VALUE ENGINEERING STUDY

OF

WIDEN US 42 CARROLTON TO MARKLAND DAM

STATE PROJECT NUMBER: 06-8002.00

FRANKFORT, KENTUCKY

APRIL 21-25, 2008

Prepared by:

VE GROUP, L.L.C.

In Association With:

KENTUCKY TRANSPORTATION CABINET

VALUE ENGINEERING STUDY
TEAM LEADER

_____

Thomas A. Hartley, P.E., C.V.S.
C.V.S. Registration No. 20010901

_____

DATE

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I. EXECUTIVE SUMMARY

INTRODUCTION

This Value Engineering report summarizes the results of the Value Engineering study performed by VE Group and the Kentucky Transportation Cabinet (KYTC). The study was performed during the week of April 21-25, 2008.

The subject of the study was the widening of US 42 along the Ohio River from east of Carrolton, KY to the Stephens Creek Bridge over Stephens Creek just west of the Markland Locks & Dam.

PROJECT DESCRIPTION

US 42 travels along the Ohio River with two and three lane typical sections. The three-lane section is for a Two Way Left Turn Lane. The proposed project involves upgrading U.S. 42 to create a continuous three-lane facility throughout and bypassing the City of Ghent to the south with a three-lane or five-lane facility. The 2.18 mile bypass corridor around Ghent extends approximately one mile south of existing US 42. The total project corridor is approximately 10.9 miles long, which includes approximately 7.2 miles in Carroll County and approximately 3.7 miles in Gallatin County. The project was broken into 6 different sections. Sections 1, 2, & 3, are under construction or have been completed. Section 4, 5, & 6, are the subjects of this Value Engineering Study.

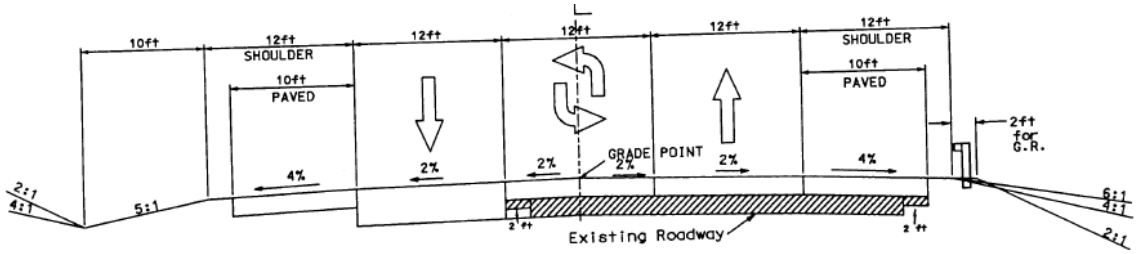


EXHIBIT 4B
THREE LANE RURAL TYPICAL

AS PROPOSED US 42 TYPICAL SECTION – SECTIONS 4 & 6

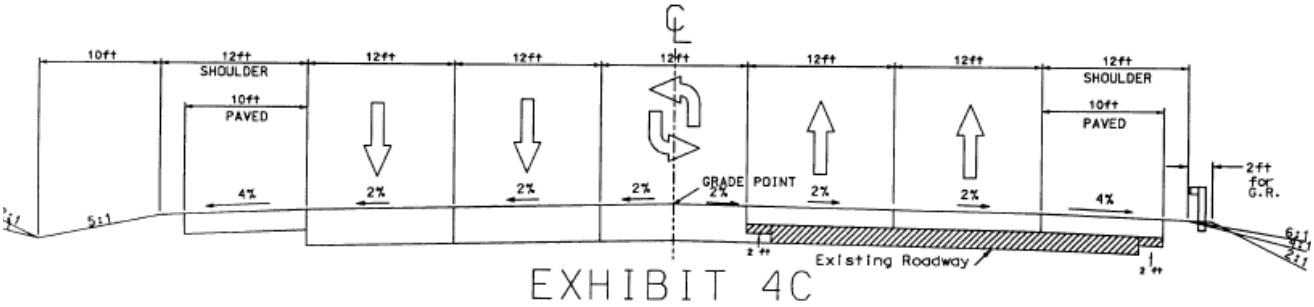


EXHIBIT 4C

AS PROPOSED GHENT BYPASS TYPICAL SECTION – SECTION 5

I. EXECUTIVE SUMMARY

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. Presentation
6. Report Preparation

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

- Future Maintenance Cost
- Traffic operations
- Construction Time
- Construction Cost
- Constructability
- Maintenance Of Traffic

I. EXECUTIVE SUMMARY

RESULTS – AREAS OF FOCUS

The following areas of focus were analyzed by the Value Engineering team and from these areas the following Value Engineering alternatives were developed and are recommended for Implementation:

RECOMMENDATION NUMBER 1-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "A" with 3-lanes.

If this recommendation can be implemented, there is a possible savings of ***$5,149,671.***

RECOMMENDATION NUMBER 2-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "A" with 2-lanes.

If this recommendation can be implemented, there is a possible savings of ***$5,866,573.***

RECOMMENDATION NUMBER 3-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "B" with 3-lanes.

If this recommendation can be implemented, there is a possible savings of ***$1,311,755.***

RECOMMENDATION NUMBER 4-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "B" with 2-lanes.

If this recommendation can be implemented, there is a possible savings of ***$2,055,968.***

RECOMMENDATION NUMBER 5-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "C".

If this recommendation can be implemented, there is a possible savings of ***$6,527,353.***

I. EXECUTIVE SUMMARY

RESULTS – AREAS OF FOCUS

RECOMMENDATION NUMBER 6-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "C" with widened bridge over Black Rock Creek.

If this recommendation can be implemented, there is a possible savings of ***$7,004,210.***

RECOMMENDATION NUMBER 7-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will relocate the cemetery and construct an at grade intersection with KY 47 for Alignment "B".

If this recommendation can be implemented, there is a possible savings of ***$3,177,960.***

RECOMMENDATION NUMBER 8-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will use existing US 42 alignment.

If this recommendation can be implemented, there is a possible savings of ***$392,600.***

RECOMMENDATION NUMBER 9-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct a grade separation at the North American Stainless haul road.

If this recommendation can be implemented, there is a possible added value of ***$3,550,220.***

RECOMMENDATION NUMBER 10-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct a thicker PCC pavement at North American Stainless haul road.

If this recommendation can be implemented, there is a possible added value of ***$67,048.***

RECOMMENDATION NUMBER 11-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct 10' shoulders – 6' paved.

If this recommendation can be implemented, there is a possible savings of ***$3,598,747.***

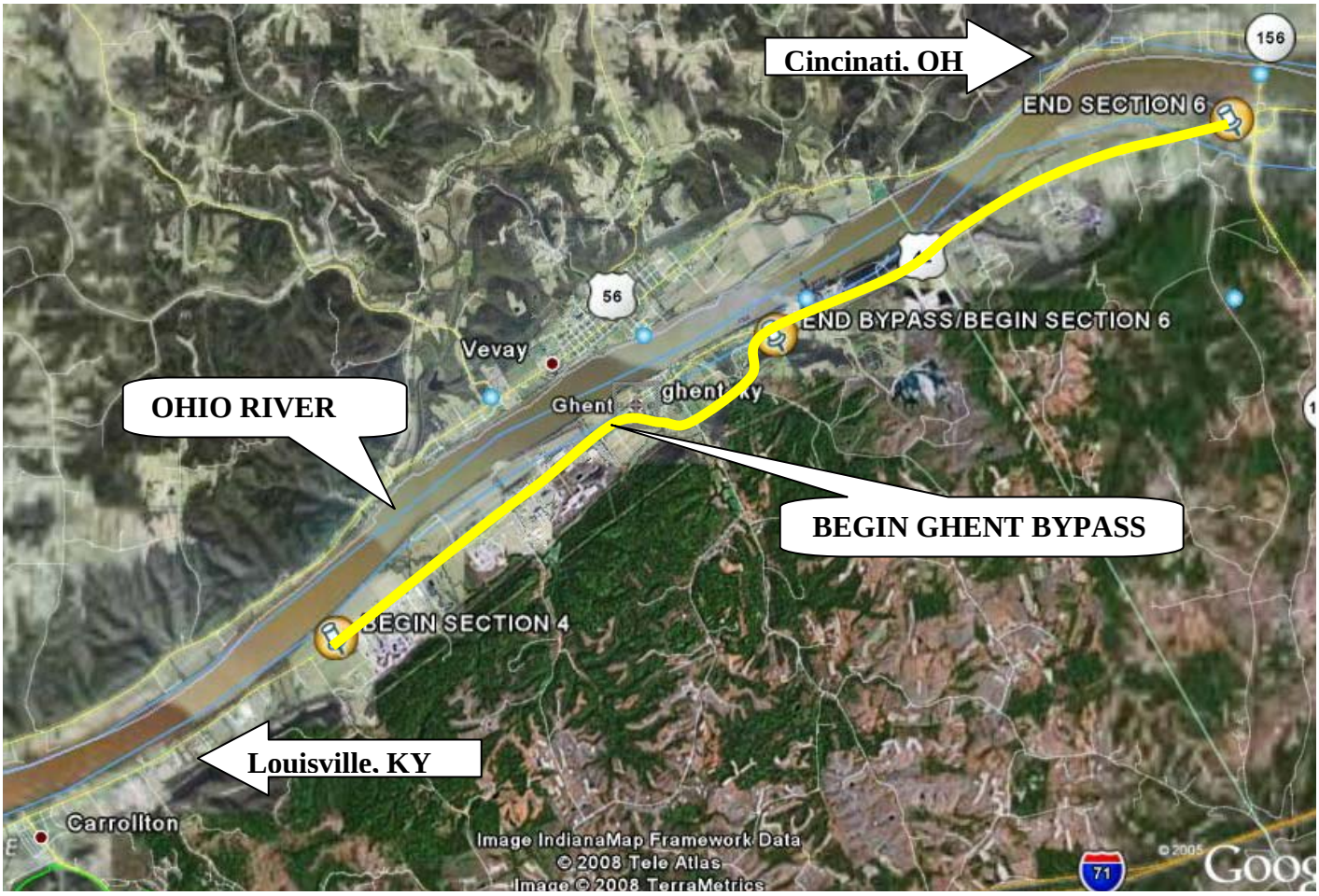
	A VE #1	A VE #2	A VE #3	A VE #4	A VE #5	A VE #6	A VE #7	B VE #1	C VE #1	C VE #2	C VE #3	TOTAL POSSIBLE SAVINGS
A - VE #1 A/3-LANE **$5,149,671**	1	0	0	0	0	0	0	1	0	1	1	**$9,073,969**
A - VE #2 A/2-LANE **$5,866,573**	0	1	0	0	0	0	0	1	0	1	1	**$9,790,872**
A - VE #3 B/3-LANE **$1,311,755**	0	0	1	0	0	0	1	1	0	1	1	**$8,414,014**
A - VE #4 B/2-LANE **$2,055,968**	0	0	0	1	0	0	1	1	0	1	1	**$9,158,227**
A - VE#5 C/3-LANE **$6,527,353**	0	0	0	0	1	0	0	1	0	1	1	**$10,451,652**
A - VE #6 C/BRIDGE **$7,004,210**	0	0	0	0	0	1	0	1	0	1	1	**$10,928,509**
A - VE #7 B/CEMETARY **$3,177,960**	0	0	0	0	0	0	1	0	0	0	0	**$3,177,960**
B RIGHT OF WAY **$392,600**	0	0	0	0	0	0	0	1	0	0	0	**$392,600**
C - VE#1 GRADE SEP **-$3,550,220**	0	0	0	0	0	0	0	0	1	0	0	**-$3,550,220**
C - VE#2 PCCP **-$67,048**	0	0	0	0	0	0	0	0	0	1	0	**-$67,048**
C - VE #3 SHOULDERS **$3,598,747**	0	0	0	0	0	0	0	0	0	0	1	**$3,598,747**

COMPETING ALTERNATIVES

PREFERRED ALTERNATIVE

There are two sets of competing Alternatives within the Project Study: Alignment & Lane configuration for the Ghent Bypass and the North American Stainless haul road crossing of US 42. This chart shows the alternative that has the maximum savings potential.

II. LOCATION OF PROJECT



III. TEAM MEMBERS AND PROJECT DESCRIPTION

TEAM MEMBERS

NAME	AFFILIATION	EXPERTISE	PHONE/ EMAIL
Thomas A. Hartley, P.E., C.V.S.	VE GROUP	Team Leader	850/627-3900 thartley09@aol.com
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Mindy Rockwell	KYTC	Program Performance	502/564-4555 mindy.Rockwell@kytc.gov
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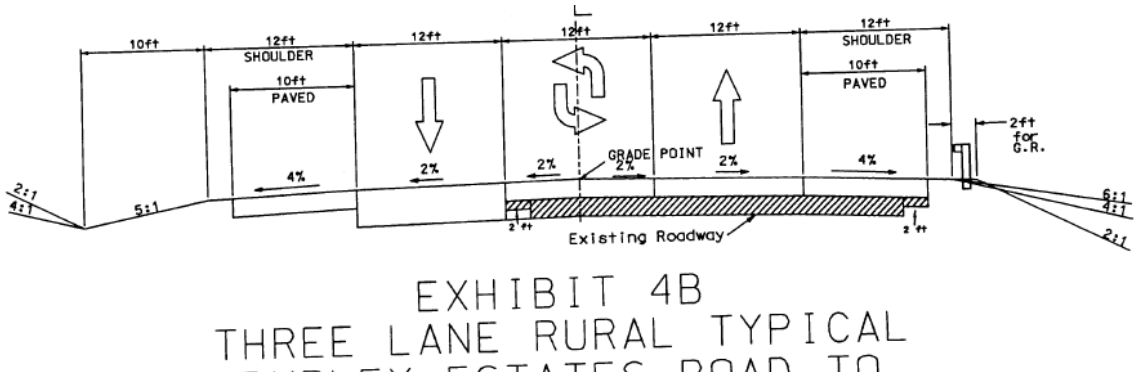
Joshua Rogers	KYTC	Structures	502/564-4560 Joshua.rogers@kytc.gov

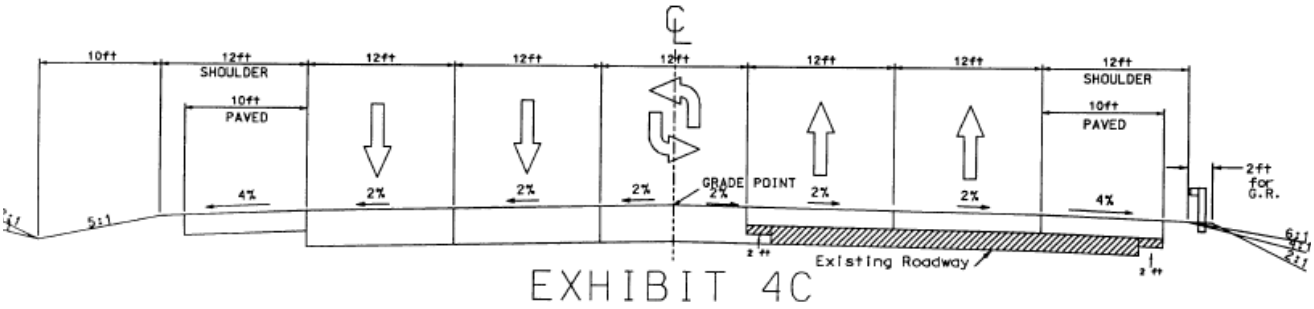
III. TEAM MEMBERS AND PROJECT DESCRIPTION

PROJECT DESCRIPTION

US 42 travels along the Ohio River with two and three lane typical sections. The three-lane section is for a Two Way Left Turn Lane. The proposed project involves upgrading US 42 to create a continuous three-lane facility throughout and bypassing the City of Ghent to the south with a three-lane or five-lane facility. The 2.18 mile bypass corridor around Ghent extends approximately one mile south of existing US 42. The total project corridor is approximately 10.9 miles long, which includes approximately 7.2 miles in Carroll County and approximately 3.7 miles in Gallatin County. The project was broken into 6 different sections. Sections 1, 2, & 3, are under construction or have been completed. Section 4, 5, & 6, are the subjects of this Value Engineering Study.



