VALUE ENGINEERING SUMMARY
OF
US 460
YEAGER TO GREASY CREEK
PIKE COUNTY
ITEM NO. 12-263.00
FRANKFORT, KENTUCKY

DECEMBER 1-9, 1997

Prepared by:
William F. Ventry, P.E., C.V.S.

In Association With:

Kentucky Transportation Cabinet

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

INTRODUCTION

This Value Engineering report summarizes the results of the Value Engineering study performed by Ventry Engineering for the Kentucky Transportation Cabinet. The study was performed December 1-9, 1997 in Frankfort, Kentucky.

The subject of the study was the US 460 - Yeager to Greasy Creek in Pike County.

PROJECT DESCRIPTION

The proposed project is to reconstruct existing route US 460/KY 80 from US 119/23 to State Route 631. The Value Engineering study covers an approximate 6.5 km segment from Yeager to Greasy Creek, at the project beginning point. The proposed highway project is for a four-lane, median-divided, full safety roadway with controlled access.

The Value Engineering study's purpose is to identify potential alternatives which will add value to the project and still provide the same project functions, consistent with desired quality standards and the needs of the user.

METHODOLOGY

The Value Engineering Team followed the basic Value Engineering procedure for conducting this type of analysis.

This process included the following phases:

1. Investigation
2. Speculation
3. Evaluation
4. Development
5. Presentation
6. Report Preparation

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

- Function Performance
- Safety
- Driver Expectation
- Cost
- Construction/Design Impacts
- R/W Impact
- Maintenance of Traffic
- Maintainability

RESULTS

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

1. Roadway Alignment

   The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative combines "A" alignment with "C2" alignment in Section 1 from approximate Station 1 + 500 to 2 + 500

   If this recommendation can be implemented, there is a possible savings of **$4,997,092.**

2. Profile Grades

   The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative revises fill slopes and grades in selected areas of the project.

   If this recommendation can be implemented, there is a possible savings of **$2,410,573.**

3. Interchanges

   The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative moves Interchange "A" south from the "As Proposed" location and reconfigures the Interchange.

   If this recommendation can be implemented, there is a possible savings of **$13,063,037.**

4. Dry Fork Road Bridge

   The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative stops pavement at Section 2 Interchange and does not build the Dry Fork Road Bridge.

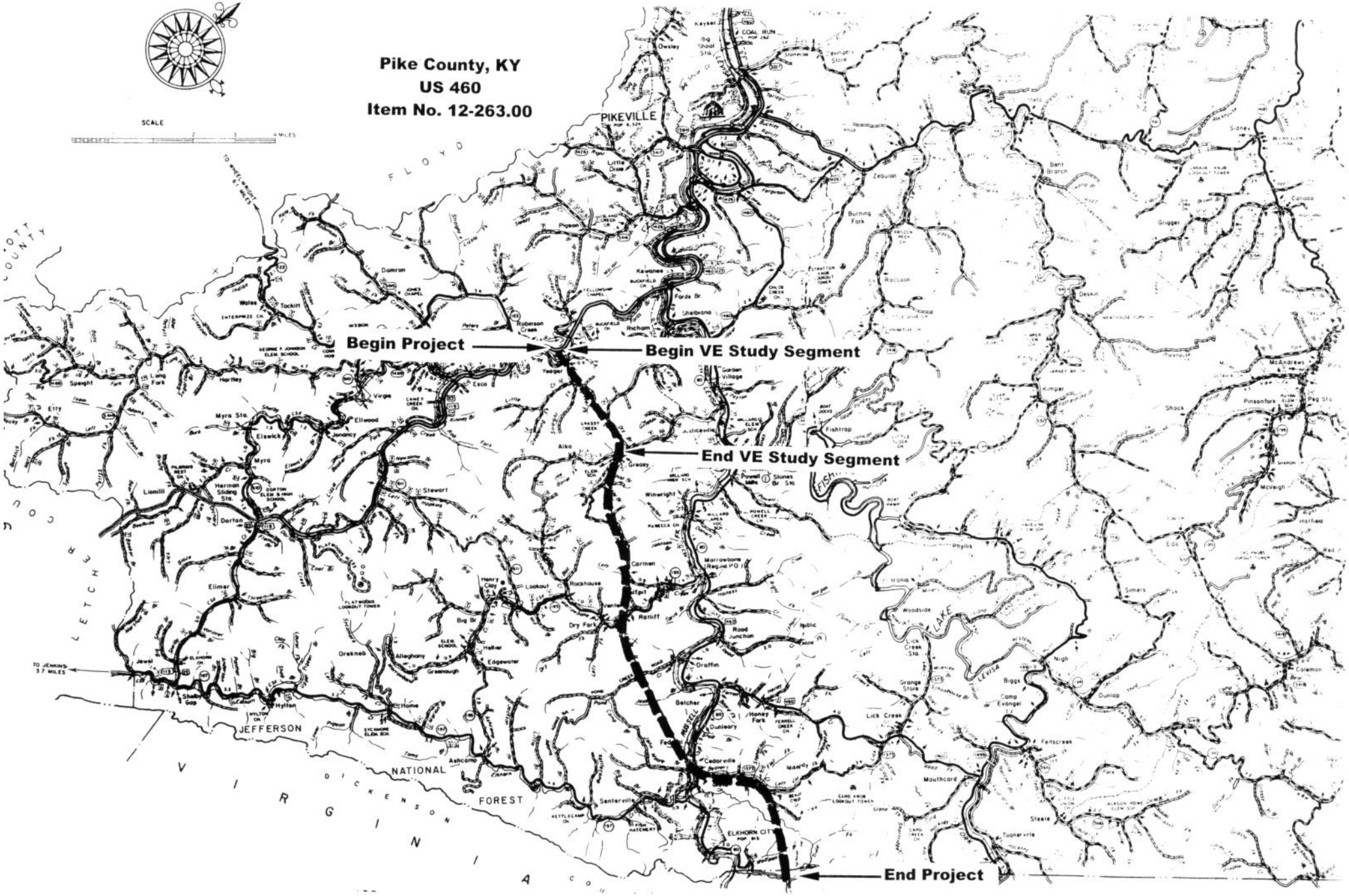
   If this recommendation can be implemented, there is a possible savings of **$729,224.**

5. US 460/CSX Railroad Bridge

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative relocates old US 23 under US 460/CSX railroad bridge and shortens bridge.

If this recommendation can be implemented, there is a possible savings of $751,694.

II. LOCATION OF PROJECT


Pike County, KY
US 460
Item No. 12-263.00
SCALE
Begin Project
Begin VE Study Segment
End VE Study Segment
End Project
PIKEVILLE
JEFFERSON
NATIONAL
FOREST
VIRGINIA
FLOYD
LETCHER
DICKENSON
LAKE
TO JENKINS 37 MILES

III. TEAM MEMBERS AND PROJECT DESCRIPTION

TEAM MEMBERS

NAME	AFFILIATION	EXPERTISE	PHONE
Joseph J. Waits, P.E., C.V.S.	Ventry Engineering	Team Leader	850/627-3900
Don Keenan, P.E.	Ventry Engineering	Structural Team Member	850/627-3900
Ron Whichel, P.E.	Ventry Engineering	Roadway Design Team Member	850/627-3900
Lowell Filsinger	Ventry Engineering	Roadway Design Team Member	850/627-3900
Ken Sperry, P.E.	Kentucky Transportation Cabinet	Roadway Design Team Member	502-564-3280
Doug Smith, P.G.	Kentucky Transportation Cabinet	Geotechnical Team Member	502-564-2374
Bob Lewis, P.E.	Kentucky Transportation Cabinet	Construction	502-564-4780

PROJECT DESCRIPTION

Length:	+/- 6.5 km
Construction cost:	$87,465,224 (Alternate A, Section 1 + Alternate C, Section 2)
Design speed:	60 mph (100 km/hr)
Projected letting date:	November 1999

Task at hand

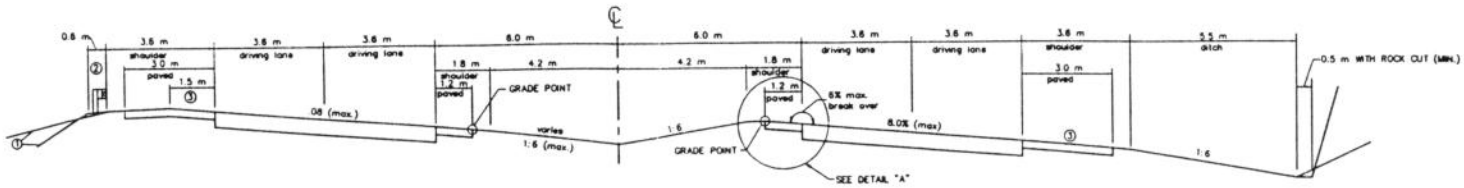
The scope of the proposed project is to reconstruct existing route US 460/KY 80 from US 119/23 to State Route 631. The Value Engineering study covers an approximate 6.5 km segment from Yeager to Greasy Creek, at the project beginning. The proposed highway project is for a four-lane, median-divided, full safety roadway with controlled access.

Existing US 460/KY 80 is a two-lane route with very narrow shoulders throughout the length, in Pike County in Southeastern Kentucky. It is on the National Highway System and part of the Appalachian Corridor. It has many vertical and horizontal deficiencies and has numerous access breaks, with traffic volumes moderate to heavy.

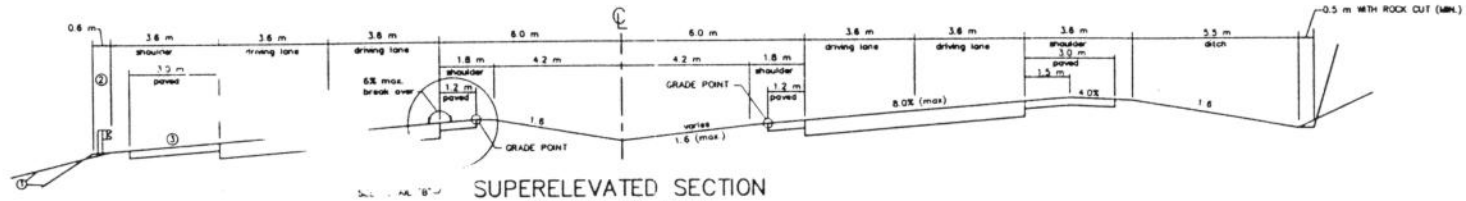
The proposed project is a connecting link in the regional transportation network linking major routes in southwestern Virginia with those of eastern Kentucky including the APD corridor represented by US 119 and US 23 routes. The project will serve arterial roads including KY 40, KY 122, KY 194, and KY 197.

COUNTY OF	FISCAL YEAR	SHEET NO	TOTAL SHEETS
PIKE		2	

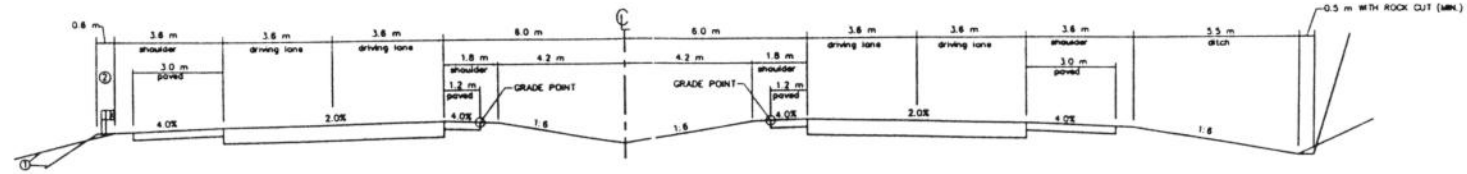
ITEM No. 12-263.00



SUPERELEVATED SECTION
CURVE TO RIGHT



SUPERELEVATED SECTION
CURVE TO LEFT



NORMAL SECTION

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

② SHOULDERS SHALL BE WIDENED 0.6 m WHERE GUARDRAIL IS REQUIRED

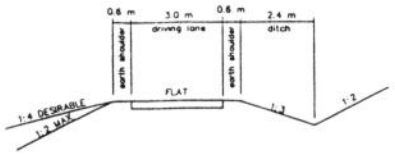
③ SUPERELEVATED SHOULDERS: CONSTRUCT TO STANDARD SUPERELEVATION EXCEPT NOT FLATTER THAN 4.0%

RIGHT OF WAY PLANS

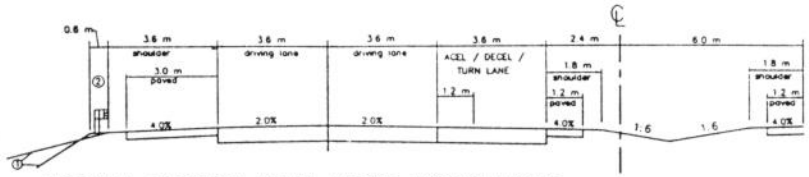
H:\JOBS\US460\TYPICALS\TYPICAL

COUNTY OF	FISCAL YEAR	SHEET NO	TOTAL SHEETS
PIKE		2A	

ITEM No. 12-263.00

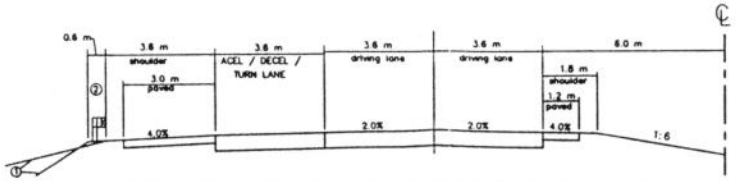


ENTRANCE SECTION



NORMAL SECTION WITH ADDED INSIDE LANE
TYP. FOR OPPOSITE LANES BUT MIRRORED

NOTE: GRADE POINT TO BE ESTABLISHED AS IF ADDITIONAL LANE WAS NOT THERE & GRADE ADJUSTED FROM EDGE OF M.L. PAVEMENT



NORMAL SECTION WITH ADDED OUTSIDE LANE
TYP. FOR OPPOSITE LANES BUT MIRRORED

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

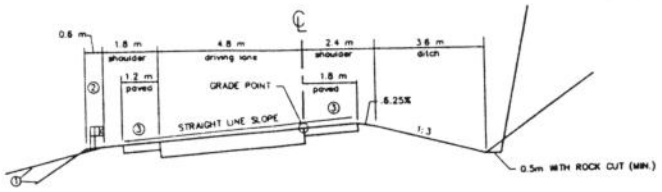
② SHOULDERS SHALL BE WIDENED 0.6 m WHERE GUARDRAIL IS REQUIRED

