VALUE ENGINEERING SUMMARY
OF
US 119/BENT MT. TO COBURN MT.
WPI NO. 12-264.01
PIKE COUNTY, KENTUCKY

DECEMBER 5-13, 1996

Prepared by:
Ventry Engineering

In Association With:

Kentucky Transportation Cabinet,
Department of Highways

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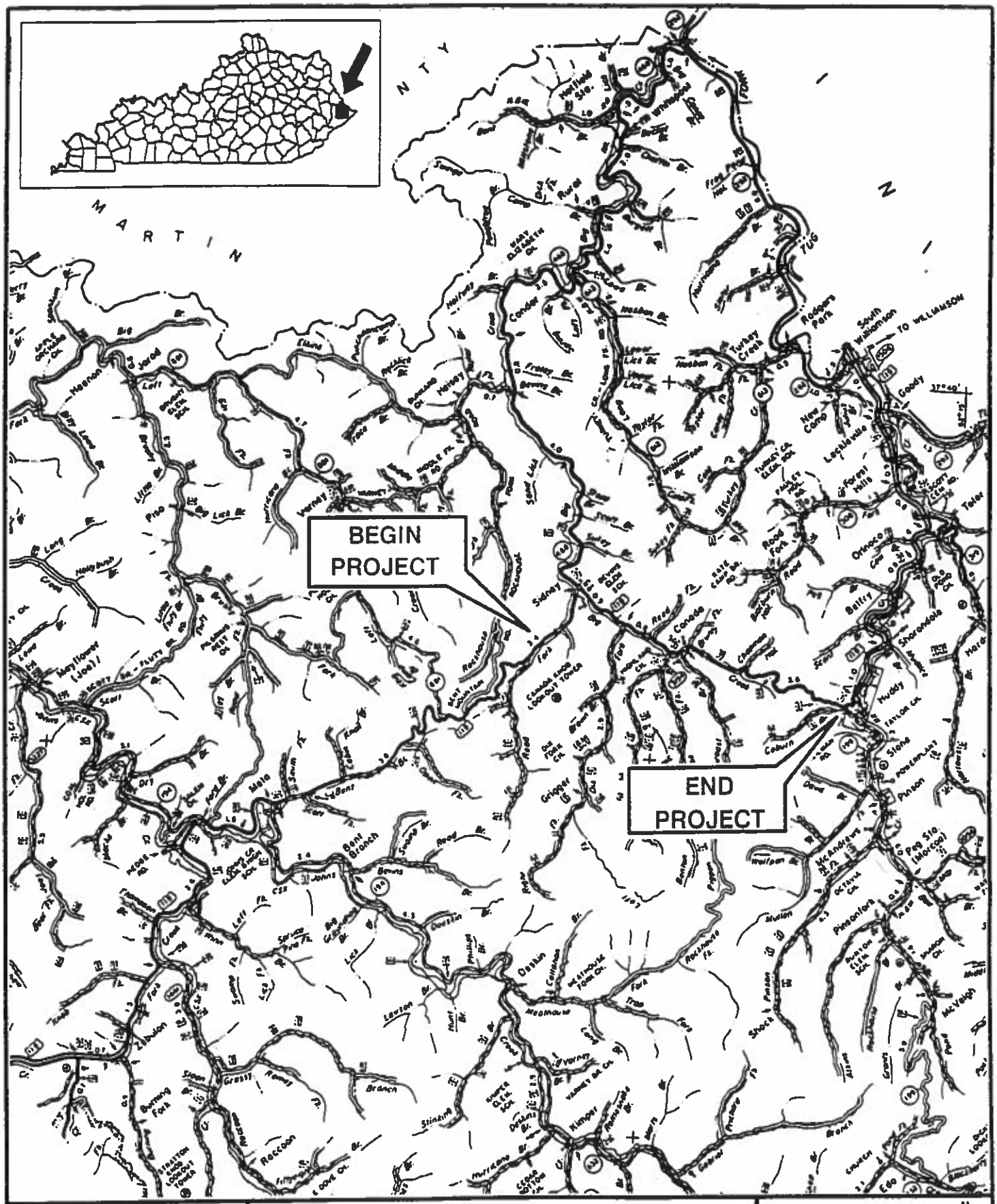
I. LOCATION OF PROJECT



Palmer ENGINEERING

DAVIESS • THOMPKINSVILLE • LOUISVILLE

EXHIBIT 1

PROJECT LOCATION MAP

Pike County, Kentucky

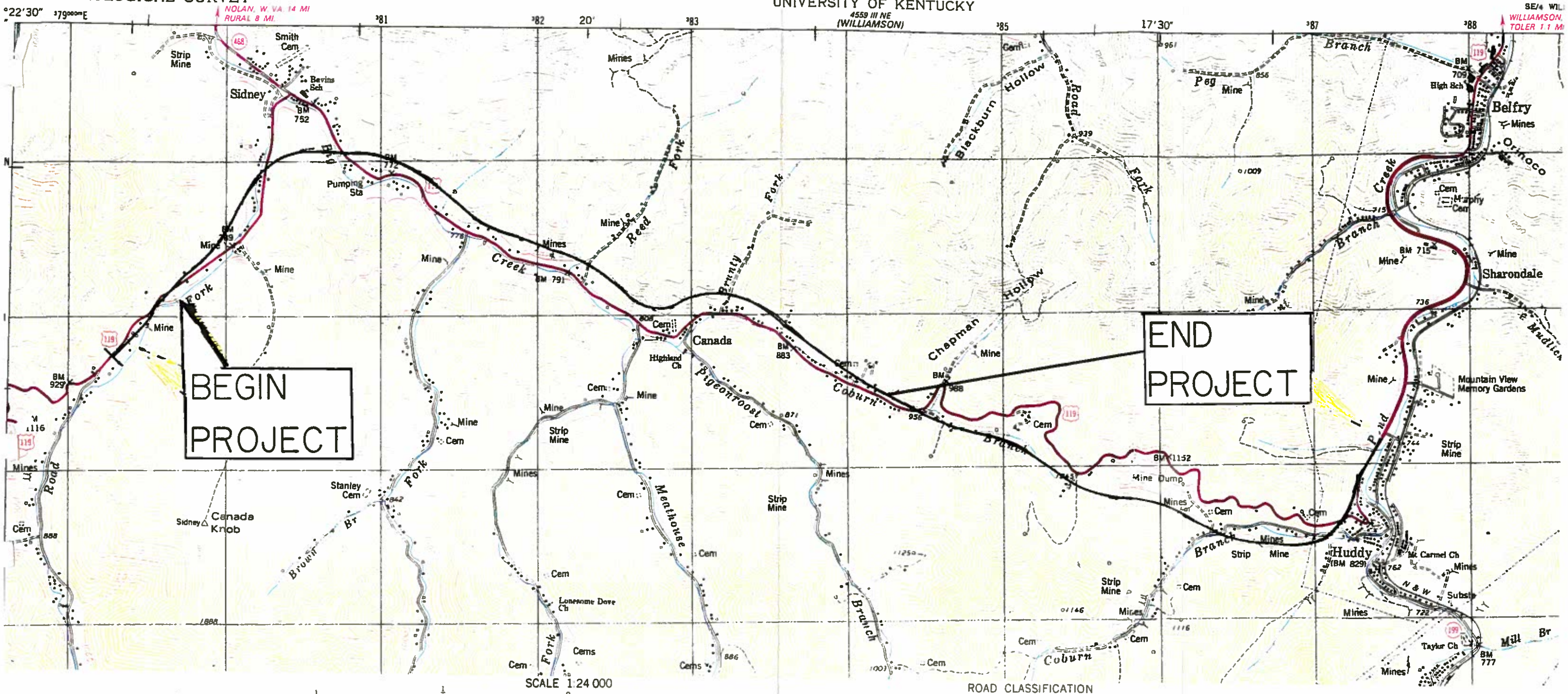
US 119 (Sidney - Huddy)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF KENTUCKY
KENTUCKY GEOLOGICAL SURVEY
UNIVERSITY OF KENTUCKY

4559 III NE
(WILLIAMSON)

BELFR
KENT
7.5 MINUTE
SE/4 WIL



SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MN
GN
3° 53 MILS
0°48' 14 MILS

UTM GRID AND 1978 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
KENTUCKY GEOLOGICAL SURVEY LEXINGTON, KENTUCKY 40505
AND KENTUCKY DEPARTMENT OF COMMERCE, FRANKFORT, KENTUCKY 40601
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route U S Route State Route

KENTUCKY
QUADRANGLE LOCATION

BELFRY, KY.
SE/4 WILLIAMSON 15' QUADRANGLE
N3730-W8215/7.5

1978

AMS 4559 III SE—SERIES V853

EXHIBIT 2

Topographic Map Showing Proposed Alternate Compared to Existing Situation

U.S. 119 Sidney – Huddy

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II. TEAM MEMBERS, PROJECT DESCRIPTION AND PERSONS CONTACTED

TEAM MEMBERS

NAME	AFFILIATION	EXPERTISE	PHONE
Jack Trickey, P.E.	Ventry Engineering	Team Leader	904/627-3900
Don Keenan, P.E.	Ventry Engineering	Structural Team Member	904/627-3900
William Nickas, P.E.	Ventry Engineering	Roadway Team Member	904/627-3900
Tom Howard, R.L.S.	Ventry Engineering	Right of Way Team Member	904/627-3900
Doug Smith	KY Transportation Cabinet	Geotechnical	502/564-2374
Steve Criswell, P.E.	KY Transportation Cabinet	Construction	502/564-4780

PROJECT DESCRIPTION

A 5.9 kilometer (3.65 mile) highway improvement is proposed for east-central Pike County, Kentucky. The project calls for relocation of existing U.S. 119 from road fork to Big Creek (Sta. 21 + 214) to just west of Chapman Hollow (Sta. 26 + 998.192).

The proposed alignment for the most part, is located on steep slopes typically within 150-300 meters of U.S. and should have very little impact on local traffic during construction.

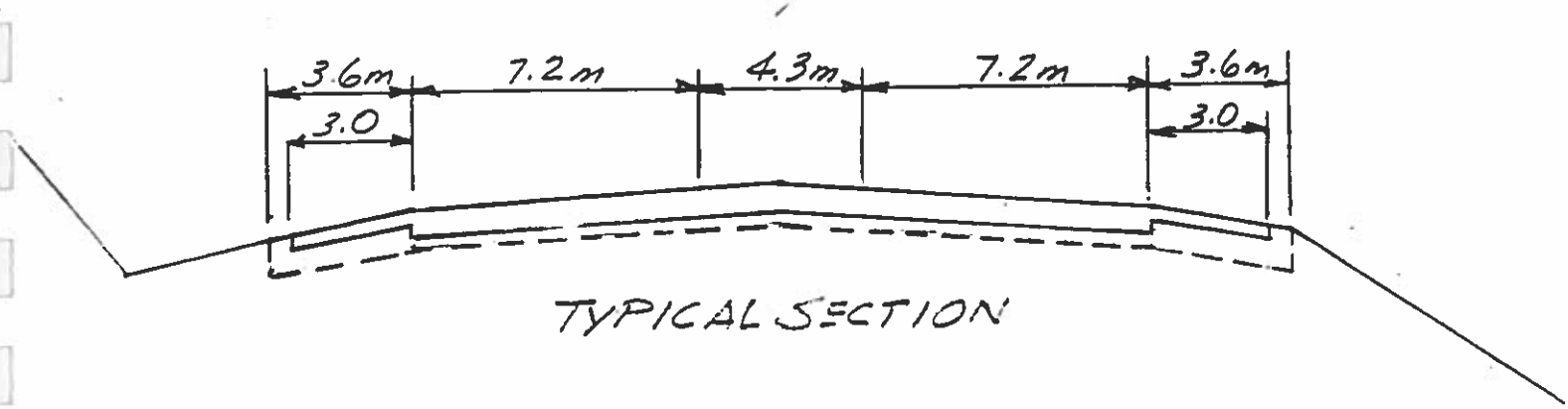
The proposed project is functionally classified as a rural arturial in mountainous terrain.

The project as proposed will entail two bridges over existing U.S. 119 of approximately 193 and 164 meters in length. The proposed project will also require numerous box and pipe culverts as well as a few channel changes.

There are two major at grade connections proposed to existing U.S. 119 as well as several at grade connections for community roads.

The proposed typical section consist of a 4.3m flush median and two 7.2m roadways with 3.0m shoulders. Median barrier is proposed at strategic locations. The project will displace approximately 42 families, 5 businesses and 44 graves. Three gas well will also be affected.

The existing and proposed facility not only serves local traffic, but is a major route for many coal operations located throughout the area.



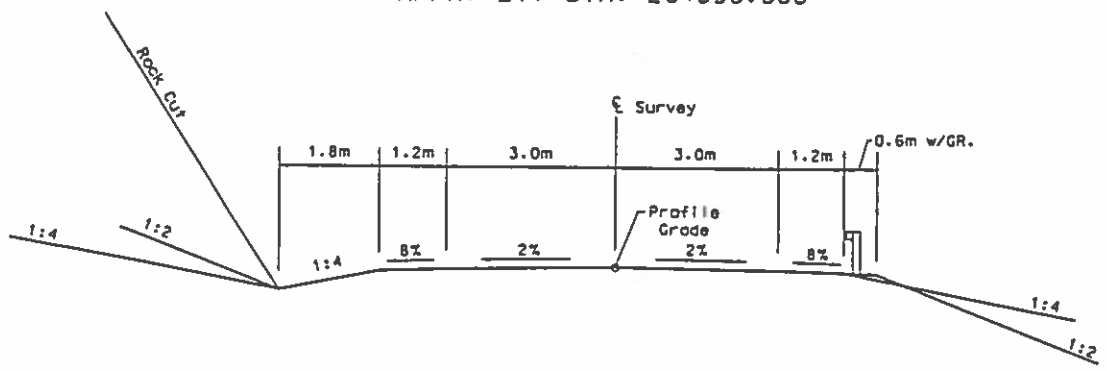
TYPICAL SECTION

TYPICAL SECTIONS

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

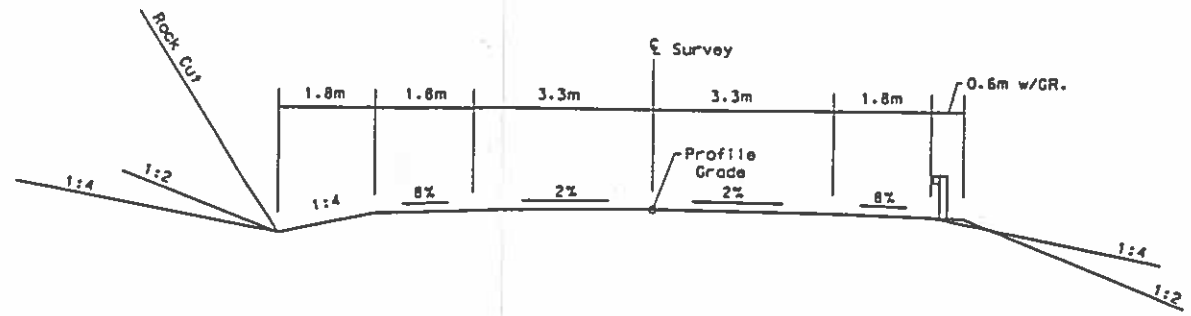
US 119 (PIKEVILLE – S. WILLIAMSON RD.)
000APD 0506 009
FD18 098 0019 015-020 155D

APPR. RT. STA. 1+214.884 (Lt. US 119 Conn.)
REED FORK RD. (Lt. Sta. 24+917)
BRUNTY FORK RD. (Lt. Sta. 25+937)
APPR. LT. STA. 26+310.000
APPR. LT. STA. 26+890.000

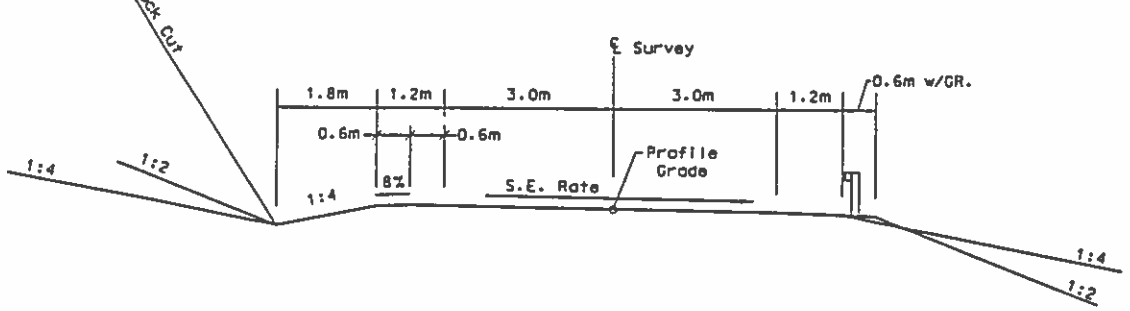


NORMAL SECTIONS

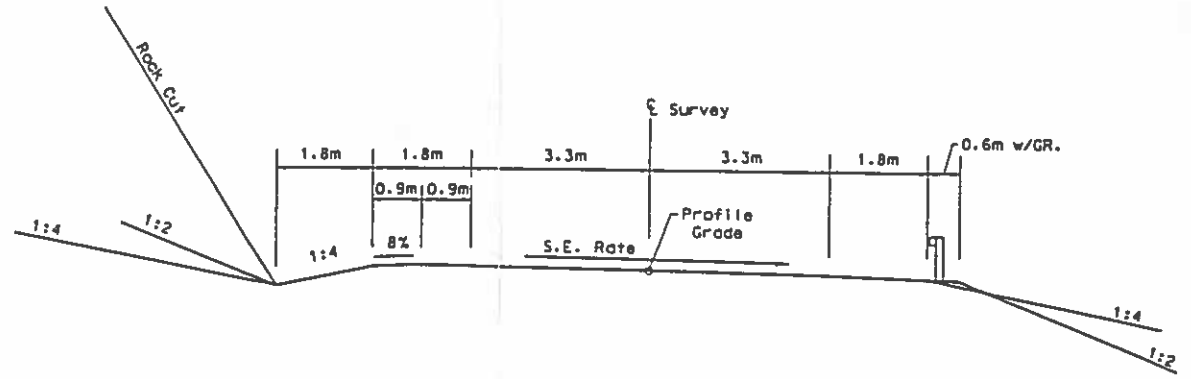
US 119 CONNECTOR (RT. 21+962.000)



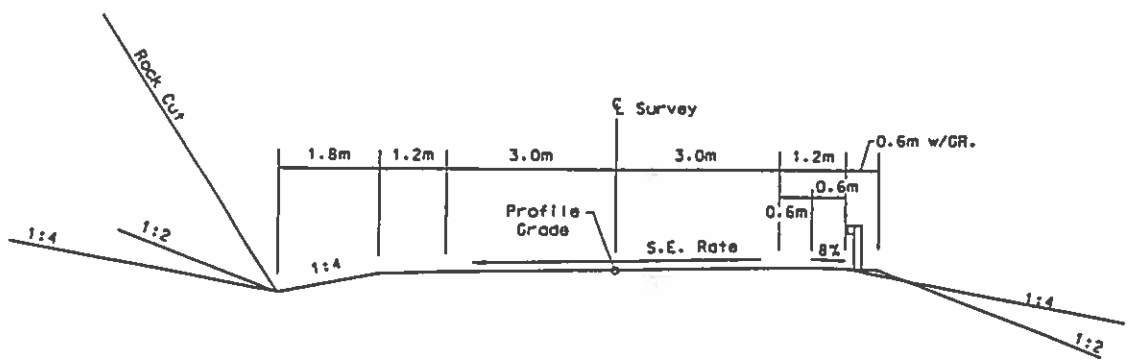
NORMAL SECTIONS



SUPERELEVATED SECTION RT.

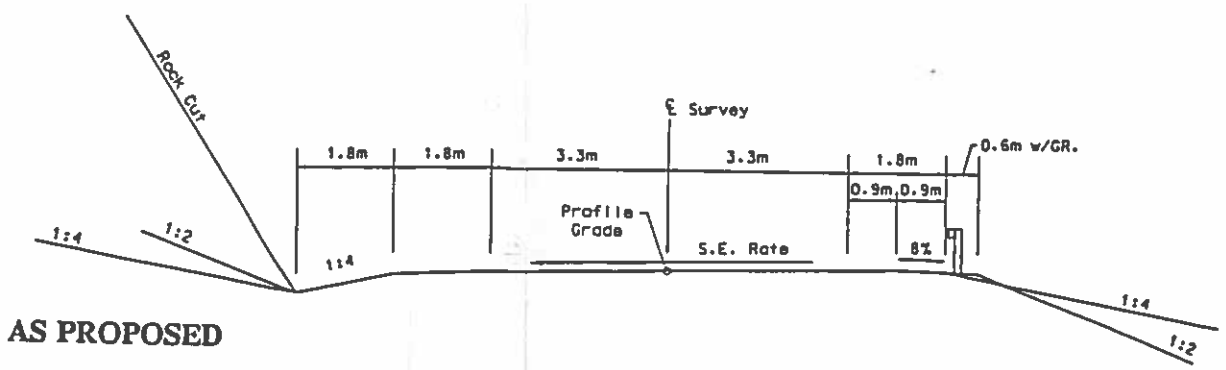


SUPERELEVATED SECTION RT.



SUPERELEVATED SECTION LT.

AS PROPOSED



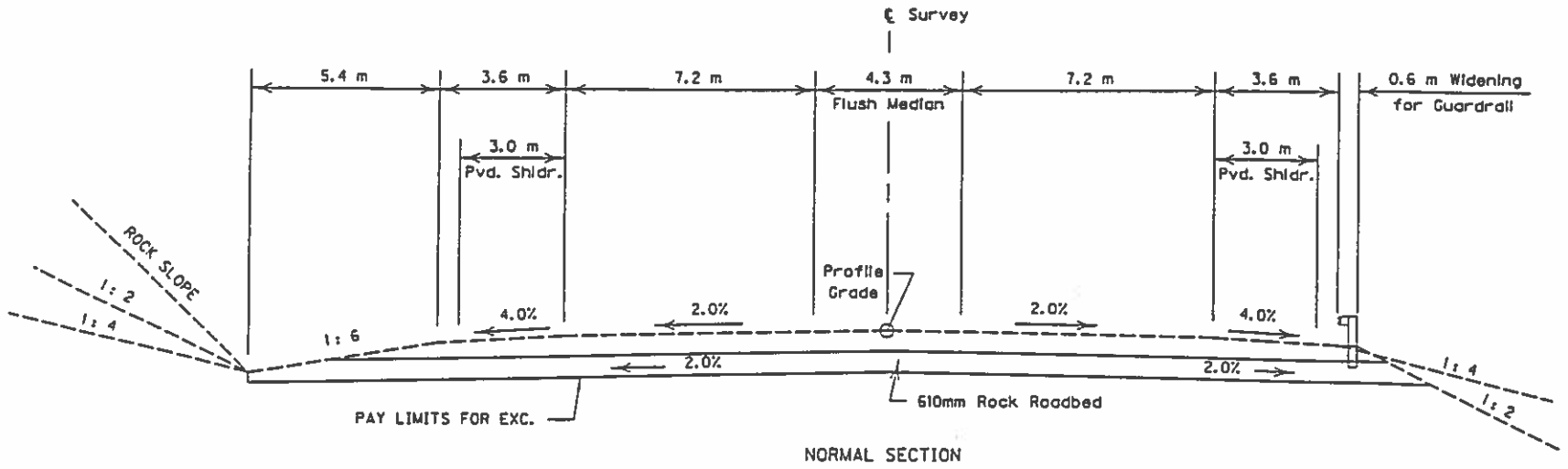
SUPERELEVATED SECTION LT.

