VALUE ENGINEERING STUDY

OF

US 78/SR 10/STONE MOUNTAIN FREEWAY

PROJECT NUMBER: STP-0003-00(406)

PI NUMBER: 0003406

ATLANTA, GEORGIA

December 4 and 7, 2006

Prepared by:

VE GROUP, L.L.C.

In Association With:

Georgia Department of Transportation

VALUE ENGINEERING STUDY
TEAM LEADER

_____

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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 December 4 and 7, 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

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.

I. CONSTRUCTABILITY

RECOMMENDATION NUMBER 1:

A. ROADWAY MEDIAN

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative uses asphalt curb.

If this recommendation can be implemented, there is a possible savings of ***$270,087.***

RECOMMENDATION NUMBER 2

B. BRIDGE MEDIAN

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative uses type seven markers.

If this recommendation can be implemented, there is a possible savings of ***$4,045.***

II. MATERIALS

RECOMMENDATION NUMBER 3:

A. PAVEMENT DESIGN

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative uses superpave.

If this recommendation can be implemented, there is a possible savings of ***$242,758.***

RECOMMENDATION NUMBER 4:

B. EAST PARK SOUTH SIDE

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative uses full depth asphalt.

If this recommendation can be implemented, there is a **possible cost increase** of ***$21,825.***

SUMMARY OF RECOMMENDATIONS *(continued)*

III. STAGE CONSTRUCTION

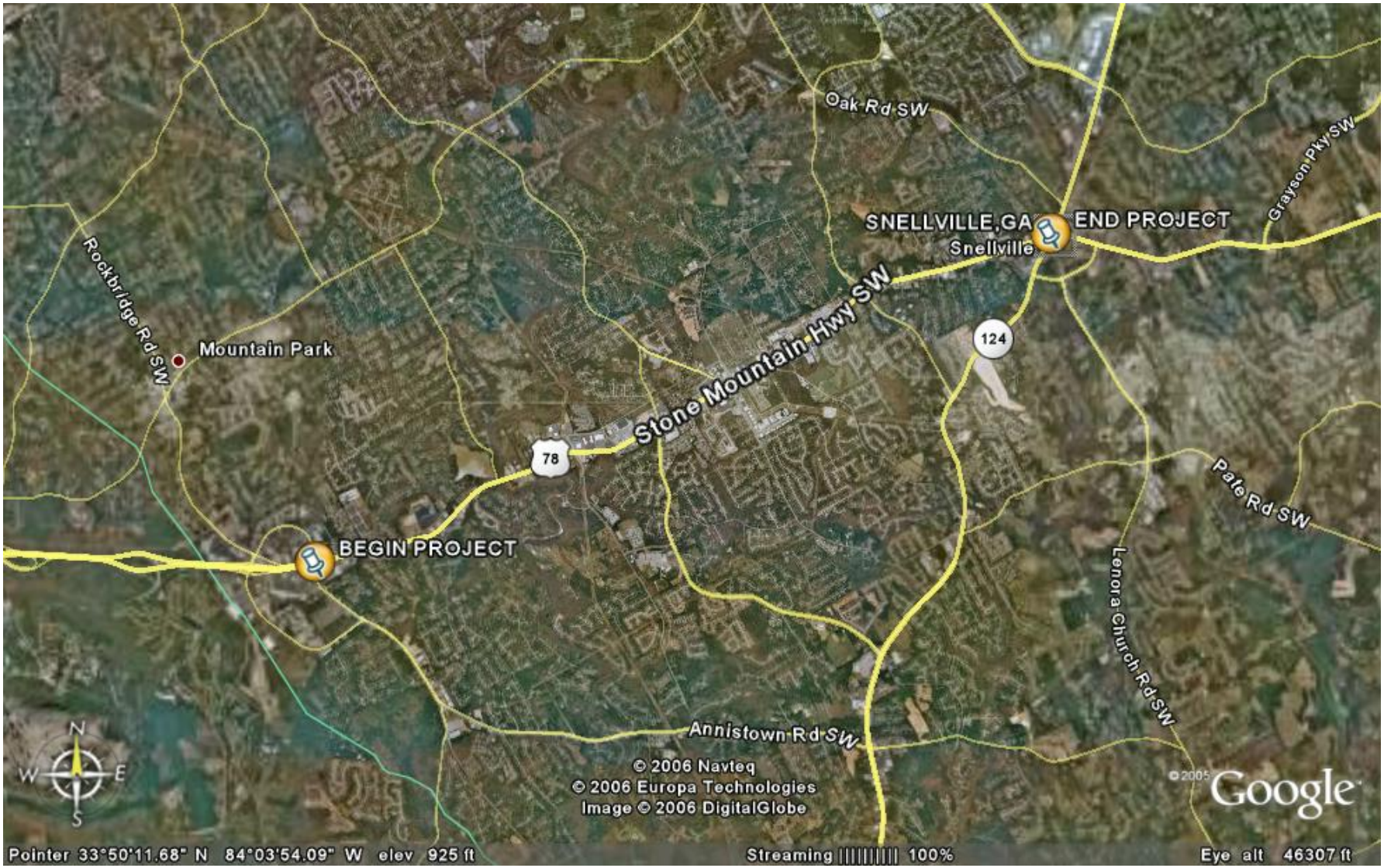
RECOMMENDATION NUMBER 5:

A. LANE CLOSURE/STAGE BOTTLENECKS

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative revises the staging plans.

If this recommendation can be implemented, there is a possible savings of ***$407,969.***

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
Dickey Forrester	VE Group	Construction	850-627-3900
Tom Hartley, P.E., C.V.S.	VE Group	Roadway Design/Traffic	850/627-3900

PROJECT DESCRIPTION

The project proposes to remove the reversible lanes system along US 78/SR 10/Stone Mountain Freeway, from East Park Place Boulevard in the City of Stone Mountain to SR 124/Scenic Highway, in the City of Snellville, for a total of 6.02 miles. The existing typical section consists of six lanes, four 10’ wide outside lanes and two 11’ wide reversible center turn lanes. The proposed improvements consist of removing the existing reversible system, improving the existing intersections, and re-striping the existing lane configuration to three 10’ travel lanes in each direction with a raised concrete median. 12’ wide left and right turn auxiliary lanes will be constructed, as required to provide an acceptable level of service at signalized intersections. New retaining walls, new curb and gutter, sidewalk and landscaping will also be constructed. ATMS communication, including CCTV cameras, radar detection systems, highway advisory radio, and CMS signs will be installed along the corridor.

