

VALUE ENGINEERING STUDY
OF
SR 104/ RIVERWATCH PARKWAY

PROJECT NUMBER: DE-00MS(389)
PI NUMBER: 262750

ATLANTA, GEORGIA
December 4 and 5, 2006

Prepared by:

VE GROUP, L.L.C.

In Association With:

Georgia Department of Transportation

VALUE ENGINEERING STUDY
TEAM LEADER

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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 5, 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
4. Development
5. Report Preparation

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

- Ease of construction
- Construction Cost
- Traffic Control
- Local Traffic Disruption

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. MULTI-USE TRAIL

The Value Engineering Team recommends that Value Engineering Alternative Number 1 be implemented. This alternative combines the trail and bridge.

If this recommendation can be implemented, there is a possible savings of ***\$ 245,587.***

If Value Engineering Number 1 cannot be implemented, then the Value Engineering Team recommends that Value Engineering Alternative Number 2 be implemented. This alternative eliminates the arch culvert and carries the trail across the roadway.

If this recommendation can be implemented, there is a possible savings of ***\$ 240,605.***

II. MATERIALS

RECOMMENDATION NUMBER 2:

A. MULTI-USE TRAIL

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative uses asphalt rather than concrete.

If this recommendation can be implemented, there is a possible savings of ***\$16,017.***

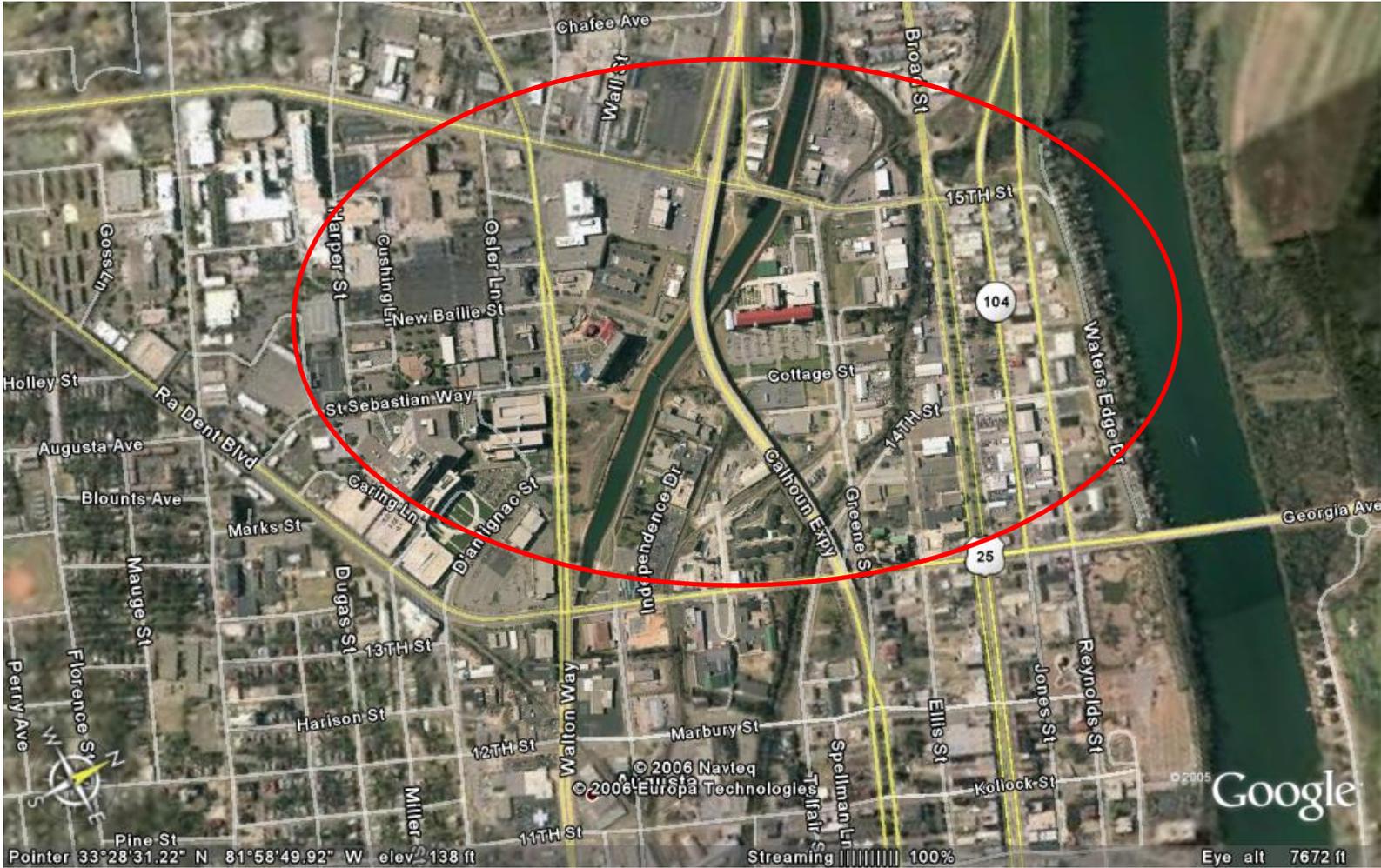
III. STAGE CONSTRUCTION

RECOMMENDATION NUMBER 3:

A. SEQUENCE OF CONSTRUCTION

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative revises the sequence of construction and establishes interim completion dates and milestones.