AS PROPOSED US 42 TYPICAL SECTION – SECTIONS 4 & 6



AS PROPOSED GHENT BYPASS TYPICAL SECTION – SECTION 5

IV. INVESTIGATION PHASE

VALUE ENGINEERING STUDY BRIEFING *WIDEN US 42 CARROLTON TO MARKLAND DAM* April 21, 2008		
NAME	**AFFILIATION**	**PHONE**
Thomas A. Hartley, P.E., C.V.S.	VE GROUP	850/627-3900
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Mindy Rockwell	KYTC Program Performance	502/564-4555
Robert Semones	KYTC Program Performance	502/564-4555
Joshua Rogers	KYTC	502/564-4560
Kelly R. Meyer	HDR/Quest	502/584-4118
John Eckler	KYTC D-6 Design	859/341-2707
Michael Hill	KYTC Program Performance	502/564-4555

STUDY RESOURCES *WIDEN US 42 CARROLTON TO MARKLAND DAM* April 21-25, 2008		
NAME	**AFFILIATION**	**PHONE**
Leo Frank	KYTC – Pavement	502/564-3280
Daniel B. Davis	KYTC-Archeologist	502/564-7250

IV. INVESTIGATION PHASE

FUNCTIONAL ANALYSIS WORKSHEET

WIDEN US 42 CARROLTON TO MARKLAND DAM

APRIL 21-25, 2008

ITEM	FUNCT. VERB	FUNCT. NOUN	* TYPE	COST	WORTH	VALUE INDEX
Ghent Bypass	**Eliminate** **Reduce**	**Conflict** **Congestion**	**B**	**$14,000,000**	**$8,000,000**	**1.75**
Right of Way (Section 4 & 6)	**Acquire**	**Rights**	**B**	**$1,650,000**	**$800,000**	**2.06**
Pavement	**Increase** **Support**	**Capacity** **Vehicles**	**B** **B**	**$15,000,000**	**$10,000,000**	**1.50**

***B – Basic S - Secondary**

** Note: This worksheet is a tool of the Value Engineering process and is only used for determining the areas that the Value Engineering team should focus on for possible alternatives. The column for COST indicates the approximate amount of the cost as shown in the cost estimate. The column for WORTH is an estimated cost for the lowest possible alternative that would provide the FUNCTION shown. Many times the lowest cost alternatives are not considered implementable but are used only to establish a worth for a function. A value index greater than 1.00 indicates the Value Engineering team intends to focus on this area of the project.

IV. INVESTIGATION PHASE

The following areas have a value index greater than 1.00 on the proceeding Functional Analysis Worksheet and therefore have been identified by the Value Engineering Team as areas of focus and investigation for the Value Engineering process:

A. GHENT BYPASS

B. RIGHT OF WAY (SECTION 4 & 6)

C. PAVEMENT

V. SPECULATION PHASE

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

A. GHENT BYPASS

- Construct Alignment "A" with 5-lanes
- Construct Alignment "A" with 4-lanes
- Construct Alignment "A" with 3-lanes
- Construct Alignment "A" with 2-lanes
- Construct Alignment "B" with 4-lanes
- Construct Alignment "B" with 3-lanes
- Construct Alignment "B" with 2-lanes
- Keep current alignment with improvements (Alignment "C")
- No build
- Widen bridge over Black Rock Creek (Alignment "C")

B. RIGHT OF WAY (SECTION 4 & 6)

- 2- lane Typical
- Passing lanes only
- Use existing alignment

C. PAVEMENT

- 2- lane roadway
- Grade separate North American Stainless (NAS) haul road
- Us thicker pavement at NAS haul road
- Mill off existing asphalt, Crack & Seat PCC pavement, and overlay with asphalt
- Construct 10' shoulders – 6' paved

VI. EVALUATION PHASE

A. ALTERNATIVES

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

A. GHENT BYPASS

Value Engineering Alternative Number 1:	***Construct Alignment "A" with 4-lanes.***
Value Engineering Alternative Number 2:	***Construct Alignment "A" with 3-lanes.***
Value Engineering Alternative Number 3:	***Construct Alignment "A" with 2-lanes.***
Value Engineering Alternative Number 4:	***Construct Alignment "B" with 4-lanes.***
Value Engineering Alternative Number 5:	***Construct Alignment "B" with 3-lanes.***
Value Engineering Alternative Number 6:	***Construct Alignment "B" with 2-lanes.***
Value Engineering Alternative Number 7:	***Construct Alignment "C".***
Value Engineering Alternative Number 8:	***Construct Alignment"C" with widened bridge over Black Rock Creek.***
Value Engineering Alternative Number 9:	***Relocate cemetery and construct at grade intersection with KY 47 for Alignment "B".***

B. RIGHT OF WAY

Value Engineering Alternative:	***Use existing US 42 alignment.***

C. PAVEMENT

Value Engineering Alternative Number 1:	***Construct 2-lane roadway***
Value Engineering Alternative Number 2:	***Construct grade separation at North American Stainless haul road.***
Value Engineering Alternative Number 3:	***Construct thicker PCC pavement at North American Stainless haul road.***
Value Engineering Alternative Number 4:	***Construct 10' shoulders – 6' paved.***

VI. EVALUATION PHASE

B. ADVANTAGES AND DISADVANTAGES

The following Advantages and Disadvantages were developed for the Value Engineering Alternatives previously generated during the speculation phase. It also includes the Advantages and Disadvantages for the "As Proposed".

A. GHENT BYPASS

"As Proposed": The alignment for the bypass has not been selected, so the Value Engineering Team chose the 5-lane Alignment "B" Bypass as the As Proposed. This alignment is approximately 2.18 miles long and includes a grade separation at KY 47.

Advantages

- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.

Disadvantages

- Loss of commerce.
- Possible cemetery impacts.
- High construction costs.
- High Right of Way costs.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.
- No access to KY 47.
- Excess capacity.

Conclusion

Carry forward for further development.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 1: Construct Alignment "A" with 4-lanes.

Advantages

- Reduced pavement costs.
- Reduced Right of Way Costs.
- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.

Disadvantages

- Loss of commerce.
- Possible cemetery impacts.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.
- No access to KY 47.
- Excess capacity.
- Pass lanes.

Conclusion

DROPPED from further consideration.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 2: Construct Alignment "A" with 3-lanes.

Advantages

- Reduced pavement costs.
- Reduced Right of Way.
- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.
- Meets capacity.
- Passing lanes.

Disadvantages

- Loss of commerce.
- Possible cemetery impacts.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.
- No access to KY 47.
- Excess capacity.

Conclusion

Carry forward for further development.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 3: Construct Alignment "A" with 2-lanes.

Advantages

- Low pavement costs.
- Low Right of Way.
- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.
- Meets capacity.
- Possible access to KY 47.

Disadvantages

- Low pavement costs.
- Low Right of Way.
- No trucks through Ghent.
- No historical property impacts.
- Loss of commerce.
- Possible cemetery impacts.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.

Conclusion

Carry forward for further development.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 4: Construct Alignment "B" with 4-lanes.

Advantages

- Reduced pavement costs.
- Reduced Right of Way Costs.
- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.

Disadvantages

- Loss of commerce.
- Possible cemetery impacts.
- High construction costs.
- High Right of Way costs.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.
- No access to KY 47.
- Excess capacity.

Conclusion

DROPPED from further consideration.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 5: Construct Alignment "B" with 3-lanes.

Advantages

- Reduced pavement costs.
- Reduced Right of Way.
- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.
- Meets capacity.
- Passing lanes.

Disadvantages

- Loss of commerce.
- Possible cemetery impacts.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.
- No access to KY 47.
- Excess capacity.

Conclusion

Carry forward for further development.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 6: Construct Alignment "B" with 2-lanes.

Advantages

- Low pavement costs.
- Low Right of Way.
- No trucks through Ghent.
- No historical property impacts.
- Improved capacity.
- Possible opportunity for economic growth.
- Quicker travel time.
- Meets capacity.
- Possible access to KY 47.

Disadvantages

- Low pavement costs.
- Low Right of Way.
- No trucks through Ghent.
- No historical property impacts.
- Loss of commerce.
- Possible cemetery impacts.
- High environmental impacts.
- Loss of farm land.
- Longer travel route.

Conclusion

Carry forward for further development.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 7: Construct Alignment "C".

Advantages

- Lowest construction costs.
- Lowest Right of Way costs.
- Meets capacity.
- Shortest travel length.
- Sustains commerce.

Disadvantages

- Truck traffic in town.
- Longer travel time.
- Increased MOT.
- Construction noise.
- High utility impacts.

Conclusion

Carry forward for further development.

A. GHENT BYPASS *(continued)*

Value Engineering Alternative Number 8: ***Construct Alignment "C" with widened bridge over Black Rock Creek.***

Advantages

- Lowest construction costs.
- Lowest Right of Way costs.
- Meets capacity.
- Shortest travel length.
- Sustains commerce.
- Utilize remaining service life of Black Rock Creek Bridge.

Disadvantages

- Truck traffic in town.
- Longer travel time.
- Increased MOT.
- Construction noise.
- High utility impacts.

Conclusion

Carry forward for further development.

Value Engineering Alternative Number 9: ***Relocate cemetery and construct at grade intersection with KY 47for Alignment "B".***

Advantages

- Possibly eliminate grade separation.
- Improve condition of graves.

Disadvantages

- Increased Right of Way costs.
- Possibly controversial.
- Relative notification.
- Possibly increased project/Right of Way time.

Conclusion

Carry forward for further development.

B. RIGHT OF WAY SECTIONS 4 & 6

"As Proposed": **The Proposed Right of Way Take will acquire an average of 50' on new Right of Way to construct the roadway.**

Advantages

- Improved geometrics.

Disadvantages

- High Right of Way Cost.
- High environmental impacts.
- High farmland impacts.
- Higher construction costs.
- High utility impacts.

Conclusion

Carry forward for further development.

Value Engineering Alternative: ***Use existing US 42 alignment.***

Advantages

- Lower Right of Way Costs.
- Lower Construction costs.
- Lower MOT costs.
- Less farmland impacts.
- Less environmental impacts.
- Less utility impacts.

Disadvantages

- No geometric improvements.

Conclusion

Carry forward for further development.

C. PAVEMENT

"As Proposed": **The As Proposed Pavement Design is assumed to be a Maximum Asphalt Design for a 5-lane typical section through the Ghent Bypass and a 3-lane typical section for Sections 4 & 6.**

Advantages

- None Apparent.

Disadvantages

- High construction cost.
- More impervious area.

Conclusion

Carry forward for further development.

Value Engineering Alternative Number 1: Construct 2-lane roadway.

Advantages

- Lower construction costs.
- Less impervious.

Disadvantages

- Not consistent with adjoining projects.
- No left turn lane.

Conclusion

DROPPED from further consideration.

C. PAVEMENT *(continued)*

Value Engineering Alternative Number 2: Construct grade separation at North American Stainless haul road.

Advantages

- No conflict with NAS off road vehicles.
- Less pavement damage.
- Increase production rates for NAS.
- Reduced congestion.
- Better traffic operations.

Disadvantages

- High construction cost.
- Higher maintenance costs.
- Longer construction time.
- More MOT.
- Requires construction easement.

Conclusion

Carry forward for further development.

Value Engineering Alternative Number 3: Construct thicker PCC pavement at North American Stainless haul road.

Advantages

- Lower construction cost.
- Quicker construction time.

Disadvantages

- Conflict with NAS off road vehicles.
- Increased congestion.
- Less efficient traffic operations.

Conclusion

Carry forward for further development.

C. PAVEMENT *(continued)*

Value Engineering Alternative Number 4: Construct 10' shoulders – 6' paved.

Advantages

- Lower construction cost.
- Reduces impervious.

Disadvantages

- May increase maintenance costs.

Conclusion

Carry forward for further evaluation.

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE NUMBER 1
(3) VALUE ENGINEERING ALTERNATIVE NUMBER 2
(4) VALUE ENGINEERING ALTERNATIVE NUMBER 3
(5) VALUE ENGINEERING ALTERNATIVE NUMBER 4
(6) VALUE ENGINEERING ALTERNATIVE NUMBER 5
(7) VALUE ENGINEERING ALTERNATIVE NUMBER 6
(8) VALUE ENGINEERING ALTERNATIVE NUMBER 7

B. RIGHT OF WAY

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

C. PAVEMENT

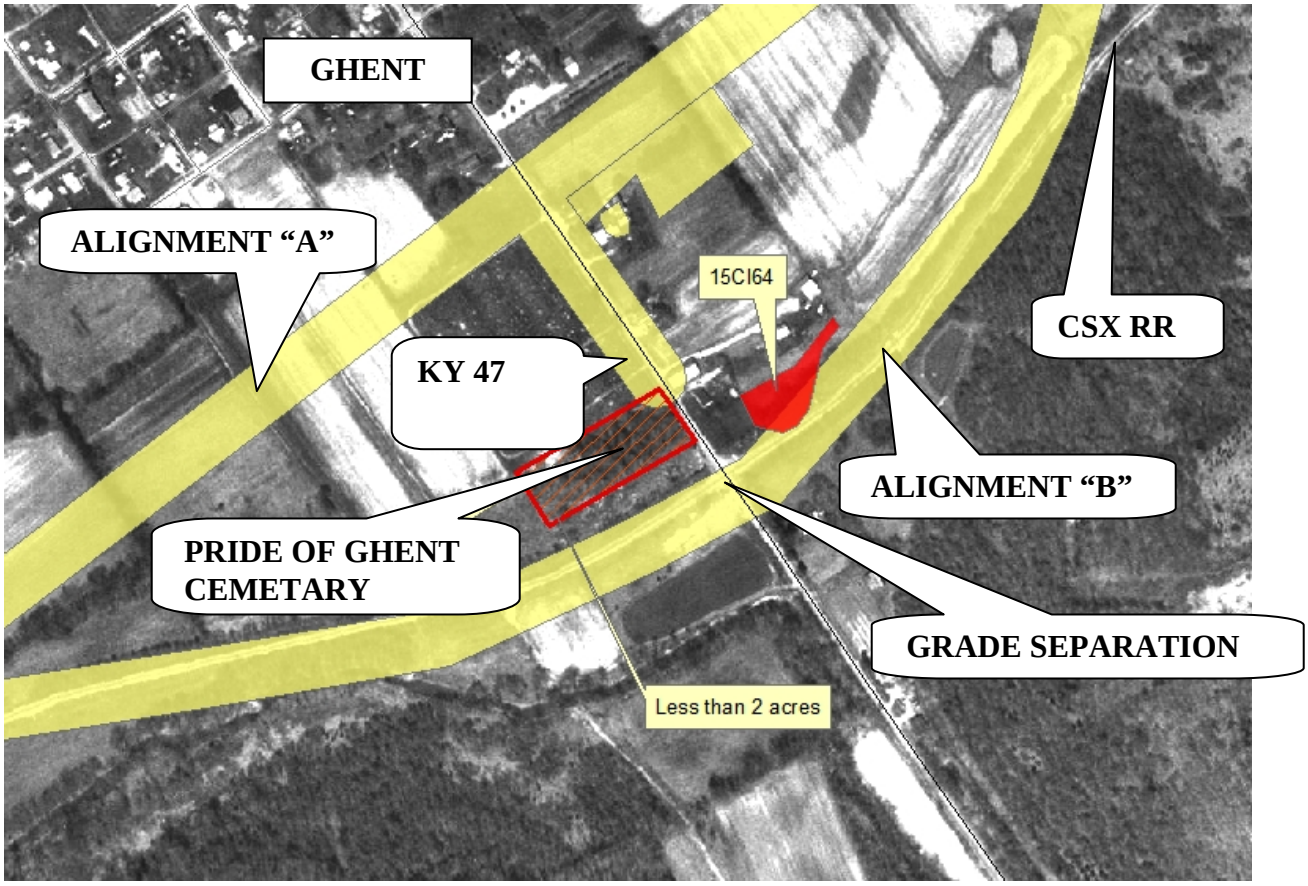
(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE NUMBER 1
(3) VALUE ENGINEERING ALTERNATIVE NUMBER 2
(4) VALUE ENGINEERING ALTERNATIVE NUMBER 3

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

1. "As Proposed"

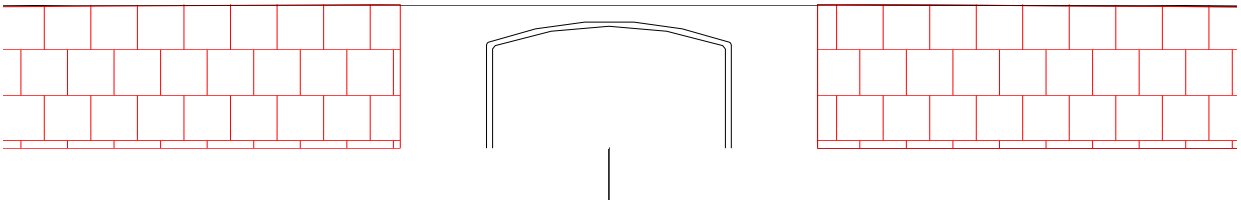
The "As Proposed" design is to construct a five-lane 2.18-mile long bypass on Alignment "B" that begins at the intersection of US 42 and Four Mile Road (same point as Alignment "A") and extends to the east along US 42 until reaching North American Stainless. The alignment veers to the south just east of the entrance to North American Stainless and then curves back to the east about two-tenth of mile south of Alignment "A". This alternate requires a grade separation at the intersection with KY 47 between the historic Pride of Ghent cemetery and the CSX Railroad. The alignment then continues east and swings back to the north and east tying back into US 42 at the same location as Alignment "A", just west of the entrance to Kentucky Utilities.