IV. INVESTIGATION PHASE

VALUE ENGINEERING STUDY BRIEFING

US 78/SR 10/STONE MOUNTAIN FREEWAY **December 4 and 7, 2006**		
NAME	**AFFILIATION**	**PHONE**
William F. Ventry, P.E., C.V.S.	VE Group	850/627-3900
Dickey Forrester	VE Group	850/627-3900
Tom Hartley, P.E., C.V.S.	VE Group	850/627-3900
Lisa Myers	GDOT	404/651-7468
James Magnus	GDOT	404/656-5306
Derrick Cameron	GDOT	404/635-8153
Scott Shelton	GS&P	678/518-3684
Jeff Church	GS&P	770/754-0755

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. ROADWAY MEDIAN

B. BRIDGE MEDIAN

II. MATERIALS

A. PAVEMENT DESIGN

B. EAST PARK SOUTH SIDE

III. STAGE CONSTRUCTION

A. LANE CLOSURE/STAGE BOTTLENECKS

V. SPECULATION PHASE

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

I. CONSTRUCTABILITY

A. ROADWAY MEDIAN

- **Use a painted median**
- **Use asphalt curb**

B. BRIDGE MEDIAN

- **Use a painted median**
- **Use type seven markers**

II. MATERIALS

A. PAVEMENT DESIGN

- **Use superpave**

B. EAST PARK SOUTH SIDE

- **Use full depth asphalt**

III. STAGE CONSTRUCTION

A. LANE CLOSURE/STAGE BOTTLENECKS

- **Revise staging plans**

VI. EVALUATION PHASE

A. ALTERNATIVES

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

I. CONSTRUCTABILITY

A. ROADWAY MEDIAN

Value Engineering Alternative: ***Use asphalt curb.***

B. BRIDGE MEDIAN

Value Engineering Alternative: ***Use type seven markers.***

II. MATERIALS

A. PAVEMENT DESIGN

Value Engineering Alternative: ***Use superpave.***

B. EAST PARK SOUTH SIDE

Value Engineering Alternative: ***Use full depth asphalt.***

III. STAGE CONSTRUCTION

A. LANE CLOSURE/STAGE BOTTLENECKS

Value Engineering Alternative: ***Revise staging plans.***

VI. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. ROADWAY MEDIAN

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

B. BRIDGE MEDIAN

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

II. MATERIALS

A. PAVEMENT DESIGN

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

B. EAST PARK SOUTH SIDE

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

III. STAGE CONSTRUCTION

A. LANE CLOSURE/STAGE BOTTLENECKS

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

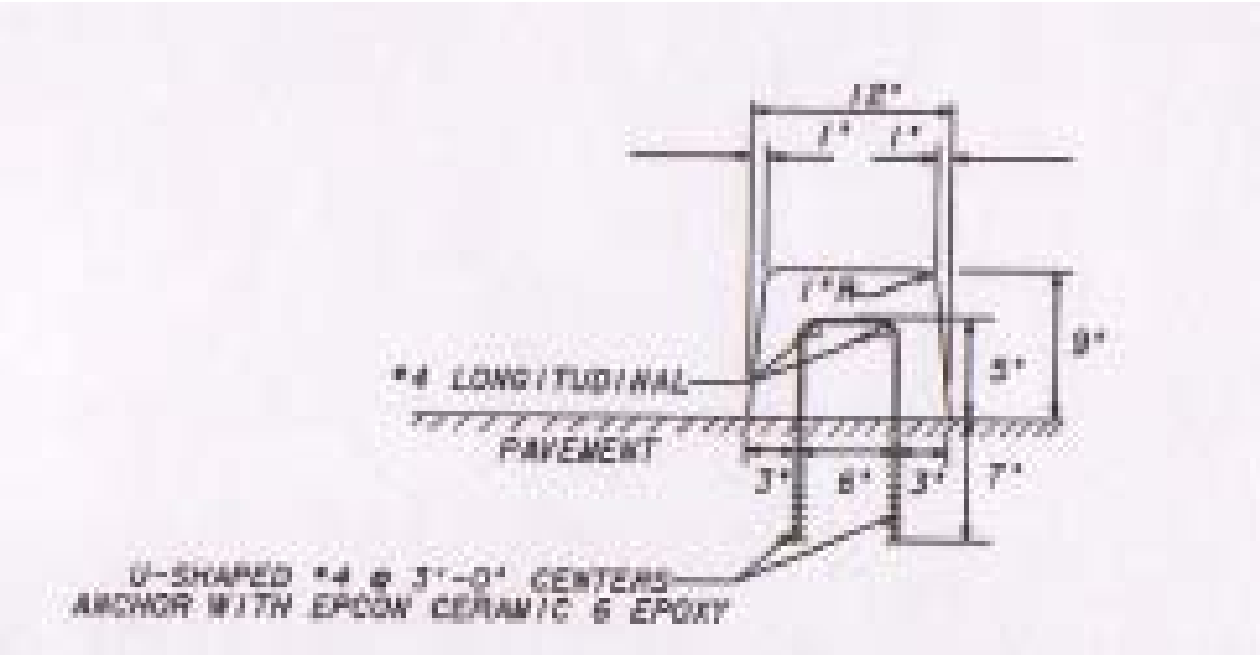
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. ROADWAY MEDIAN

1. "As Proposed"

The As Proposed design calls for installing 10,220 LF of Concrete Doweled Integral Curb, Type 3, including dowels along with several types of concrete curb for the median traffic separator.



