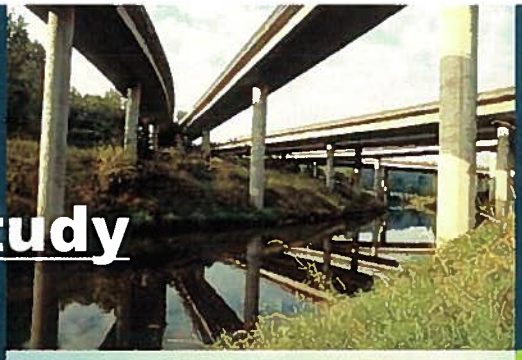
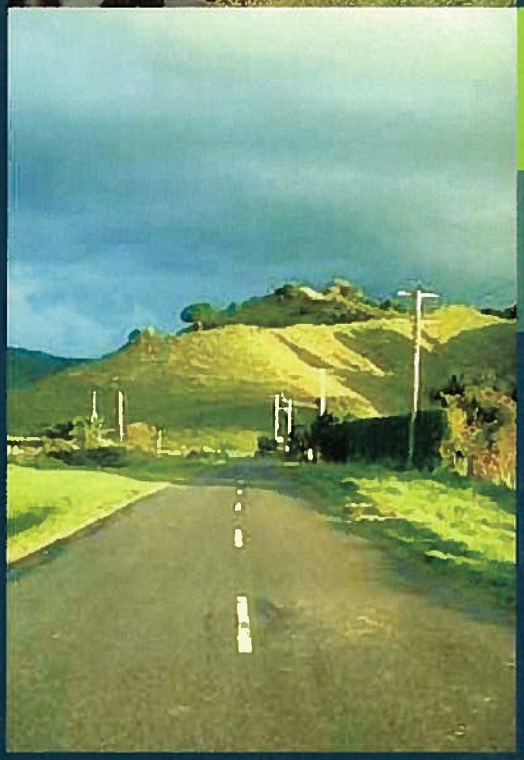
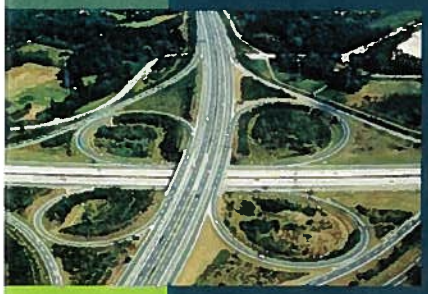
Value Engineering Study







FINAL REPORT

RECONSTRUCTION OF US 460
PIKE COUNTY, KENTUCKY
PHASE I

Study Date: February 8 - 12, 1999

for

Kentucky Transportation Cabinet
Division of Transportation Planning
Frankfort, Kentucky

March 2, 1999

DCM GROUP

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

RECONSTRUCTION OF US 460
PIKE COUNTY, KENTUCKY

PHASE I

VALUE ENGINEERING STUDY
for
Kentucky Transportation Cabinet
Division of Transportation Planning
Frankfort, Kentucky

Study Date: February 8 - 12, 1999

Final Report

March 2, 1999

Dames & Moore, Inc.
A Dames & Moore Group Company

EXECUTIVE SUMMARY

This report documents the results of a value engineering study of the design of the proposed new construction of US 460, Sections 3 through Section 6, from approximately 6+100 to Section 19+800 (Phase I) in Eastern Kentucky. The value engineering study team was comprised of Dames and Moore and KYTC personnel, and was under the leadership of a PE/CVS team leader from Dames and Moore. The study was for, and under the direction of the Kentucky Transportation Cabinet.

The value engineering team was given the task of studying a practical and workable design to see if an intensive value engineering review might discover additional recommendations that would improve the project.

The Project.
The project is briefly described as the reconstruction of existing US 460/KY 80 in Pike County, Kentucky, and Buchanan County, Virginia. The proposed project will be constructed at a new location to correct existing deficiencies. The value engineering team concentrated on Sections 3 through 6 (Phase I) of the nine-section project.

Estimate of Construction Cost and the Budget.
The value engineering team was furnished with a cost estimate prepared by the design firm, Palmer Engineering, Inc., dated 20 October, 1998. The total estimated cost of the preferred alternative, Sections 3 through 6, including 15% engineering and contingencies, is $240,919,372. The estimated cost of the total project, Sections 1 through Section 9, including improvements to existing KY 80, is $415,863,109.

Recommendations.
Recommendations for change to the design are presented in this report. These recommendations represent, in the opinion of the study team, changes that will add project value and improve the overall project quality and value. A detailed description of each recommendation is included in Section 3. This section also includes a table that summarizes all recommendations.

Savings From Recommendations.
The study generated 10 ideas, of which five were developed as recommendations to be submitted for consideration by the owner and design team. The total maximum savings represented by all 5 recommendations was $47,113,788, of which two recommendations involved added cost of $1,799,608. This represents the team's opinion as to a suggested overall action for the good of the project, considering both cost savings and value added.

ACKNOWLEDGMENTS

The value engineering team was supported throughout the study by the Kentucky Transportation Cabinet and the design agent, Palmer Engineering, Inc. The team is particularly appreciative to team members Ken Sperry, Naresh Shah and Eddie Terry of the KYTC, who added greatly to the process and the outcome of the study. Also, the overall administrative assistance, guidance and direction from the KYTC value engineering staff, Robert Semones and Joette Fields, contributed immeasurably to the study success.

Value Engineering Team Members

NAME	AFFILIATION	ROLE IN STUDY
Joseph J. Waits, P.E., C.V.S.	Dames & Moore	Team Leader
Ben Goodman, P.E.	Dames & Moore	Roadway Engineer
Dallas E. Montgomery, P.E., LLS	BRW/Hazelet & Erdal/ Dames & Moore	Construction Engineer
C. W. Seymour, Jr., LLS	Dames & Moore	Right-of-way Engineer
George Schober, P.E.	SDI Consultants	Traffic Engineer
Naresh Shah, P.E.	KYTC	Bridge Engineer
Eddie Terry	KYTC	Transportation Engineer
Ken Sperry, P.E.	KYTC	Transportation Engineer

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION

This report documents the results of a value engineering study of the Reconstruction of US 460, in Pike County, Kentucky, and particularly Sections 3 through 6. The study workshop was held in the offices of the Kentucky Transportation Cabinet, Frankfort, Kentucky, February 8 through 12, 1999. The study team was from the firm of Dames & Moore, and the Kentucky Transportation Cabinet, under the leadership of a PE/CVS from Dames & Moore. The study was under the administrative guidance and direction of Mr. Robert Semones, Value Engineering Coordinator, KYTC. The design firm is Palmer Engineering, Inc., Lexington, Kentucky.

The Job Plan.
The study followed a five-step job plan endorsed by SAVE International, the professional organization of value engineers.

Value Engineering
The following is a note to those persons unfamiliar with value engineering. Because there is a value engineering study, and because recommendations for changes to the design have been made, one should not assume that there is a problem with the existing design. There is nothing wrong with the existing design.

The value engineering team is called primarily to look for ways to add value to the project by suggesting alternatives that the team believes will lead to improvement. It must be understood that a VE team works from a different perspective than does the design team. The value engineering team represents a second opinion with the benefit of hindsight, and with the ability to challenge the owner's instructions to the designer.

In addition, VE Studies are done on designs in progress. Some recommendations will cover items that are still in a state of change, thus causing the recommendations, in certain cases, to be irrelevant. In other instances, the design team may already be intending to do the thing that the recommendation is suggesting.

In any event, the VE recommendations simply represent an attempt at a different way of looking at the problem to be solved, and are presented as additional ideas for consideration by both owner and designer.

Value Engineering studies serve to provide an added degree of certainty to the design.

VE recommendations for a change to the design serve to broaden the base of information open for consideration.

An absence of VE recommendations pursuant to certain portions of the project serves as a validation of the design of these portions of the project.

In either case, the project benefits.

The final decision as to the acceptance of these recommendations and suggestions rests ultimately with the owner and the designer.

Cost Estimate.
The current estimate of construction cost was used as a base line for study. For the study to be valid, the base line estimate must be reasonable. Not only must there be a reasonable estimate of total cost of construction, but there must also be a true breakdown of intermediate parts of the estimate. Most VE recommendations compare the life cycle cost of the recommendation to the life cycle cost of the corresponding part of the existing design. To show a realistic comparison between the cost of the recommendation, and the cost of the part of the design being altered, it is important that the cost breakdown in the existing estimate, for this design part, reflect a true picture of the part.

All costs considered during the study are "total cost of construction to the owner." This is the measure of cost that is important to the owner. This cost includes direct cost plus all owner administration, supervision, and contingencies (the total amount of money that the owner will spend to complete the project).

Ideas and Recommendations
Part of the value methodology is to generate as many ideas as is practical, and to then evaluate each idea and select as candidates for further development, only those ideas that offer added value to the project. If an idea is proven feasible, that idea is presented as a formal value engineering recommendation. Recommendations represent only those ideas that are proven, to the team's satisfaction.

Full documentation of all VE recommendations developed in this study are included in Section 3 of this report. A full list of all VE ideas generated in this study is included in Appendix B.

Design Comments.
Some ideas that did not make the selection for development as recommendations, were, never-the-less, judged worthy of further consideration. These ideas have been written up as "Design Suggestions." Documentation of all design suggestions is included in Section 4.

Summary of Decisions.
At the end of this report, in Appendix E, there is a place to record the owner's and designer's response to recommendations put forth in this study. As decisions regarding recommendations are made, these decisions can be recorded here for future reference, thus making this report complete in that it contains both the recommendations, and the response to those recommendations.

SECTION 2 - PROJECT DESCRIPTION

The scope of the proposed project is to reconstruct 28.6 kilometers of existing route US 460/KY 80/VA 80 in Pike County Kentucky and Buchanan County, Virginia. The existing roadway is a winding, two-lane facility with very narrow shoulders throughout its length. The road is also characterized by numerous access points (side roads, driveways, parking lots, etc.) which contribute to unsafe travel conditions. It is congested with a mixture of local and through traffic and currently operates at capacity. Current traffic volumes range from moderate to heavy and the traffic counts indicate that the route has a very poor level of service.