RIGHT OF WAY PLANS

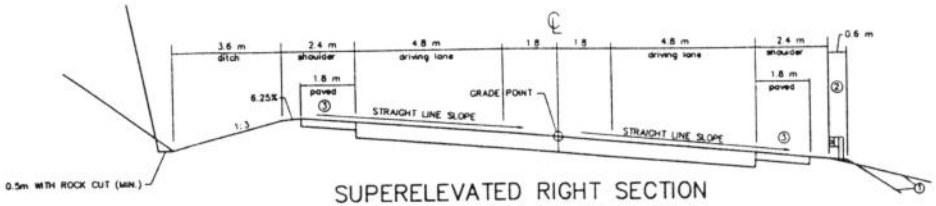
H:\JOBS\US460\TYPICALS\TYPICAL

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE		28	

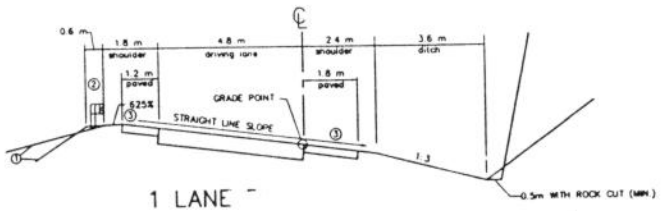
ITEM No. 12-263.00



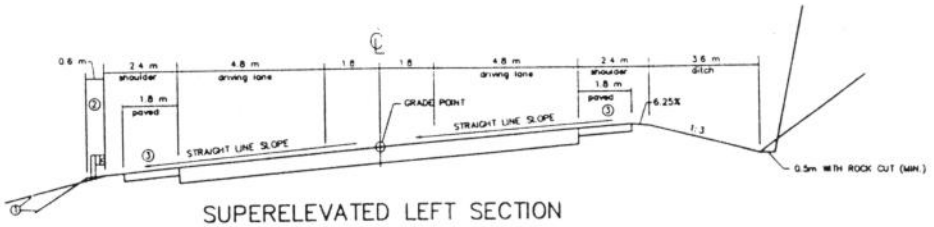
1 LANE RAMP
SUPERELEVATED LEFT



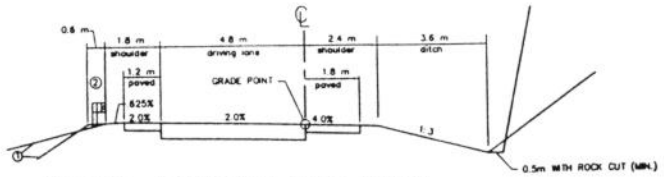
SUPERELEVATED RIGHT SECTION
2 WAY RAMP WITH FLUSH MEDIAN



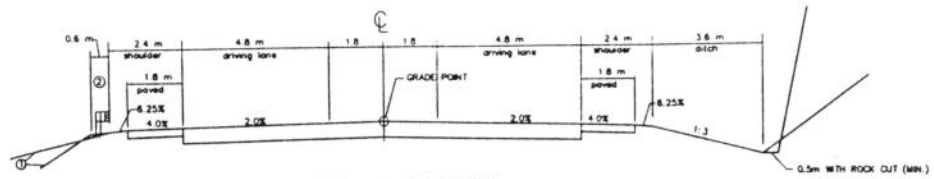
1 LANE
SUPERELEVATED



SUPERELEVATED LEFT SECTION
2 WAY RAMP WITH FLUSH MEDIAN



NORMAL SECTION 1 LANE RAMP



NORMAL SECTION
2 WAY RAMP WITH FLUSH MEDIAN

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

② SHOULDERS SHALL BE WIDENED 0.6 m WHERE GUARDRAIL IS REQUIRED

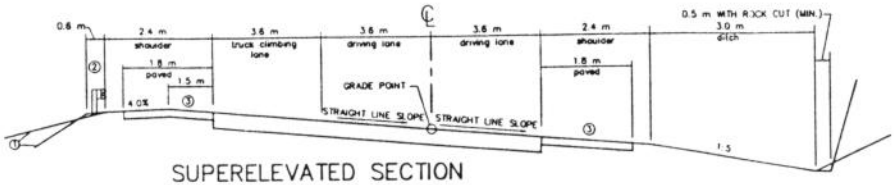
③ SUPERELEVATED SHOULDERS: CONSTRUCT TO STANDARD SUPERELEVATION EXCEPT NOT FLATTER THAN 4.0%

RIGHT OF WAY PLANS

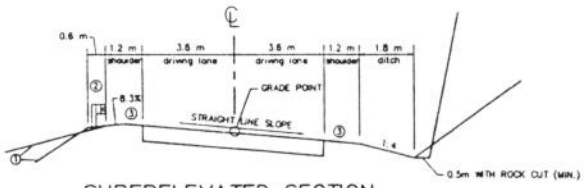
H:\JOBS\US460\TYPICALS\TYPICAL

COUNTY OF	FISCAL YEAR	SHEET NO	TOTAL SHEETS
PIKE		2E	

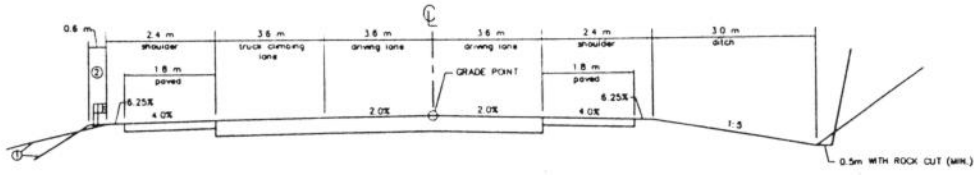
ITEM No. 12-263.00



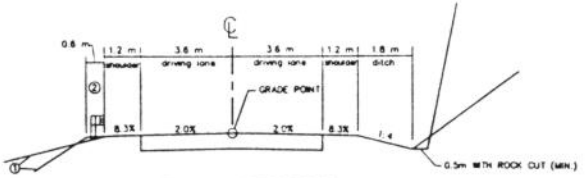
SUPERELEVATED SECTION
APPROACH TYPICAL FOR
DRY BRANCH ROAD



SUPERELEVATED SECTION
APPROACH TYPICAL FOR
STAGGER FORK ROAD



NORMAL SECTION
APPROACH TYPICAL FOR
DRY BRANCH ROAD



NORMAL SECTION
APPROACH TYPICAL FOR
STAGGER FORK ROAD

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

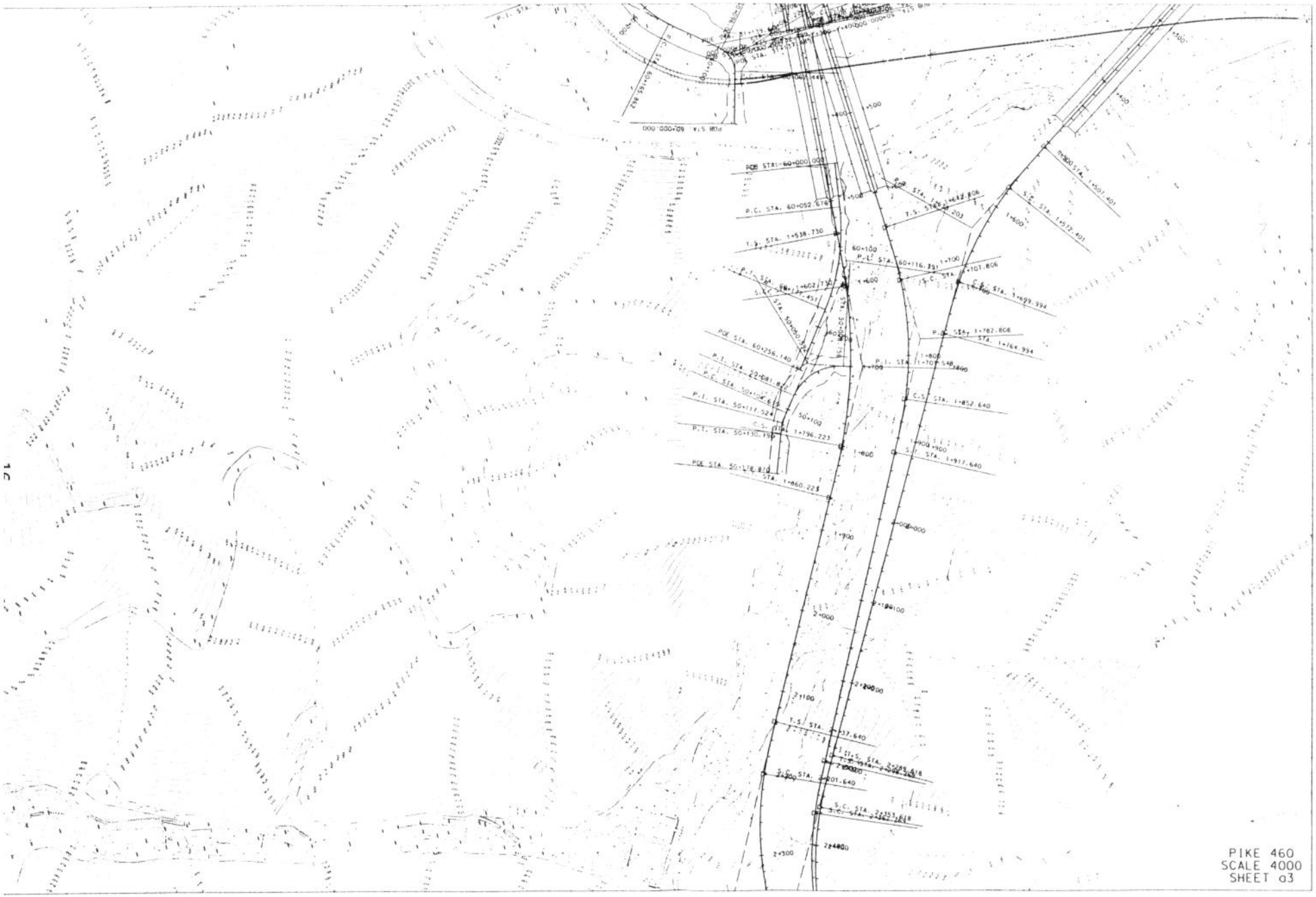
② SHOULDERS SHALL BE WIDENED 0.6 m WHERE GUARDRAIL IS REQUIRED

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

RIGHT OF WAY PLANS

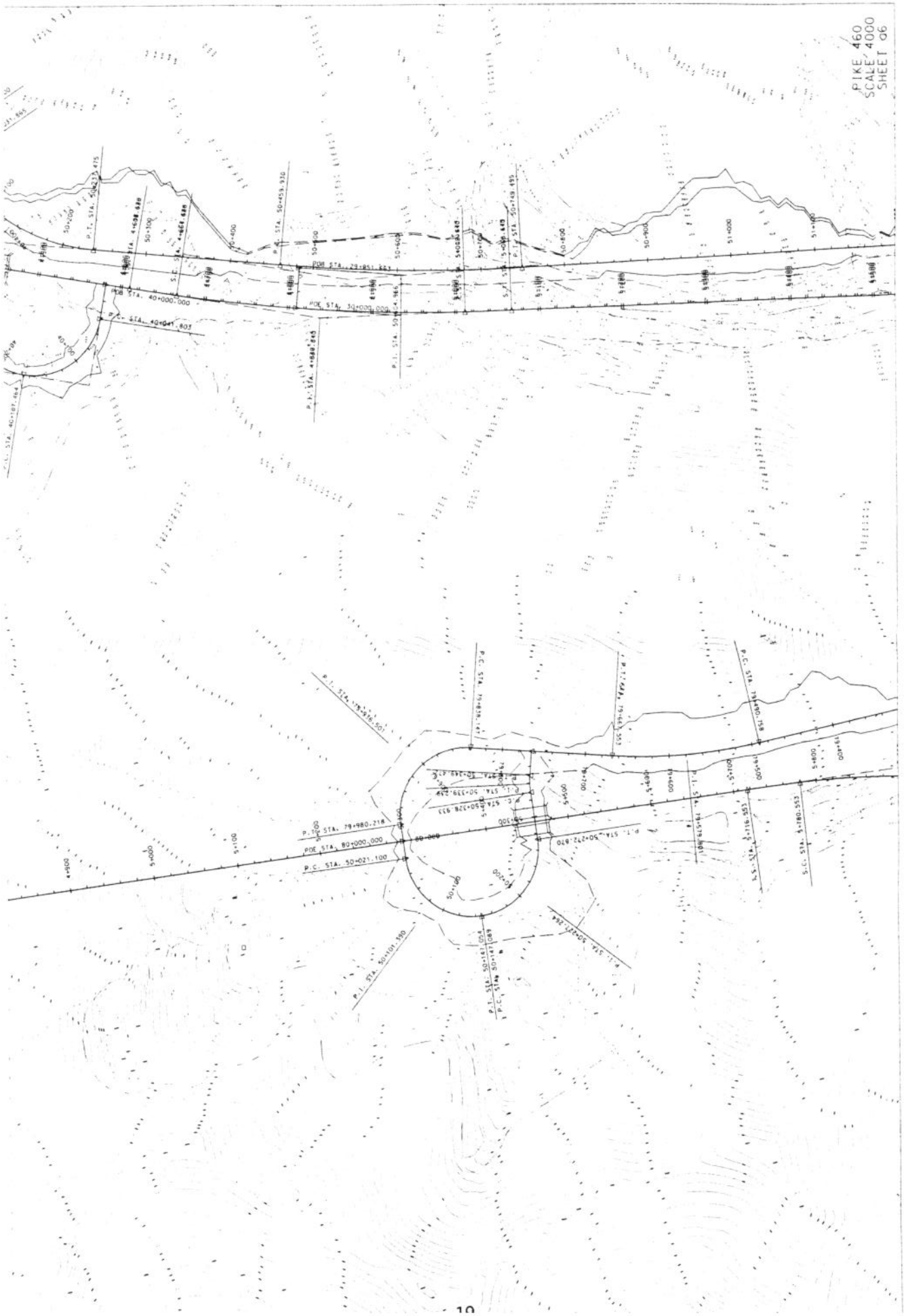
H:\JOBS\U5460\TYPICALS\TYPICAL


PIKE 460
SCALE 1"=1000'
SHEET 02


PIKE 460
SCALE 4000
SHEET 03


PIKE 460
SCALE 4000
SHEET 1 OF 4
SECTION
SECTION


PIKE 460
SCALE 4000
SHEET 05
POB STA. 50+000.000
P.C. STA. 50+056.660
P.I. STA. 50+125.224
P.T. STA. 50+193.591
P.C.S. STA. 3+689.901
POE STA. 50+331.899
S.T. STA. 3+753.901
P.C.S. STA. 3+995.097
S.C. STA. 4+059.097
C.S. STA. 4+551.847
S.T. STA. 4+615.847
P.I. STA. 4+581.594
POB STA. 50+000.000
STA. 50+331.865
P.C. STA. 40+329.087
P.T. STA. 40+293.730
P.C. STA. 40+187.464