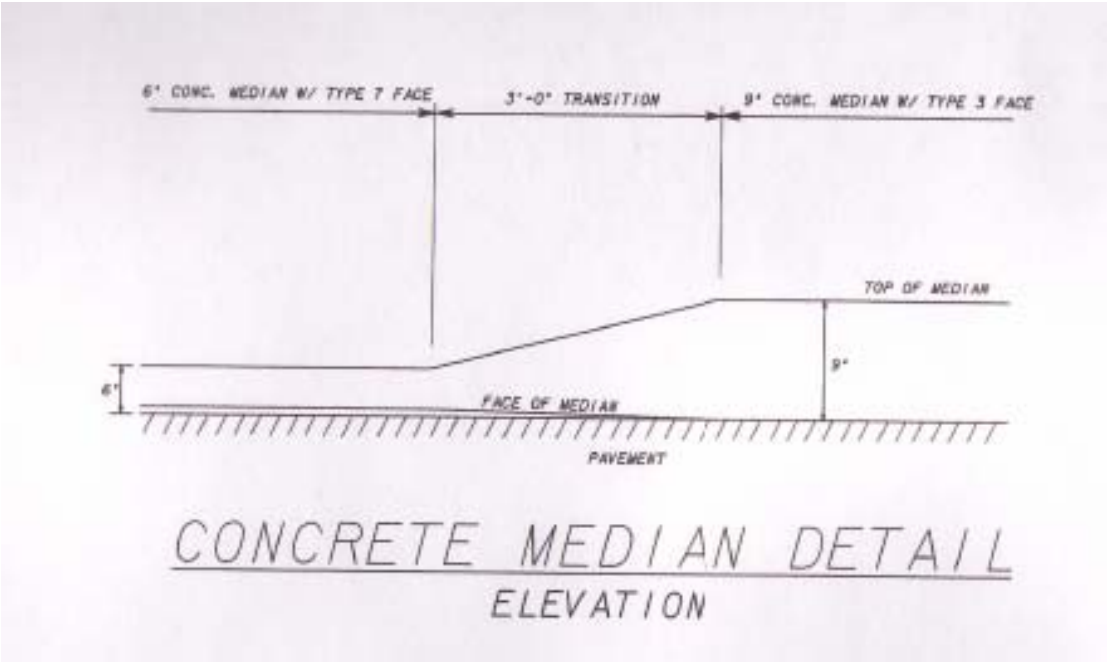
AS PROPOSED CONCRETE DOWELED INTEGRAL CURB

VII. DEVELOPMENT PHASE

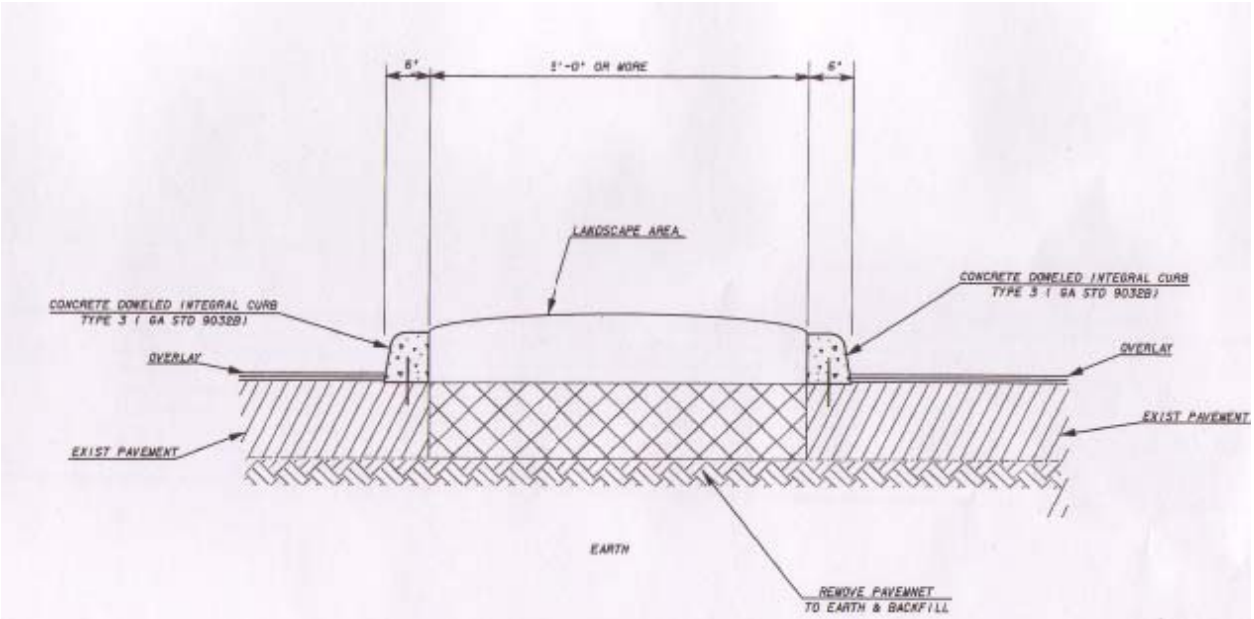
I. CONSTRUCTABILITY

A. ROADWAY MEDIAN

1. "As Proposed"



TRANSITION BETWEEN CURB HEIGHTS



AS PROPOSED LANDSCAPE MEDIAN

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

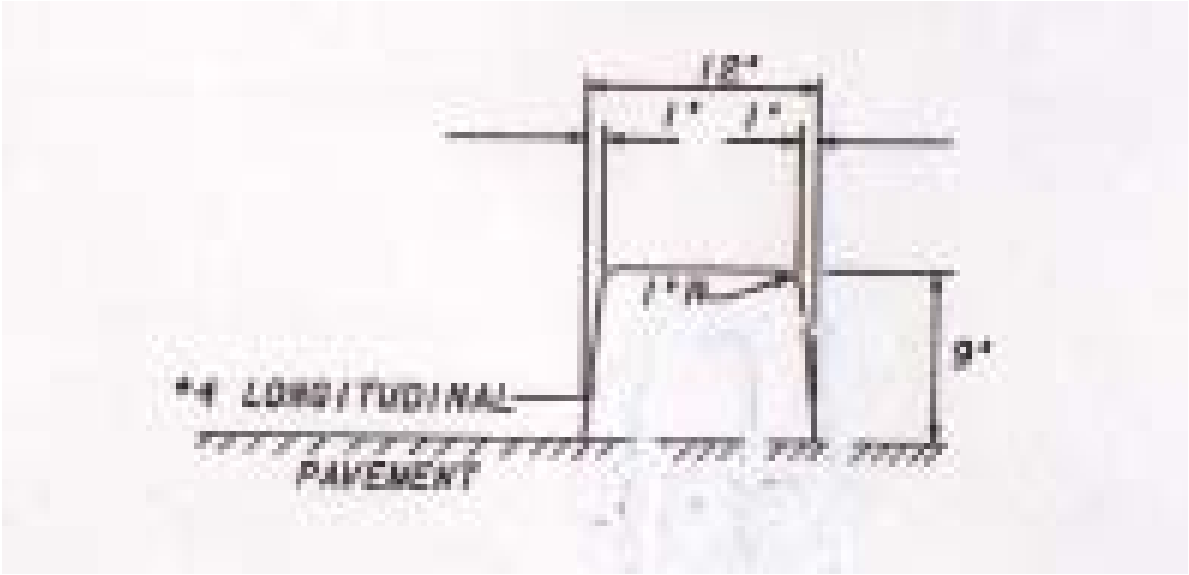
A. ROADWAY MEDIAN

2. Value Engineering Alternative

The "Need and Purpose Statement" from the Project Concept Report done May 21, 2002 implies this project is another "interim" fix until a Major Investment Study for the corridor can be completed. Based on the temporary nature of the project, the Value Engineering Team recommends replacing the proposed addition of concrete median curbs and traffic separators with painted asphalt curbing and traffic separators.

