**

III. TRAFFIC CONTROL/MAINTENACE OF TRAFFIC

- **A. LITTLE CREEK BOX CULVERT**

IV. CONSTRUCTION TIME

- **A. LENGTH OF TIME**
- **B. LANE CLOSURES**

V. SPECULATION PHASE

Ideas generated, utilizing the brainstorming method, for performing the functions of previously identified areas of focus.

I. CONSTRUCTABILITY

A. LAKE SINCLAIR BOX CULVERTS

- Leave existing structures in place and extend to needed length.
- Remove existing structures and replace with a short bridge.
- Remove existing structures and replace with pipes.

B. MEDIAN DRAINS

- Lower pipes to avoid roadway base.

C. CROSSDRAIN PIPES

- Utilize the same grade across roadway with a redesigned slope drain for the outfall.

D. RAILROAD BRIDGE

- Use MSE walls with vertical abutments.

II. MATERIALS

A. IN-PLACE EMBANKMENT

- Reduce the amount required by eliminating the proposed railroad grade separation, if possible.

B. PAVEMENT

- Use “Best Fit” as much as possible.

V. SPECULATION PHASE

III. TRAFFIC CONTROL/MAINTENANCE OF TRAFFIC

A. LITTLE CREEK BOX CULVERT

- Build low side first.
- Consider short bridge or a pre-cast bottomless culvert.

IV. CONSTRUCTION TIME

A. LENGTH OF TIME

- Set time for project at 24 months.

B. LANE CLOSURES

- No lane closures during UG football games.

VI. EVALUATION PHASE

A. ALTERNATIVES

The following alternatives were formulated during the "eliminate and combine" portion of the Evaluation Phase.

I. CONSTRUCTABILITY

A. LAKE SINCLAIR BOX CULVERTS

Value Engineering Alternative Number 1 - Leave existing structures in place and extend to needed length.

Value Engineering Alternative Number 2 - Remove existing structures and replace with Pipes.

B. MEDIAN DRAINS

Value Engineering Alternative - Lower pipes to avoid roadway base.

C. CROSSDRAIN PIPES

Value Engineering Alternative - Utilize the same grade across roadway with a redesigned slope drain for the outfall.

D. RAILROAD BRIDGE

Value Engineering Alternative - Use MSE walls with vertical abutments.

II. MATERIALS

A. IN-PLACE EMBANKMENT

Value Engineering Alternative - Reduce the amount required by eliminating the proposed railroad grade separation, if possible.

B. PAVEMENT

Value Engineering Alternative - Use “Best Fit” as much as possible.

A. ALTERNATIVES *(continued)*

III. TRAFFIC CONTROL/MAINTENANCE OF TRAFFIC

A. LITTLE CREEK BOX CULVERT

Value Engineering Alternative Number 1 - Build low side first.

Value Engineering Alternative Number 2 - Consider short bridge or a pre-cast bottomless culvert.

IV. CONSTRUCTION TIME

A. LENGTH OF TIME

Value Engineering Alternative - Set time for project at 24 months.

B. LANE CLOSURES

Value Engineering Alternative - No lane closures during UG football games.

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. LAKE SINCLAIR BOX CULVERTS

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE NUMBER 1
(3) VALUE ENGINEERING ALTERNATIVE NUMBER 2

B. MEDIAN DRAINS

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

C. CROSSDRAIN PIPES

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

D. RAILROAD BRIDGE

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

II. MATERIALS

A. IN-PLACE EMBANKMENT

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE NUMBER 1
(3) VALUE ENGINEERING ALTERNATIVE NUMBER 2

B. PAVEMENT

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

VII. DEVELOPMENT PHASE

III. TRAFFIC CONTROL

A. LITTLE CREEK BOX CULVERT

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE NUMBER 1

(3) AS PROPOSED
(4) VALUE ENGINEERING ALTERNATIVE NUMBER 2

IV. CONSTRUCTION TIME

A. LENGTH OF TIME

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

B. LANE CLOSURES

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. LAKE SINCLAIR BOX CULVERTS

1. "As Proposed"

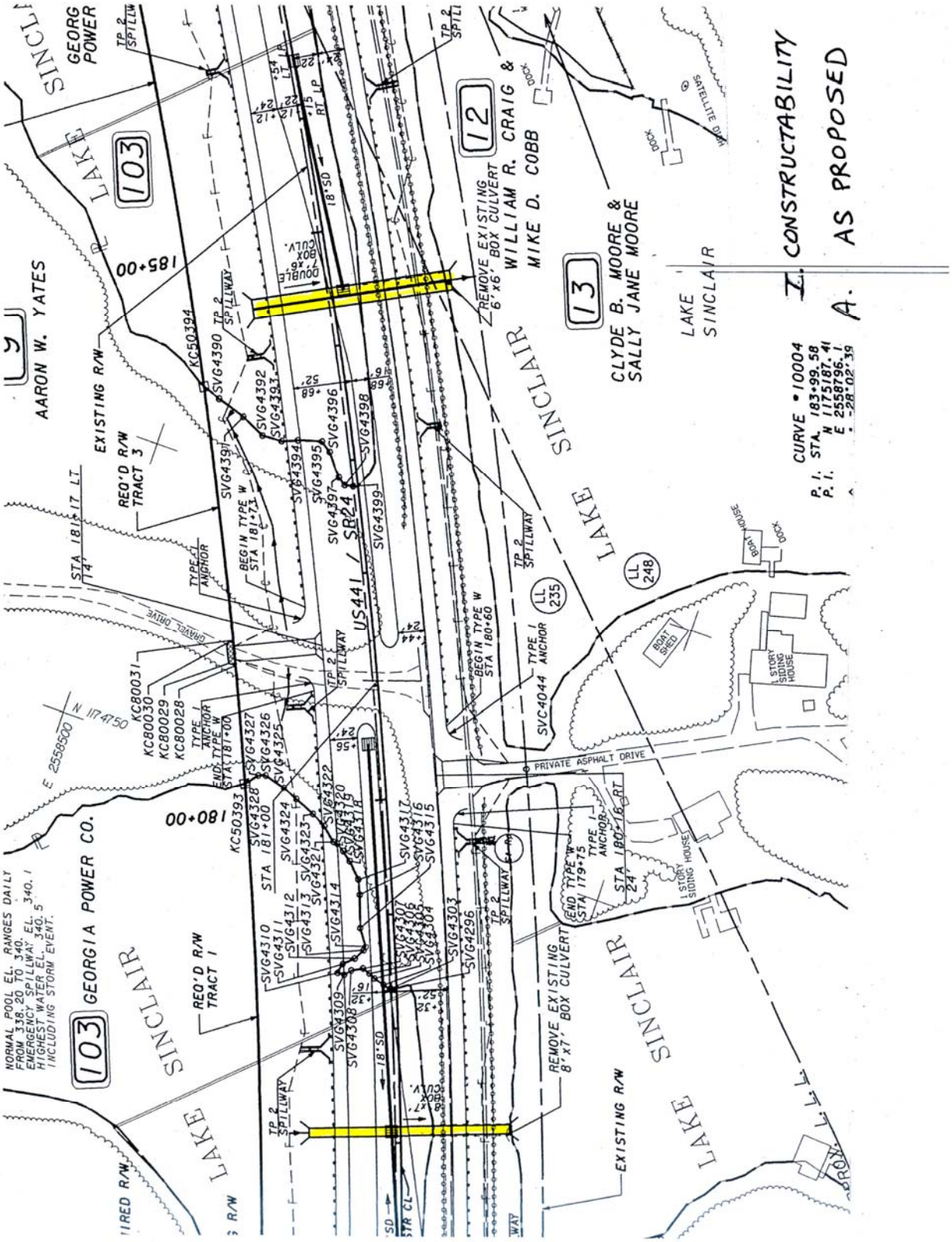
Two culverts are proposed in the head waters of Lake Sinclair. The first is located at Sta. 177+10. It is proposed to remove the existing 8'X7' concrete box culvert which is approximately 70' long, and replace it with a new 8'X7' concrete box culvert 178' long.

The second culvert is at Sta. 184+43. At this location there is an existing 6'X6' concrete box culvert approximately 70' long. It is proposed to remove the existing structure and replace it with a double 7'X6' concrete box culvert 179' long.

The existing culverts are both considered as equalizers, since the waters of the lake are almost always above the top of the culverts.

During the proposed construction, the southbound lanes will be constructed first with the upstream portion of the box culverts completed at that time. During this construction, coffer dams will have to be utilized to enclose and allow dewatering of the culvert area. The *Special Provisions* need to include a description of these coffer dams, stipulating that storm water runoff has to be allowed to flow through the culvert area.

During the next stage, the existing culverts are to be removed and the remainder of the culverts constructed. As before, coffer dams will be required.



I. CONSTRUCTABILITY
A. AS PROPOSED
CURVE #10004
P.I. STA. 183+99.58
P.I. N 1175187.41
E 2558796.1
AARON W. YATES
GEORGIA POWER CO.
WILLIAM R. CRAIG &
MIKE D. COBB
CLYDE B. MOORE &
SALLY JANE MOORE
LAKE SINCLAIR
103
12
13
185+00
180+00
US441 / SR24
LL 235
LL 248
EXISTING R/W
REQ'D R/W TRACT 3
REQ'D R/W TRACT 1
REMOVE EXISTING 6'x6' BOX CULVERT
REMOVE EXISTING 8'x7' BOX CULVERT
PRIVATE ASPHALT DRIVE
GRAVEL DRIVE
BOAT SHED
BOAT HOUSE
1 STORY SIDING HOUSE
SATELLITE DISH
NORMAL POOL EL. RANGES DAILY FROM 338.20 TO 340.
EMERGENCY SPILLWAY EL. 340.1
HIGHEST WATER EL. 340.5
INCLUDING STORM EVENT.

