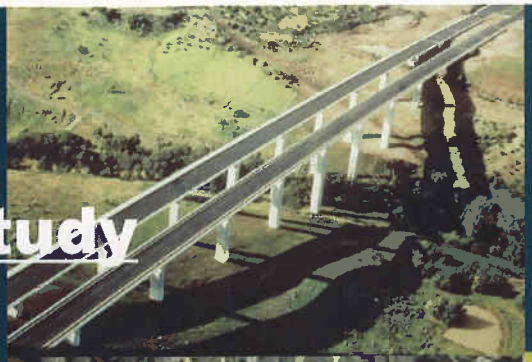
Value Engineering Study



FINAL REPORT

RECONSTRUCTION OF US 460
PIKE COUNTY, KENTUCKY
PHASE II
SECTIONS 7 THROUGH 9V

Study Date: March 29 - April 2, 1999

for

Kentucky Transportation Cabinet
Division of Transportation Planning
Frankfort, Kentucky

April 19, 1999

DCM GROUP

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

RECONSTRUCTION OF US 460
PIKE COUNTY, KENTUCKY

PHASE II
SECTIONS 7 THRU 9V

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

Study Date: March 29 - April 2, 1999

Final Report

April 19, 1999

Dames & Moore
A Dames & Moore Group Company

EXECUTIVE SUMMARY

This report documents the results of a value engineering study on the project: US 460, KY 80 to Kentucky-Virginia State Line. The study workshop was conducted at KYTC offices in Frankfort Kentucky, March 29 through April 2, 1999. The value engineering study team was from the firm Dames and Moore, under the leadership of a P.E./CVS team leader. The project design firm is Palmer Engineering, Lexington Kentucky. The project is under the management of the Kentucky Transportation Cabinet with the VE effort directed by the VE staff. An oral presentation of the study results was made to the KYTC and the design team on Friday, 2 April, 1999.

The value engineering team's task was to apply value engineering methodology to identify alternative proposals for performing project functions, to reduce costs without reduction in quality or customer satisfaction.

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 project will be constructed at a new location to correct existing deficiencies. The value engineering study encompassed only sections 7, 8, and 9V, 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 7 through 9V, is $131,012,392. The estimated cost of the total project, Sections 1 through 9, including improvements to existing KY 80, is $415,863,109.

Recommendations.
Recommendations for change to the design are put forth in this report. These recommendations represent, in the opinion of the study team, changes that will improve the overall project. A detailed writeup of each recommendation can be found in Section 3. Section 3 also includes a table that summarizes all recommendations.

Savings From Recommendations.
The study generated five (5) ideas, which were developed as recommendations to be submitted for consideration by the owner and design team. The total dollar amount represented by all five recommendations was $22,320,000. All listed recommendations can be accepted together, however, if both the bifurcation proposal (No. 2) and the raise profile proposal (No. 3) are chosen, then there will be some undetermined adjustment of excavation quantities due to overlap (although assumed to be minor).

Acknowledgments
The value engineering study tam was supported throughout the study by the Kentucky Transportation Cabinet and the design agent, Palmer Engineering, Inc.. The team is particularly appreciative to team member Bob Lewis, KYTC, and Rick Lambert, Palmer Engineering, for their participation and contributions, which added greatly to the successful outcome of the study. Also, the overall administrative assistance, guidance, and direction from the KYTC value engineering staff, Robert Semones and Joette Fields, was instrumental in the accomplishment of study goals and objectives and overall success of the study.

Team Members.

NAME	ORGANIZATION	TEL / FAX	LICENSE [PE, PA, PLA etc]	ROLE IN THIS STUDY
Joseph J. Waits	Dames and Moore	334-666-5892	P.E., CVS	Team Leader
Ben Goodman	Dames and Moore	312-461-0267	P.E.	Roadway Engineer
Dallas E. Montgomery	Dames and Moore/ BRW/Hazelet & Erdal	502-564-4556	P.E., LLS	Construction Engineer
C. W. Seymour, Jr.	Dames and Moore/ BRW/Hazelet & Erdal	502-583-2723	LLS	Right-of-Way Engineer
George Schober	Dames and Moore/ SDI Consultants	630-571-0353	P.E.	Traffic Engineer
Bob Lewis	KYTC	502-564-4780		Transportation Engineer
Robert Semones	KYTC			

TABLE OF CONTENTS

SECTION 1 - INTRODUCTION

This report documents the results of a value engineering study of the construction of US 460, Sections 7 through 9, in Eastern Kentucky. The study workshop was held at the offices of the Kentucky Transportation Cabinet, Frankfort, Kentucky, March 29 through April 2, 1999. At the time of the study the project was in the phase I design stage, prepared by the firm of Palmer Engineering, Lexington, Kentucky. The names and phone numbers of all participants in the study are listed in the appendix. Study materials furnished to the study team are also listed in the Appendix.

The Project.
The project as given to the study team is describe in Appendix-B

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.

The value engineering team applies value engineering concepts to the project, with the purpose to identify alternative means to preform functions at reduced costs. The team does not "second guess" or "criticize" the present design, but uses value engineering methodology and applied creativity to generate and develop potential alternatives in a very team oriented and organized approach. Under the leadership of a Certified Value Specialist (CVS) and Professional Engineer (PE), the team proceeds methodically through the VE job plan phases, identifying, testing, and developing proposals. The climax of the effort takes place on the 5th day, with the presentation of results to the management staff.

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 will 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, provided that portion of the

project was investigated. If a portion of the project is investigated, and no recommendation for change results from that investigation, then it can be assumed that the value team agrees with the design as originally presented.

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.

Boundary of the Study

There were no restraints placed on the VE team in the conduct of the study.

Study Objective

The study objective was to perform the study in strict conformance with accepted value engineering methodology and develop quality proposals for presentation to the Kentucky Transportation Staff.

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 an 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.

The team reviewed the estimate to make sure there was general acceptance and agreement as to meeting the requirements necessary for a VE Study. As a result of this review, the following conclusions were made:

Note that 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 thus selected, turns out to work in the manner expected, that idea is put forth 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 can be found in Section 3 of this report. A full list of all VE ideas generated in this study can be found in Appendix D.

Design Suggestions.
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 Comments". Documentation of all design suggestions is included in Section 5.

Summary of Decisions.
At the end of this report, in Appendix H, 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.

2.0 PROJECT DESCRIPTION

The proposed project is the construction of US 460 in Pike County Kentucky and Buchanan County Virginia. The subject value engineering study encompasses a segment which runs from US 80 to the Kentucky/Virginia state line, known as Sections 7, 8, and 9V. The existing roadway is a winding, two-lane facility with very narrow shoulders throughout it's length. The roadway 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.

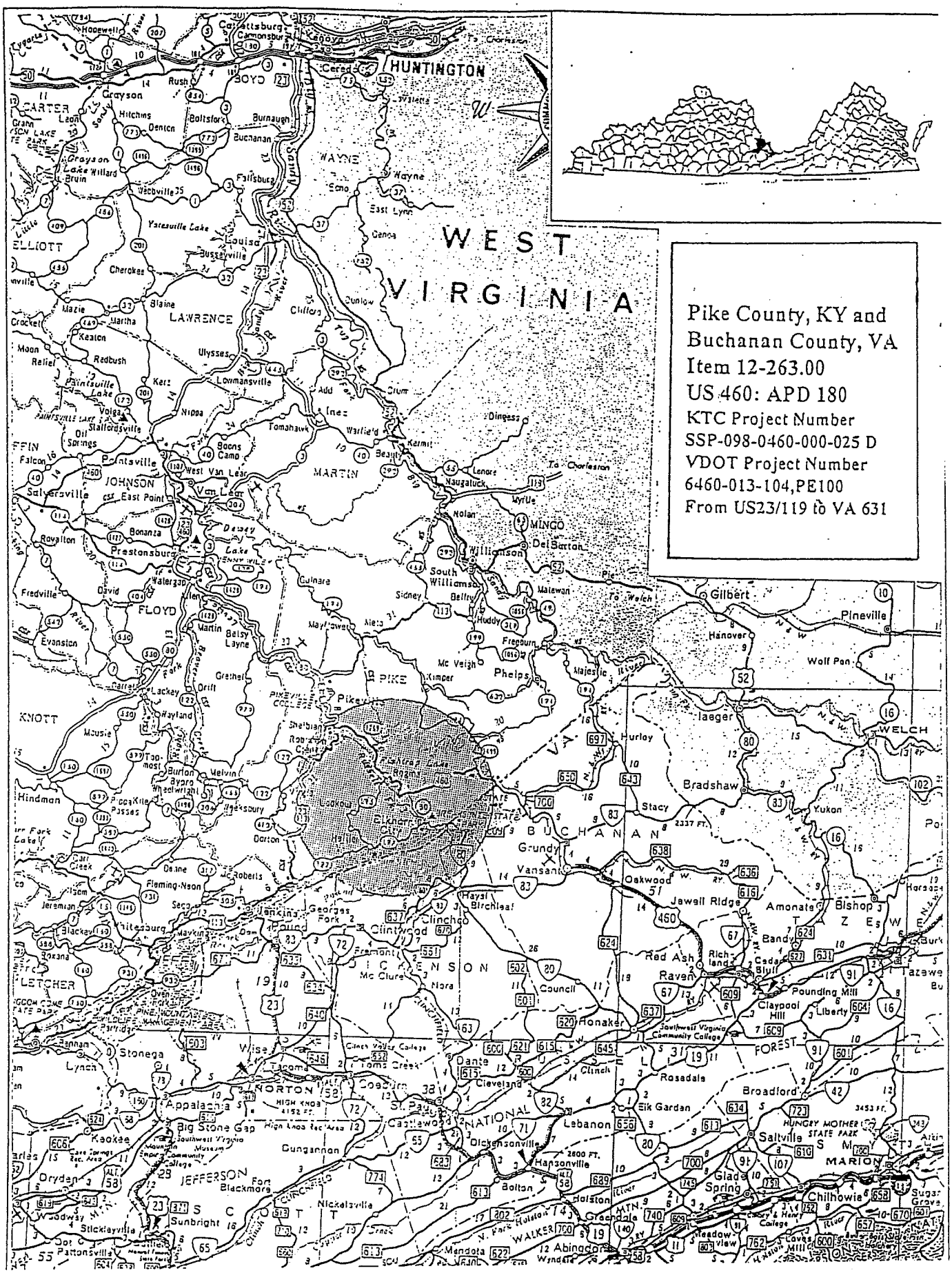
The proposed project would reconstruct the route principally on new location in order to correct existing deficiencies, avoid environmental impacts, and provide for traffic maintenance on the existing road during the construction period. The new road would continue to be on the National Highway System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