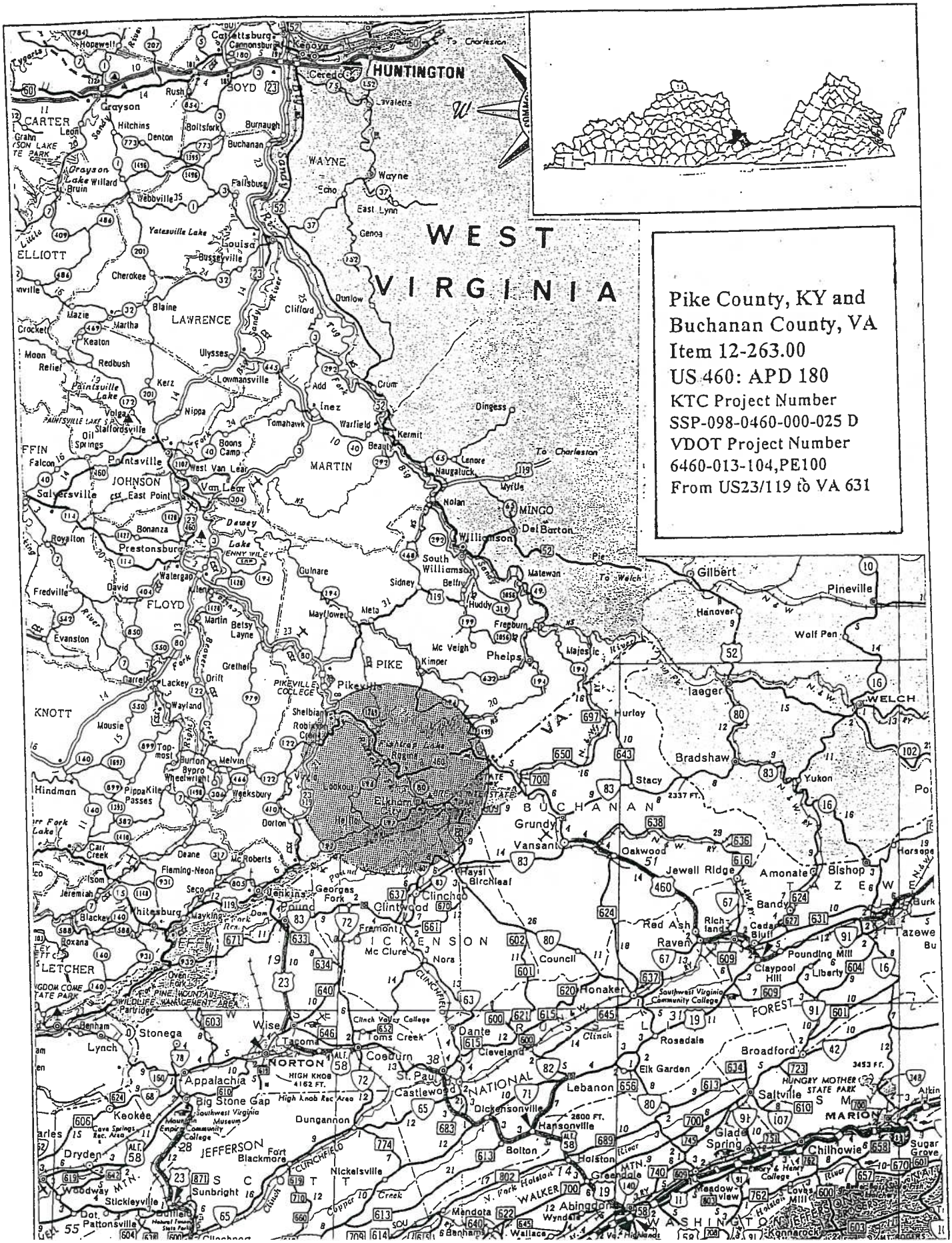
The proposed project will reconstruct the route principally on new location in order to correct existing deficiencies, avoid impacts to Russell Fork River, and provide for traffic maintenance on the existing road during the construction period. The new road will continue to be on the National Highway System and a part of the Appalachian Development Highway Corridor (APD) system. It will be designated as route US 460 and the existing route will be re-designated as route KY 80.

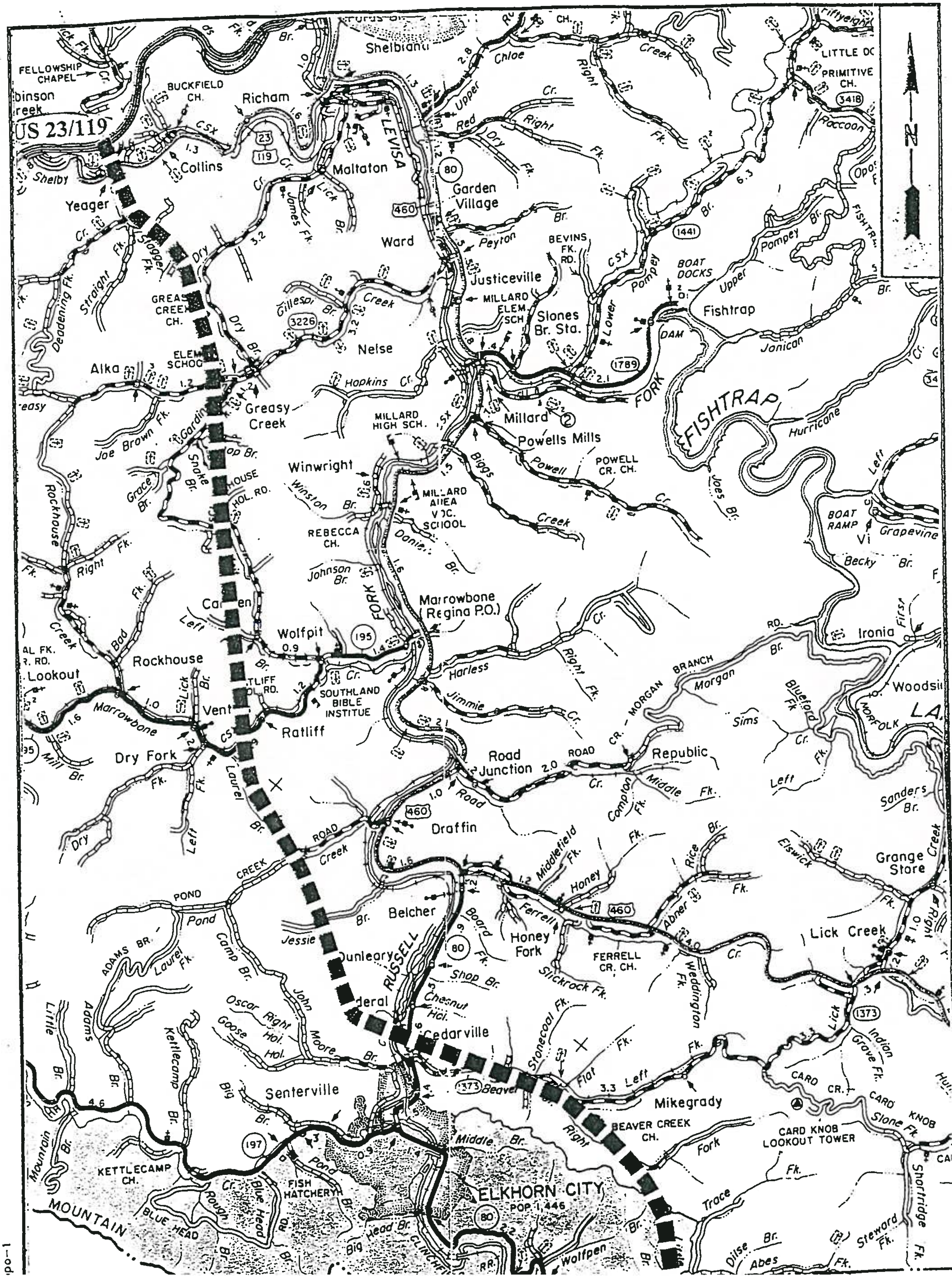
The project begins on the north at US 23/119 near the community of Yeager and extends southeasterly, cross-country crossing KY 195 at the midpoint, crossing Russell Fork River and KY 80 near Cedarville and continuing north of Elkhorn City. The project will cross the Virginia State line northeast of Breaks Interstate Park, extend approximately 1.4 miles into Virginia and tie-in to VA route 631 approximately 4000 feet east of the entrance to Breaks Interstate Park.

The project will also include the reconstruction of KY route 80 along the existing corridor between Elkhorn City and existing US 460 at Belcher to provide an improved connection from new US 460 to old US 460.

The new US 460 will be a four-lane, median divided, and partial access-controlled facility. For design and construction purposes the project is divided into nine sections. The VE study encompasses sections 3 through 6, the central part of the project, and extends from approximately Section 6+100 to Section 19 + 800.

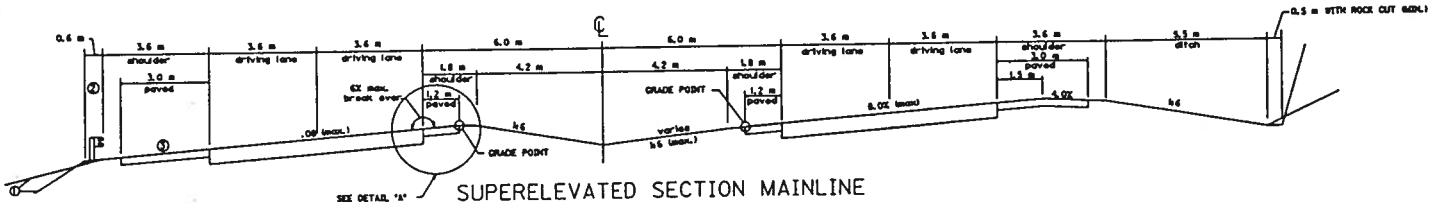
See the attached location drawings and typical cross sections.


WEST VIRGINIA
HUNTINGTON
Pike County, KY and
Buchanan County, VA
Item 12-263.00
US 460: APD 180
KTC Project Number
SSP-098-0460-000-025 D
VDOT Project Number
6460-013-104,PE100
From US23/119 to VA 631

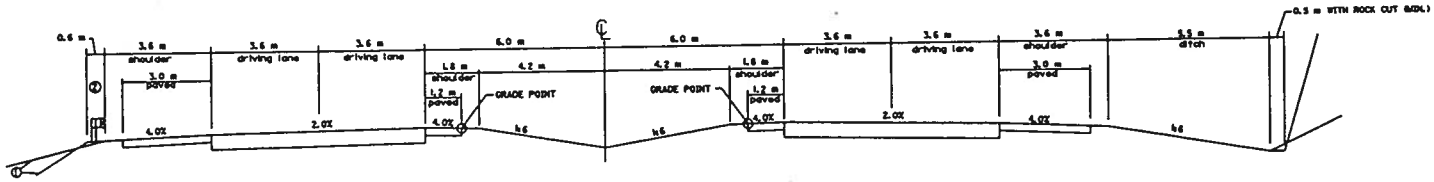

US 23/119
FELLOWSHIP CHAPEL
BUCKFIELD CH.
Richam
Shelbiana
Chloe
Upper
Right
Creek
LITTLE DC
PRIMITIVE CH.
3418
Raccoon
Collins
CSX
Maltaton
LEVISA
Red
Dry
Fk.
Garden Village
Shelby
Yeager
Stagger Fk.
James Fk.
Lick
460
80
23
119
1441
Ward
Peyton
BEVINS FK. RD.
Justiceville
MILLARD ELEM SCH
Slones Br. Sta.
Lower
Pompey
BOAT DOCKS
Upper Pompey
Fishtrap
DAM
Jonican
Straight Fk.
Deadening Fk.
GREASY CREEK CH.
Gillespie Br.
3226
Creek
Nelse
Alka
ELEM SCHOOL
Greasy Creek
Hopkins Cr.
1789
FORK
Millard
FISHTRAP
Hurricane
MILLARD HIGH SCH.
Powells Mills
Powell
POWELL CR. CH.
Joe Brown Fk.
Gardner
Snake Br.
Grace Br.
Winwright
Winston Br.
Biggs
MILLARD AREA VOC. SCHOOL
REBECCA CH.
Creek
Joes Br.
BOAT RAMP
Grapevine
Rockhouse
Right Fk.
Johnson Br.
Daniel Br.
Becky Br.
Marrowbone (Regina P.O.)
FORK
Wolfpit
195
Harless
Right Fk.
Ironia
Rockhouse
Lookout
SOUTHLAND BIBLE INSTITUTE
Jimmie
MORGAN BRANCH
Morgan
Bluebird
Woodsi
Marrowbone
Vent
Ratliff
Sims
NORFOLK
Dry Fork
Mill Br.
Laurel
Road Junction
ROAD
Republic
Compton Fk.
Middle Fk.
Left
Sanders Br.
Draffin
Dry
Middlefield Fk.
Honey
Rice
Elswick
Grange Store
CREEK ROAD
Creek
POND
Pond
Belcher
Ferrell
Abner
Fk.
Lick Creek
Jessie
Dunleary
RUSSELL
80
Honey Fork
FERRELL CR. CH.
Weddington
Cr.
ADAMS BR.
Laurel Fk.
Camp Br.
Shop Br.
Slickrock Fk.
John Moore Br.
Chesnut Hol.
1373
Indian Grove Fk.
Little
Adams
Kettlecamp
Oscar Right Hol.
Goose Hol.
Cedarville
Stonecoal Fk.
Flat Fk.
Left
Big
Senterville
373
Beaver
Mikegrady
CARD CR.
CARD KNOB
Slone Fk.
BEAVER CREEK CH.
Fork
CARD KNOB LOOKOUT TOWER
Mountain Br.
KETTLECAMP CH.
197
Pond
FISH HATCHERY
Middle Br.
ELKHORN CITY
POP. 1,446
Right
Fk.
Trace
Shortridge
MOUNTAIN
BLUE HEAD
Rough Br.
Blue Head
Big Head Br.
CLINCH
Wolfpen
Dilse Br.
Abes
Steward Fk.
Fk.