Issues arise from the doweling of some of the median curbing, such as the possibility of existing PCC pavement under the asphalt surface and the expense of the permanent concrete curbing.

The Value Engineering Alternative curbing and traffic separators would consist of asphalt in accordance with Georgia Department of Transportation Standard D-26. The curbs and traffic separators will be painted with yellow paint to increase their visibility.



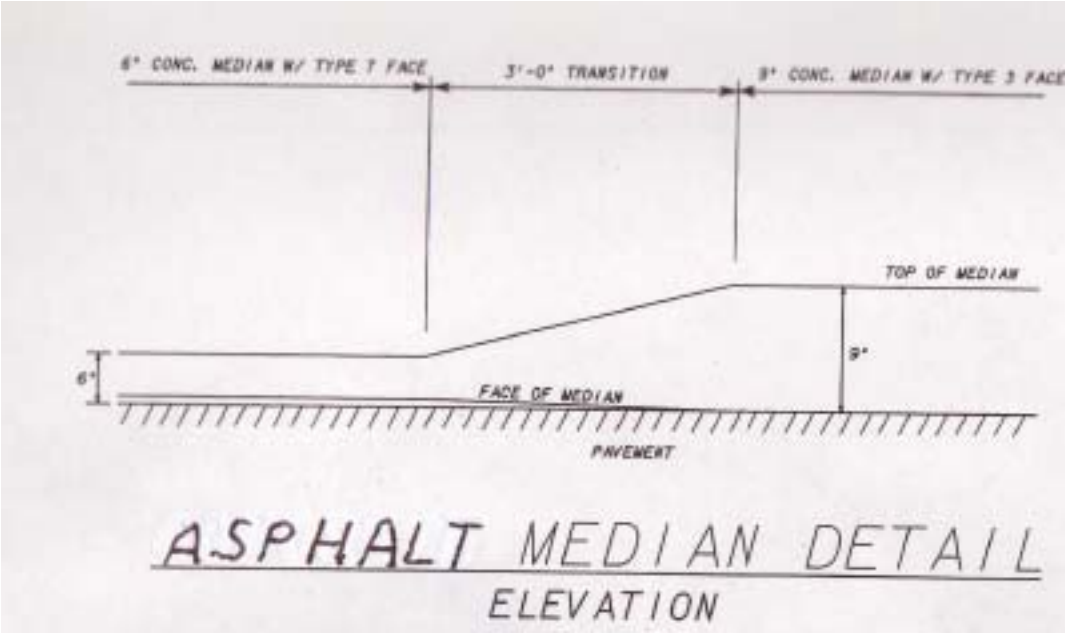
1' ASPHALT TRAFFIC SEPARATOR

VII. DEVELOPMENT PHASE

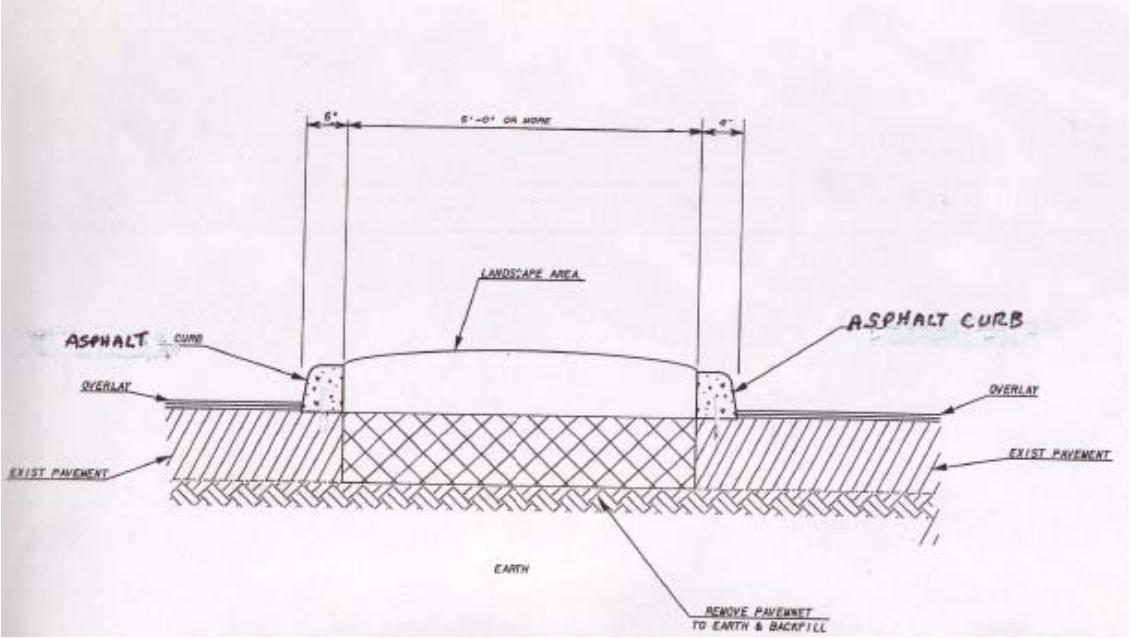
I. CONSTRUCTABILITY

A. ROADWAY MEDIAN

2. Value Engineering Alternative



TRANSITION BETWEEN CURB HEIGHTS



LANDSCAPED MEDIANS

I. CONSTRUCTABILITY
ROADWAY MEDIAN
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
CONCRETE DOWELED INTEGRAL CURB, T3, INCLUDE DOWELS	LF	$9.53	10,220.0	$97,397	0.0	$0
CONCRETE MEDIAN 4"	SY	$24.89	1,501.0	$37,360	0.0	$0
CONCRETE MEDIAN 6"	SY	$28.21	6,254.0	$176,425	0.0	$0
ASPHALT	TN	$75.00	0.0	$0	727.3	$54,548
SOLID YELLOW PAINT STRIPE 6"	GM	$370.00	0.0	$0	30.0	$11,100
SUBTOTAL				**$311,182**		**$65,648**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		$0		$0
TRAFFIC CONTROL/MOT		0.0%		$0		$0
ENGINEERING & CONTINGENCY		10.0%		$31,118		$6,565
GRAND TOTAL				**$342,300**		**$72,213**