VII. DEVELOPMENT PHASE

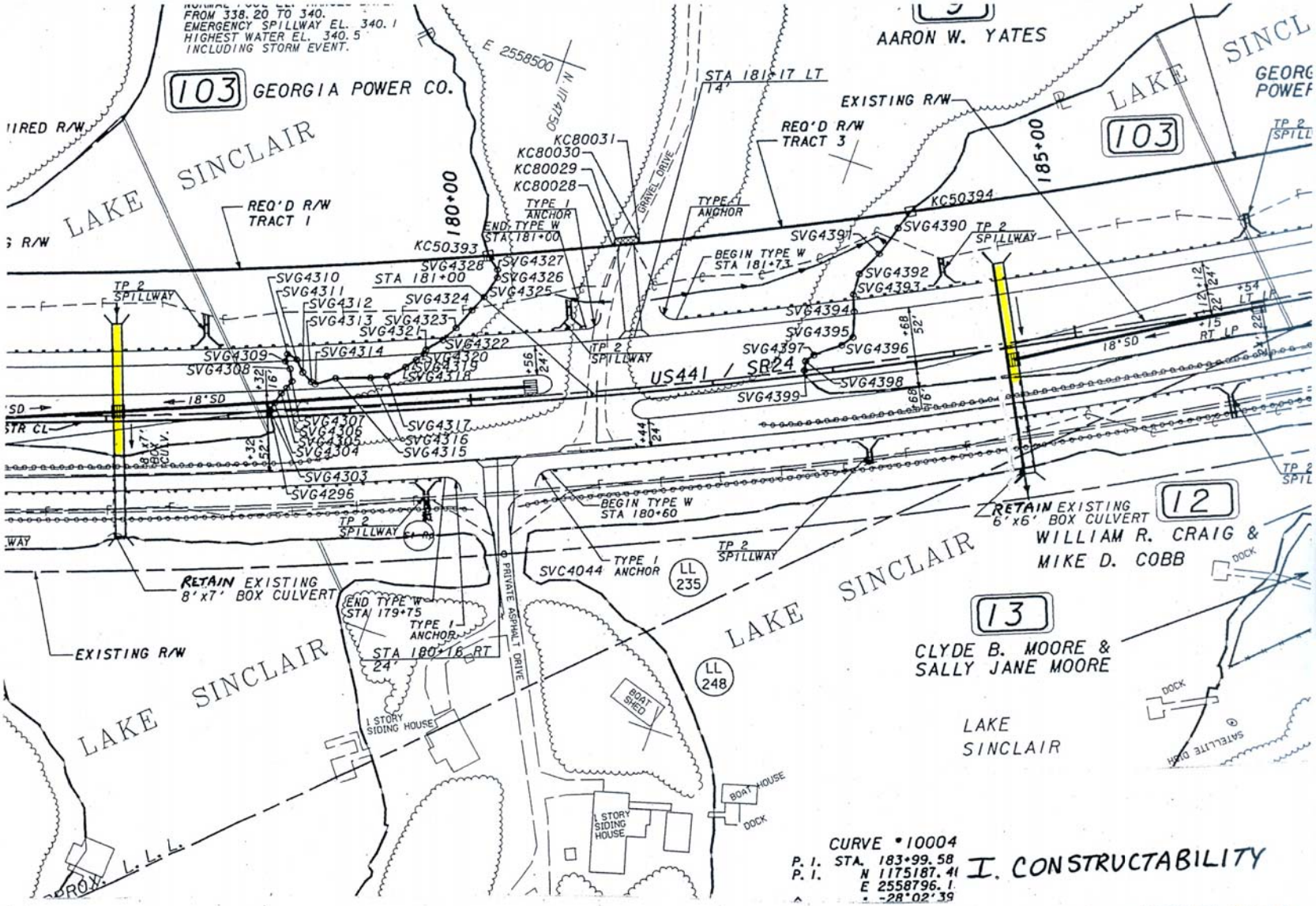
I. CONSTRUCTABILITY

A. LAKE SINCLAIR BOX CULVERTS

2. Value Engineering Alternative Number 1

The Value Engineering Alternative to the proposed entirely new concrete box culverts is to extend the culverts that are in place. This proposed extension at Sta. 177+10 would be an extension in kind. The extension at Sta. 184+43 would be a change from the as-proposed structure of the double 7'X6' to just extending the existing 6'X6' culvert. As in the as-proposed, coffer dams would have to be used to construct the upstream extensions.

By extending the existing culverts, the construction in this area would require only one stage and would thus allow the project to be finished much faster. The cost savings would be significant at an estimated $329,000. There could also be less impact to the lake since the work is completed quicker.



I. CONSTRUCTABILITY

A. VE ALTERNATIVE

I. CONSTRUCTABILITY
A. LAKE SINCLAIR BOX CULVERTS
VALUE ENGINEERING ALTERNATIVE NUMBER 1
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
8'X7' CONCRETE BOX CULVERT	LF	$843.00	178.0	$150,054	110.0	$92,730
DOUBLE 7'X6' CONCRETE BOX CULVERT	LF	$1,163.00	179.0	$208,177	0	$0
6'X6' CONCRETE BOX CULVERT	LF	$675.00	0	$0	110.0	$74,250
COFFER DAMS	EACH	$30,000.00	4.0	$120,000	2.0	$60,000
SUBTOTAL				**$478,231**		**$226,980**
INFLATION	20%			$95,646		$45,396
TRAFFIC CONTROL/MOT	1.2%			$5,739		$2,724
CONTINGENCY	10%			$47,823		$22,698
GRAND TOTAL				**$627,439**		**$297,798**

POSSIBLE SAVINGS: $329,641

VII. DEVELOPMENT PHASE

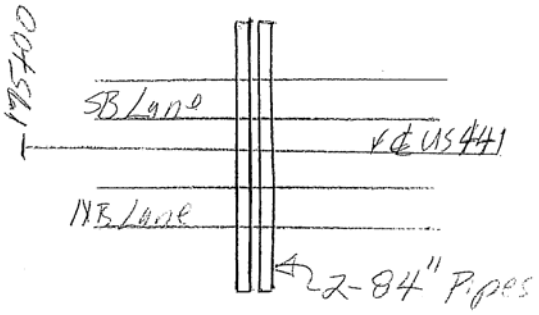
I. CONSTRUCTABILITY

A. LAKE SINCLAIR BOX CULVERTS

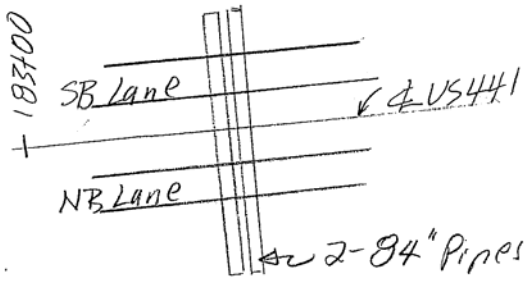
3. Value Engineering Alternative Number 2

This Value Engineering Alternative consists of using two 84-inch diameter pipes at both Sta. 177 and Sta. 184 + 50. Two pipes provide 77 square feet of waterway opening. This is considered adequate for both sites, since a 6' x 6' box culvert is in place at Sta. 184 + 50. It is anticipated that the pipes can be installed without the use of dewatered coffer dams. If sedimentation control is required, short steel sheeting or hanging silt fences should suffice. The use of 84-inch pipes will shorten construction time and will provide simpler procedure.

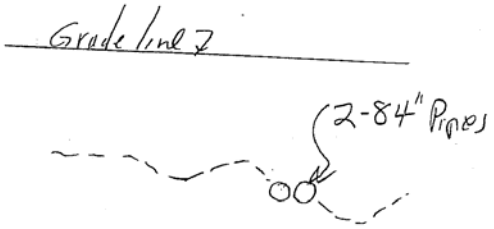
I-A VE #2



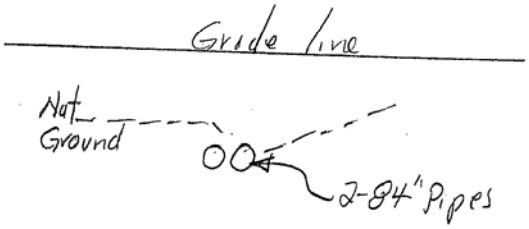
Plan View



Plan View



Profile



Profile

VE ALT
sta 177+00 & 184+50

I. CONSTRUCTABILITY
A. LAKE SINCLAIR BOX CULVERTS
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
8' x 7' BOX CULVERT STA. 177	LF	$843.00	180.0	$151,740	0	$0
COFFERDAM STA. 177	EACH	$30,000.00	2.0	$60,000	0	$0
2- 84" PIPES STA. 177	LF	$600.00	0	$0	180.0	$108,000
DOUBLE 7'x 6' BOX CULVERT STA. 184+50	LF	$1,163.00	180.0	$209,340	0	$0
COFFERDAM STA. 184+50	EACH	$30,000.00	2.0	$60,000	0	$0
2- 84" PIPES STA. 184+50	LF	$600.00	0	$0	180.0	$108,000
SUBTOTAL				**$481,080**		**$216,000**
E & C	10%			$48,108		$21,600
INFLATION	20%			$96,216		$43,200
TRAFFIC CONTROL/MOT	1.2%			$5,773		$2,592
GRAND TOTAL				**$631,177**		**$283,392**

POSSIBLE SAVINGS: $347,785

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

B. MEDIAN DRAINS

1. "As Proposed"

The project proposes to use median drain pipe to drain the median. Due to the low fill height through much of this project, there are several of these median drains which have less than two feet of cover. This means that the pipe will be in the base material. During the course of construction, these pipes will be "pumped out" and will actually surface. Also, any time there is less than two feet of cover over a structure, it will "reflect" up into the pavement creating a bump.