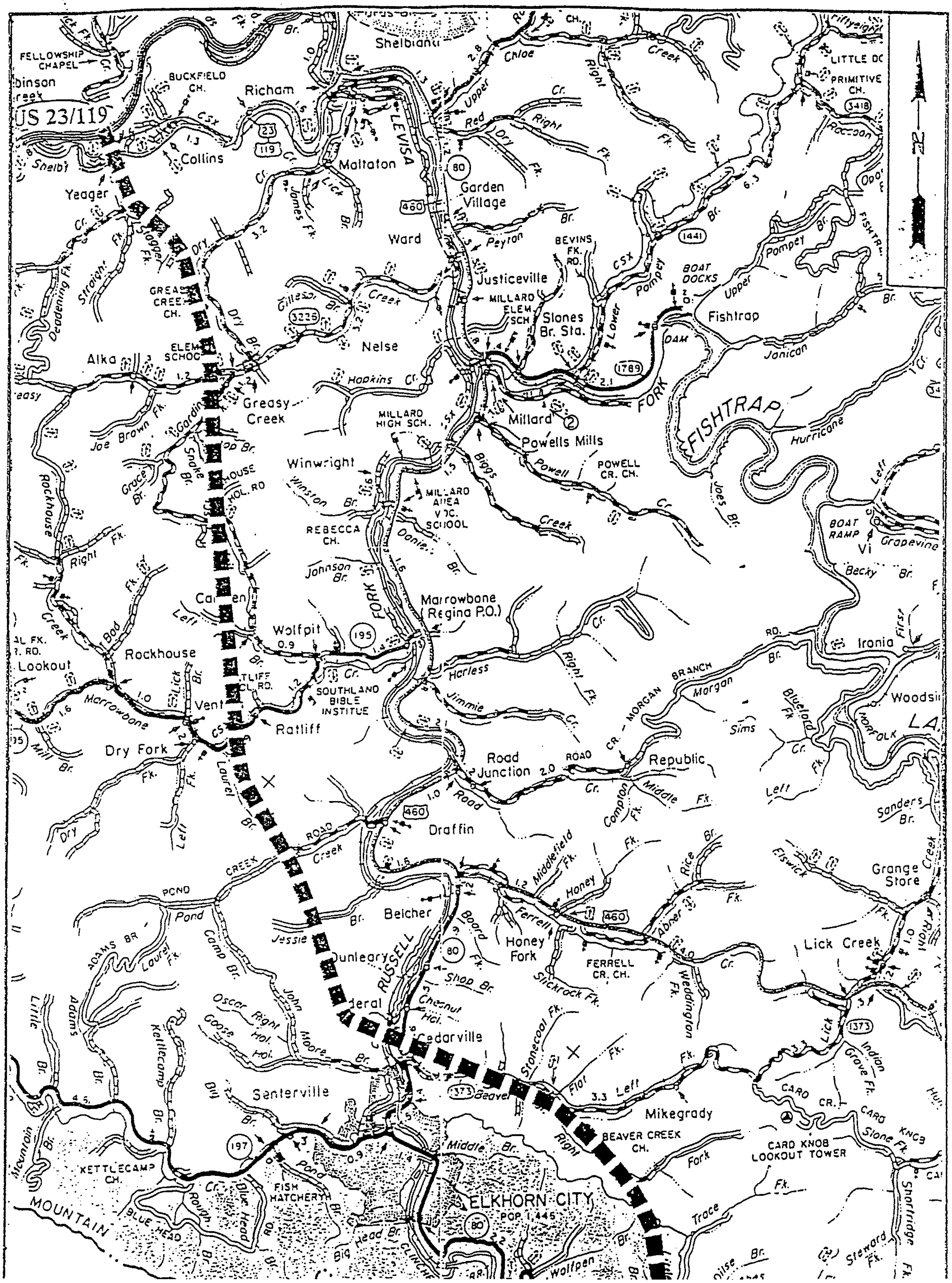
The overall US 460 project begins on the north at US 23/119 near the community of Yeager and extends southeasterly cross-country crossing KY 195 at midpoint, crossing Russell fork river and KY 80 near Cedarville and continuing to north of Elkhorn City. The project will cross the Virginia State line northeast 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.

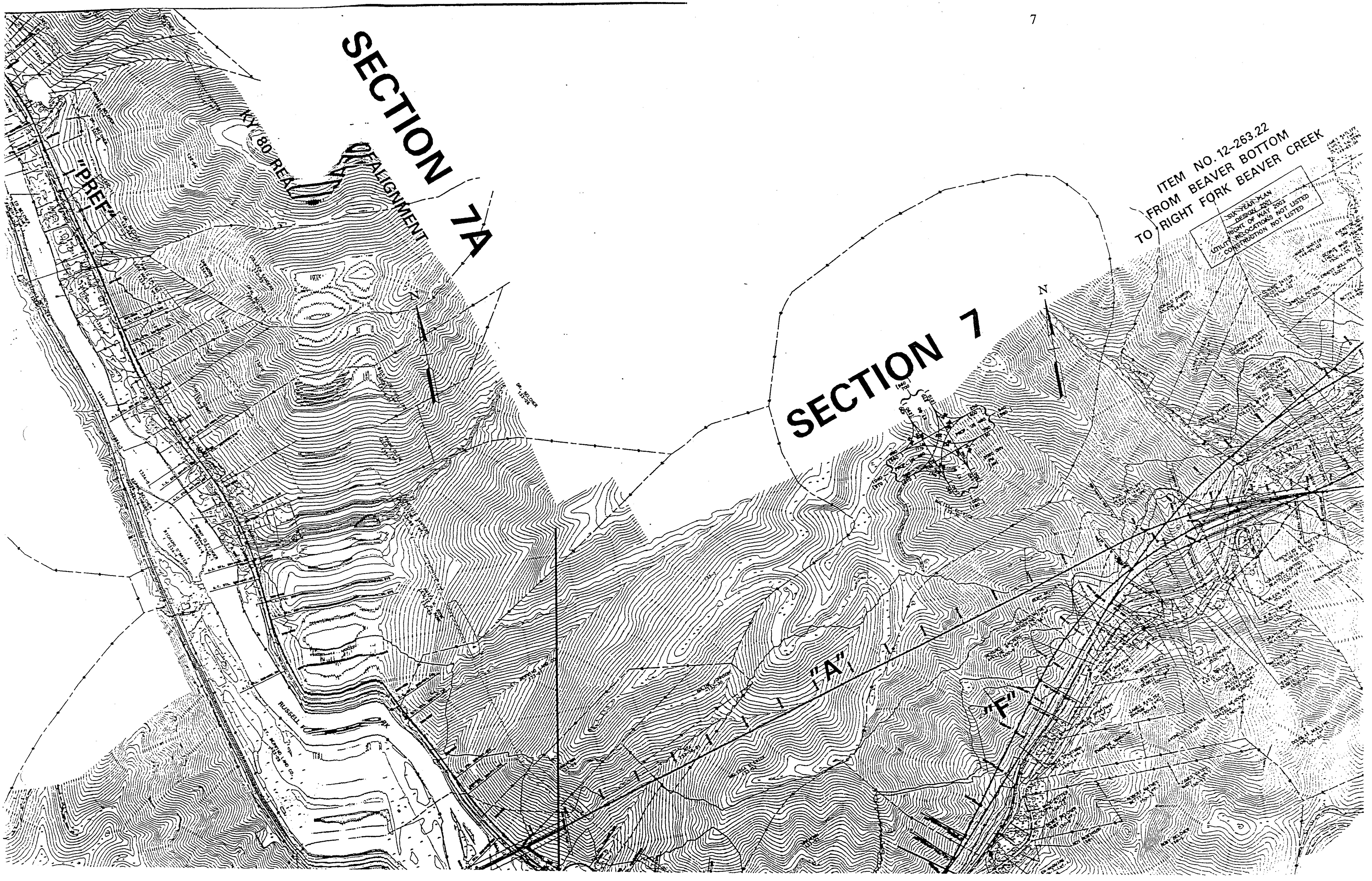
Although not a part of the VE study, the project will also include the reconstruction of KY 80 along the existing corridor between Elkhorn City and existing US 460 at Belcher, to provide an improved connection from new US 460 to old US 460.

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 only sections 7 through 9V, and extends from approximately Section 19+800 to Section 20 + 200.

The total cost of the segment under study by the VE team is $131,012,392.


HUNTINGTON
WEST VIRGINIA
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.
Collins
Maltaton
LEVISA
Garden Village
Yeager
Ward
Peyton
BEVINS FK. RD.
Justiceville
MILLARD ELEM SCH
Slones Br. Sta.
BOAT DOCKS
Fishtrap
DAM
Nelse
Alka
Greasy Creek
Hopkins Cr.
MILLARD HIGH SCH.
Millard
Powells Mills
POWELL CR. CH.
FORK
FISHTRAP
Hurricane
Winwright
REBECCA CH.
BOAT RAMP
Grapevine
Marrowbone (Regina P.O.)
Wolfpit
Rockhouse
Lookout
Vent
SOUTHLAND BIBLE INSTITUE
Ratliff
Dry Fork
Ironia
Woodsi
Road Junction
Republic
Draffin
Belcher
Honey Fork
FERRELL CR. CH.
Grange Store
Lick Creek
Dunleary
Cedarville
Senterville
Mikegrady
BEAVER CREEK CH.
CARD KNOB LOOKOUT TOWER
KETTLECAMP CH.
FISH HATCHERY
ELKHORN CITY
POP. 1,445
MOUNTAIN
RUSSELL
CSX


SECTION 7A
KY 80 REALIGNMENT
"PREF"
SECTION 7
ITEM NO. 12-263.22
FROM BEAVER BOTTOM
TO RIGHT FORK BEAVER CREEK
SIX YEAR PLAN
DESIGN 2001
RIGHT OF WAY 2003
UTILITY RELOCATIONS NOT LISTED
CONSTRUCTION NOT LISTED
"A"
"F"
N
RUSSELL FORK


SCALE 1:2000
"A"
"B"
"C"
"D"
"REF"
SECTION 8

ITEM NO. 12-263.24
FROM RIGHT FORK BEAVER CREEK
TO BREAKS INTERSTATE PARK

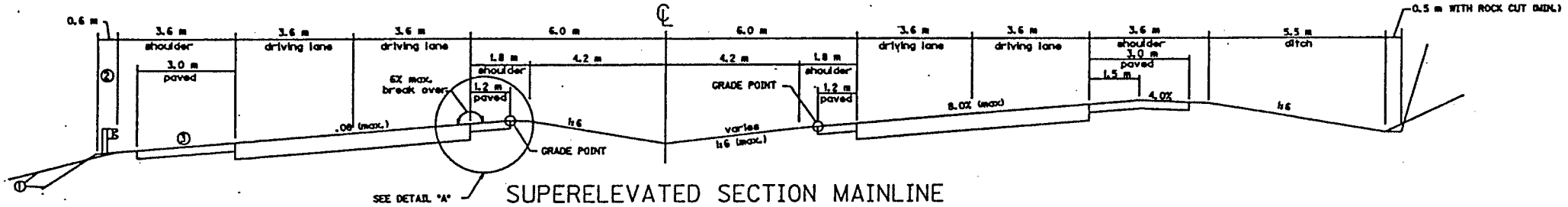
SIX YEAR PLAN
DESIGN 2003
RIGHT OF WAY NOT LISTED
UTILITY RELOCATIONS NOT LISTED
CONSTRUCTION NOT LISTED