VII. DEVELOPMENT PHASE

A. GHENT BYPASS

1. "As Proposed"



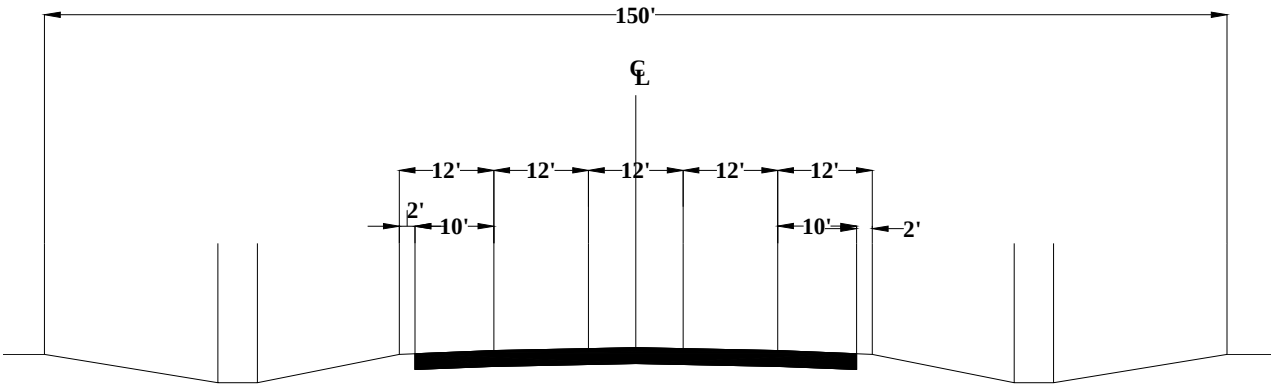
AS PROPOSED
GRADE SEPARATION – BYPASS OVER KY 47

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

2. Value Engineering Alternative Number 1

This Value Engineering Alternative will reduce the number of lanes from five to three on Alignment "A" and results in reduced pavement and R/W costs while providing the sufficient capacity. This proposal reduces high environmental impacts to the farmland and the cemetery. The disadvantage of this Value Engineering Alternative may be loss of incentive for commercial development along the bypass and lack of a passing lane should a substantial volume of non-truck traffic utilize the bypass.



VALUE ENGINEERING ALTERNATIVE NUMBER 1
3-LANE TYPICAL SECTION

ALIGNMENT A 3-LANE
VALUE ENGINEERING ALTERNATIVE NUMBER 1
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
Pavement 3-lane	LF	$241.58		$0	11,088.0	$2,678,639
Pavement 5-lane	LF	$310.57	11,510.4	$3,574,785		$0
GRADE SEPERATION	LS	$2,900,480.01	1.0	$2,900,480		$0
Embankment	CU YD	$3.00	102,315	$306,944	68,992	$206,976
SUBTOTAL				**$6,782,209**		**$2,885,615**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$484,928		$206,321
TRAFFIC CONTROL/MOT		10.0%		$678,221		$288,562
CONTINGENCY		10.0%		$678,221		$288,562
Right of Way	ACRE	$7,000.00	66.1	$462,424	38.2	$267,273
GRAND TOTAL				**$9,086,003**		**$3,936,332**

POSSIBLE SAVINGS: $5,149,671

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

TRAFFIC LANES

Surface	336	CL 3 ASPH SURF 0.38A PG76-22	0.138	ton	76.50		10.52
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.303	ton	56.33		17.04
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.303	ton	51.11		15.46
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.495	ton	43.65		21.61
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.550	ton	43.65		24.01
MTV	338	ASPHALT PLACEMENT WITH MTV	1.788	ton	1.80		3.22
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.400	ton	35.85		14.34
Aggregate	1	DGA	0.460	ton	17.03		7.83
				SUBTOTAL		$	114.02

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

				TOTAL COST			174.81 PER FOOT

3-LANE NEW CONSTRUCTION

TRAFFIC LANES

Surface	)469ES4(	CL 3 ASPH SURF 0.38B PG76-22	0.229	ton	72.00		16.50
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.504	ton	56.33		28.40
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.504	ton	51.11		25.77
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.825	ton	43.65		36.01
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.917	ton	43.65		40.01
MTV	338	ASPHALT PLACEMENT WITH MTV	2.979	ton	1.80		5.36
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.667	ton	35.85		23.90
Aggregate	1	DGA	0.767	ton	17.03		13.06
				SUBTOTAL		$	189.01

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

				TOTAL COST			249.79 PER FOOT

5-LANE NEW CONSTRUCTION

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

3. Value Engineering Alternative Number 2

This Value Engineering Alternative will reduce the number of lanes from five to two on Alignment "A" and results in reduced pavement and R/W costs while providing the sufficient capacity. This proposal reduces high environmental impacts to the farmland and the cemetery. The disadvantage of this Value Engineering Alternative may be loss of incentive for commercial development along the bypass and lack of a passing lane should a substantial volume of non-truck traffic utilize the bypass.

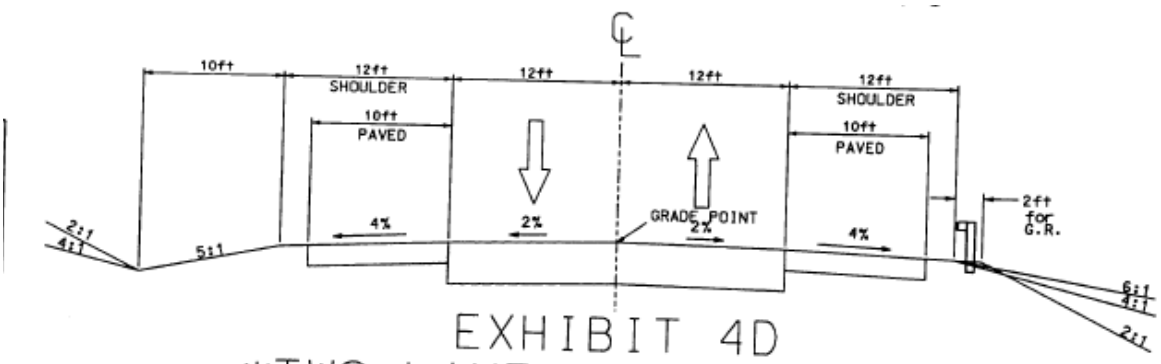


EXHIBIT 4D
*TWO LANE RURAL TYPICAL
GHENT BYPASS

ALIGNMENT A 2-LANE
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
Pavement 2-lane	LF	$197.58		$0	11,088	$2,190,767
Pavement 5-lane	LF	$310.57	11,510	$3,574,785	-	$0
GRADE SEPARATION	LS	$2,900,480.01	1.0	$2,900,480		$0
Embankment	CU YD	$3.00	102,315	$306,944	49,280	$147,840
SUBTOTAL				**$6,782,209**		**$2,338,607**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$484,928		$167,210
TRAFFIC CONTROL/MOT		10.0%		$678,221		$233,861
CONTINGENCY		10.0%		$678,221		$233,861
Right of Way	ACRE	$7,000.00	66.1	$462,424	35.1	$245,891
GRAND TOTAL				**$9,086,003**		**$3,219,430**

POSSIBLE SAVINGS: $5,866,573

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

TRAFFIC LANES

Surface	336	CL 3 ASPH SURF 0.38A PG76-22	0.092	ton	76.50		7.01
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.202	ton	56.33		11.36
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.202	ton	51.11		10.31
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.330	ton	43.65		14.40
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.367	ton	43.65		16.01
MTV	338	ASPHALT PLACEMENT WITH MTV	1.192	ton	1.80		2.15
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.267	ton	35.85		9.56
Aggregate	1	DGA	0.307	ton	17.03		5.22
				SUBTOTAL		$	76.02

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST 136.80 PER FOOT

2-LANE/NEW CONSTRUCTION

TRAFFIC LANES

Surface	)469ES4(	CL 3 ASPH SURF 0.38B PG76-22	0.229	ton	72.00		16.50
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.504	ton	56.33		28.40
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.504	ton	51.11		25.77
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.825	ton	43.65		36.01
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.917	ton	43.65		40.01
MTV	338	ASPHALT PLACEMENT WITH MTV	2.979	ton	1.80		5.36
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.667	ton	35.85		23.90
Aggregate	1	DGA	0.767	ton	17.03		13.06
				SUBTOTAL		$	189.01

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST 249.79 PER FOOT

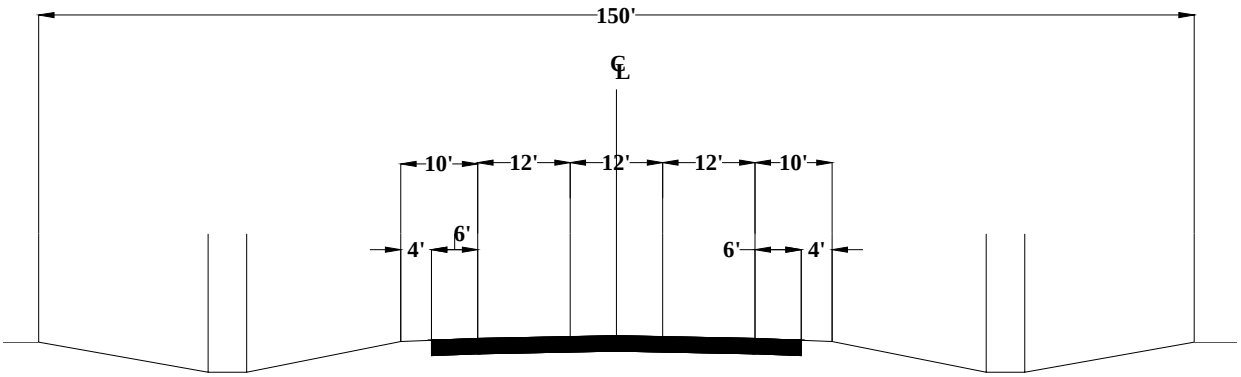
5-LANE NEW CONSTRUCTION

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

4. Value Engineering Alternative Number 3

This Value Engineering Alternative will reduce the number of lanes from five to three on Alignment "B" and results in reduced pavement and R/W costs while providing the sufficient capacity. This proposal reduces high environmental impacts to the farmland and the cemetery. The disadvantage of this Value Engineering Alternative may be loss of incentive for commercial development along the bypass and lack of a passing lane should a substantial volume of non-truck traffic utilize the bypass.



VALUE ENGINEERING ALTERNATIVE 3 – LANE TYPICAL SECTION

ALIGNMENT B 3-LANE
VALUE ENGINEERING ALTERNATIVE NUMBER 3
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT 5-LANE	LF	$310.57	11,510.4	$3,574,785		$0
PAVEMENT 3-LANE	LF	$241.58		$0	11,510.4	$2,780,682
EARTHWORK	CY	$3.00	102,315	$306,944	71,620	$214,861
SUBTOTAL				**$3,881,729**		**$2,995,543**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$277,544		$214,181
TRAFFIC CONTROL/MOT		10.0%		$388,173		$299,554
CONTINGENCY		10.0%		$388,173		$299,554
R/W (24' X 2.18 miles)	AC	$7,000.00	66.1	$462,424	39.6	$277,455
GRAND TOTAL				**$5,398,043**		**$4,086,288**

POSSIBLE SAVINGS: $1,311,755

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

TRAFFIC LANES

Surface	336	CL 3 ASPH SURF 0.38A PG76-22	0.138	ton	76.50		10.52
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.303	ton	56.33		17.04
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.303	ton	51.11		15.46
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.495	ton	43.65		21.61
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.550	ton	43.65		24.01
MTV	338	ASPHALT PLACEMENT WITH MTV	1.788	ton	1.80		3.22
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.400	ton	35.85		14.34
Aggregate	1	DGA	0.460	ton	17.03		7.83
				SUBTOTAL		$	114.02

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST		174.81	PER FOOT
LENGTH OF PROJECT		2.18	MILES
MAINT. OF TRAFFIC	$	21,800.00	
User Cost	$	-	
COST OF PROJECT	$	4,046,026.98	

3-LANE NEW CONSTRUCTION

TRAFFIC LANES

Surface	)469ES4(	CL 3 ASPH SURF 0.38B PG76-22	0.229	ton	72.00		16.50
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.504	ton	56.33		28.40
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.504	ton	51.11		25.77
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.825	ton	43.65		36.01
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.917	ton	43.65		40.01
MTV	338	ASPHALT PLACEMENT WITH MTV	2.979	ton	1.80		5.36
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.667	ton	35.85		23.90
Aggregate	1	DGA	0.767	ton	17.03		13.06
				SUBTOTAL		$	189.01

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST		249.79	PER FOOT

5-LANE NEW CONSTRUCTION

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

5. Value Engineering Alternative Number 4

This Value Engineering Alternative will reduce the number of lanes from five to two on Alignment "B" and results in reduced pavement and R/W costs while providing the sufficient capacity. This proposal reduces high environmental impacts to the farmland and the cemetery. The disadvantage of this Value Engineering Alternative may be loss of incentive for commercial development along the bypass and lack of a passing lane should a substantial volume of non-truck traffic utilize the bypass.