PIKE 460
SCALE 4000
SHEET 06
P.T. STA. 50+272.870
P.C. STA. 50+021.100
PDE STA. 80+000.000
P.T. STA. 79+980.218
P.C. STA. 79+839.167
P.T. STA. 50+339.249
P.C. STA. 50+128.923
P.T. STA. 50+149.495
P.C. STA. 50+459.930
P.T. STA. 50+228.415
PDE STA. 29+851.883
PDE STA. 30+000.000
PDE STA. 40+000.000
P.C. STA. 40+041.803
P.I. STA. 50+101.100
P.I. STA. 50+147.089
P.C. STA. 50+116.553
P.T. STA. 50+180.553
P.I. STA. 79+579.801


PIKE 460
SCALE 4000
SHEET 1


6+500
6+600
6+700
6+800
6+900
7+000
7+100
7+200
7+300
7+400
7+500
C.S. STA. 7+031.363
S.C. STA. 7+095.363
T.S. STA. 7+289.998
S.C. STA. 7+311.499
S.C. STA. 7+344.998
S.C. STA. 7+377.499
PIKE 460
SCALE 4000
SHEET 2

updated Cost Estimate

Pike County US 460 Summary

12/1/97

Section 1	Alternate A	Alternate B	Alternate C2	Alternate D
Mainline Cost	$25,497,906	$31,974,733	$11,256,470	$17,801,398
Interchange Cost	$24,463,252	$24,463,252	$14,554,007	$14,511,062
Approach Cost	$707,742	$150,997	$1,330,816	$2,158,162
Total Construction Cost	**$50,668,899**	**$56,588,982**	**$27,141,292**	**$34,470,622**
Relocations	31	17	53	37
Waste Material	4,878,258	7,150,614	869,426	2,935,910
Movements at US 23	4	4	4	4
Movements at Old US 23	0	0	0	0

Section 2	Alternate A	Alternate B	Alternate C
Mainline Cost	$23,801,664	$40,964,671	$33,446,938
Interchange Cost	$7,259,216	$4,216,152	$3,349,387
Total Construction Cost	**$31,060,879**	**$45,180,823**	**$36,796,325**
Relocations	50	19	3
Waste Material	3,789,689	8,654,335	2,928,537

COST ESTIMATE

Pike County US 460
Section 1
Alternate A
31 Relocations

12/1/97

Mainline				
Excavation	3,241,100	CM	$3.68	$11,927,248
Paving	2640	Meters	$757.41	$1,999,570
Bridges				$5,900,000
Drainage				$157,771
Misc.	2640	Meters	$466.94	$1,232,723
Mob. & Demob. (4.5%)				$954,779
Eng. & Conting. (15%)				$3,325,814
Total				**$25,497,906**
US 23 Interchange				
Exc. West of 23	1,284,323	CM	$8.00	$10,274,584
Exc. East of 23	2,156,068	CM	$3.68	$7,934,330
Paving - Ramp A	253	Meters	$287.75	$72,800
Paving - Ramp B	1418	Meters	$287.75	$408,023
Paving - Ramp C	1109	Meters	$287.75	$319,109
Paving - Ramp D	777	Meters	$287.75	$223,578
Bridges				$2,400,000
Drainage				$33,605
Misc.	3557	Meters	$116.74	$415,227
Mob. & Demob. (4.5%)				$531,300
Eng. & Conting. (15%)				$1,850,696
Total				**$24,463,252**
Appr. Lt. 2+890				
Excavation	3,852	CM	$3.68	$14,175
Paving	200	Meters	$352.87	$70,574
Drainage				$22,474
Misc.	200	Meters	$116.74	$23,347
Mob. & Demob. (4.5%)				$5,876
Eng. & Conting. (15%)				$20,467
Total				**$156,913**
Appr. Rt. 3+610				
Excavation	69,143	CM	$3.68	$254,446
Paving	332	Meters	$352.87	$117,153
Drainage				$48,000
Misc.	332	Meters	$116.74	$38,756
Mob. & Demob. (4.5%)				$20,626
Eng. & Conting. (15%)				$71,847
Total				**$550,829**

Section 1 Alternate A Total — $50,668,899

Pike County US 460
Section 1
Alternate B
17 Relocations

12/1/97

Mainline

Excavation	4,699,867	CM	$3.68	$17,295,511
Paving	2680	Meters	$757.41	$2,029,867
Bridges				$5,900,000
Drainage				$130,031
Misc.	2680	Meters	$466.94	$1,251,401
Mob. & Demob. (4.5%)				$1,197,306
Eng. & Conting. (15%)				$4,170,617
Total				**$31,974,733**

US 23 Interchange

Exc. West of 23	1,284,323	CM	$8.00	$10,274,584
Exc. East of 23	2,156,068	CM	$3.68	$7,934,330
Paving - Ramp A	253	Meters	$287.75	$72,800
Paving - Ramp B	1418	Meters	$287.75	$408,023
Paving - Ramp C	1109	Meters	$287.75	$319,109
Paving - Ramp D	777	Meters	$287.75	$223,578
Bridges				$2,400,000
Drainage				$33,605
Misc.	3557	Meters	$116.74	$415,227
Mob. & Demob. (4.5%)				$531,300
Eng. & Conting. (15%)				$1,850,696
Total				**$24,463,252**

Appr. Lt. 2+990

Excavation	75	CM	$3.68	$276
Paving	220	Meters	$352.87	$77,632
Drainage				$22,058
Misc.	220	Meters	$116.74	$25,682
Mob. & Demob. (4.5%)				$5,654
Eng. & Conting. (15%)				$19,695
Total				**$150,997**

Section 1 Alternate B Total $56,588,982

Pike County US 460
Section 1
Alternate C
50 Relocations

12/1/97

Mainline

Excavation	1,804,263	CM	$3.68	$6,639,688
Paving	2540	Meters	$757.41	$1,923,829
Bridges				$3,300,000
Drainage				$121,215
Misc.	2540	Meters	$466.94	$1,186,029
Mob. & Demob. (4.5%)				$592,684
Eng. & Conting. (15%)				$2,064,517
Total				**$15,827,962**

US 23 Interchange

Excavation	251,218	CM	$3.68	$924,482
Paving - Ramp A	180	Meters	$287.75	$51,794
Paving - Ramp B	474	Meters	$287.75	$136,391
Paving - Ramp C	758	Meters	$287.75	$218,111
Paving - US 23	840	Meters	$352.87	$296,411
Bridges				$720,000
Drainage				$65,735
Misc.	1494	Meters	$116.74	$174,402
Mob. & Demob. (4.5%)				$116,430
Eng. & Conting. (15%)				$405,564
Total				**$3,109,320**

Ramp Lt. 1+800

Excavation	712,459	CM	$3.68	$2,621,849
Paving	484	Meters	$287.75	$139,269
Drainage				$8,312
Misc.	484	Meters	$116.74	$56,500
Mob. & Demob. (4.5%)				$127,167
Eng. & Conting. (15%)				$442,964
Total				**$3,396,061**

Ramp Rt. 1+850

Excavation	218,969	CM	$3.68	$805,806
Paving	440	Meters	$287.75	$126,608
Drainage				$9,552
Misc.	440	Meters	$116.74	$51,363
Mob. & Demob. (4.5%)				$44,700
Eng. & Conting. (15%)				$155,704
Total				**$1,193,733**

Appr. Rt. 2+160

Excavation	9,901	CM	$3.68	$36,436
Paving	230	Meters	$352.87	$81,160
Misc.	230	Meters	$116.74	$26,849
Mob. & Demob. (4.5%)				$6,500
Eng. & Conting. (15%)				$22,642
Total				**$173,587**

Appr. Lt. 2+810

Excavation	2,075	CM	$3.68	$7,636
Paving	190	Meters	$352.87	$67,045
Drainage				$39,886
Misc.	190	Meters	$116.74	$22,180
Mob. & Demob. (4.5%)				$6,154
Eng. & Conting. (15%)				$21,435
Total				**$164,336**

Section 1 Alternate C Total $23,865,000

Pike County US 460
Section 1
Alternate C2
53 Relocations

12/1/97

Mainline

Excavation	644,691	CM	$3.68	$2,372,463
Paving	2250	Meters	$757.41	$1,704,179
Bridges				$3,400,000
Box Culvert				$787,200
Drainage				$52,273
Misc.	2250	Meters	$466.94	$1,050,616
Mob. & Demob. (4.5%)				$421,503
Eng. & Conting. (15%)				$1,468,235
Total				**$11,256,470**

US 23 Interchange

Excavation	2,007,980	CM	$3.68	$7,389,366
Paving - Ramp A	730	Meters	$287.75	$210,054
Paving - Ramp B	1140	Meters	$287.75	$328,030
Paving - Ramp C	1005	Meters	$287.75	$289,184
Paving - Ramp D	785	Meters	$287.75	$225,880
Bridge - B&C				$1,650,000
Bridge - D				$1,625,000
Drainage				$57,550
Misc.	2875	Meters	$116.74	$335,614
Mob. & Demob. (4.5%)				$544,980
Eng. & Conting. (15%)				$1,898,349
Total				**$14,554,007**

Cemetery Access Road

Excavation	51,363	CM	$3.68	$189,016
Paving	520	Meters	$352.87	$183,493
Drainage				$10,000
Misc.	520	Meters	$116.74	$60,702
Mob. & Demob. (4.5%)				$19,944
Eng. & Conting. (15%)				$69,473
Total				**$532,629**

New Compton Road

Excavation	96,739	CM	$3.68	$356,000
Paving	214	Meters	$352.87	$75,514
Drainage				$9,560
Misc.	214	Meters	$116.74	$24,981
Mob. & Demob. (4.5%)				$20,972
Eng. & Conting. (15%)				$73,054
Total				**$560,082**

Ramp Rt. 1+700

Excavation	2,000	CM	$3.68	$7,360
Paving	180	Meters	$352.87	$63,517
Drainage				$6,147
Misc.	180	Meters	$116.74	$21,012
Mob. & Demob. (4.5%)				$4,412
Eng. & Conting. (15%)				$15,367

Total				**$117,815**

Appr. Lt. 2+810

Excavation	2,075	CM	$3.68	$7,636
Paving	190	Meters	$352.87	$67,045
Drainage				$3,235
Misc.	190	Meters	$116.74	$22,180
Mob. & Demob. (4.5%)				$4,504
Eng. & Conting. (15%)				$15,690
Total				**$120,290**

Section 1 Alternate C2 Total $27,141,292

Pike County US 460
Section 1
Alternate D
37 Relocations

12/1/97

Mainline

Excavation	2,306,545	CM	$3.68	$8,488,086
Paving	2260	Meters	$757.41	$1,711,753
Bridges				$3,400,000
Drainage				$157,771
Misc.	2260	Meters	$466.94	$1,055,286
Mob. & Demob. (4.5%)				$666,580
Eng. & Conting. (15%)				$2,321,921
Total				**$17,801,398**

US 23 Interchange

Excavation	2,000,070	CM	$3.68	$7,360,258
Paving - Ramp A	733	Meters	$287.75	$210,917
Paving - Ramp B	1137	Meters	$287.75	$327,166
Paving - Ramp C	1000	Meters	$287.75	$287,745
Paving - Ramp D	769	Meters	$287.75	$221,276
Bridge - B&C				$1,650,000
Bridge - D				$1,625,000
Drainage				$57,550
Misc.	2870	Meters	$116.74	$335,030
Mob. & Demob. (4.5%)				$543,372
Eng. & Conting. (15%)				$1,892,747
Total				**$14,511,062**

Cemetery Access Road

Excavation	51,363	CM	$3.68	$189,016
Paving	520	Meters	$352.87	$183,493
Drainage				$10,000
Misc.	520	Meters	$116.74	$60,702
Mob. & Demob. (4.5%)				$19,944
Eng. & Conting. (15%)				$69,473
Total				**$532,629**

New Compton Road

Excavation	96,739	CM	$3.68	$356,000
Paving	214	Meters	$352.87	$75,514
Drainage				$9,560
Misc.	214	Meters	$116.74	$24,981
Mob. & Demob. (4.5%)				$20,972
Eng. & Conting. (15%)				$73,054
Total				**$560,082**

Realigned Little Creek Road

Excavation	750	CM	$3.68	$2,760
Paving	260	Meters	$352.87	$91,746
Drainage				$172,800
Misc.	260	Meters	$116.74	$30,351
Mob. & Demob. (4.5%)				$13,395
Eng. & Conting. (15%)				$46,658
Total				**$357,710**

Appr. Lt. 2+890

Excavation	3,852	CM	$3.68	$14,175
Paving	200	Meters	$352.87	$70,574
Drainage				$22,474
Misc.	200	Meters	$116.74	$23,347
Mob. & Demob. (4.5%)				$5,876
Eng. & Conting. (15%)				$20,467
Total				**$156,913**

Appr. Rt. 3+610

Excavation	69,143	CM	$3.68	$254,446
Paving	332	Meters	$352.87	$117,153
Drainage				$48,000
Misc.	332	Meters	$116.74	$38,756
Mob. & Demob. (4.5%)				$20,626
Eng. & Conting. (15%)				$71,847
Total				**$550,829**

Section 1 Alternate D Total $33,552,830

Pike County US 460
Section 2
Alternate A
50 Relocations

12/1/97

Mainline

Excavation	4,143,271	CM	$3.68	$15,247,237
Paving	2460	Meters	$757.41	$1,863,236
Bridges				$1,300,000
Drainage				$246,689
Misc.	2460	Meters	$466.94	$1,148,674
Mob. & Demob. (4.5%)				$891,263
Eng. & Conting. (15%)				$3,104,565
Total				**$23,801,664**

Dry Branch Road

Excavation	1,151,047	CM	$3.68	$4,235,853
Paving	1827	Meters	$352.87	$644,695
Box Culverts				$130,920
Drainage				$29,834
Misc.	1827	Meters	$116.74	$213,275
Mob. & Demob. (4.5%)				$236,456
Eng. & Conting. (15%)				$823,655
Total				**$6,314,688**

Ramp Rt. 4+600

Excavation	134,508	CM	$3.68	$494,989
Paving	400	Meters	$561.72	$224,687
Drainage				$19,590
Misc.	400	Meters	$116.74	$46,694
Mob. & Demob. (4.5%)				$35,368
Eng. & Conting. (15%)				$123,199
Total				**$944,528**

Section 2 Alternate A Total $31,060,879

Pike County US 460
Section 2
Alternate B
19 Relocations

12/1/97

Mainline

Excavation	8,089,451	CM	$3.68	$29,769,180
Paving	2440	Meters	$757.41	$1,848,088
Bridges				$1,300,000
Drainage				$30,912
Misc.	2440	Meters	$466.94	$1,139,335
Mob. & Demob. (4.5%)				$1,533,938
Eng. & Conting. (15%)				$5,343,218
Total				**$40,964,671**

Dry Branch Road

Excavation	113,106	CM	$3.68	$416,230
Paving	418	Meters	$561.72	$234,798
Misc.	418	Meters	$116.74	$48,795
Mob. & Demob. (4.5%)				$31,492
Eng. & Conting. (15%)				$109,697
Total				**$841,013**