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

B. MEDIAN DRAINS

2. Value Engineering Alternative

There are several options that the study team recommends for consideration to resolve this problem:

- Use longitudinal pipe for such a distance as would allow proper cover and outfall.
- Use elliptical pipe.
- Use a smaller pipe on closer spacing.

While these alternatives are not standard, this is not a typical situation and it should be addressed during this preconstruction phase.

VII. DEVELOPMENT PHASE

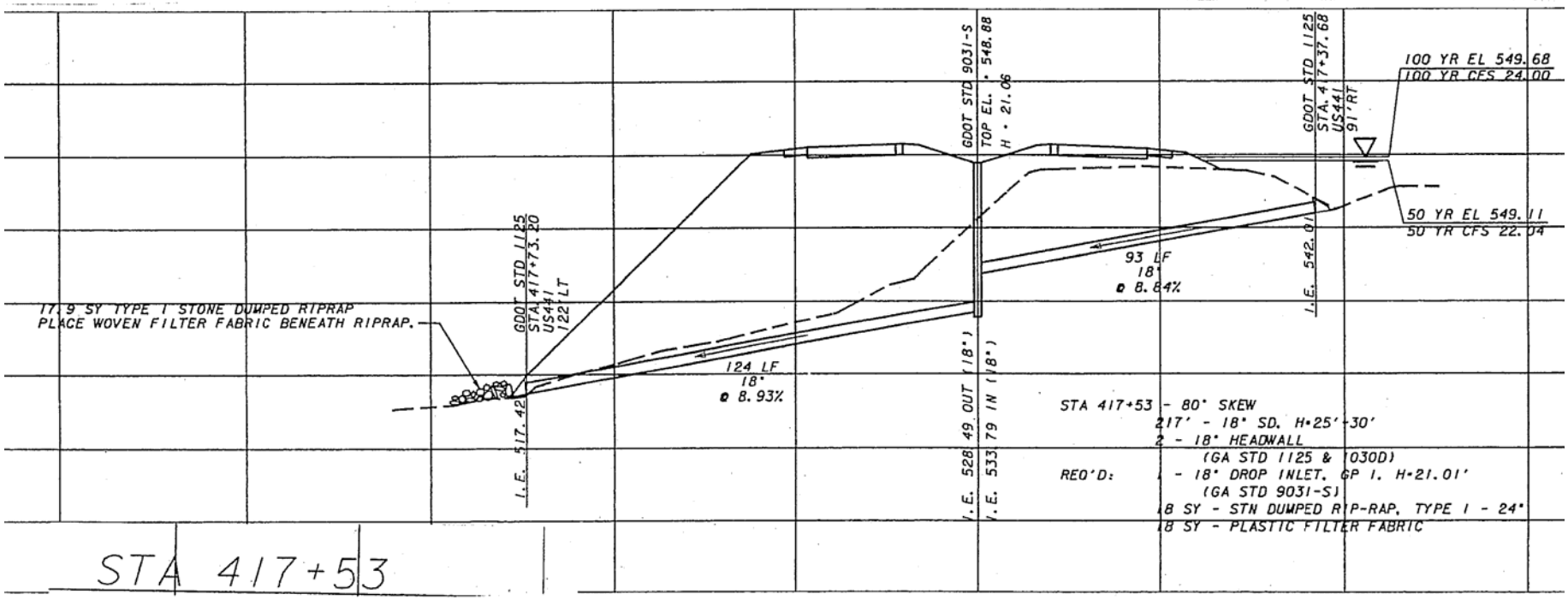
I. CONSTRUCTABILITY

C. CROSSDRAIN PIPES

1. "As Proposed"

The project proposes to use a typical line of cross drain extending from the approximate ground elevation at the inlet end of the pipe and continuing on a steady grade to the approximate ground elevation at the outlet end. At some locations, this requires an extra depth median drop inlet.

In the "As Proposed" drawing, for example, the 18" pipe is on a rather steep grade of almost 9% and the median drop inlet is over 21' in depth.



I. CONSTRUCTABILITY

C. AS PROPOSED

VII. DEVELOPMENT PHASE

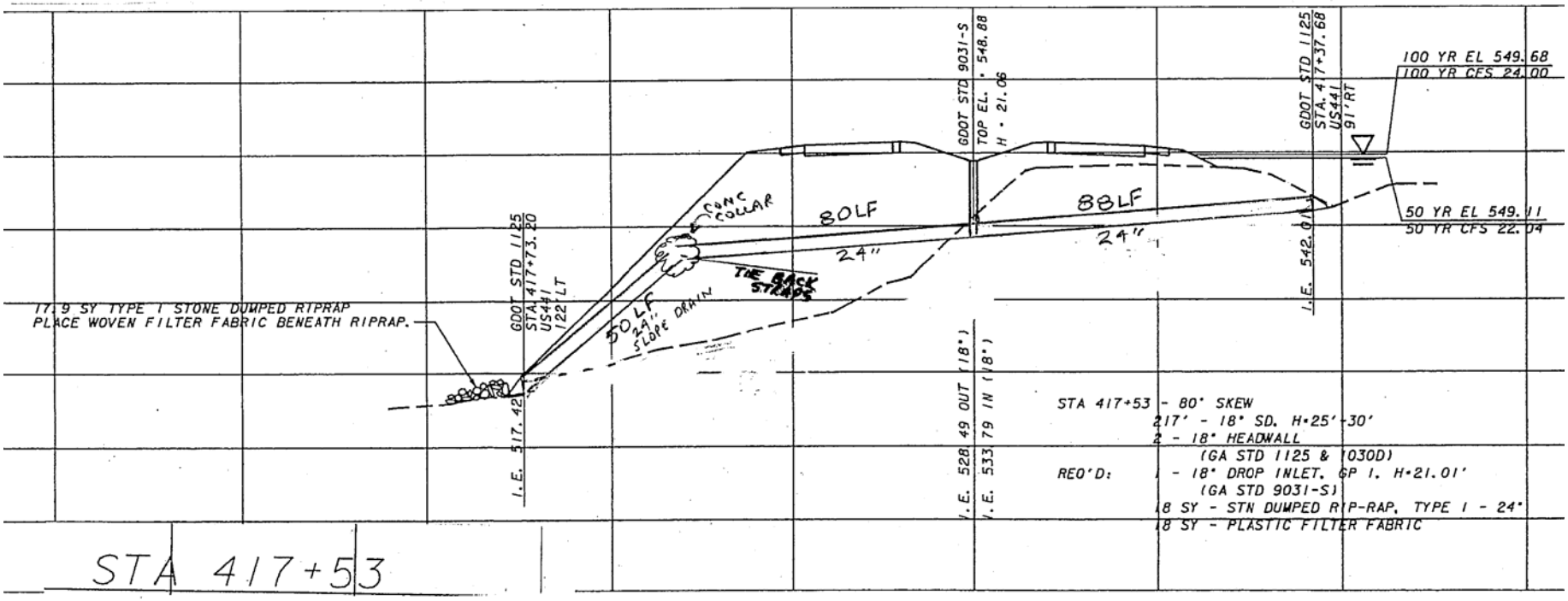
I. CONSTRUCTABILITY

C. CROSSDRAIN PIPES

2. Value Engineering Alternative

The Value Engineering Alternative to the proposed cross drain method is to use a lesser grade on the cross drain under the roadway proper and then use a slope drain pipe down the front slope. In the location focused on as the study example, the size of the pipe was increased from 18” to 24” because of the flatter grade. The height of the median drop inlet is significantly decreased making it much more maintainable.

There is a concrete collar poured around the intersection on the cross drain and the slope drain. The study team recommends that there also be included a couple of tie-down straps back into the embankment to reduce the possibility of separation. On this example, a cost savings of almost $2,000 per location would be realized. Over the length of the project, if this type design were used, the savings could become significant.



I. CONSTRUCTABILITY

C. VE ALTERNATIVE

I. CONSTRUCTABILITY
C. CROSS DRAINS
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
18” STORM DRAIN PIPE	LF	$41.50	217.0	$9,006	0	$0
MEDIAN DROP INLET	EACH	$3,330.00	1.0	$3,330	1	$3,330
MEDIAN DROP INLET EXTRA DEPTH	LF	$255.00	15.1	$3,851	4.0	$1,020
24” STORM DRAIN PIPE	LF	$46.50	0	$0	168.0	$7,812
24” SLOPE DRAIN	LF	$38.00	0	$0	50.0	$1,900
CONCRETE COLLAR WITH STRAPS	CY	$460.00	0	$0	1.0	$460
SUBTOTAL				**$16,187**		**$14,522**
INFLATION	20%			$3,237		$2,904
TRAFFIC CONTROL/MOT	1.2%			$194		$175
CONTINGENCY	10%			$1,619		$1,452
GRAND TOTAL				**$21,237**		**$19,053**

POSSIBLE SAVINGS: $2,184 per location

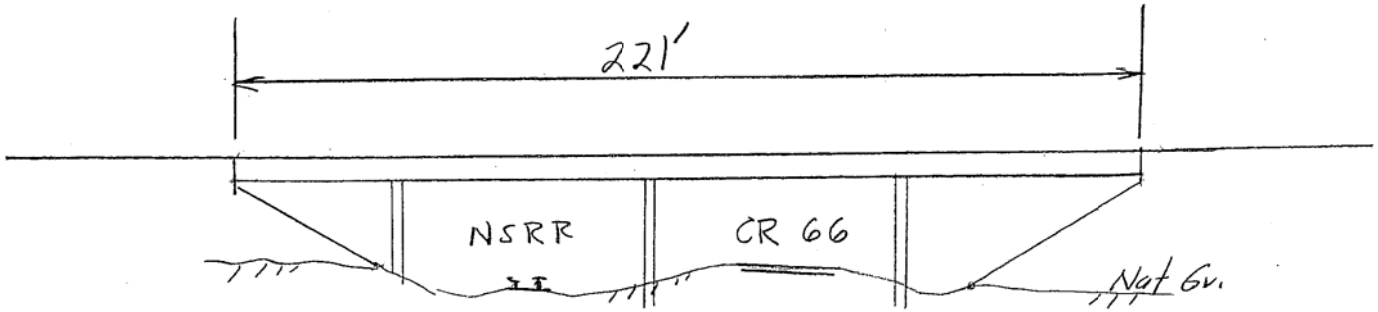
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

D. RAILROAD BRIDGE

1. "As Proposed"

The proposed dual bridges are 4 spans with Type II PSC beams. They are 221' long and 41.25' wide. The abutments are spill through on a 2H to 1V end slope. The bridges go over the Norfolk Ssouthern Railroad and CR 66.