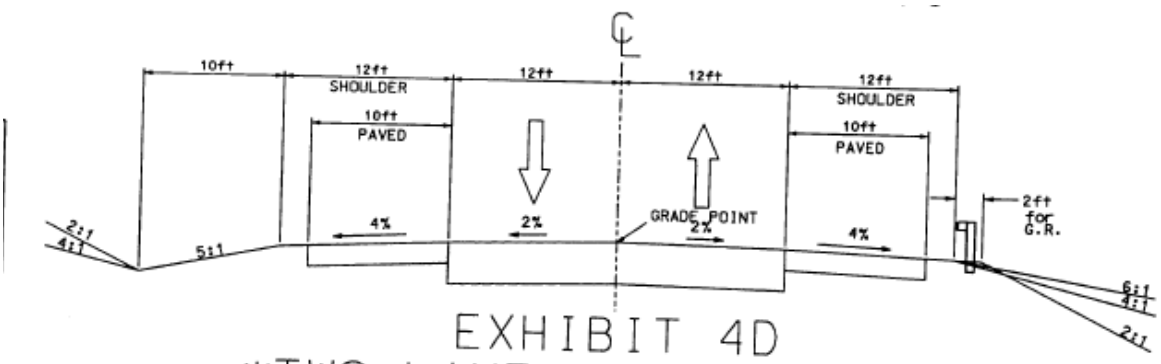


EXHIBIT 4D
*TWO LANE RURAL TYPICAL
GHENT BYPASS

ALIGNMENT B 2-LANE
VALUE ENGINEERING ALTERNATIVE NUMBER 4
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT 5-LANE	LF	$310.57	11,510.4	$3,574,785		$0
PAVEMENT 2-LANE	LF	$197.58		$0	11,510.4	$2,274,225
EARTHWORK	CY	$3.00	102,315	$306,944	51,157	$153,472
SUBTOTAL				**$3,881,729**		**$2,427,697**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$277,544		$173,580
TRAFFIC CONTROL/MOT		10.0%		$388,173		$242,770
CONTINGENCY		10.0%		$388,173		$242,770
R/W (24' X 2.18 miles)	AC	$7,000.00	66.1	$462,424	36.5	$255,258
GRAND TOTAL				**$5,398,043**		**$3,342,075**

POSSIBLE SAVINGS: $2,055,968

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

TRAFFIC LANES

Surface	336	CL 3 ASPH SURF 0.38A PG76-22	0.092	ton	76.50		7.01
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.202	ton	56.33		11.36
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.202	ton	51.11		10.31
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.330	ton	43.65		14.40
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.367	ton	43.65		16.01
MTV	338	ASPHALT PLACEMENT WITH MTV	1.192	ton	1.80		2.15
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.267	ton	35.85		9.56
Aggregate	1	DGA	0.307	ton	17.03		5.22
				SUBTOTAL		$	76.02

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST	136.80	PER FOOT

2-LANE NEW CONSTRUCTION

TRAFFIC LANES

Surface	)469ES4(	CL 3 ASPH SURF 0.38B PG76-22	0.229	ton	72.00		16.50
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.504	ton	56.33		28.40
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.504	ton	51.11		25.77
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.825	ton	43.65		36.01
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.917	ton	43.65		40.01
MTV	338	ASPHALT PLACEMENT WITH MTV	2.979	ton	1.80		5.36
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.667	ton	35.85		23.90
Aggregate	1	DGA	0.767	ton	17.03		13.06
				SUBTOTAL		$	189.01

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST	249.79	PER FOOT

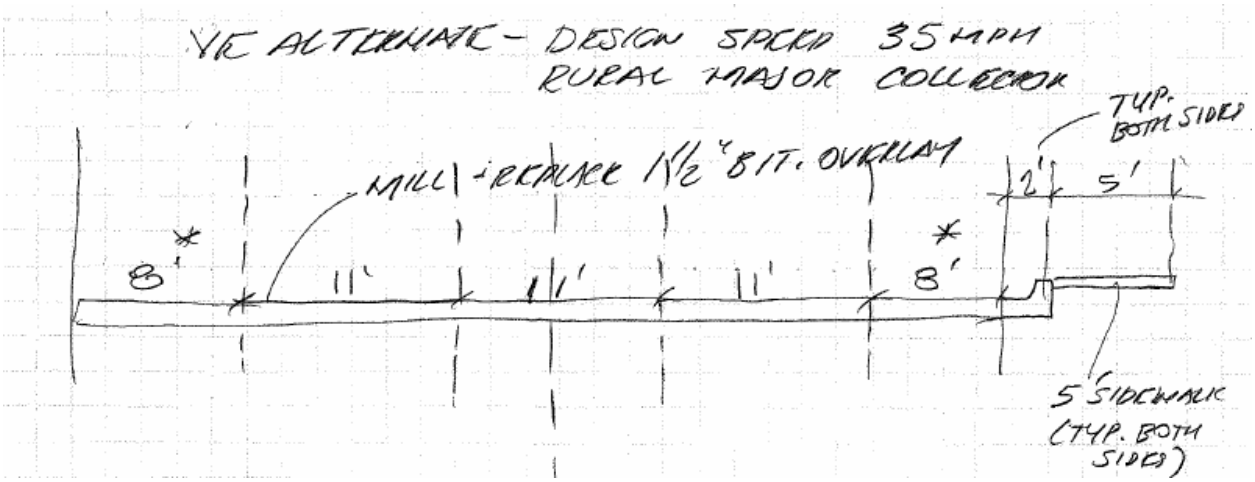
5-LANE NEW CONSTRUCTION

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

6. Value Engineering Alternative Number 5

This Value Engineering Alternative, Alignment "C", will eliminate the Ghent Bypass and make minor improvements to the existing US 42 Alignment through Ghent. It is assumed the new bridge over Black Rock Creek adjacent to US 42 will be the same as the bridge over Black Rock Bridge on the Bypass Alignment.



VALUE ENGINEERING ALTERNATIVE
US 42 FROM FISHING STREET TO FERRY STREET

US 42 WITHIN GHENT

ALIGNMENT C 3-LANE
VALUE ENGINEERING ALTERNATIVE NUMBER 5
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT 5-LANE	LF	$310.57	11510.4	$3,574,785	0.0	$0
PAVEMENT 3-LANE WIDENED	LF	$241.58		$0	5544.0	$1,339,320
PAVEMENT 3-LANE NEW 3-LANE	LF	$174.81		$0	2640.0	$461,498
MILLING	TN	$20.52		$0	1571.8	$32,254
RESURFACE WITH ASPHALT	TN	$72.00	0.0	$0	1571.8	$113,172
EMBANKMENT	CY	$3.00	102,315	$306,944	0.0	$0
GRADE SEPARATION	LS	$2,900,480.01	1.0	$2,900,480		$0
SUBTOTAL				**$6,782,209**		**$1,946,245**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$484,928		$139,156
TRAFFIC CONTROL/MOT		10.0%		$678,221		$194,624
CONTINGENCY		10.0%		$678,221		$194,624
Right of Way	ACRE	$7,000.00	66.1	$462,424	12.0	$84,000
GRAND TOTAL				**$9,086,003**		**$2,558,650**

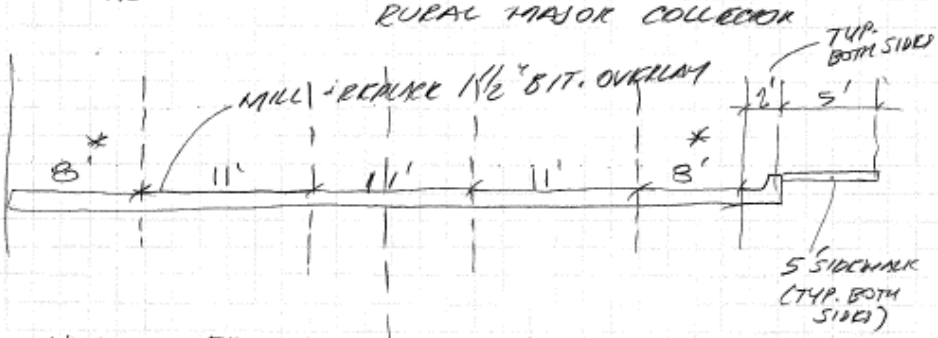
POSSIBLE SAVINGS: $6,527,353

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

ALT C - THRU DOWNTOWN

YK ALTERNATE - DESIGN SPEED 35 MPH
RURAL MAJOR COLLECTOR



* FROM FISHING STREET TO FELIX STREET

TOTAL WIDTH OF ALIGNMENT - 63'

EXISTING R/W THRU TOWN - APPROX 70' **

** FROM TABLE 1, CATEGORICAL EXCLUSION LEVEL THREE AND SECTION 4(f) EVALUATION

ALT C WILL BEGIN AT 500+00.00
END AT 619+53.21

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

ALT C

MILL EXISTING PAVEMENT

USE 3 - 11' LANES + 2 - 8' PARKING LANES

33 + 16 = 48'

LENGTH FROM FISHING TO FERRY STREET

544+00 − 560+00 = 1,600 L.F.

AREA = (48)(1600) = 76,800 FT²

$\left(\frac{1.5}{12}\right)(76{,}800)\left(150\frac{\#}{FT^3}\right)/2000 = 720$ TONS

$ 20.52/TON FOR MILLING

COST OF MILLING = $14,774 USE $15,000

SURFACE

= 720 TONS × 72.00 = $52,000

MOT = $ 10,000

TOTAL COST OF MILLING & RESURFACING = $ 77,000

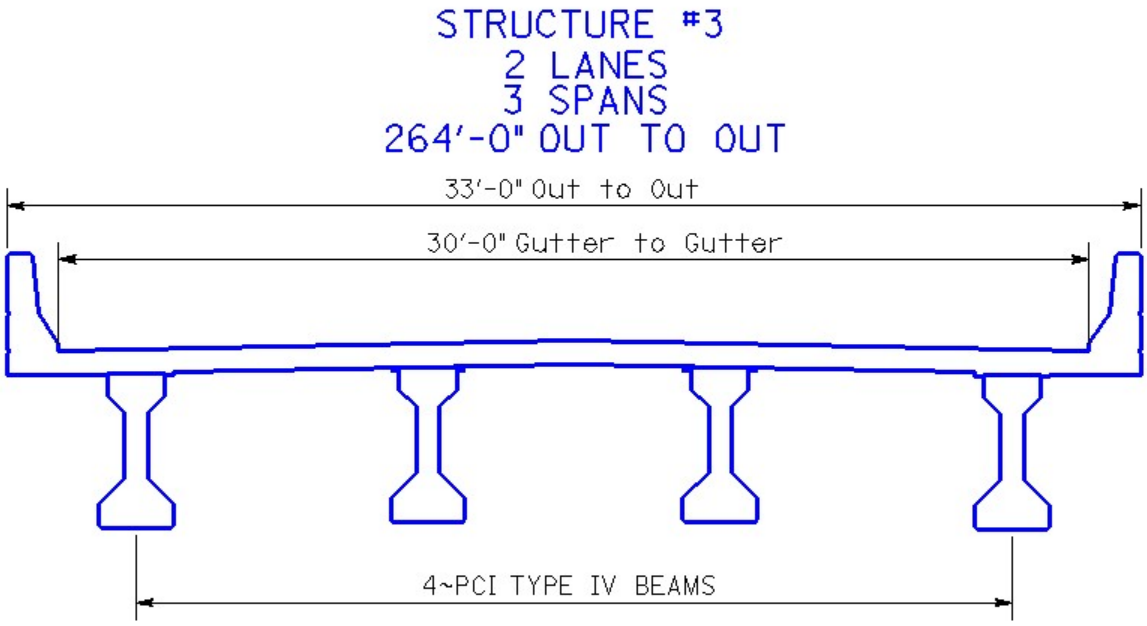
VII. DEVELOPMENT PHASE

A. GHENT BYPASS

7. Value Engineering Alternative Number 6

This Value Engineering Alternative will eliminate the Ghent Bypass (Alignment "C") and make minor improvements to US 42 through Ghent, the same as Value Engineering Alternative 5 with exception of the Bridge over Black Rock Creek will be widened instead of replaced on a new alignment.

Bridge inspection reports indicate the bridge is in good shape and the superstructure as replaced approximately 25 years ago.

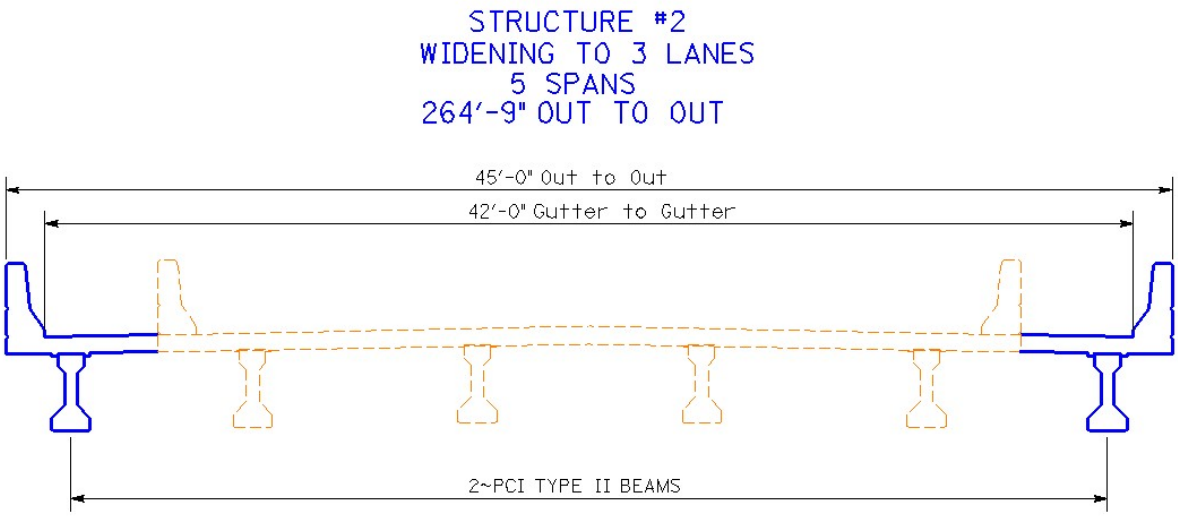


AS PROPOSED NEW BRIDGE OVER BLACK ROCK CREEK

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

7. Value Engineering Alternative Number 6



VALUE ENGINEERING ALTERNATIVE NUMBER 6
WIDENED BRIDGE OVER BLACK ROCK CREEK

ALIGNMENT C 3-LANE/WIDEN BRIDGE
VALUE ENGINEERING ALTERNATIVE NUMBER 6
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT 5-LANE	LF	$310.57	11510.4	$3,574,785	0.0	$0
PAVEMENT 3-LANE	LF	$241.58	0.0	$0	8184.0	$1,977,091
MILLING	TN	$20.52	0.0	$0	1920.3	$39,405
RESURFACE WITH ASPHALT	TN	$72.00	0.0	$0	1920.3	$138,263
NEW BRIDGE OVER BLACK ROCK CREEK	LS	$1,021,681.00	1.0	$1,021,681	0.0	$0
WIDENED BRIDGE OVER BLACK ROCK CREEK	LS	$452,479.00	0.0	$0	1.0	$452,479
GRADE SEPARATION	LS	$2,900,480.01	1.0	$2,900,480	0.0	$0
EMBANKMENT	CY	$3.00	102,315	$306,944	0.0	$0
SUBTOTAL				**$7,803,890**		**$2,607,238**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$557,978		$186,417
TRAFFIC CONTROL/MOT		10.0%		$780,389		$260,724
CONTINGENCY		10.0%		$780,389		$260,724
Right of Way	ACRE	$7,000.00	66.1	$462,424	9.4	$65,758
GRAND TOTAL				**$10,385,070**		**$3,380,860**

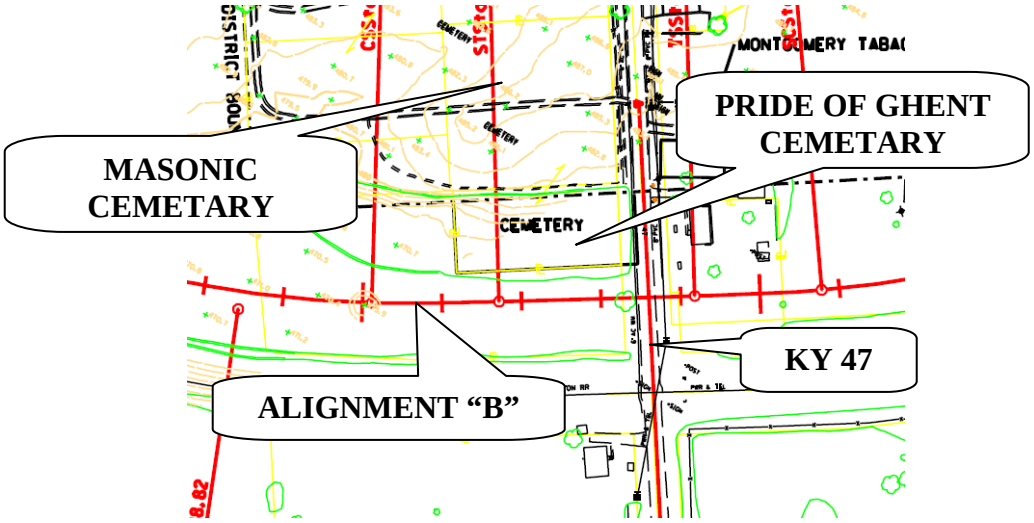
POSSIBLE SAVINGS: $7,004,210

VII. DEVELOPMENT PHASE

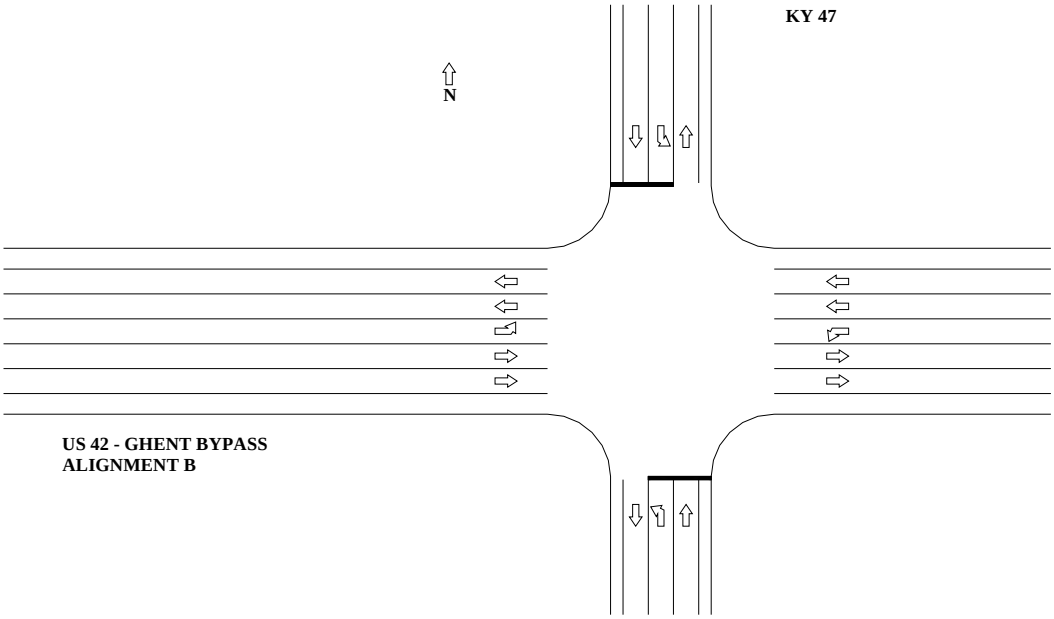
A. GHENT BYPASS

8. Value Engineering Alternative Number 7

This Value Engineering Alternative replaces the Alignment "B" – KY 47 grade separation with an at grade intersection. This Value Engineering Alternative requires relocating the Pride of Ghent Cemetery to the new section of Masonic Cemetery.