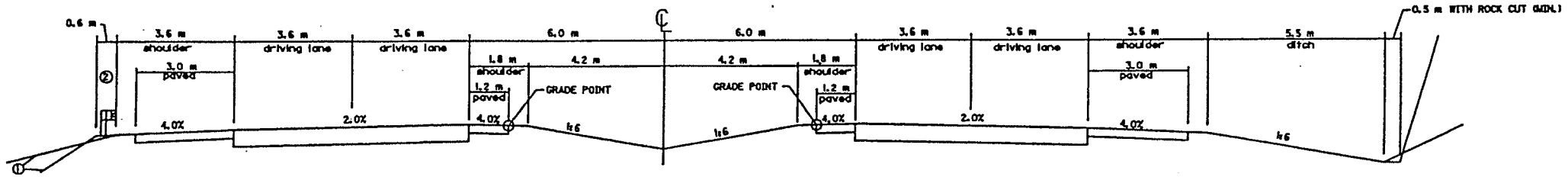
"A"

"PREF"

N

SECTION 9V

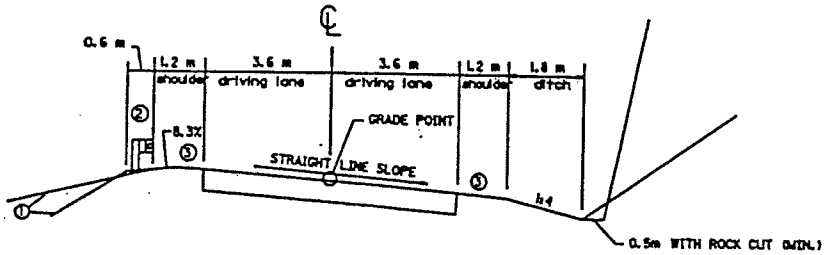




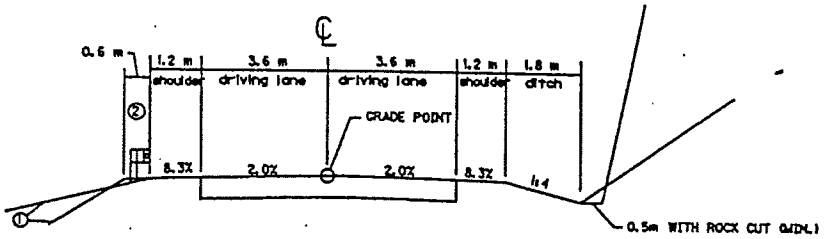
① SEE CROSS SECTIONS FOR SLOPES OUTSIDE THE LIMITS OF THE SHOULDERS

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%



SUPERELEVATED SECTION
APPROACH TYPICAL



NORMAL SECTION
APPROACH TYPICAL

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%

SECTION 3 - VE RECOMMENDATIONS

This section contains the complete team writeups of all recommendations to come out 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, 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.
All listed proposals can be accepted together, however , if both the bifurcation proposal (No.2) and the raise profile proposal (No. 3) are chosen, then there will be some undetermined adjustment of excavation quantities due to overlap, although assumed to be minor.

Summary of Recommendations.
The reader will find a table titled "Summary of Recommendations" on the following page. 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.

FORM: 5 SEP,. 1997

SUMMARY OF RECOMMENDATIONS

Project: Reconstruction of US 460, Phase II, Sectionss 7 thru 9V
Location: Pike County, Kentucky
Study Date: March 29 - April 2, 1999

DESCRIPTION			PRESENT WORTH AMOUNT					BEST
Rec .#	Idea I.D. #	Recommendation Title / Description	1st cost of original design	1st cost of recommen-dation	resulting 1st cost savings (or cost)	O & M savings (or cost)	total LCC savings (or cost)	suggested best selec-tion or combin-ation
1		Build Tunnel at grassy Greek	4,608,000	1,002,546	3,605,454	0	3,605,454	
2		Bifurcate sections	43,700,00	38,000,000	5,700,000	0	5,700,000	
3		Raise grade in selected areas	109,722,242	102,745,913	6,976,329	0	6,976,329	
4		Use barrier wall with 4 m shoulders in median in lieu of 12m depressed median in cut areas.	80,506,009	78,261,310	2,244,699	0	2,244,699	
5		Raise/shorten culvert	768,000	245,250	522,750	0	522,750	

LEGEND: LCC = life cycle cost = 1st cost + all use-costs (O & M) over the life of the project.
LCC savings = 1st cost savings (or adds) + all O & M cost savings (or adds) over the life of the project.
Note: savings in parenthesis "( )" = negative savings = an added cost.

VALUE ENGINEERING RECOMMENDATION #1

VALUE ENGINEERING RECOMMENDATION # 1

FORM 26 MARCH 1998

PROJECT: Pike County US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 3/29/99 through 4/2/99

TEAM MEMBER RESPONSIBLE FOR WRITEUP: George Schober

FUNCTION OF COMPONENT BEING CHANGED: Remove Water

DESCRIPTIVE TITLE OF RECOMMENDATION: Build Tunnel at Grassy Creek

ORIGINAL DESIGN:

See Attached Diagram.

The original design calls for the construction of a 20' by 12' box culvert, 1280 feet (390 meters) in length, to carry Grassy Creek beneath the proposed roadway embankment.

RECOMMENDED CHANGE:

See Attached Diagram.

Eliminate the proposed box culvert and replace with a 400 meter tunnel through the adjacent hillside. This alternative will also require 245 feet of channel realignment and a 15 meter box culvert under shallow fill.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present Worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$4,608,000	$0	$4,608,000
RECOMMENDED DESIGN	$1,002,546	$0	$1,002,546
ESTIMATED SAVINGS OR (COST)	$3,605,454	$0	$3,605,454

VALUE ENGINEERING RECOMMENDATION # 1

FORM 23 MARCH 1998

ADVANTAGES:

1. Reduces excavation
2. Improves water quality

DISADVANTAGES:

1. Requires revised environmental assessment

JUSTIFICATION:

The elimination of the culvert at this location will reduce the construction cost of the project, minimize future maintenance costs and lower the impacts to water quality during construction.

Since the cost of a culvert under approximately 55m of fill is relatively costly, replacing the culvert with a drilled tunnel will substantially reduce the cost of spanning the Grassy Creek.

The tunnel, which is structurally simple, will require little maintenance or inspection during its' life span.

Since the tunnel will not be constructed on the same alignment as the existing creek, it can be constructed with minimal impact to water quality. The construction of the proposed culvert may require a diversion channel and will be adjacent to embankment operations, making it susceptible to erosion and contamination from construction activities.

Furthermore, as noted in the Design Comment #1, the feasibility of constructing a box culvert under 55 meters of fill is questioned by the VE Study Team, as well as Transportation Cabinet staff. It is more feasible to construct the stream crossing using a bank of pipe culverts or a bridge. Both of these alternatives would be significantly more costly than the $4.6 million dollars estimated for this creek crossing. This fact further reinforces the need to look at alternatives, such as a drainage tunnel, to pass Grassy Creek through the proposed embankment.

VALUE ENGINEERING RECOMMENDATION # 1

FORM: 2 MARCH 1999

ENGINEERING CALCULATIONS

Tunnel Geometry Computations

	Diam. (m)	Area(m2)	Circumference (m)		
Tunnel Geometry	5.350	22.480	16.808	22.297	
Tunnel Length	400 Meters				
Channel Change	245 Meters				

Quantity Computations

		Length	Width	Height	Cross Sectional Area	Circumference	Num of Units
Alternate A, 20 meter vertical, 20 meter south							
Tunnel Excavation	Cu. m	400			22.480		8992
Rock Bolts	Lin. M	400					400
Shot Crete	Sq. M	400				16.808	6723
Channel Change	Cu. M	245	5.486	1.219	6.689		1639
Culvert (under north access road)	Cu. m (Conc.)	15	20	12	9.7536		146

Unit Cost Computations

Rock Bolt (previous Study)		$ 6.91	/Lin. ft (15 Dia. tunnel)
Circumference of 10 M culvert (in meters)		16.808	meters
Circumference of 15' dia. culvert (in meters)	4.572	14.363	meters
Circumference of 10 M dia. culvert / 15' dia. tunnel		1.170	
Cost of Rock Bolts per Lin/M for 10 M dia Tunnel (this Study)		$ 26.53	/Lin. M
Tunnel Excavtion (Previous Study)		$ 36.53	/Cu. Yd
Conversion Factor (Cu.Yd. to Cu. M)		1.308	
Tunnel Excavation (This Study)		$ 47.78	/Cu. M
Shot Creet (Previous Study)		$ 23.37	/Sq. Yd.
Conversion Factor (Sq. Yd. to Sq. M)		1.196029	
		27.9512	/Sq. M

VALUE ENGINEERING RECOMMENDATION # 1

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
Tunnel Excavation	Cu M	$47.78	9			8992
Rock Bolts	Lin M	$26.53	9			400
Shot Crete	Sq M	$27.95	9			6723
Channel Change	Cu M	$10.00	1,7			1639
Culvert (under north acess road)	Cu M (conc)	$300	1,7			146
Contingency	50%					
Box Culvert		$3,600	1	1280	$4,608,000	
Total					$4,608,000	

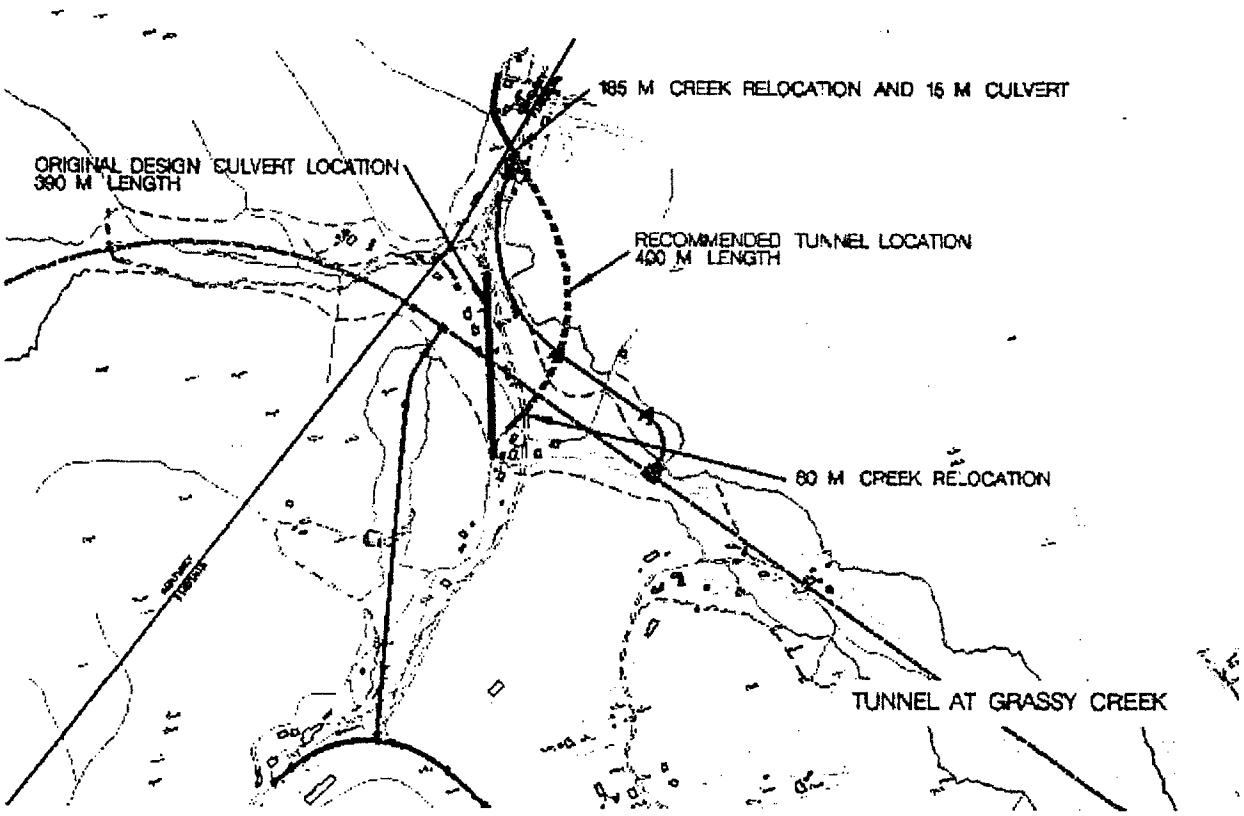
SOURCE CODE:

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 # 1

FORM: 23 MARCH 1998

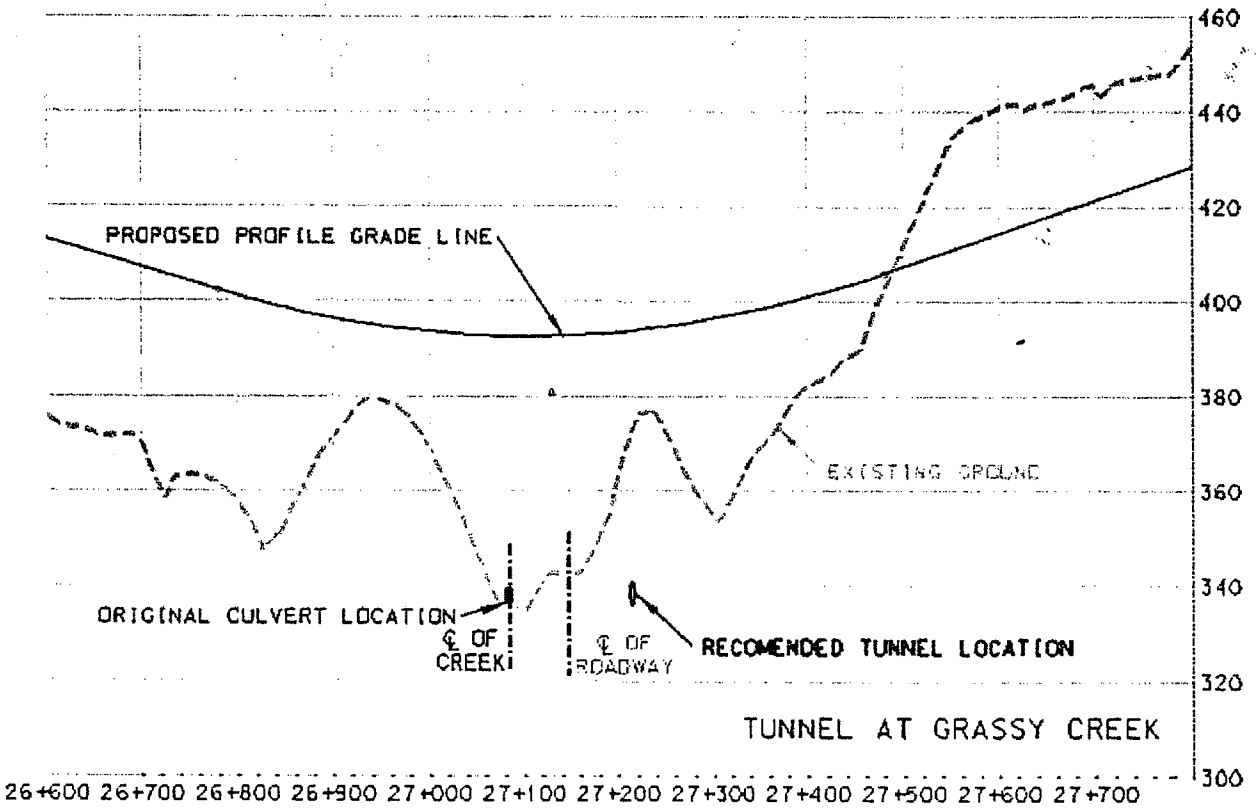
SKETCH OF RECOMMENDED DESIGN



VALUE ENGINEERING RECOMMENDATION # 1

FORM: 23 MARCH 1998

SKETCH OF RECOMMENDED DESIGN



VALUE ENGINEERING RECOMMENDATION #2

VALUE ENGINEERING RECOMMENDATION #2

FORM 26 MARCH 1998

PROJECT: Pike County US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 3/29/99 through 4/2 /99

TEAM MEMBER RESPONSIBLE FOR WRITEUP: C.W. Seymour, Jr. and George Schober

FUNCTION OF COMPONENT BEING CHANGED: Establish grade

DESCRIPTIVE TITLE OF RECOMMENDATION: Bifurcate sections

ORIGINAL DESIGN:

Four lane, divided highway with depressed median.

See attached sketch.

RECOMMENDED CHANGE:

Bifurcate east and west bound lanes, making one roadway higher than the other, and thereby reducing the excavation quantity.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present Worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$43,700,00		$43,700,000
RECOMMENDED DESIGN	38,000,000		38,000,000
ESTIMATED SAVINGS OR (COST)	5,700,000		5,700,000

VALUE ENGINEERING RECOMMENDATION #2

FORM 23 MARCH 1998

ADVANTAGES:

- Reduces excavation
- Enhances aesthetics

DISADVANTAGES:

- May require barrier or retaining wall.

JUSTIFICATION:

Bifurcation of the Alignment reduces the excavation and thereby the cost. While additional cost is required with the addition of a barrier wall, the net savings is substantial.

VALUE ENGINEERING RECOMMENDATION #2

FORM 23 MARCH 1998

DISCUSSION CONTINUED

Bifurcate Alignment

Between stations 22 + 225 to station 24 + 875 and station 26 + 740 to station 28 + 960, we propose raising the grade of the right (eastbound) lanes, approximately 10 meters but parallel to the 7.000% grade segment, in two different areas. Area one is from station 22 + 650 to station 24 + 575. Area two runs from station 27 + 130 to station 28 + 460 +/-. This would raise the eastbound lanes and reduce excavation cost. This recommendation will reduce the excavation quantity by approximately 1,800,000 Cubic Meters. There may be other areas where this bifurcation feature would apply. However, due to the relatively short time frame allowed for the VE study, only two areas were analyzed.

Two alternatives for bifurcation have been analyzed for cost savings opportunities. For alternative #1 the alignment of the eastbound lanes was raised 10 meters vertically along the originally designed horizontal alignment. For alternative #2 the alignment of the eastbound lanes was raised 10 meters vertically and shifted 10 meters to the south (and parallel) to the original design alignments. Alternative #1 although it will yield a greater savings, will reduce the safety characteristics of the roadway to some small degree. The safety characteristics of alternative #2 will have essentially the same safety characteristics as the original design.

VALUE ENGINEERING RECOMMENDATION #2

FORM: 2 MARCH 1999

ENGINEERING CALCULATIONS

Bifurcation Alternative #1

Area 1 = Station 22 + 650 to station 24 + 575 Length = 1925 meters

Area 2 = Station 26 + 725 to station 28 + 975 Length = 2250 meters

CUBIC METERS

	AREA 1	AREA 2	TOTALS
Study Excavation	7,412,379	4,474,624	11,887,003
Bifurcated Excavation	5,131,025	3,541,470	8,672,495

Reduction in excavation = 3,214,508

2 x 1600 + 2 x 2225 = Required length of barrier wall = 7640 meters

Saving:

3,214,508 x $3.68 = 11,829,389 (Excavation)
7640 x $312/m = - 2,383,680 (Barrier wall)

TOTAL NET SAVINGS of Alternative #1 = $9,445,709

VALUE ENGINEERING RECOMMENDATION #2

FORM: 2 MARCH 1999

ENGINEERING CALCULATIONS

Bifurcation Alternative #2

Area 1 = Station 22 + 650 to station 24 + 575 Length = 1925 meters

Area 2 = Station 26 + 725 to station 28 + 975 Length = 2250 meters

Computed by Average Area Method:

STATION	END AREA	VOLUME
	Sq. M.	Cu. M.
22+225	0	
		71875
22+800	250	
		342000
24+168	250	
		88375
24+875	0	
	Total AREA 1 =	**502,250**

STATION	END AREA	VOLUME
	Sq. M.	Cu. M.
26+740	0	
		92500
27+480	250	
		105000
27+900	250	
		132,500
28+960	0	
	Total AREA 2 =	**330,000**

For second estimate, the length of Barrier Wall is estimated as follows:

24+650
-22+425
2,225 = length of Barrier Wall Required in Area 1

And

28+600
-27+000
1,600 = length of Barrier Wall Required in Area 2

Therefore:

2,225
+1600
3,825 = Total Length of Barrier Wall Estimated (Cost = 312$/M)

Total Reduction in Excavation = (502,500+330,000) or 832,500 Cu. M.

832,500 x $3.68 = 3,063,600

Less the Cost of the Barrier Wall Required = 3,825 x $312 = - 1,200,000

NET SAVINGS Alternative #2 = $ 1,863,600 (This Est)

Bifurcation Alternative #1 yields a savings of $9,400,000 and Alternative #2 yields a savings of $1,900,000. For the purpose of this study we have estimated an average savings of approximately $5,700,000 for the recommendation to Bifurcate the roadways.