US 441 over NSRR & CR 66

As Proposed

I-E

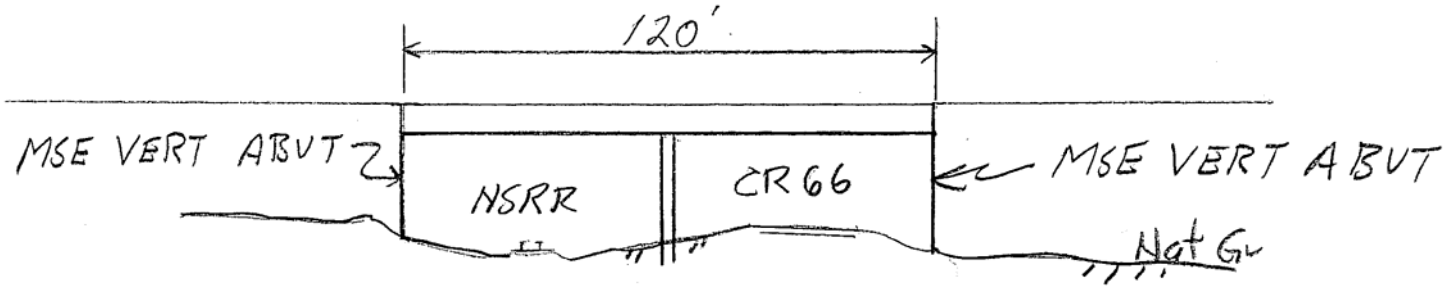
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

D. RAILROAD BRIDGE

2. Value Engineering Alternative

The Value Engineering Alternative consists of dual bridges with MSE Vertical Abutments. The length is reduced to 120’ and is made up of two 60’ spans. The use of MSE Vertical Abutments will allow the construction of the bridge to be completed faster, besides being more economical.



US 441 over NSRR & CR66

VE ALT
I-E

I. CONSTRUCTABILITY
D. CONSTRUCTABILITY
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
US 441 OVER NS RAILROAD CR 66	SF	$85.00	18,233.0	$1,549,805	9,900.0	$841,500
MSE VERTICAL ABUTMENTS	SF	$50.00	0	$0	10,159.0	$507,950
BASE AND PAVEMENTS	SY	$32.50	0	$0	916.0	$29,770
SUBTOTAL				**$1,549,805**		**$1,379,220**
E &C	10%			$154,981		$137,922
TRAFFIC CONTROL/MOT	1.2%			$18,598		$16,551
INFLATION	20%			$309,961		$275,844
GRAND TOTAL				**$2,033,344**		**$1,809,537**