PRIDE OF GHENT CEMETERY



VALUE ENGINEERING ALTERNATIVE AT GRADE INTERSECTION

VII. DEVELOPMENT PHASE

A. GHENT BYPASS

8. Value Engineering Alternative Number 7

The Pride of Ghent Cemetery is overgrown and many of the headstones are broken. The cemetery has not been maintained even though it has been not abandoned. The relocation of the cemetery requires placing an advertisement in the local paper in accordance with State and Federal Laws and Regulations to locate and seek permission for the relocation from the next of kin.

PRIDE OF GHENT CEMETERY

The Pride of Ghent Cemetery holds a total of 28 known graves. Based on the archeological study of the cemetery, there may be twice as many (the VE Alternative assumes 100) unknown graves that may be encountered during the relocation by a qualified Archeological consultant.

The burial dates in the cemetery range from 1884 to 1940. It is possible that these gravesites contain Arsenic that was used in the practice of embalming during this period. Therefore, implementation of this proposal must also be accompanied with advance thorough soil sampling to identify the presence of contamination such as Arsenic or other heavy metals. If this proposal is to be implemented, a mitigation and/or toxic materials handling plan by a qualified consultant in accordance with the applicable Federal and State Laws and Regulations must be in place, should any traces of Arsenic or other heavy metals are found in the preliminary soil sampling of the cemetery area.

ALIGNMENT B RELOCATE CEMETERY
VALUE ENGINEERING ALTERNATIVE NUMBER 7
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
GRADE SEPERATION	LS	$2,900,480.01	1.0	$2,900,480		$0
SUBTOTAL				**$2,900,480**		**$0**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$207,384		$0
TRAFFIC CONTROL/MOT		10.0%		$290,048		$0
CONTINGENCY		10.0%		$290,048		$0
GRAVE/INTERNMENT	EA	$1,100.00	0.0	$0	100.0	$110,000
RELOCATE GRAVES	EA	$4,000.00	0.0	$0	100.0	$400,000
GRAND TOTAL				**$3,687,960**		**$510,000**

POSSIBLE SAVINGS: $3,177,960

VII. DEVELOPMENT PHASE

A. COST COMPARISON SHEET BACK UP CALCULATIONS

		FINAL PLANS ESTIMATE					5/1/08
Item	Units	Unit Price	Superstructure		Substructure		Bridge
Concrete Class A	CY	401.82			50.0	20,091.00	20,091.00
Concrete Class AA	CY	478.43	85.0	40,666.55			40,666.55
Steel Reinforcement	LB	0.83			3200	2,656.00	2,656.00
Steel Reinforcement Epoxy Coated	LB	0.90	25200	22,680.00			22,680.00
Piles - Steel HP 12 X 53	LF	60.00			800	48,000.00	48,000.00
Pile Points 12"	Each	99.36			20	1,987.20	1,987.20
Precast PC I Beam Type 4	LF	250.00	400.0	100,000.00			100,000.00
Rail System Type III	LF	100.00	100	10,000.00			10,000.00
Armored Edge for Concrete	LF	97.98	132	12,933.36			12,933.36
Masonry Coating	SY	7.30	83	605.90			605.90
Total for Additional Items						2,640,860.00	2,640,860.00
TOTAL COST				186,885.81		2,713,594.20	2,900,480.01
Cost per Deck Area				54.17		786.55	840.72

VII. DEVELOPMENT PHASE

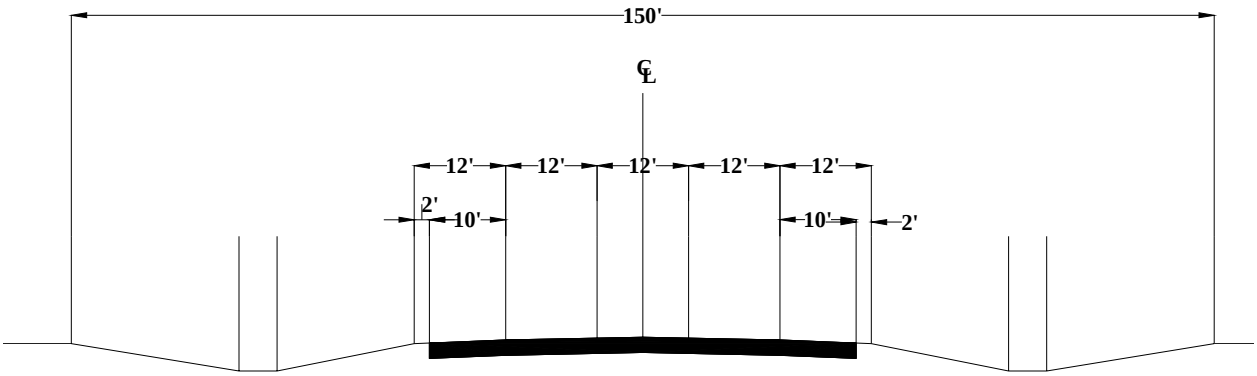
B. RIGHT OF WAY

1. "As Proposed"

The "As Proposed" alignment for Section 4 and Section 6 of this project consist of a 3-lane typical section with 12' lanes and 12' shoulders; 10' of which is paved. This alignment closely follows the existing alignment except for a few deviations.

The total length of Section 4 is 2.10 miles. The Section 4 alignment begins just west of the Dow Corning Corporation lot and ends at the East end of the North American Stainless lot. The vertical alignment is raised on average two feet with the majority of fill at the west end. The horizontal alignment is offset roughly 15-30' to the north of the existing centerline. The alignment deviates nearly 50' from the existing centerline from Sta. 151+00 to Sta. 165+00.

Section 6 is a total of 4.22 miles starting the west end of the Kentucky Utilities Plant and extending to the Stephens Creek Bridge. The horizontal alignment again follows the existing centerline closely except through Sta. 490+00 to Sta. 510+00. Here the existing S-curve is slightly straightened out offsetting the centerline up to 30'. This vertical alignment has a small amount of fill at the beginning, in front of the KU plant, and some cut near Sta. 413+00.

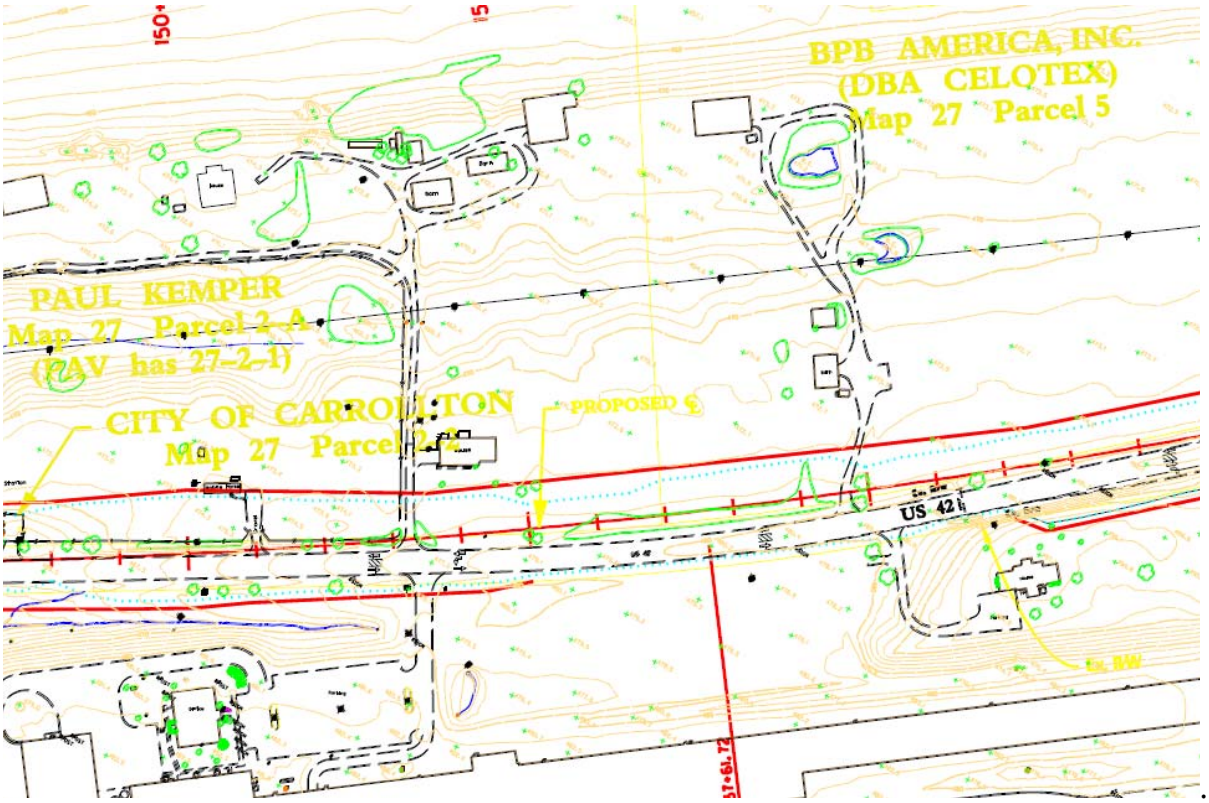


AS PROPOSED 3 – LANE TYPICAL/NEW CONSTRUCTION

VII. DEVELOPMENT PHASE

B. RIGHT OF WAY

1. "As Proposed"

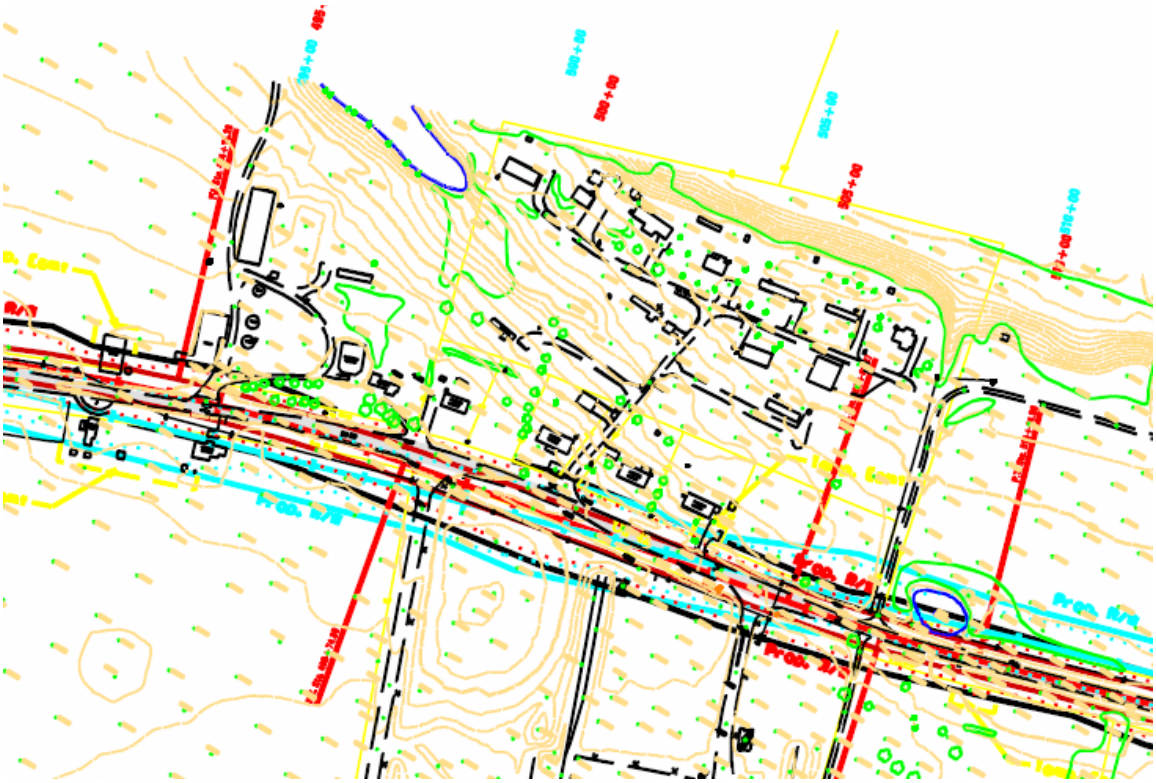


AS PROPOSED ALIGNMENT SHIFT IN SECTION 4 – Sta. 151+00 to Sta. 165+00

VII. DEVELOPMENT PHASE

B. RIGHT OF WAY

1. "As Proposed"



AS PROPOSED ALIGNMENT SHIFT IN SECTION 6 – Sta. 490+00 to Sta. 510+00

VII. DEVELOPMENT PHASE

B. RIGHT OF WAY

2. Value Engineering Alternative

This Value Engineering Alternative will follow the existing alignment for both Section 4 and Section 6. The typical section consists of three 12' lanes and two 12' shoulders; 10' paved. The existing pavement will be salvaged so that the roadway will only have to widen on one side a total of 32'.

This proposed alignment will decrease the Right of Way acquisition required and reduce the total pavement and embankment needed while still meeting the capacity needs of this corridor. There will be minimum Maintenance of Traffic required to complete the construction of this alternate and with staying on the existing alignment there will not be much earthwork required other than for the widening. There is the possibility of having a large amount of utility impacts since this alignment follows the existing roadway. Also, with following the existing alignment some design exceptions may be required.