Ramp Rt. 4+700

Excavation	678,434	CM	$3.68	$2,496,637
Paving	448	Meters	$561.72	$251,649
Drainage				$7,937
Misc.	448	Meters	$116.74	$52,297
Mob. & Demob. (4.5%)				$126,383
Eng. & Conting. (15%)				$440,236
Total				**$3,375,140**

Section 2 Alternate B Total $45,180,823

Pike County US 460
Section 2
Alternate C
3 Relocations

12/1/97

Mainline

Excavation	6,173,669	CM	$3.68	$22,719,102
Paving	2460	Meters	$757.41	$1,863,236
Drainage				$50,371
Bridges				$1,300,000
Misc.	2460	Meters	$466.94	$1,148,674
Mob. & Demob. (4.5%)				$1,218,662
Eng. & Conting. (15%)				$4,245,007
Total				**$32,545,052**

Ramp Lt. 5+300

Excavation	488,138	CM	$3.68	$1,796,348
Paving	1420	Meters	$561.72	$797,639
Drainage				$27,341
Misc.	1420	Meters	$116.74	$165,764
Mob. & Demob. (4.5%)				$125,419
Eng. & Conting. (15%)				$436,877
Total				**$3,349,387**

Section 3 Differences over Alt A & Alt B

Excavation	-995,138	CM	$3.68	-$3,662,108
Paving	-100	Meters	$757.41	-$75,741
Alt C Bridges				$9,000,000
Alt A Bridges				-$4,500,000
Misc.	-100	Meters	$116.74	-$11,674
Mob. & Demob. (4.5%)				$33,771
Eng. & Conting. (15%)				$117,637
Total				**$901,886**

Section 2 Alternate C Total **$36,796,325**

PIKE 460 SECTION 1			12/1/97
STATION	**CUT**	**FILL**	**NET**
ALT "A" SECTION #1			
MAINLINE 1+000 TO 3+600	3,241,100	1,728,751	1,512,349
INTERCHANGE NORTH OF US 23	1,284,323	39,394	1,244,929
INTERCHANGE SOUTH OF US 23	2,156,068	57,390	2,098,678
APPROACH 2+890 LT.	3,852	44,811	(40,959)
APPROACH 3+600 RT.	69,143	5,882	63,261
TOTAL SECTION 1 ALT. "A"	**6,754,486**	**1,876,228**	**4,878,258**
ALT "B" SECTION #1			
MAINLINE 1+000 TO 3+600	4,699,867	848,505	3,851,362
INTERCHANGE NORTH OF US 23	1,284,323	39,394	1,244,929
INTERCHANGE SOUTH OF US 23	2,156,068	57,390	2,098,678
APPROACH 2+990	75	44,430	(44,355)
TOTAL SECTION 1 ALT. "B"	**8,140,333**	**989,719**	**7,150,614**
ALT "C" SECTION #1			
MAINLINE 1+000 TO 3+600	1,804,263	1,934,516	(130,253)
RAMP "A", "B", "C", US 23	251,218	343,411	(92,193)
RAMP 1+800 LT.	712,459	791	711,668
RAMP 1+850 RT.	218,969	28,294	190,675
APPROACH 2+160	9,901	40,468	(30,567)
APPROACH 2+810	2,075	28,204	(26,129)
TOTAL SECTION 1 ALT. "C"	**2,998,885**	**2,375,684**	**623,201**
ALT "C2" SECTION #1			
MAINLINE 1+000 TO 3+600	644,691	1,620,308	(975,617)
INTERCHANGE NORTH OF US 23	1,825,306	23,558	1,801,748
INTERCHANGE SOUTH OF US 23	182,674	338,158	(155,484)
ACCESS ROAD @ CEMETERY	51,363	2,781	48,582
NEW COMPTON ROAD	96,739	5,141	91,598
APPROACH 1+700	142	4,804	(4,662)
APPROACH @ 3+600 RT.	69,143	5,882	63,261
TOTAL SECTION 1 ALT. "C2"	**2,870,058**	**2,000,632**	**869,426**
ALT "D" SECTION #1			
MAINLINE 1+000 TO 3+600	2,306,545	1,148,164	1,158,381
INTERCHANGE NORTH OF US 23	1,815,723	21,434	1,794,289
INTERCHANGE SOUTH OF US 23	184,347	363,146	(178,799)
NEW COMPTON ROAD	96,739	5,141	91,598
ACCESS ROAD @ CEMETERY	51,363	2,781	48,582
ACCESS ROAD @ LITTLE CREEK	750	1,193	(443)
APPROACH @ 2+890 LT.	3,852	44,811	(40,959)
APPROACH @ 3+600 RT.	69,143	5,882	63,261
TOTAL SECTION 1 ALT. "D"	**4,528,462**	**1,592,552**	**2,935,910**

PIKE 460 SECTION 2			12/1/97
STATION	**CUT**	**FILL**	**NET**
ALT "A" SECTION #2			
MAINLINE 3+600 TO 6+100	4,143,271	1,341,445	2,801,826
RAMP 4+600 RT.	134,508	78,300	56,208
DRY BRANCH ROAD	1,151,047	219,392	931,655
TOTAL SECTION 2 ALT. "A"	**5,428,826**	**1,639,137**	**3,789,689**
ALT "B" SECTION #2			
MAINLINE 3+600 TO 6+100	8,089,451	113,233	7,976,218
DRY BRANCH	148,048	3,438	144,610
RAMP 4+700 RT.	658,081	124,574	533,507
TOTAL SECTION 2 ALT. "B"	**8,895,580**	**241,245**	**8,654,335**
ALT "C" SECTION #2			
MAINLINE 3+600 TO 6+100	6,176,856	3,583,779	2,593,077
GREASY CREEK INT. (5+300)	488,138	152,678	335,460
TOTAL ALT . "C"	**6,664,994**	**3,736,457**	**2,928,537**

PERSONS CONTACTED

NAME	AFFILIATION	PHONE
Greg Smith	KTC- Utility Eng.	502-564-4780
Kevin Damron	KTC- D12	606-433-7791
Keith Damron	KTC- D12	606-433-7791
Dexter Newman	KTC- Construction	502-564-4780
Earl Wright	KTC- Geotech	502-564-2374
Greg Smith	KTC- Utilities	502-564-3210
Jeff Bibb	KTC- MVE	502-564-3276
Zane Young	HMB Consultants	502-695-9800
Richard Dutton	KTC- Environmental	502-564-7250
Gary Poole	KTC- Drainage	502-564-3280
Alan Frank	KTC- Bridge Design	502-564-4560
Kelly Coy	KTC- Materials	502-564-2374
Kenny Barrett	KTC- Drainage	502-564-3280
Don Herd	KTC- Operations	502-564-4556
Shannon Reynolds	KTC- Operations	502-564-4556
Richard Wilson	KTC- Geology	502-564-2374
Daryl Greer	KTC- VE Coordinator	502-564-3280

REFERENCE DOCUMENTS

1. Draft Project Planning Report, Palmer Engineering, January 1995
2. Policy on Geometric Design of Highway and Streets, AASHTO, 1994
3. Project Plans and Cost Estimates, Palmer Engineering, Nov. 24, 1997
4. Bridge Plans, US 23-119 over Shelby Creek, Dwg. 22000, Station 1262 + 00
5. Bridge Plans, US 23-119 over Shelby Creek, Dwg. 21958, Station 1305 + 96.00
6. Misc. Bridge Data, Palmer Engineering

IV. INVESTIGATION PHASE

PROJECT BRIEFING
December 1, 1997

NAME	AFFILIATION	TELEPHONE
Joe Waits	Ventry Engineering	850-627-3900
Ron Whichel	Ventry Engineering	850-627-3900
Don Keenan	Ventry Engineering	850-627-3900
Lowell Filsinger	Ventry Engineering	850-627-3900
Daryl Greer	KTC- Hwy Design VE Coordinator	502-564-3280
Ken Sperry	KTC- Hwy Design	502-564-3280
Joette Fields	KTC- Hwy Design	502-564-3280
Robert Semones	KTC- Hwy Design	502-564-3280
Doug Smith	KTC- Geotech	502-564-2374
Mike Craft	Palmer Engineering	606-744-1218
David Lindeman	Palmer Engineering	606-744-1218
Kevin Damron	KTC- D-12	606-433-7791
Keith Damron	KTC- D-12	606-433-7791
James D. Wright	KTC- D-12 Const.	606-433-7791
Jim Wood	KTC- CO-Operations	502-564-4556
Bob Lewis	KTC- CO-Operations	502-564-4780

The team met for the initial informational meeting on Tuesday morning at 8 AM, in the District 12 office building.

Joe Waits, Team Leader, Ventry Engineering, discussed the Value Engineering process and the study schedule for the project.

David Lindeman, Palmer Engineering, gave the project briefing and an open discussion followed.

. The most probable concept consisted of Alternate "A" for Section 1, and Alternate "C" for Section 2.

- There are no R/W costs available at this early stage of the project.
- Environmental studies are to begin in the spring. There are no environmental issues known at this time.
- There are no weight limit enforcement facilities to be built into this project.
- The C2 Interchange has potential R/W acquisition problems. C2 may be the most cost effective alternate if not for this.
- There are no bridge design documents available at this early stage.
- Waste areas are contractor's responsibility.
- A depressed medium is generally preferred.
- Alternate "B" has been rejected.

At the conclusion of the project briefing, the Value Engineering team was taken on tour of the project site. Daryl Greer, Value Engineering Coordinator, accompanied the team, along with Kevin Damron, Joette Fields, and Robert Semones.

FUNCTION ANALYSIS WORKSHEET, INVESTIGATION PHASE
PROJECT: US 460 - YEAGER TO GREASY CREEK
DATE: DECEMBER 1-9, 1997

ITEM	FUNCT. VERB	FUNCT. NOUN	TYPE *	COST	WORTH	VALUE INDEX
Roadway Excavation	Establish	Grade	B	54.9	45.0	1.22
Pavement	Support Smooth Identify	Load Ride Roadway	B S S	5.9	5.0	1.18
Bridge Structures	Span Support	Obstructions Loads	B B	9.6	8.5	1.13
Drainage	Remove	Water	B	0.33	0.33	1.0
Right of Way	Locate Store	Roadway Waste	B S	Not Available	-	-

* B = Basic
S = Secondary

INVESTIGATION

The following high cost areas have been identified by the Value Engineering Team as areas of focus and investigation for the Value Engineering process:

1. Roadway Alignment
2. Profile Grades
3. Interchanges
4. Bridge Structures
5. Roadway Pavement

V. SPECULATION PHASE

SPECULATION

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

1. ROADWAY ALIGNMENT

- **Combine "A" alignment with "C2" alignment in Section 1**
- **Use alignment "A" for Section 2**
- **Construct dry branch road close to mainline**

2. PROFILE GRADES

- **Utilize fill slopes at selected locations**
- **Raise grades throughout the project**
- **Use flatter slopes where possible**
- **Use steeper fill slopes using Mechanically Stabilized Earth**

3. INTERCHANGES

- **Reconfigure Section 2 Interchange**
- **Utilize flyover in lieu of Interchange "A" with a off-ramp to Hwy 23 under RR bridge**
- **Relocate Shelby Creek to maximize Interchange "A" movement**
- **Move Interchange "A" Southward**
- **Utilize Interchange "C2"**

4. BRIDGE STRUCTURES:
DRY FORK ROAD BRIDGE & US 460/CSX RAILROAD BRIDGE

- **Relocate old Hwy 23 under RR bridge to shorten bridge**
- **Do not build bridges for Greasy Creek with Section #2**
- **Waste excavation under post-tension bridge, Hwy 23**

5. ROADWAY PAVEMENTS

- Use Portland Cement Concrete pavement in lieu of asphalt
- Provide areas for potential weight enforcement activities
- Stop pavement @ Section 2 Interchange

VI. EVALUATION PHASE

VI.(A) ALTERNATIVES

ALTERNATIVES

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

1. ROADWAY ALIGNMENT

Value Engineering Alternative - Combine "A" alignment with "C2" alignment in Section 1

Value Engineering Alternative - Use alignment "A" for Section 2 and move Dry Branch close to mainline

2. PROFILE GRADES

Value Engineering Alternative - Revise fill slopes and grades, selected areas

3. INTERCHANGES

Value Engineering Alternative - Move Interchange "A" southward and Reconfigure Section 2 Interchange

4. BRIDGE STRUCTURES

DRY FORK ROAD BRIDGE
Value Engineering Alternative - Stop pavement @ Section 2 Interchange and do not build bridges

US 460/CSX RAILROAD BRIDGE
Value Engineering Alternative - Relocate old Hwy 23 under RR bridge to shorten bridge

5. ROADWAY PAVEMENTS

- No Value Engineering Alternative Identified

VI.(B) ADVANTAGES AND DISADVANTAGES

EVALUATION

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

1. ROADWAY ALIGNMENT

"As Proposed" - "A" alignment and "C2" alignment, Section 1

Advantages

- avoids relocation
- less traffic maintenance
- no utility relocation

Disadvantages

- increase in excavation

Conclusion:
Carry forward for further consideration

Value Engineering Alternative - Combine "A" alignment with "C2" alignment in Section 1

Advantages

- decreases excavation

Disadvantages

- relocations
- maintenance of traffic
- utility relocations
- longer route
- side hill cut

Conclusion:
Carry forward for further consideration

"As Proposed" - "C" alignment for Section 2

Advantages

- less relocations
- minimum traffic maintenance

Disadvantages

- longer route
- over mining operation
- steeper grade
- large excavation quantities

Conclusion:
Carry forward for further consideration

Value Engineering Alternative - Use alignment "A' for Section 2 and move Dry Branch close to mainline

Advantages

- less excavation
- flatter grades
- shorter route

Disadvantages

- longer construction time
- utility relocation
- maintenance of traffic
- significant relocations

Conclusion:
The disadvantages outweigh the advantages and the team determined at this point to discontinue development of this idea

2. PROFILE GRADES

"As Proposed" - fill slopes and grades

Advantages

- less R/W required

Disadvantages

- more excavation
- less waste area

Conclusion:
Carry forward for further consideration

Value Engineering Alternative - Revise fill slopes and grades in selected areas

Advantages

- less excavation
- more waste area
- creates more flatland
- decreases construction time

Disadvantages

- more R/W required

Conclusion:
Carry forward for further consideration

3. INTERCHANGES

"As Proposed" - location and configuration of Interchange "A"

Advantages

- eliminates potential right of way issues involved with interchange alternative C
- provides good north to east movement
- does not affect county access road

Disadvantages

- requires large amount of excavation
- provides for a limited amount of waste areas
- major utility adjustments required (both gas & electric)
- complex maintenance of traffic

Conclusion:
Carry forward for further consideration

Value Engineering Alternative - Move Interchange "A" southward and reconfigure interchange

Advantages

- reduced excavation
- reduced utility impact
- requires shorter structure on U.S. 460 over railroad and old U.S. 23
- provides increased waste area
- decreased construction time/user cost
- increased distance between access points

Disadvantages

- potential fill stability problem
- requires 200 meter realignment of the county access road

Conclusion
Carry forward for further consideration

4. BRIDGE STRUCTURES

DRY FORK ROAD BRIDGE

"As Proposed" - pavements and bridges

Advantages

- none noted

Disadvantages

- lengthens construction time
- maintenance
- capital investment required without benefit

Conclusion:
Carry forward for further consideration

Value Engineering Alternative - Stop pavement at Section 2 Interchange and do not build bridges

Advantages

- less construction time/cost
- reduces design cost

- eliminates maintenance problems
- significant cost savings

Disadvantages

- none noted

Conclusion:
Carry forward for further consideration

US 460/CSX RAILROAD BRIDGE

"As Proposed" - location of US 23 and US 460/CSX RR bridge

Advantages

- less local traffic
- no R/W required
- less design time

Disadvantages

- requires longer bridge
- more maintenance

Conclusion:
Carry forward for further consideration

Value Engineering Alternative - Relocate old US 23 under US 460/CSX RR bridge and shorten US 460/CSX bridge

Advantages

- less expensive
- less maintenance

Disadvantages

- more impact on local traffic
- more R/W required

Conclusion:
Carry forward for further consideration

VII. DEVELOPMENT PHASE

VII.(A) ROADWAY ALIGNMENT

VII.(A)(1) AS PROPOSED

"As Proposed"

The "As Proposed" alignment "A" from Station 1 + 600 to Station 2 + 500 is in a cut section. This section is 50 meters north of existing Little Creek Road. The mainline section from Station 1 + 500 to Station 3 + 300 has 2,933,847 m^3 of excavation with 2,128,000 m^3 of waste. This alignment avoids existing houses and utilities.