TYPICAL SECTIONS

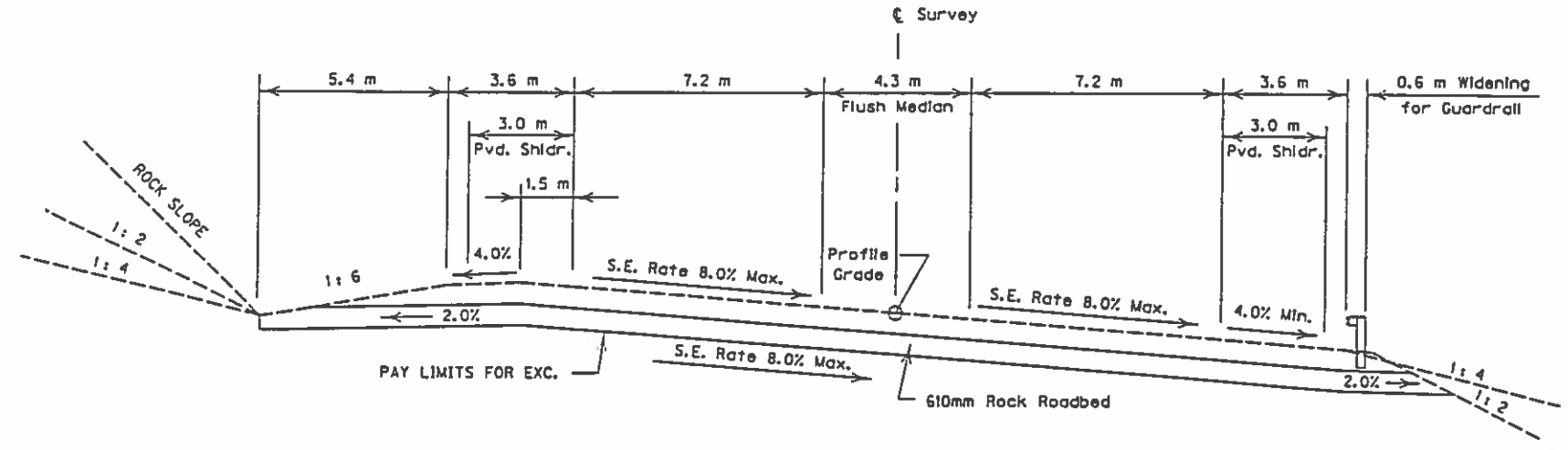
COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville-S. Williamson Rd.)
00APD 0506 009

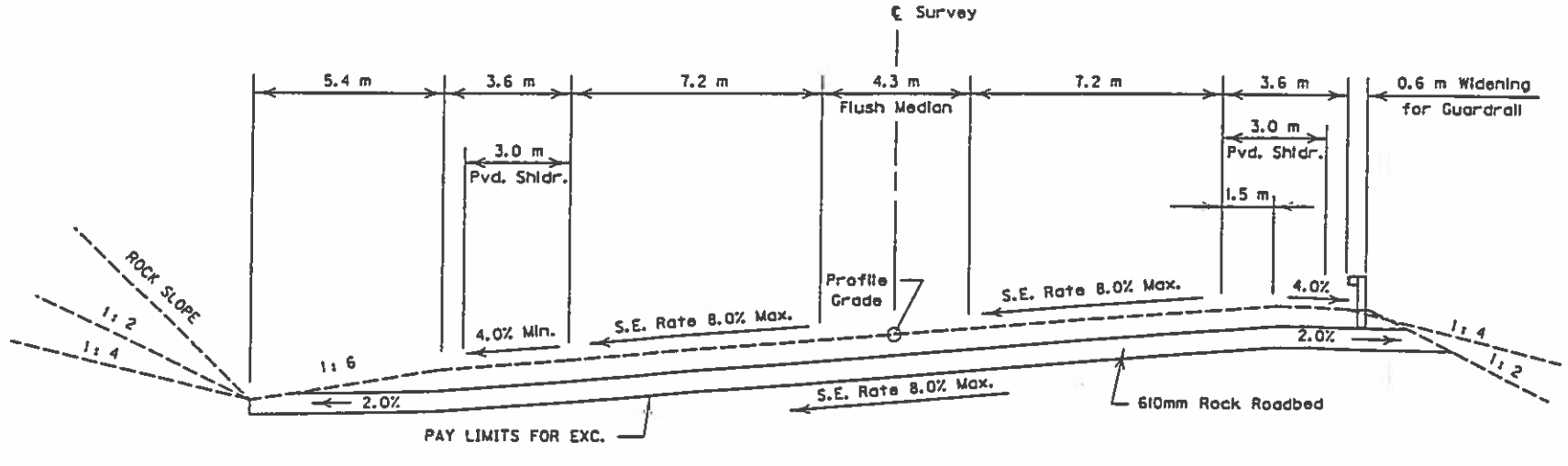
MAINLINE
GRADE & DRAIN



NORMAL SECTION



SUPERELEVATED SECT. RT.



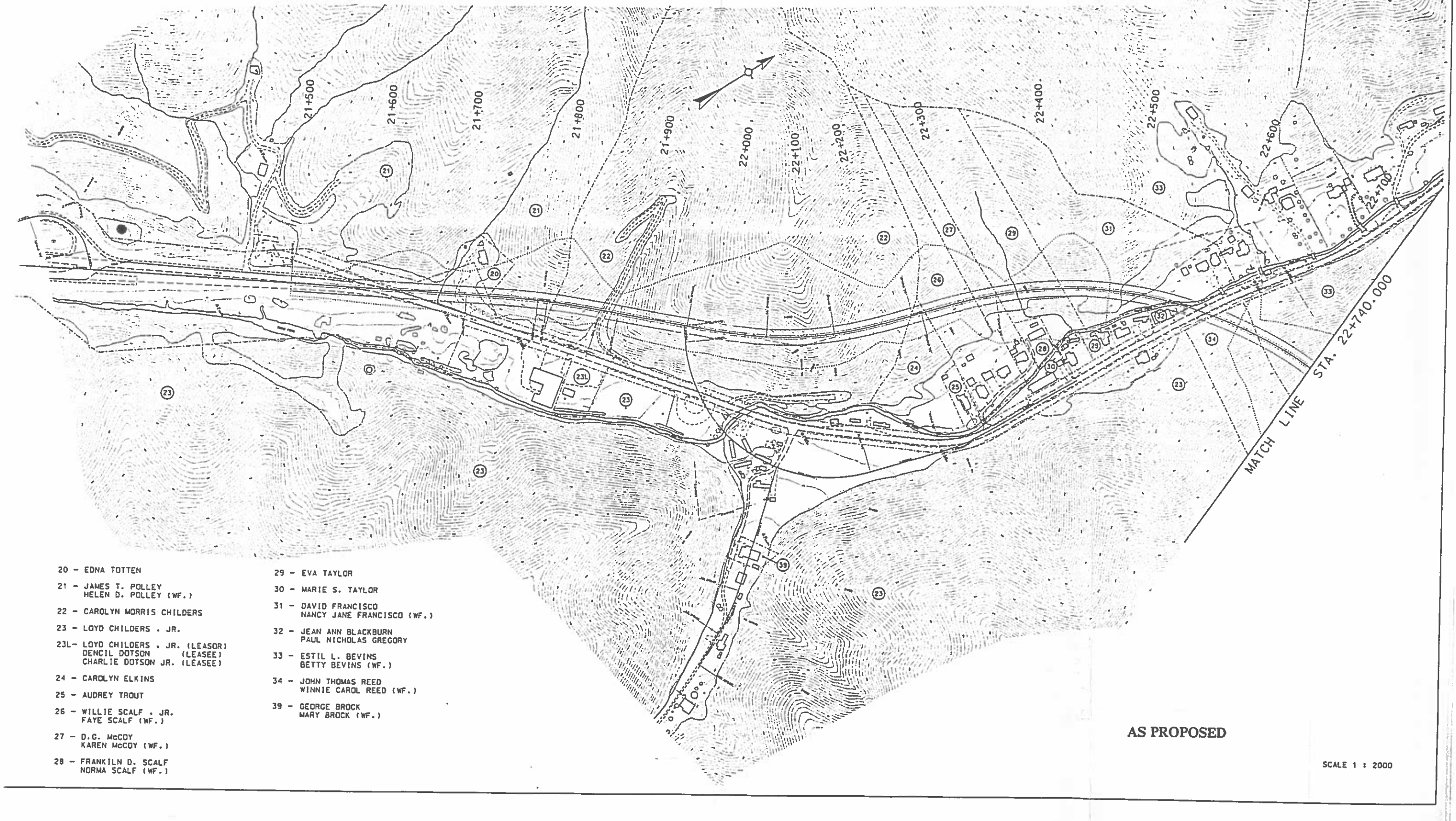
SUPERELEVATED SECT. LT.

AS PROPOSED

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

R/W STRIP MAP

US 119 (Pikeville - S.Williamson Rd.)
00APD 0506 009



20 - EDNA TOTTEN

21 - JAMES T. POLLEY
HELEN D. POLLEY (WF.)

22 - CAROLYN MORRIS CHILDERS

23 - LOYD CHILDERS , JR.

23L- LOYD CHILDERS , JR. (LEASOR)
DENCIL DOTSON (LEASEE)
CHARLIE DOTSON JR. (LEASEE)

24 - CAROLYN ELKINS

25 - AUDREY TROUT

26 - WILLIE SCALF , JR.
FAYE SCALF (WF.)

27 - D.G. McCOY
KAREN McCOY (WF.)

28 - FRANKILN D. SCALF
NORMA SCALF (WF.)

29 - EVA TAYLOR

30 - MARIE S. TAYLOR

31 - DAVID FRANCISCO
NANCY JANE FRANCISCO (WF.)

32 - JEAN ANN BLACKBURN
PAUL NICHOLAS GREGORY

33 - ESTIL L. BEVINS
BETTY BEVINS (WF.)

34 - JOHN THOMAS REED
WINNIE CAROL REED (WF.)

39 - GEORGE BROCK
MARY BROCK (WF.)

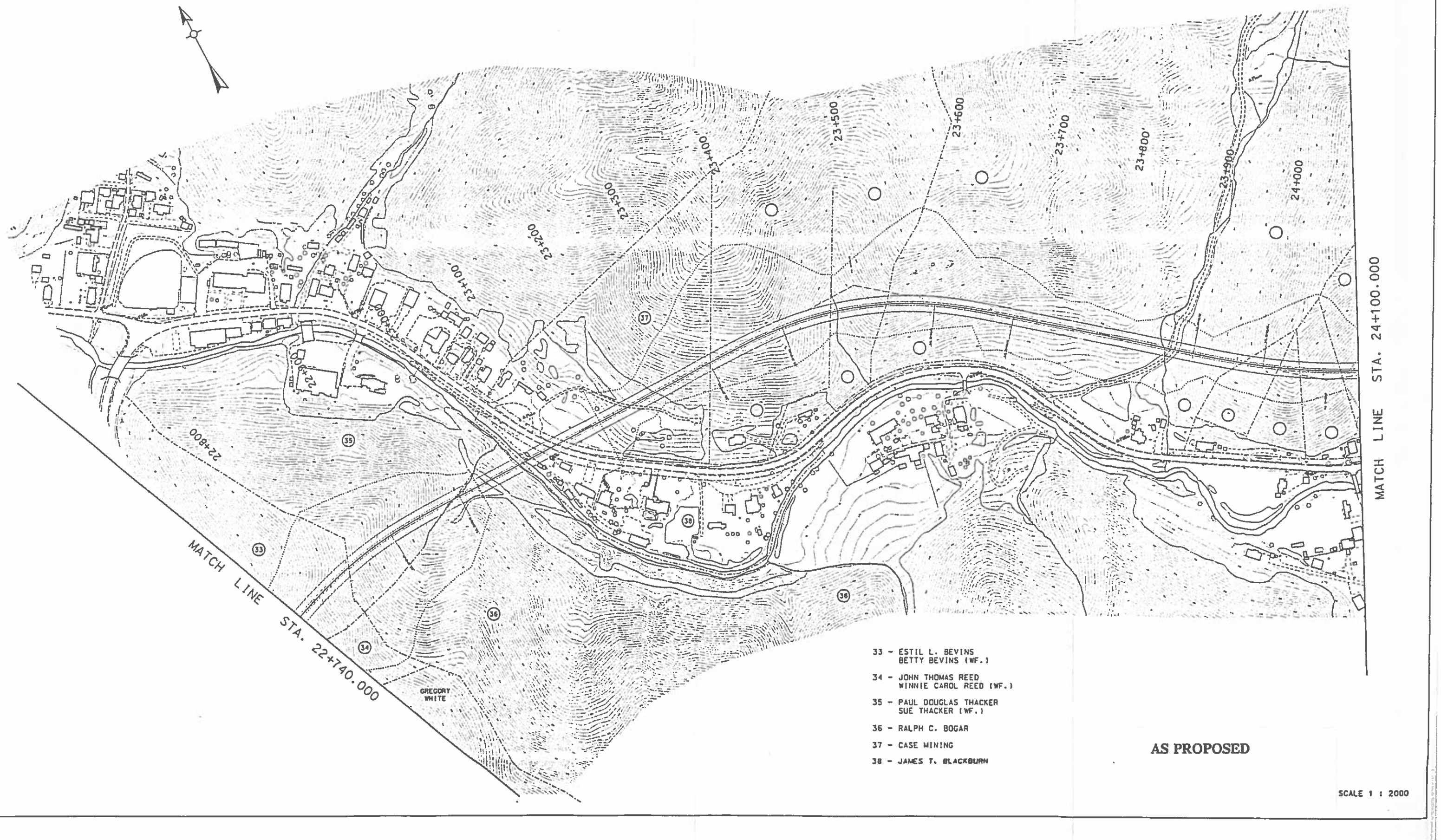
AS PROPOSED

SCALE 1 : 2000

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville – S. Williamson Rd.)
00APD 0506 009

R/W STRIP MAP



33 – ESTIL L. BEVINS
BETTY BEVINS (WF.)

34 – JOHN THOMAS REED
WINNIE CAROL REED (WF.)

35 – PAUL DOUGLAS THACKER
SUE THACKER (WF.)

36 – RALPH C. BOGAR

37 – CASE MINING

38 – JAMES T. BLACKBURN

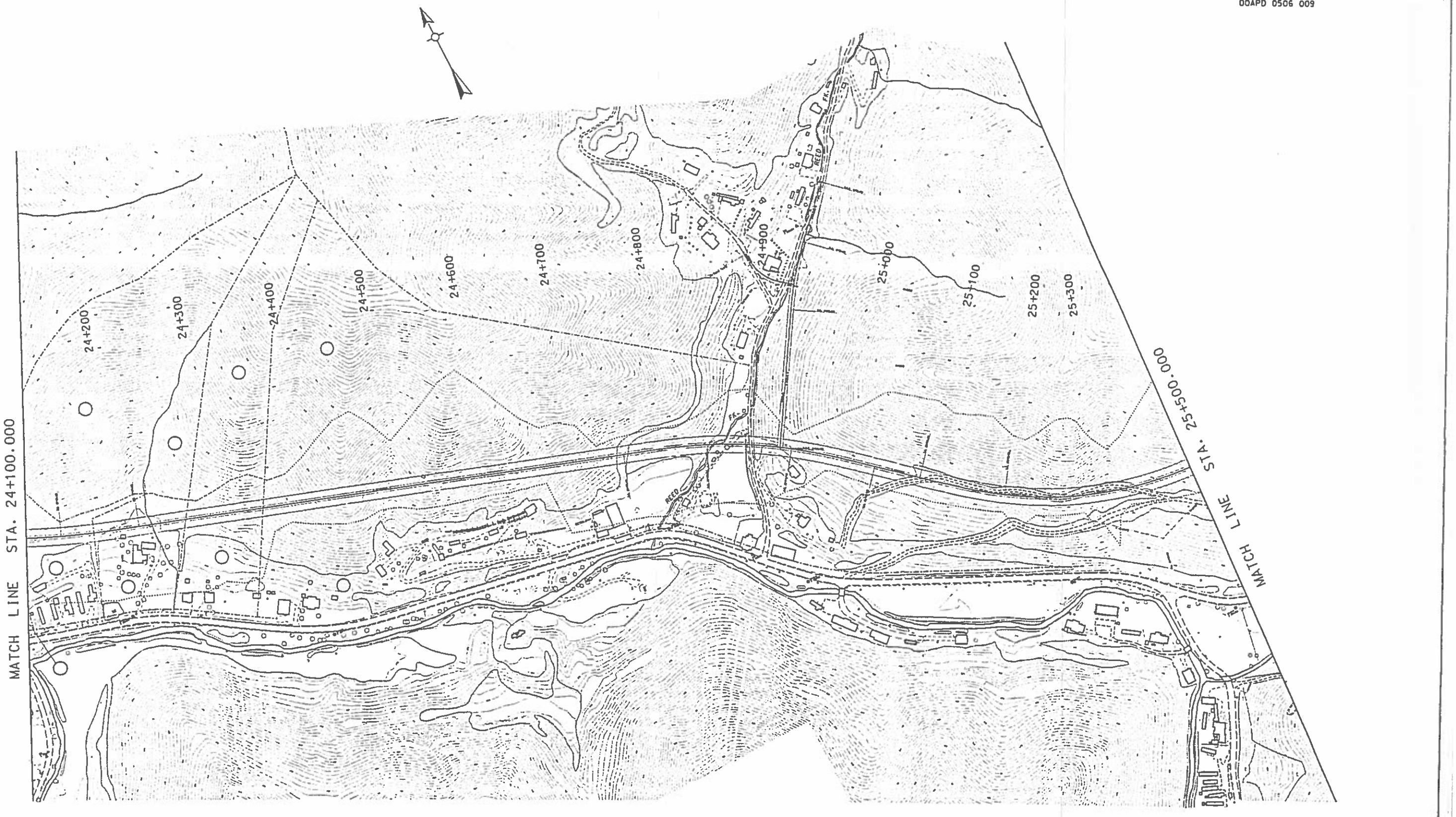
AS PROPOSED

SCALE 1 : 2000

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville - S. Williamson Rd.)
00APD 0506 009

R/W STRIP MAP



AS PROPOSED

SCALE 1 : 2000

R/W STRIP MAP

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville - S. Williamson Rd.)
00APD 0506 009

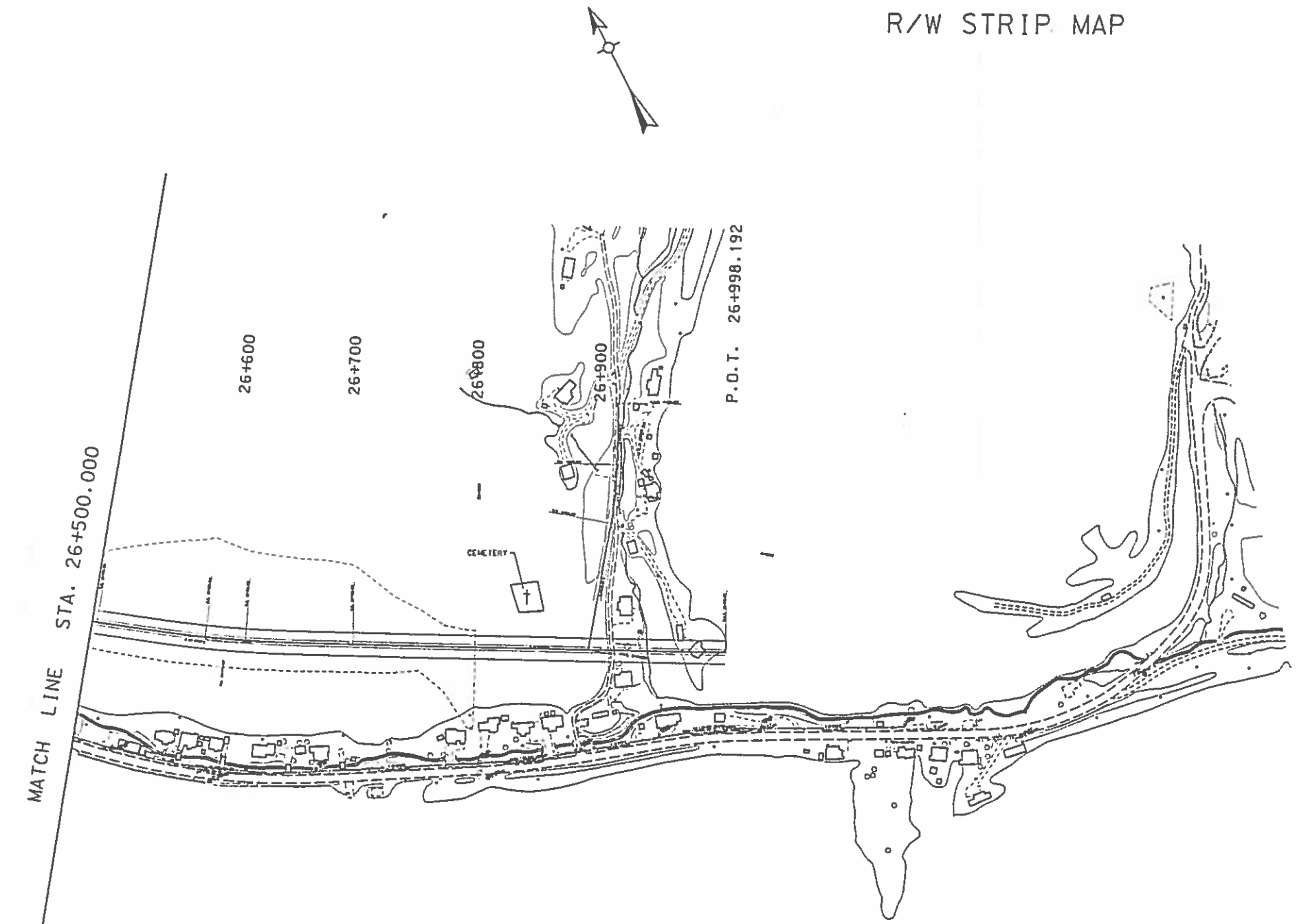
AS PROPOSED

SCALE 1 : 2000

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville - S. Williamson Rd.)
00APD 0506 009

R/W STRIP MAP



AS PROPOSED

SCALE 1 : 2000

PRELIMINARY ESTIMATE
PIKE COUNTY, US 119, SECTION I
ROAD FORK to BIG CREEK; STA 21+214 to 23+220
FD52 098 0119 015-020 APD 0506 008
NET LENGTH 2.0 km
GRADE AND DRAIN
RURAL ARTERIAL