POSSIBLE SAVINGS: $270,087

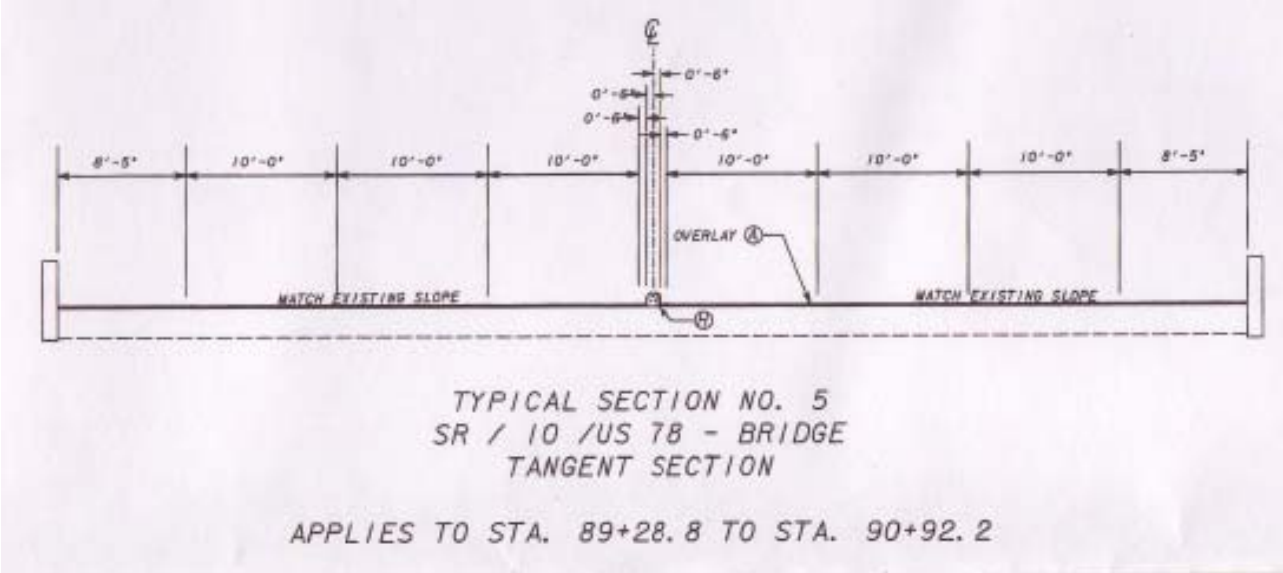
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

B. BRIDGE MEDIAN

1. "As Proposed"

The proposed design calls for placing a 9" high Concrete Median in the center of the bridge.

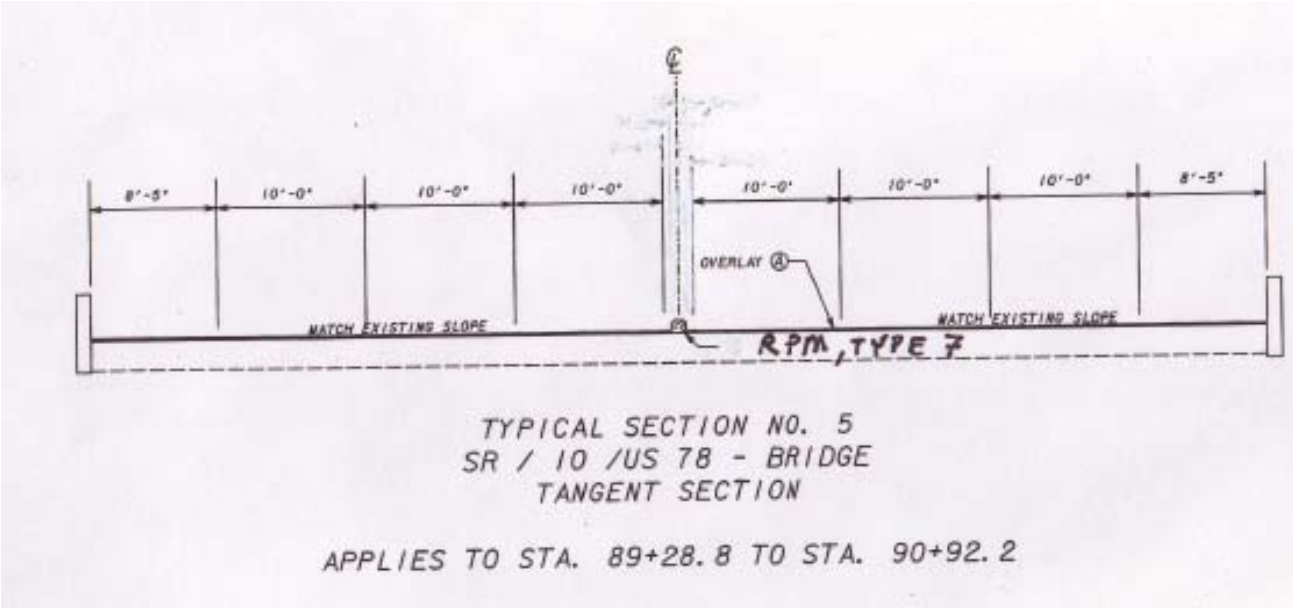


I. CONSTRUCTABILITY

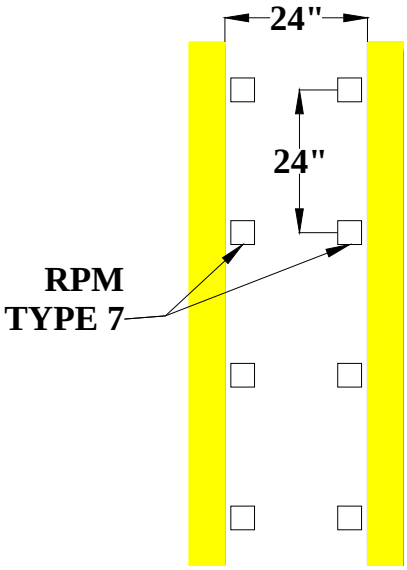
B. BRIDGE MEDIAN

2. Value Engineering Alternative

The Value Engineering Team recommends replacing the Concrete Doweled Integral Curb, TP 3 with Raised Pavement Markers, TP 7. These RPM's will be easier to install and maintain than the proposed Concrete Curb.