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	Cu. M.	3.68	1	11,887,003	43,744,171	10,088,242	37,124,731
Barrier Wall	M.	312.00	KYTC			4870	1,519,440
TOTAL					43,744,171		38,644,171

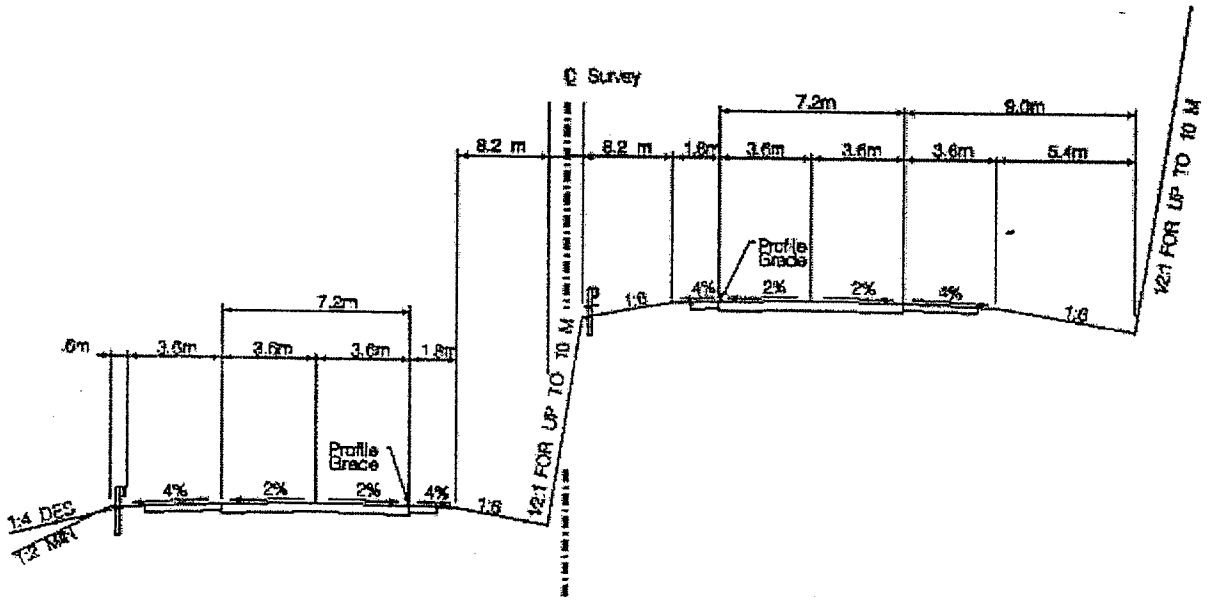
SOURCE CODE:

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

FORM: 23 MARCH 1998

SKETCH OF RECOMMENDED DESIGN

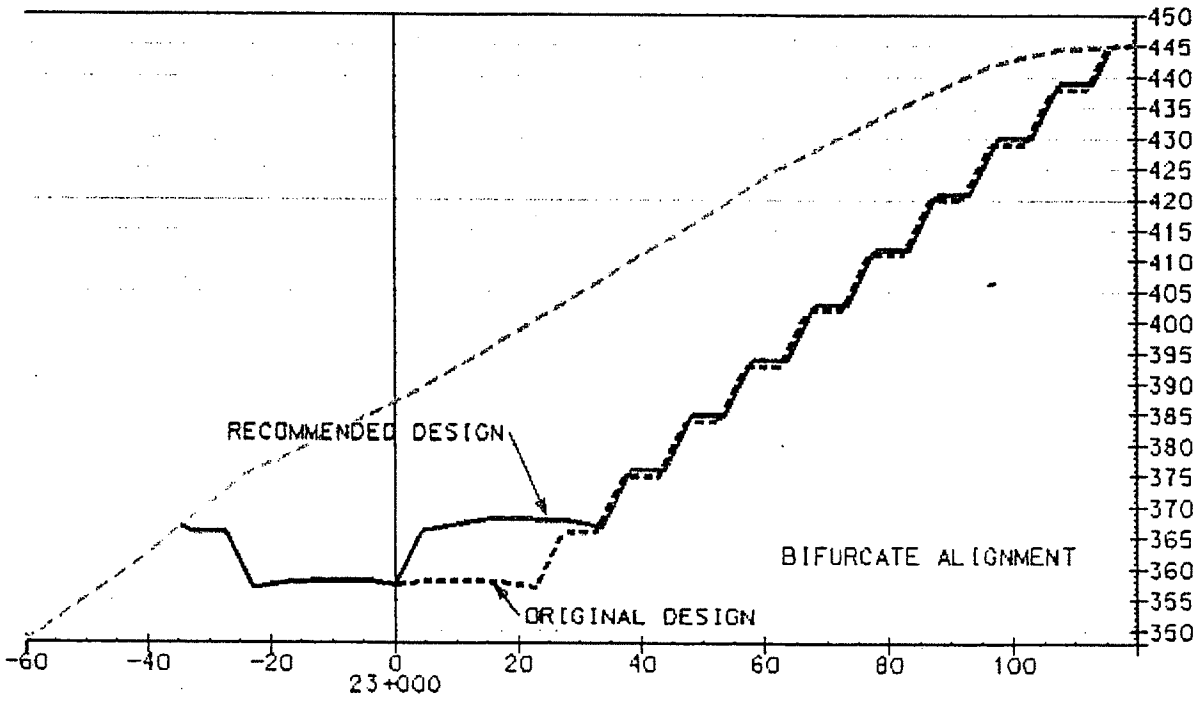


RECOMMENDED TYPICAL SECTION
BIFURCATED ALIGNMENT

VALUE ENGINEERING RECOMMENDATION # 2

FORM: 23 MARCH 1998

SKETCH OF RECOMMENDED DESIGN



VALUE ENGINEERING RECOMMENDATION #3

VALUE ENGINEERING RECOMMENDATION #3

FORM 23 MARCH 1998

PROJECT: Pike County US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 3/29/99 through 4/2 /99

TEAM MEMBER RESPONSIBLE FOR WRITEUP: Ben Goodman

FUNCTION OF COMPONENT BEING CHANGED: Alignment

DESCRIPTIVE TITLE OF RECOMMENDATION: Raise grade in selected areas.

ORIGINAL DESIGN:

Utilizes vertical alignment grades varying from minimum 1.5 % to a maximum of 7 %.

RECOMMENDED CHANGE:

Raise profile by approximately 2.0 m between stations 20 + 400 and 24 + 500, and by approximately 5-6 m between stations 24 + 500 and 26 + 100, and by 2.0 - 2.5 m between stations 26 + 450 and 28 + 960.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present Worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$109,722,242		$109,722,242
RECOMMENDED DESIGN	102,745,913		102,745,913
ESTIMATED SAVINGS OR (COST)	6,976,329		6,976,329

VALUE ENGINEERING RECOMMENDATION #3

FORM 23 MARCH 1998

ADVANTAGES:

- Reduces excavation
- Reduces waste

DISADVANTAGES:

- Potential increase in bridge length by approximately 8 meters.
- Increase culvert length.
- May require short retaining walls.

JUSTIFICATION:

Provides $6.97 million in potential savings in excavation and reduces waste by approximately3.5 million cubic meters without adversely affecting drainage and profile.

VALUE ENGINEERING RECOMMENDATION #3

FORM: 2 MARCH 1999

ENGINEERING CALCULATIONS

Revisions to vertical alignment are made by Ben Goodman. Quantities for comparing the revised grade with the original proposed grade provided for by Rick Lambert of Palmer Engineering.

VALUE ENGINEERING RECOMMENDATION #3

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	3.68	1	22,730,297	83,647,493	20,808,526	76,575,375
Bridge	Lsum		1		16,100,000		16,530,000
Retaining Walls	Lsum		7				300,000
Subtotal					99,747,493		93,405,376
Cont.		10%			9,974,749		9,340,537
TOTAL					109,722,242		102,745,913

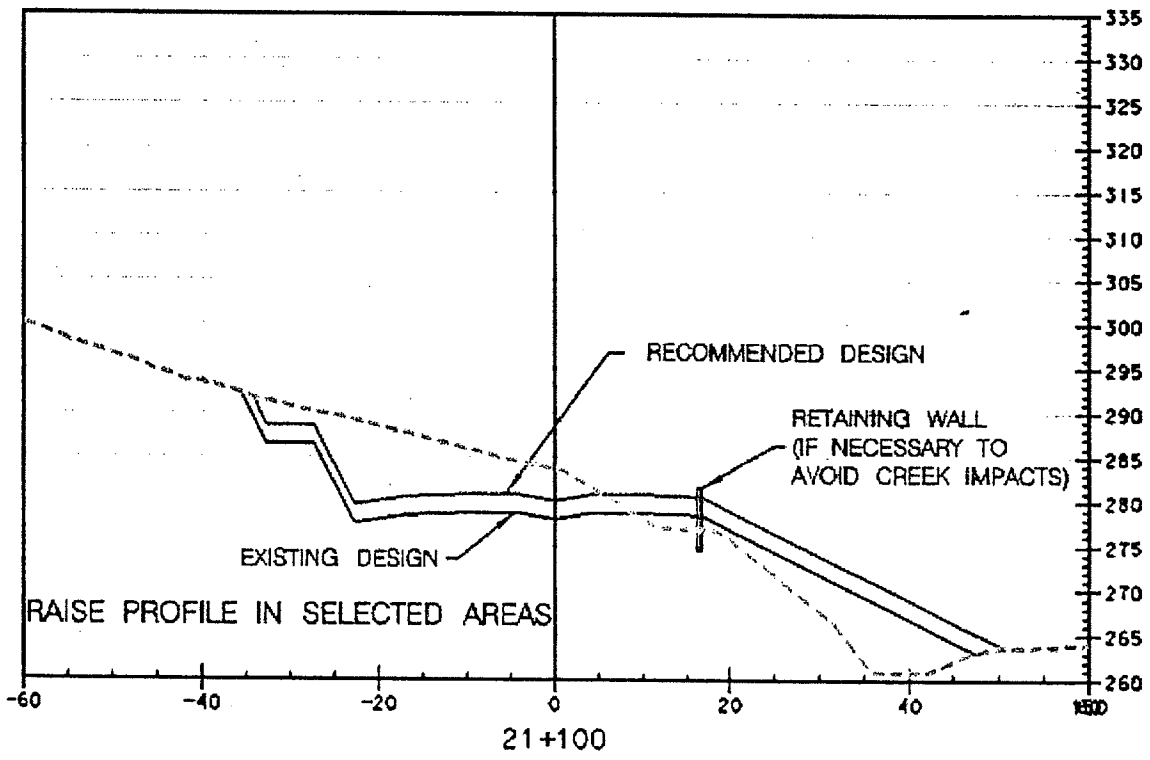
SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Richardsons
6 Vendor Lit or Quote (list name/details)
7 Professional Experience
8 Other sources (specify)

8 = Average 1998 Construction Costs from Bridge Office

VALUE ENGINEERING RECOMMENDATION # 3

FORM: 23 MARCH 1998

SKETCH OF ORIGINAL AND RECOMMENDED DESIGN



VALUE ENGINEERING RECOMMENDATION #4

VALUE ENGINEERING RECOMMENDATION #4

FORM 23 MARCH 1998

PROJECT: Pike County US 460
LOCATION: Pike County, Kentucky
STUDY DATE: 3/29/99 through 4/2 /99
TEAM MEMBER RESPONSIBLE FOR WRITEUP: Bob Lewis

FUNCTION OF COMPONENT BEING CHANGED: Separate traffic
DESCRIPTIVE TITLE OF RECOMMENDATION: Use barrier wall with 4 m shoulders in median in lieu of 12m depressed median in cut areas.

ORIGINAL DESIGN:

Original design has 12 meter median with 1.2 meter paved shoulder adjacent to left driving lane. The median is depressed on 1:6 slope. The unpaved portion of median is turf.