October 15, 1996

ITEM CODE	ITEM	UNIT	QUANTITY	UNIT COST	COST
	Mainline Paving	km	0.74	$950,000	$703,000
	Approach Paving	km	0.87	$190,000	$165,300
462	Culvert Pipe - 450mm	meter	0	$105.00	$0
464	Culvert Pipe - 600mm	meter	160	$130.00	$20,800
466	Culvert Pipe - 750mm	meter	50	$150.00	$7,500
468	Culvert Pipe - 900mm	meter	55	$170.00	$9,350
469	Culvert Pipe - 1050mm	meter	0	$200.00	$0
471	Culvert Pipe - 1350mm	meter	0	$270.00	$0
474	Culvert Pipe - 1800 mm	meter	50	$440.00	$22,000
475	Culvert Pipe - 1950 mm	meter	0	$490.00	
1490	Drop Box Inlet Type 1	each	4	$2,000.00	$8,000
1450	S&F Box Inlet-Outlet - 450mm	each	0	$1,500.00	$0
1451	S&F Box Inlet-Outlet - 600mm	each	2	$1,900.00	$3,800
1452	S&F Box Inlet-Outlet - 750mm	each	1	$2,200.00	$2,200
1453	S&F Box Inlet-Outlet - 900mm	each	1	$2,500.00	$2,500
1955	Concrete Median Barrier - Type 300C1	meter	1070	$130.00	$139,100
2200	Roadway Excavation	cu m	3135000	$5.00	$15,675,000
2351	Steel "W" Beam Guardrail (Single Face)	meter	1800	$30.00	$54,000
	Guardrail End Treatment Type 4A	each	13	$450.00	$5,850
2387	G-rail Connector to Bridge End, Type A-1	each	8	$300.00	$2,400
2545	Clearing & Grubbing	lp sum	1	$190,000	$190,000
2568	Mobilization	lp sum	1	$664,116	$664,116
2569	Demobilization	lp sum	1	$332,058	$332,058
8100	Concrete Class 'A'	cu m	580	$360.00	$208,800
8150	Steel Reinforcement	kg	58000	$1.20	$69,600
	26-35-35-29m Type IV Mod. PCIB Bridge	lp sum	1	$2,300,000	$2,300,000
	32-38-38-32m Type IV Mod. PCIB Bridge	lp sum	1	$2,570,000	$2,570,000
	SUBTOTAL				$23,155,374
	ENGR. & CONTG. (15%)				$3,470,006
	TOTAL COST				$26,625,380

PRELIMINARY ESTIMATE
PIKE COUNTY, US 119, SECTION II
BIG CREEK to 1.9 km east of KY 3154; STA 23+220 to 26+998
FD52 098 0119 015-020 APD 0506 008 October 15, 1996
NET LENGTH 3.78 km
GRADE AND DRAIN
RURAL ARTERIAL

ITEM CODE	ITEM	UNIT	QUANTITY	UNIT COST	COST
	Mainline Paving	km	0	$950,000	$0
	Approach Paving	km	1.85	$190,000	$351,500
462	Culvert Pipe - 450mm	meter	230	$105.00	$24,150
464	Culvert Pipe - 600mm	meter	250	$130.00	$32,500
466	Culvert Pipe - 750mm	meter	190	$150.00	$28,500
468	Culvert Pipe - 900mm	meter	0	$170.00	$0
469	Culvert Pipe - 1050mm	meter	80	$200.00	$16,000
471	Culvert Pipe - 1350mm	meter	80	$270.00	$21,600
474	Culvert Pipe - 1800 mm	meter	0	$440.00	$0
475	Culvert Pipe - 1950 mm	meter	230	$490.00	$112,700
1490	Drop Box Inlet Type 1	each	7	$2,000.00	$14,000
1450	S&F Box Inlet-Outlet - 450mm	each	3	$1,500.00	$4,500
1451	S&F Box Inlet-Outlet - 600mm	each	3	$1,900.00	$5,700
1452	S&F Box Inlet-Outlet - 750mm	each	3	$2,200.00	$6,600
1453	S&F Box Inlet-Outlet - 900mm	each	0	$2,500.00	$0
1955	Concrete Median Barrier - Type 300C1	meter	2190	$130.00	$284,700
2200	Roadway Excavation	cu m	3910000	$5.00	$19,550,000
2351	Steel "W" Beam Guardrail (Single Face)	meter	3400	$30.00	$102,000
	Guardrail End Treatment Type 4A	each	25	$450.00	$11,250
2387	G-rail Connector to Bridge End, Type A-1	each	0	$300.00	$0
2545	Clearing & Grubbing	lp sum	1	$190,000	$360,000
2568	Mobilization	lp sum	1	$629,574	$629,574
2569	Demobilization	lp sum	1	$314,787	$314,787
8100	Concrete Class 'A'	cu m	1110	$360.00	$399,600
8150	Steel Reinforcement	kg	111000	$1.20	$133,200
	SUBTOTAL				$22,402,861
	ENGR. & CONTG. (15%)				$3,289,524
	TOTAL COST				$25,692,385

PRELIMINARY ESTIMATE
PIKE COUNTY, US 119, SECTION III
ROAD FORK to 1.9 km east of KY 3154, STA 21+214 to 26+998
FD52 098 0119 015-020 APD 0506 008 October 15, 1998
NET LENGTH 5.78 km
SURFACING
RURAL ARTERIAL

ITEM CODE	ITEM	UNIT	QUANTITY	UNIT COST	COST
	Mainline Paving	km	4.94	$950,000	$4,693,000
	Approach Paving	km	0	$190,000	$0
2568	Mobilization	lp sum	1	$140,790	$140,790
2569	Demobilization	lp sum	1	$70,395	$70,395
8100	Concrete Class 'A'	cu m	0	$360.00	$0
8150	Steel Reinforcement	kg	0	$1.20	$0
	SUBTOTAL				$4,904,185
	ENGR. & CONTG. (10%)				$490,419
	TOTAL COST				$5,394,604

COST ESTIMATE

Roadway Exc.		$32,862,169
Mainline Pavement		5,130,000
Approach Pavement		507,000
Bridge Structures		6,525,000
Box Culvert		226,000
Median Barrier		630,000
Concrete Pipes		225,000
Guardrail		151,000
Clearing and Grubbing		550,000
Drop Box Inlets		22,000
S & F Box Inlets		25,300
Crash Cushions		56,000
Guardrail End Treatment		17,100
Mobilization		1,375,212
Demobilization		687,606
	Subtotal	$49,558,201
Eng. And Conting. (10%)		$ 4,955,820
	Total Construction	$54,514,021
Right of Way		$11,605,000
Utility Relocation		1,500,000
	TOTAL PROJECT ESTIMATE	**$67,619,021**

PERSONS CONTACTED

NAME	AFFILIATION	PHONE
Zane Young	Haworth,Meyer & Boleyn	502/695-9800
Bryan Stopper	Haworth,Meyer & Boleyn	502/695-9800
Earl Wright	KY Transportation Cabinet Materials	502/564-2374
Gary Sharpe	KY Transportation Cabinet Pavement Design	502/564-3280
Leo Frank	KY Transportation Cabinet Pavement Design	502/564-3280
Dan Height	KY Transportation Cabinet Pavement Design	502/564-3280
John Bowlin	KY Transportation Cabinet Dist. 12	606/433-7791

III. INVESTIGATION PHASE

US 19/BENT MOUNTAIN TO COBURN MOUNTAIN
V.E. STUDY BRIEFING
December 6, 1996

NAME	REPRESENTING	PHONE
JACK TRICKEY	VENTRY ENGINEERING	904/627-3900
TOM HOWARD	VENTRY ENGINEERING	904/627-3900
WILLIAM NICKAS	VENTRY ENGINEERING	904/627-3900
DON KEENAN	VENTRY ENGINEERING	904/627-3900
JOHN BOWLIN	KY D.O.T. DIST. #12	606/433-7791
STEVEN CRISWELL	CENTRAL OFFICE CONSTRUCTION	502/564-4780
DOUG SMITH	CENTRAL OFFICE GEOTECH	502/564-2374
DEXTER NEWMAN	DIST.# 12 CONSTRUCTION	606/433-7791
BRYAN STOPPER	HAWORTH, MEYER & BOLEYN	502/695-9800
ZANE T. YOUNG	HAWORTH, MEYER & BOLEYN	502/695-9800
CHARLES REICHENBACH	KY D.O.H. DIST.# 12 PRECONSTRUCTION	606/433-7791
DARYL GREER	C.O.- HIGHWAY DESIGN	502/564-3280
DENTON BILITER	CH. DIST. ENGINEER DIST.# 12	606/433-7791

FUNCTIONAL ANALYSIS WORKSHEET, INFORMATION PHASE
PROJECT: US 119/BENT MOUNTAIN TO COBURN MOUNTAIN
DATE: DECEMBER 5-13, 1996

ITEM	FUNCT. VERB	FUNCT. NOUN	TYPE	COST	WORTH	VALUE INDEX
ROADWAY EXC.	establish provide facilitate	align (vert) rdwy typ develop.	B B S	$32,900,000	$25,000,000	1.3
RIGHT OF WAY	provides provides compensate	rdwy area waste site damages	B S S	$11,605,000	$11,000,000	1.1
MAIN LINE PAV'T.	support	loads wheel	B	$5,130,000	$ 5,130,000	1.0
BRIDGE STRUCT.	span separate	creek roadways	B B	$6,525,000	$ 6,000,000	1.1
UTILITY RELOC.	maintain	service	B	$1,500,000	$ 1,500,000	1.0
BOX CULVERT	convey span	water creek	S B	$226,500	$ 175,000	1.3
MEDIAN BARRIER	separate redirect	traffic vehicle	B B	$630,000	$ 630,000	1.0
APPROACH PAV'T.	provide	access	B	$507,000	$ 150,000	3.4
CONCRETE PIPES	convey	water	B	$225,000	$ 225,000	1.0

INVESTIGATION

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

Areas identified as high cost items during the investigation phase:

ITEM	COST	FUNCTION
ROADWAY EXC.	$32,900,000	ESTABLISH VERTICAL ALIGNMENT FACILITATE TYPICAL SECTION
RIGHT OF WAY	$11,600,000	PROVIDE LAND AREA
STRUCTURES	$6,750,000	SEPARATE ROADWAYS CONVEY WATER SPAN CREEKS
MEDIAN BARRIER	$630,000	SEPARATE TRAFFIC REDIRECT VEHICLES
PAVEMENT	$5,637,000	SUPPORT WHEEL LOADS
ACCESS/INTERSECTION/INTERCHANGE		PROVIDE ACCESS

(This area was included due to a concern with allowing left turns across the median of relocated U.S. 119 at at-grade intersections.)

IV. SPECULATION PHASE

SPECULATION

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

ROADWAY EXC. (GRADES)

- revise the grade and alignment to reduce the volume of roadway excavation required
- bifurcate the roadways where possible to reduce the volume of excavation required
- reduce the median width to 3.2m from 4.3m in the areas where median barrier is included.
- ~~steepening fill slopes to 1:1 ½~~
- ~~reinforce fill slopes to allow for 1:1 slopes~~
- ~~use old mines for disposal sites~~
- ~~remove excess material by rail shipping~~
- ~~steepening out slopes~~
- ~~revise the alignment between the beginning of the project and Reed Fork to go more easterly across the mountain~~

STRUCTURES

- reduce the length of bridge structures by using retaining wall and additional fill
- ~~reduce the number of columns in the bents~~
- use a steel superstructure to reduce the number of bents required
- eliminate the box culvert on the access road by using a bridge

TYPICAL SECTION

- reduce the amount of barrier wall by eliminating sections in areas with flat grades and tangent alignment
- ~~use double face guardrail instead of concrete median barrier~~

- allow precast barrier wall as an alternate to cast-in-place barrier wall in the bid package (Design Comment)
- use concrete for mainline pavement instead of asphalt

CONCRETE PIPE

- allow alternate pipe materials as bid alternates in the bid package (Design Comment)

RIGHT-OF-WAY

- ~~use retaining walls to reduce the right-of-way requirements~~
- ~~provide new homesites for the people being relocated~~

V. EVALUATION PHASE

V.(a) ALTERNATIVES

ALTERNATIVES

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

GRADES

1. **Revise the grades and alignment to reduce the volume of roadway excavation required**

2. **Bifurcate the roadways where possible to reduce the volume of excavation required**

ACCESS/INTERSECTIONS/INTERCHANGES

1. **Utilize the two grade separations crossing existing US 119 to provide split access to the relocated US 119 and eliminate the two proposed at-grade intersections**

2. **Move the access to existing US 119 to the area around 24+200± and provide a diamond type interchange.**

STRUCTURES

1. **Reduce the length of bridge structures over existing US 119 by using retaining wall and additional fill**

2. **Use a steel superstructure to reduce the number of bents required in the two US 119 overpasses**

3. **Eliminate the box culvert on the access road by using a bridge to span the creek**

TYPICAL SECTION

1. **Reduce the amount of barrier wall by eliminating sections in areas with flat grades and tangent alignment**

2. **Reduce the median width to 3.2m from 4.3m in the areas where median barrier is included.**

3. **Use concrete pavement for mainline paving instead of asphalt**

V.(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 Design.

A. GRADES

As Proposed Grades

Advantages
- only uses a maximum grade of 4.8% at one location with a majority of grades less than 3.0%
- allows relative easy access to existing US 119
- relocations to residences due to roadway construction are reduced

Disadvantages
- requires large disposal areas for excess material
- requires additional construction time due to large cuts
- increased impacts to the environment due to large cuts and large waste sites
- grades in combination with superelevation exceed normal cross slopes at one of the bridges

Revise the grades and alignment to reduce the volume of roadway excavation required

Advantages
- reduces the amount of roadway excavation required
- reduces the environmental impacts due to reduction of cuts and size of disposal areas
- reduces the time required for construction
- would reduce the amount of property being landlocked on the high side of the roadway
- may allow flatter grades at the bridges

Disadvantages
- may impact the project design schedule
- would introduce more curves into the alignment
- makes it more difficult to provide access to existing US 119

Conclusion
Carry forward for further consideration

Bifurcate the roadways where possible to reduce the volume of excavation required

Advantages
- may reduce the amount of roadway excavation required
- may reduce the amount of excess material requiring disposal

Disadvantages

- requires provision for rock falls on both roadways
- will increase the grades for both termini
- precludes at-grade intersection construction
- may adversely affect the horizontal alignment
- would increase the difficulty of construction

Conclusion

Drop from further consideration

B. ACCESS/INTERSECTIONS/INTERCHANGES

As Proposed Intersections

Advantages

- allows easier disposal of cut material produced from roadway construction
- provides a connection to existing US 119 at each end of the project

Disadvantages

- uses valuable property to support the high fills on the access sections
- adds to the number of relocations for both businesses and residences
- at-grade design allows left turns across the median of the mainline roadway
- west connection requires the construction of a large box culvert
- maintenance of traffic will be increased due to the construction of large fills on each side of existing US 119

Conclusion

Carry forward for further consideration

Utilize the two proposed grade separations crossing existing US 119 to provide split access to the relocated US 119 and eliminate the two proposed at-grade intersections

Advantages

- would allow elimination of the two proposed at-grade intersections at sta. 21 + 965 and sta. 25 + 950
- would reduce the number of r/w parcels required
- eliminates the large box culvert
- reduces the time required for construction
- would allow elimination of the two at-grade intersections and their associated provision for left turns
- retains more of existing US 119 with its reduced impact to the residences and businesses

Disadvantages

- require additional acceleration and deceleration lanes on the mainline
- would increase the amount roadway excavation
- does not meet normal driver expectations for a full interchange due to the split/multi-point access
- would require a bridge structure on the entrance ramp from existing US 119 to span Big Creek
- may require the use of additional retaining walls on the ramps

Conclusion

Carry forward for further consideration

Move the access to existing US 119 to the area around 24+200+/- and provide a diamond type interchange.

Advantages

- more centrally located in the project
- does not require left turns across the median
- use normal design practices and approaches to interchange design
- would eliminate the need for the box culvert
- utilizes more of the existing US 119 roadway with a reduction in impacts to residents

Disadvantages

- requires a longer haul for trucks accessing the mines on the west end of the project to/from the relocated US 119
- requires additional structures and retaining walls
- would increase roadway excavation due to the addition of acceleration and deceleration lanes

Conclusion

Carry forward for further consideration

C. STRUCTURES

As Proposed Bridge Structures

Advantages

- uses standard KTC design practices and processes

Disadvantages

- appears to be longer than necessary
- concrete design may cost more than a steel design due to the number of bents and the high skew angle
- the current design allows superelevation on the bridge that combined with the grade exceeds standards (8.8% vs.8.0%)

Conclusion
Carry forward for further evaluation

Reduce the length of bridge structures by using retaining wall and additional fill

Advantages
- would reduce the amount of structure required
- would utilize more of the surplus material in the construction of the roadway
- may improve the aesthetics

Disadvantages
- increases the concern about the stability of high fills and retaining walls

Conclusion
Carry forward for further evaluation

Use a steel superstructure to reduce the number of bents required

Advantages
- allows the use of longer span lengths
- reduces the amount of substructure required
- allows the use of flatter skew angles

Disadvantages
- may increase the time required for construction
- increases the cost of routine maintenance due to the requirement to paint the steel

Conclusion
Carry forward for further evaluation

Eliminate the box culvert on the access road by using a bridge to span the creek

Advantages
- more environmental acceptable due to reduced disturbance to the steam bed
- would not require relocation of the creek channel
- would provide more vertical clearance

Disadvantages
- may increase the time required for construction

Conclusion
Carry forward for further consideration

D. TYPICAL SECTION

Reduce the amount of barrier wall by eliminating it in areas with flat grades and tangent horizontal alignment

Advantages
- easier to complete future resurfacing operations
- would increase access to adjacent properties
- may reduce the cost barrier wall end treatment
- reduces the time required for construction
- would allow conversion to a future left turn lane

Disadvantages
- increases the potential for head on crashes
- may require the use of wider median

Conclusion
Drop from further consideration

Reduce the median width to 3.2m from 4.3m in the areas where median barrier is included.

Advantages
- reduces the amount of roadway excavation required
- reduces the amount of surplus material to be disposed of
- reduces the amount of pavement and base required
- reduces the width of the two bridges
- provides continuity to the adjoining section on the west end that uses a 3.2m median width with barrier wall

Disadvantages
- would not allow for removal of barrier wall and construction of a median left turn lane in the future
- may increase the number of drop boxes required for drainage in superelevated sections

Conclusion
Carry forward for further evaluation

Use concrete for the mainline pavement instead of asphalt

Advantages
- provides a longer lasting pavement
- reduces impact to the traveling public due to the reduction in rehabilitation activities required
- provides additional subgrade bridging

Disadvantages

- has a higher initial cost to construct
- more complex to construct
- may increase the time required to construct the pavement
- local industry and contract administration personnel may not be familiar with concrete pavement construction and inspection
- maintenance of joints during construction will add to complexity of construction

Conclusion

Carry forward for further evaluation

V.(c) EVALUATION MATRICE

***NOTE:** Matrices are used to determine a preferred alternative when more than one competing Alternative to the "As Proposed" Alternative survives the advantages and disadvantages process.

ACCESS / INTERSECTIONS / INTERCHANG

ALTERNATIVES	WEIGHT	Driver Expectation	Safety	Const. Cost	RW Impacts	Maint of Traffic	Community Impacts	Const. Time	Trucking Impacts			TOTAL	RANKING	USE NOW	REJECT	Modify how?
		7	9	6	7	4	7	3	7							
AS PROPOSED		3 / 21	2 / 18	2 / 12	1 / 7	1 / 4	3 / 21	1 / 3	1 / 7			93	3			
VE ALT 1 - MULTI-POINT ACCESS		2 / 14	3 / 27	2 / 12	2 / 14	2 / 8	2 / 14	3 / 9	3 / 21			119	2			
VE ALT - DIAMOND INTERCHANGE		4 / 28	4 / 36	1 / 6	3 / 21	4 / 16	3 / 21	3 / 9	2 / 14			151	1	✓		