POSSIBLE SAVINGS: $223,808

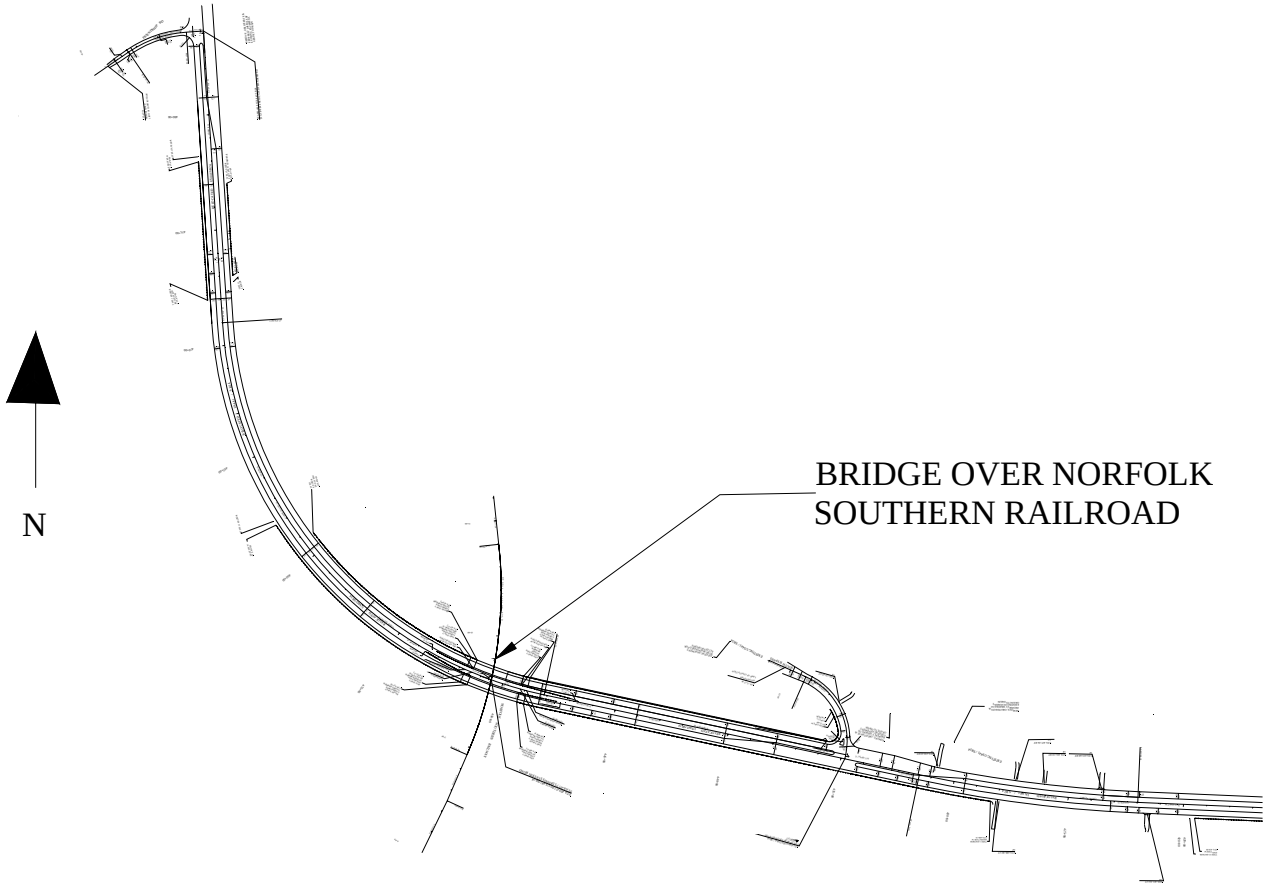
VII. DEVELOPMENT PHASE

II. MATERIALS

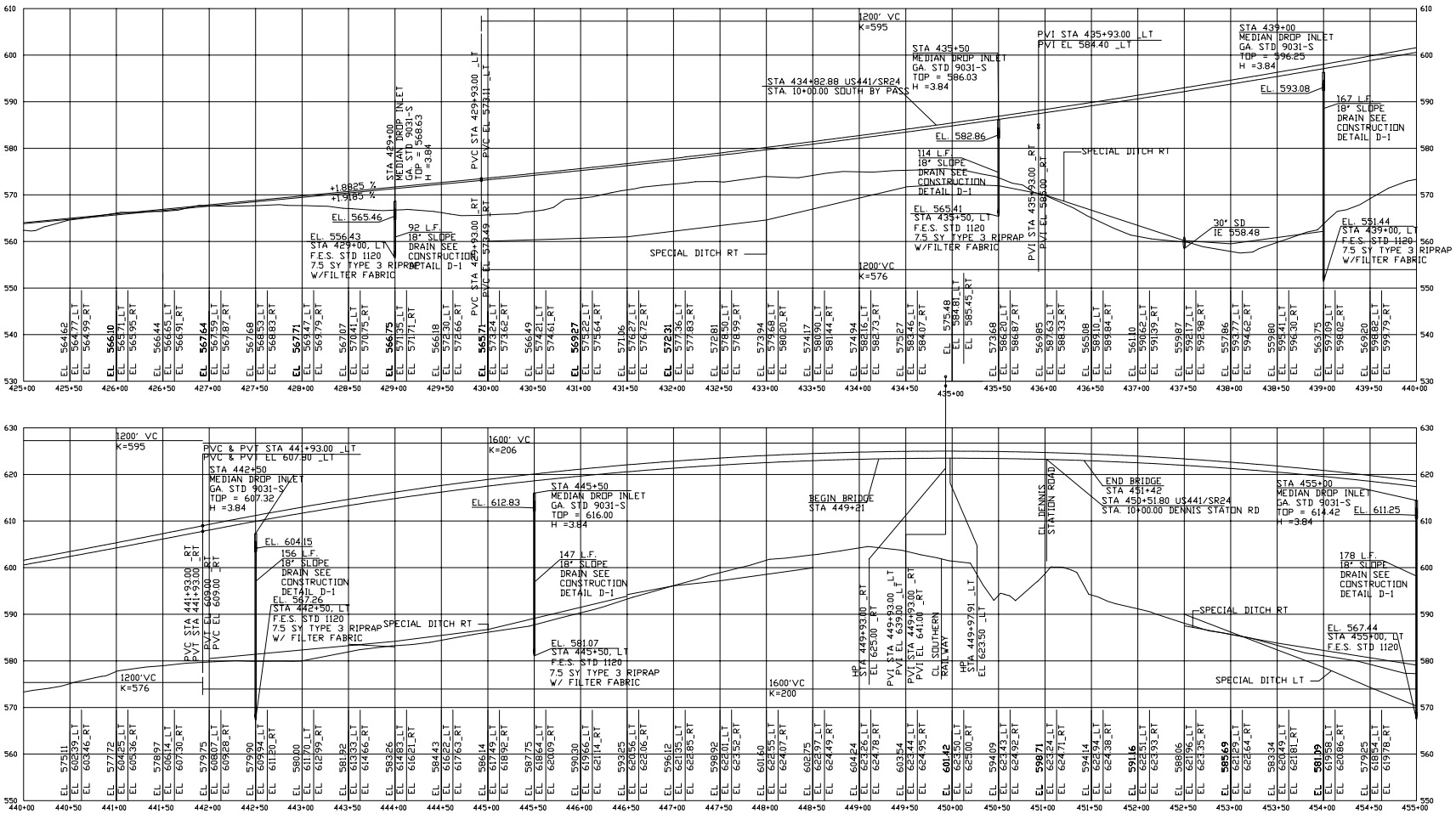
A. IN-PLACE EMBANKMENT

1. "As Proposed"

The proposed design is to shift the roadway alignment to the west at STA 420+00 +/-. This alignment crosses the Norfolk Southern Railroad and Dennis Station Road at STA 449+89 +/- with a grade separation and continues north and east to return to the existing alignment at STA 517+00 +/-. This will require new roadway construction for 1.84 +/- miles within a right-of-way width between 250' and 400' resulting in right-of-way acquisition of approximately 78 acres.



AS PROPOSED ALIGNMENT



AS PROPOSED PROFILE

VII. DEVELOPMENT PHASE

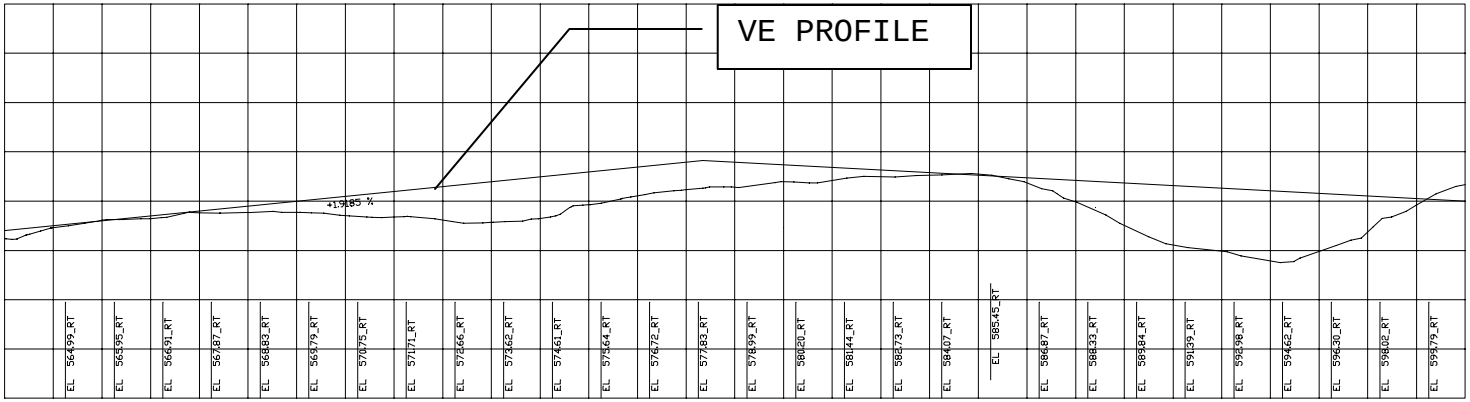
II. MATERIALS

A. IN-PLACE EMBANKMENT

2. Value Engineering Alternative Number 1

The Value Engineering Team recommends using the proposed alignment through this area with an at-grade Norfolk Southern Railroad crossing. This will reduce structure costs, embankment costs, and right-of-way acquisition costs.

The Value Engineering Team understands the desire to grade separate highways and railroads, but this grades separation appears to be too costly for the benefits received. According to Tim Smith of the GDOT Transportation Management Center, there are only 4 trains per day crossing US 441 at the existing at grade crossing. The AADT for 2027 is estimated to be 12,800 vpd.


VE PROFILE
+19.85 %
EL 564.99_RT
EL 565.95_RT
EL 566.91_RT
EL 567.87_RT
EL 568.83_RT
EL 569.79_RT
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EL 571.71_RT
EL 572.66_RT
EL 573.62_RT
EL 574.61_RT
EL 575.64_RT
EL 576.72_RT
EL 577.83_RT
EL 578.99_RT
EL 580.20_RT
EL 581.44_RT
EL 582.73_RT
EL 584.07_RT
EL 585.45_RT
EL 586.87_RT
EL 588.33_RT
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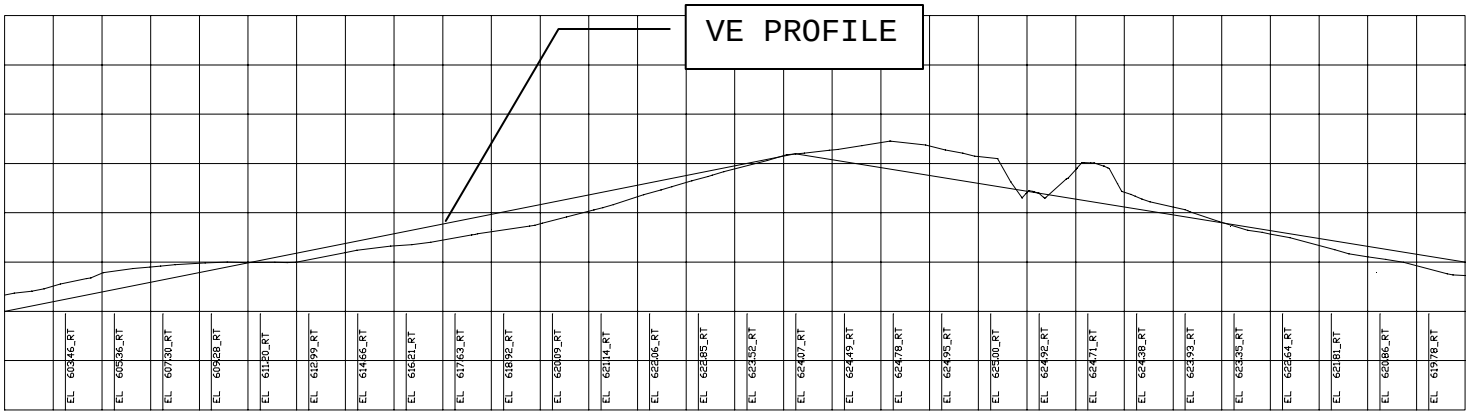
EL 598.02_RT
EL 599.79_RT


VE PROFILE
EL 605.46_RT
EL 605.36_RT
EL 607.30_RT
EL 609.28_RT
EL 611.30_RT
EL 612.99_RT
EL 614.66_RT
EL 616.21_RT
EL 617.63_RT
EL 618.92_RT
EL 620.09_RT
EL 621.14_RT
EL 622.06_RT
EL 622.85_RT
EL 623.52_RT
EL 624.07_RT
EL 624.49_RT
EL 624.78_RT
EL 624.95_RT
EL 625.00_RT
EL 624.92_RT
EL 624.71_RT
EL 624.38_RT
EL 623.93_RT
EL 623.35_RT
EL 622.64_RT
EL 621.81_RT
EL 620.86_RT
EL 619.78_RT

II. MATERIALS
A. IN-PLACE EMBANKEMNT
VALUE ENGINEERING ALTERNATIVE NUMBER 1
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
BRIDGE OVER RAILROAD	SF	$59.02	20,332.0	$1,199,995	0	$0
PAVEMENT	SY	$22.34	616,135.0	$13,764,456	630,500.0	$14,085,370
EMBANKMENT IN-PLACE	CY	$3.15	554,456.7	$1,746,539	103,514.4	$326,071
RAILROAD XING	EA	$300,000.00	0	$0	1.0	$300,000
SUBTOTAL				**$16,710,990**		**$14,711,440**
INFLATION 4 YEARS 5%	20%			$3,342,198		$2,942,288
TRAFFIC CONTROL/MOT	1.2%			$200,532		$176,537
CONTINGENCY	10%			$1,671,099		$1,471,144
RIGHT-OF-WAY	AC	$10,000	78	$780,000	56	$560,000
GRAND TOTAL				**$22,704,819**		**$19,861,409**

POSSIBLE SAVINGS: $2,843,410

VII. DEVELOPMENT PHASE

II. MATERIALS

A. IN-PLACE EMBANKMENT

3. Value Engineering Alternative Number 2

The Value Engineering Team recommends using the existing alignment through this area and the existing at-grade Norfolk Southern Railroad crossing. The Value Engineering Team recommends changing the typical section from south of Dennis Station Road to a 5-lane typical through the developed area and back to the 4-lane divided typical north of Sweet Shrub Road. The 5-lane section would be created by adding 1lane and a 6'-6" shoulder in each direction to the existing 3-lane typical section.

The Value Engineering Team understands the desire to grade separate highways and railroads, but this grades separation appears to be too costly for the benefits received. According to Tim Smith of the GDOT Transportation Management Center, there are only 4 trains per day crossing US 441 at the existing at-grade crossing. The AADT for 2027 is estimated to be 12,800 vpd.