COUNTY OF	FED. ROAD NO.	STATE NO.	SHEET NO.
PIKE			

ITEM NO. 12-283.00



SUPERELEVATED SECTION MAINLINE



NORMAL SECTION MAINLINE

① SEE CROSS SECTIONS FOR SLOPES OUTSIDE THE LIMITS OF THE SHOULDERS

② SHOULDERS SHALL BE WIDENED 0.6 m WHERE GUARDRAIL IS REQUIRED

③ SUPERELEVATED SHOULDERS: CONSTRUCT TO STANDARD SUPERELEVATION EXCEPT NOT FLATTER THAN 4.0%

SHALL NOT BE SCALED

DATE
CHECKED BY
DATE
APPROVED BY

Cell Library: PEC-30.CEL
Cell Name: PIKEPL

6-93
FORM NO. 2a

SECTION 3 - VE RECOMMENDATIONS

This section contains the complete team writeups of all recommendations of this study. Each "recommendation" is marked by a unique identification number. This number is assigned from the Creative Idea List and is used throughout the report to uniquely refer to a given recommendation. The parent idea, from which the recommendation began can be determined from the Creative Idea List (see Appendix B), where the recommendation number is shown adjacent to the corresponding parent idea.

Acceptance of Single Issues
An attempt has been made to develop each recommendation around a single issue. This simplifies the acceptance or rejection of the recommendation, and gives added flexibility to the implementation of the recommendations, in that several single issue recommendations can be combined as needed to achieve a desired result. When evaluating a recommendation, each part of the recommendation should be reviewed on an independent basis. There is no need to discard an entire recommendation because one part of the recommendation is unacceptable. It is not necessary to accept or reject a recommendation in total. A recommendation can be accepted in part, or accepted with a specified partial modification.

Combining Recommendations.
Usually all recommendations cannot be simultaneously accepted or combined. This is because some recommendations are mutually exclusive of one another, and the acceptance of one recommendation will automatically preclude the acceptance of certain others.

The team has developed one suggested combination of mutually additive recommendations. This suggested combination of recommendations can be found by referring to the final column of the table "Summary of Recommendations". All recommendations flagged in this column make up the suggested combination of recommendations. This combination represents the team's suggestion as to their choice of recommendations that will give maximum benefit to the project.

Summary of Recommendations.
The reader will find a table titled "Summary of Recommendations". This table offers a convenient overview of all recommendations along with economic data associated with each.

Organization of Recommendations.
The recommendations presented on the following pages are organized numerically by identification number. Each recommendation is documented by a separate writeup that includes a description of the recommendation, a list of advantages and disadvantages, sketches where appropriate, calculations, cost estimate, and the economic impact of the recommendation on the life cycle project in terms of savings or added cost.

SUMMARY OF RECOMMENDATIONS

Project: RECONSTRUCTION OF US 460
Location: PIKE COUNTY, KENTUCKY
Study Date: February 8 - 12, 1999

RECOMMENDATION		SAVINGS (or cost) of RECOMMENDATION (In Present Worth Amount Dollars)		
Rec #	Recommendation Title / Description	resulting 1st cost savings (or cost)	O & M savings (or cost)	total LCC savings (or cost)
2	Raise Profile Grade 1 meter	$4,400,000	-0-	$4,400,000
4	Realign and Raise Grade in Section 4	$8,006,475	-0-	$8,006,475
6	Combine Two North Access Points in Section 4	($23,539)	-0-	($23,539)
7	Combine Approaches to Create an Interchange in Section 4	($1,776,148)	-0-	($1,776,148)
10	Divert Pond Creek Through Tunnel and Eliminate Bridge	$12,160,000	-0-	$36,507,000

VALUE ENGINEERING RECOMMENDATION #2

FORM 20 DEC 1996

PROJECT: PIKE COUNTY US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 2/8/99 through 2/12/99

DEVELOPED BY: Eddie Terry and C.W. Seymour, Jr.

IDENTIFICATION NUMBER: 2

FUNCTION OF COMPONENT BEING CHANGED: Excavate Material

DESCRIPTIVE TITLE OF RECOMMENDATION: Raise profile grade 1 meter

ORIGINAL DESIGN:

Utilizes vertical alignment grades varying from a maximum of 7% to a minimum of 2.0%.

RECOMMENDED CHANGE:

Shift the vertical PI from station 6+560, elevation 295.60 to station 6+535, elevation 296.60. Raise each of the subsequent vertical PIs at their existing PI station one meter to create a vertical alignment 1 meter higher and parallel to the original proposed profile.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$145,000,000		$145,000,000
RECOMMENDED DESIGN	$140,600,000		$140,600,000
ESTIMATED SAVINGS OR (COST)	$4,400,000		$4,400,000

VALUE ENGINEERING RECOMMENDATION #2

ADVANTAGES:

- Reduces Excavation
- Reduces need for waste area site

DISADVANTAGES:

- Increase pipe and culvert length 4 meters
- Increase bridge height/length
- Increase connector length

JUSTIFICATION:

Provides for $3.8 million in potential savings in excavation and reduces the amount of waste material that needs to be hauled off the project by 1.66 million cubic meters without adversely affecting the vertical alignment or drainage.

VALUE ENGINEERING RECOMMENDATION #2

FORM: 23 MARCH 1998

COST ESTIMATE - FIRST COST

Cost Item	Units	Unit Cost		Original Design		Recommended Design	
		$/Unit	Source Code	Num of Units	Total $	Num of Units	Total $
Excavation	cm	3.68	1	34,266,997	$126,100,000	33,231,078	$122,300,000
			+15% E&C		$18,900,000		$18,300,000
TOTAL					$145,000,000		$140,600,000

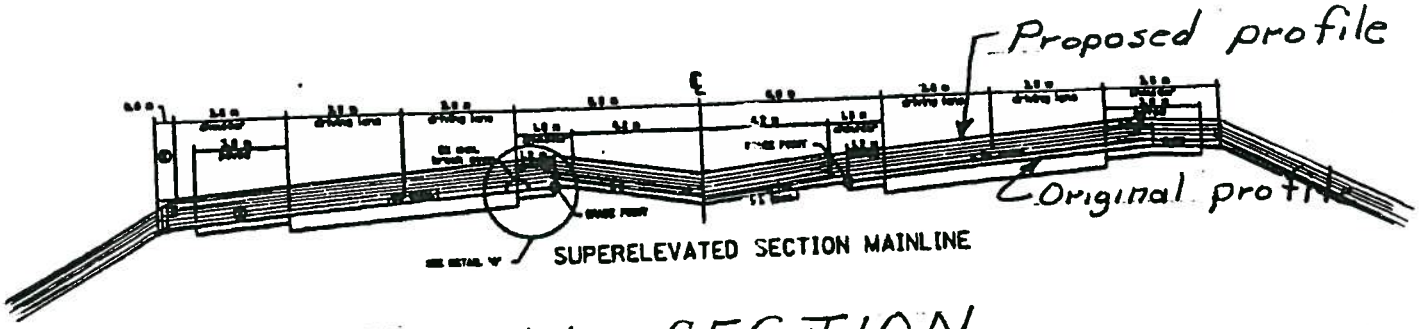
SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Richardson's
6 Vendor Lit or Quote (list name / details)
7 Professional Experience (List job if applicable)
8 Other Sources (specify)

VALUE ENGINEERING RECOMMENDATION #2

SKETCH OF ORIGINAL DESIGN

FORM: 20 DEC 1966

IDENTIFICATION NUMBER:



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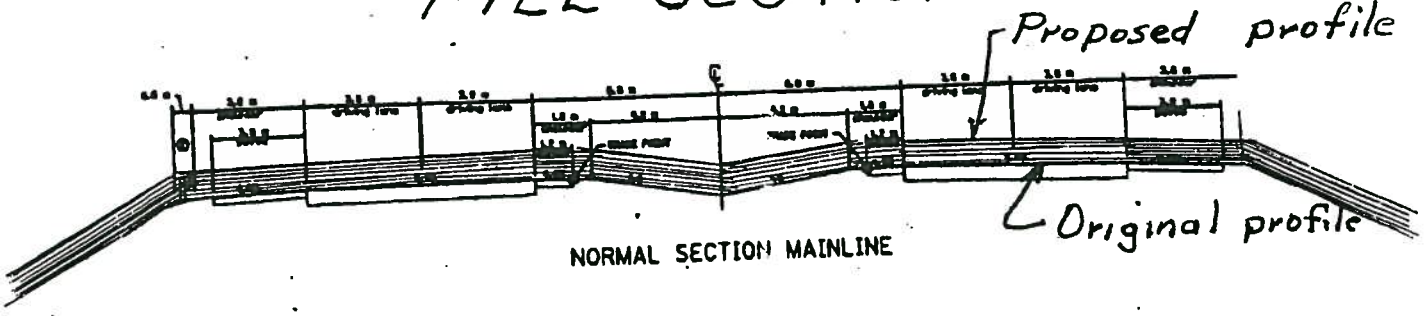

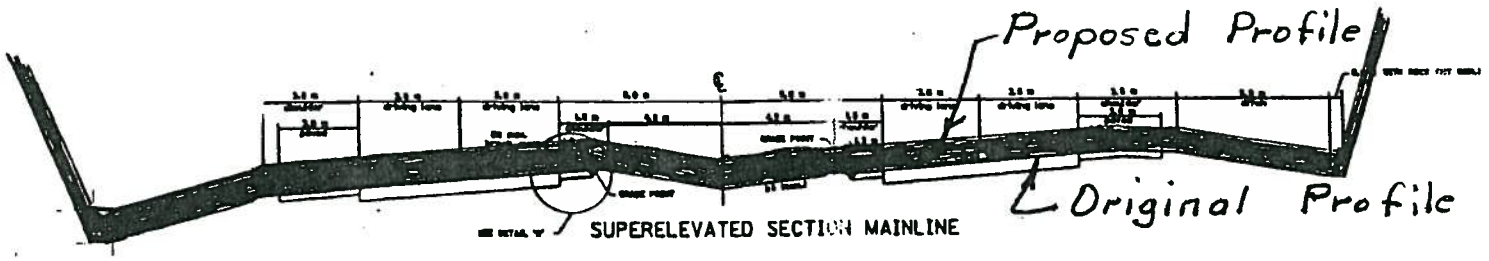

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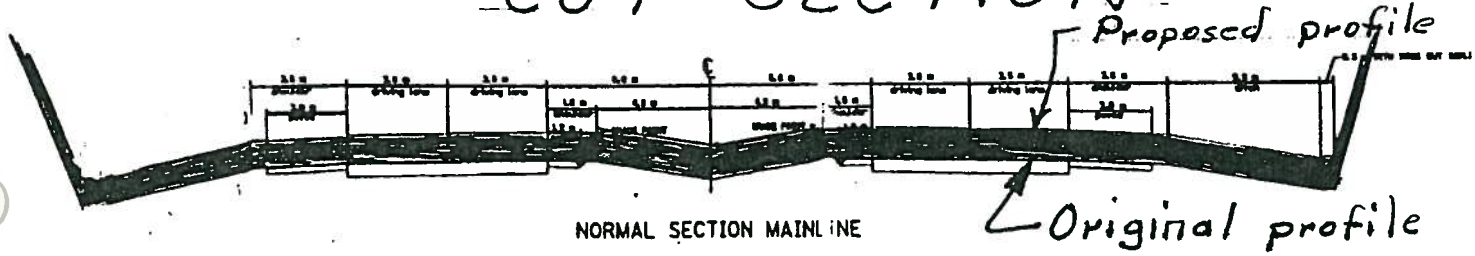


VALUE ENGINEERING RECOMMENDATION #2

FORM: 20 DEC 1996

CALCULATIONS

IDENTIFICATION NUMBER:

Quantities for comparing the revised grade with the original proposed grade provided for by Inroads Computer Technician, Rick Lambert of Palmer Engineering.