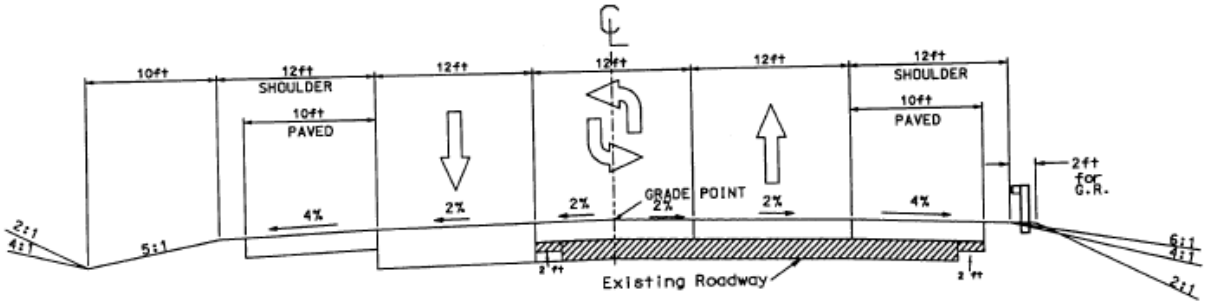


EXHIBIT 4B
THREE LANE RURAL TYPICAL

VALUE ENGINEERING ALTERNATIVE TYPICAL ON EXISTING ALIGNMENT

RIGHT OF WAY - KEEP ALIGNMENT
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
Pavement (section 4) - 3-lane	LF	$241.58	1,100	$265,738		$0
Pavement (section 4) - 1-lane	LF	$190.27	13,842	$2,633,793	14,942	$2,843,090
Pavement (section 6) 3-lane	LF	$241.58	2,000	$483,160		$0
Pavement (section 6) 1-lane	LF	$190.27	20,282	$3,858,980	22,282	$4,239,520
Embankment (section 4)	CU YD	$3.00	83,756	$251,269	78,516	$235,547
Embankment (section 6)	CU YD	$3.00	130,412	$391,235	120,486	$361,457
SUBTOTAL				**$7,884,176**		**$7,679,614**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$563,719		$549,092
TRAFFIC CONTROL/MOT		10.0%		$788,418		$767,961
CONTINGENCY		10.0%		$788,418		$767,961
RIGHT OF WAY	AC	$25,000.00	43.6	$1,090,076	38.3	$957,576
GRAND TOTAL				**$11,114,805**		**$10,722,205**

POSSIBLE SAVINGS: $392,600

VII. DEVELOPMENT PHASE

B. COST COMPARISON SHEET BACK UP CALCULATIONS

TRAFFIC LANES

Surface	336	CL 3 ASPH SURF 0.38A PG76-22	0.092	ton	76.50		7.01
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.312	ton	56.33		17.56
Base Layer 2	205	CL 3 ASPH BASE 1.50D PG64-22	0.367	ton	43.65		16.01
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.367	ton	43.65		16.01
Base Layer 4	#N/A		0.000	ton	#N/A		0.00
MTV	338	ASPHALT PLACEMENT WITH MTV	1.137	ton	1.80		2.05
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.267	ton	35.85		9.56
Aggregate	1	DGA	0.307	ton	17.03		5.22
				SUBTOTAL		$	73.41

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.260	ton	49.79		12.93
Base Layer 2	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Base Layer 4	#N/A		0.000	ton	#N/A		0.00
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	58.43

TOTAL COST		131.83	PER FOOT

WIDEN 1-LANE & ADD 2-10’ PAVED SHOULDERS

TRAFFIC LANES

Surface	336	CL 3 ASPH SURF 0.38A PG76-22	0.138	ton	76.50		10.52
Base Layer 1	216	CL 3 ASPH BASE 1.00D PG76-22	0.303	ton	56.33		17.04
Base Layer 2	214	CL 3 ASPH BASE 1.00D PG64-22	0.303	ton	51.11		15.46
Base Layer 3	205	CL 3 ASPH BASE 1.50D PG64-22	0.495	ton	43.65		21.61
Base Layer 4	205	CL 3 ASPH BASE 1.50D PG64-22	0.550	ton	43.65		24.01
MTV	338	ASPHALT PLACEMENT WITH MTV	1.788	ton	1.80		3.22
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.400	ton	35.85		14.34
Aggregate	1	DGA	0.460	ton	17.03		7.83
				SUBTOTAL		$	114.02

SHOULDERS

Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

TOTAL COST		174.81	PER FOOT

NEW CONSTRUCTION 3-LANE & 2-10’ PAVED SHOULDERS

VII. DEVELOPMENT PHASE

C. PAVEMENT

1. "As Proposed"

It is assumed the pavement design will be for a maximum asphalt design and using the KYTC pavement design spreadsheet the following Maximum Asphalt Design was generated:

Maximum Asphalt Design

	Default Layer Thickness (in.)				User Defined Thickness (in.)			Final Design Thickness (in.)		
	Design	SN	Nominal	SN	Mainline	Shoulder	SN	Mainline	Shoulder	SN
Surface	1.25	0.55	1.25	0.55	1.25	0.00	0.55	1.25	1.25	0.55
Base Total (in) 14.2										
Layer 1	4.72	1.89	4.25	1.70	0.00	0.00	0.00	4.25	4.25	1.70
Layer 2	4.72	1.89	5.00	2.00	0.00	0.00	0.00	5.00	5.00	2.00
Layer 3	4.72	1.89	5.00	2.00	0.00	0.00	0.00	5.00	5.00	2.00
Layer 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage Blanket-Ty II-Asphalt	4.00	0.84	4.00	0.84	0.00	0.00	0.00	4.00	4.00	0.84
DGA	4.00	0.56	4.00	0.56	0.00	0.00	0.00	4.00	4.00	0.56
Stabilized Roadbed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		7.61		SN 7.65		Total SN	0.55		Total SN	7.65
									Design OK	

WIDENED PAVEMENT 3-LANE TYPICAL

WIDENING	EXISTING PAVEMENT
1.25" CL 3 ASPH SURF 0.38D PG76-22	1.25" CL 3 ASPH SURF 0.38D PG76-22
4.5" CL 3 ASPH BASE 1.00D PG76-22	1.75" CL 3 ASPH BASE 1.00D PG76-22
5" CL 3 ASPH BASE 1.50D PG64-22	
5" CL 3 ASPH BASE 1.50D PG64-22	
4" DRAINAGE LAYER	
4" DGA	

The "As Proposed" typical section includes:

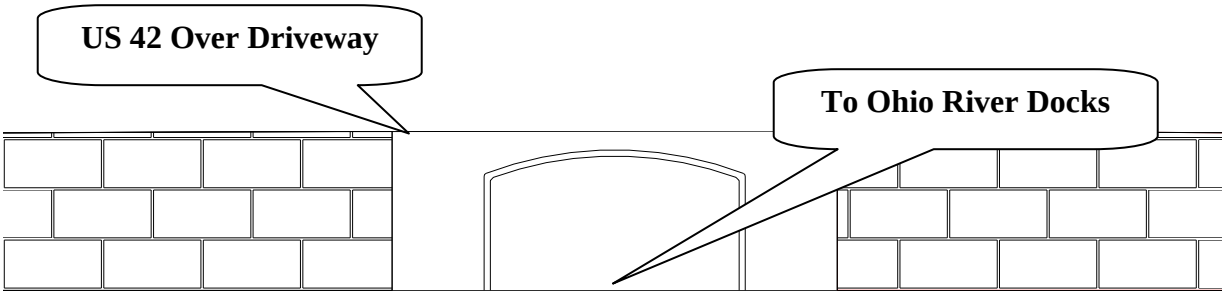
- 3-12' travel lanes/5-12' travel lanes on Bypass
- 12' shoulders, 10' paved

The shoulder pavement design is the same as the travel lane except it is CL 2 Asphalt base and surface.

C. PAVEMENT

2. Value Engineering Alternative Number 1

North American Stainless (N.A.S.) runs heavy vehicles across US 42 at the eastern driveway. These heavy vehicles carry scrap steel from their dock on the Ohio River to their processing plant. It is probable these heavy vehicles will cause damage to the new roadway and it appears a grade separation with US 42 going over N.A.S.'s driveway will eliminate this problem as well as eliminate traffic conflicts with US 42 traffic and these heavy vehicles.



It appears a short bridge will be less expensive than a Pre-cast culvert for this application. Mechanically Stabilized Earth Retaining Walls will be require to eliminate encroachment onto N.A.S.'s property. The cost of the walls and embankment were computed assuming 4% grades.

PAVEMENT - GRADE SEPARATE NAS HAUL ROAD
VALUE ENGINEERING ALTERNATIVE NUMBER 1
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PCIB TYPE IV BRIDGE	LS	$121,191.00		$0	1.0	$121,191
MSE WALL	SF	$60.00		$0	44,516.00	$2,670,960
SUBTOTAL				**$0**		**$2,792,151**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$0		$199,639
TRAFFIC CONTROL/MOT		10.0%		$0		$279,215
CONTINGENCY		10.0%		$0		$279,215
GRAND TOTAL				**$0**		**$3,550,220**

POSSIBLE COST INCREASE **$3,550,220**

VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS

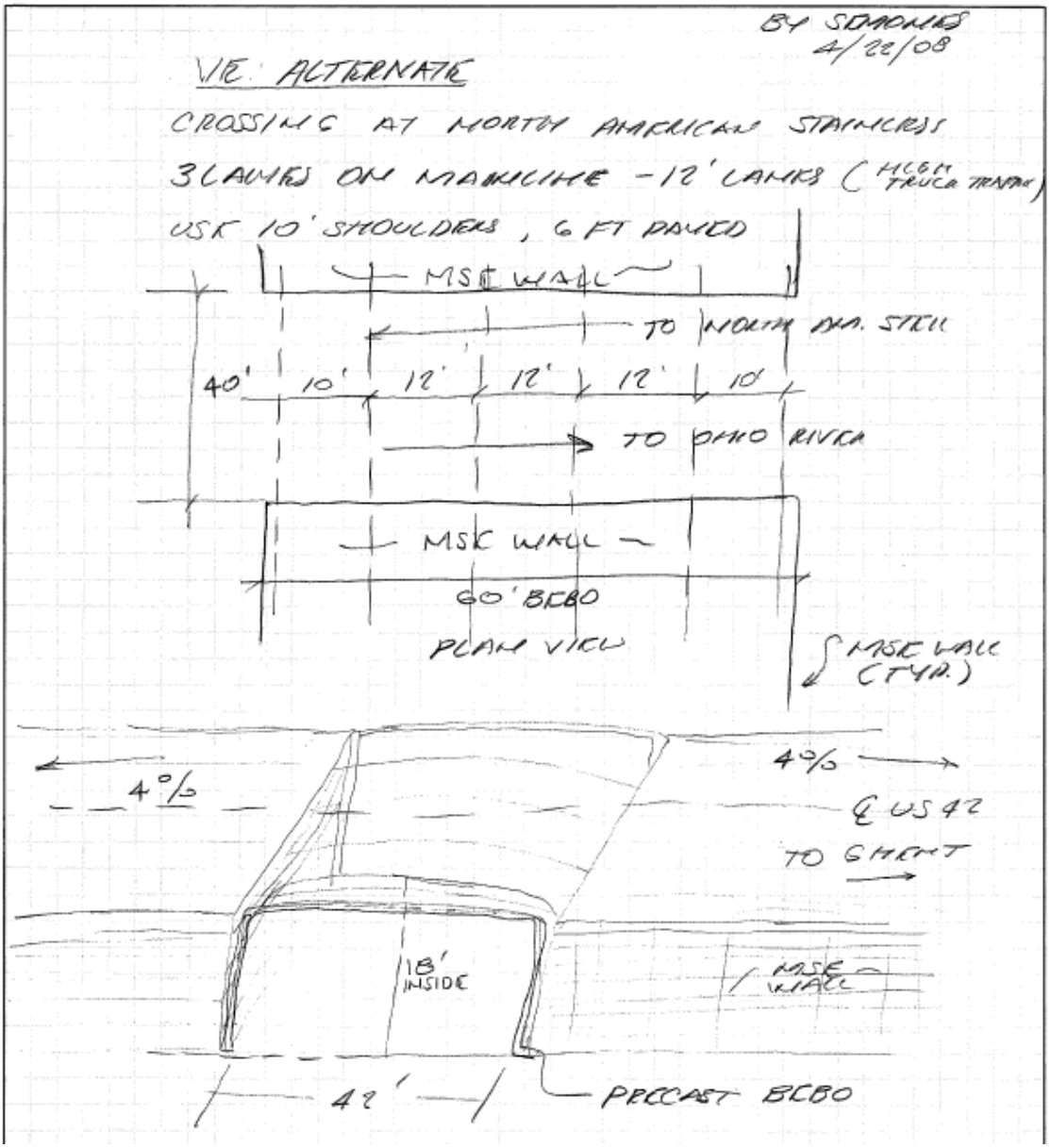
BEBO

DESIGN COMMENTS

1.) WILL HAVE TO CONSTRUCT A DETOUR TO MAINTAIN TRAFFIC

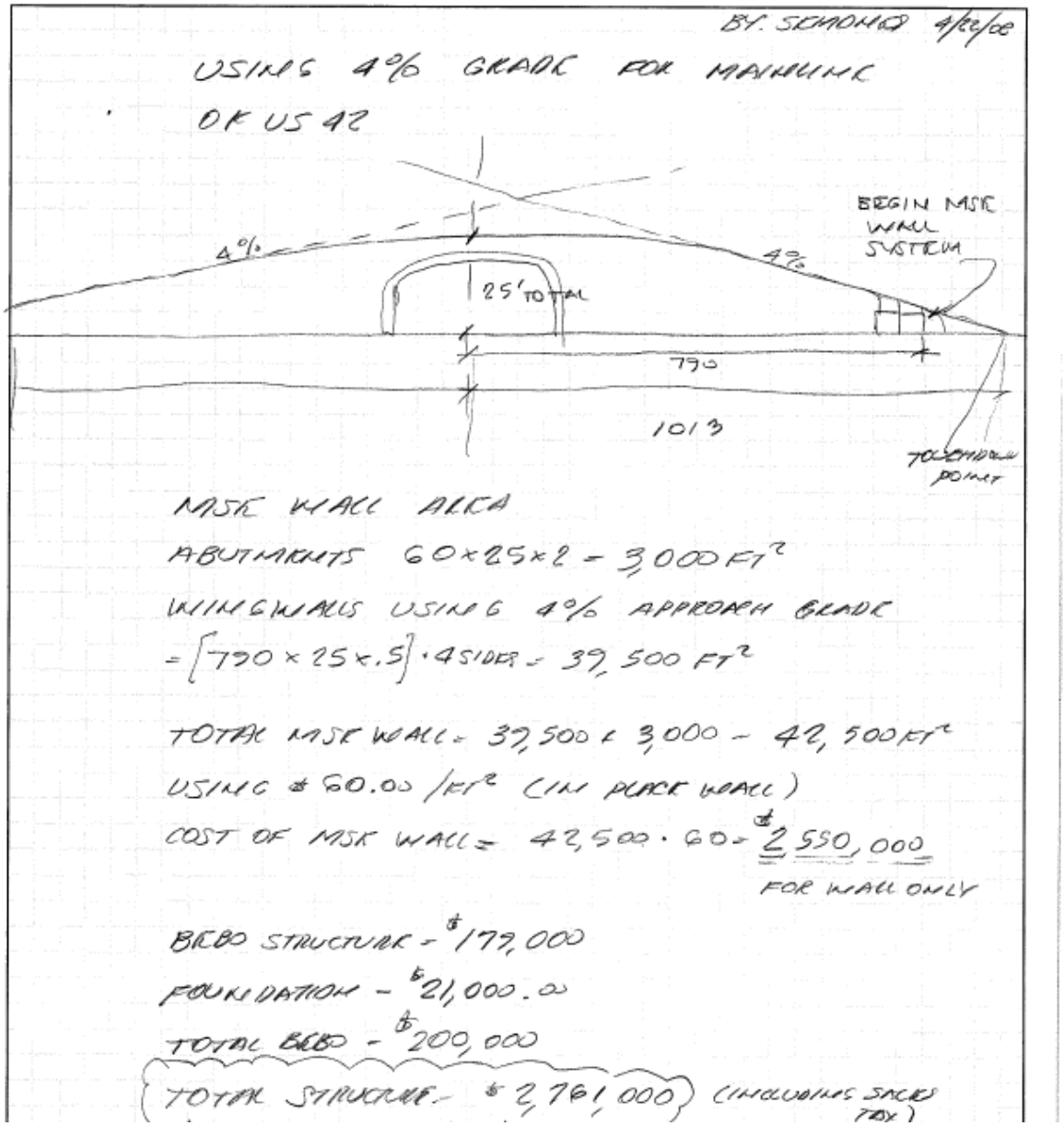
VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS



VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS



VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS

CONTECH BRIDGE SOLUTIONS INC.