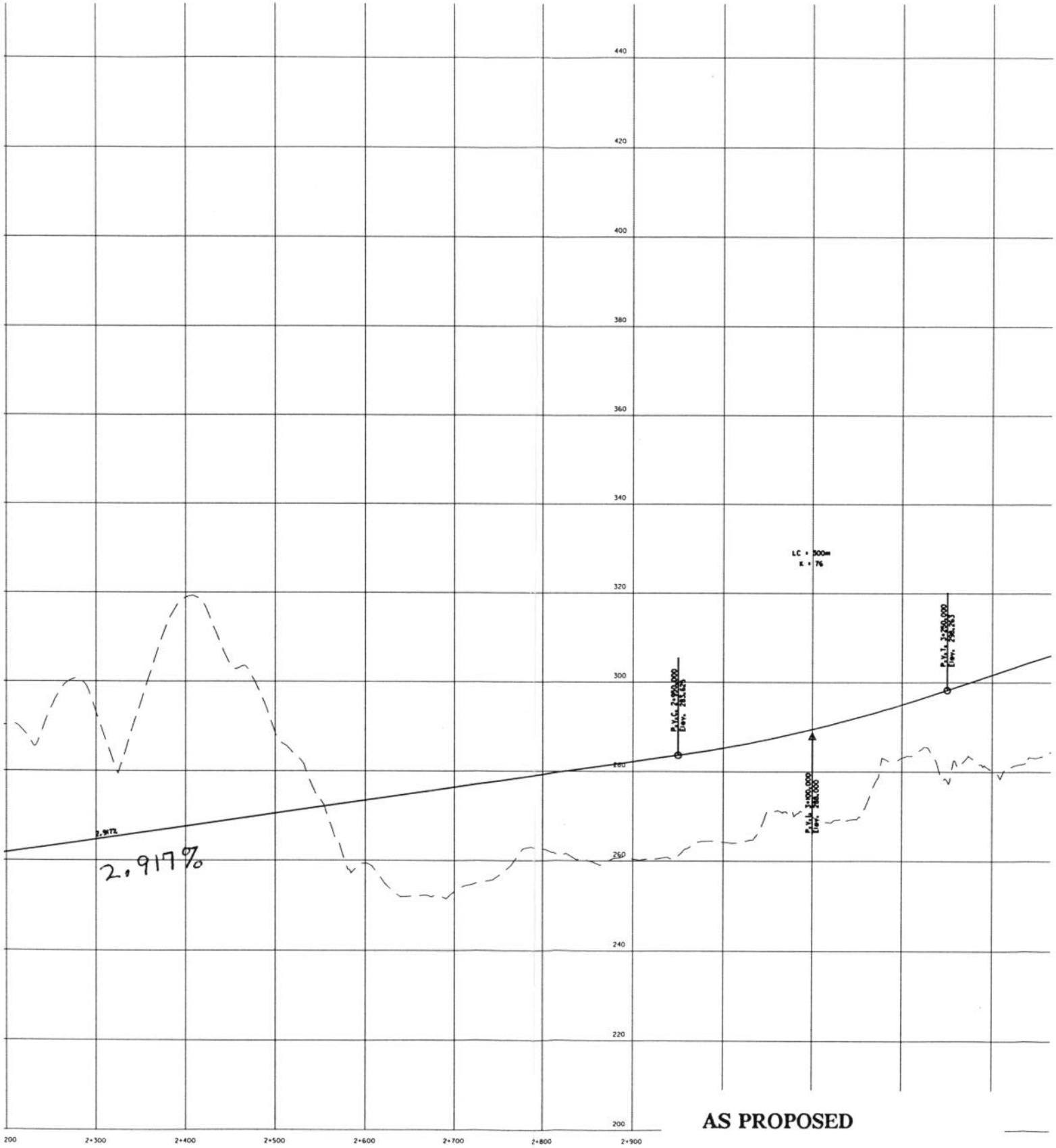
Advantages

- avoids relocations near Little Creek Road
- lessens maintenance of traffic
- no utility relocations from 1 + 500 to 2 + 200

Disadvantages

- large amount of excavation and waste
- no readily available waste areas

IMENT "A"



AS PROPOSED

VII.(A)(2) V.E. ALTERNATIVE

Value Engineering Alternative - Combine "A" alignment with C2 alignment in Section 1

The Value Engineering Alternate shifts alignment A from Station 1+600 south toward Little Creek Road. The shifted alignment intersects proposed alignment C2 near Station 1+950. This new merged alignment from 1+500 to 3+300 requires 1,277,244 m^3 of excavation.

Advantages

- avoids relocations near Little Creek Road
- lessens maintenance of traffic
- no utility relocations from 1+500 to 2+200

Disadvantages

- large amount of excavation and waste
- no readily available waste areas

Discussion

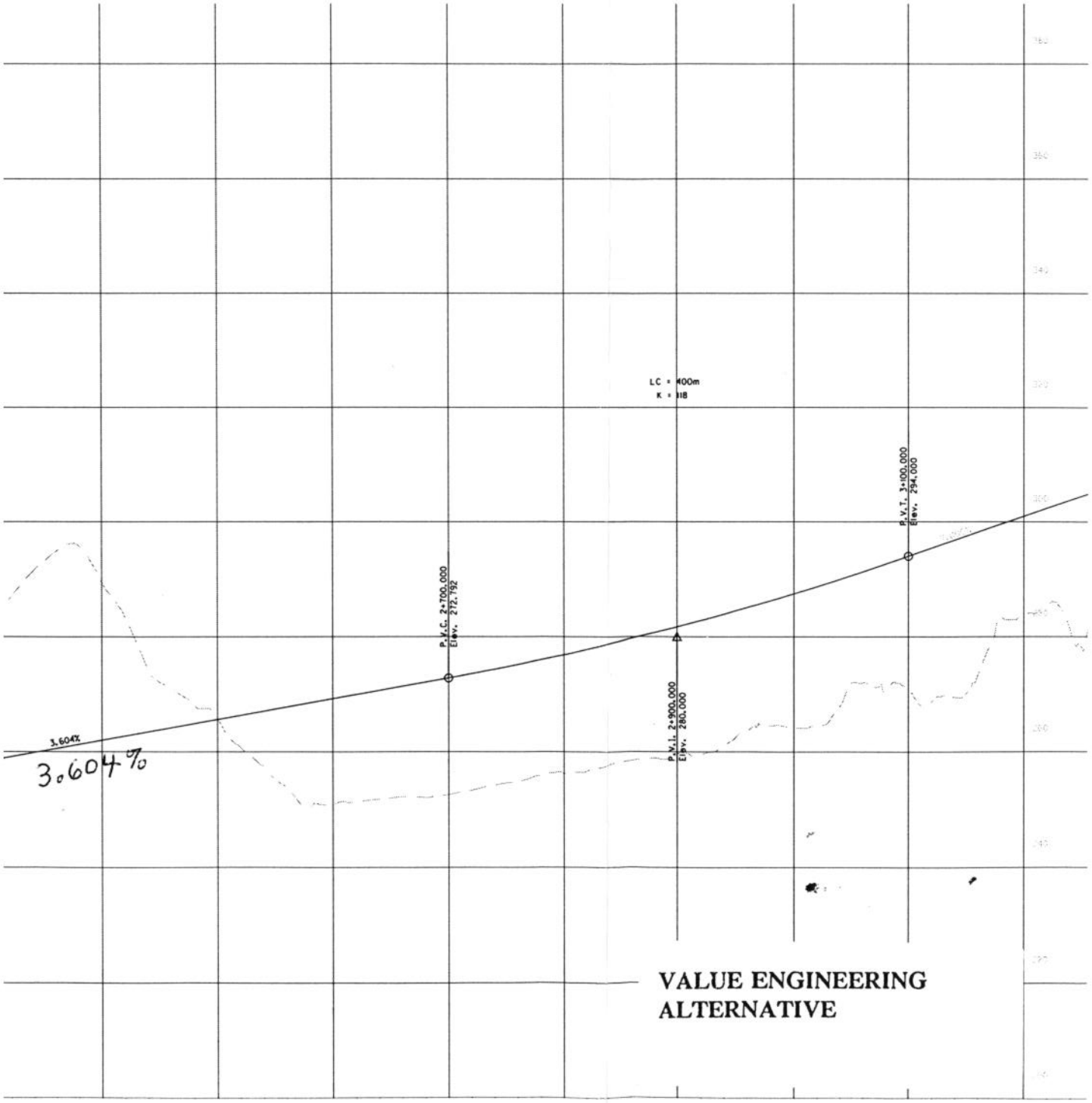
The present design is in a cut section with 2,900,000 m^3 of excavation and creates 2,000,000 m^3 of waste. The value engineering team evaluation indicated the alignment shifting south toward Little Creek Road and lowering the profile grades from 1+500 to 1+950 would significantly reduce the excavation required. This reduction in excavation reduces the need for additional waste areas. The relocations of right-of-way and utilities is offset by the savings from reduced excavation and waste.

The Value Engineering Alternate, Raising Profile Grades, would be affected by this proposal from Station 1+400 to Station 3+000. If grades are raised, an access road intersecting the mainline at approximate Station 2+500 would be required for access to Straight Fork and Little Fork Roads. This would eliminate the need for Little Creek Road from right Stations 1+600 to 2+300.

VALUE ENGINEERING ALTERNATIVE

1 OF 2

C 2 Modified Profile merge from A Alignment to C2 Alignme



3.604%

VALUE ENGINEERING ALTERNATIVE

VALUE ENGINEERING ALTERNATIVE
ALIGNMENT A MERGED TOWARD ALIGNMENT C AT STATION 1 + 950
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
EXCAVATION	$3.68/M^3	2,933,947M^3	$10,796,925	1,277,244M^3	$4,700,258
ROW RELOCATION	$125,000 EACH	0	0	15	$1,875,000
UTILITY RELOCATION	$30,000 LUMP SUM	0	0	1	$ 30,000
MAINTENANCE OF TRAFFIC	$10,000 LUMP SUM	0	0	1	$ 10,000
MOB/DEB 4.5%			$ 485,862		$ 297,687
ENG/CONTI 15%			$ 1,619,539		$ 992,289
TOTAL			**$12,902,325**		**$7,905,233**

Possible Savings $4,997,092

VII.(B) PROFILE GRADES

VII.(B)(1) AS PROPOSED

"As Proposed"

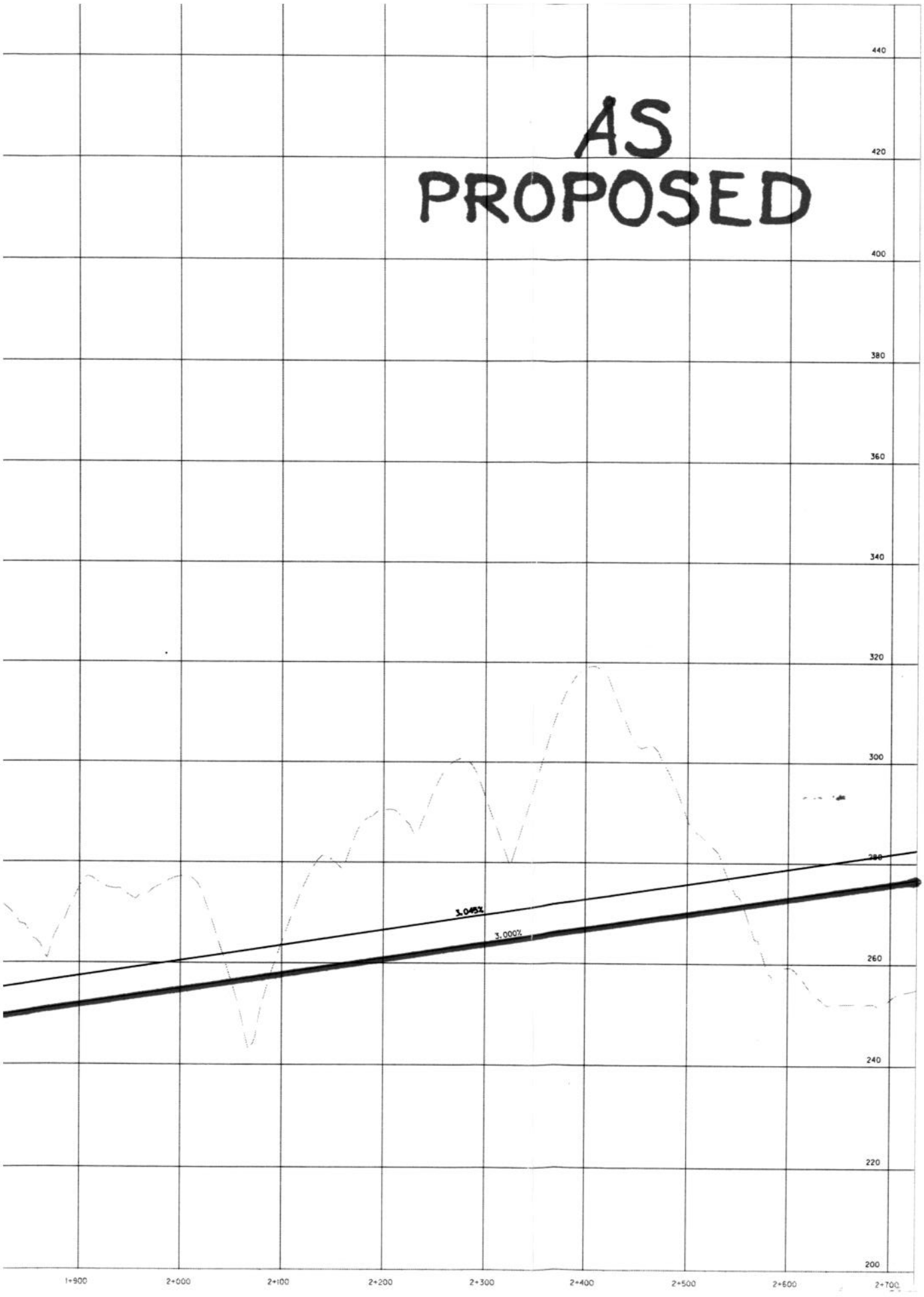
The "As Proposed" fill slopes for the project comply with the standard Kentucky Transportation Cabinet, Department of Highways practices and the typical sections. The majority of the fills have a 2:1 max. slope. The grades as shown require deep cuts and fills of moderate height.