This alternative may also require an Environmental Re-Evaluation because of the extensive changes in right-of-way impacts. In this case it would be a net reduction in right-of-way acquisition. Even though there are considerable savings associated with the alternative, it is not recommended because of the potential for an Environmental Re-Evaluation.

II. MATERIALS
A. IN-PLACE EMBANKEMNT
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
BRIDGE OVER RAILROAD	SF	$59.02	20,332.0	$1,199,995	0	$0
PAVEMENT	SY	$22.34	616,135.0	$13,764,456	21,706.7	$484,928
EMBANKMENT IN-PLACE	CY	$3.15	554,456.7	$1,746,539	0	$0
RAILROAD XING	EA	$300,000.00	0	$0	1.0	$300,000
SUBTOTAL				**$16,710,990**		**$784,928**
INFLATION 4 YEARS 5%	20%			$3,342,198		$156,986
TRAFFIC CONTROL/MOT	1.2%			$200,532		$9,419
CONTINGENCY	10%			$1,671,099		$78,493
RIGHT-OF-WAY	AC	$10,000	78	$780,000	0	$0
GRAND TOTAL				**$22,704,819**		**$1,029,826**

POSSIBLE SAVINGS: $21,674,993

VII. DEVELOPMENT PHASE

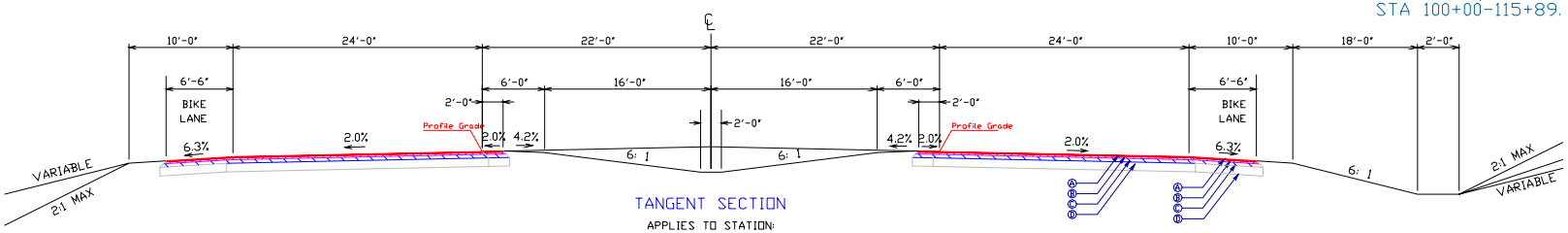
II. MATERIALS

B. PAVEMENT

1. "As Proposed"

Typical Section No. 1 is for new construction of the roadway and the Stations for the new construction are identified under the typical section. There is also an Overlay Typical, where it is possible to salvage some of the existing pavement structure by overlaying it with new asphalt. These areas are also identified by Station.

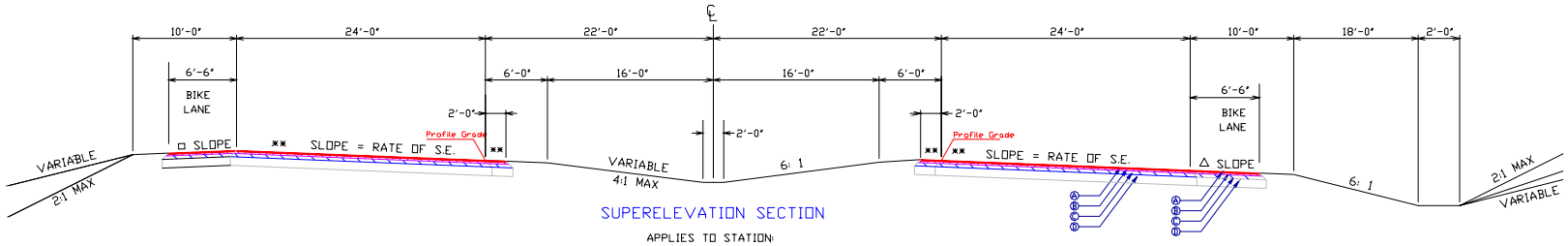
NOTE: MEDIAN VARIES FROM 6'-0 TO 44'-0
STA 100+00-115+89.



TANGENT SECTION

APPLIES TO STATION:

	367+59-368+71
117+64-133+18	382+31-383+29
149+47-154+52	404+44-420+24
166+78-167+94	433+27-445+13
199+47-232+56	473+99-486+84
252+56-345+51	514+02-528+67



SUPERELEVATION SECTION

APPLIES TO STATION:

108+50-117+64	368+71-382+31
133+18-149+47	383+29-404+44
154+52-166+78	420+24-433+27
167+94-199+47	445+13-473+99
232+56-252+56	486+84-514+02
345+51-367+59	528+67-536+35.27

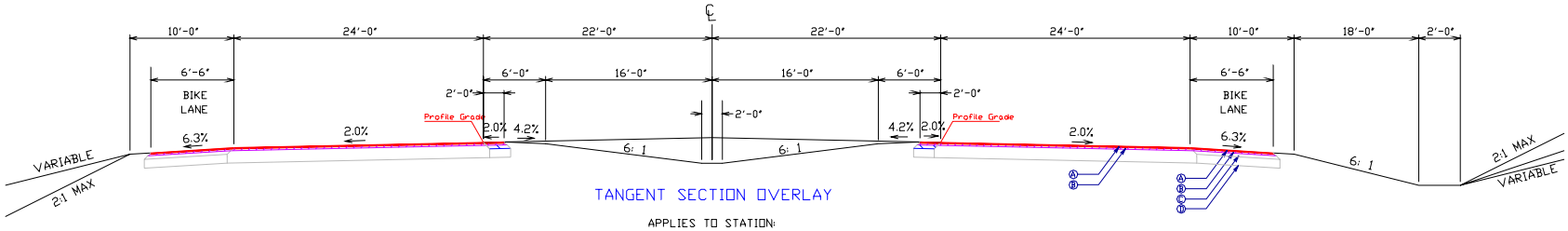
REQUIRED PAVEMENT

(A) 12.5mm SUPERPAVE, 165LB/SQYD (1?") SUPERPAVE MIX DESIGN LEVEL "B"
(B) 19MM SUPERPAVE, 220 LB/SQYD (2") SUPERPAVE MIX DESIGN LEVEL "B"
(C) 25MM SUPERPAVE, 660 LB/SQYD (6") SUPERPAVE MIX DESIGN LEVEL "A"
(D) GRADED AGGREGATE BASE - 12"

TYPICAL SECTION NO. 1

OUTSIDE SHOULDERS USE LEVEL "A"

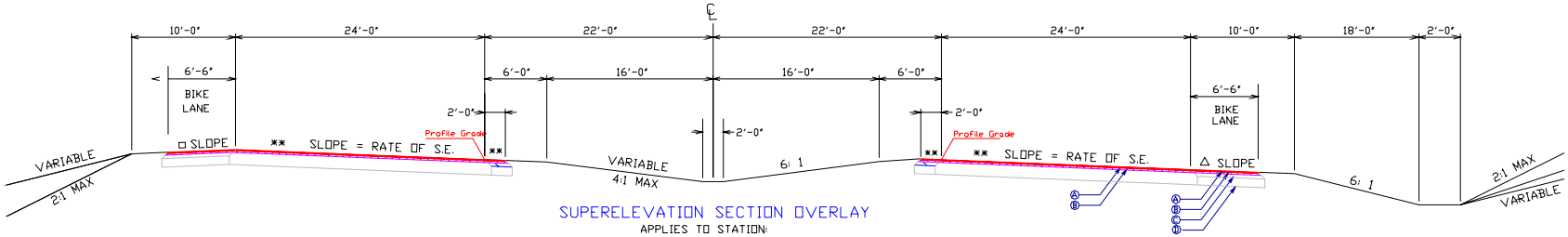
△ SLOPE 6.3% OR RATE OF S.E. WHICHEVER IS GREATER



TANGENT SECTION OVERLAY

APPLIES TO STATION:

259+50 LT - 266+00 LT
284+00 LT - 286+00 LT
294+50 LT - 295+00 LT
307+50 LT - 308+50 LT
315+50 LT - 316+00 LT
327+50 LT - 329+00 LT
330+50 LT - 332+00 LT
421+50 RT - 422+00 RT



SUPERELEVATION SECTION OVERLAY

APPLIES TO STATION:

108+50 LT - 109+50 LT
115+50 RT - 116+00 RT
136+50 LT - 139+00 LT
329+50 RT - 329+75 RT
400+00 RT - 402+00 RT
427+50 RT - 427+75 RT
506+50 RT - 506+75 RT
536+00 RT

REQUIRED PAVEMENT

Ⓐ 12.5mm SUPERPAVE. 165LB/SQYD (1?") SUPERPAVE MIX DESIGN LEVEL "B"
Ⓑ 19MM SUPERPAVE, 220 LB/SQYD (2") SUPERPAVE MIX DESIGN LEVEL "B"
Ⓒ 25MM SUPERPAVE, 660 LB/SQYD (6") SUPERPAVE MIX DESIGN LEVEL "A"
Ⓓ GRADED AGGREGATE BASE - 12"

TYPICAL SECTION NO. 2

OUTSIDE SHOULDERS USE LEVEL "A"

NOTE: EXISIT 4' PAVED SHOULDER TO BE REMOVED.

△ SLOPE 6.3% OR RATE OF S.E. WHICHEVER IS GREATER

VII. DEVELOPMENT PHASE

II. MATERIALS

B. PAVEMENT

2. Value Engineering Alternative

The Value Engineering Team reviewed the limits of both typical sections and found some conflicts in the limits of the two different typicals. In addition, the Consultant should scrutinize opportunities for additional use of the Overlay Typical.