VI. DEVELOPMENT PHASE

VI.(a) GRADES

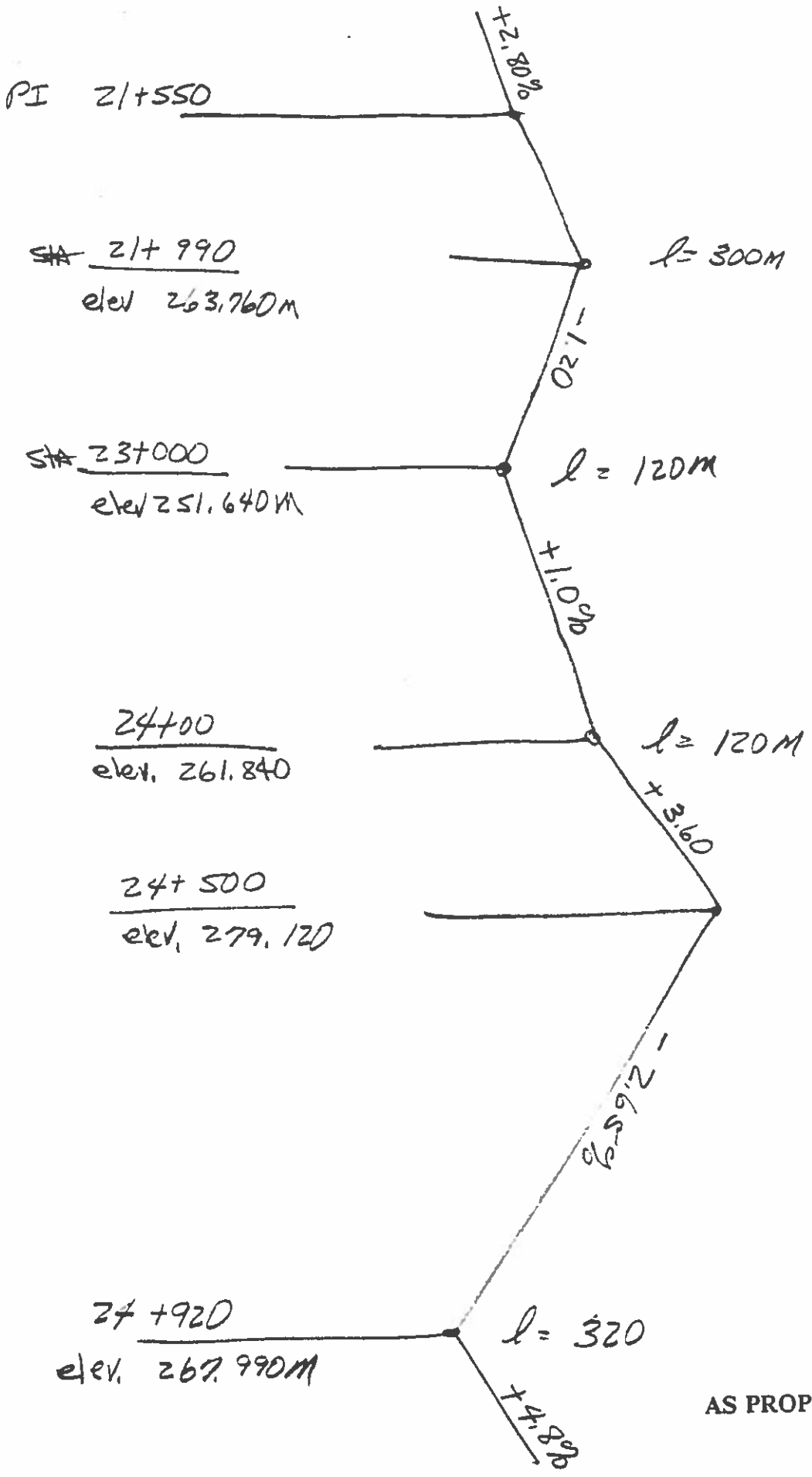
VI.(a)(1) AS PROPOSED

GRADES

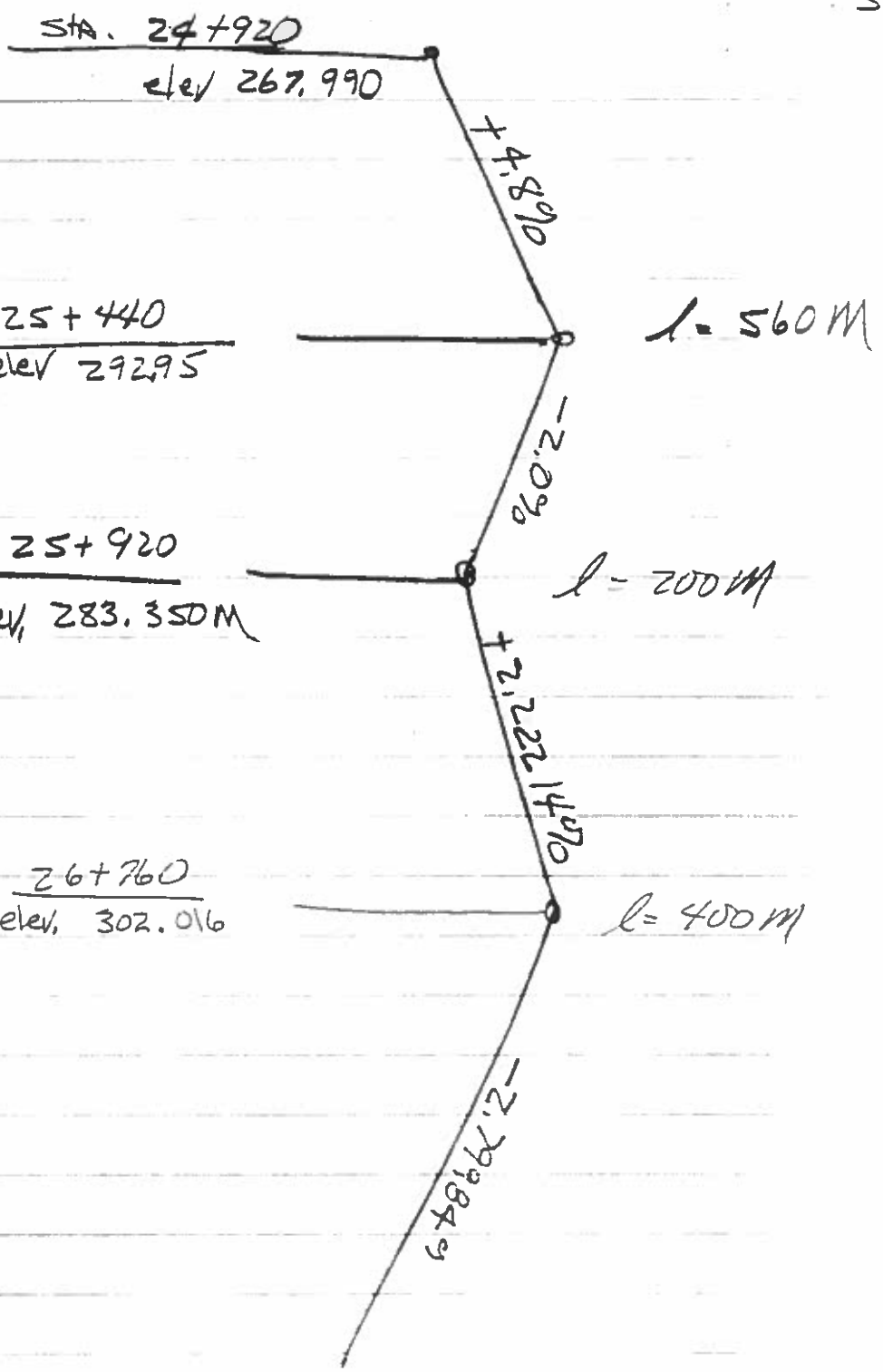
"AS PROPOSED"

The major cost item in this project is roadway excavation at $32,800,000. The vertical alignment as depicted utilized a maximum grade of 4.8%. The consultant indicated that they had raised the grades in some areas and the quantities had changed, reducing the excess material to 5,245,000 m^3 from 7,045,000 m^3. The grades depicted were controlled at the two intersections and fill heights at the two bridge structures. The profile has few P.I.'s and low K's.

Sheet
Y2



AS PROPOSED


STA. 24+920
elev 267.990
+4.810
STA 25+440
elev 292.95
l = 560 M
-2.096
STA 25+920
elev, 283.350M
l = 200 M
+2.222 1470
STA 26+760
elev, 302.016
l = 400 M
-2.79984.9

AS PROPOSED

VI.(a)(2) V.E. ALTERNATIVES

GRADES

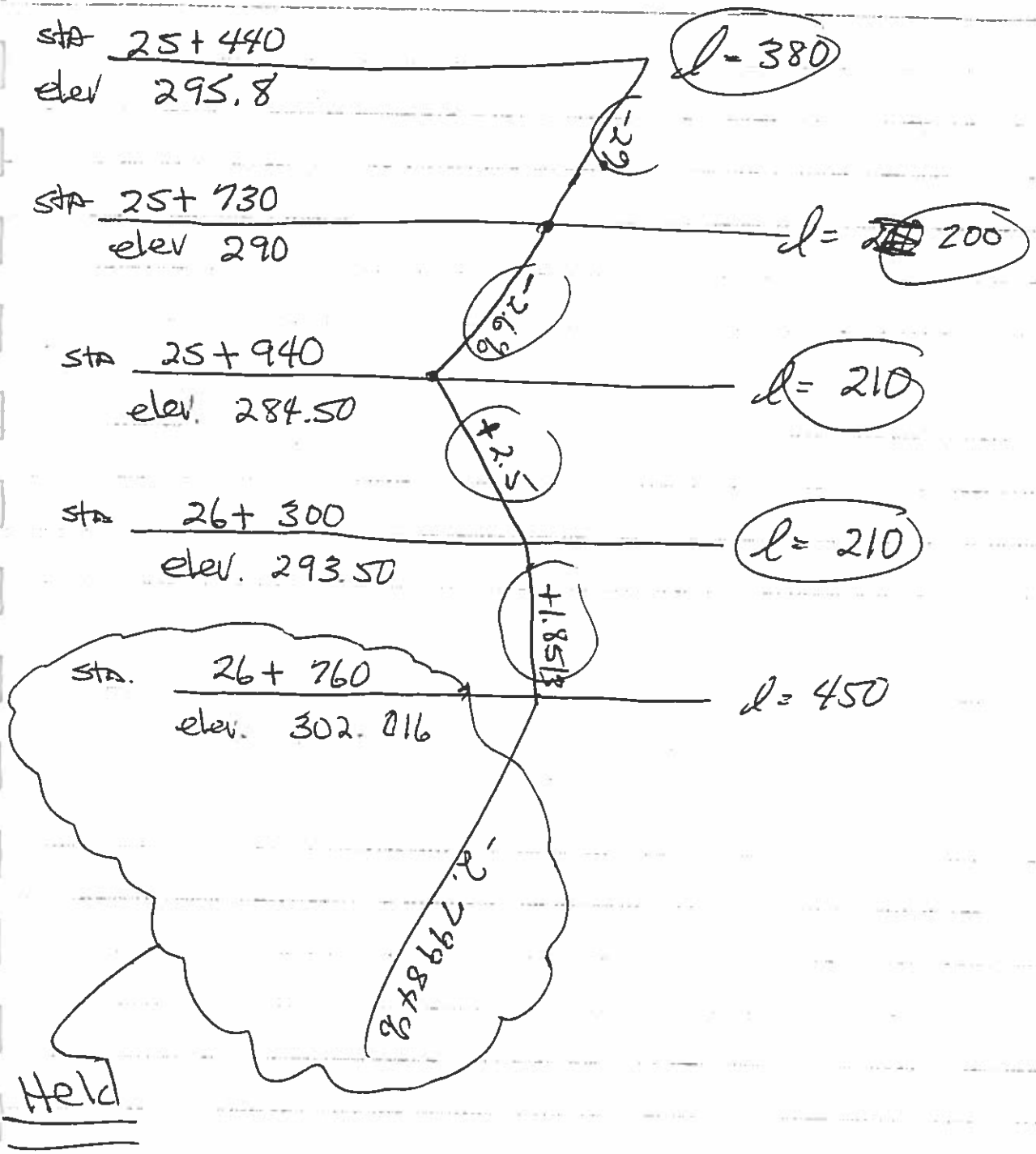
"V.E. ALTERNATIVES"

The V.E. team considered a new profile that basically ramped up at the beginning project, crossed the existing roadway at higher elevations and dipped at a centralized prospective interchange location. The profile which was studied then rose at a 6% grade after Sta. 24+200 for 550 meters. The horizontal alignment was shifted 10 meters left from Sta. 24+063 to Sta. 25+371. This shift would move the revised grade higher up the mountain reducing the volume of roadway excavation. The horizontal curve lengths were not changed because all delta angles were not revised. The number of V.P.I.'s and vertical curves were increased by 40% over the proposed design.

The earthwork was recalculated with the revised profile and indicated a savings in cut and spoil material. (See below table).

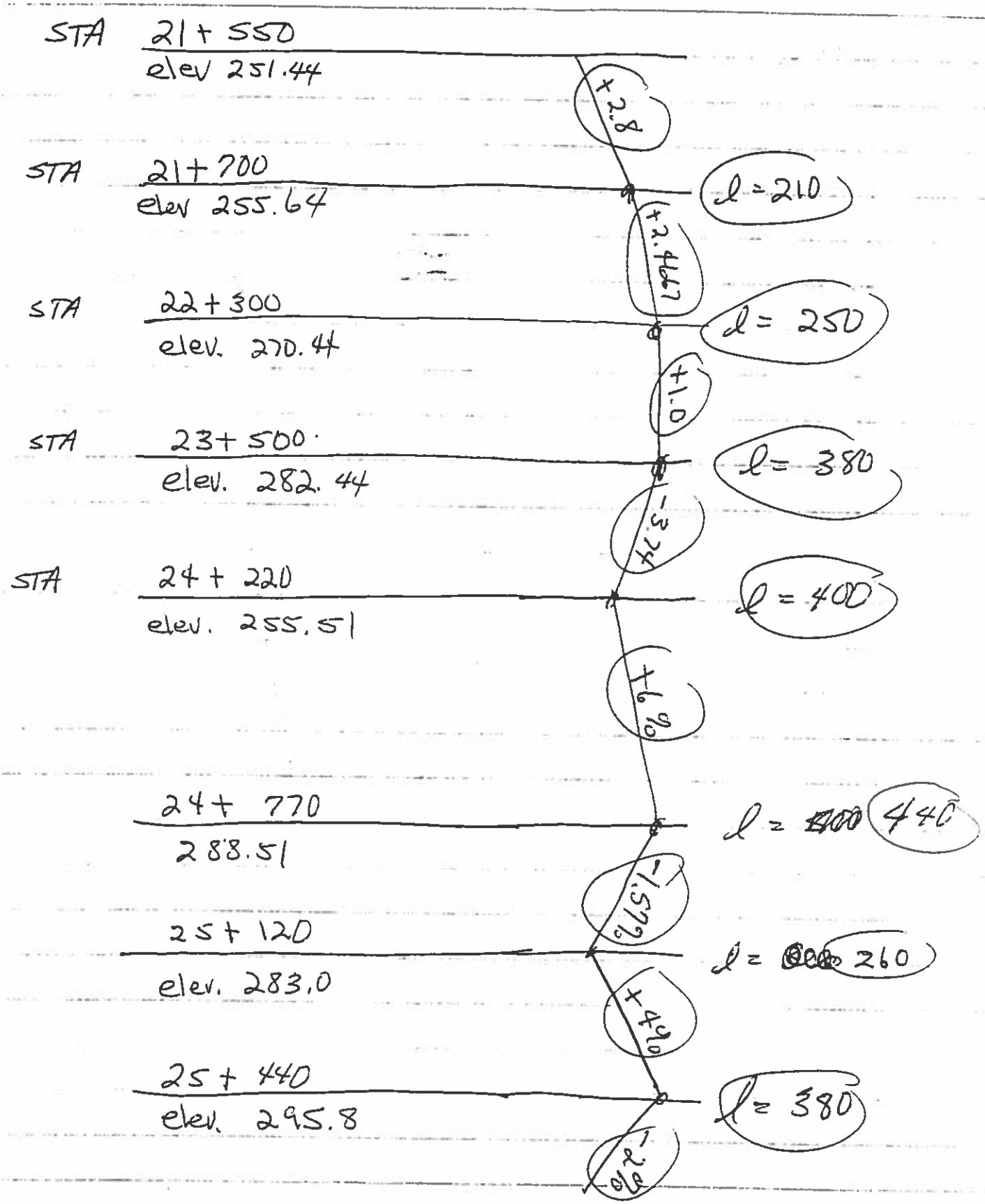
	AS PROPOSED:	V.E. ALTERNATIVE:
CUT:	6,265,334 Cu.M.	4,467,129 Cu.M.
FILL:	1,020,247 Cu.M.	2,119,296 Cu.M.
EXCESS:	5,245,087 Cu.M.	2,347,833 Cu.M.

The team then reviewed the toe of slope locations to establish any right-of-way changes. This grade revision resulted in the addition of $500,000 of retaining walls (or MSE walls). The V.E. alternative also required the bridges to be lengthened at both crossings. This resulted in the addition of $4,747,000 of additional structure. While this alternative would save approximately $4.5 million, the V.E. team does not recommend it, due to concerns with retaining wall on fill, the increased fill heights, additional roller coaster effect and longer bridge lengths at intersections.



26+898.192 295.347

YES !.
ANY


STA 21+550
elev 251.44
+2.8
STA 21+700
elev 255.64
l = 210
+2.4427
STA 22+300
elev. 270.44
l = 250
+1.0
STA 23+500
elev. 282.44
l = 380
-3.74
STA 24+220
elev. 255.51
l = 400
+6.9%
24+770
288.51
l = 440
-1.5729
25+120
elev. 283.0
l = 260
+4%
25+440
elev. 295.8
l = 380
-2.7%

21+550 to 22+470

	ORIGINAL:	REVISED:
CUT:	1,045,317.05 cu m	869,049.65 cu m
FILL:	75,576.63 cu m	257,953.71 cu m
NET:	969,740.41 cu m	611,095.94 cu m

22+650 to 23+000

	ORIGINAL:	REVISED:
CUT:	1,653,017.70 cu m	807,508.20 cu m
FILL:	1,347.35 cu m	81,760.40 cu m
NET:	1,651,670.35 cu m	725,747.80 cu m

23+200 to 26+980

	ORIGINAL:	REVISED:
CUT:	3,566,999.89 cu m	2,790,572.12 cu m
FILL:	943,323.28 cu m	1,779,582.16 cu m
NET:	2,623,676.61 cu m	1,010,989.96 cu m

TOTAL:

	ORIGINAL:	REVISED:
CUT:	6,265,334.64 cu m	4,467,129.97 cu m
FILL:	1,020,247.26 cu m	2,119,296.27 cu m
NET:	5,245,087.38 cu m	2,347,833.70 cu m

COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
ROADWAY EXCAVATION	$5.00/ Cu.M	6,295,334	31,476,670	4,467,129	22,340,000
BRIDGE 1			3,551,000		
BRIDGE 2			2,973,000		5,483,000
WALLS					430,000
REVISED TYPICAL (ADD SH'DR)			500,000		0
			38,500,000		34,030,000

Possible Savings $ 4,470,000

VI.(b) ACCESS/INTERSECTIONS/INTERCHANGE

VI.(b)(1) AS PROPOSED

ACCESS/INTERSECTIONS/INTERCHANGE

"AS PROPOSED"

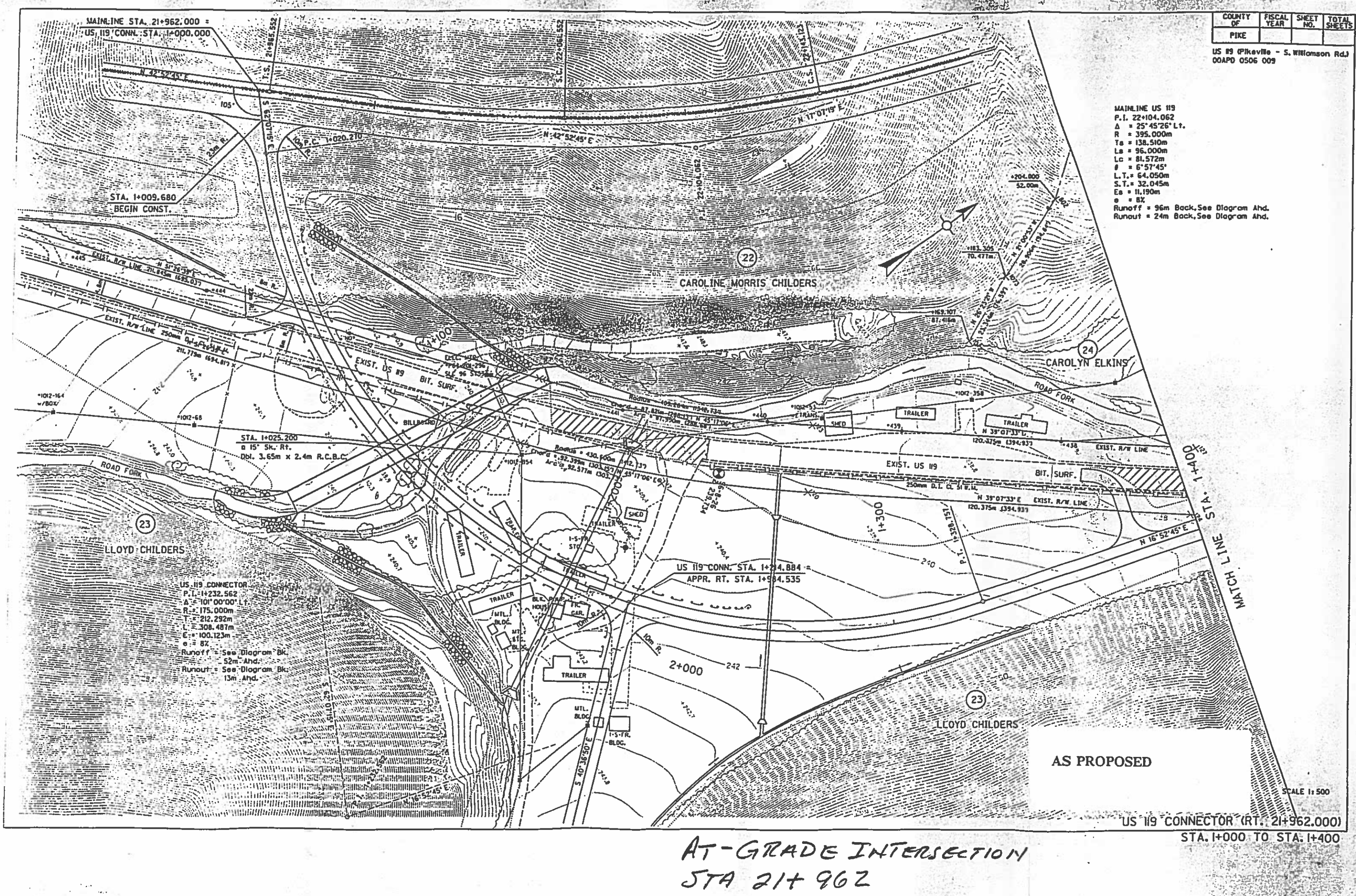
The proposed project contains an at-grade connector at station 21 + 965.552 which connects existing U.S. 119. The connector is 500 meters in length which requires construction of an embankment, maximum height of 19 meters. Right-of-way will require the purchase of two parcels and will relocate 7 families (6 trailers and one house). A double 3.65m x 2.4m X 76m R.A.B.C. will be constructed at station 1 + 125.20 at a cost of $226,500. The construction phasing of the access roads may have considerable impact on traffic during construction.

An additional at-grade intersection is being added at sta. 26 + 920 on the east end of the project. Both crossing will require extensive reconstruction of existing U.S. 119 in order to ramp up to the new mountain alignment. The differential grades requires a 500+ meter roadway to be constructed at 8% grades to bring the local traffic up to the new four lane section. The consultant provided a verbal description of the configuration of the intersection at the end of the job. The V.E. team then approximated the right-of-way impacts, fill volumes and pavement areas. The total dollars saved if both intersections were eliminated would be $1,490,000.

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville - S. Williamson Rd.)
00APD 0506 009

MAINLINE US 119
P.I. 22+104.062
Δ = 25°45'26" Lt.
R = 395.000m
Ts = 138.510m
Ls = 96.000m
Lc = 81.572m
θ = 6°57'45"
L.T.= 64.050m
S.T.= 32.045m
Es = 11.190m
e = 8%
Runoff = 96m Back, See Diagram Ahd.
Runout = 24m Back, See Diagram Ahd.



US 119 CONNECTOR (RT. 21+962.000)
STA. 1+000 TO STA. 1+400

AT-GRADE INTERSECTION
STA 21+962

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			
US 119 (Pikeville-S. Williamson Rd.) 00APD 0506	009		

MATCHLINE 'A'

MATCHLINE 'A'

STA. 11+009.680
BEGIN CONST.

11+000
Elev. 261.984

11+009.680
Elev. 262.026

+0.43%

V.C.

-2.00%

-6.80%

V.P.I. 11+080
Elev. 260.620m

140m V.C.
N.P.S.D. = 109m

V.C.

V.P.I. 20m RT.
ELEV. 260.670

+1.3%

EL. 260.453

-12.00%

0.00%

160m RT.
ELEV. 246.270

V.P.I. 140m RT.
ELEV. 246.270

COMMERCIAL ENTRANCE RT. STA. 1+070

SUPERELEVATION DIAGRAM

Rt. Edge Pvmt.

Profile Grade

Lt. Edge Pvmt.

FULL SUPERELEVATION

8%

2%

SUPERELEVATION DIAGRAM

11+009.680

11+074.610

Lt. Edge Pvmt.

Profile Grade

Rt. Edge Pvmt.

FULL SUPERELEVATION

8%

2%

V.C.

-6.80%

V.P.I. 1+420
Elev. 237.500m
120m V.C.
H.L.S.D. = 102m

Classification -	Rural Collector
Terrain -	Mountainous
Design Speed -	70 kph
Access -	By Permit

SCALE : 1 : 500 HORIZ.
1 : 100 VERT.