(502) 493-493-2930
(800) 344-2102
Fax: (502) 493-2931
www.contechbridge.com

April 22, 2008

Mr. Robert Semones, Pe, PLS, PG
Transportation Engineering Specialist
Division of Programs Performance
Value Engineering Coordinator

Project: Value Engineering

Dear Mr. Semones:

As requested, the following is a BEBO Bridge System ENGINEER'S COST ESTIMATE for the above referenced project. This ESTIMATE is intended for preliminary estimating purposes only and should **not** be interpreted as a final QUOTATION. The information presented is based on the most current data made available to CONTECH Bridge Solutions Inc. **Estimate does not include sales tax.**

CONTECH Bridge Solutions will fabricate and deliver the following described BEBO Precast Concrete Culvert Sections and appurtenances:

DESCRIPTION OF SUPPLIED MATERIALS:

- 60 LF. of C42/1 with 41 FT. span x 11 FT. rise Precast Concrete Culvert units
- Two (2) precast detached parapet headwalls
- Four (4) precast wingwalls with mounting hardware
- Joint sealant material
- Masonite shims
- Filter fabric and perforated drain tile
- **Design and shop drawings for foundation and structure**

ESTIMATE - $179,000 Delivered (F.O.B.) BEBO

HEAVIEST CRANE PICK=25 TONS

Please note that the foundation cost is not included in the above estimate.

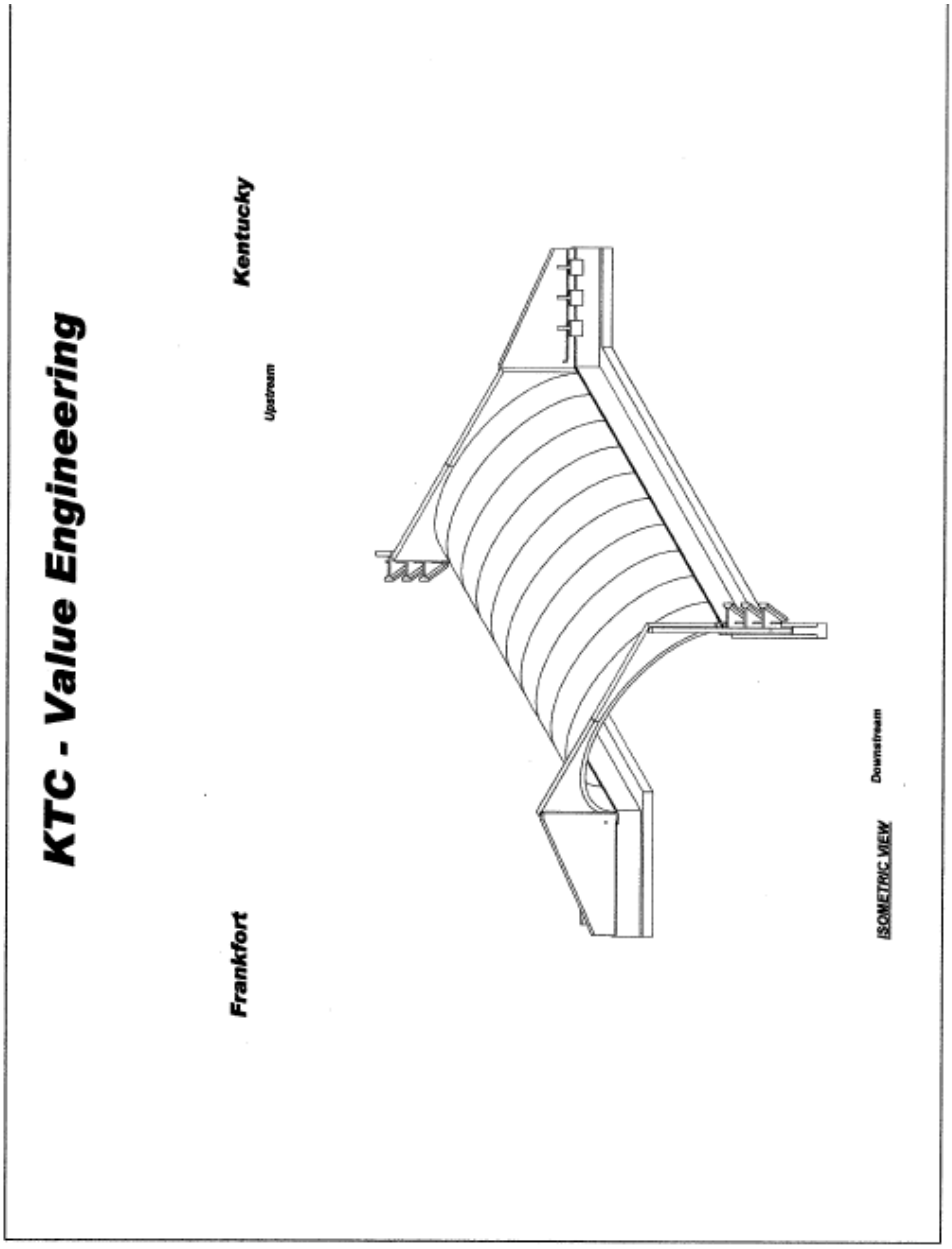
Please contact me at 859-421-1233 should you have any questions or need additional information. Thank you for your interest in BEBO Bridges.

Sincerely,

Lance E. Williams, P.E.
Region Manager
CONTECH Bridge Solutions, Inc.

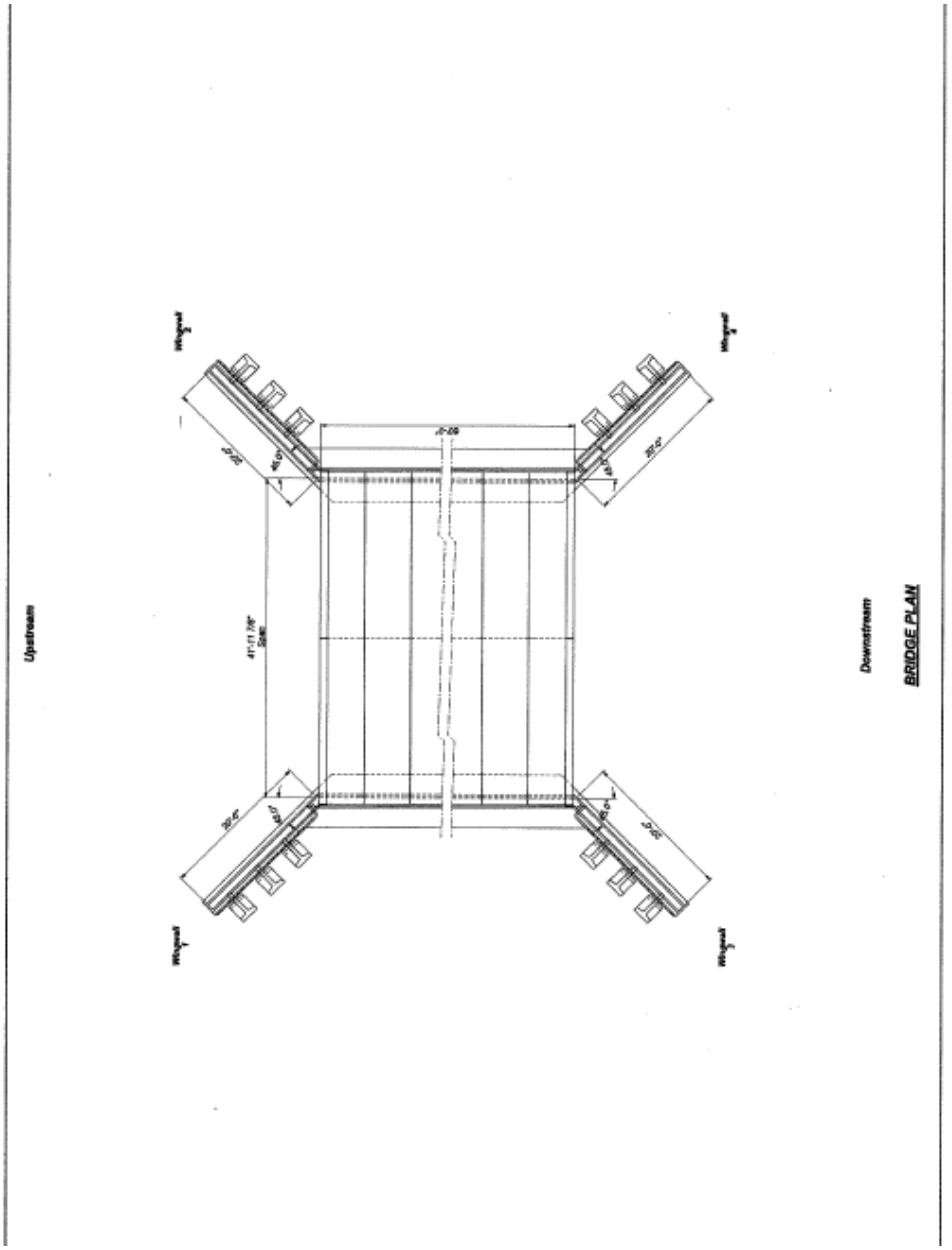
VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS



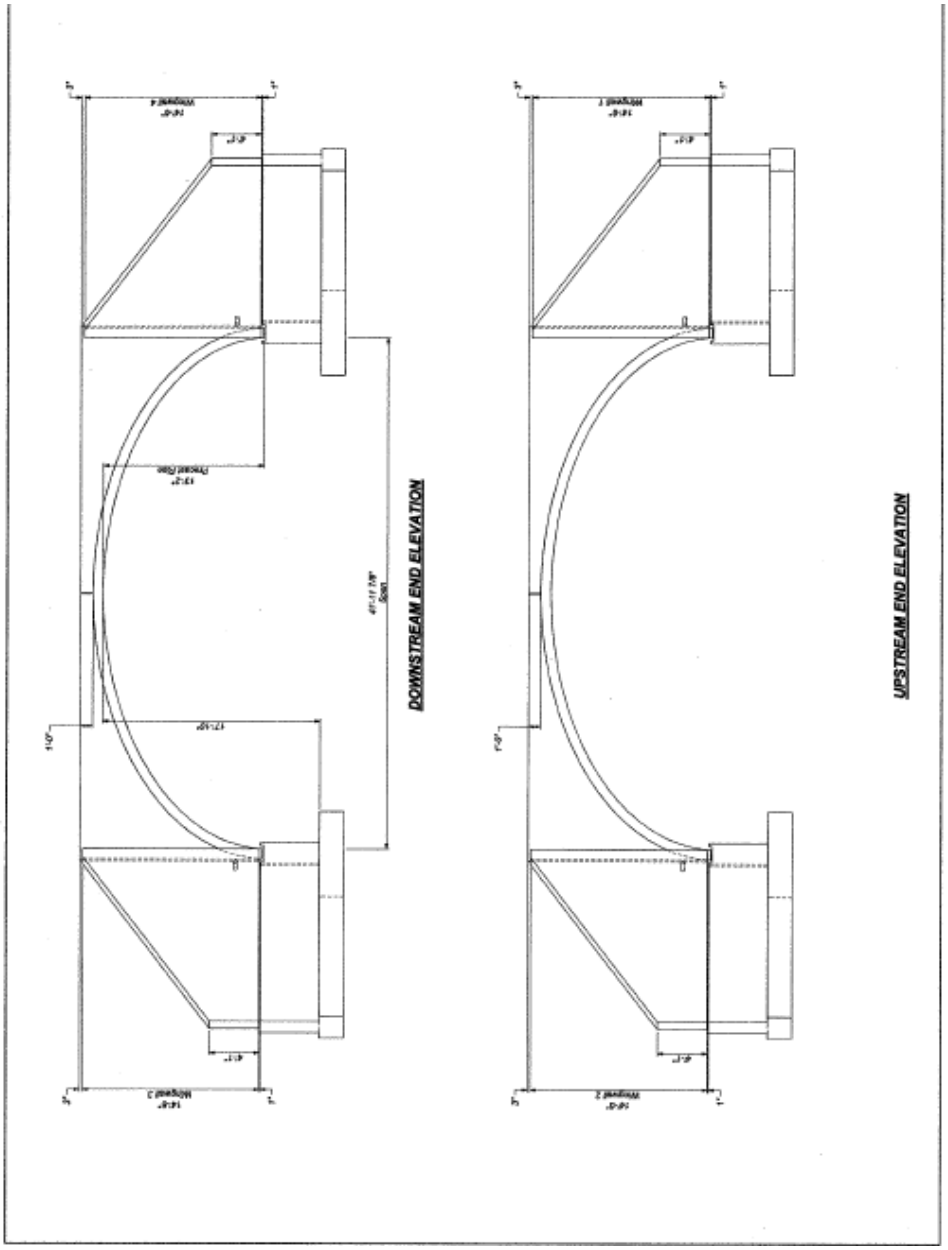
VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS



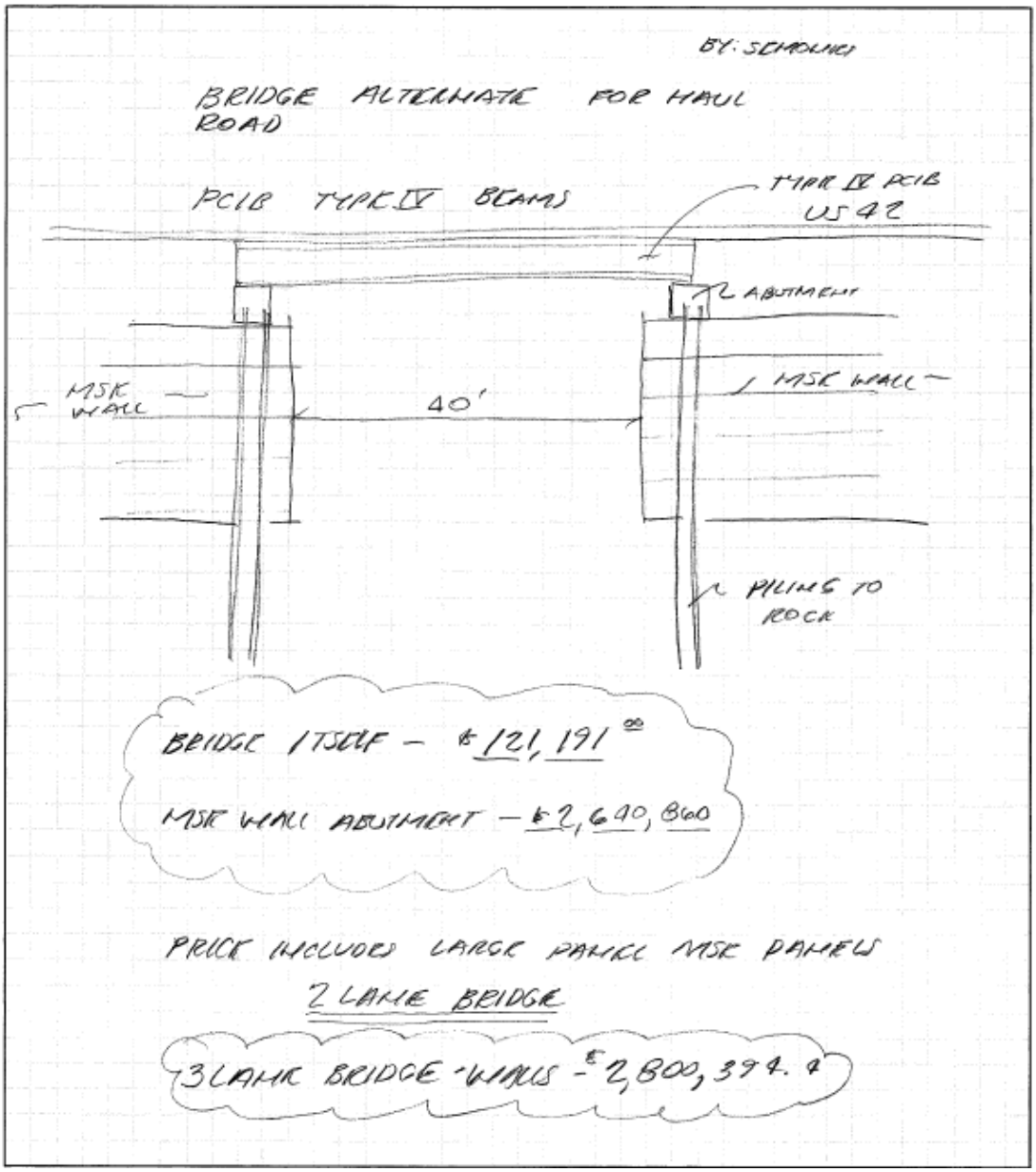
VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS



VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS



C. PAVEMENT

3. Value Engineering Alternative Number 2

This Value Engineering Alternative will construct a plain concrete intersection at the North American Stainless (N.A.S.) driveway for their heavy vehicles traveling to and from the Ohio River docks. Traffic operations would be negatively impacted for both US 42 and the driveway, but would cost considerably less than a grade separation. It is assumed the flashing warning lights would continue to operate to warn motorists of the heavy vehicle traffic.