II. LOCATION OF PROJECT



AUGUSTA, GEORGIA

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

This project will provide a grade separation between traffic entering and exiting Augusta on SR 104/Riverwatch Parkway, traveling to the Augusta Medical Center complex located west of downtown and the CSX railroad.

The purpose of the project is to provide improved mobility and relieve traffic congestion on the existing 13th and 15th Streets. The project uses a basic four-lane divided typical section, modified to minimize impacts on property and other constraints and to provide bike lanes and sidewalk as needed. The project includes bridges over Riverwatch Parkway, CSX Railroad, Hawks Gulley and the Augusta Canal. The project length is 2.55 miles.

IV. INVESTIGATION PHASE

VALUE ENGINEERING STUDY BRIEFING

<i>SR 104/ RIVERWATCH PARKWAY</i>		
December 4 and 5, 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
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Jack Muirhead	GDOT	404/656-5197
Blake Bihner	GDOT	404/656-5197
Tom Barwick	Heath & Lineback	770/424-1668
Jimmy Smith	GDOT	478/553-2331

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. Multi-use Trail

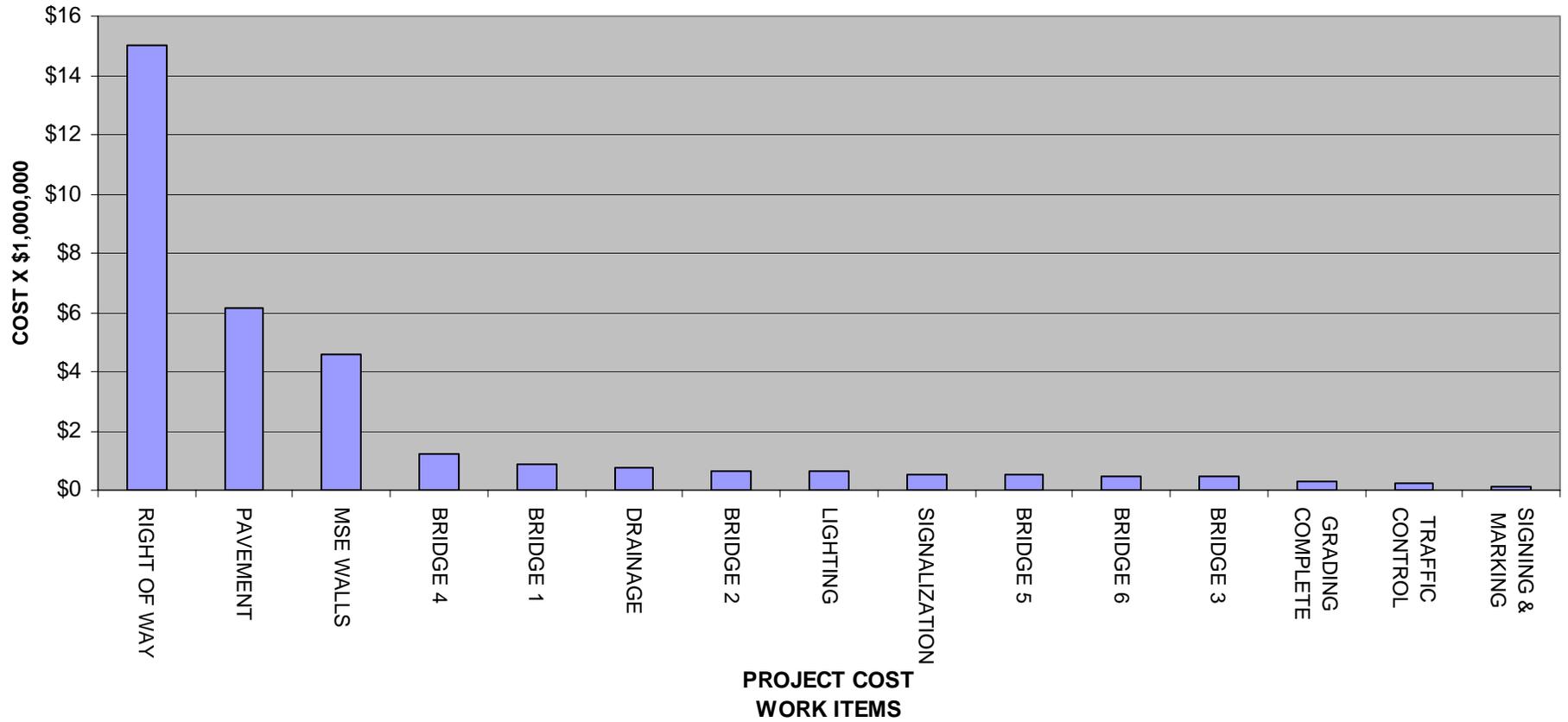
II. MATERIALS

A. Multi-use Trail

III. STAGE CONSTRUCTION

A. Sequence of Construction

PARETO CHART



V. SPECULATION PHASE

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

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

- **Eliminate the arch culvert and carry across roadway**
- **Combine arch culvert and bridge**