Advantages

. requires less R/W in fill section

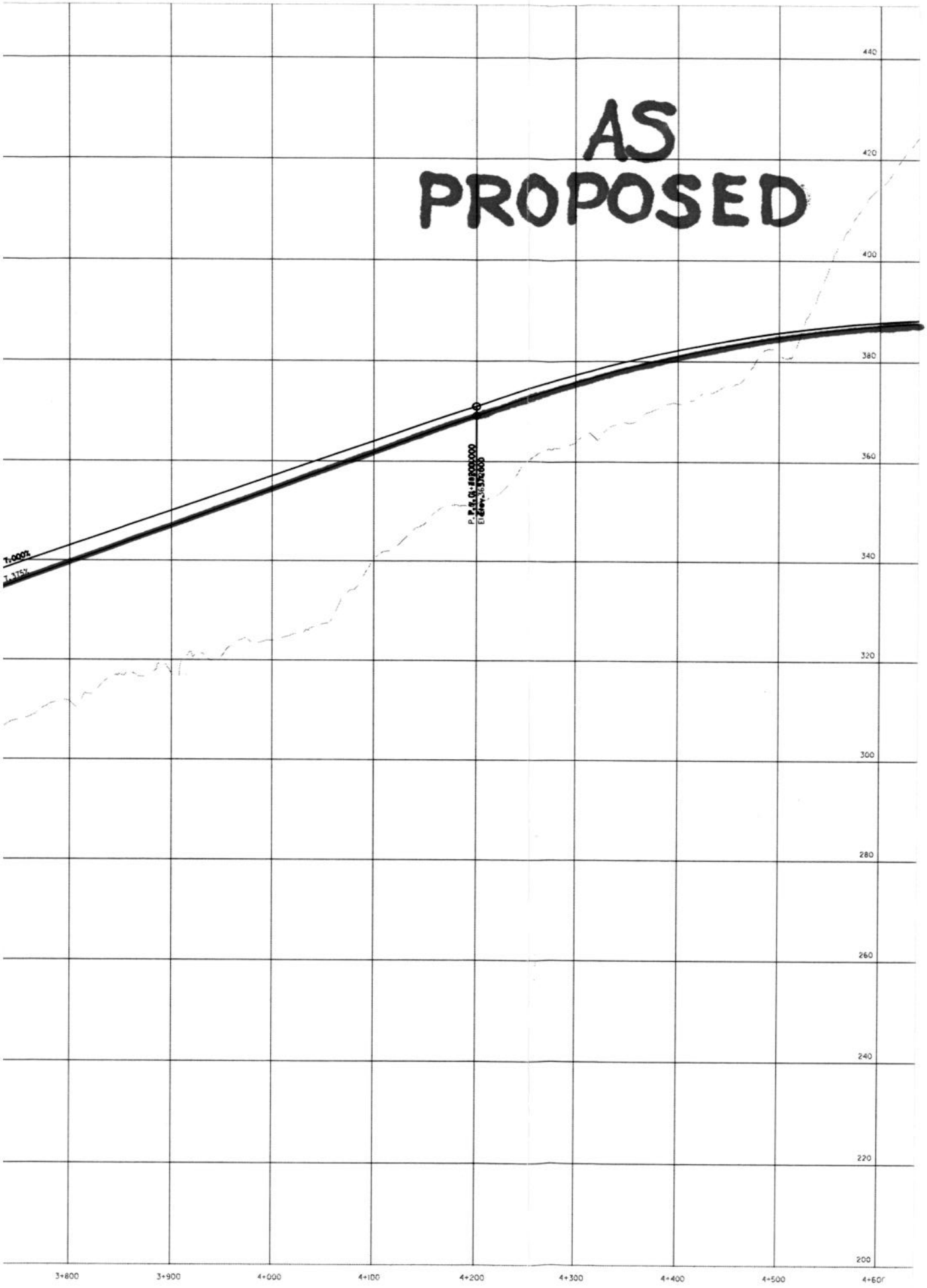
Disadvantages

. more excavation in cut sections
. less waste area
. more construction time

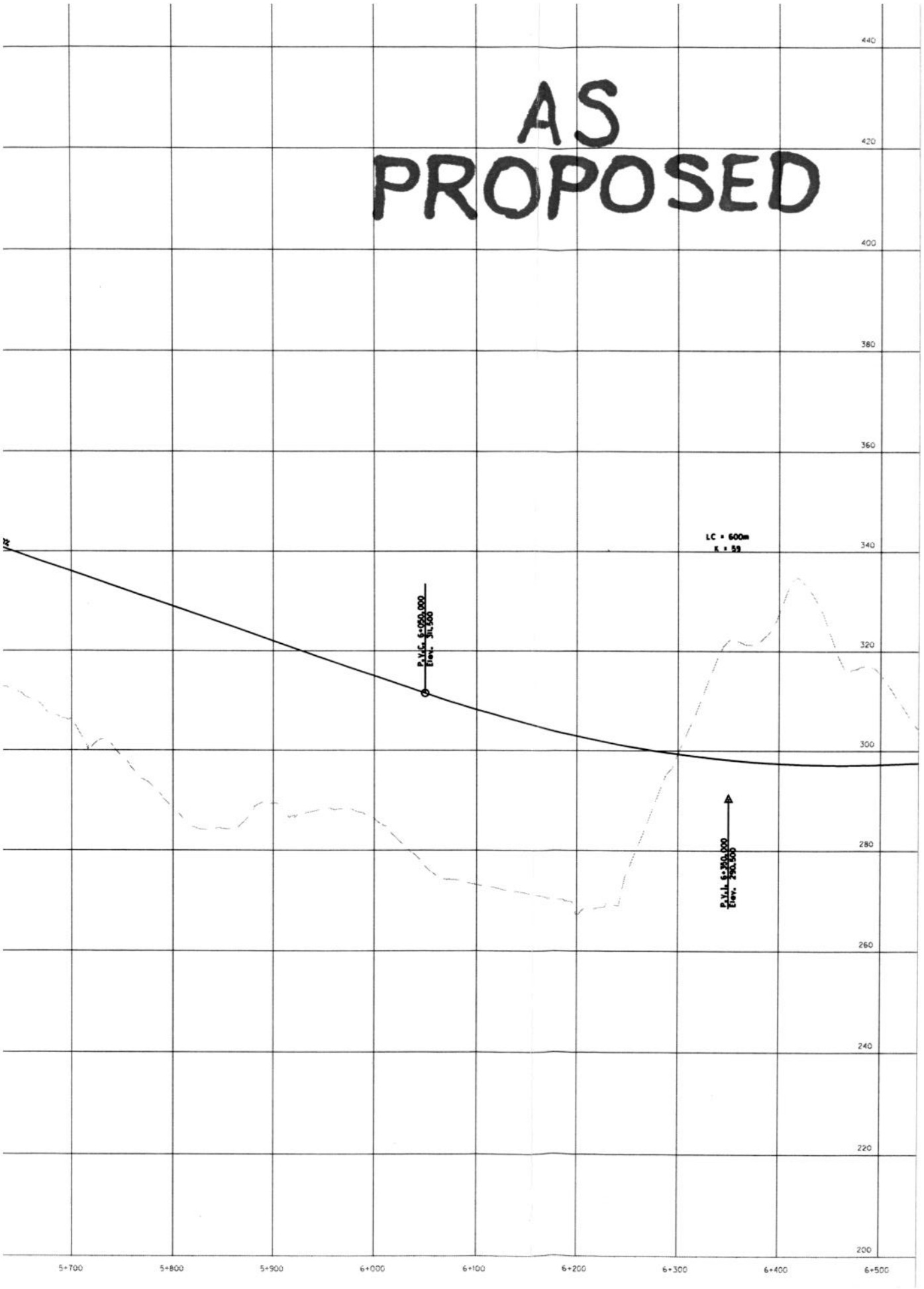


AS PROPOSED

1 of 3


AS
PROPOSED
440
420
400
380
360
340
320
300
280
260
240
220
200
3+800
3+900
4+000
4+100
4+200
4+300
4+400
4+500
4+600

AS PROPOSED



PIKE 460
ALT. A
SCALE 1: 5000

AS PROPOSED

3 of 3

VII.(B)(2) V.E. ALTERNATIVE

Value Engineering Alternative - Revise fill slopes and grades in selected locations

The Value Engineering Alternate recommends that on line "A" profile, slide the P.I. at 1 + 500 back to 1 + 425, maintaining the 500 m vertical curve and continue the ahead grade a 3.045% to a P.I. at 3 + 100 where there will be a 400 m vertical curve. The grade ahead will be 7.00% and will tie to a P.I. at 4 + 700 where there is a 1000 m vertical curve. The result of this grade change will be to raise the profile approximately 6 meters for the first 1700 meters of the change and then decrease from 6 meters to zero meters over the remainder of the change. The result of this grade change will be less excavation and more fill which in turn will reduce waste. An additional way to reduce waste would be to flatten fill slopes to 4:1 or flatter which in turn would be a cost saver by reducing the need for guardrail.

Advantages

- less costly (reduced excavation)
- reduces construction time
- reduces waste
- would create more developable land
- lessen guardrail costs