RECOMMENDED CHANGE:

Recommended change is 8 meter median with 1.2 meter paved shoulder adjacent to left driving lane. The median will be separated with concrete barrier wall. Remaining shoulder in front of barrier median will be paved with DGA. This revised section in proposed is major cut areas and will require crash cushions at transition to fill sections.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present Worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$80,506,009		$80,506,009
RECOMMENDED DESIGN	78,261,310		78,261,310
ESTIMATED SAVINGS OR (COST)	2,244,699		2,244,699

VALUE ENGINEERING RECOMMENDATION #4

FORM 23 MARCH 1998

ADVANTAGES:

- Reduced excavation
- Reduced waste
- Positive separation
- Reduced maintenance (mowing)

DISADVANTAGES:

- Increases shoulder surfacing (DGA)
- Aesthetics

JUSTIFICATION:

Using barrier wall in major cut areas reduces excavation by 981,000 cubic meters. 5500 meters of barrier wall with crash cushion and 9400 metric ton of DGA will be needed. Net savings is $2,200.000.

VALUE ENGINEERING RECOMMENDATION #4

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	3.68	1	21,876,633	80,506,009	20,895,322	76,894,785
Conc.Med. Barrier 350	M	180.00	8			5461	982,980
DGA 4.8m	Met. Ton	17.00	8			9385	159,545
Crash cushion	EA	28,000	8			8	224,000
TOTAL					80,506,009		78,261,310

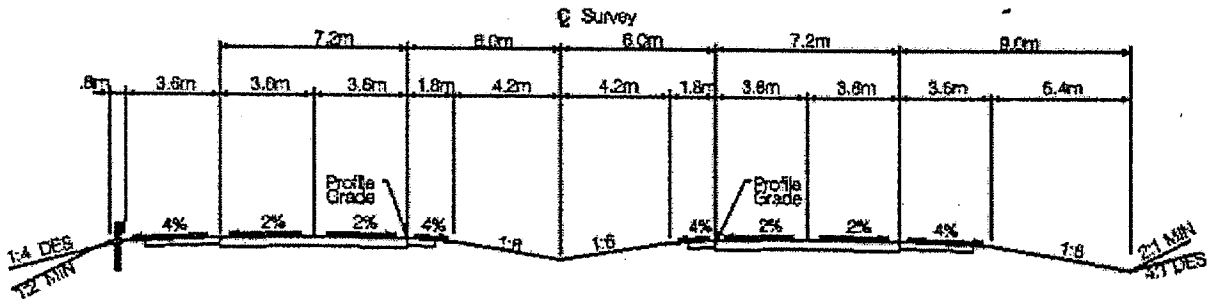
SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Richardson's
6 Vendor Lit or Quote (list name/details)
7 Professional Experience
8 Other Sources (specify)

8 = Average 1998 Construction Costs from Bridge Office

VALUE ENGINEERING RECOMMENDATION # 4

FORM: 23 MARCH 1998

SKETCH OF ORIGINAL DESIGN



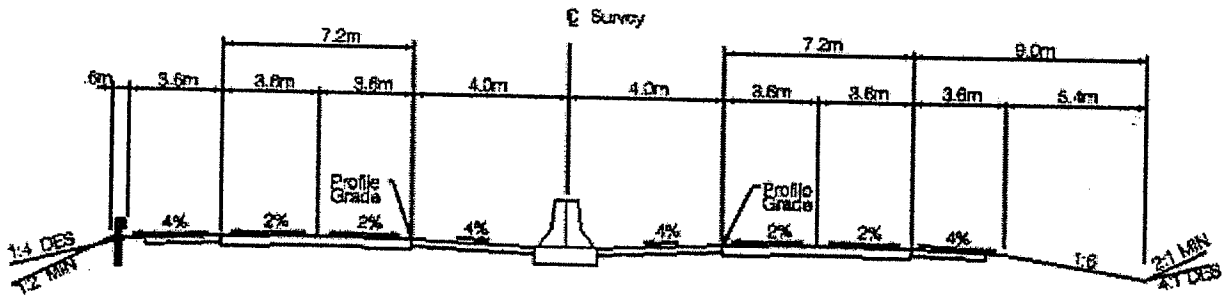
TYPICAL SECTION

Depressed Median

VALUE ENGINEERING RECOMMENDATION # 4

FORM: 23 MARCH 1998

SKETCH OF RECOMMENDED DESIGN



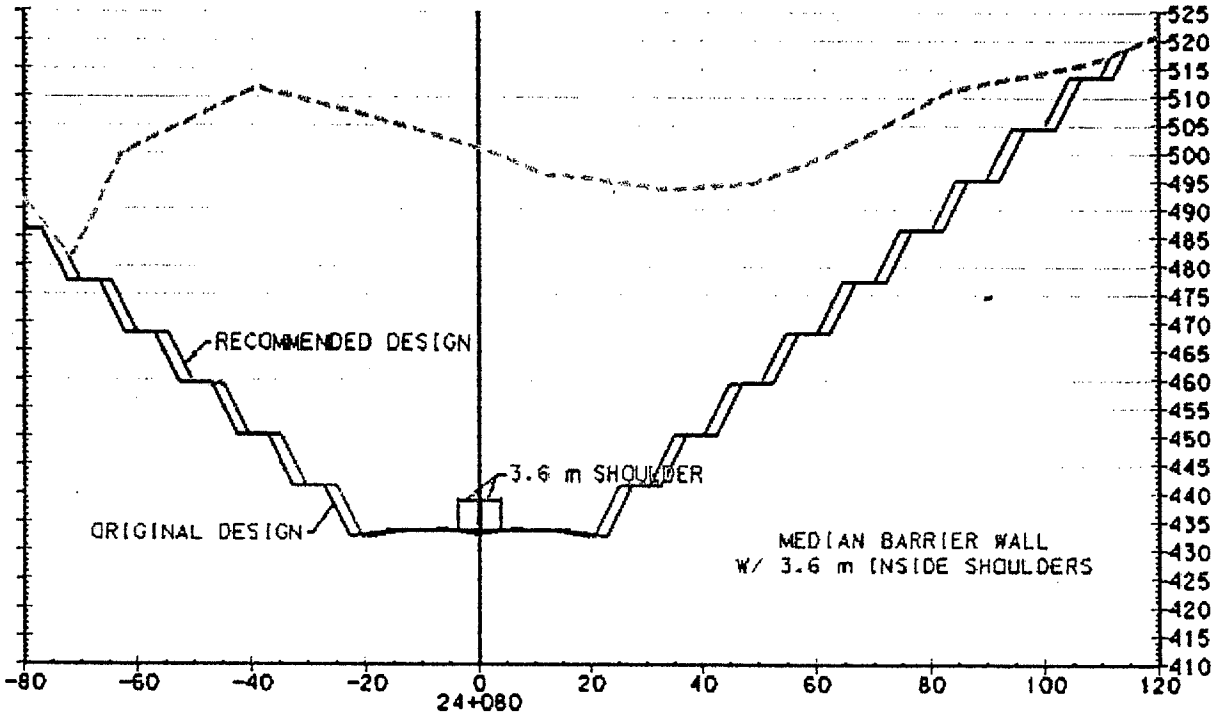
TYPICAL SECTION

Barrier Median

VALUE ENGINEERING RECOMMENDATION # 4

FORM: 23 MARCH 1998

SKETCH OF ORIGINAL AND RECOMMENDED DESIGN



VALUE ENGINEERING RECOMMENDATION #5

VALUE ENGINEERING RECOMMENDATION #5

FORM 23 MARCH 1998

PROJECT: Pike County US 460

LOCATION: Pike County, Kentucky

STUDY DATE: 3/29/99 through 4/2 /99

TEAM MEMBER RESPONSIBLE FOR WRITEUP: C.W. Seymour, Jr.

FUNCTION OF COMPONENT BEING CHANGED: Removes water.

DESCRIPTIVE TITLE OF RECOMMENDATION: Raise/shorten culvert.

ORIGINAL DESIGN:

Culvert located in natural stream bed with approximately 61 meters (200 feet) of fill in hollow.

RECOMMENDED CHANGE:

The area on the inlet (North) side of the culvert will be used as a waste area, raising the ground elevation to 440+/- (metric). Due to the filling in this area, the channel will require realignment. An energy dissipater will be required at the outlet of the culvert to handle the drop discharge. This realignment will offer the opportunity to construct the culvert at a significantly higher elevation within the embankment allowing it to be shortened.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present Worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	$768,000		$768,000
RECOMMENDED DESIGN	245,250		245,250
ESTIMATED SAVINGS OR (COST)	522,750		522,750

VALUE ENGINEERING RECOMMENDATION #5

FORM 23 MARCH 1998

ADVANTAGES:

- Shortens culvert
- Reduces construction time

DISADVANTAGES:

- Requires energy dissipation at outlet.
- Increased maintenance at outlet

JUSTIFICATION

The area on the left or north side of this culvert will be used for a waste area. This hollow will be filled , thus raising the stream flow line. This will allow the culvert to be raised and shortened. The original design cost of $768,000 per 1280 feet of Box Culvert gave a price of $600.00 per linear foot of Box. The savings will be reduced because an energy dissipating device will be required at the outlet end of the raised culvert. Waste embankment is proposed to elevation 440+/- (metric) on the culvert entrance end. The new raised culvert will be 95 meters long, thus saving $657,750. However, we estimate the cost of the energy dissipating device at $133,920. The results in a net savings of $522,750 for value engineering recommendation #5.

VALUE ENGINEERING RECOMMENDATION #5

FORM: 2 MARCH 1999

ENGINEERING CALCULATIONS

Original design culvert length = 1280' @ $600/l.f or $768,000

New culvert (same size-shorter)

Since culvert does not required the same wall thickness as before use $350/l.f.