LIST ALL PERSONS THE TEAM CONSULTED WITH DURING THE STUDY, AND INFORMATION RECEIVED.

CONSULTATION RECORD

NAME	SUBJECT	ORG.	TELEPHONE
Rick Lambert	Inroads profile grade comparison	Palmer Engr'g	(606) 744-1218

VALUE ENGINEERING RECOMMENDATION #4

FORM 20 DEC 1996

PROJECT: US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 2/8/99 through 2/12/99

DEVELOPED BY: George Schober

IDENTIFICATION NUMBER: 4

FUNCTION OF COMPONENT BEING CHANGED: Alignment

DESCRIPTIVE TITLE OF RECOMMENDATION: Realign & Raise Grade in Section 4

ORIGINAL DESIGN:

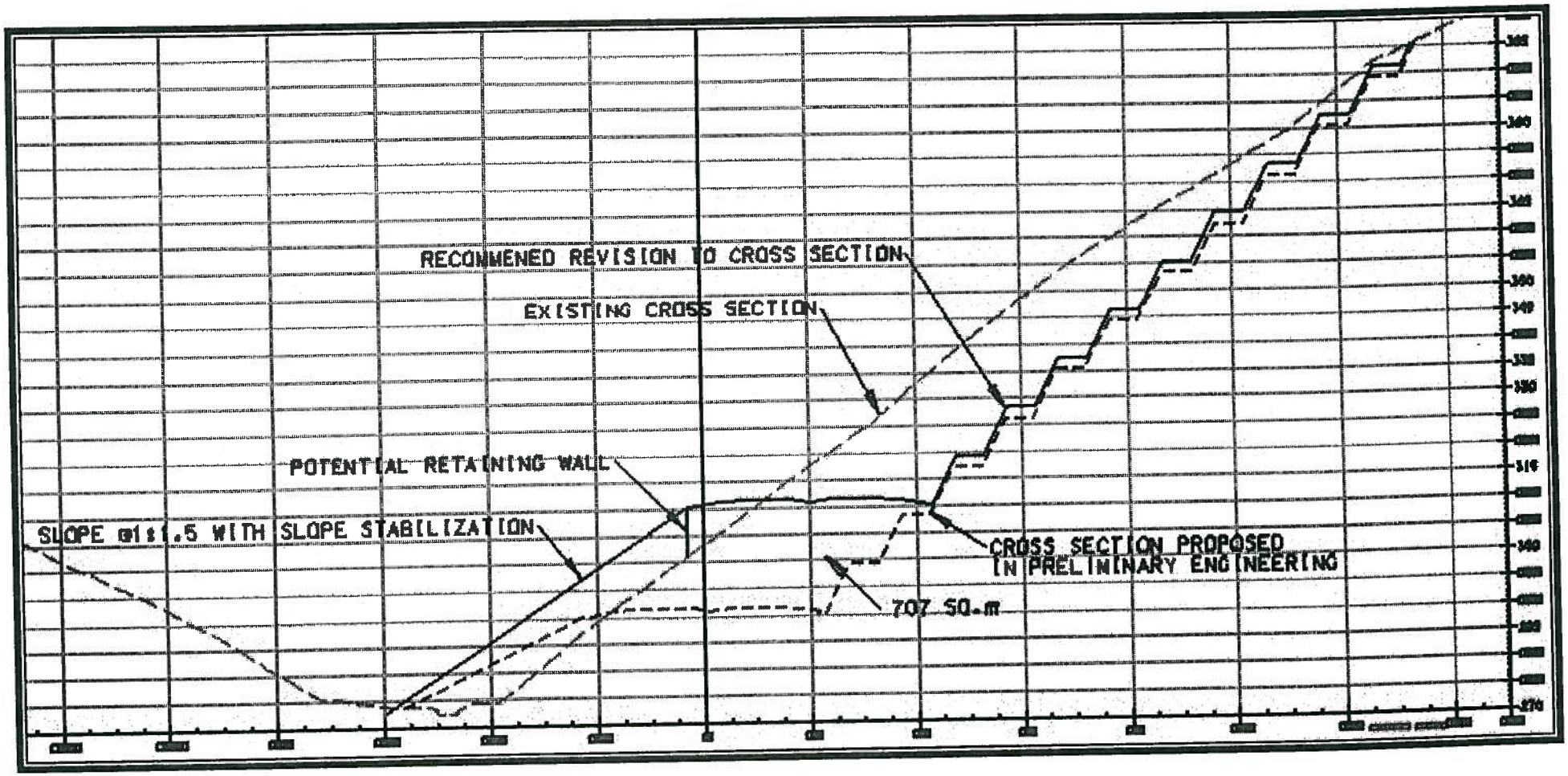
See Attached Diagram

RECOMMENDED CHANGE:

Raise the existing grade by 20 meters and shift the horizontal alignment 20 meters to the south.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$33,551,624		$33,551,624
RECOMMENDED DESIGN	$25,545,148		$25,545,148
ESTIMATED SAVINGS OR (COST)	$8,006,475		$8,006,475

Realign & Raise Grades in Section 4



VALUE ENGINEERING RECOMMENDATION #4

ADVANTAGES:

- Reduce Excavation
- Reduce Waste
- Increase Fill Areas

DISADVANTAGES:

- None Noted

JUSTIFICATION:

Modifications to the alignment and profile in section 4 can be designed to allow the profile to be raised significantly, reducing excavation. The slope toe in the fill sections will need to be extended, or the slope must increase to 1:1.5. Another alternative to minimize additional impacts from raising the grade is to construct retaining walls. The cost necessary to mitigate the additional impacts caused by raising the grade is insignificant compared to the cost saving yielded from the reduction in cut.