II. MATERIALS

A. MULTI-USE TRAIL

- **Use asphalt rather than concrete**
- **Use aggregate**
- **Use earth**

III. STAGE CONSTRUCTION

A. SEQUENCE OF CONSTRUCTION

- **Revise the sequence of construction and establish interim completion dates and milestones.**

VI. EVALUATION PHASE

A. ALTERNATIVES

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

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

Value Engineering Alternative Number 1: Combine the trail and bridge.

Value Engineering Alternative Number 2: Eliminate the arch culvert and carry across roadway.

II. MATERIALS

A. MULTI-USE TRAIL

Value Engineering Alternative: Use asphalt rather than concrete.

III. STAGE CONSTRUCTION

A. SEQUENCE OF CONSTRUCTION

Value Engineering Alternative: Revise the sequence of construction and establish interim completion dates and milestones.

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

- 1. AS PROPOSED**
- 2. VALUE ENGINEERING ALTERNATIVE NUMBER 1**
- 3. VALUE ENGINEERING ALTERNATIVE NUMBER 2**

II. MATERIALS

A. MULTI-USE TRAIL

- 1. AS PROPOSED**
- 2. VALUE ENGINEERING ALTERNATIVE**

III. STAGE CONSTRUCTION

A. SEQUENCE OF CONSTRUCTION

- 1. AS PROPOSED**
- 2. VALUE ENGINEERING ALTERNATIVE**

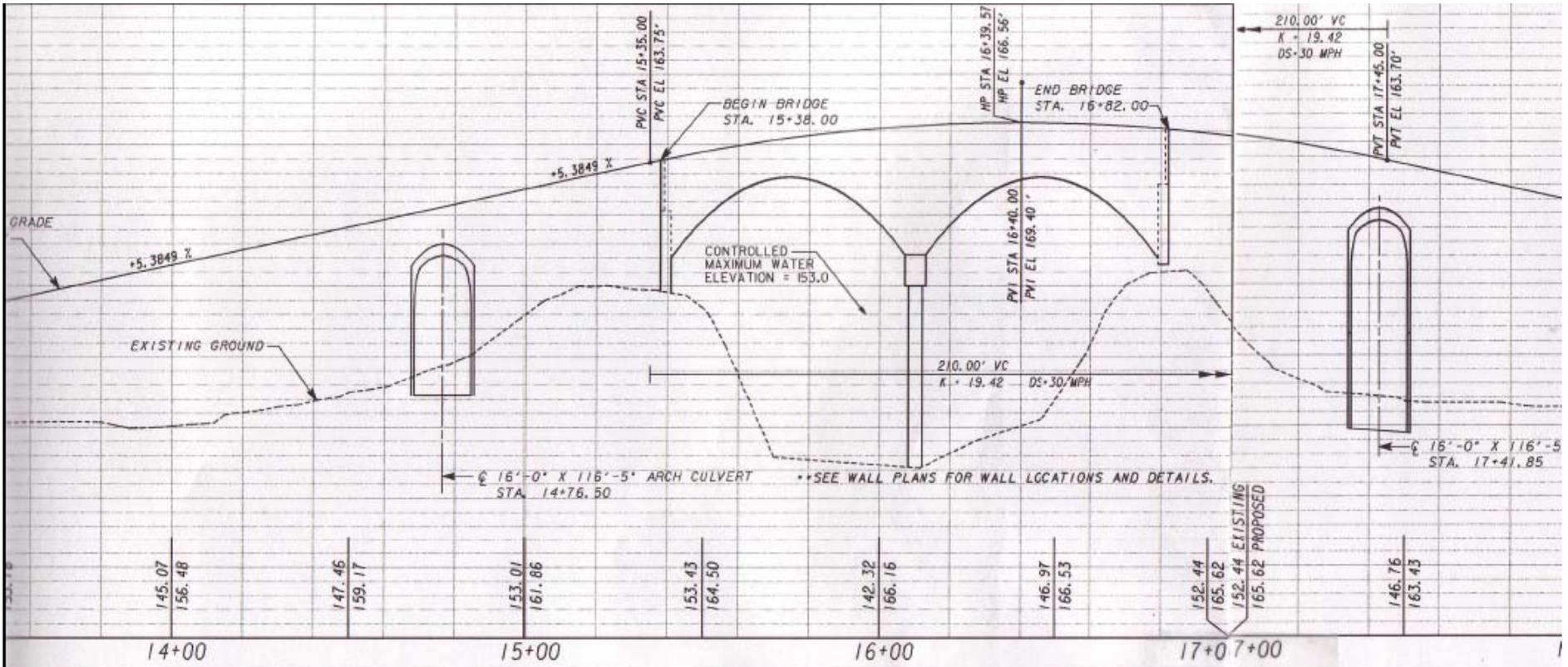
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