Therefore:

315 l.f. (Scaled from x-section)
315 x $350 = $110,250

Gabion baskets will be required at outlet (discussed with KY Transportation Cabinet staff)

1116 cu. m - estimated down side slope
1116 cu. m x $120/cu.m = $135,000
+ 110,250
Cost of new culvert = $ 245,250

Savings = $768,000 - 245,250 = $522,750

VALUE ENGINEERING RECOMMENDATION #5

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 $
10' x 4' RC Box	L.F.	600	1	1280	768,000		
10' X 4' RC Box	L.F.	350	7			315	110,250
GABION BASKETS	CM	120	PALMER			1116	133,920
TOTAL					768,000		244,170

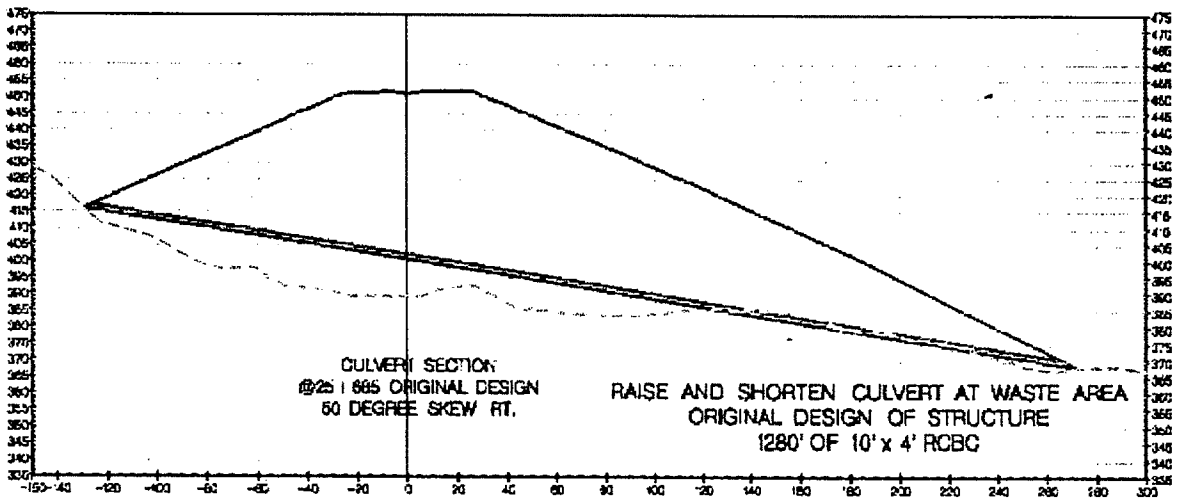
SOURCE CODE:
1 Project Cost Estimate
2 CES Data Base
3 CACES Data Base
4 Means Estimating Manual
5 Ricahrdson's
6 Vendor Lit or Quote (list name/details)
7 Professional Experience
8 Other Sources (specify)

8 = Average 1998 Construction Costs from Bridge Office

VALUE ENGINEERING RECOMMENDATION # 5

FORM: 23 MARCH 1998

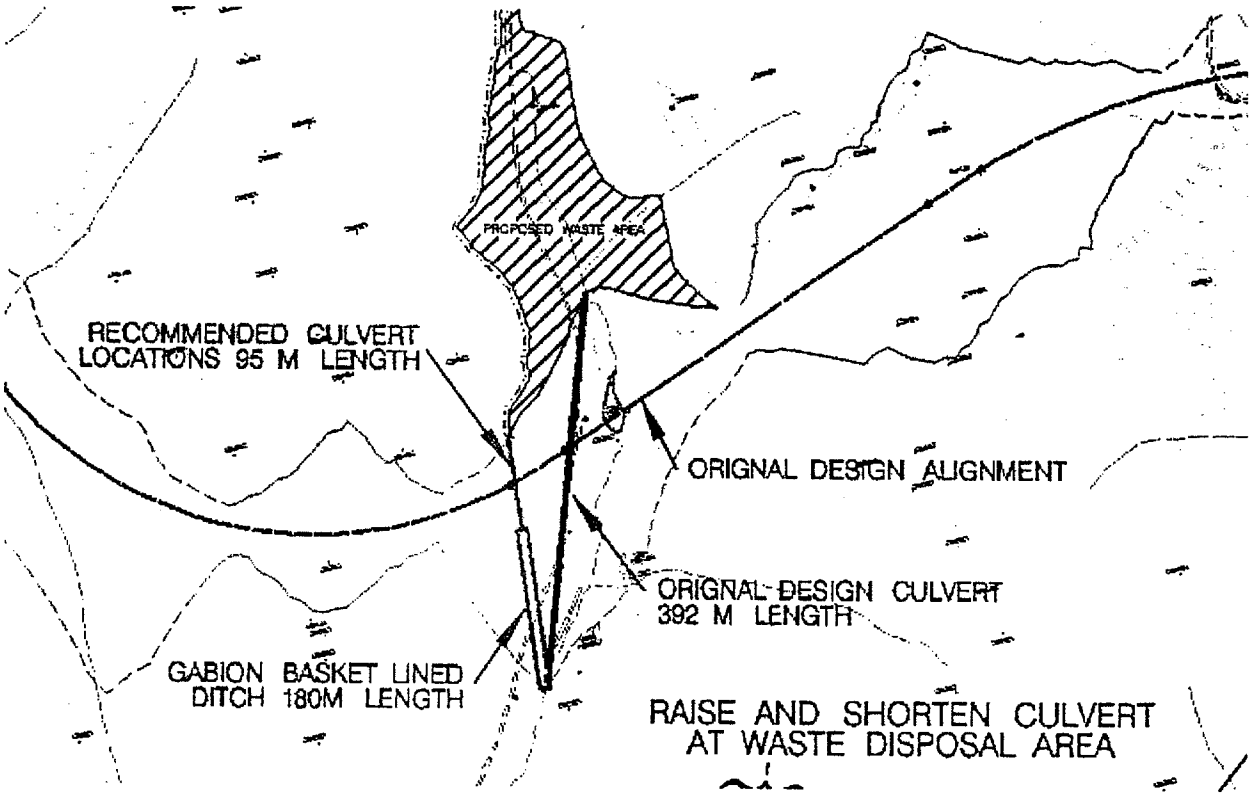
SKETCH OF ORIGINAL DESIGN



VALUE ENGINEERING RECOMMENDATION # 5

FORM: 23 MARCH 1998

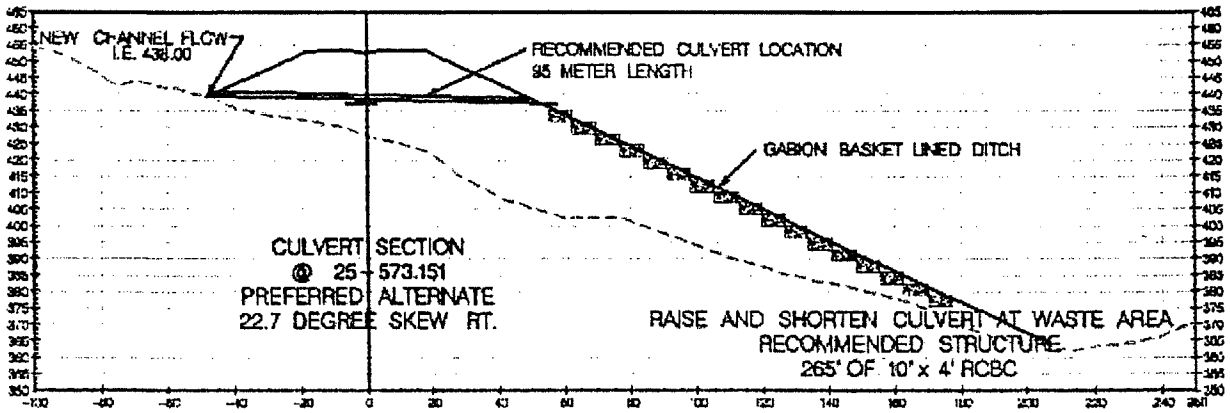
SKETCH OF ORIGINAL AND RECOMMENDED DESIGN



VALUE ENGINEERING RECOMMENDATION # 5

FORM: 23 MARCH 1998

SKETCH OF RECOMMENDED DESIGN



SECTION 3 - DESIGN COMMENTS.

Design Comments are 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 might 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, in any event, with the thought that there might be a few comments that aid the designer in some way.

DESIGN COMMENT #1

Replace Box Culverts with Pipe Culverts in excessive fills:

There are several locations along the proposed alignment where box culverts are proposed beneath fills of 50 to 60 meters. The VE team's judgement and conversations with Transportation Cabinet staff suggest that box culverts should not be constructed beneath fills of this depth. Appropriately designed pipe culverts are better able to withstand these loads since the load is more evenly distributed along the entire surface of the culvert. Of course, an appropriately thick and completely compacted bedding layer for the pipe culvert must also be provided to insure that the load is distributed evenly across the surface of the pipe. In the event that the pipe culvert fabrication or the number of pipe required cause the cost of the proposed culvert to be excessive, a bridge should be considered to span the existing waterway.

APPENDICES

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

CONTENTS

APPENDIX A
Participants

Appendix A documents those persons who participated in the workshop by name, organization and telephone number. Also included is a listing of team members and the attendance sheets.

FORM 20 FEB, 1998

Workshop Attendance

Attendees				Participation							
				Meetings			Study Sessions(1)				
Name	Organization and Address (Organization first, with complete address underneath)	Tel # and FAX. (Tel first with FAX underneath)	Role in wk shop	Intro	Mid Wk Rev	Out Brief	Day 1	Day 2	Day 3	Day 4	Day 5
Joseph J. Waits, P.E., CVS	Dames and Moore	334-666-5892		x		x	x	x	x	x	x
Ben Goodman, P.E.	Dames and Moore	312-461-0267		x		x	x	x	x	x	x
Dallas E. Montgomery, P.E., LLS	BRW/Hazelet & Erdal/ Dames and Moore	502-564-4556					0	x	0	0	0
C. W. Seymour, Jr., LLS	Dames and Moore	502-583-2723		x		x	x	x	x	x	x
George Schober, P.E.	SDI Consultants	630-571-0353		x		x	x	x	x	x	x
Joette Fields	KYTC- Highway Design	502-564-3280		x		x					
Ron Rister	KYTC C.O. Operations	502-564-4556									
Rick Gortney	D-12 Design	606-433-7791									
Bill Chaney	D-12 Construction	606-433-7791									
David Lindeman	Palmer Engineering	606-744-1218									
Bob Lewis	KYTC	502-564-4780		x		x	x	x	x	x	x
Robert Semones	KYTC			x		x					

Attendees Role in this workshop (column 4 of the form). Use more than one description if appropriate.

C = Consultant Cl = Client D = Designer DM = Design Manager FM = Facility Manager FO = Facility Operator
Ob = Observer Ow = Owner PM = Project Manager PrM = Program Manager TM = Team Member
U = User

Note: (1) X = Present most of the day. O = Present, but not most of the day. Blank = not present that day.

APPENDIX B.
Cost Information.