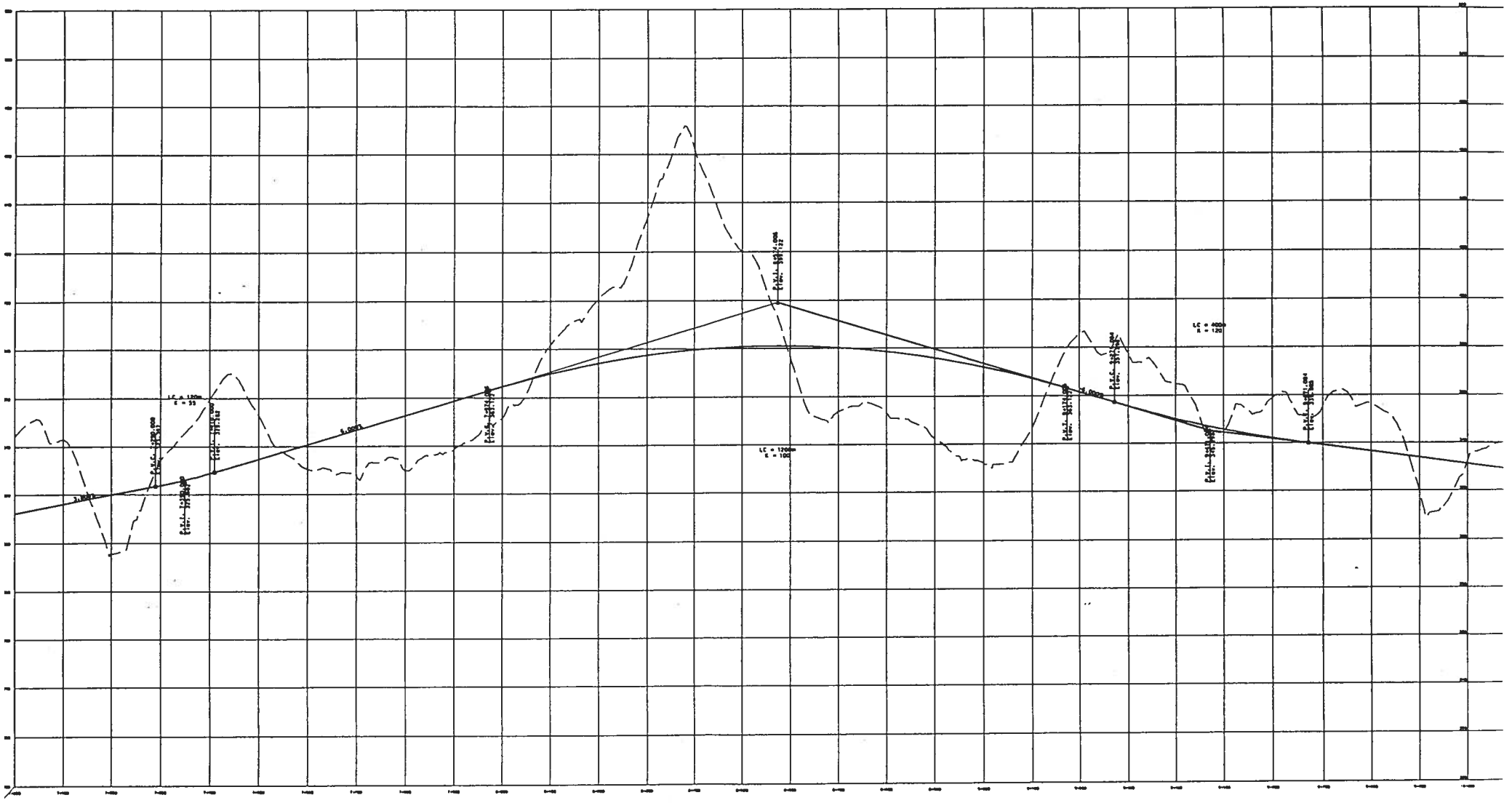
VALUE ENGINEERING RECOMMENDATION #4

FORM: 23 MARCH 1998

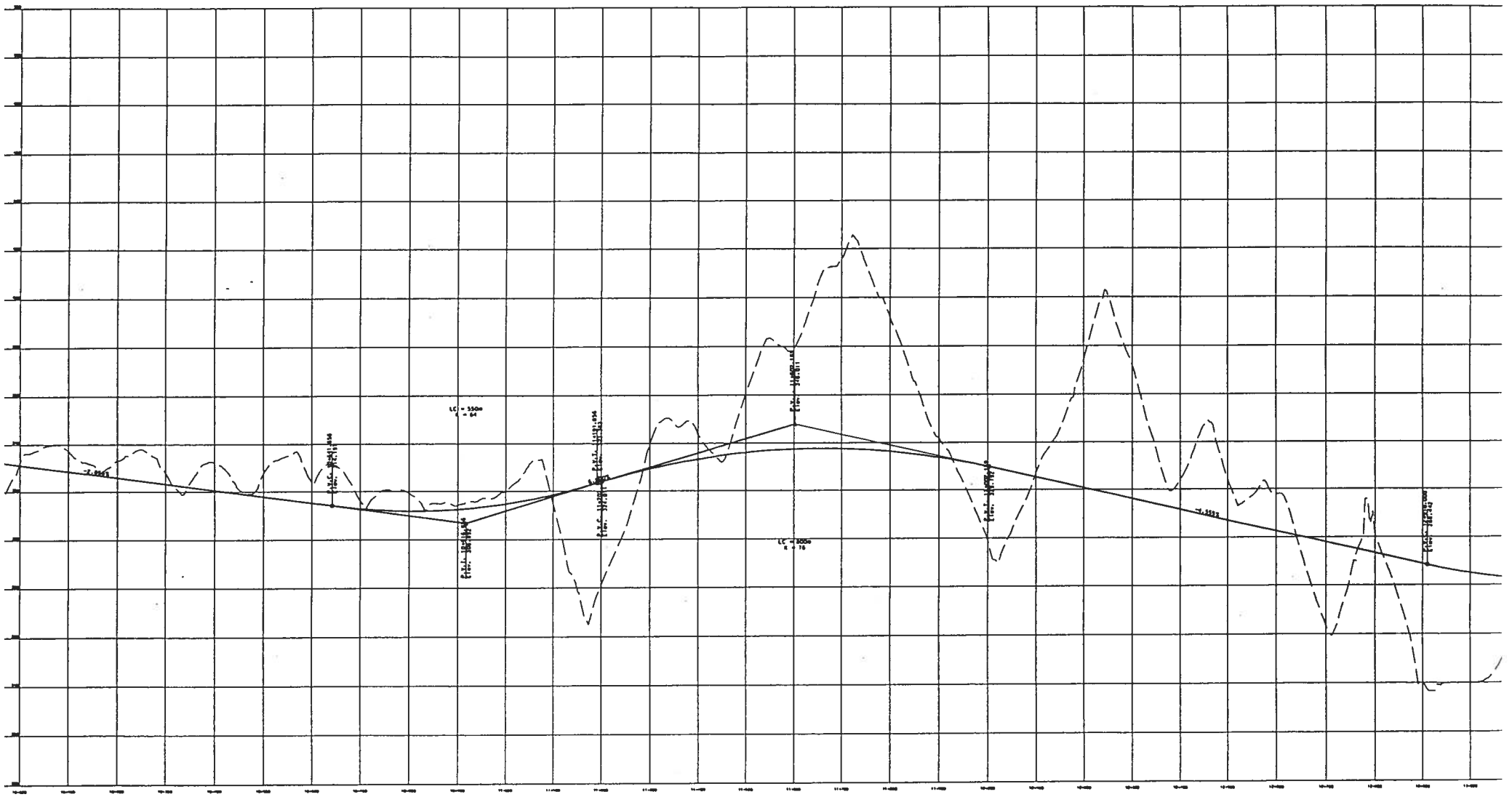
COST ESTIMATE - FIRST COST

Cost Item	Units	Unit Cost		Original Design		Recommended Design	
		$/Unit	Sou-rce Code	Num of Units	Total $	Num of Units	Total $
Excavation	Cu m	$3.68	1	9,117,289	$33,551,624	6,910,312	$25,429,948
Retaining walls	Cu m	$432.0	8			267	$115,200
Total					$33,551,624		$25,545,148

SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Richardson's
6 Vendor Lit or Quote (list name / details)
7 Professional Experience (List job if applicable)
8 Other Sources (specify)



Sec 4



Sec 4(2)

VALUE ENGINEERING RECOMMENDATION #6

FORM 20 DEC 1996

PROJECT: US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 2/8/99 through 2/12/99

DEVELOPED BY: Ken Sperry

IDENTIFICATION NUMBER: 6

FUNCTION OF COMPONENT BEING CHANGED: Access

DESCRIPTIVE TITLE OF RECOMMENDATION: Combine two north access points in section 4.

ORIGINAL DESIGN:

Two separate access points exist in the original design along mainline @ Sta. 8+524 and Sta. 9+060.

RECOMMENDED CHANGE:

Combine the two access points in order to minimize conflict points on mainline.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$359,388		$359,388
RECOMMENDED DESIGN	$382,927		$382,927
ESTIMATED SAVINGS OR (COST)	($23,539)		($23,539)

VALUE ENGINEERING RECOMMENDATION #6

ADVANTAGES:

- Reduce Conflicting Movements
- Reduces Pavement

DISADVANTAGES:

- None Noted

JUSTIFICATION:

Modifications to the alignment and location of the accesses will provide additional access for area residents. It will also eliminate conflicting traffic movements at one location. Although the cost of this alternative is slightly higher, the additional access provided and the elimination of the conflicting movements should warrant further consideration.

VALUE ENGINEERING RECOMMENDATION #6

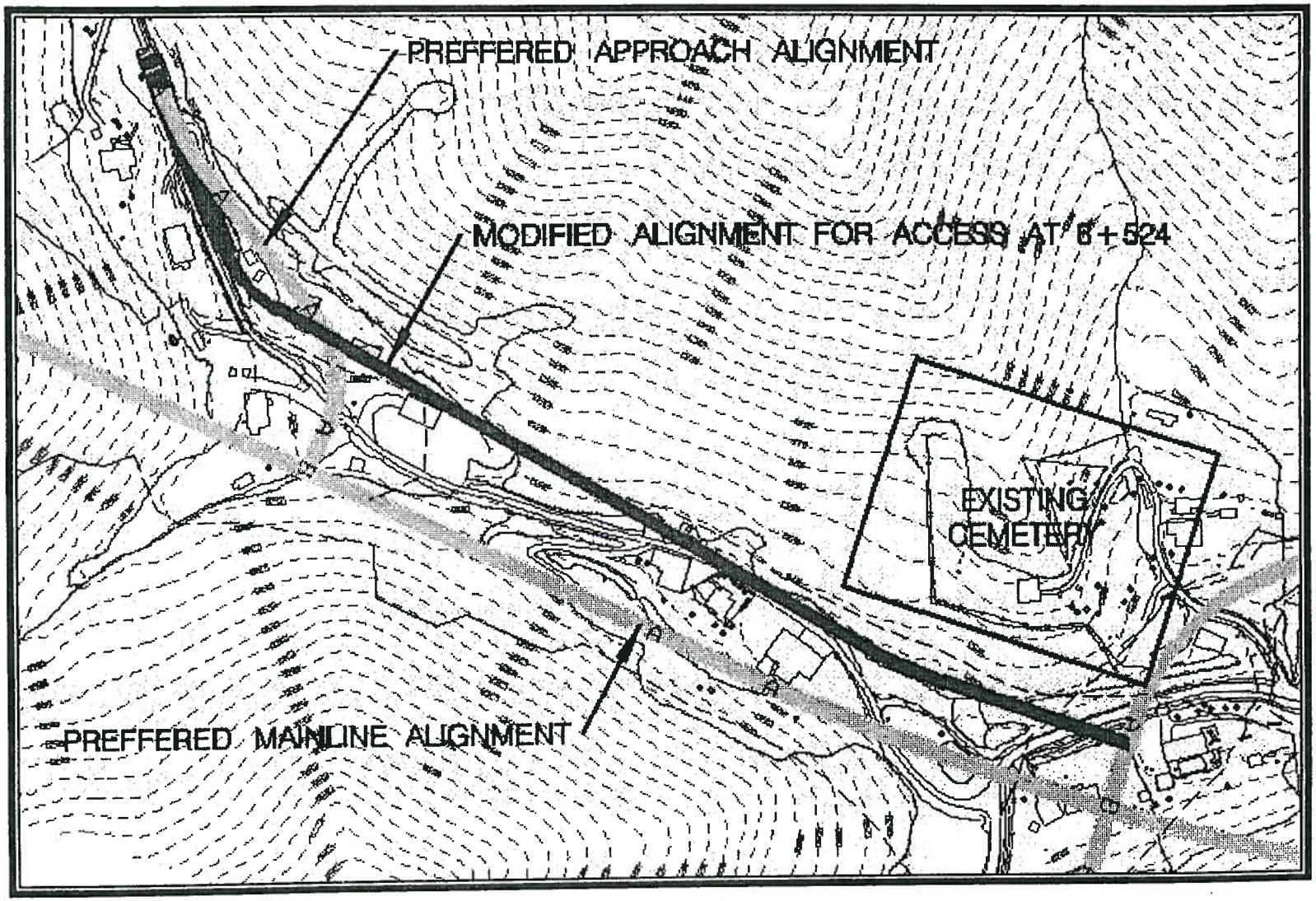
FORM: 23 MARCH 1998

COST ESTIMATE - FIRST COST

Cost Item	Units	Unit Cost		Original Design		Recommended Design	
		$/Unit	Source Code	Num of Units	Total $	Num of Units	Total $
Excavation	Cu m	$8.00	1	14,615	$116,920	-0-	-0-
Paving	meter	$452.0	1	300	$135,612	540	$244,102
Drainage			1		$11,500		$11,500
Misc.	meter	$116.74	1	300	$35,022	540	$63,040
Mob & Demob	4.5%		1		$13,547		$14,339
Eng. & Cont.	15%		1		$46,877		$49,947
TOTAL					$359,388		$382,927

SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Richardson's
6 Vendor Lit or Quote (list name / details)
7 Professional Experience (List job if applicable)
8 Other Sources (specify)

Combine Two North Access Points in Section 4



Recomendation #6

Cost Item	Units	Unit Cost $/Unit	Source Code	Orignial Design Num of Units	Orignial Design Total $	Recommended Design Num of Units	Recommended Design Total $		
Excavation	CU m	$ 8.00	1	14615	$ 116,920	0	$ -		
Paving	Meters	$452	1	300	$ 135,612	540	$ 244,102		
Drainage			1		$ 11,500		$ 11,500		
Misc.	Meters	$ 116.74	1	300	$ 35,022	540	$ 63,040	$	(28,018)
Mob. & Demob. (4.5%)			1		$ 13,457		$ 14,339		
Eng. & Conting. (15%)			1		$ 46,877		$ 49,947		
Total					$ 359,388		$ 382,927		

VALUE ENGINEERING RECOMMENDATION #7

FORM 20 DEC 1996

PROJECT: US 460 Page 1 of 4

LOCATION: Pike County, Kentucky

STUDY DATE: 2/8/99 through 2/12/99

DEVELOPED BY: George Schober

IDENTIFICATION NUMBER: 7

FUNCTION OF COMPONENT BEING CHANGED: Access

DESCRIPTIVE TITLE OF RECOMMENDATION: Combine Approaches to Create an Interchange in Section 4

ORIGINAL DESIGN:

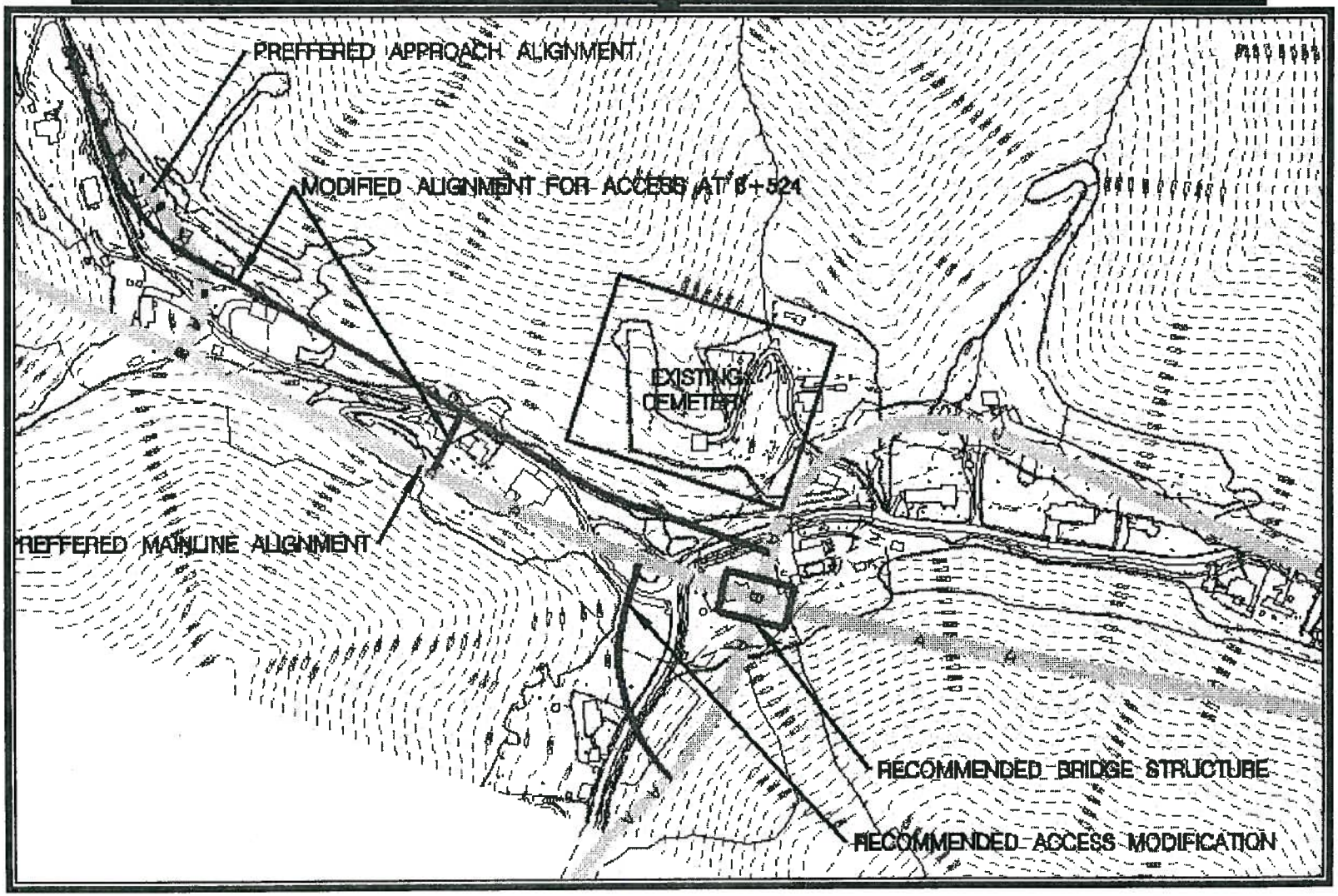
Four separate access locations exist within Section 4. Two right in right out access locations on north side and two right in right out access locations on south side.

RECOMMENDED CHANGE:

Combine two north and one south access and construction of full access interchange. See attached diagram

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$359,368		$359,369
RECOMMENDED DESIGN	$2,135,536		$2,135,536
ESTIMATED SAVINGS OR (COST)	($1,776,148)		($1,776,148)

Combine Approaches to Create Full Interchange in Section 4



VALUE ENGINEERING RECOMMENDATION #7

ADVANTAGES:

- Reduce adverse travel distances
- Reduce conflicting movements

DISADVANTAGES:

- Increase cost
- May conflict with cemetery

JUSTIFICATION:

Modifications to the alignment and location of the accesses (two north and one from south) will provide additional access for area residents. It will also eliminate conflicting traffic movements at one location. Although the cost of this alternative is higher, because of the additional access provided and the elimination of the conflicting traffic movements, this alternative warrants further consideration.

VALUE ENGINEERING RECOMMENDATION #7

FORM: 23 MARCH 1998

COST ESTIMATE - FIRST COST

Cost Item	Units	Unit Cost		Original Design		Recommended Design	
		$/Unit	Source Code	Num of Units	Total $	Num of Units	Total $
Excavation	Cu m	$8.00	1	14,615	$116,920	7,000	$56,000
Bridge Construction	L. Sum	$1,300,000	1			1	$1,300,000
Paving	meter	$432.00	1	300	$135,612	720	$325,469
Draining			1		$11,500		$11,500
Misc.	meter	$116.74	1	300	$35,022	720	$84,053
Mob. & Demob.	4.5%		1		$13,457		$79,966
Eng. & Cont.	15%		1		$46,877		$278,548
TOTAL					$359,388		$2,135,536

SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Richardson's
6 Vendor Lit or Quote (list name / details)
7 Professional Experience (List job if applicable)
8 Other Sources (specify)

VALUE ENGINEERING RECOMMENDATION #10

PROJECT: US 460 Page 1 of 7

LOCATION: Pike County, Kentucky

STUDY DATE: 2/8/99 through 2/12/99

DEVELOPED BY: Richard Wilson & Dallas Montgomery

IDENTIFICATION NUMBER: 10

FUNCTION OF COMPONENT BEING CHANGED:

DESCRIPTIVE TITLE OF RECOMMENDATION: Divert Pond Creek through tunnel and eliminate bridge.

ORIGINAL DESIGN:

Proposed structures are a multi-span continuous concrete or steel superstructure bridge with an approximate out-to-out length of 400 meters and an out-to-out width of 13.6 meters per bridge.

RECOMMENDED CHANGE:

Divert Pond Creek through a 15-foot (internal diameter) drainage tunnel and eliminate bridge. The bridge will be replaced with embankment material for the mainline. The approach roadway will be eliminated and replaced with an approach roadway on each side of the mainline.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$70,500,000	$1,347,000	$71,847,000
RECOMMENDED DESIGN	$35,340,000	-0-	$35,340,000
ESTIMATED SAVINGS OR (COST)	$12,160,000	-0-	$36,507,000

VALUE ENGINEERING RECOMMENDATION #10

ADVANTAGES:

- Reduce excavation by providing embankment from cut material and minimizes overhaul.
- Reduces the size of potential waste areas and impacts on blue line from waste area.
- Eliminates bridge over Pond Creek, provides better access for local traffic on the mainline and eliminates future maintenance cost of the bridge.

DISADVANTAGES:

- More relocations of homes.
- Requires a revised Environmental Impact on stream.
- Requires more right-of-way

JUSTIFICATION:

Can reduce cost of the project by elimination of bridge and future bridge maintenance. All environmental issues and permits should be investigated thoroughly before proceeding further, if this item is chosen for implementation.

VALUE ENGINEERING RECOMMENDATION #10

FORM: 23 MARCH 1998

COST ESTIMATE - FIRST COST

Cost Item	Units	Unit Cost		Original Design		Recommended Design	
		$/Unit	Sou-rce Code	Num of Units	Total $	Num of Units	Total $
Tunnel Excavation	Cu Yds.	$36.53	Corps			11,911	$435,112
Rock Bolts	lin. ft.	$6.91	Corps			4,800	$33,168
Shotcrete	sq. Yds.	$23.37	Corps			8,942	$208,974
Cont.	50%						$266,121
Energy Dissipating Device							$100,000
Roadway Excavation	Cu. m	$3.68	Palmer	9,046,401	$33,290,756		
Revised Excavation	Cu. m	$3.31	VET			9,046,401	$29,961,680
Bridge	L. Sum	$140 / sq. Ft	Palmer		$32,800,000		
Prop approach					$4,422,000		
Upstream trash rack	1	$1,000				1	$1,000
Screens	2	$2,000					$4,000
New approaches lt. & rt.	2						$4,330,000
TOTALS					$70,512,756		$35,340,055

O & M Cost (Present Worth) for Bridge Inspection and Future Deck Replacement.

Bridge Inspection
Annual Cost PWF
50,000 x 13.80 =

Deck Replacement				$ 690,000
Cost in 30 years		PWF		
$5,000,000	x	0.1314 =	+	$ 657,000
				$1,347,000

Pond Creek Approach Right

Cost Item	Units	Unit Cost $/Unit	Source Code	Orignial Design Num of Units	Total $	Recommended Design Num of Units	Total $
Excavation	CU m	$ 3.68	1		$ -	140000	$ 515,200
Paving	Meters	$ 563.90	1	0		985	$ 555,442
Drainage	LP. SUM		1		$ -		$ 50,000
Misc.	Meters	116.74	1			985	$ 114,989
Mob. & Demob. (4.5%)			1	0	$ -	0	$ 55,603
Eng. & Conting. (15%)			1		$ -		$ 193,685
Total					$ -		$ 1,484,919

Pond Creek Approach Left

Cost Item	Units	Unit Cost $/Unit	Source Code	Orignial Design Num of Units	Total $	Recommended Design Num of Units	Total $
Excavation	CU m	$ 3.68	1	861,686	$ 3,171,004	380,000	$ 1,398,400
Paving	Meters	$ 563.90	1	718	$ 404,880	1350	$ 761,265
Drainage	LP. SUM		1		$ 20,000		$ 50,000
Misc.	Meters	116.74	1	718	$ 83,819	1350	$ 157,599
Mob. & Demob. (4.5%)			1	0	$ 165,587	0	$ 106,527
Eng. & Conting. (15%)			1		$ 576,794		$ 371,069
Total					$ 4,422,084		$ 2,844,860
Total (2 approaches)					$ 4,422,084		$ 4,329,778

Eliminate Pond Creek Bridge

Provided Length of Structure is 400m. Needs to be lengthened to 800m to secure abutments into bedrock.

Actual Cost

800m x 13.6m x 2 x $1,505/m = $9,800,000

SECTION 4 - DESIGN SUGGESTIONS AND COMMENTS

Design Suggestions are ideas that were, in the opinion of the team, good ideas but were, for any of several reasons, not selected for development and writeup as a formal recommendation. Design Suggestions, by definition, have not been developed (proven) through team development and writeups. The team presents these ideas for further consideration by the owner and designer.

Design Suggestions are also notes to the designer. These notes document various thoughts that come up during the course of the study. Some refer to possible problems. Some are suggested items that might need further study. Some are questions that the designer may want to explore. Many of these comments will most likely be things of which the designer is already aware. Because the study is done on a design in progress, there is never any way of knowing for sure the designer's intent. The comments are presented with the thought that they might aid the designer in some way.

DESIGN COMMENT #9

Flatten Fill Slope

In all areas where 2:1 slopes are used, consideration should be given to flattening the fill slopes. In section 3, it may be possible to use all the waste material (700,000 cm +/-) on the side slopes by flattening the slopes. Section 4 has approximately 8 million cm of waste. Section 5 is close to a balance job. Sections 6 and 6-A contain 8 to 9 million cm of waste. While the slopes should be flattened in all possible areas, a major waste area will also be required. Although flattening the slopes may increase right of way requirements and drainage cost, it is an effective method of wasting the material on site. The numbers shown herein were obtained by phone from the consultant and are totally independent of all other VE recommendations.

DESIGN COMMENT #10

Estimated Bridge Cost:

The Engineers estimated bridge cost is $4.5 million; the VE team's estimate was $8.5 million. The main difference is as follows:

The engineers estimate uses the unit price of $700 - $850 per square meter. The VE team used values of $700 - $1,505 per square meter and the longest bridges required the highest unit price due to their substructure heights. Also, the bridge over Pond Creek was increased in length from 400 - 800 meters to construct the abutments on solid rock instead of deep fill.