VALUE ENGINEERING ALTERNATIVE



TYPICAL RPM PLACEMENT ON BRIDGE

I. CONSTRUCTABILITY
BRIDGE MEDIAN
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
CONCRETE DOWELED INTEGRAL CURB, T3, INCLUDE DOWELS	LF	$9.53	173.4	$1,653	0.0	$0
RAISED PAVEMENT MARKERS, TP7	EA	$8.30	0.0	$0	174.0	$1,444
BRIDGE DECK PREP WORK/MOT	SF	$20.00	173.4	$3,468	0.0	$0
SUBTOTAL				**$5,121**		**$1,444**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		$0		$0
TRAFFIC CONTROL/MOT		0.0%		$0		$0
ENGINEERING & CONTINGENCY		10.0%		$512		$144
GRAND TOTAL				**$5,633**		**$1,588**

POSSIBLE SAVINGS: $4,045

VII. DEVELOPMENT PHASE

II. MATERIALS

A. PAVEMENT DESIGN

1. "As Proposed"

The proposed pavement design calls for Asphalt Concrete 12.5 mm, GP 2 only, including polymer-modified bitum Matl & H Lime.

II. MATERIALS

A. PAVEMENT DESIGN

2. Value Engineering Alternative

The Value Engineering Team recommends replacing the SMA mix with Asphalt Concrete 12.5 mm Superpave.

II. MATERIALS
PAVEMENT DESIGN
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
ASPHALT CONCRETE 12.5 MM, INCL POLYMOER-MODIFIED BITUM MATL & H LIME	TN	$71.00	31,527.0	$2,238,417	0.0	$0
ASPHALT CONCRETE 12.5 MM, SUPERPAVE	TN	$64.00	0.0	$0	31,527.0	$2,017,728
SUBTOTAL				**$2,238,417**		**$2,017,728**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		$0		$0
TRAFFIC CONTROL/MOT		0.0%		$0		$0
ENGINEERING & CONTINGENCY		10.0%		$223,842		$201,773
GRAND TOTAL				**$2,462,259**		**$2,219,501**

POSSIBLE SAVINGS: $242,758

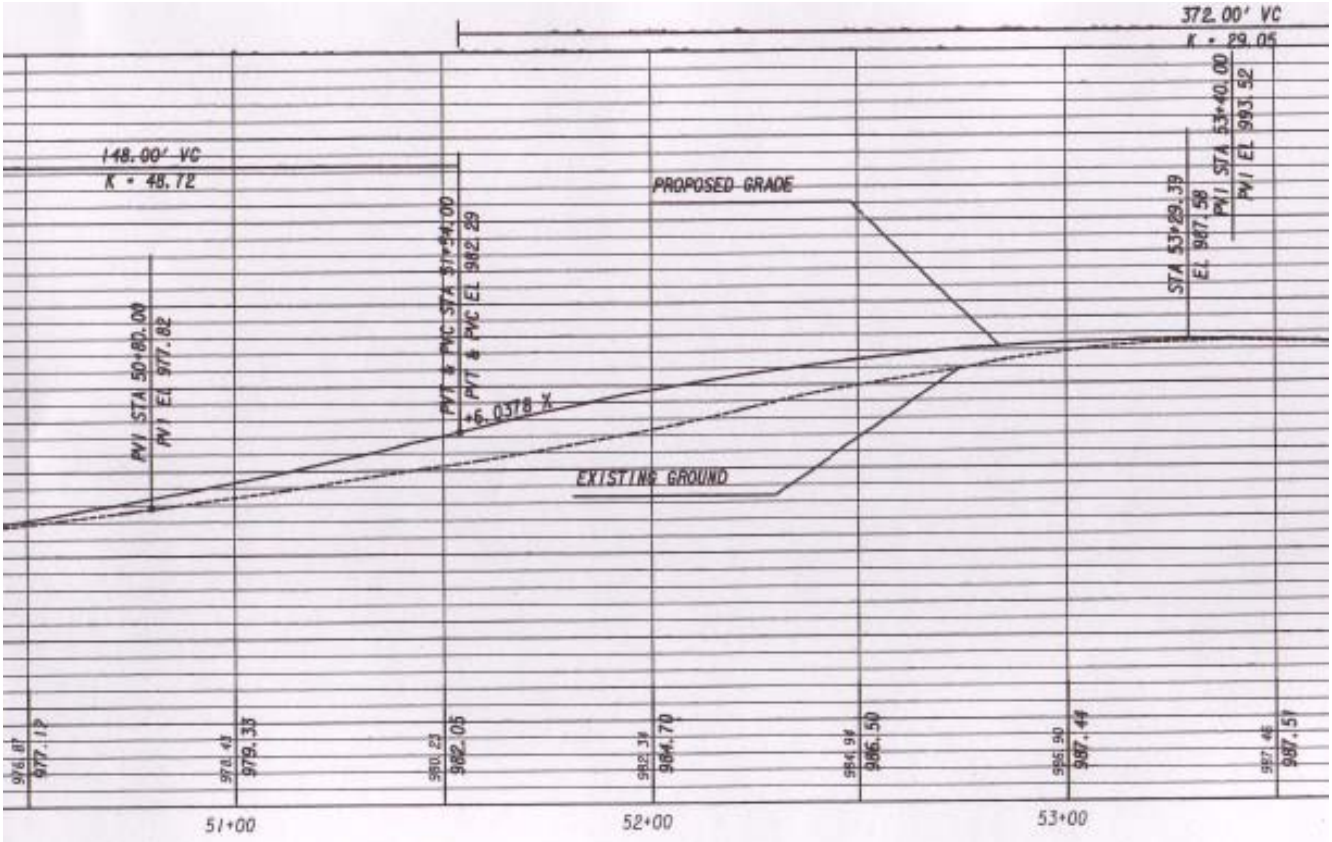
VII. DEVELOPMENT PHASE

II. MATERIALS

B. EAST PARK SOUTH SIDE

1. "As Proposed"

There is a section of East Park Place on the south side of the project that requires raising the profile grade by approximately 2' by closing the road to traffic, and removing the existing pavement and placing a new section of pavement by filling the area with soil, stone base, asphaltic base, asphaltic binder, and topping. No provisions are provided in the contract for how long the road can be closed and what detours are available.