Pike County US 460
Section 9

3/26/99

17 Relocations
Sta. 27+300 to 29+590

Mainline				
Excavation	4,314,866	CM	$3.68	$15,878,707
Paving	2290	Meters	$757.41	$1,734,476
Drainage				$5,884,400
Misc.	2290	Meters	$466.94	$1,069,294
Mob. & Demob. (4.5%)				$1,105,509
Eng. & Conting. (15%)				$3,850,858
Total				**$29,523,244**
Appr. Lt. Sta. 27+800 (VA 610)				
Excavation	116,056	CM	$3.68	$427,086
Paving	650	Meters	$352.87	$229,366
Drainage				$20,000
Misc.	650	Meters	$116.74	$75,878
Mob. & Demob. (4.5%)				$33,855
Eng. & Conting. (15%)				$117,928
Total				**$904,112**
Appr. Rt. Sta. 27+370 (80 Connector)				
Excavation	392,542	CM	$3.68	$1,444,555
Paving	720	Meters	$352.87	$254,067
Drainage				$20,000
Misc.	720	Meters	$116.74	$84,049
Mob. & Demob. (4.5%)				$81,120
Eng. & Conting. (15%)				$282,569
Total				**$2,166,360**
VA 80 Realignment				
Excavation	0	CM	$3.68	$0
Paving	413	Meters	$352.87	$145,735
Drainage				$20,000
Misc.	413	Meters	$116.74	$48,212
Mob. & Demob. (4.5%)				$9,628
Eng. & Conting. (15%)				$33,536
Total				**$257,111**
Appr. Rt. Sta. 28+320 (VA 631)				
Excavation	538	CM	$3.68	$1,980
Paving	410	Meters	$352.87	$144,677
Drainage				$20,000
Misc.	410	Meters	$116.74	$47,861
Mob. & Demob. (4.5%)				$9,653
Eng. & Conting. (15%)				$33,626
Total				**$257,797**

Total **$33,108,624**

Pike County US 460
Section 8

3/26/99

7 Relocations
Sta. 21+540 to 24+100

Mainline

Excavation	7,119,165	CM	$3.68	$26,198,527
Paving	2560	Meters	$757.41	$1,938,977
Bridge				$3,600,000
Drainage				$813,000
Misc.	2560	Meters	$466.94	$1,195,368
Mob. & Demob. (4.5%)				$1,518,564
Eng. & Conting. (15%)				$5,289,666
Total				**$40,554,102**

Total **$40,554,102**

Pike County US 460
Section 7

3/26/99

24 Relocations
Sta. 19+000 to 21+580

Mainline				
Excavation	4,495,197	CM	$3.68	$16,542,325
Paving	2580	Meters	$757.41	$1,954,126
Bridges				$16,100,000
Drainage				$188,360
Misc.	2580	Meters	$466.94	$1,204,707
Mob. & Demob. (4.5%)				$1,619,528
Eng. & Conting. (15%)				$5,641,357
Total				**$43,250,403**
Ramp Lt. Sta. 19+900 (KY 80)				
Excavation	1,282,666	CM	$3.68	$4,720,211
Paving	505	Meters	$561.72	$283,667
Drainage				$20,000
Misc.	505	Meters	$116.74	$58,951
Mob. & Demob. (4.5%)				$228,727
Eng. & Conting. (15%)				$796,734
Total				**$6,108,290**
Ramp Rt. Sta. 20+340 (KY 80)				
Excavation	1,318,094	CM	$3.68	$4,850,586
Paving	411	Meters	$561.72	$230,866
Bridge				$1,500,000
Drainage				$20,000
Misc.	411	Meters	$116.74	$47,978
Mob. & Demob. (4.5%)				$299,224
Eng. & Conting. (15%)				$1,042,298
Total				**$7,990,952**

Total **$57,349,645**

APPENDIX C.
Function Analysis.

FUNCTION ANALYSIS

ITEM	FUNCTION NOUN	FUNCTION VERB	COST	WORTH	C/W
Excavation	Establish	Grade	70.1	60.0	1.17
Paving	Supports	Load	6.9	6.9	1.0
Bridges	Span	Obstacles	21.2	18	1.18
Drainage	Remove	Water	7.0	7.0	1.00
Misc.	Control Provide	Erosion Safety	3.8	3.8	1.00
M & B			4.9	4.9	1.00
Eng./Cont.			17.1	17.1	1.00

APPENDIX D.
Creative Idea List and Evaluation.

FORM 25 AUG, 1997

List of CREATIVE IDEAS			
Idea Category:			
ID #	**Name of Idea / description**	**Value Potential**	**To be Developed**
1	Build tunnel at grassy creek		x
2	Bifurcate in Section 8		x
3	Raise profile, sta 24 + 300, 26 + 400		x
4	Barrier wall in lieu of depressed medians at selected locations		x
5	Raise and shorten culvert at waste disposal area		x

ADVANTAGES/DISADVANTAGES

1. Build tunnel at grassy creek

   Advantages:

   Reduces cost

   Improves water quality

   Disadvantages:

   Requires environmental assessment

   Conclusion-continue development

2. Bifurcate in Section #8

   Advantages:

   Reduces excavation

   Enhances aesthetics

   Disadvantages:

   May require barrier or retaining walls

   Conclusion-continue development

3. Raise profile in selected areas

   Advantages:

   Reduces excavation

   Reduces waste

Disadvantages:

Increases length of drainage structure

Conclusion-continue development

4. Use barrier wall in lieu of depressed median at selected locations

Advantages:

Reduce excavation

Reduce waste

Positive separation

Reduced maintenance

Disadvantages:

Increases surfacing

Reduced aesthetics

Conclusion-continue development

5. Raise and shorten culvert at waste disposal area

Advantages:

Reduces cost of construction

Disadvantages:

Requires energy dissipation

Increase maintenance

Conclusion-continue development

APPENDIX E.
Project Briefing.

Briefing

The project briefing was held on Monday, 29 March, 1999, 9:30 AM, in the offices of District 12 in Pikeville, Kentucky.

Robert Semones opened the meeting, welcoming attendees and explaining the task to be accomplished by the VE team during the weeklong study. He then introduced Joe Waits, Dames and Moore Team Leader, who briefed the group on the VE process and the goals and objectives of the VE team. He emphasized that it was the team's intention to identify potential proposals which would reduce the cost of the project, but still maintain project function and the desired quality and customer satisfaction. He further explained that the team would not "second guess" or criticize the design team.

David Lindeman, Palmer Engineering, explained the project the group, and discussed the design rationale and background which has led the design team to the current solution. The project is currently in Phase I, with project letting in the year 2003. The Right of Way aquisition activities were projected to begin in 2001. The Virginia DOT had done little on the project at the interface and Palmer was doing preliminary work on Section 9V, which would also be looked at by the VE team. David answered questions by the VE team relative to Utilities, Environmental Impacts, Maintenance of traffic, and other issues.

The group was then taken on a tour of the site to get a first-hand feel for the terrain and the proposed structure locations.

The meeting was concluded at 2:30 PM and the VE team returned to Frankfort to resume study activities at KYTC offices on Tuesday.

PIKE COUNTY
US 460 FROM KY 80 TO THE KENTUCKY- VIRGINIA STATE LINE
V. E. STUDY BRIEFING
MARCH 29, 1999

	NAME	AFFILIATION	PHONE
1	Joe Waits	DAMES & MOORE	(334) 666-5897
2	George Schober	SDI Consultants	(630) 571-0353
3	Joette Fields	KYTC - Highway Design	502-564-3280
4	Richard Simmons	"	"
5	Ben Goodman	BRW/DAMES & MOORE	(312) 461-0267
6	C.W. SEYMOUR, JR.	BRW HAZELET & ERDAL	(502) 583-2723 EXT 330
7	Ron Rister	KYTC C.O. OPERATIONS	502-564-4556
8	DAVID LINDEMAN	PALMER ENGINEERING	606-744-1218
9	Rick Gortney	D-12 DESIGN	606-433-7791
10	Bill Chaney	D-12 Const	606-433-7791

APPENDIX F.
Project Presentation.

Presentation Conference
Pike County, Kentucky
Reconstruction of US 460
Phase II, Sections 7 thru 9V
April 2, 1999

A presentation conferece for the subject value engineering study was held on the 1st floor training room of the KYTC headquarters in Frankfort, Kentucky at 10:00am on Friday, April 2, 1999. The meeting was opened by Robert Semones, who welcomed the attendees and expressed his appreciation for their attendance participation in the VE program. He introduced attendees and explained the project goals for the VE study. Joe Waits, team leader for the study, explained the VE process and the team activities for the week long study. He emphasized that there was much for the team to do in the 5-day compressed schedule, which prevented the development of as much detail as the team would like. However, he pointed, the team did have sevearl potentially "value adding" ideas to present which could result in impressive savings. He expressed thanks to the design team and the value engineering staff for a job well done.

Each of the five recommendations as well as the list of design comments were presented by team members. A discussion followed, with the team answering questions to clarify proposals.

PIKE COUNTY
US 460 FROM KY 80 TO THE KENTUCKY- VIRGINIA STATE LINE
V. E. STUDY PRESENTATION
APRIL 2, 1999

NAME	AFFILIATION	PHONE
Joe Waits	Amec & Moore	334 666-5892
Bob Lewis	KYTC Const	502-695-5495
C.W. SEYMOUR, JR.	BRW HAZELET & ERDAL	502 583-2723 EXT 330
Rick Lambert	Palmer	606 744 1218
Joette Fields	KYTC Highway Design	564-3280
George Schuler	SDI Consultants	630-571-0353
Robert Simons	KYTC Highway Design	502-564-3280
Kenny Barrett	KYTC "	502-564-3280
Ananias Calvin III	" "	" " "
John Sackfield	" "	" " "
Ben Goodman	BRW HAZELET & ERDAL	312 461-0267
Kevin Damron	KYTC-D12-Reconstruct	606-433-7791
David Lindeman	PALMER ENG.	606-744-1218

APPENDIX G.

Reference Documents/Consultation Records.

Reference Documents	
Date	**Title**
2/10/99	Draft Project Planning Report U.S. 460-From U.S. 32 to Virginia State Line. January 1995
2/10/99	Environmental Assesment Pike County, KY and Buchanan County, VA U.S. 460. August 1998
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**

Consultation Record			
Name	**Subject**	**Organization**	**Telephone**
Rick Lambert	Inroads profile grade comparison	Palmer Engineering	(606) 744-1218
Gary Poole	Drainage	C.O. KYTC	(502) 564-3280
Naresh Shah	Structures	C.O. CYTC	(502) 564-3280

APPENDIX H.
Response to Recommendations.

FORM: 5 SEP,. 1997

SUMMARY OF DECISIONS

Project: Reconstruction of US 460, Phase II, Sectionss 7 thru 9V
Location: Pike County, Kentucky
Study Date: March 29 - April 2, 1999

DESCRIPTION		PRESENT WORTH AMOUNT			BEST	DECISION		
Rec #	Recommendation Title / Description	resulting 1st cost savings (or cost)	O & M savings (or cost)	total LCC savings (or cost)	suggested best selec-tion or combin-ation	designer decision	owner decision	final decision
1	Build Tunnel at grassy Greek	3,605,454	0	3,605,454				
2	Bifurcate sections	5,700,000	0	5,700,000				
3	Raise grade in selected areas	6,976,329	0	6,976,329				
4	Use barrier wall with 4 m shoulders in median in lieu of 12m depressed median in cut areas.	2,244,699	0	2,244,699				
5	Raise/shorten culvert	522,750	0	522,750				

This report was compiled by:
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Division of Highway Design
Kentucky Transportation Cabinet
502-564-3280

This report was released for publication by:
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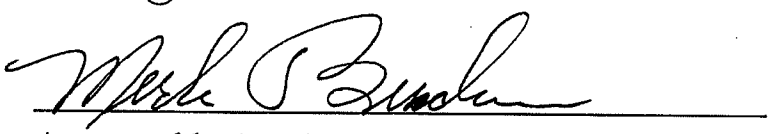

Approved by Merle Braden, PE, CVS-Life (Dames & Moore)

END OF REPORT