US 119 CONNECTOR (RT. STA. 21+962) STA. 1+000 TO 1+400

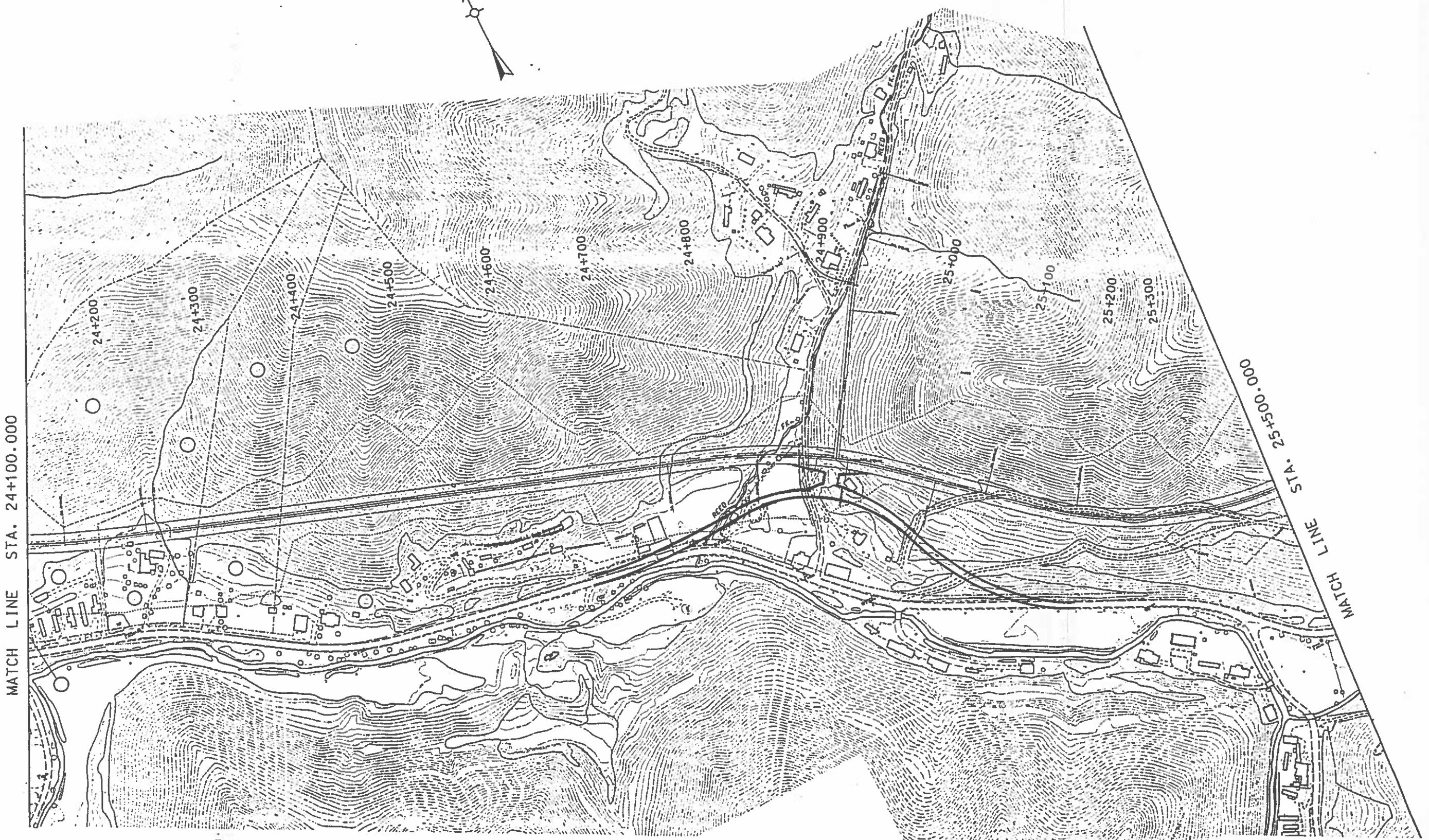
AS PROPOSED

PREPARED BY _____ DATE _____
CHECKED BY _____ DATE _____
APPROVED BY _____ DATE _____

R/W STRIP MAP

COUNTY OF	FI... YE...
PIKE	

US 119 (Pikeville - S...
00APD 0506 009



PREPARED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

AT-GRADE INTERSECTION
STA. 24+950 ±

AS PROPOSED

VI.(b)(2) V.E. ALTERNATIVES

ACCESS/INTERSECTIONS/INTERCHANGE

"V.E. ALTERNATIVES"

The value engineering alternative is a grade separation interchange at approximately station 24 + 000 ± which would eliminate the two at-grade connectors at station 21 + 965.552 and sta. 29 + 200 ±. This interchange would require a single span bridge with four ramps. The approach embankments will require retaining walls on each side to allow placement of the ramps. Approximately 120 meters of roadway will be necessary to connect the existing U.S. 119 to the proposed alignment.

The team reviewed documentation provided from department staff and news media about concerns about traffic crossing the new highway at intersections. This concern centered about coal trucks turning across traffic out into mainline without acceleration lanes from a stop condition.

The V.E. team then compared alternate interchange sites and a proposed split interchange concept. The tight diamond interchange was studied in depth at Sta. 24 + 200. The team first reviewed the cost of right-of-way and construction of the current intersection designs and the two existing bridge sites.

Split Access Interchange

The team felt the ability to utilize the existing grade separations should offer an economical solution. During the evaluation phase this split concept dropped out as a result of the matrix evaluation. This was not carried forward to the development phase. During the presentation it was noted that the split concept interchange with the northbound exit located at Sta. 21 + 600; southbound entrance located at Sta. 22 + 500; and northbound entrance and southbound exit at Sta. 23 + 050, may have strong possibilities. This concept would require one additional structure for the SB on-ramp over Road Fork Creek at sta. 21 + 600. The grades as depicted upon first glance are workable with the southbound entrance ramp needing some acceleration lane requirements.

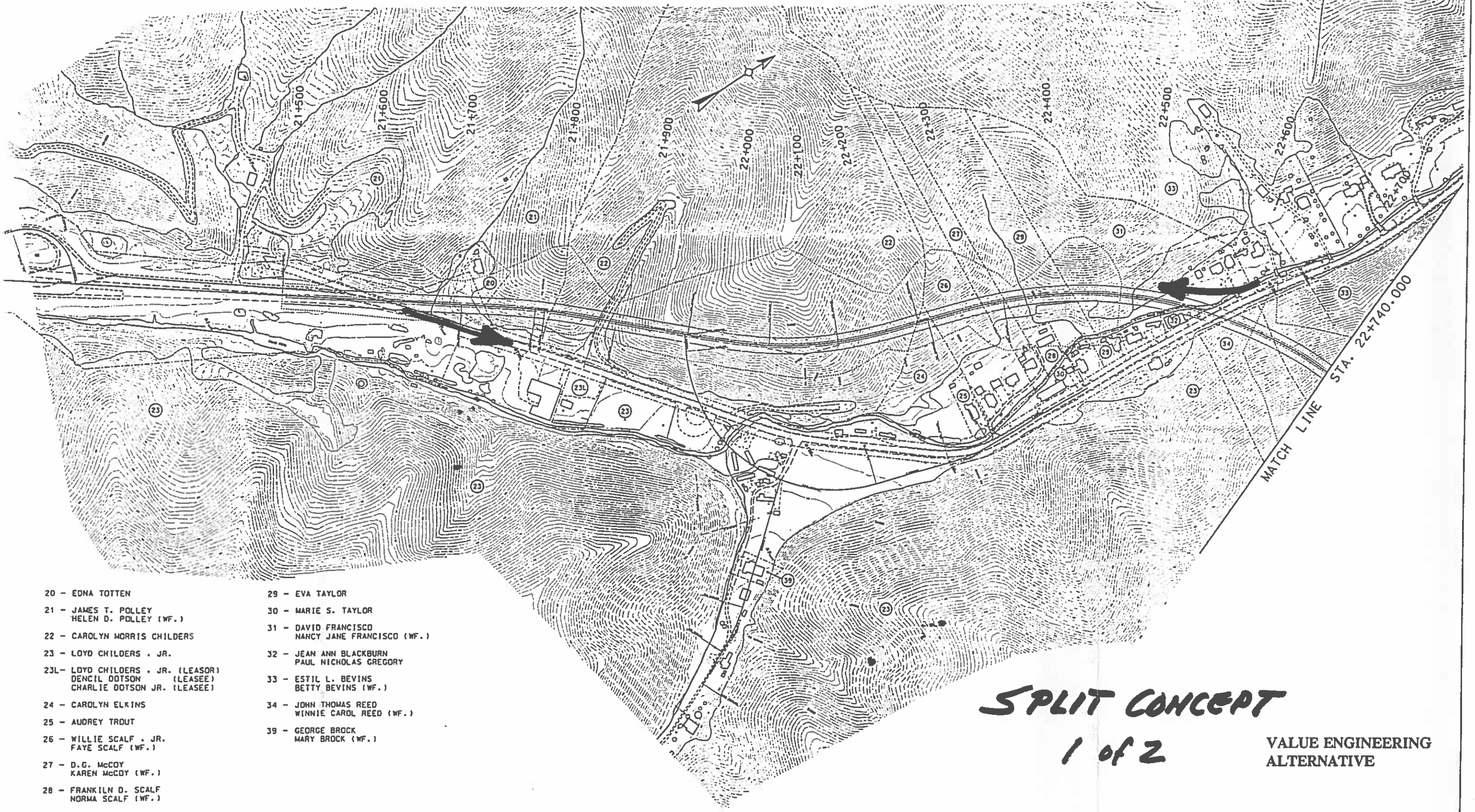
Tight Diamond Interchange

The team located a prospective interchange site at Sta. 24 + 200. This site was located and the revised grades discussed in a previous V.E. alternative were set to facilitate their design. The reason this site was located was due to the reduced right-of-way impacts, flatter site available and a more centralized location.

R/W STRIP MAP

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
PIKE			

US 119 (Pikeville - S.Williamson Rd.)
00APD 0506 009



20 - EDNA TOTTEN

21 - JAMES T. POLLEY
HELEN D. POLLEY (WF.)

22 - CAROLYN MORRIS CHILDERS

23 - LOYD CHILDERS . JR.

23L- LOYD CHILDERS . JR. (LEASOR)
DENCIL DOTSON (LEASEE)
CHARLIE DOTSON JR. (LEASEE)

24 - CAROLYN ELKINS

25 - AUDREY TROUT

26 - WILLIE SCALF . JR.
FAYE SCALF (WF.)

27 - D.G. McCOY
KAREN McCOY (WF.)

28 - FRANKILN D. SCALF
NORMA SCALF (WF.)

29 - EVA TAYLOR

30 - MARIE S. TAYLOR

31 - DAVID FRANCISCO
NANCY JANE FRANCISCO (WF.)

32 - JEAN ANN BLACKBURN
PAUL NICHOLAS GREGORY

33 - ESTIL L. BEVINS
BETTY BEVINS (WF.)

34 - JOHN THOMAS REED
WINNIE CAROL REED (WF.)

39 - GEORGE BROCK
MARY BROCK (WF.)

SPLIT CONCEPT

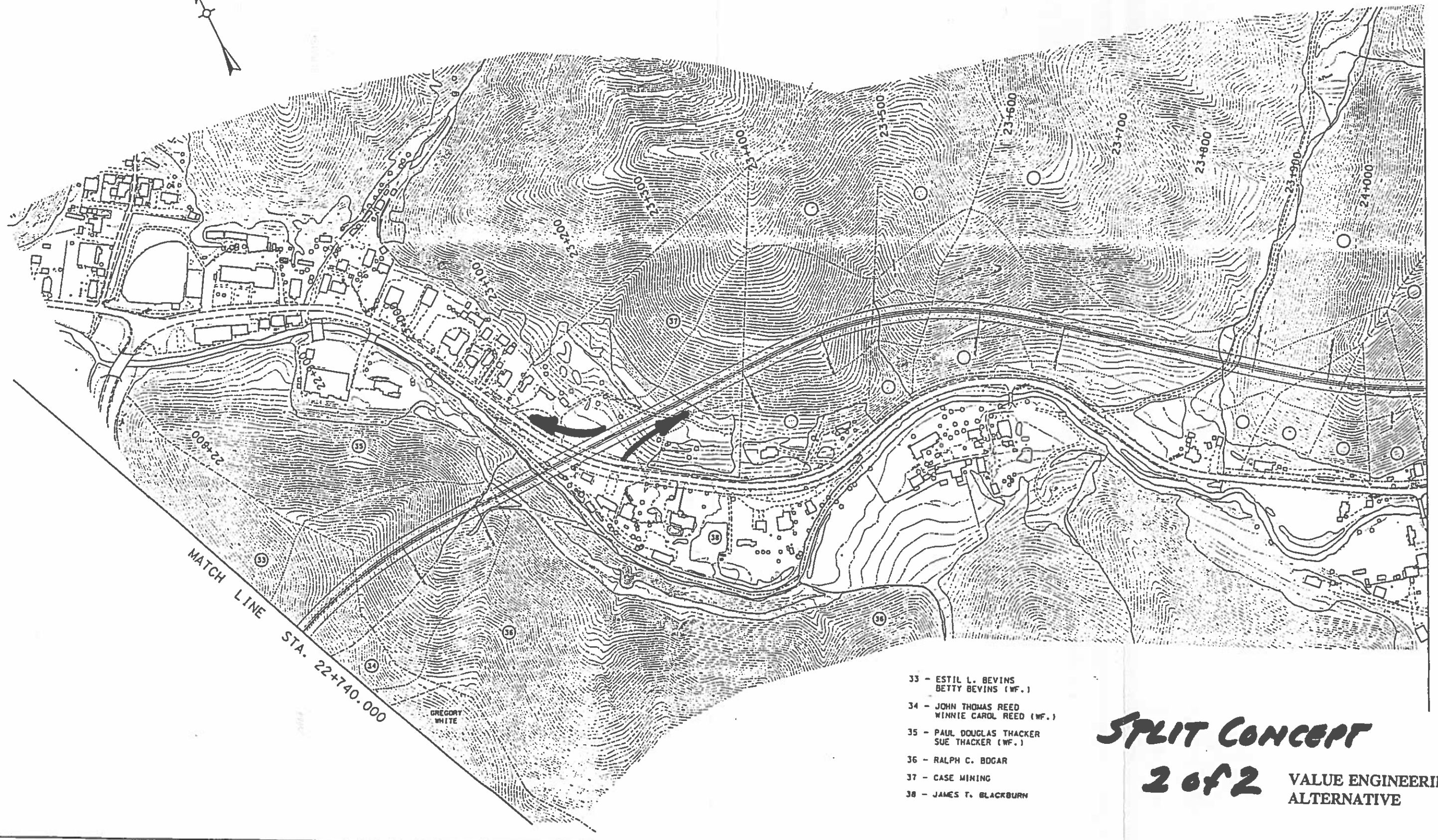
1 of 2

VALUE ENGINEERING ALTERNATIVE

R/W STRIP MAP

COUNTY OF	FISCAL YEAR	SHEET NO.	TOTAL SHEET
PIKE			

US 119 (Pikeville - S. Williamson Rd.
00APD 0506 009



33 - ESTIL L. BEVINS
BETTY BEVINS (WF.)

34 - JOHN THOMAS REED
WINNIE CAROL REED (WF.)

35 - PAUL DOUGLAS THACKER
SUE THACKER (WF.)

36 - RALPH C. BOGAR

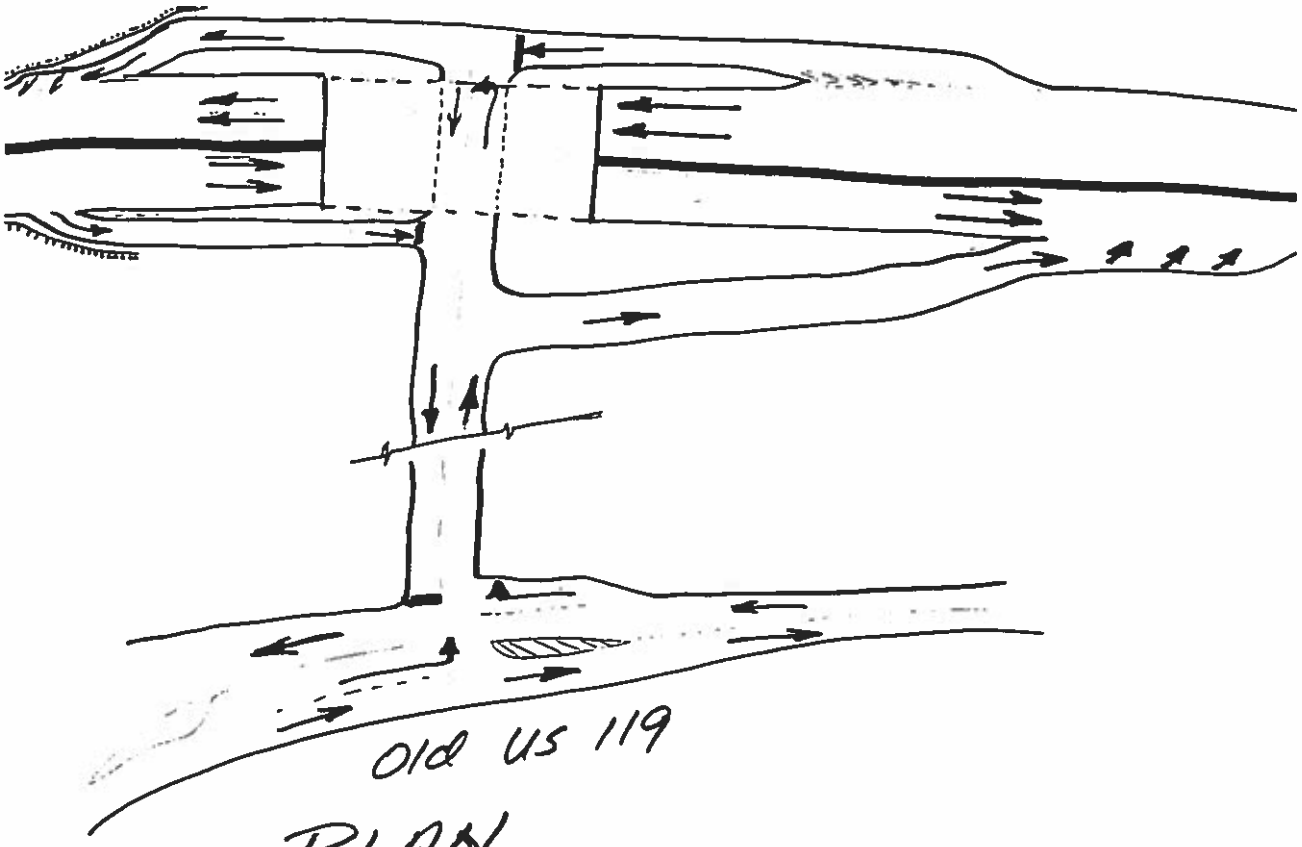
37 - CASE MINING

38 - JAMES T. BLACKBURN

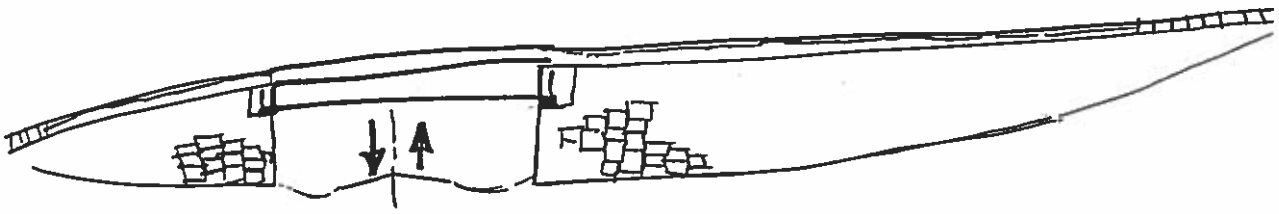
SPLIT CONCEPT

2 of 2

VALUE ENGINEERING ALTERNATIVE



PLAN



ELEVATION

INTERCHANGE
AT STA 24+200 ±

VALUE ENGINEERING ALTERNATIVE

Concept 1 (8% Grade of Connector Road) With Walls

This concept involved the shortest bridge with walls carrying mainline over the access road. It did require the highest grades from the existing U.S. 119 to the interchange site. This team felt the 105 meter distance at a 8% grade could be undesirable with the high coal truck traffic. The cost was estimated at an additional $14,751,000.

Concept 2 (5.5% Grade of Connector Road)

This concept required a longer bridge due to the limitation of MSE wall height to ten meters. This alternative increase the cut volume also. This concept would require an increase in cut material. The cost was estimated to be $16,790,000 more than the at grade intersections.

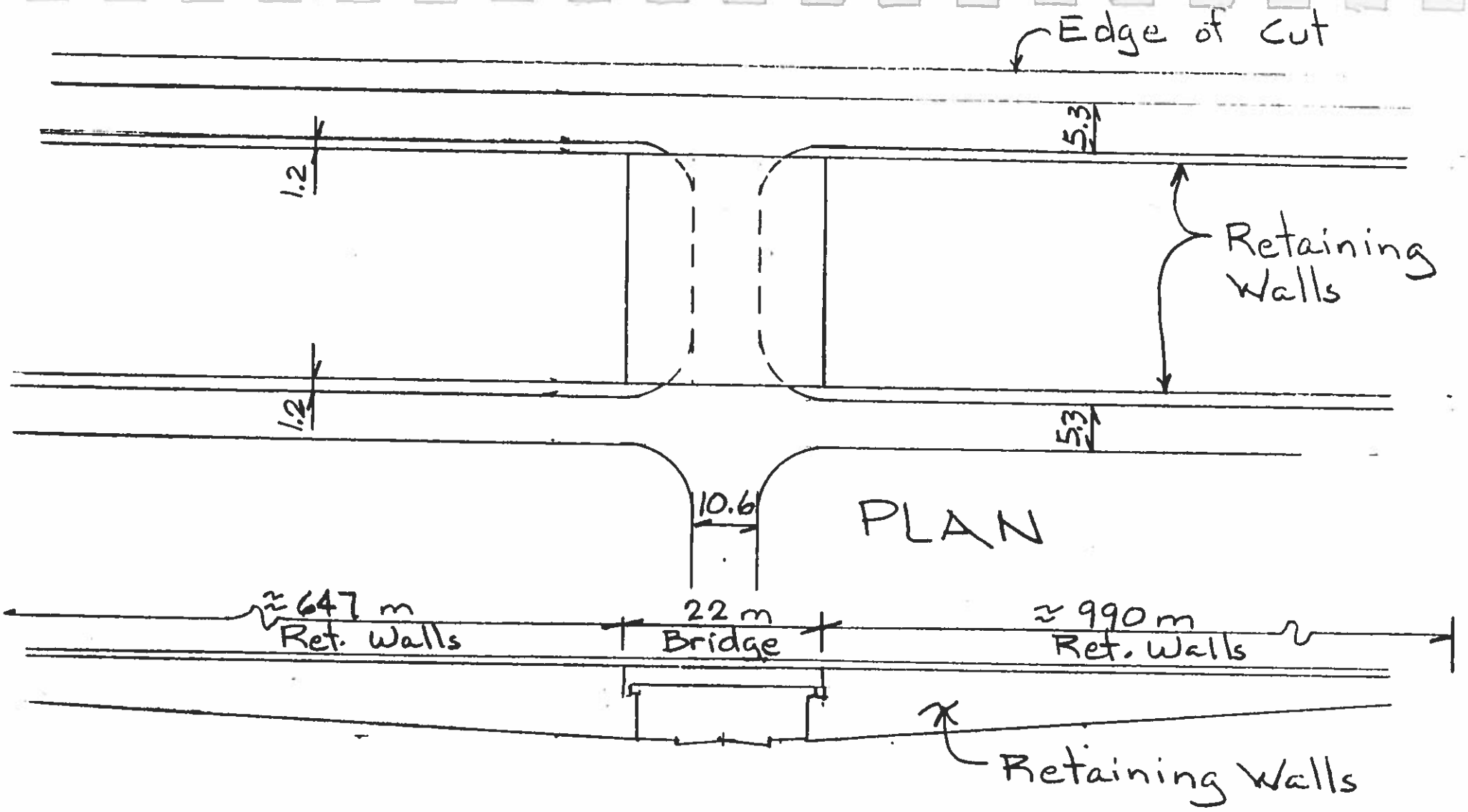
Concept 3 (8% grade with Fill Slopes)

This concept came about after noticing the total wall and bridge cost for either of the two above described concepts was between 11 and 12 million dollars.