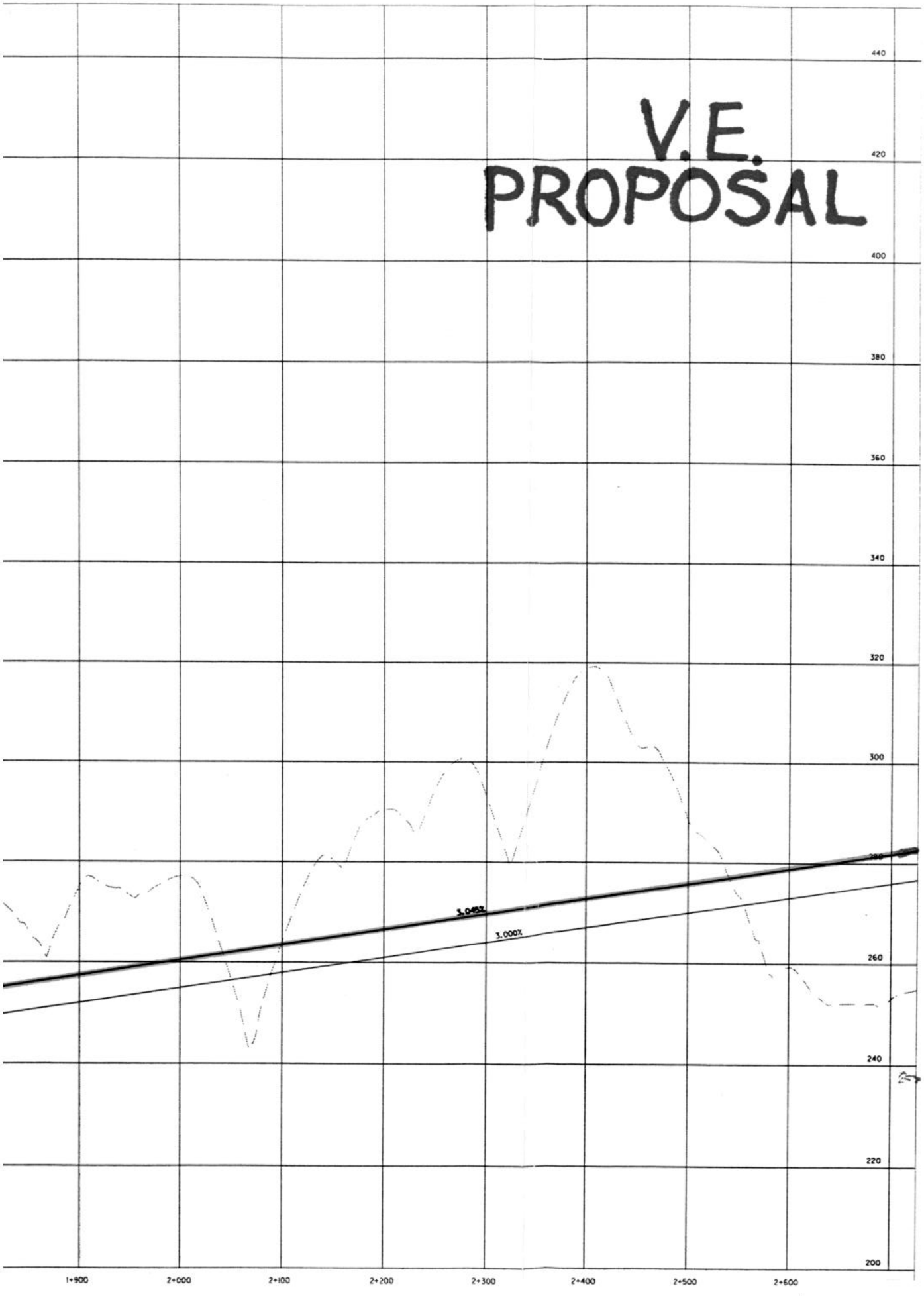
Disadvantages

- requires more right of way in fill areas

Discussion

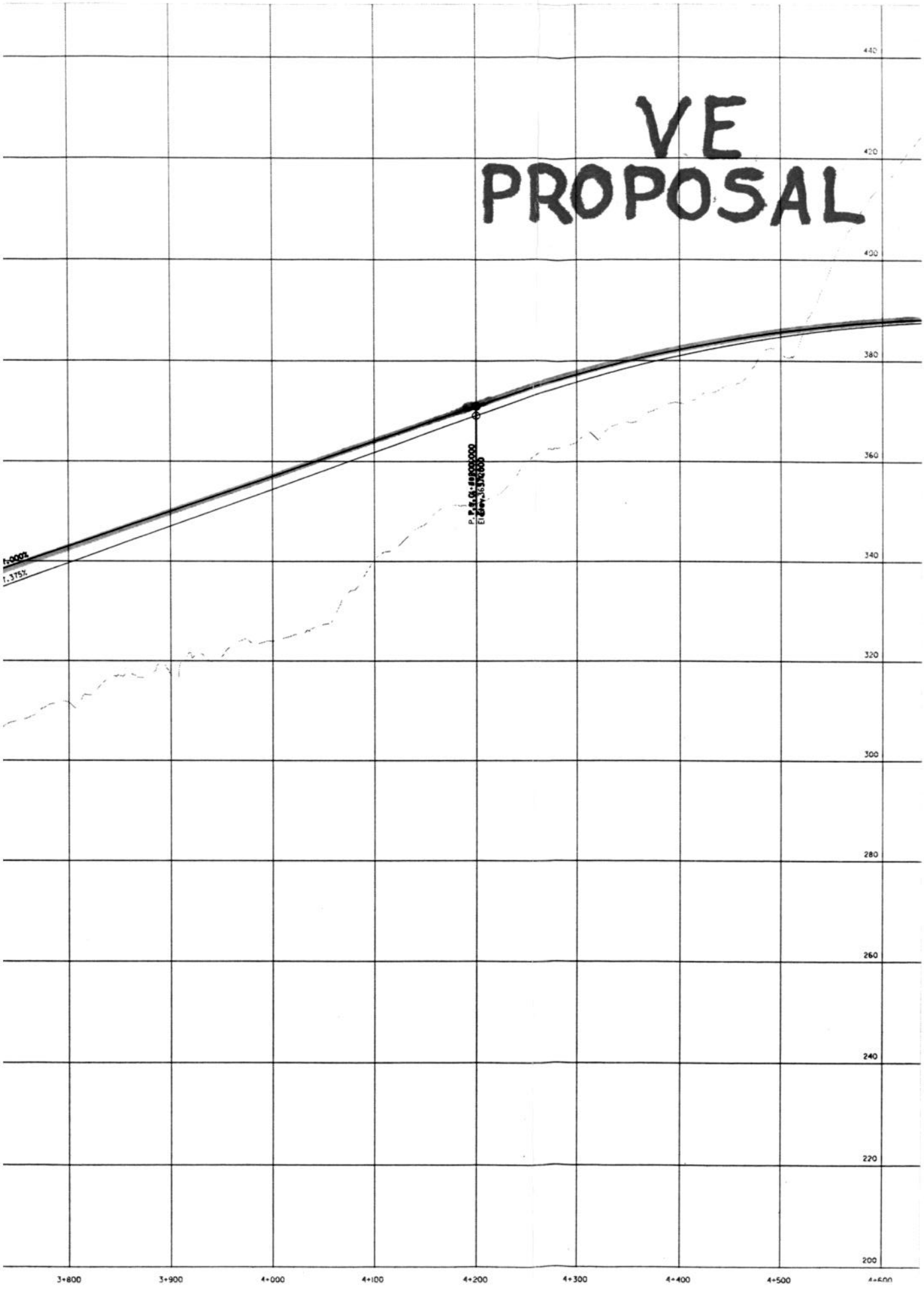
The "As Proposed" design complies with Kentucky Transportation Cabinet, Department of Highways standard practices.

The Value Engineering team, after looking at the overall project (sections 1 and 2), believed that a large portion of the construction cost was for excavation and that one of the ways to reduce this cost was to reduce the quantity of excavation. Raising grades is one way to accomplish this. One area of concern was the approach road at 2 + 890 LT and the Value Engineering team concluded that since nearly all the residents will be relocated, it would be cost effective to purchase all the property and use the area to dispose of waste and develop more usable land.

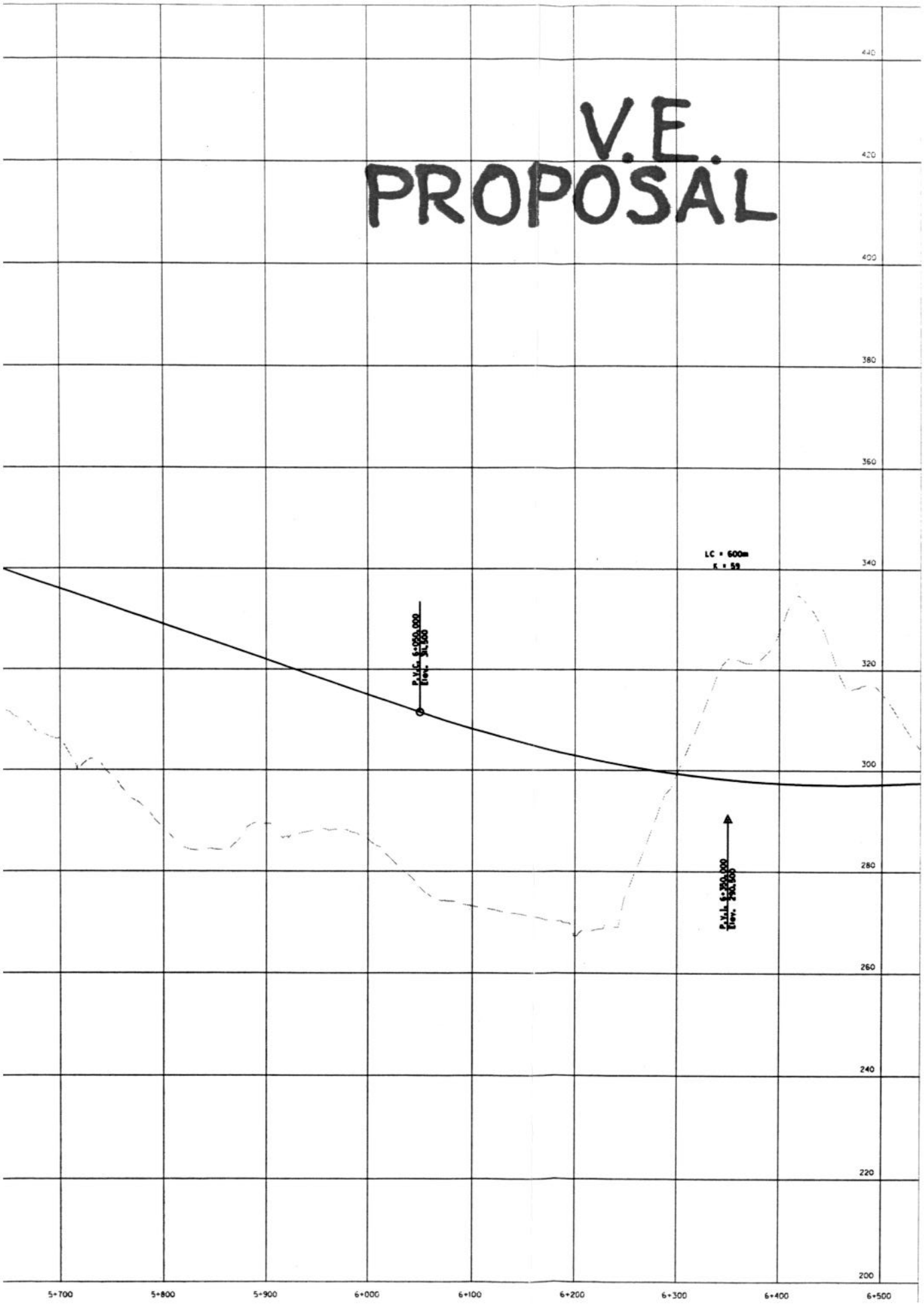


PIKE 46
ALT. 2
SCALE 1: 5

VALUE ENGINEERING ALTERNATIVE



VALUE ENGINEERING
ALTERNATIVE



PIKE 460
ALT. A
SCALE 1: 500

VALUE ENGINEERING ALTERNATIVE

V.E. ALT.

VALUE ENGINEERING ALTERNATIVE

VALUE ENGINEERING ALTERNATIVE
INTERCHANGE A RECONFIGURATION
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
MAINLINE					
EXCAVATION	$ 3.68/cm	3,241,100cm	$11,927,248	3,127,318cm	$11,508,530
PAVING	$757.41/m	2,640m	$ 1,999,562	2,460m	$ 1,863,229
BRIDGES	Lump Sum		$ 5,900,000		$ 5,900,000
MISC.	$466.94/m	2,640m	$ 1,232,722	2,460m	$ 1,148,672
MOB/DEMOB 4.5%			$ 947,679		$ 878,419
ENG/CONTING 15%			$ 3,301,082		$ 3,059,828
TOTAL MAINLINE			$25,308,293		$23,458,678
U.S. 23 INTERCHANGE					
EXC. WEST OF 23 @ $8	$ 8.00/cm	1,284,323cm	$10,274,584	895,702cm	$ 7,165,616
EXC. WEST OF 23 @ $3.68	$ 3.68/cm	0	0	296,998cm	$ 1,092,953
EXC. EAST OF 23	$ 3.68/cm	2,156,068cm	$ 7,934,330	155,904cm	$ 573,727
PAVING-RAMP A	$287.75/m	253m	$ 72,801	220m	$ 63,305
PAVING-RAMP B	$287.75/m	1,418m	$ 408,030	1,180m	$ 339,545
PAVING-RAMP C	$287.75/m	1,109m	$ 319,115	1,315m	$ 378,391
PAVING-RAMP D	$287.74/m	777m	$ 223,582	955m	$ 274,801
MIS.	$116.74/m	3,557m	$ 415,244	3,670m	$ 428,436
MOB/DEMOB 4.5%			$ 884,146		$ 464,255
ENG/CONTING 15%			$ 3,079,775		$ 1,617,154
TOTAL U.S. 23 INTERCHANGE			$23,611,606		$12,398,183
TOTAL			$48,919,898		$35,856,861

Possible Savings $13,063,037

VII.(D) BRIDGE STRUCTURES

VII.(D)(1) DRY FORK ROAD BRIDGE

VII.(D)(1)(a) AS PROPOSED

DRY FORK ROAD BRIDGE

"As Proposed"

The "As Proposed" design is to build new US 460 from the intersection of new US 23 to Greasy Creek. An interchange will be built allowing local traffic to enter and exit US 460. This interchange is to be built at Dry Fork Road. The proposed design is to build the interchange bridge and the pavement to the end of Section 2 at Greasy Creek.

Advantages

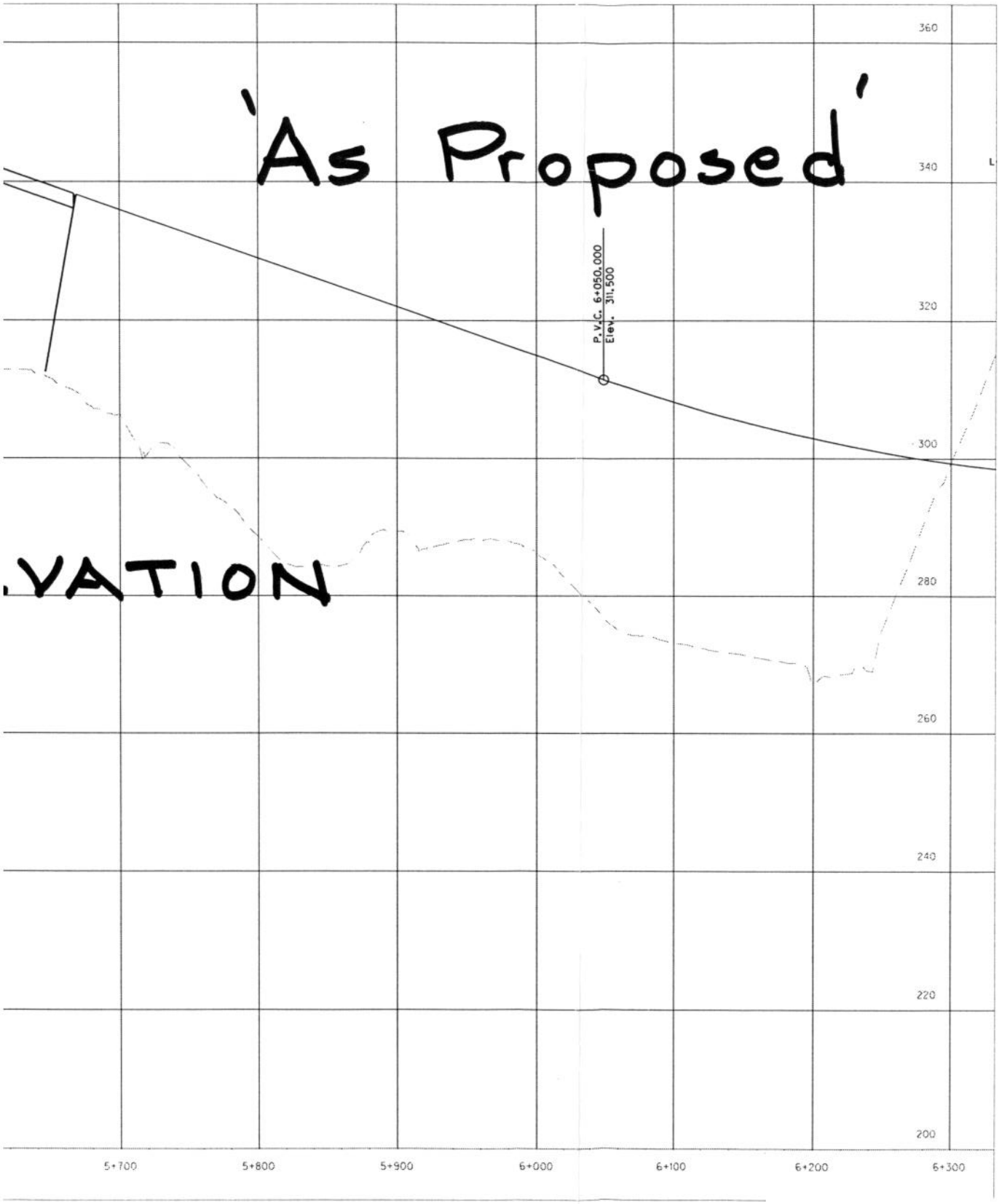
(None noted)

Disadvantages

- requires capital investment without immediate benefit
- lengthens construction time
- requires maintenance of bridge and roadway

AS PROPOSED

1 of 2



AS PROPOSED

2 of 3

VII.(D)(1)(b) V.E. ALTERNATIVE

Value Engineering Alternative - Stop pavement at Section #2 Interchange and do not build bridge

The Value Engineering Alternative is to not build the Dry Fork Road Interchange Bridge and to not build the pavement from Dry Creek to Greasy Creek.