APPENDICES

The appendices in this report contains backup information supporting the body of the report, and the mechanics of the workshop. The following appendices are included:

CONTENTS

APPENDIX A

APPENDIX A - COST ESTIMATE

Pike County US 460
Section 3
Alternate C
16 Relocations
Sta. 6+180 to 8+200

Mainline

Excavation	$2,491,146	CM	$ 3.68	$ 9,167,417
Paving	$ 2,020	Meters	$1,194,61	$ 2,413,117
Bridges				$10,400,000
Drainage				$ 213,800
Misc.	$ 2,020	Meters	$ 466.94	$ 943.220
Mob. & Demob. (4.5%)				$ 1,041,190
Eng. & Conting. (15%)				$ 3,626,812
				$27,805,556

Shop Branch Approach

Excavation	$ 1,002	CM	$ 3.68	$ 3,687
Paving	$ 305	Meters	$ 452.04	$ 137,872
Drainage				$ 861,000
Misc.	$ 305	Meters	$ 116.74	$ 35,604
Mob. & Demob. (4.5%)				$ 46,717
Eng. & Conting. (15%)				$ 162,732
				$ 1,247,613

or

Shop Branch Bridge

Bridge	**$ 2,100,000**

Section 3 Alternative C (w/ bridge) Total **$29,905,556**

Pike County US 460
Section 4
Alternate C
29 Relocations
Sta. 8+200 to 11+700

Mainline

Excavation	9,117,289	CM	$ 3.68	$33,551,624
Paving	3,500	Meters	$1,194.61	$ 4,181,144
Drainage				$ 2,334,850
Misc.	3,500	Meters	$ 466.94	$ 1,634,292
Mob. & Demob (4.5%)				$ 1,876,586
Eng. & Conting. (15%)				$ 6,536,774
Total				**$50,115,270**

Appr. Lt. Sta. 8+524

Excavation	14,815	CM	$ 8.00	$ 116,920
Paving	300	Meters	$ 452.04	$ 135,612
Drainage				$ 11,500
Misc.	300	Meters	$ 116.74	$ 35,021
Mob. & Demob. (4.5%)				$ 8,196
Eng. & Conting. (15%)				$ 28,549
Total				**$ 335,798**

Appr. Rt. Sta. 8+960

Excavation	35	CM	$ 3.68	$ 129
Paving	287	Meters	$ 452.04	$ 129,735
Drainage				$ 11,500
Misc.	287	Meters	$ 116.74	$ 33,503
Mob. & Demob. (4.5%)				$ 9,310
Eng. & Conting. (15%)				$ 32,430
Total				**$ 248,627**

Appr. Lt. Sta. 9+060

Excavation	6,462	CM	$ 3.68	$ 23,780
Paving	419	Meters	$ 452.04	$ 189,405
Drainage				$ 50,000
Misc.	419	Meters	$ 116.74	$ 48,912
Mob. & Demob. (4.5%)				$ 14,044
Eng. & Conting. (15%)				$ 48,921
Total				**$ 375,062**

Appr. Rt. Sta. 11+120

Excavation	4,893	CM	$ 3.68	$ 18,006
Paving	327	Meters	$ 452.04	$ 147,817
Drainage				$ 22,058
Misc.	300	Meters	$ 116.74	$ 38,172
Mob. & Demob. (4.5%)				$ 10,172
Eng. & Conting. (15%)				$ 35,434
Total				**$ 271,660**

Section 4 Alternative C Total **$50,971,355**

Pike County US 460
Section 5
Alternate C
24 Relocations (East Interchange)
28 Relocations (West Interchange)
Sta. 11+700 to 14+700

Mainline

Excavation	4,766,601	CM	$ 3.68	$ 17,541,092
Paving	3,000	Meters	$1,194.61	$ 3,583,838
Drainage				$ 7,600,000
Misc.	3,000	Meters	$ 466.94	$ 739,304
Mob. & Demob. (4.5%)				$ 1,400,000
Eng. & Conting. (15%)				$ 4,838,097
Total				**$ 37,092,080**

KY 195 East Interchange

Excavation	1,418,171	CM	$ 3.68	$ 116,920
Paving - Ramp A	1,200	Meters	$ 937.70	$ 1,125,236
Paving - Ramp B	300	Meters	$ 937.70	$ 281,309
Bridge				$ 1,300,000
Drainage				$ 50,000
Misc.	1,500	Meters	$ 116.74	$ 175,103
Mob. & Demob. (4.5%)				$ 366,773
Eng. & Conting. (15%)				$ 1,277,594
Total				**$ 9,794,884**

KY 195 West Interchange

Excavation	19,482	CM	$ 3.68	$ 71,694
Paving - Ramp A	975	Meters	$ 937.70	$ 914,254
Paving - Ramp B	327	Meters	$ 937.70	$ 306,627
Bridge				$ 2,160,000
Drainage				$ 200,000
Misc.	1,302	Meters	$ 116.74	$ 151,989
Mob. & Demob. (4.5%)				$ 171,205
Eng. & Conting. (15%)				$ 596,365
Total				**$ 4,572,135**

Section 5 Alternate C East Interchange Total **$46,886,964**

Section 5 Alternate C West Interchange Total **$41,664,215**

Pike County US 460
Section 6
Alternate C
7 Relocations
Sta. 14+700 to 17+300

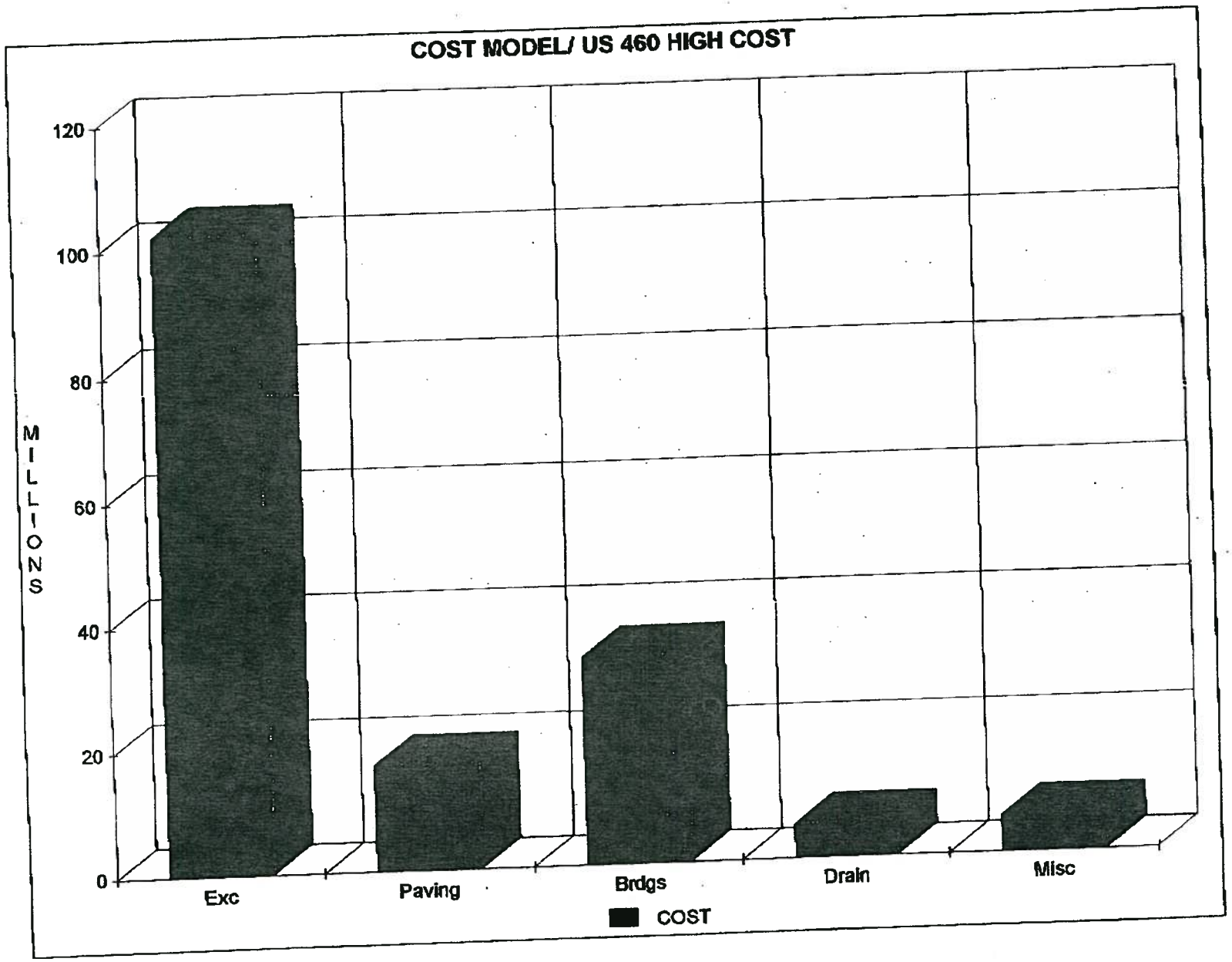
Mainline

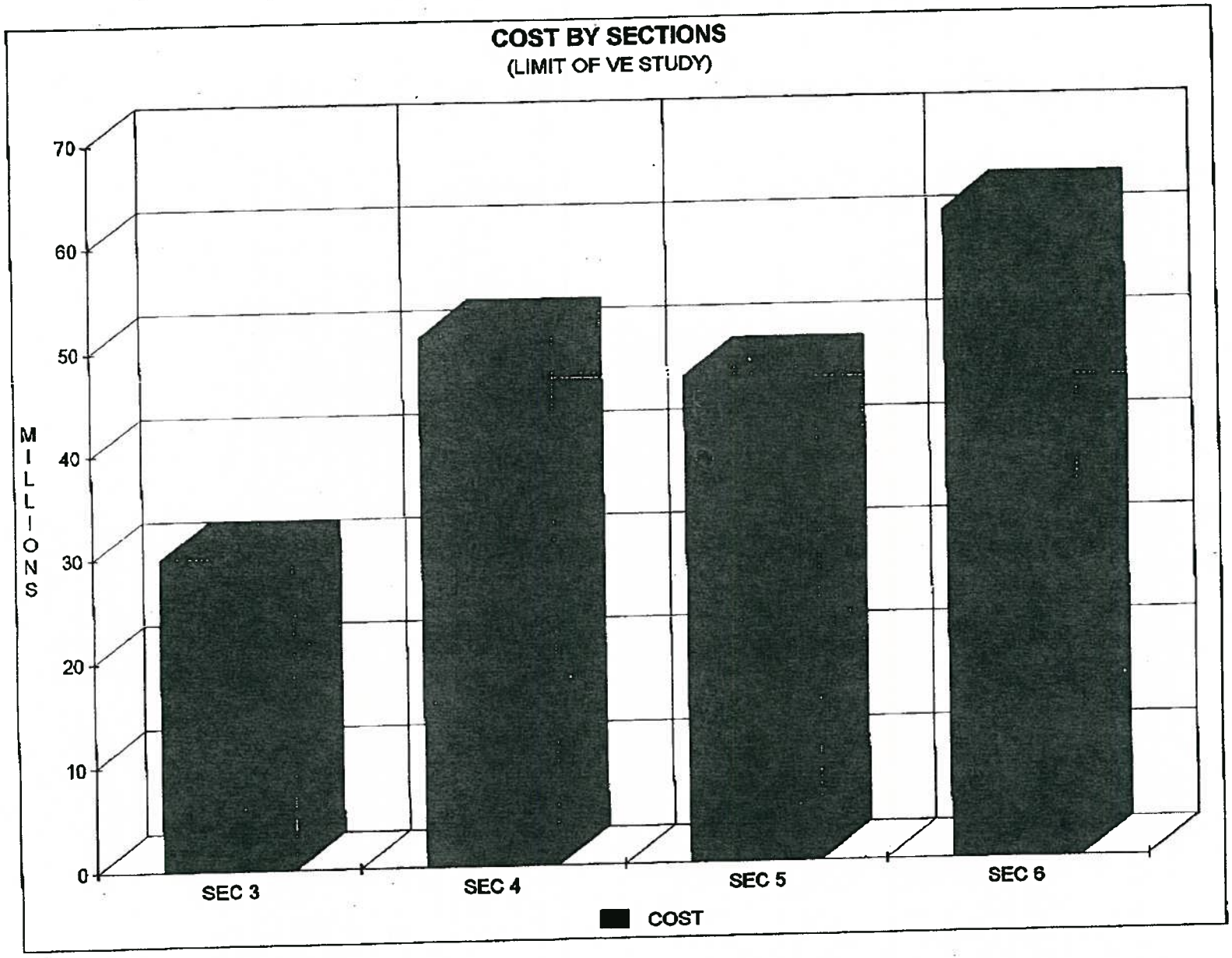
Excavation	1,418,171	CM	$ 3.68	$ 116,920
Paving	2,600	Meters	$1,194.61	$ 3,105,993
Bridges				$ 9,800,000
Drainage				$ 820,000
Misc.	2,600	Meters	$ 466.94	$ 1,214,046
Mob. & Demob. (4.5%)				$ 2,170,386
Eng. & Conting. (15%)				$ 7,560,177
Total				**$ 57,961,357**