The last quick look at interchanges involved the use of spill through abutments at the bridge ends and side slopes. The foot print of this interchange is much larger than the previously discussed alternatives. The cut material dramatically increases with the project cost increasing by $11.8 million. This cost is being driven by the cut volume and spoil area location.

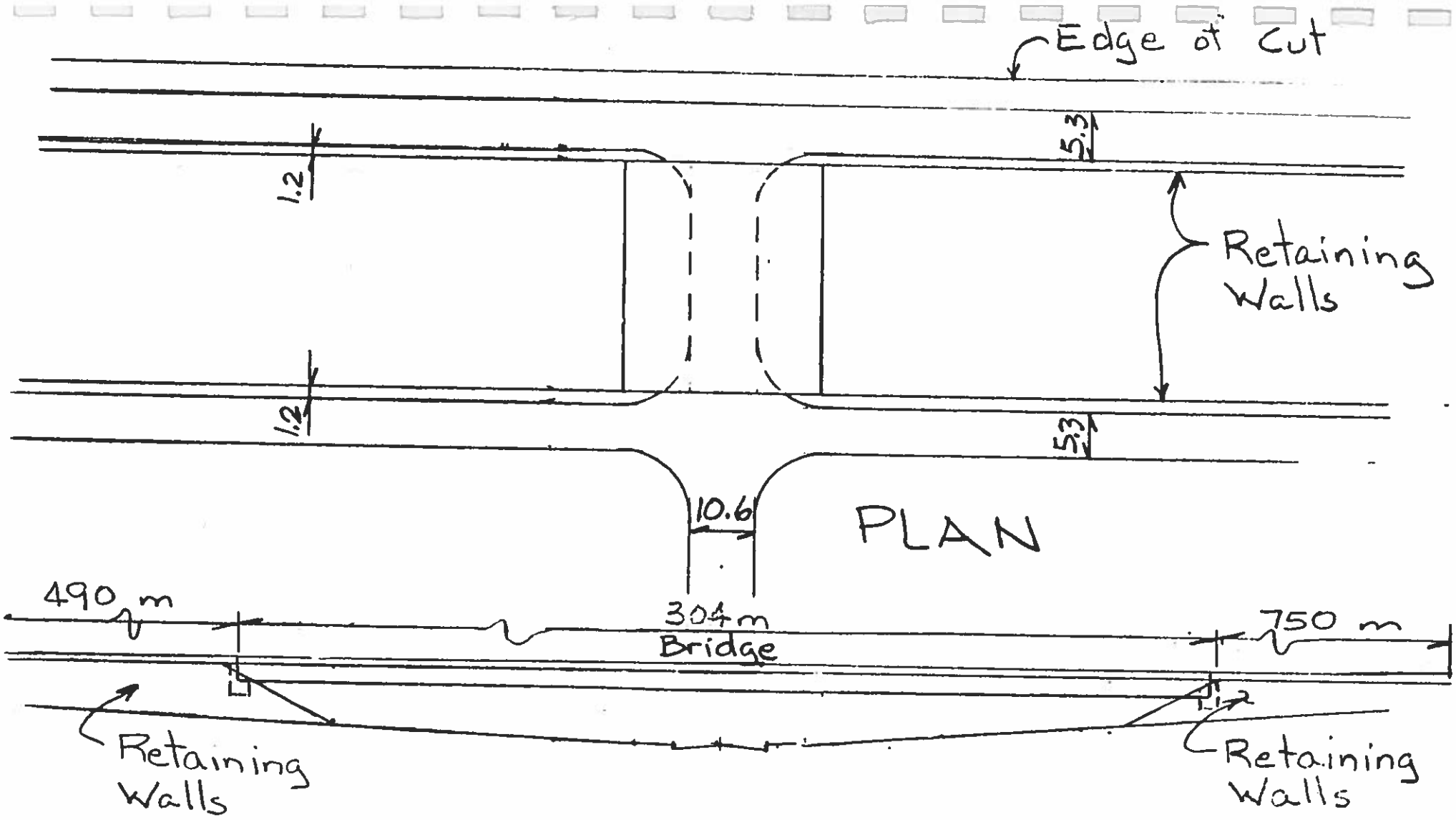
The tight diamond interchange provides a good cost effective solution for trucks to safely transition in and out of mainline traffic. However, the connector road and some of the ramp grades were very steep (76%) and also included stop conditions at their termini. The selected site of an interchange will have unique problems that must be carefully reviewed. The V.E. team attempted to locate a site that would minimize the trip length for any vehicle going North or South.

The studies provided did not include accident reports, traffic counts, etc. So, therefore, our group could not evaluate user type costs. **NO RECOMMENDATION WAS MADE BY THE V.E. TEAM WITH REGARD TO INTERCHANGES ALONG THE U.S. 119 CORRIDOR, DUE TO THE CONCERN WITH HEAVY TRUCKS AND THE STEEP APPROACH GRADES.**



ELEVATION
(Single Span Type III)

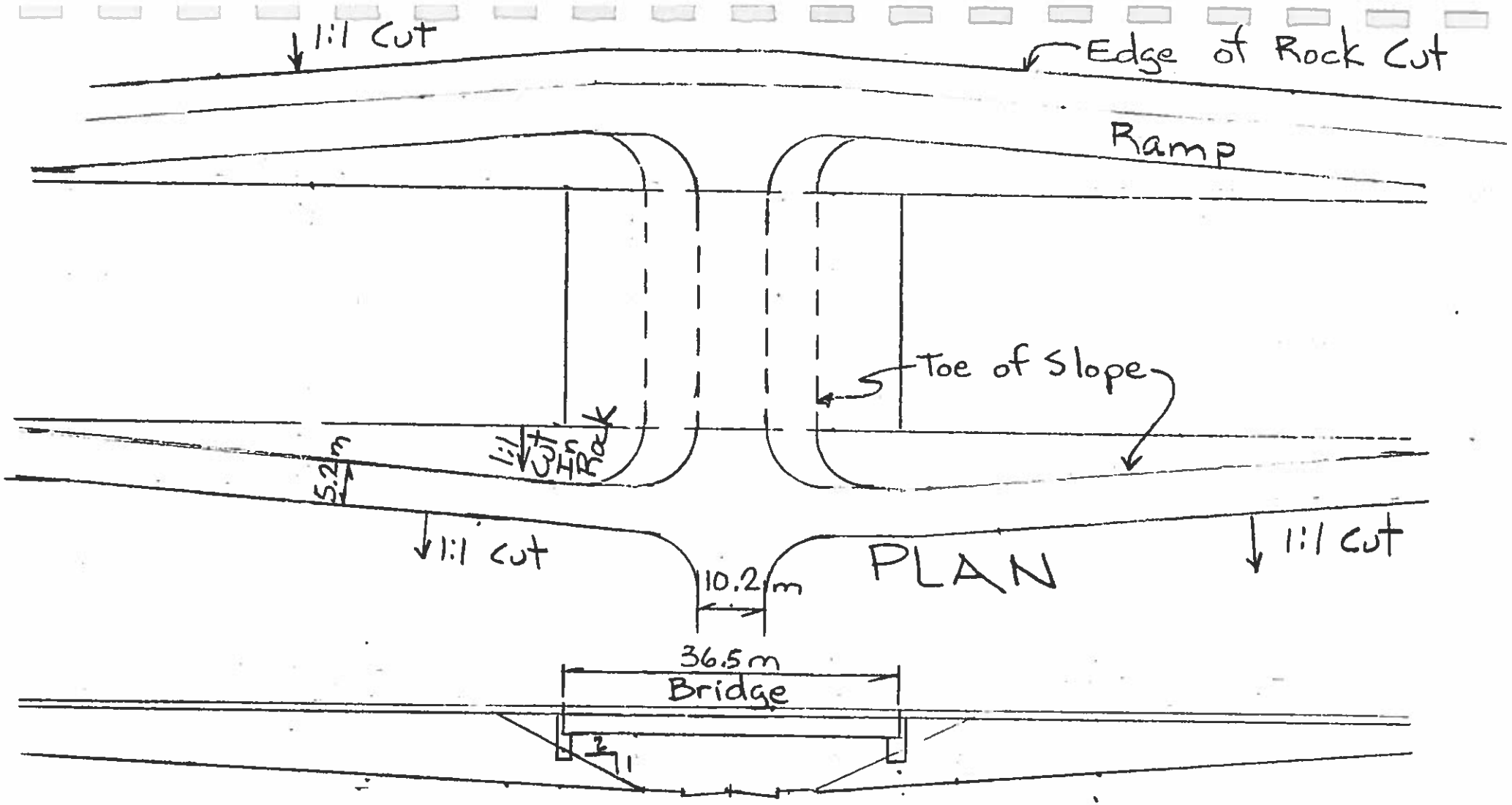
Concept 1



ELEVATION

(9 Spans @ 33,77 m)

Concept 2



ELEVATION
(Single Span Type III)

Concept 3

CONCEPT 1
(8% GRADE OF CONNECTION ROAD W/ WALLS)
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
RIGHT-OF-WAY COSTS	$74,400/ ACRE	12.5 ACRES	$ 930,000		
PAVING	$38.80/$M^2$	14,831.98	+ 575,481		
FILL (DISPOSABLE COST NEG SAVINGS)	$ 0.25/M^3	968,196 Cu.M	- 242,049		
BOX CULVERT			226,500		
FILL CUT					$ 4,300,000
PAVING					$ 650,000
WALLS					$10,911,000
BRIDGE					$ 380,000
			$1,489,932		$16,241,000

Possible Additional Cost $14,751,068

CONCEPT 2
(5% APPROACH GRADE)
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
RIGHT-OF-WAY COSTS	$74,400/ ACRES	12.5 ACRES	$ 930,000		
PAVING	$38.80/$M^2$	14,831.98	+ 575,481		
FILL (DISPOSABLE COST NEG SAVINGS)	$ 0.25/M^3	968,196 Cu.M.	- 242,049		
BOX CULVERT			226,500		
FILL CUT					$ 5,400,000
PAVING					$ 750,000
WALLS					$ 6,570,000
BRIDGE					$ 5,560,000
			$ 1,489,932		$18,280,000

Possible Additional Cost $16,790,068

CONCEPT 3
(8% GRADE W/ FILL SLOPES)
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
RIGHT-OF-WAY COSTS	$74,400/ ACRE	12.5 ACRES	$ 930,000		
PAVING	$38.80/M^2	14,831.98	+ 575,481		
FILL (DISPOSABLE COST NEG SAVINGS)	$ 0.25/M^3	968,196 Cu.M	- 242,049		
BOX CULVERT			226,500		
FILL CUT					12,000,000
PAVING					650,000
WALLS					0
BRIDGE					730,000
			$1,489,932		$13,380,000

Possible Additional Costs $11,890,068

VI.(c) STRUCTURES

VI.(c)(1) AS PROPOSED

"AS PROPOSED"

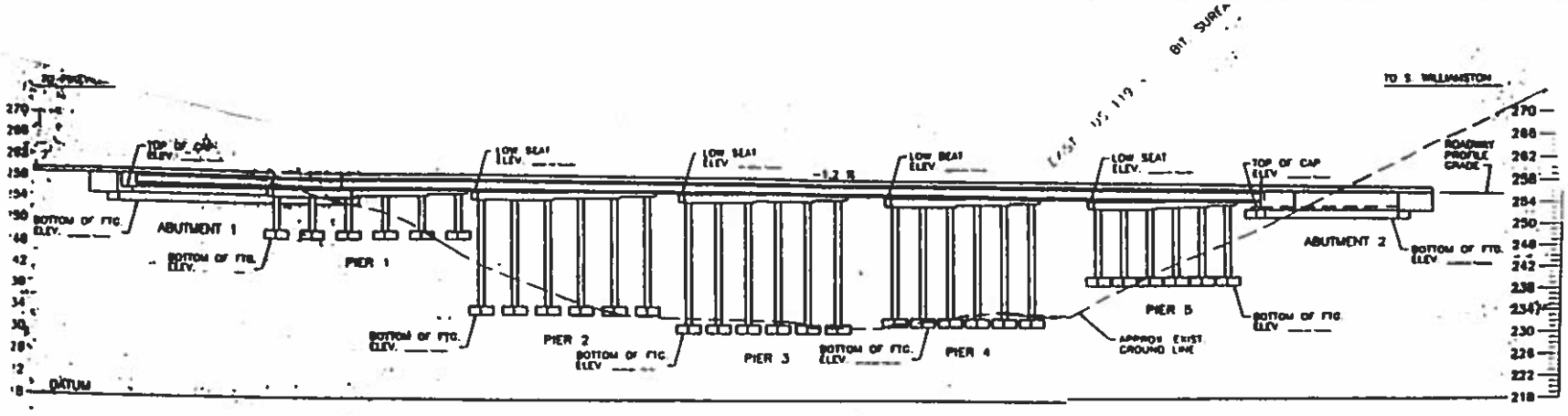
The proposed route for relocated U.S. 119 includes the construction of two bridge structures.

The first structure at Sta. 22 + 550 is a six span (24000 X 4 spans @ 35000 X 29000) structure utilizing 72" modified Type IV P.C.I. beams. The bridge spans Road Ford and existing U.S. 119. The bridge is on a 51° skew to the right. It is anticipated that all the piers will utilize spread footers on rock and the foundation design for the abutments will be determined after the subsurface data has been gathered. The anticipated cost of this structure is $3,551,194.00.

The second structure at Sta. 23 + 100 is a five span (29000 - 3 spans @ 35500 - 26500) structure utilizing 72" modified Type IV P.C.I. beams. This structure spans Big Creek and existing U.S. 119, with a skew which varies from 25° to 40° left. While the subsurface information is not yet complete, it is anticipated that the foundations for piers 1 thru 3 will be spread footers on rock and pier 4 will be on H-Piles on point bearing, as well as end ?bent? two. It is anticipated that the beginning of the bridge will be an abutment on rock. The anticipated cost of this structure is $2,974,000.00.

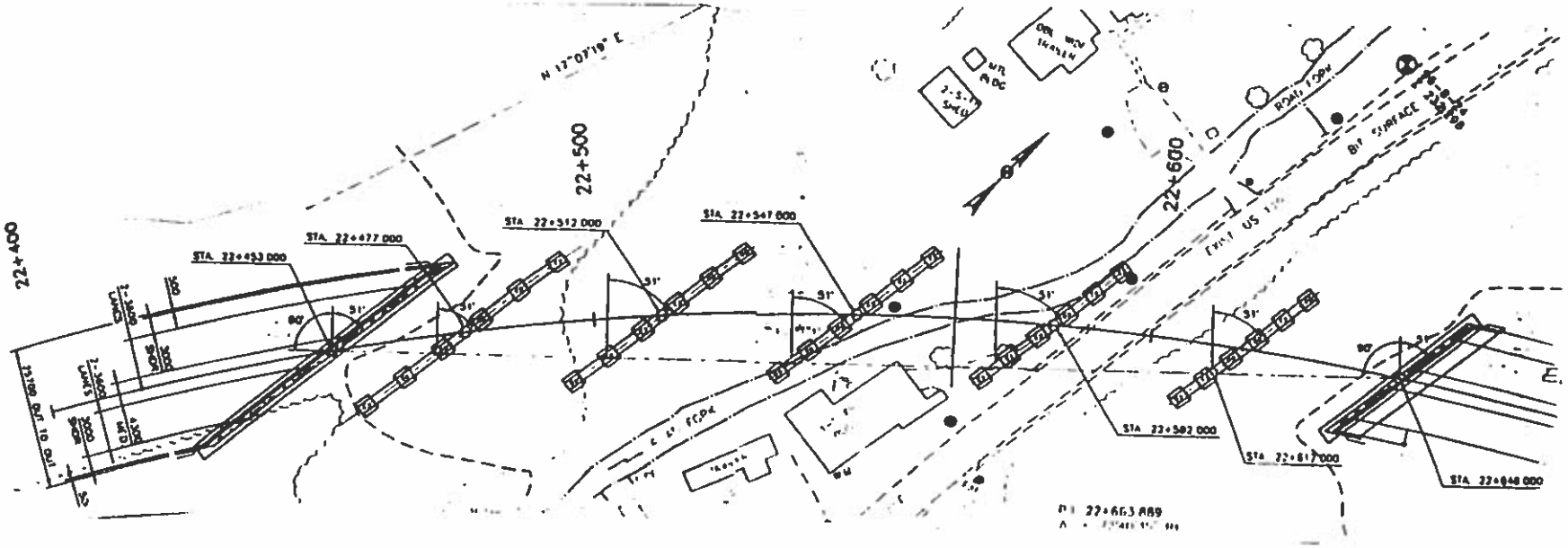
Both bridges will have 4 - 3.6 meter driving lanes, a 4.3 meter median with a median barrier wall and a 3.0 meter outside shoulders.

The proposed box culvert is a double 3.65m x 2.4m x 76m R.C.B.C. at sta. 1 + 125.20 on the connection right of sta. 21 + 965.552. The embankment height at the culvert location is 19 meters. The estimated cost of the culvert is $226,500.



ELEVATION

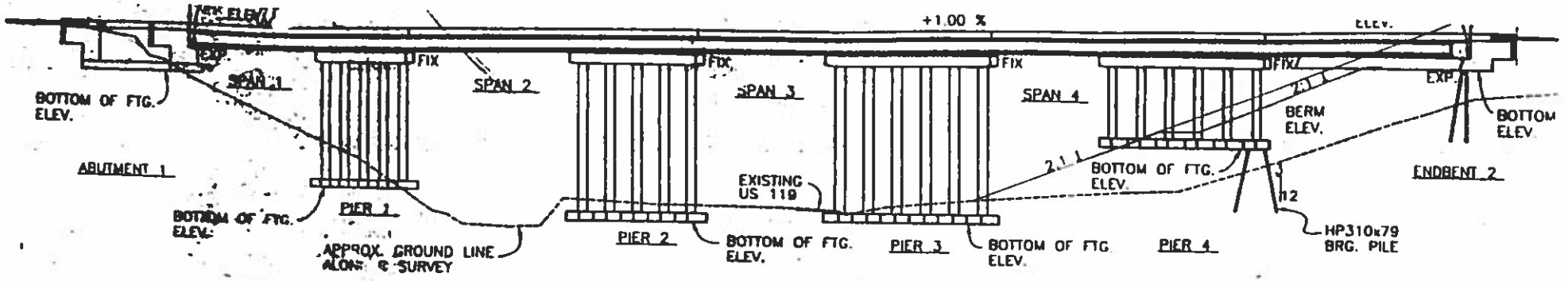
24000 – 4 SPANS @ 35000 – 24000 TYPE IV MOD. P.C.I.B.
CONTINUOUS FOR LIVE LOAD – HS25 LOADING
51° SKEW RT. – 24700 ROADWAY – 2:1 FILL SLOPES