Advantages

- less construction time
- reduces design cost
- allows fill to settle

Disadvantages

(none noted)

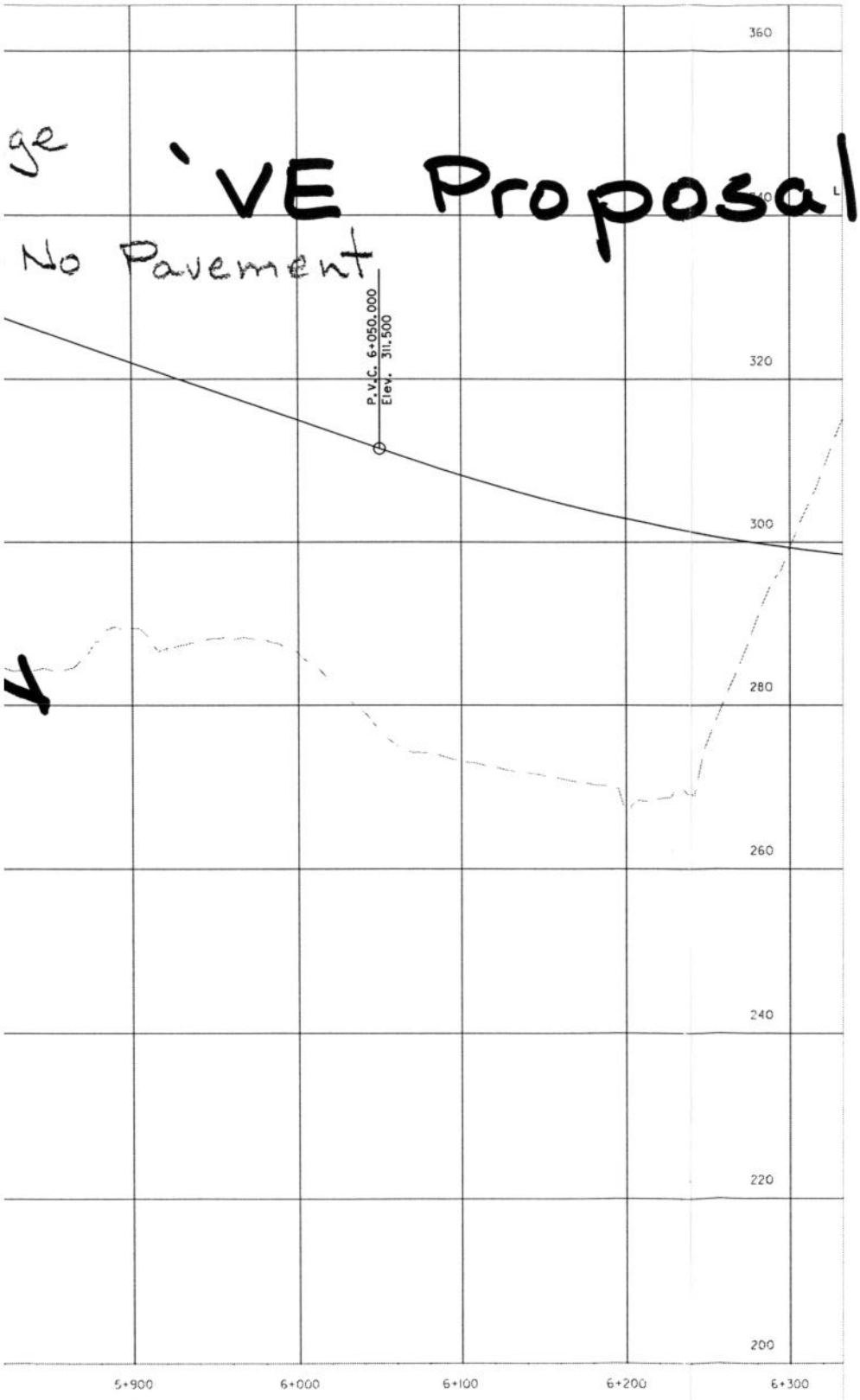
Discussion

The "As Proposed" design is to build the bridge at Dry Fork Road and to pave the roadway from Dry Fork Road to Greasy.

Sections 1 and 2 of the project are in the current 6 year plan but are unfunded. Section 3 is not in the current 6 year plan. Therefore, it is anticipated that it may be 10 years before Section 3 is built, the section of roadway from Dry Fork Road to Greasy Creek will be a road to 'nowhere' because there will be not be a connection of KY 460 at Greasy Creek. If the bridge at Dry Fork Road and the pavement from Dry Fork Road to Greasy Creek are built they will serve no purpose, they will require maintenance and will have a reduced usable life. The Value Engineering Alternative is to not build the Dry Fork Road Bridge and not pave the portion from Dry Fork Road to Greasy Creek. The savings is computed base on a 3% inflation rate for construction cost and a 7% discount rate. If the entire project was funded and the decision was made during construction to build the bridge and pavement then those funds could be set aside. The future cost will be greater than the present cost but less funds are required to be invested now that would offset those future costs. Also, if the fill is constructed now, then it will have 10 years to settle before the pavement is built.

VALUE ENGINEERING ALTERNATIVE

1 of 2



ge

'VE Proposal'

No Pavement

VALUE ENGINEERING ALTERNATIVE

2 of 2

DESIGN COMMENTS

Design Comment #1
Waste Disposal under US 23 Shelby Creek Bridge west of proposed intersection.

Proposed Alignment A requires 1,244,000 cm of waste north side of US 23. The portion of the intersection south of US 23 requires 2,000,000 cm of waste. An area under bridge on US 23 over Shelby Creek Station 1305+95, drawing number 21958, might be utilized for 100,000 cm of waste. Possibly, waste could be constructed from elevation 220 to 240 in the south two spans. Haul distance from proposed intersection to bridge is 600 meters.

The team recommends further investigation of this idea to determine feasibility. Further review of impact on bridge piers from fill would be needed to determine the maximum amount of fill to be used. Additionally, 67 meter flood plain for Shelby Creek must be maintained in this area.

Design Comment #2
Portland Cement Concrete Pavement Option

A Portland Cement Concrete pavement option in lieu of asphalt was discussed in the speculation phase of the Value Engineering study. The team elected to drop this option early in the analysis phase of the study due to low potential for cost savings. The team recommends that the design team further investigate this option using life-cycle costing based on the District's maintenance experience over the 40 yr. life of project.

Design Comment #3
Pull Over Areas for Weight Enforcement

The project purpose and need statement placed considerable emphasis on the high truck traffic and that Pikeville is expected to become a major trucking and distribution hub for the tri-state area.

In view of this the team is of the opinion that there is a need for further investigation into the feasibility of including weight inspection facilities in this project. Increased pavement life would be one of the benefits of increased weight enforcement.

Discussions with Mr. Jeff Bibb, Motor Vehicle Enforcement Office, stated that enforcement staffing for the area had recently been increased from 3 to 8 officers. Mr. Bibb further stated that a permanent station would probably not be appropriate, but that paved pull-overs as envisioned by the VE team, could be beneficial. Increased Inspection Stops would then be feasible in a safe manner at designated locations.

Further investigation and study by Kentucky Transportation Cabinet should determine the appropriate location and the desired design for these facilities. The team believes that fill locations could be utilized so that the additional embankment width required would provide an additional waste area for the project. Additional construction cost may be off-set by additional pavement life and the potential increase in enforcement revenue. The team is aware that asphalt paved roadways in this area are being re-surfaced at 5-year intervals, twice the rate of other parts of the state.

A concept which could be investigated, is a standard truck deceleration lane and "off-ramp" leading to a paved area two lane widths wide (one travel lane/one weigh and inspection lane), followed by a standard one lane "on-ramp" with a truck acceleration lane. Details of the design should be developed by the design team in conjunction with appropriate Motor Vehicle Inspection staff.

Design Comment #4
Dry Fork Road alignment.

The "As Proposed" access road (Dry Fork Road) at the east end of the project is on a 10% downgrade & aligned with the Greasy Creek school at the termination point. The VE team recommends realignment of Dry Fork Road to avoid the conflict.

Design Comment #5
Method to Shorten Bridges

The "As Proposed" bridges were only identified by length, width, maximum span lengths and several possible foundation types. Bridge ends are not located; therefore, it is not possible to determine if the bridge ends are in the rock cut or fill sections. Also, no geotechnical report was available. Therefore, it was not possible to compare a VE Alternative to a largely unknown "As Proposed" bridge. The cost basis for the "As Proposed" bridges is based on the assumed plan area of the bridge times an assumed cost per square meter of bridge. The cost is based on assumed bridge type and height of piers.

V.E. Alternatives:

The Value Engineering team has identified several alternatives to reduce bridge lengths.

1. Steepen the front fill slope. Hold the toe of the front slope and steepen the front slope from 2:1 to 1:1. For every meter of height from the toe of slope to the berm in front of the abutment, the bridge length could be reduced by twice this amount, i.e. vertical height of fill = 30 meters. Then the bridge length could be reduced by 60 meters. Assuming a bridge width of 13.6 meters and a cost of $\$600/m^2$, this could be $489,600. The fill is basically rock; therefore, it should be stable on a steeper slope. If the slope is not stable, it could be reinforced with a geosynthetic or only steepened to a slope of 1-1/2 to 1. The $489,600 savings is per bridge.

2. **Deepen abutment or retaining walls. Another method of shortening the bridge is by using deepened abutments or retaining walls. For every meter of extra depth of abutment there could be a reduction of bridge length by 4 times that depth. Assuming a two meter depth of abutment increase or a retaining wall, the savings could be as follows:**

Bridge Cost 13.6 x 8 x $600/m^2	=	**$65,280**
Extra abutment cost 4m x 1m x 13.6m x $350m^3	=	$19,040
Savings	=	**$46,240/bridge**

The Value Engineering team feels these example savings show the need for the designer to further investigate which of these or combination of these methods may be appropriate.

VIII. SUMMARY OF RECOMMENDATIONS

SUMMARY OF RECOMMENDATIONS

It is the recommendation of the Value Engineering team that the following Value Engineering Alternatives be carried into the Project Development process for further development.

Recommendation Number 1-Roadway Alignment

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative combines "A" alignment with "C2" alignment in Section 1 from approximate Station 1 + 500 to 2 + 500

If this recommendation can be implemented, there is a possible savings of $4,997,092.

Recommendation Number 2-Profile Grades

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative revises fill slopes and grades in selected areas of the project.

If this recommendation can be implemented, there is a possible savings of $2,410,573.

Recommendation Number 3-Interchanges

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative moves Interchange "A" south from the "As Proposed" location and reconfigures the Interchange.

If this recommendation can be implemented, there is a possible savings of $13,063,037.

Recommendation Number 4-Bridge Structure: Dry Fork Road Bridge

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative stops pavement at Section 2 Interchange and does not build the Dry Fork Road Bridge.

If this recommendation can be implemented, there is a possible savings of $729,224.

Recommendation Number 5-Bridge Structure: US 460/CSX Railroad Bridge

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative relocates old US 23 under US 460/CSX railroad bridge and shortens bridge.

If this recommendation can be implemented, there is a possible savings of **$751,694.**

US 460 - YEAGER TO GREASY CREEK; PIKE COUNTY
V.E. STUDY PRESENTATION
DECEMBER 9, 1997

NAME	AFFILIATION	PHONE
Joe Waits	Ventry Engineering	850-627-3900
Daryl Greer	KTC- Hwy Design VE Coordinator	502-564-3280
Ron Whichel	Ventry Engineering	850-717-3900
Ken Sperry	KTC- Hwy Design	502-564-3280
Bob Lewis	KTC- Const	502-564-4780
Robert Semones	KTC- Hwy Design	502-564-3280
Doug Smith	KTC- Geotech	502-564-2374
Lowell Filsinger	Ventry Engineering	850-627-3900
Joette Fields	KTC- Hwy Design	502-564-3280
Andre Johannes	KTC- Hwy Design	502-564-3280
Don Keenan	Ventry engineering	850-627-3900
John Sacksteder	KTC- Hwy Design	502-564-3280
David Lindeman	Palmer Engineering	606-744-1218
Rick Lambert	Palmer Engineering	606-744-1218
Kevin Damron	KTC- D-12 Preconst.	502-564-3280
Jim Wood	KTC CO Operations	501-564-4556
David Kratt	KTC CO Design	502-564-3280

The Presentation of the Value Engineering Study began at 1:15 P.M., December 9, 1997, at the State Office Building, Frankfort Kentucky.

Joe Waits, Team Leader, Ventry Engineering, opened the Presentation meeting with introduction of team members and those present in the audience. He then discussed the Value Engineering process that the team had followed during the study. He particularly emphasized that the study was intended to add value to the project and in no way was critical of the current design concepts. To the contrary, the Value Engineering team found the current design to be professionally prepared and fully responsive to the required project functions.

Team members then presented five alternative proposals and discussed four design comments.

V.E. Alternative-Roadway Alignment	Presented by Doug Smith and Bob Lewis
V.E. Alternative-Grades	Presented by Lowell Filsinger
V.E. Alternative-Interchanges	Presented by Ken Sperry
V.E. Alternative No. 1-Dry Fork Road Bridge	Presented by Don Keenan
V.E. Alternative No. 2-US 460/CSX Railroad Bridge	Presented by Don Keenan
Design Comments	Presented by Ron Whichel

Discussion

A general discussion of the alternatives then ensued at the completion of the Presentations.

- Moving Interchange "A" southward was conceptually favored by the group. The consultant with Palmer Engineering, David Lindeman, had done some work over the weekend after meeting with the VE team last week and discussing the possibility. At this time it appeared to be feasible. He implied that some further investigation and development work is anticipated to determine required design and feasibility.

- David Lindeman indicated that Alt. A in Section 1, and C in Section 2 were still favored, and saw little chance for a C2 Interchange.

- The combination of line "A" and "C2" in VE Alternative-Grades was not favored because of the additional "takes" required in the lower alignment.

- Revising grades and slopes was generally favored in concept. Further investigation and development will be required to determine feasibility.

- Weight enforcement provisions in design comments was generally favored by the group, with additional investigation to follow.

- The Dry Fork Road/Greasy Creek School conflict was addressed during the Value Engineering Presentation. It was noted the Dry Fork Road was on a 10% downgrade & aligned with the Greasy Creek School. Kevin Damron, Kentucky Transportation Cabinet, District 12, and David Lindeman, Palmer Engineering, both agreed this would be addressed in the forthcoming Line and Grade Review (week of 15 Dec., 1997). It was stated this conflict would probably be resolved before final design, and the Dry Fork Road realigned to avoid the conflict.

In final comments, Joe Waits expressed appreciation to Daryl Greer, Kentucky Transportation Cabinet Value Engineering Coordinator, for his outstanding support of the team during the study. The study was greatly enhanced by his presence and support of the team. Also, the outstanding CADD support of Rick Lambert, Palmer Engineering, was acknowledged.

Daryl Greer and Kevin Damron both complimented the team for the study effort, and were appreciative for the input the team made to "Line and Grade" conference to be held the following week.

The Presentation Conference ended at 2:30 P.M.