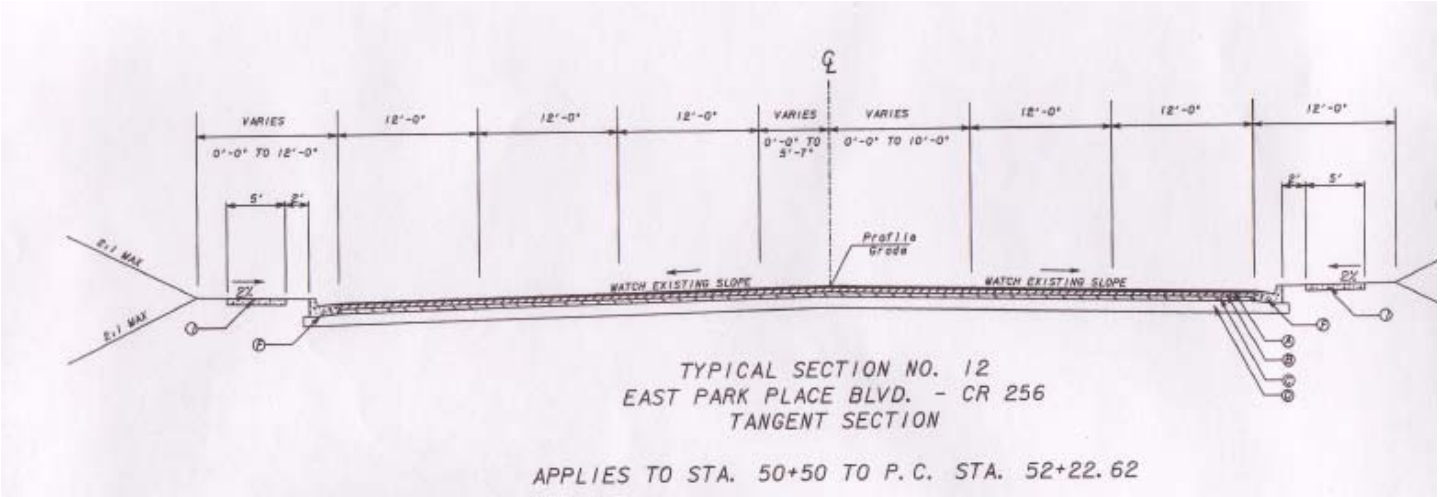
AS PROPOSED PROFILE GRADE

VII. DEVELOPMENT PHASE

II. MATERIALS

B. EAST PARK SOUTH SIDE

1. "As Proposed"



A. RECYCLED ASPHALTIC CONCRETE 12.5 mm, SMA, GP 2 ONLY, INCL. BITUM. MAT'L & H LIME (165 LB/SY)

B. RECYCLED ASPHALTIC CONCRETE 19 mm, SUPERPAVE, GP 1 OR 2, INCL BITUM. MAT' L & H LIME (220 LB/SY)

C. RECYCLED ASPHALTIC CONCRETE 25 mm, SUPERPAVE, GP 1 OR 2, INCL BITUM. MAT' L & H LIME (440 LB/SY)

D. GRADED AGGREGATE BASE, 12"

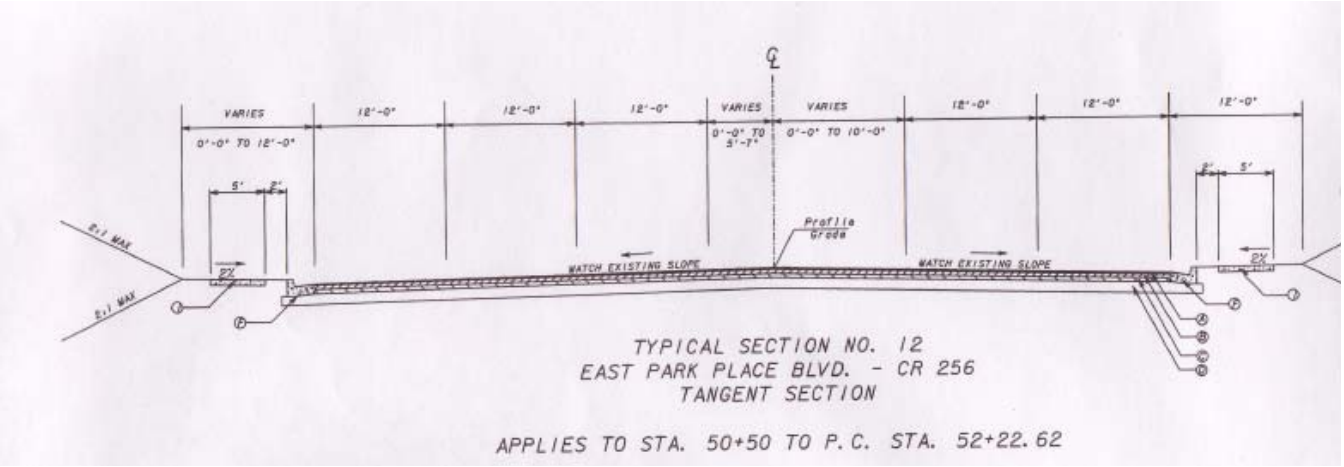
E. ASPHALTIC CONCRETE LEVELEING INCL. BITUM. MAT' L & H LIME

II. MATERIALS

B. EAST PARK SOUTH SIDE

2. Value Engineering Alternative

To avoid closing the road, the Value Engineering Team propose placing asphaltic concrete leveling in this location. This leveling will be placed in lifts that will allow the roadway to remain open except for temporary lane closure while the leveling is placed. This eliminates the need for the installation and advertising a detour and reduces the inconvenience to the traveling public caused by road closure. The time saved would likely be one month that the road would not be closed.