PLAN

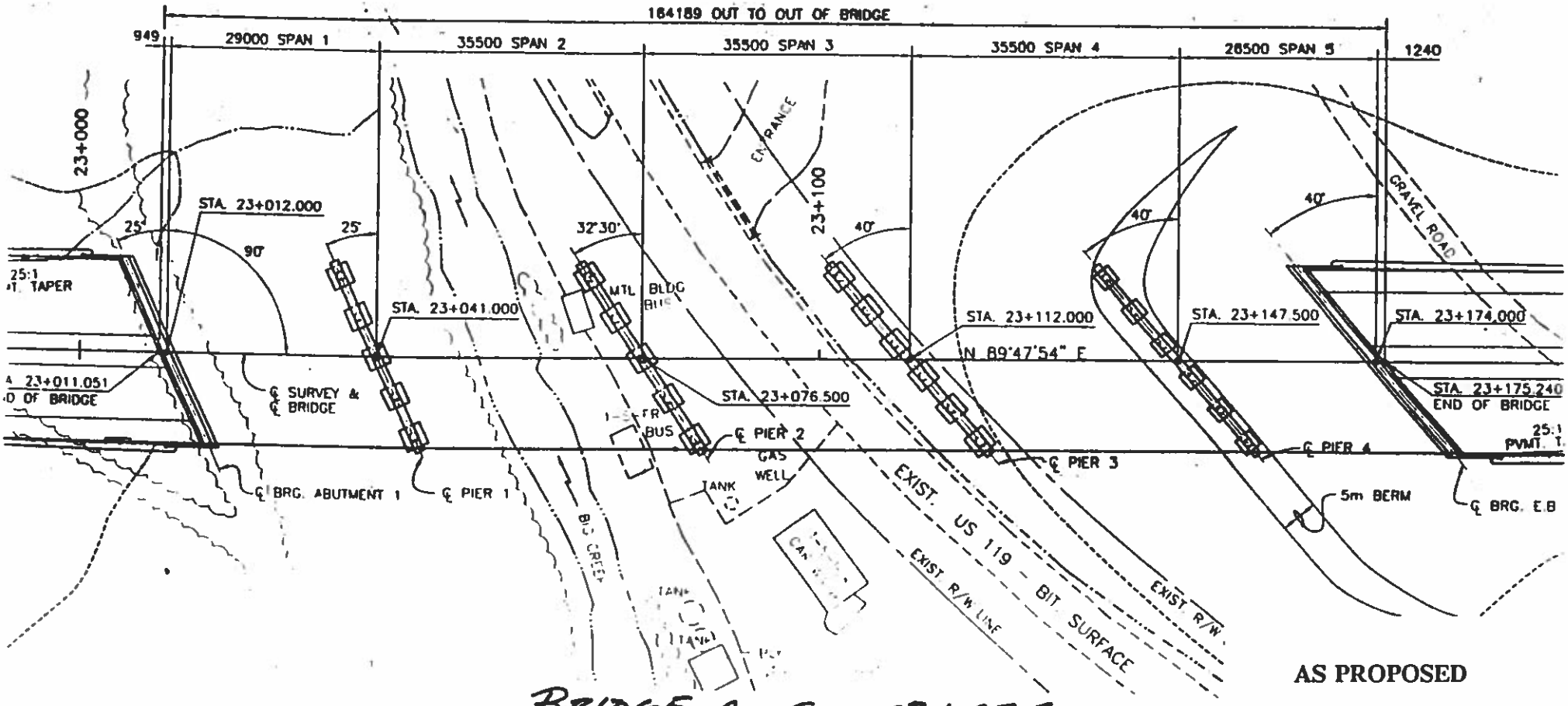
BRIDGE AT STA 22+600

AS PROPOSED



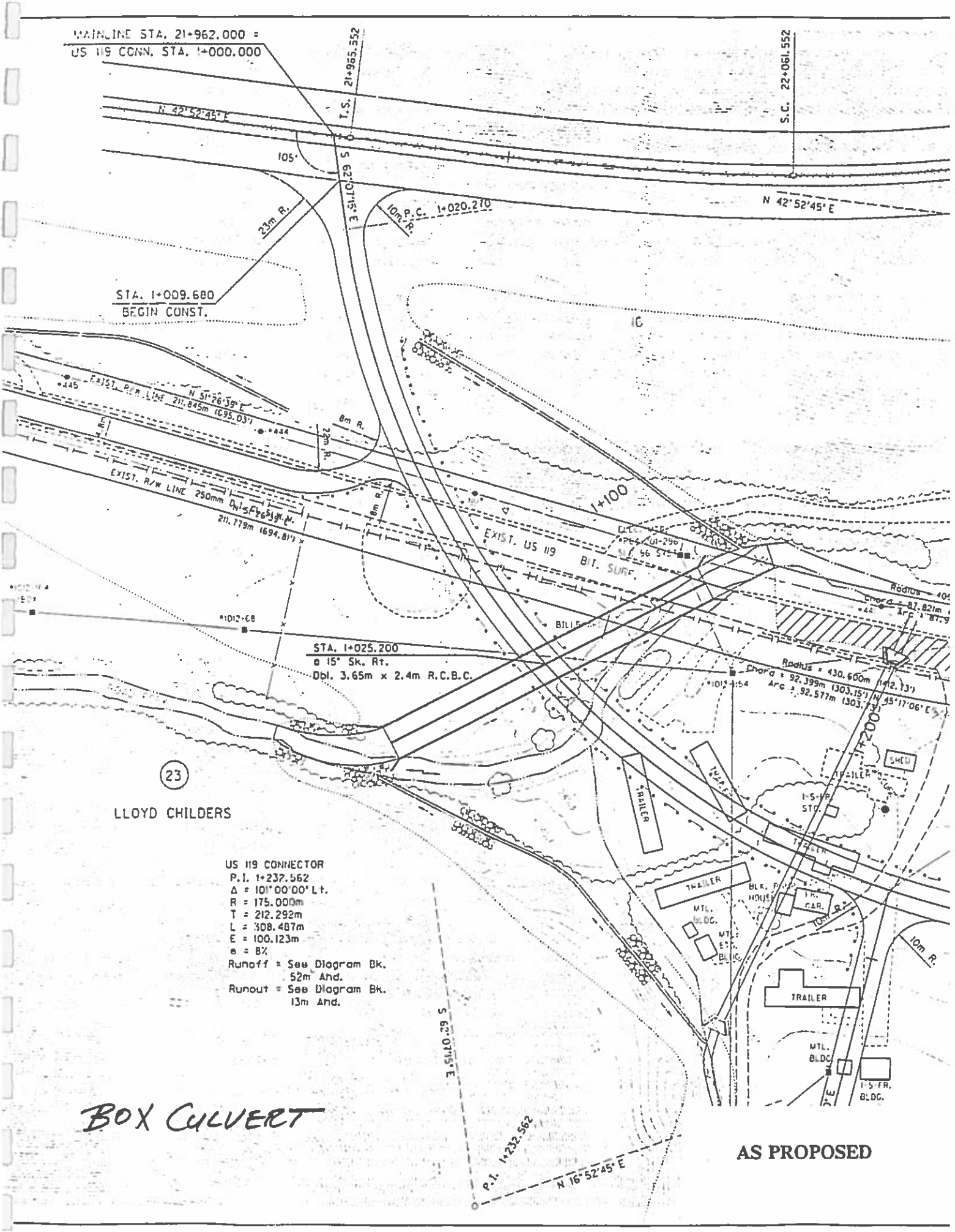
ELEVATION

29000 ~ 3 SPANS @ 35500 ~ 26500 TYPE IV MODIFIED P.C.I.B.
CONTINUOUS FOR LIVE LOAD ~ HS25 & ALT. MILITARY LOADING
SKEW VARIES 25°, 32.5° & 40° LT. ~ 24700 ROADWAY
2:1 FILL SLOPES ~ 27100 SHOULDERS @ BRIDGE



AS PROPOSED

BRIDGE AT STA. 23+075



BOX CULVERT

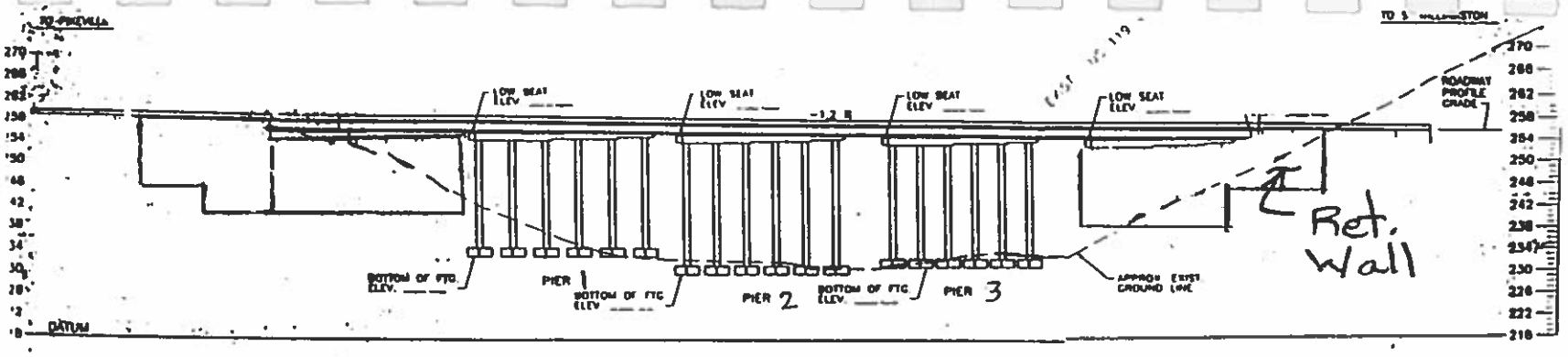
AS PROPOSED

VI.(c)(2) V.E. ALTERNATIVES

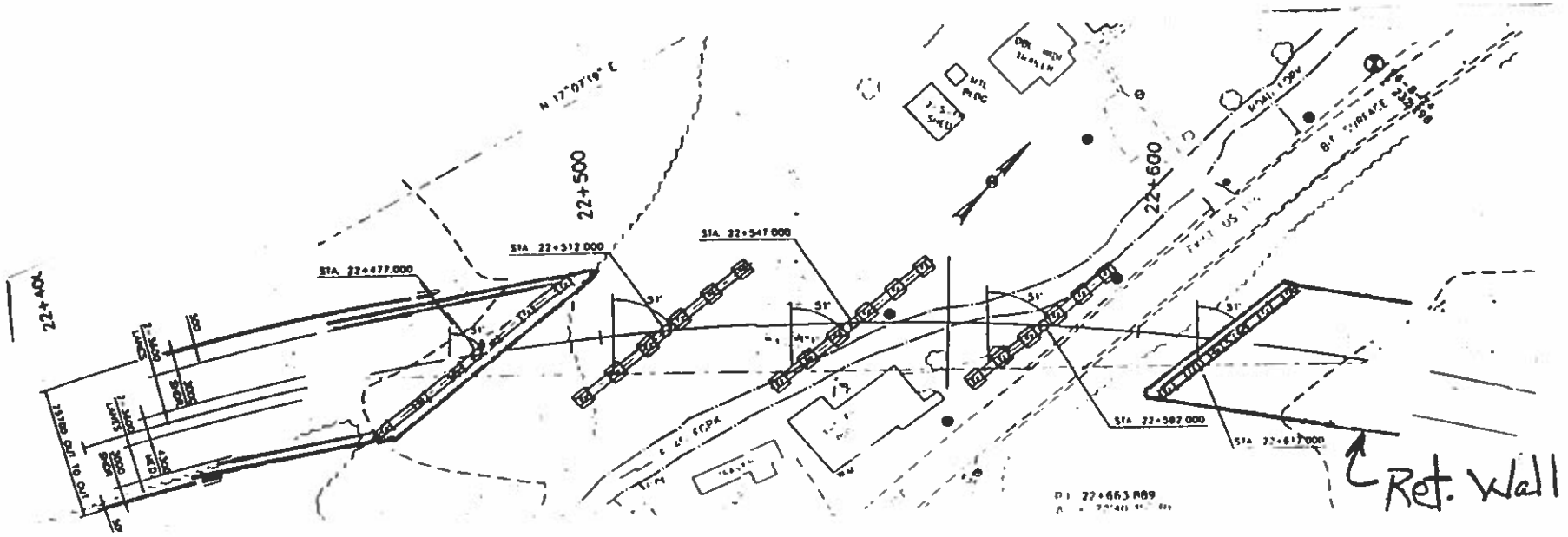
V.E. ALTERNATIVE

The V.E. alternative for Bridge 1 (at Sta. 22 + 550) is to use a four span bride (4 @ 35m) and retaining walls at the abutments. This structure will be shorter than the "As Proposed".

This alternative will cost approximately $3,211,500.



ELEVATION



VALUE ENGINEERING ALTERNATIVE

V.E. ALTERNATIVE
COST COMPARISON

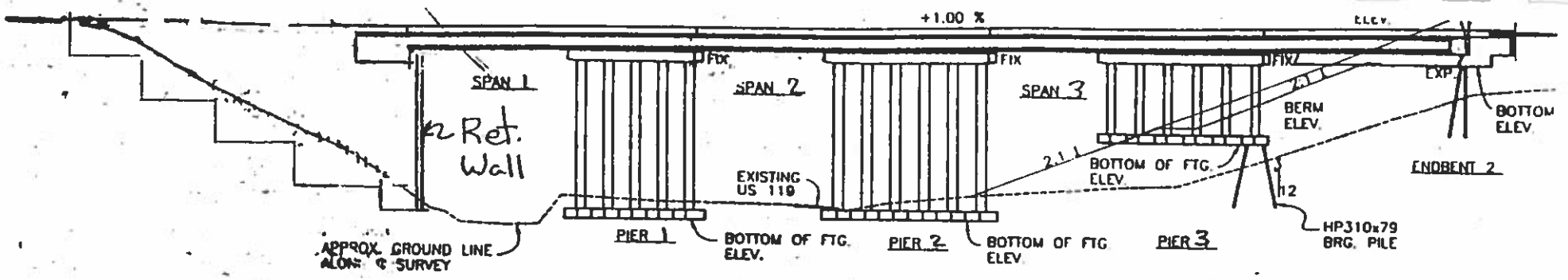
DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
6 Span Bridge 26-4 @ 35-29 Type IV Mod.	$716/M^2$	4960M	$3,551,360		
4 Span Bridge 4 @ 37 Type IV Mod.	$716/M^2$			3804	$2,723,664
Retaining Walls	$430/M^2$			1012	$ 435,160
Asphalt, Base, etc.	$38.80/M^2$			13585	$ 52,710
			$3,551,360		$3,211,534

Possible Savings $ 339,826

V.E. ALTERNATIVE

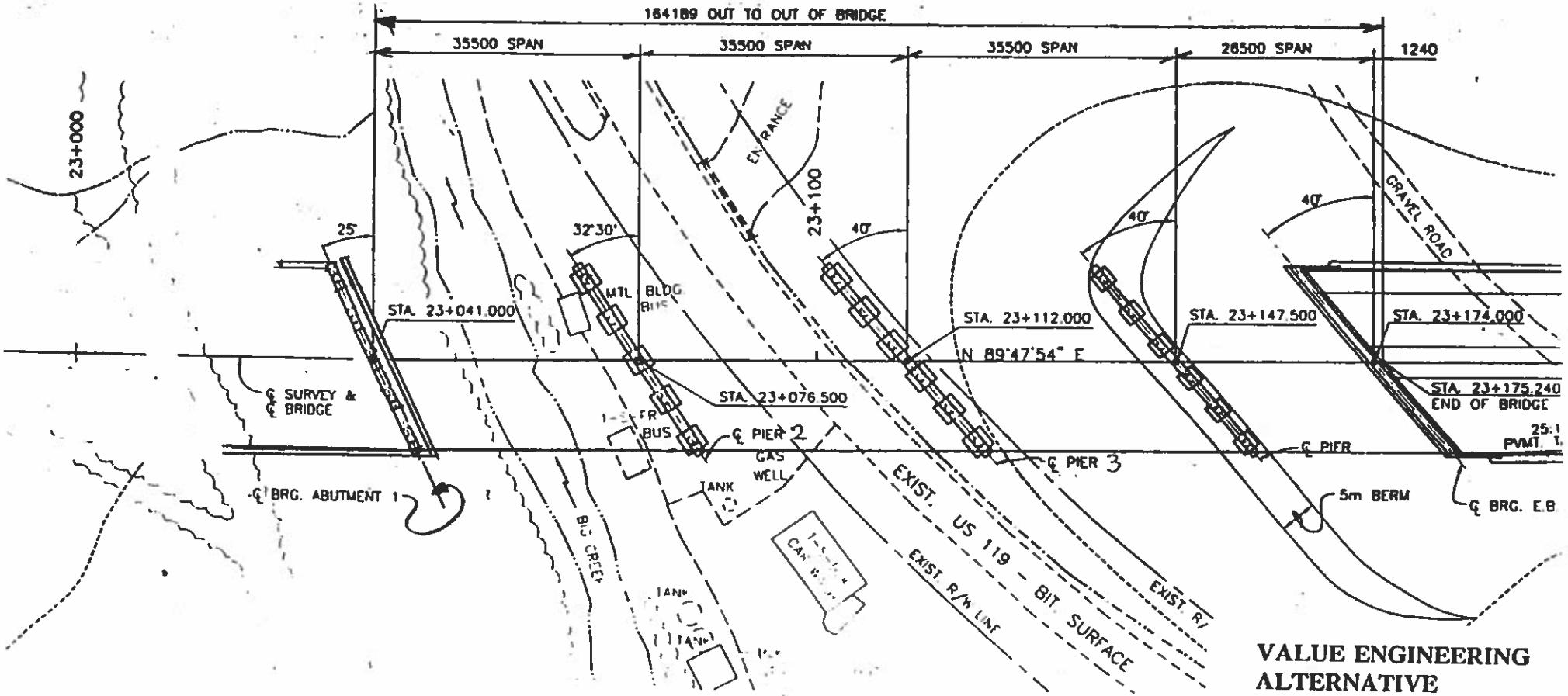
The V.E. alternative for Bridge 2 (at Sta. 23 + 100) is to use a four span bridge (3 @ 35.5 - 26.5) and retaining wall at abutment 1. This structure will be shorter than the "As Proposed".

This alternative will cost approximately $2,717,600.



ELEVATION

3 SPANS @ 35500 ~ 26500 TYPE IV MODIFIED P.C.I.B.
CONTINUOUS FOR LIVE LOAD ~ HS25 & ALT. MILITARY LOADING
SKEW VARIES 25°, 32.5° & 40° LT. ~ 24700 ROADWAY
2:1 FILL SLOPES ~ 27100 SHOULDERS @ BRIDGE



VALUE ENGINEERING ALTERNATIVE

COST COMPARISON

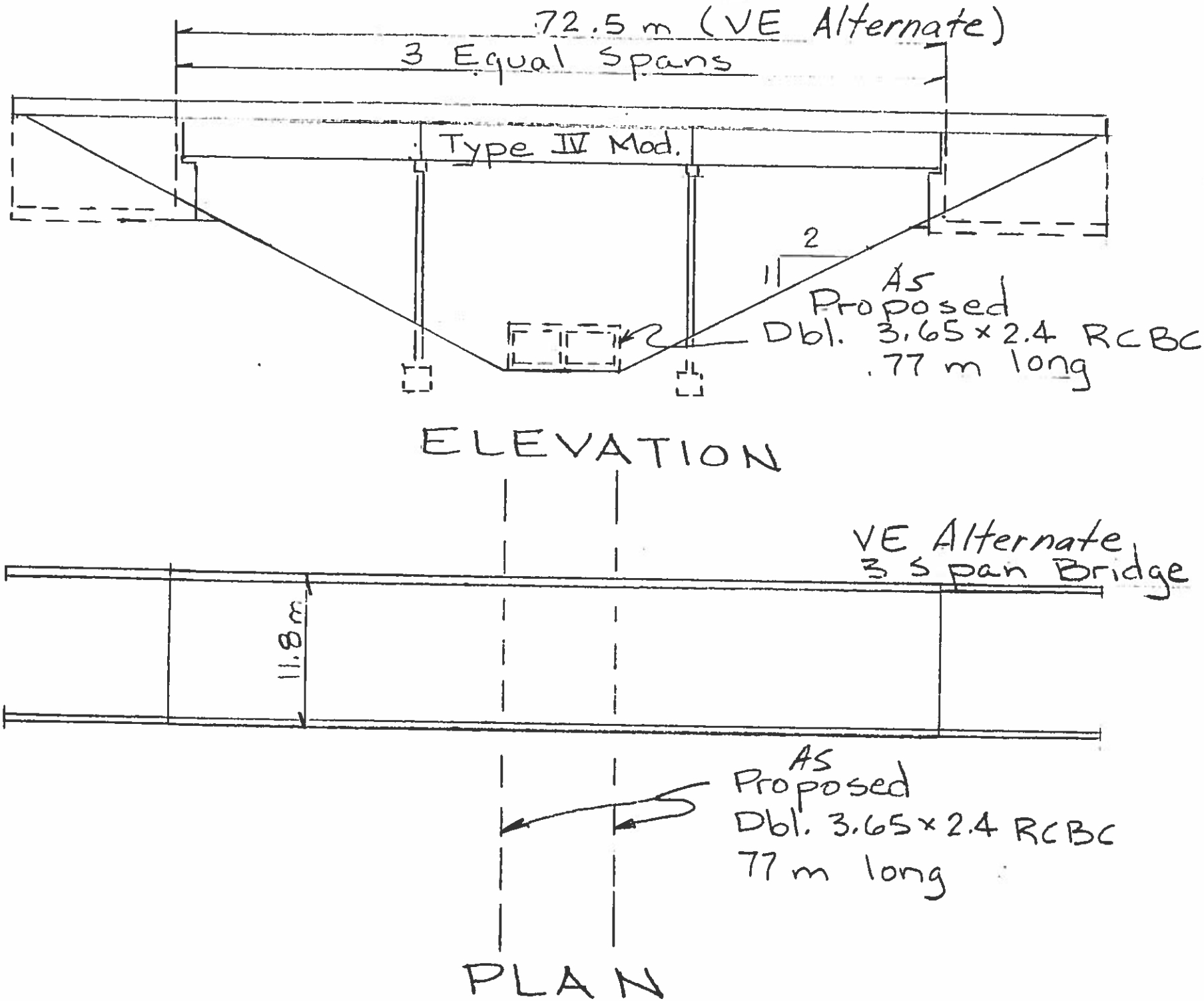
DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
5 Span Bridge 29 - 3 @ 35.5 - 26.5	$714/M^2$	4163	$2,972,382		
4 Span Bridge 3 @ 35.5 - 26.5	$714/M^2$			3418	$2,440,452
Retaining Walls	$430/M^2$			580	$ 249,400
Asphalt, Base, etc.	$38.80/M^2$			716	$ 27,781
			$2,972,382		$2,717,633

Possible Savings $ 254,749

STRUCTURES

"V.E. ALTERNATIVES"

The Value Engineering alternative is to replace the R.C.B.C. with a three span concrete bridge. The length of the bridge would be 72.5 meters and the cost would be $612,538.


72.5 m (VE Alternate)
3 Equal Spans
Type IV Mod.
2
1
As Proposed
Dbl. 3.65 x 2.4 RCBC
.77 m long
ELEVATION
VE Alternate
3 Span Bridge
11.8 m
As Proposed
Dbl. 3.65 x 2.4 RCBC
77 m long
PLAN

V.E. ALTERNATIVE
STRUCTURE 3
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
Dbl' 3.65 x 2.4 R.C.B.C.	$360/m^3$ $1.20/kg	493.7m3 40,566 kg	$177,842 $ 48,679		
3 Span Bridge	$7.16/m^2$			$855.5m^2$	$612,538
Asphalt, 5" Base, 8" Base 24" Roadbed	$38.80/m^2$	$768.5m^2$	$ 29,818		
Fill	$ .25/m^3			22,591 m^3	$ 5,648
			$256,339		$618,186

Possible Addition Cost: $361,847

VI.(d) TYPICAL SECTION

VI.(d)(1) AS PROPOSED

TYPICAL SECTION

"AS PROPOSED"

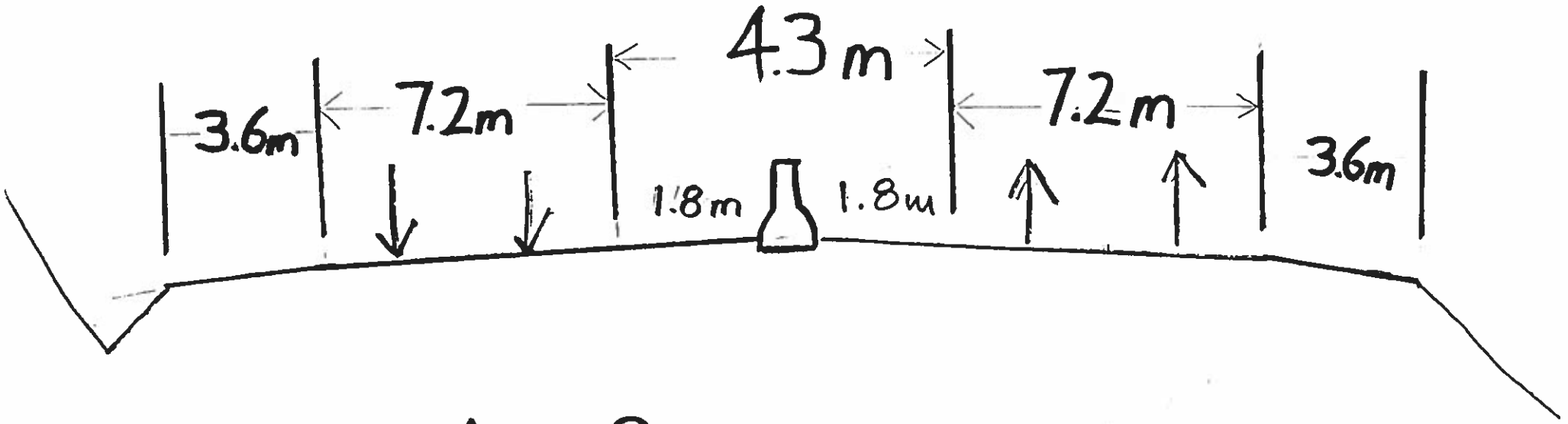
The mainline typical as depicted in the construction plans has a 4.3m (14 feet) flush median with a median barrier wall in most of the project. The project to the south of this one has a 10.5 ft (3.18 meter) median with a median barrier wall. This 4.3 meter typical section facilitates the development of a left turn lane in the median in the areas where access is being provided. The current plans indicate the following barrier wall requirements for this project from Road Fork to 1.9 kilometer east of KY 3154:

BARRIER WALL LOCATION

Sta. 22 + 132 Begin Barrier (after U.S. 119 Connector at Road Fork)
Sta. 24 + 762 End Barrier (before Reed Fork approach)
Sta. 25 + 132 Begin Barrier (after Reed Fork approach)
Sta. 25 + 775 End Barrier (before Brunty Ford approach)

Leave flush median without barrier to end of project. Barrier wall resumes 675 meters into the adjoining Canada to Huddy Project.