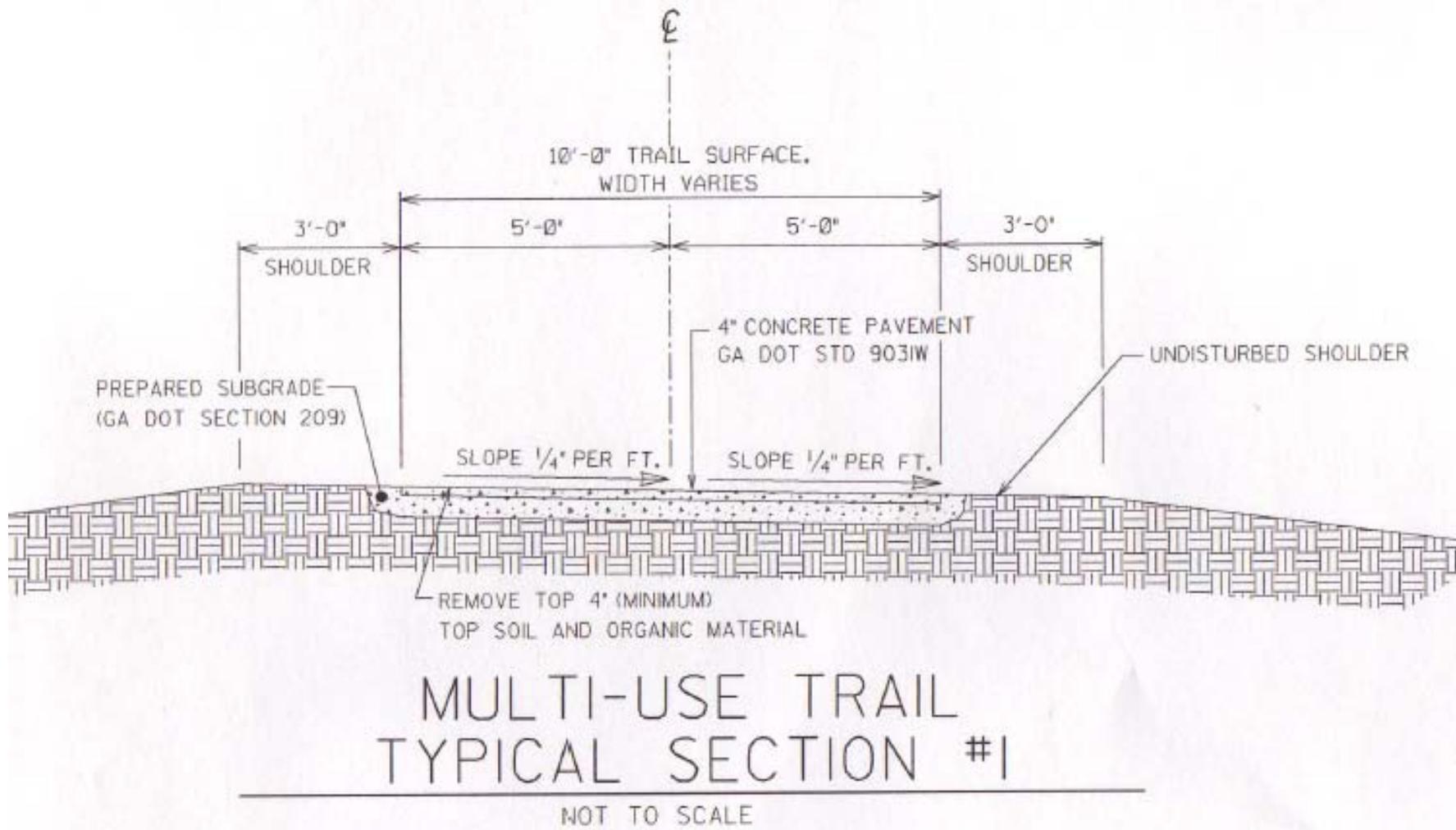
1. “As Proposed”

The proposed project contains a Multi-Use Trail on both the levees along the Augusta Canal 1st Level. The trail will shift away from the canal to pass through arched culverts that will be constructed under the approaches to the St. Sebastian Way Bridge as shown on the following pages.