NORTH AMERICAN STAINLESS HEAVY VEHICLE DRIVE

WIDENING	15.50" CONCRETE PAVEMENT
1.25" CL 3 ASPH SURF 0.38D PG76-22	
4.5" CL 3 ASPH BASE 1.00D PG76-22	
5" CL 3 ASPH BASE 1.50D PG64-22	
5" CL 3 ASPH BASE 1.50D PG64-22	
4" DRAINAGE LAYER	4" DRAINAGE LAYER
4" DGA	4" DGA

PAVEMENT - PCCP AT NAS HAUL ROAD
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
CONCRETE CLASS AA	CY	$478.00		$0	125.0	$59,750
REMOVE EXISTING PAVEMENT	SY	$28.00		$0	267.0	$7,476
PAVEMENT 3-LANE	LF	$241.58	60.0	$14,495		$0
SUBTOTAL				**$14,495**		**$67,226**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$1,036		$4,807
TRAFFIC CONTROL/MOT		10.0%		$1,449		$6,723
CONTINGENCY		10.0%		$1,449		$6,723
GRAND TOTAL				**$18,430**		**$85,478**

POSSIBLE COST INCREASE **$67,048**

VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS

KENTUCKY CONCRETE PAVEMENT ASSOCIATION

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CONCRETE PAD

DESIGN COMMENTS.

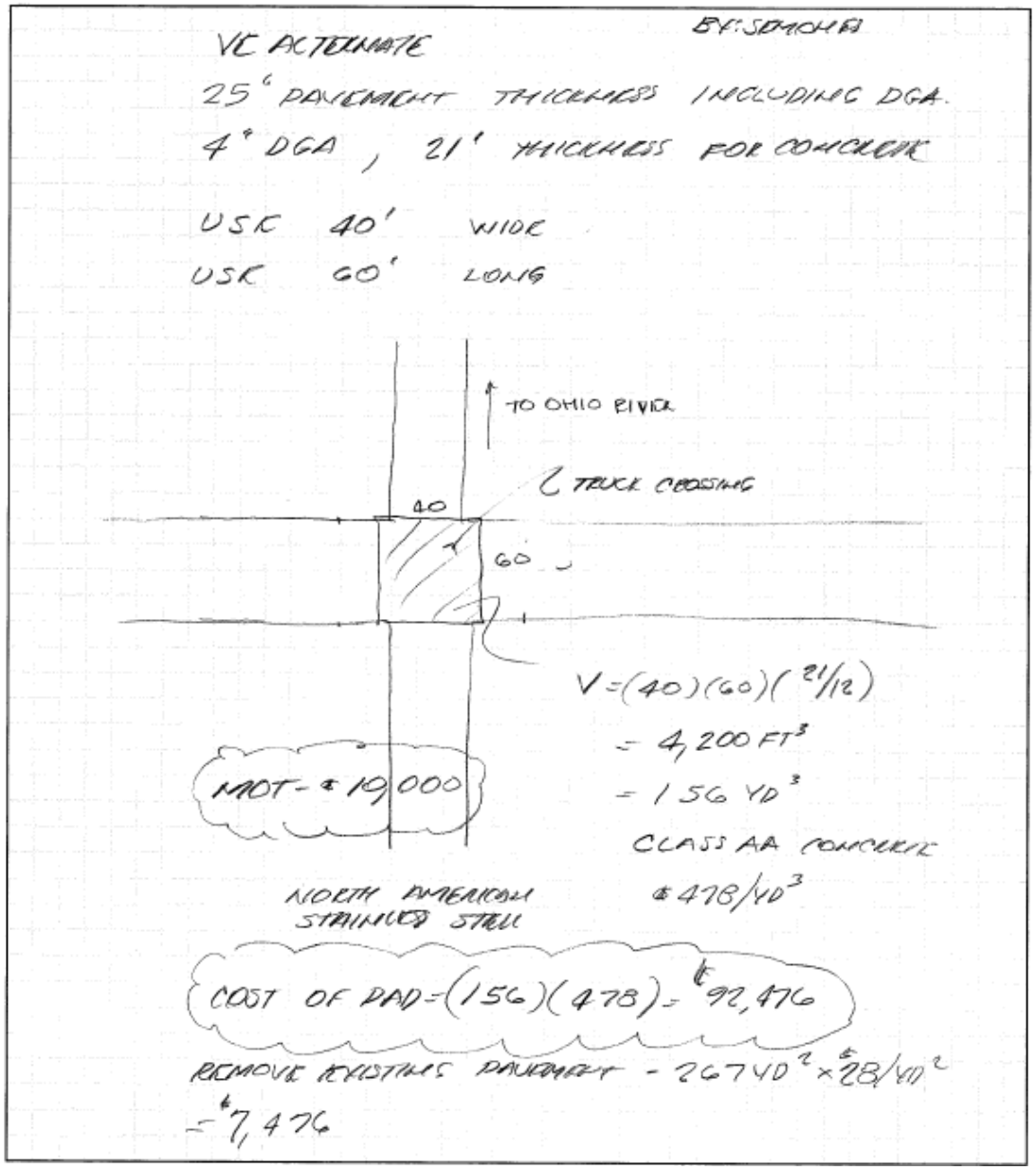
1.) INSTALL "TRUCK CROSSING SIGNS" — ALREADY THERE

2.) INSTALL FLASHING WARNING LIGHTS

3.) MDOT WILL HAVE TO SHUT DOWN ONE LANE DURING CONSTRUCTION

VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS

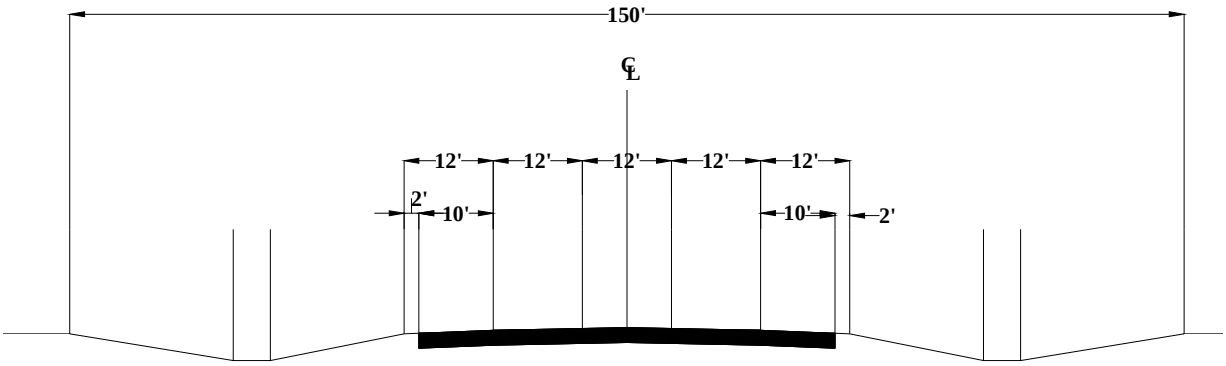


VII. DEVELOPMENT PHASE

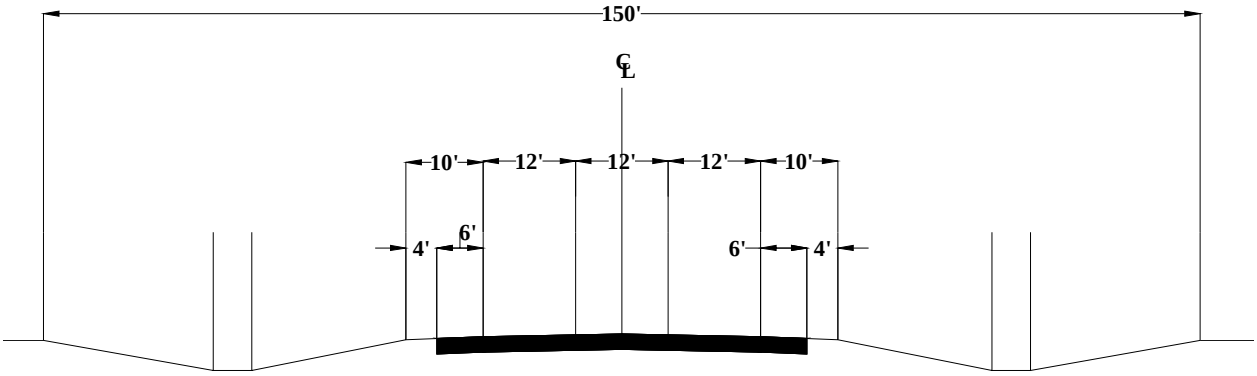
C. PAVEMENT

2. Value Engineering Alternative Number 3

This Value Engineering Alternative will construct 10’ shoulders – 6’ paved still allow for a safe haven for vehicles to pull over.



AS PROPOSED 12’ SHOULDERS – 10’ PAVED



VALUE ENGINEERING ALTERNATIVE 10’ SHOULDERS – 6’ PAVED

PAVEMENT - 10' SHOULDER/6' PAVED
VALUE ENGINEERING ALTERNATIVE NUMBER 3
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
12' SHOULDER - 10' PAVED	LF	$121.56	57,552.00	$6,996,021		$0
10' SHOULDER - 6' PAVED	LF	$72.94		$0	57,552.00	$4,197,843
EARTHWORK	CY	$3.00	64,275.20	$192,826	53,562.67	$160,688
SUBTOTAL				**$7,188,847**		**$4,358,531**
MOBILIZATION (THIS IS SUB+CONTIN. X % =)		6.5%		$514,003		$311,635
TRAFFIC CONTROL/MOT		10.0%		$718,885		$435,853
CONTINGENCY		10.0%		$718,885		$435,853
GRAND TOTAL				**$9,140,619**		**$5,541,872**

POSSIBLE SAVINGS: $3,598,747

VII. DEVELOPMENT PHASE

C. COST COMPARISON SHEET BACK UP CALCULATIONS

			SHOULDERS				
Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.076	ton	55.89		4.27
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.168	ton	49.79		8.37
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.275	ton	47.30		13.01
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.306	ton	47.30		14.45
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.222	ton	35.85		7.97
Aggregate	1	DGA	0.256	ton	17.03		4.35
				SUBTOTAL		$	60.78

10’ SHOULDERS/LF

			SHOULDERS				
Surface	301	CL 2 ASPH SURF 0.38D PG64-22	0.046	ton	55.89		2.56
Base Layer 1	212	CL 2 ASPH BASE 1.00D PG64-22	0.101	ton	49.79		5.02
Base Layer 2	212	CL 2 ASPH BASE 1.00D PG64-22	0.101	ton	49.79		5.02
Base Layer 3	203	CL 2 ASPH BASE 1.50D PG64-22	0.165	ton	47.30		7.80
Base Layer 4	203	CL 2 ASPH BASE 1.50D PG64-22	0.183	ton	47.30		8.67
Drainage Blkt	18	Drainage Blanket - Type II - Asph	0.133	ton	35.85		4.78
Aggregate	1	DGA	0.153	ton	17.03		2.61
				SUBTOTAL		$	36.47

6’ SHOULDER/LF

VIII. 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 further development.

RECOMMENDATION NUMBER 1-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "A" with 3-lanes.

If this recommendation can be implemented, there is a possible savings of ***$5,149,671.***

RECOMMENDATION NUMBER 2-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "A" with 2-lanes.

If this recommendation can be implemented, there is a possible savings of ***$5,866,573.***

RECOMMENDATION NUMBER 3-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "B" with 3-lanes.

If this recommendation can be implemented, there is a possible savings of ***$1,311,755.***

RECOMMENDATION NUMBER 4-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "B" with 2-lanes.

If this recommendation can be implemented, there is a possible savings of ***$2,055,968.***

RECOMMENDATION NUMBER 5-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "C".

If this recommendation can be implemented, there is a possible savings of ***$6,527,353.***

VIII. SUMMARY OF RECOMMENDATIONS

RECOMMENDATION NUMBER 6-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct Alignment "C" with widened bridge over Black Rock Creek.

If this recommendation can be implemented, there is a possible savings of ***$7,004,210.***

RECOMMENDATION NUMBER 7-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will relocate the cemetery and construct an at grade intersection with KY 47 for Alignment "B".

If this recommendation can be implemented, there is a possible savings of ***$3,177,960.***

RECOMMENDATION NUMBER 8-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will use existing US 42 alignment.

If this recommendation can be implemented, there is a possible savings of ***$392,600.***

RECOMMENDATION NUMBER 9-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct a grade separation at the North American Stainless haul road.

If this recommendation can be implemented, there is a possible added value of ***$3,550,220.***

RECOMMENDATION NUMBER 10-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct a thicker PCC pavement at North American Stainless haul road.

If this recommendation can be implemented, there is a possible added value of ***$67,048.***

RECOMMENDATION NUMBER 11-

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This Value Engineering Alternative will construct 10' shoulders – 6' paved.

If this recommendation can be implemented, there is a possible savings of ***$3,598,747.***

	A VE #1	A VE #2	A VE #3	A VE #4	A VE #5	A VE #6	A VE #7	B VE #1	C VE #1	C VE #2	C VE #3	TOTAL POSSIBLE SAVINGS
A - VE #1 A/3-LANE **$5,149,671**	1	0	0	0	0	0	0	1	0	1	1	**$9,073,969**
A - VE #2 A/2-LANE **$5,866,573**	0	1	0	0	0	0	0	1	0	1	1	**$9,790,872**
A - VE #3 B/3-LANE **$1,311,755**	0	0	1	0	0	0	1	1	0	1	1	**$8,414,014**
A - VE #4 B/2-LANE **$2,055,968**	0	0	0	1	0	0	1	1	0	1	1	**$9,158,227**
A - VE#5 C/3-LANE **$6,527,353**	0	0	0	0	1	0	0	1	0	1	1	**$10,451,652**
A - VE #6 C/BRIDGE **$7,004,210**	0	0	0	0	0	1	0	1	0	1	1	**$10,928,509**
A - VE #7 B/CEMETARY **$3,177,960**	0	0	0	0	0	0	1	0	0	0	0	**$3,177,960**
B RIGHT OF WAY **$392,600**	0	0	0	0	0	0	0	1	0	0	0	**$392,600**
C - VE#1 GRADE SEP **-$3,550,220**	0	0	0	0	0	0	0	0	1	0	0	**-$3,550,220**
C - VE#2 PCCP **-$67,048**	0	0	0	0	0	0	0	0	0	1	0	**-$67,048**
C - VE #3 SHOULDERS **$3,598,747**	0	0	0	0	0	0	0	0	0	0	1	**$3,598,747**

COMPETING ALTERNATIVES

PREFERRED ALTERNATIVE

There are two sets of competing Alternatives within the Project Study: Alignment & Lane configuration for the Ghent Bypass and the North American Stainless haul road crossing of US 42. This chart shows the alternative that has the maximum savings potential.

WIDEN US 42 CARROLTON TO MARKLAND DAM
VALUE ENGINEERING STUDY PRESENTATION
APRIL 21-25, 2008

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Mary Wade	KYTC Program Performance	502/564-4555