VII. DEVELOPMENT PHASE

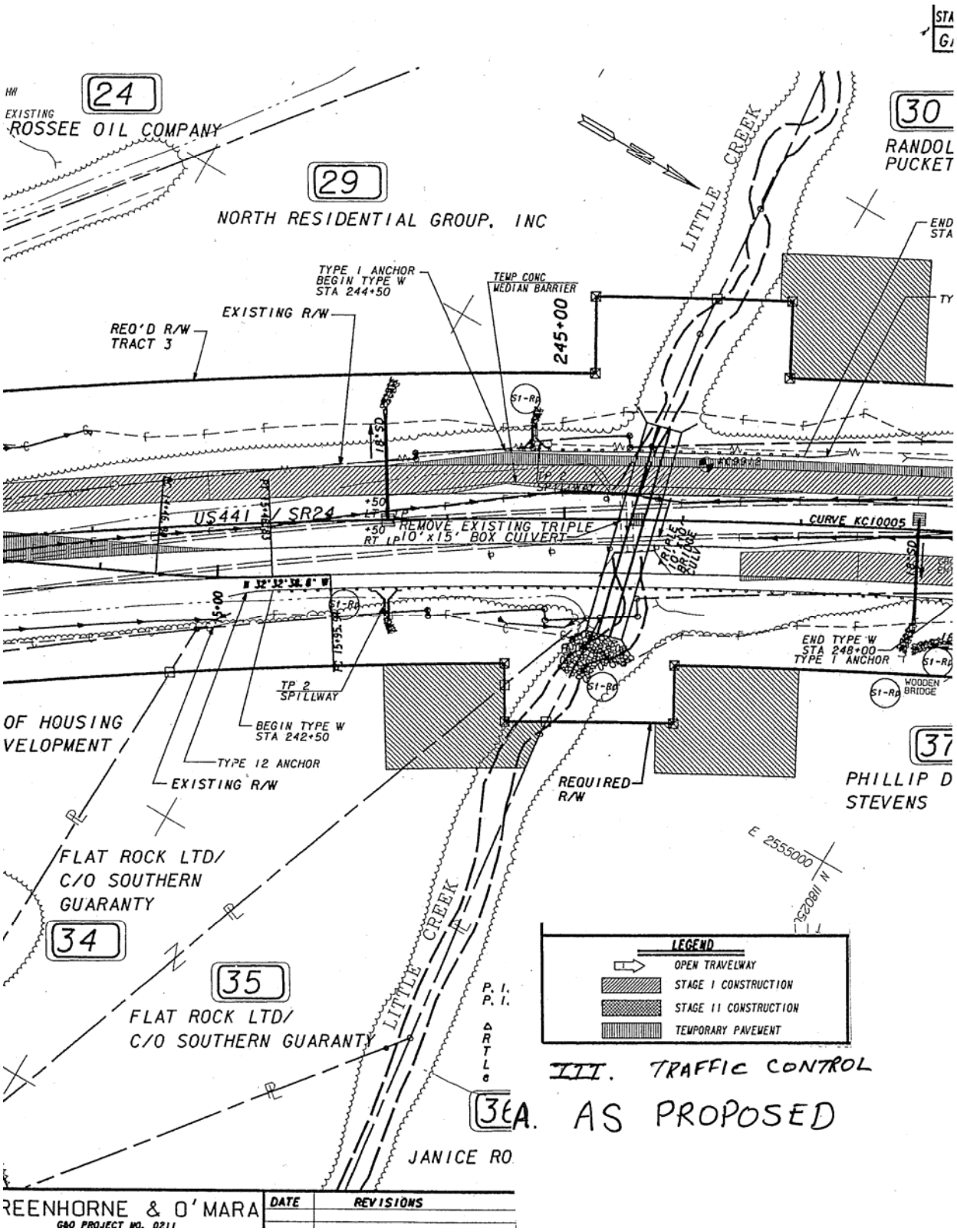
III. TRAFFIC CONTROL

A. LITTLE CREEK BOX CULVERT

1. "As Proposed"

The project proposes to replace the existing triple 10' x 15' concrete box culvert with a new triple 10' x 10' concrete box culvert. The construction must be staged in order to replace the existing structure.

The project staging plans propose to construct the upstream section first while traffic is maintained on the existing culvert. After the upstream section culvert is completed, this side will be paved along with a short section of about 10' wide which must be built to the outside to accommodate traffic while the remainder of the culvert is completed.


24
EXISTING
ROSSEE OIL COMPANY
29
NORTH RESIDENTIAL GROUP, INC
30
RANDOL
PUCKET
LITTLE CREEK
TYPE I ANCHOR
BEGIN TYPE W
STA 244+50
TEMP CONC
MEDIAN BARRIER
245+00
EXISTING R/W
REQ'D R/W
TRACT 3
US441 / SR24
REMOVE EXISTING TRIPLE
10' x 15' BOX CULVERT
CURVE KC10005
END TYPE W
STA 248+00
TYPE I ANCHOR
WOODEN
BRIDGE
TP 2
SPILLWAY
BEGIN TYPE W
STA 242+50
TYPE 12 ANCHOR
EXISTING R/W
OF HOUSING
VELOPMENT
REQUIRED
R/W
PHILLIP D
STEVENS
FLAT ROCK LTD/
C/O SOUTHERN
GUARANTY
34
35
FLAT ROCK LTD/
C/O SOUTHERN GUARANTY
LITTLE CREEK
P. I.
P. I.
JANICE RO
E 2555000
N 1180250
LEGEND
OPEN TRAVELWAY
STAGE I CONSTRUCTION
STAGE II CONSTRUCTION
TEMPORARY PAVEMENT
III. TRAFFIC CONTROL
A. AS PROPOSED
REENHORNE & O'MARA
G&O PROJECT NO. 0211
DATE
REVISIONS

VII. DEVELOPMENT PHASE

III. TRAFFIC CONTROL

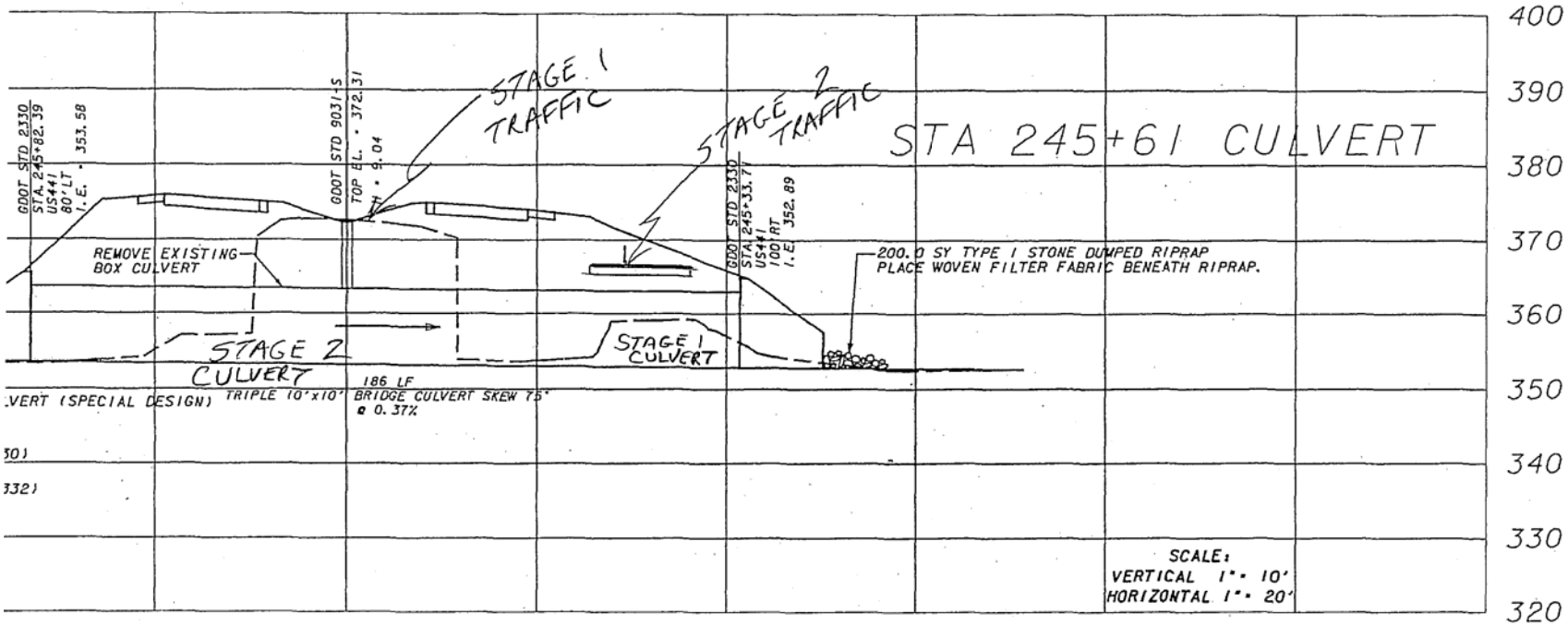
A. LITTLE CREEK BOX CULVERT

2. Value Engineering Alternative Number 1

The main problem with the as-proposed method of construction is the fact that the upstream portion has a different flow line than the existing culvert. This could result in the area flooding during what would ordinarily be minor rain events.

The Value Engineering Alternative to the as-proposed is to modify the traffic control staging at this location. A portion of the downstream section would need to be constructed (shown as stage 1) while traffic is using the existing roadway (shown as stage 1 traffic). A portion of the embankment would be placed and temporary pavement would be placed (stage 2 traffic) while the existing culvert is removed and the remainder of the upstream culvert is completed (stage 2 construction).