A. RECYCLED ASPHALTIC CONCRETE 12.5 mm, SMA, GP 2 ONLY, INCL. BITUM. MAT'L & H LIME (165 LB/SY)

B. RECYCLED ASPHALTIC CONCRETE 19 mm, SUPERPAVE, GP 1 OR 2, INCL BITUM. MAT' L & H LIME (220 LB/SY)

C. RECYCLED ASPHALTIC CONCRETE 25 mm, SUPERPAVE, GP 1 OR 2, INCL BITUM. MAT' L & H LIME (440 LB/SY)

D. ASPHALTIC CONCRETE LEVELEING INCL. (VARIES FROM 0" TO 21")

II. MATERIALS
PAVEMENT DESIGN
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
RECYCLED ASPHALTIC CONCRETE 12.5 MM, SMA GP 2 ONLY -165#/SY	TN	$71.00	801.0	$56,871	801.0	$56,871
RECYCLED ASPHALTIC CONCRETE 19 MM, SUPERPAVE, GP 1 OR 2	TN	$64.00	279.0	$17,856	801.0	$51,264
RECYCLED ASPHALTIC CONCRETE 25 MM, SUPERPAVE, GP 1 OR 2	TN	$64.00	1,033.0	$66,112	1,033.0	$66,112
RECYCLED ASPHALTIC CONCRETE LEVELING	TN	$64.00	400.0	$25,600	891.8	$57,075
BITUMINOUS TACK COAT	GL	$2.00	8.0	$16	10.0	$20
GRADED AGGREGATE BASE 12"	TN	$29.65	1,321.0	$39,168	0.0	$0
EMBANKMENT	CY	$5.77	82.8	$478	0.0	$0
MOT	DAY	$200.00	30.0	$6,000	3.0	$600
SUBTOTAL				**$212,101**		**$231,942**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		$0		$0
TRAFFIC CONTROL/MOT		0.0%		$0		$0
ENGINEERING & CONTINGENCY		10.0%		$21,210		$23,194
GRAND TOTAL				**$233,311**		**$255,136**

POSSIBLE COST INCREASE **$21,825**

VII. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. LANE CLOSURE/STAGE BOTTLENECKS

1. "As Proposed"

The as-planned staging directions that the project be sequenced with the initial reconstruction work beginning on the west end of the project and proceeding to the east in four sections. The staging requires that all work on each section must be completed before moving to the next segment. The reversible lanes are to remain operational on the sections that are not under construction. This approach to staging was planned to accommodate the utilities on the project and to protect the master controller for the reversible lanes located on the east end of the project at Fountain Drive.

The initial reconstruction work starts with the removal of the reversible lanes on the segment under construction and the installation of three lanes in the westbound direction and two lanes in the eastbound direction with one center lane to accommodate left turn movements. The traffic approaching from the Stone Mountain Freeway is three lanes in the eastbound direction. This traffic is reduced to two lanes in the east bound direction as the work begins on Section #1. The reduction from three lanes to two lanes is accomplished with a left hand lane drop into the intersection with East Park Place. As each section is completed this left lane drop is repeated three more times as the sections are completed and the work moves to the east end of the project.

The as-planned project has provisions for the use of an automated portable real-time workzone information system and a highway advisory radio beacon system.

VII. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. LANE CLOSURE/STAGE BOTTLENECKS

2. Value Engineering Alternative

Modify the staging plan to eliminate performing the work in sections.

Stage 1: *Eliminate the reversible lanes for the entire length of the project.* (Avoid the need for maintaining a partial reversible lane system.) *Mark the entire project with three lanes in the westbound direction, two lanes in the eastbound direction and a center turn lane to accommodate the left turn movements during construction. Provide for a right hand lane drop on the west end of the project before entering the work area or provide for a right hand lane drop into East Park Place.*

Require the contractor to start work on the east end of the project and progress the work toward the west. The south side of the roadway must be completed as the work moves to the west. As soon as the work on the south side of the roadway is complete to the point that traffic can be placed on the third lane in the eastbound direction the lane shall be opened. (The best incentive for the contractor to open the third lane is to eliminate the cost of maintaining the traffic control for keeping the lane closed. If additional incentive is required then a calendar day intermediate date could be used to ensure that once the contractor begins work on the east end that a segment must have the third lane opened to traffic within the set number of calendar days.)

All work on the south side of the roadway shall be completed to provide for three lanes in the eastbound direction.

The advantage for progressing the work from the east to the west is that the original lane drop on the west end of the project is never moved for the duration of the project. The need for a left hand lane drop at four separate locations is no longer required. The traveling public is trained one time to merge into two lanes of traffic at the beginning of the project and is not required to make any further decisions for the length of the project. This greatly reduces the need to provide information to the public regarding lane shifts, lane drops, and future closures. This information can be distributed to the public via portable changeable message signs and this would eliminate the need for the very costly real-time workzone information system. Most of the traffic signals can be installed to operate with the detection loops or optical sensors placed in their permanent locations on the eastbound lanes and timed to assist the flow of traffic.

Stage 2*:* *Complete the north side of the roadway with the turn lanes a priority. When the side roads, frontage roads, curb and gutter, turn lanes and sidewalks have been completed, then proceed to Stage 3.*

Stage 3: *Remove the center turn lane and interim mark the location of the median. Realign the eastbound lanes as necessary to maintain three lanes. Use temporary lane closures to construct the raised median. Place the final surface on the roadway.*

III. STAGE CONSTRUCTION
LANE CLOSURES/STAGE BOTTLENECKS
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
MOBILIZATION OF AUTOMATED PORTABLE REAL-TIME WORKZONE INFORMATION SYSTEM	LS	$290,378.92	1.0	$290,379	0.0	$0
AUTOMATED PORTABLE REAL-TIME WORKZONE INFORMATION SYSTEM	MO	$3,229.23	24.0	$77,502	0.0	$0
HIGHWAY ADVISORY RADIO, PORTABLE	EA	$500.00	2.0	$1,000	0.0	$0
HIGHWAY ADVISORY RADIO BEACON, PORTABLE	EA	$1,000.00	2.0	$2,000	0.0	$0
SUBTOTAL				**$370,881**		**$0**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		$0		$0
TRAFFIC CONTROL/MOT		0.0%		$0		$0
ENGINEERING & CONTINGENCY		10.0%		$37,088		$0
GRAND TOTAL				**$407,969**		**$0**

POSSIBLE SAVINGS: $407,969