AS PROPOSED MULTI-USE TRAIL CULVERTS

**VII. DEVELOPMENT PHASE
I. CONSTRUCTABILITY
A. MULTI-USE TRAIL
1. "AS PROPOSED"**



VII. DEVELOPMENT PHASE
I. CONSTRUCTABILITY
A. MULTI-USE TRAIL
1. "AS PROPOSED"

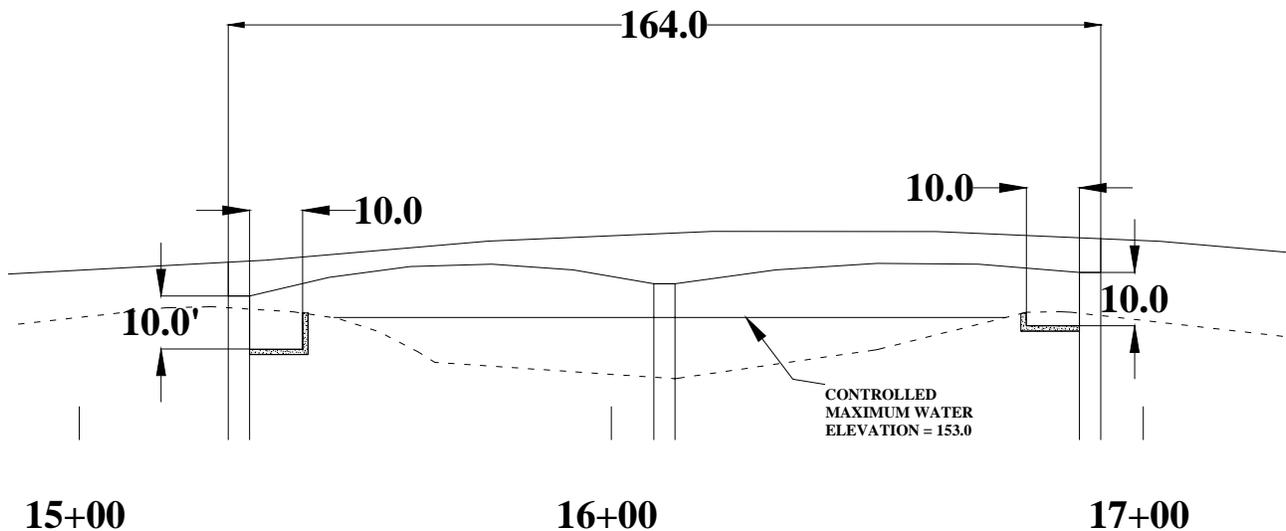
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

2. Value Engineering Alternative Number 1

The Value Engineering Team recommends extending the lengths of both spans of the St. Sebastian Way Bridge to accommodate the Multi-use Trails as shown below:



VALUE ENGINEERING ALTERNATIVE MULTI-USE PATH UNDER BRIDGE END ABUTMENTS

This alternative will shorten up the length of the trail, keep the grade separation between St. Sebastian Way and the Trail and also provide for an open Trail rather than putting the Trail users in a tunnel. It will require a longer structure to span the Trail and Canal and then will have to be encased in a topless culvert to keep the integrity of the levee.

**MULTI-USE TRAIL
VALUE ENGINEERING ALTERNATIVE NUMBER 1
COST COMPARISON SHEET**

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
St.SEBASTIAN BRIDGE OVER AUGUSTA CANAL LEVEL 1	SF	\$66.90	13,248.0	\$886,291	15,088.0	\$1,009,387
ARCHED CULVERT CLASS A CONCRETE	CY	\$498.42	703.7	\$350,738	0.0	\$0
ARCHED CULVERT REINFORCING STEEL	LB	\$0.83	52,425.0	\$43,513	0.0	\$0
TRAIL RETAINING WALL CLASS A CONCRETE	CY	\$498.42	0.0	\$0	69.9	\$34,840
TRAIL RETAINING WALL REINFORCING STEEL	LB	\$0.83	0.0	\$0	15,727.5	\$13,054
SUBTOTAL				\$1,280,542		\$1,057,281
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		\$0		\$0
TRAFFIC CONTROL/MOT		0.0%		\$0		\$0
ENGINEERING & CONTINGENCY		10.0%		\$128,054		\$105,728
GRAND TOTAL				\$1,408,596		\$1,163,009

POSSIBLE SAVINGS:

\$245,587

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

Cost Sheet Comparison Notes

1. The cost of bridge number 1 was divided by (144' x 92') to come up with the \$66.90/SF bridge cost and the Value Engineering Alternative Bridge was extended 10' on each end to accommodate the Multi-Use Trail.
2. The cost of the arched culvert was derived from the Bridge Design Section. It was assumed the proposed arch would contain similar amounts of concrete and steel as a double 10' x 8' concrete box culvert. 3.02 CY/LF and 225 LBS/LF.
3. It was assumed the Value Engineering Alternative concrete channel for the Trail would contain approximately one-third the concrete and steel of the 10' x 8' concrete box culvert.