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	EDS-441(40)		



III. TRAFFIC CONTROL

A. VE ALTERNATIVE

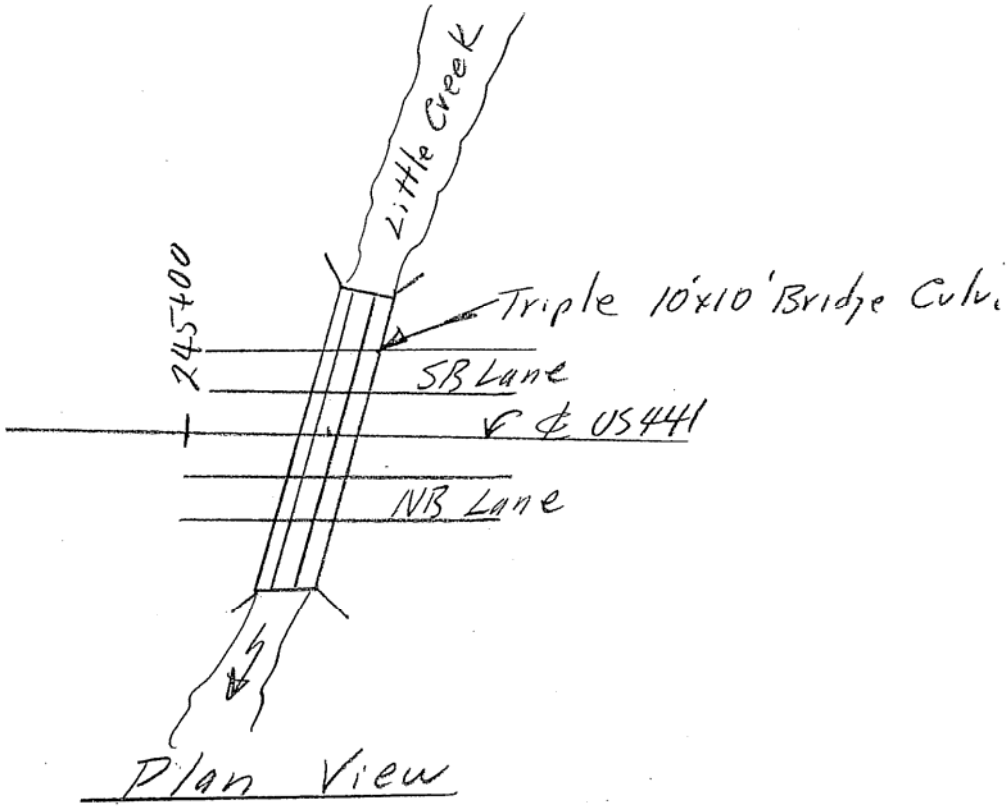
VII. DEVELOPMENT PHASE

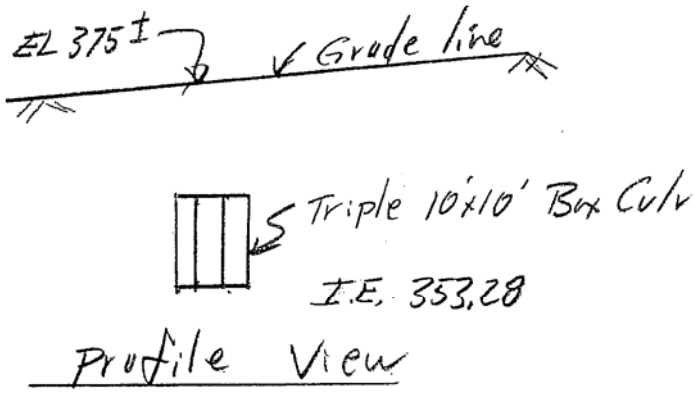
III. TRAFFIC CONTROL

A. LITTLE CREEK BOX CULVERT

3. "As Proposed"

The proposed structure at this location is a triple 10' x 10' box culvert. It is replacing a triple 10' x 15' box culvert. The proposed culvert is approximately 185' long.





As Proposed
III - VE #2

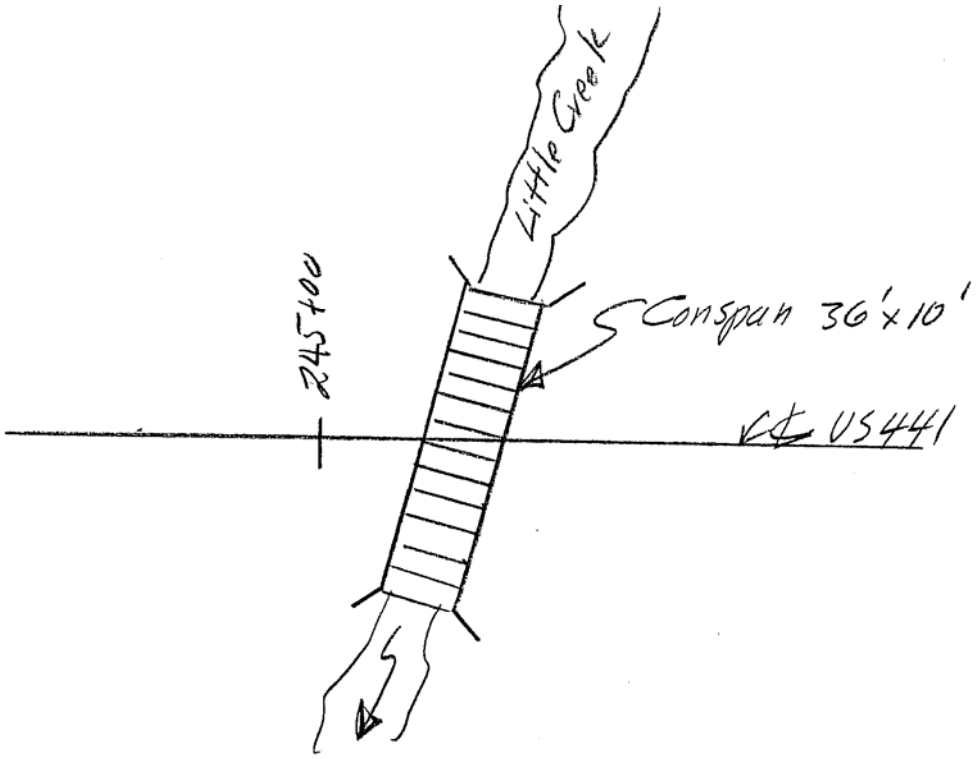
VII. DEVELOPMENT PHASE

III. TRAFFIC CONTROL

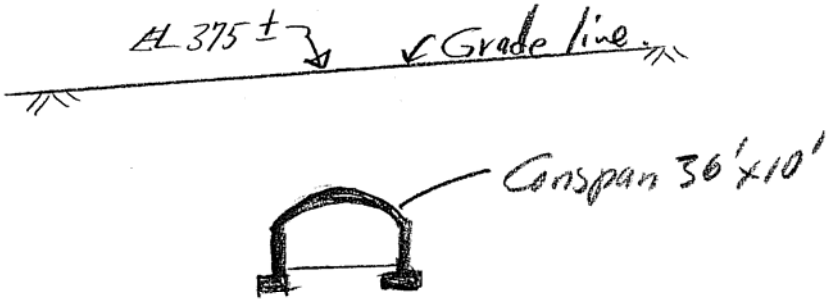
A. LITTLE CREEK BOX CULVERT

4. Value Engineering Alternative Number 2

The Value Engineering Alternative is a 36’ x 10’ Conspan Bridge System culvert. The structure is composed of precast units about 6’ wide. These can be lifted and set fairly quickly. The head walls and wing units are a separate package and are attached to the main units. This system provides 304 sq. ft. of waterway opening.



Plan View



Profile View

VE Alt

III - VE #2

III. TRAFFIC CONTROL
A. LITTLE CREEK BOX CULVERT
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
TRIPLE 10'x10' BOX CULVERT	LF	$2,859.00	185.0	$528,915	0	$0
CONSPAN 36'x10' BRIDGE SPAN	LF	$1,600.00	0	$0	185	$296,000
CONSPAN HEADWALLS AND WINGS	LS	$50,000.00	0	$0	1.0	$50,000
SUBTOTAL				**$528,915**		**$346,000**
E & C	10%			$52,892		$34,600
TRAFFIC CONTROL/MOT	1.2%			$6,347		$4,152
INFLATION	20%			$105,783		$69,200
GRAND TOTAL				**$693,937**		**$453,952**

POSSIBLE SAVINGS: $239,985

VII. DEVELOPMENT PHASE

IV. CONSTRUCTION TIME

A. LENGTH OF TIME

1. "As Proposed"

No construction time was proposed by the consultant for this project.

VII. DEVELOPMENT PHASE

IV. CONSTRUCTION TIME

A. LENGTH OF TIME

2. Value Engineering Alternative

The project consists of several main items – grading and drainage; base and paving; structures and miscellaneous items. Of these, the grading and structures will require the most time. The railroad bridges are very straightforward and should not present any unusual difficulty. The grading and drainage can be accomplished concurrently with the structure work. It is felt that the contract time should be kept to a minimum to provide the traveling public with this new facility as soon as possible. It is therefore the recommendation of the study team that the project time be limited to 24 months.

VII. DEVELOPMENT PHASE

IV. CONSTRUCTION TIME

B. LANE CLOSURES

1. "As Proposed"

Lane closures were not addressed by the Design Consultant.

VII. DEVELOPMENT PHASE

IV. CONSTRUCTION TIME

B. LANE CLOSURES

2. Value Engineering Alternative

The project lies within an area of mostly rural Putnam County and the existing traffic volumes are not excessive. Lane closures could be allowed at any time **except during AM and PM peaks**. Work on weekends, that would require lane closures, could be allowed except perhaps for home football games of the University of Georgia.