Mainline

Excavation	9,046,401	CM	$ 3.68	$ 116,920
Paving	718		$ 563.90	$ 404,881
Drainage				$ 20,000
Misc.	718	Meters	$ 116.74	$ 83,816
Mob. & Demob. (4.5%)				$ 165,587
Eng. & Conting. (15%)				$ 576,793
Total				**$ 4,422,082**

Section 6 Alternate C Total **$62,383,438**


COST MODEL/ US 460 HIGH COST
120
100
80
60
40
20
0
MILLIONS
Exc
Paving
Brdgs
Drain
Misc
COST


COST BY SECTIONS
(LIMIT OF VE STUDY)
MILLIONS
70
60
50
40
30
20
10
0
SEC 3
SEC 4
SEC 5
SEC 6
COST

APPENDIX B

APPENDIX B - Function Analysis

As part of the "Information Phase" of the study, the team analyzed the high cost areas of the project, to identify high cost-low value items of the project to focus on during the study. It can be seen in the function analysis table below, that the major item for concern is the excavation and bridges, with a value index of 1.2 and 1.34 respectively (a value which exceeds 1.0 causes concern). The ream thus targeted "Excavation" and "Bridges" as the areas of focus for maximum savings and added value.

FUNCTION ANALYSIS, HIGH COST AREAS

ITEM	FUNCTION		COST	WORTH	C/W
	NOUN	VERB			
Excavation	Establish	Alignment	102.2	85.0	1.2
Paving	Support	Road	17.1	17.1	1.0
Bridges	Span	Obstacles	33.4	25.0	1.34
Drain	Move	Water	5.4	5.4	1.0
Misc.	Maintain Protect Provide Minimize	Traffic Motorists Safety Erosion	5.8	5.8	1.0

CREATIVE IDEA LIST

IDEA #	DESCRIPTION	DISPOSITION
1	Unassigned	----------
2	Raise grade 1 meter	VE Recommendation #2
3	Eliminate Pond Creek access road and raise Grade	Design Comment #3
4	Realign and raise grades in Section 4	VE Recommendation #4
5	Rotate bridge over Russell Fork	Design Comment #5
6	Combine the Two North access points on Section 4	VE Recommendation #6
7	Combine the approaches to create a full Interchange	VE Recommendation #7
8	Raise Culverts	Drop Idea
9	Flatten and fill slopes	Design Comment #9
10	Divert Pond Creek through tunnel and eliminate bridge.	VE Recommendation #10

ADVANTAGES/DISADVANTAGES

2) Raise Grade 1 meter

Advantages:

- Reduce Excavation
- Reduce Waste

Disadvantages:

- Increase Pipe Length
- Increase Bridge Height/Length
- Increase Approach Lengths

Conclusion: Continue Development

3) Eliminate Pond Creek Access RD & Raise Grade

Advantages:

- Reduce Excavation
- Reduce Waste
- Improve Safety
- Reduce Right-Of-Way Cost

Disadvantages:

- Increase Adverse Travel Distances
- Increase Bridge Length
- Eliminate Access Point

Conclusion: Do Not Continue

4) Realign & Raise Grades In Section 4

Advantages:

- Reduce Excavation
- Reduce Waste
- Increase Fill Areas

Disadvantages:

- None Noted

Conclusion: Continue Development

5) Rotate Bridge Over Russell Fork

Advantages:

- Decrease Bridge Length
- Reduce Excavation
- Reduce interference with mining operation
- Reduce Substructure Requirements

Disadvantages:

- Increase Drainage Problems
- Increase Maintenance Requirements
- May Increase Excavation

Conclusion: Do Not Continue

6) Combine Two North Access Points In Section 4

Advantages:

- Reduce Conflicting Movements
- Reduce Pavement

Disadvantages:

- None Noted

Conclusion: Continue Development

7) Combine Approaches To Create Full Interchange In Section 4

Advantages:

- Reduce Adverse Travel Distances
- Reduce Conflicting Movements

Disadvantages

- Increase Cost
- May Conflict With Cemetery

Conclusion: Continue Development

8) Raise Culvert

Advantages:

- Reduce Length
- Reduce Waste
- Reduce Structure Cost

Disadvantages:

- Requires Dissipating Devices
- May Require Additional Right-Of-Way

Conclusion: Do Not Continue

9) Flatten Fill Slopes

Advantages:

- Reduce Waste Area
- Reduce Guard Rail

Disadvantages:

- Increase Right-Of-Way

Conclusion: Continue Development

10) Divert Pond Creek Thru Tunnel; Minimize Mainline Bridge

Advantages:

- Eliminates Bridge
- Reduce Excavation
- Minimizes Waste

Disadvantages:

- Requires Revised EA
- Requires Additional Right-Of-Way
- More Relocations
- Potential Maintenance Problem

Conclusion: Continue Development

APPENDIX C

APPENDIX C - Study Reference Material/Consultants

APPENDIX C
STUDY REFERENCE MATERIAL/CONSULTANTS

REFERENCE DOCUMENTS	
DATE	TITLE
2-10-99	Draft Project Planning Report U.S. 460-From U.S. 23 to Virginia State Line Jan. '95
2-10-99	Environmental Assessment Pike County, KY and Buchanan County, VA US 460 Aug. '98
2-10-99	Determination of Benefit/Cost Ratio
1-28-99	Average Bid Prices for Projects Let in 1997
1-99	Pike County US 460 Preliminary Plans

CONSULTANTS .

CONSULTATION RECORD			
NAME	SUBJECT	ORG.	TELEPHONE
David Linderman	Sectional Balance	Palmer Engineering	(606) 744-1218
David Linderman	Approach @ Pond Creek	Palmer Engineering	(606) 744-1218
Randy Palmer	Bridges	Palmer Engineering	(606) 744-1218
Kevin Damron	Project	KYTC	(606) 433-7781
Paul Ross	Tunnel @ Pond Creek	Army Corps of Engineers	(615) 736-5685
David Linderman	@ briefing Alignment & Profile	Palmer Engineering	(606) 744-1218
Rick Lambert	Grade Comparison	Palmer Engineering	(606) 744-1218
Tom Hurt	Tunnel	KYTC	(606) 564-3280
Brad Hamblin	Bridge @ Pond Creek	KYTC	(606) 564-4870

APPENDIX D

APPENDIX D - Project Briefing/Presentation

APPENDIX D

ATTENDANCE
VE STUDY BRIEFING
PIKE COUNTY, KY
FROM GREASY CREEK TO KY 80 AT BELCHER
FEBRUARY 8, 1999

NAME	ORGANIZATION	TELEPHONE
Kevin Damron	KYTC-District 12	(502) 583-2723
Joette Fields	KYTC-Highway Design	(502) 564-3280
Benjamin Goodman	BRW-Chicago	(321) 461-0267
Rick Gortney	KYTC-District 12	(606) 433-7791
David Lindeman	Palmer Engineering, Inc.	(606) 744-1218
Dallas E. Montgomery	BRW-Hazelet & Erdal	(502) 583-2723
Charles Reichenbach	KYDOH-District 12	(606) 433-7791
George Schober	SDI Consultants	(630) 571-0353
Robert Semones	KYTC-Highway Design	(502) 564-3280
C.W. Seymour Jr.	BRW-Hazelet & Erdal	(502) 583-2723
Naresh Shah	KYTC	(502) 564-4560
Eddie Terry	KYDOH-District 10	(606) 666-8841
Joseph J. Waits	Dames & Moore	(334) 666-5892
James D. Wright	KYTC-District 12	(606)433-7791

VE Briefing

The presentation of the value engineering study was held in the offices of the Kentucky Transportation Cabinet, Frankfort, Kentucky, on Friday, 12 February, 1999, at 10:30 a.m.

The meeting was opened by Mr. Robert Semones, Value Engineering Coordinator, KYTC, who welcomed and introduced attendees, and the value engineering team.

Mr. Joseph J. Waits, Team Leader, Dames & Moore, moderated the presentation, which consisted of the following presentations:

Proposal	**Presenter**
Raise Grade 1 Meter	Eddie Terry
Realign and Raise Grades in Section 4	George Schober
Combine Approaches	George Schober
Divert Pond Creek	C. W. Seymour, Jr.
Eliminate Pond Creek Access	Ben Goodman
Design Comments	
Rotate Bridge	Dallas Montgomery
Flatten Slopes	Naresh Shah

After the presentation to the group, there was a question and answer period and a general discussion of the team's proposals. One item of discussion was the safety issues which might occur if the tunnel proposals were implemented and particularly the problem in keeping people out of the tunnel. One suggested idea during the study was a screen or protective device. This would have to be further analyzed and addressed by the design team during the design phase to eliminate any problems in this area.

It was generally agreed that the KYTC and Palmer Engineering, Inc. would further review the work of the value engineering team, and make an appropriate decision.

APPENDIX E

SUMMARY OF DECISIONS

Project: RECONSTRUCTION OF US 460
Location: PIKE COUNTY, KENTUCKY
Study Date: February 8 - 12, 1999

RECOMMENDATION		SAVINGS (or cost) of RECOMMENDATION (In Present Worth Amount Dollars)			BEST	DECISION		
Rec #	Recommendation Title / Description	resulting 1st cost savings (or cost)	O & M savings (or cost)	total LCC savings (or cost)	suggested best selection or combination	designer decision	owner decision	final decision
2	Raise Profile Grade 1 meter	$4,400,000	-0-	$4,400,000				
4	Realign and Raise Grade in Section 4	$8,006,475	-0-	$8,006,475				
6	Combine Two North Access Points in Section 4	($23,539)	-0-	($23,539)				
7	Combine Approaches to Create an Interchange in Section 4	($1,776,148)	-0-	($1,776,148)				
10	Divert Pond Creek Through Tunnel and Eliminate Bridge	$12,160,000	-0-	$36,507,000				

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END OF REPORT