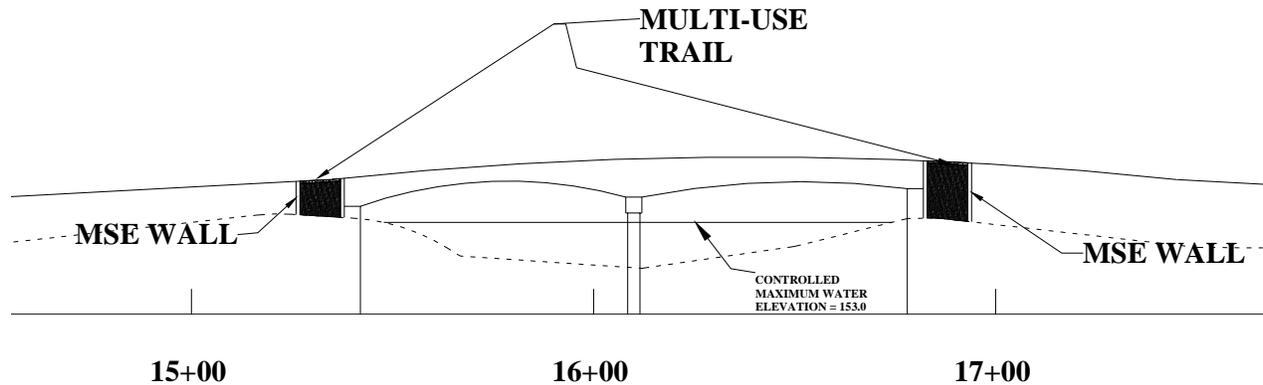
VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. MULTI-USE TRAIL

3. *Value Engineering Alternative Number 2*

Another approach to accommodate the Multi-Use Trail is to raise it to the proposed grade of St. Sebastian Way for an at grade pedestrian crossing. This will eliminate the need to construct an arched culvert. The profile of the Trail would not exceed a 12:1 grade ensuring compliance with ADA. The Trail approaches to St. Sebastian will have to be constructed using a retained earth wall. A pedestrian signal may be needed to stop St. Sebastian Way traffic in order for the Trail users to cross St. Sebastian Way.



**VALUE ENGINEERING ALTERNATIVE NUMBER 2
AT GRADE MULTI-USE TRAIL**

**MULTI-USE TRAIL
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET**

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
ARCHED CULVERT CLASS A CONCRETE	CY	\$498.42	703.7	\$350,738	0.0	\$0
ARCHED CULVERT REINFORCING STEEL	LB	\$0.83	52,425.0	\$43,513	0.0	\$0
MSE WALL 0' - 10'	SF	\$36.69	0.0	\$0	2,400.0	\$88,056
EMBANKMENT	CY	\$5.77	0.0	\$0	888.9	\$5,129
CONCRETE PARAPET, SPCL DESIGN	LF	\$171.53	0.0	\$0	480.0	\$82,334
SUBTOTAL				\$394,251		\$175,519
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		\$0		\$0
TRAFFIC CONTROL/MOT		0.0%		\$0		\$0
ENGINEERING & CONTINGENCY		10.0%		\$39,425		\$17,552
GRAND TOTAL				\$433,676		\$193,071

POSSIBLE SAVINGS:

\$240,605

VII. DEVELOPMENT PHASE

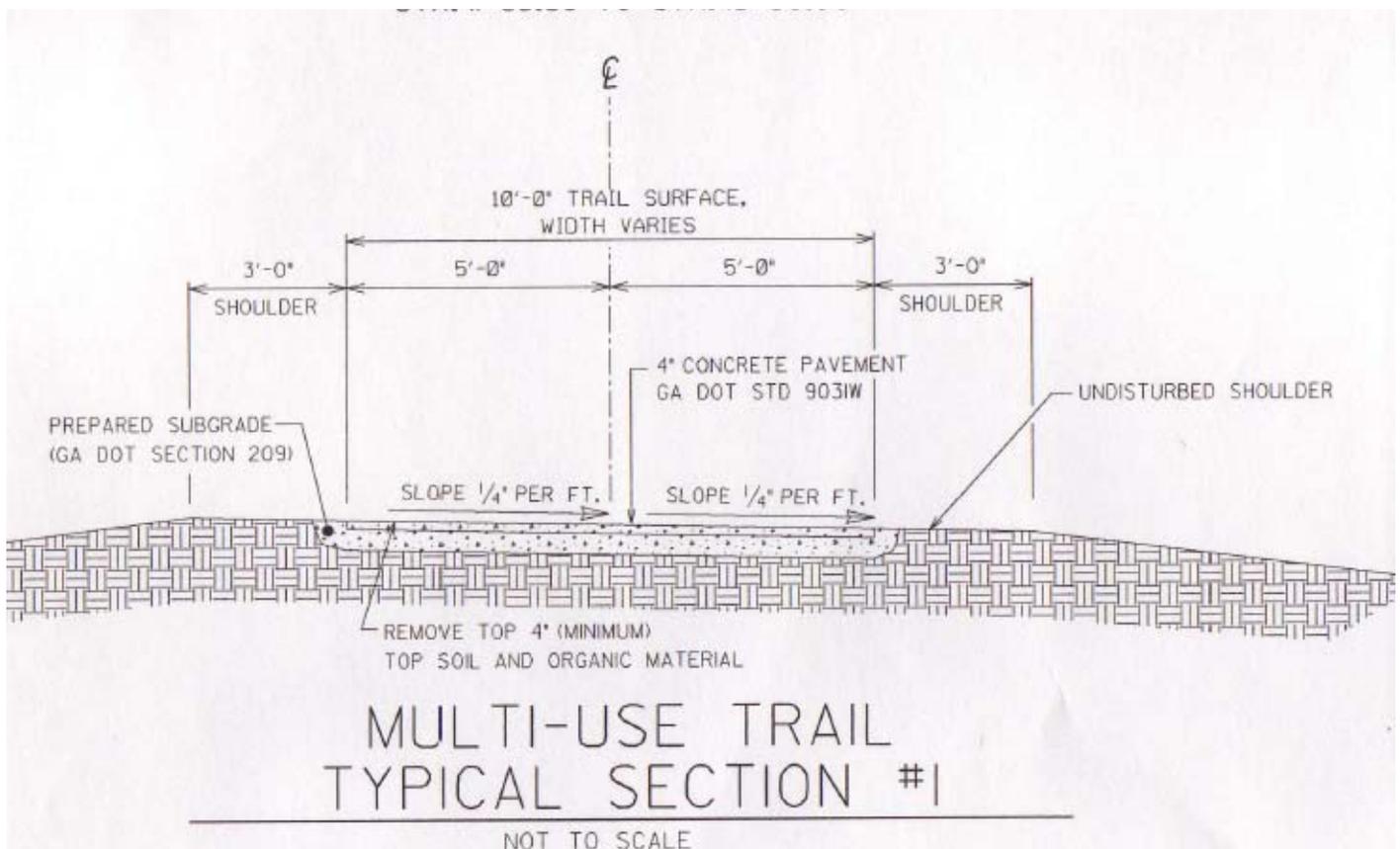
II. MATERIALS

A. MULTI-USE TRAIL

1. "As Proposed"

The "as proposed" Multi-Use Trail will be constructed with 4" of concrete paid for as 4" sidewalk. The proposed length of the Trail is 1,151':

- 443' on west bank of canal
- 263' on east bank of canal
- 445' on north west side of St. Sebastian Way



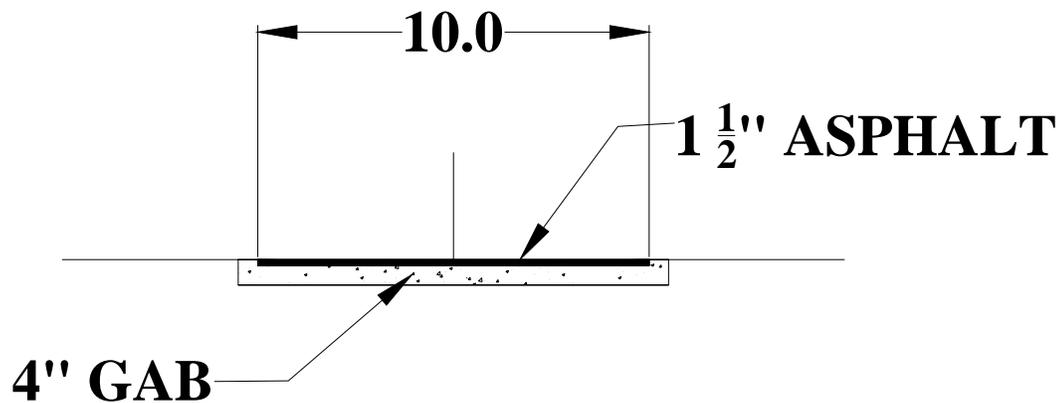
VII. DEVELOPMENT PHASE

II. MATERIALS

A. MULTI-USE TRAIL

2. *Value Engineering Alternative*

The Value Engineering Team recommends replacing the 4" Concrete pavement with 1.5" of asphalt and 4" of GAB.



VALUE ENGINEERING ALTERNATE MULTI-USE PATH PAVEMENT

**MULTI-USE TRAIL PAVEMENT
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET**

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
CONCRETE 4' SIDEWALK	SY	\$28.82	1,278.9	\$36,858	0.0	\$0
1.5" ASPHALT	TN	\$78.00	0.0	\$0	105.5	\$8,229
4" GAB	SY	\$10.00	0.0	\$0	1,406.8	\$14,068
SUBTOTAL				\$36,858		\$22,297
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		0.0%		\$0		\$0
TRAFFIC CONTROL/MOT		0.0%		\$0		\$0
ENGINEERING & CONTINGENCY		10.0%		\$3,686		\$2,230
GRAND TOTAL				\$40,544		\$24,527

POSSIBLE SAVINGS:

\$16,017

VII. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. SEQUENCE OF CONSTRUCTION

1. “As Proposed”

Existing staging plans consists of two plan sheets 20-001 and 20-002 which appear to show the staging after several sections of roadway and five of the six bridges have been completed prior to the start of the as-planned Stage 1. Directions for progressing the work appear to start when approximately seventy percent (70%) of the work has been completed. As part of the staged construction, no provisions have been included for ingress and egress for the businesses located on Ellis Street, Greene Street and Enterprize Street, when the raised medians are installed on Greene Street and St. Sebastian Way. Left turn movements are not possible by the as-planned staging.

The sequence of the work on 15th Street appears to have extra phases that could be eliminated or combined to allow the work to progress at a faster pace and to reduce the inconvenience to the traveling public. Since the staging requires that 15th Street be closed between J. C. Calhoun Expressway and Greene Street for the reconstruction of Bridge Number 2 this eliminates the through traffic on 15th Street. There does not appear to be any reason for closing the intersection of 15th Street at Greene Street for the traffic to the north of the intersection unless this closure allows CSX Railroad to reconstruct the rail crossing on 15th Street at the time of the closure. There is no reference in the plans to CSX performing this work in coordination with the prime contractor’s schedule as a part of the as-planned Stage 1 on Sheet 20-001.

Stage 2 of the as-planned on Sheet 20-002 requires that 15th Street be reopened between the J. C. Calhoun Expressway and Greene Street and between Greene Street and Ellis Street but closed to traffic on the north side of the newly completed widening of Bridge number 2. This allows traffic to the businesses on Ellis Street along the north side of Greene Street but the intersection of Broad Street and 15th Street is closed to all traffic. This staging appears to keep 15th Street closed longer that necessary.

VII. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. SEQUENCE OF CONSTRUCTION

2. *Value Engineering Alternative*

Revise the Staging Plan to clarify the sequence of the operations and to add intermediate completion date(s) and milestone(s).

Proposed Stage 1: Complete the construction of the Greene Street Extension from 15th Street to the Riverwatch Parkway. Complete the St. Sebastian Way Extension from Walton Way to Reynolds Street. Complete the construction of Enterprize Street and the Enterprize Street Connector. Reconstruct Greene Street between 15th Street and St. Sebastian Way. This Stage is shown in “green” on the proposed staging plans. When all of Stage 1 has been completed then Stage 2 can begin.

Proposed Stage 2: Closes 15th Street from the J. C. Calhoun Expressway to the south side of Greene Street. Detour 15th Street traffic southward on 15th Street to Walton Way and eastward to the new St. Sebastian Way. Close 15th Street between Greene Street and Ellis Street except for “Local Traffic Only” from the Greene Street intersection to allow business traffic to Ellis Street. Close the south end of Bridge number 2 on 15th Street and close the north side of the 15th Street intersection with Broad Street. Close the section of Broad Street from the east side of the Broad Street intersection with 15th Street to the east side of the Broad Street intersection with the new Greene Street Extension. Close the section of Broad Street from the west side of St. Sebastian Way to the intersection with 15th Street to “Local Traffic Only”. Close the section of 15th Street between Broad Street and Jones Street to “Local Traffic Only”. Close the section of 15th Street between Jones Street and Reynolds Street for reconstruction. When all of Stage 2 has been completed then Stage 3 can begin.

Intermediate completion date is proposed for a nine (9) calendar month period for construction from the time that Bridge number 2 and 15th Street is closed to traffic until Bridge number 2 is completed and 15th Street is opened to traffic except for the section of 15th Street that is allowed to remain closed under Stage 3. If the contractor begins this work with less than nine calendar months remaining in the contract then the overall contract completion date will govern.

Proposed Stage 3: Open all sections closed to traffic in Stage 2 except the section of 15th Street between the north side of Broad Street and the south side of Reynolds Street. This section of 15th Street remains open to “Local Traffic Only” between Broad Street and Reynolds Street. Close Jones Street at Riverwatch Parkway. Detour east bound traffic to Greene Street. Reconstruct the east end of Jones Street at west side of St. Sebastian Way along with the intersection of Jones Street with 15th Street in this stage.

This staging eliminates the needs for temporarily striping Jones and Reynolds Streets for two-way traffic and the associated difficulties that would arise with the traffic signal heads and traffic loops on these streets.

Stage 4: Open all sections in Stage 3 to traffic. Apply final asphalt topping to any remaining areas. Install permanent traffic control markings, signals and signs.



VALUE ENGINEERING ALTERNATIVE STAGE 2

**VII. DEVELOPMENT PHASE
III. STAGE CONSTRUCTION
A. SEQUENCE OF CONSTRUCTION
2. VALUE ENGINEERING ALTERNATIVE**