The break in barrier at the beginning of the project allows for the major intersection at Sta. 21 + 962 right. The second brake in wall facilitates another major connection to old U.S. 119. The wall ends before Brunty Fork to allow access across the median at three existing locations on the right side of the roadway.



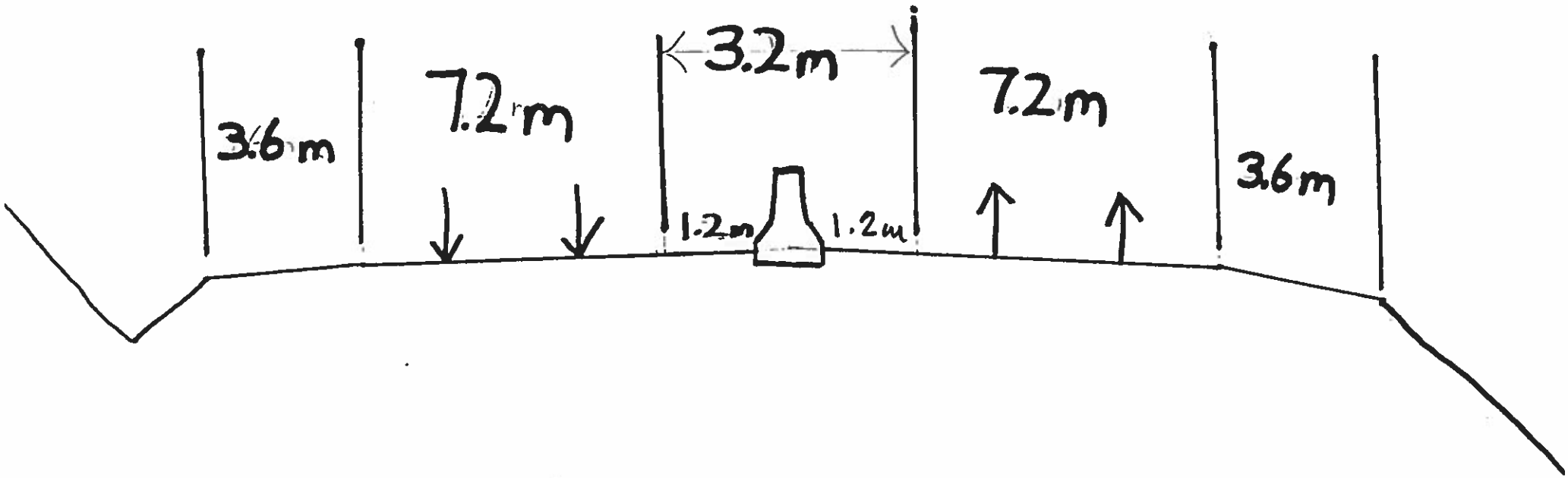
As Proposed

VI.(d)(2) V.E. ALTERNATIVES

TYPICAL SECTION

"V.E. ALTERNATIVES"

The V.E. team recognized the difference in typical sections of the adjoining project on the west end and this project during the field review of this Pike County project. After review of the as-built plans the team decided to pursue the reduction of earthwork this change would create.



V.E Alternative

REDUCE MEDIAN WIDTH TO 3.2M
IN AREAS WITH MEDIAN BARRIER WALL
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
Pavement Reduction	$38.82m^2$			3600	$139,764
Bridge Area Reduction	$710.05m^2$			212.3 180.4 392.7	$278,837
Roadway Exc. Reduction	$5.00m^3$			76,429	$382,147

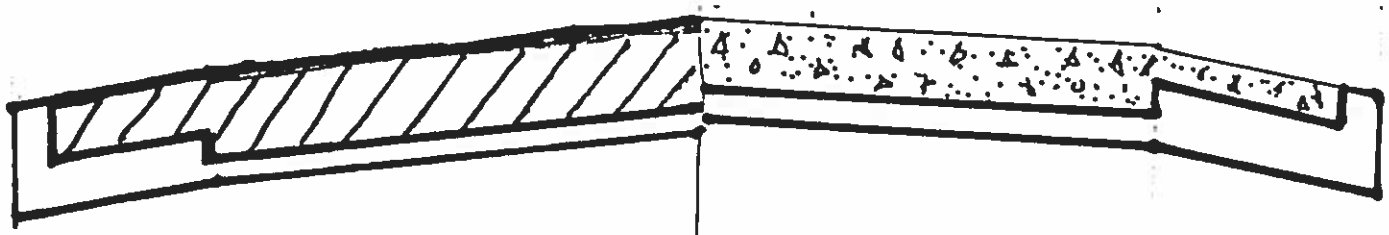
Possible Savings $800,748

PAVEMENT LCC

During the V.E. study, an alternative considered was to use concrete pavement instead of asphalt for this project. The Pavement Design Section was contacted and asked to provide equivalent pavement designs for both asphalt pavement and for concrete pavement. Due to the fact that no traffic projection information was available to determine the total Equivalent single Axle Loads (ESAL'S) during the expected 40 year economic life of this roadway, only educated guesses could be made. The two equivalent designs were then used to calculate the cost to construct one mile of pavement using the same typical section as proposed for this project. In addition, it was also requested that the rehabilitation activity required to extend each of the competing sections to a life 40 years be defined. For asphalt pavement, it was assumed that to mill 1" and provide a 2 1/2" overlay at year 10, 20 and 30 would provide a 40 year economic life. For concrete pavement it was assumed that the only rehabilitation activities required would be to reseal the joints at year 10, 20 and 30.

With these assumptions noted above, the total Life Cycle Cost was then calculated using a 5% and a 7% discount rate to determine the total Present Worth of each alternative over a 40 year life.

40 YEAR LIFE CYCLE COST COMPARISON



ASPHALT

PAVEMENT DESIGN

MAINLINE PAV'T
- 1½" AK/A
- 12" K or CK
- 4" CSB

SHOULDER PAV'T
- 1½" AK/S
- 8" K or CK
- 8" CSB

INITIAL COST TO CONSTRUCT 1 MILE
$ 1,257,957

Mill 1" & Overlay 2½"
mill 1" & Overlay 2½"
Mill 1" & Overlay 2½"
$ 1,566,915 ← TOTAL PRESENT WORTH at 5%

CONC

PAVEMENT DESIGN

MAINLINE PAV'T
- 11" PCCP
- 4" CSB

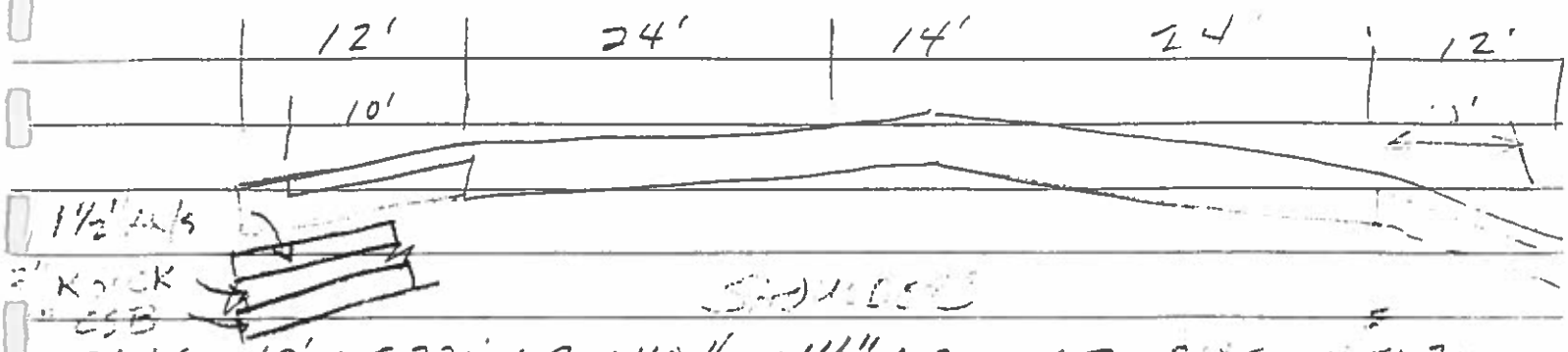
SHOULDER PAV'T
- 6" PCCP
- 4" CSB

INITIAL COST TO CONSTRUCT 1 MILE
$ 2,060,773

REHABILITATION REQUIRED
- @ YR 10 – Reseal Joints
- @ YR 20 – Reseal Joints
- @ YR 30 – Reseal Joints

→ $ 2,229,377

ASPHALT



SQUARE

AC/S 10' x 5,280' ÷ 9 x 110 lbs x 1½" ÷ 2000 x 2 = 990 tons x $21.50

KNOCK 10' x 5,280' ÷ 9 x 110 lbs x 1" ÷ 2000 x 2 = 645 tons x $19.50

CSB 12' x 5,280' ÷ 9 x 115 lbs x 1' ÷ 2000 x 2 = 1,173 tons x $22

$37,730 + 151,431 + $77,724 = 256,937

AC/S 24' x 5,280' ÷ 9 x 110 x 1½" ÷ 2000 = 2376 tons x $21.50

KNOCK 24' x 5,280' ÷ 9 x 110 x 1" ÷ 2000 = 1548 tons x $19.50

CSB 24' x 5,280' ÷ 9 x 115 x 1' ÷ 2000 = 1673 tons x $22

124,542 + 776,096 + 100,392 = 1,001,030

TOTAL ASPH / MILE = $256,937

$1,001,030

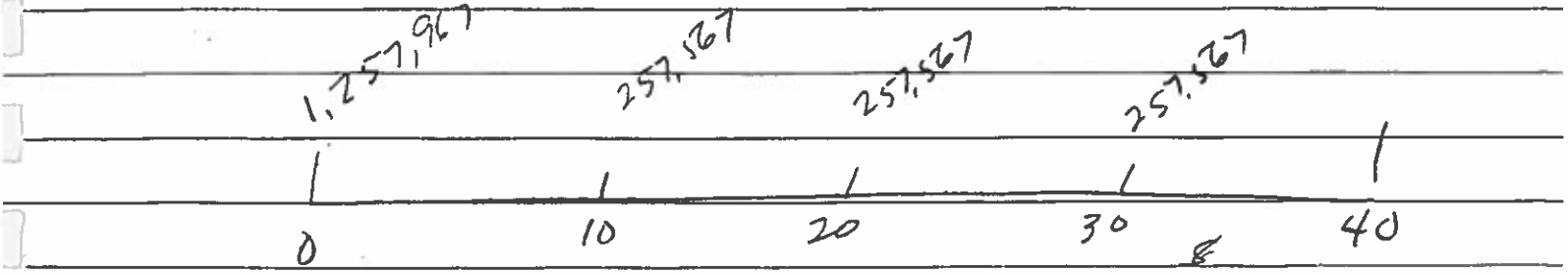
$1,257,967

RETAIL

WALL 62' x 5,280' x 110 lb x 1" ÷ 2000 = 2001 tons x $25.00

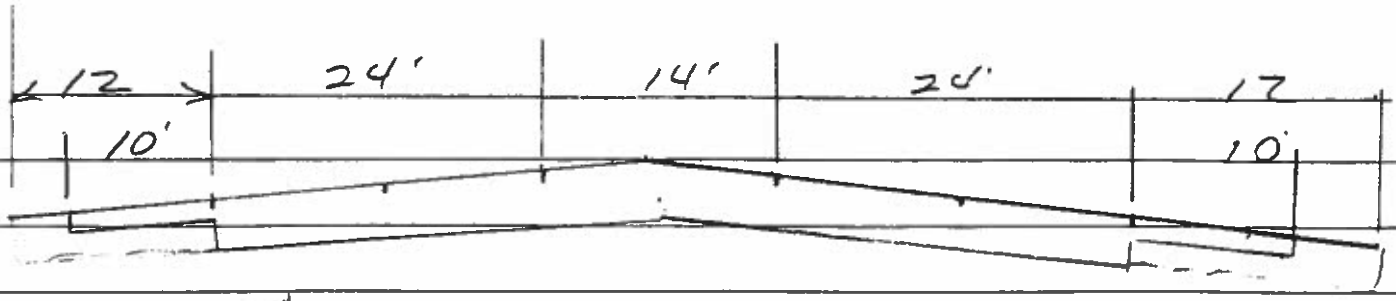
KNOCK 62' x 5,280 x 110 lb x 2½" ÷ 2000 = 5003 tons x $19.50

TOTAL $50,025 + $97,542 = $147,567



RW @ 5% 1,257,967 + 156,854 + 95,026 + 57,068 = 1,566,915

RW @ 7% 1,257,967 + 129,779 + 66,819 + 31,796 = 1,484,361



6" PCC
9" CSTB

SHOULDERS

12' 5,280 ÷ 9 × 2 × 32[00] = 375,467

12' 5,280 ÷ 9 × 115 × 9" ÷ 2000 × 2 × 11[00] = 30,150

11" PCCP
4" CSTB

MAINLINE

62' × 5,280' ÷ 9 × 41.20 = 1,513,131

62' × 5,280 ÷ 9 × 115 × 4" ÷ 2000 × 11[00] = 92,105

1 mile SHLDR & MAINLINE TON = 2,060,773

TRANS JOINTS

LONG 6 × 5,280 × 2[00] = 63,360

TRANS 5,280 / 15' × 32' × .75 = 79,376

142,736

2,060,773 | 142,736 | 142,736 | 142,736

0 10 20 30 40

PW 6.5% = 2,060,773 + 86,358 + 51,747 + 30,499 = 2,229,377

PW 7% = 2,060,773 + 71,405 + 35,144 + 10,711 = 2,184,033

VII. 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 No. 1

The V.E. Team recommends that the median shoulder width be reduced from 1.8m to 1.2m in those areas where median barrier wall is installed.

If this recommendatin can be implemented, there is a potential savings of approximately $800,000.

Recommendatin No. 2

The V.E. Team recommends that the two bridge structures separating the new roadway and old US 119 be reduced in length by the use of retaining walls.

If this recommendation can be implemented, there is a potential savings of approximately $595,000.

If both of these recommendations can be implemented, there is a potential savings of $1,395,000.

VE REVIEW OF US 119, PIKE COUNTY, KY
DECEMBER 13, 1996

AGENDA

Introduction of Guests and Team Members	Daryl Greer, KTC
Project Description & Cost Estimate	Doug Smith, KTC

VE Alternatives Evaluated

1. Pavement — Jack Trickey, Ventry Eng.

   A. Asphalt vs. Concrete

2. Structures — Don Keenan, Ventry Eng.

   A. Reduce length of structures using retaining walls

   B. Use bridge instead of box culvert

3. Typical Section — Steve Criswell, KTC

   A. Reduce median shoulder widths to 1.2 m instead of 1.8 m in the areas where median barrier walls are to be installed.

4. Grades and Alignment — William Nickas, Ventry Eng.

   A. Revise grades and alignment to reduce the amount of road way excavation required.

5. Interchanges — William Nickas, Ventry Eng.

   A. Multi-point access using proposed grade separation over US 119

   B. Full diamond type interchange at Sta. 24 + 200 ±

Summary and VE Recommendations	Jack Trickey, Ventry Eng.

US 119/BENT MOUNTAIN TO COBURN MOUNTAIN
V.E. STUDY PRESENTATION
December 13, 1996

NAME	AFFILIATION	PHONE
JACK TRICKEY	VENTRY ENGINEERING	904/627-3900
DON KEENAN	VENTRY ENGINEERING	904/627-3900
TOM HOWARD	VENTRY ENGINEERING	904/627-3900
DOUG SMITH	KY T.C. - HWY DESIGN	502/564-2374
BUAN SMITH	FWHA	502/223-6740
WILLIAM NICKAS	VENTRY ENGINEERING	904/627-3900
DARYL GREER	KY T.C. - HWY DESIGN	502/564-3280
STEVEN CRISWELL	KY T.C. - HWY CONSTR	502/564-4780
STEVE HOEFLER	KY T.C. - HWY DESIGN	502/564-3280
BILL HORNBECK	DIV. OF BRDG. DESIGN	502/564-4560
BOB CRISCILLIS	H.M.B.	502/695-9800
BRYAN STOPPER	H.M.B.	502/695-9800
JOETTE FIELDS	KY T.C. - HWY DESIGN	502/564-3280
CHARLES REICHENBACH	KY D.O.H. DIST.#12 PRECONSTR ENGINEER	606/433-7791
CHARLES BRIGGS	DN OPERATIONS	502/564-4556
BRAD HAMBLIN	KY T.C. - CONSTR	502/564-4780
RALPH DIVINE	KY T.C. - R/W & UTIL.	502/564-3210
JOHN SACKSTEDER	KY T.C. - HWY DESIGN	502/564-3280

VIII. APPENDICES

ENDORSEMENT TO: Mr. Zane Young, P. E.
Haworth, Meyer, & Boleyn, Inc.

DATE: September 14, 1993

SUBJECT: Pike County
FSP 098 0119 015-020 155 D
00APD 0506 009
Pikeville-Williamson Road
Item No. 12-264.00

The report of the Preliminary Line & Grade Inspection held on July 30, 1993, has been reviewed and is approved with the following comments:

Alternate No. 2 is the preferred alignment to be used for the development of Final Plans.

Maintenance of traffic, avoidance and minimization of water related impacts, waste considerations and geotechnical considerations were discussed in the Preliminary Line & Grade Report submitted with the Preliminary Plans.

There are no known wetlands on this project; however, there is involvement with channelization and blue line streams. Provide floodway analysis for all drainage areas equal to or greater than one square mile.

Estimates are as follows:

	Original (2)	Revised (2)	Six Year Plan
C	43,180,081	52,693,521	36,000,000
R	11,605,000	11,605,000	15,500,000
U	1,500,000	1,500,000	1,750,000
	56,285,081	65,798,521	53,250,000

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET
FRANKFORT, KENTUCKY 40622

DON C. KELLY, P.E.
CRETARY OF TRANSPORTATION

JERRY D. ANGLIN
DEPUTY SECRETARY
AND
OMMISSIONER OF HIGHWAYS

BRERETON C. JONES
GOVERNOR

MEMORANDUM:

To: Jim Lyons, P.E.
Design Engineer

From: (Jerry)Willis Justice, Jr.
Right of Way Supervisor
District #12-Pikeville

Date: September 3, 1993

Subject: Pike County/Item No. 12-264.01
FSP 098 0119 015-020 3155 D
00APD 00506 009
Pikeville-South Williamson Rd.
Right of Way Estimate

The Estimated Right of Way Costs for Alternate #1 and Alternate #2 are as follows:

Alternate #1 $ 12,263,000

Alternate #2 $ 11,605,000

JWJ/bacd
pc: Charles W. Reichenbach
File

Rec'd
9/7/93

(REVISED)

TRANSPORTATION CABINET
Department of Highways
ESTIMATE SHEET

Pike County

UPN _____ Fed. No. FSP 098 0119 015-020: 00APD 001

Road Name U.S. 119 Pikeville-Williamson Road Alternate 2

From Road Fork of Big Creek (705 + 00)

To 1.16 miles east of Ky. 3154 (885 -00)

Net Length, Miles 3.45 Type of Construction Grade & Drain Surface Class of Road Rural Arterial

CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
2545	CLEARING AND GRUBBING	1	L.S.	$550,000.00	$550,000.00
2200	ROADWAY EXCAVATION	8,763,245	C.Y.	$3.75	$32,862,168.75
462	CULVERT PIPE-18 INCH	720	L.F.	$32.00	$23,040.00
464	CULVERT PIPE-24 INCH	1,480	L.F.	$40.00	$59,200.00
466	CULVERT PIPE-30 INCH	710	L.F.	$45.00	$31,950.00
468	CULVERT PIPE - 36 INCH	130	L.F.	$52.00	$6,760.00
469	CULVERT PIPE - 42 INCH	270	L.F.	$62.00	$16,740.00
471	CULVERT PIPE-54 INCH	250	L.F.	$82.00	$20,500.00
474	CULVERT PIPE-72 INCH	170	L.F.	$134.00	$22,780.00
475	CULVERT PIPE-78 INCH	300	L.F.	$148.00	$44,400.00
8100	CLASS A CONCRETE	2,195	C.Y.	$275.00	$603,625.00
8150	STEEL REINFORCEMENT	317,700	LBS.	$0.60	$190,620.00
1490	DROP BOX INLET TYPE 1	11	EACH	$2,000.00	$22,000.00
1450	S & P BOX INLET-OUTLET-18 INCH	3	EACH	$1,500.00	$4,500.00
1451	S&P BOX INLET-OUTLET - 24 INCH	5	EACH	$1,900.00	$9,500.00
1452	S & P BOX INLET-OUTLET-30 INCH	4	EACH	$2,200.00	$8,800.00
1453	S & P BOX INLET-OUTLET-36 INCH	1	EACH	$2,500.00	$2,500.00
1955	CONC. MEDIAN BARRIER TYPE 12C1	315,750	L.F.	$40.00	$630,000.00
2929	CRASH CUSHION TYPE IX	8	EACH	$7,000.00	$56,000.00
2351	GUARDRAIL-STEEL W BEAM-S FACE	16,800	L.F.	$9.00	$151,200.00
2370	GUARDRAIL END TREATMENT TYPE 4	38	EACH	$450.00	$17,100.00
	MAINLINE PAVING	3.42	MILE	$1,500,000.00	$5,130,000.00
	APPROACH PAVING	1.69	MILE	$300,000.00	$507,000.00
	85-115-115-95 Type IV Mod. PCIB Bridge	1	L.S.	$2,570,000.00	$2,570,000.00
	105-125-125-105 Type IV Mod. PCIB Bridge	1	L.S.	$2,300,000.00	$2,300,000.00
	Mobilization	1	L.S.	$1,126,926.00	$1,375,211.51
	Demobilization	1	L.S.	$563,463.00	$687,605.76

Cost per mile Grade and Drain $

SUB-TOTAL $47,903,201.02

Cost per mile G. & D. & Surf. $

ENGR. & CONTG. (+10%) $4,790,320.10

GRAND TOTAL $52,693,521.12

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cc - Gree.

Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

T. Kevin Flanery
Deputy Secretary

Paul E. Patton
Governor

November 15, 1996

Mr. Phil Boleyn, P.E.
Haworth, Meyer & Boleyn, Inc.
3 HMB Circle
Frankfort, Kentucky 40601

Dear Mr. Boleyn:

SUBJECT: Pike County, US 119
Pikeville - South Williamson
Item No. 12-264.01

We appreciate your meeting with us on short notice yesterday. We hope you understand how important it is for us to finalize work on US 119, particularly the section for which your firm has a contract for providing construction plans. We discussed several actions that need to be resolved to allow you to provide right of way plans for Section 1 at the end of next February and for Section 2 at the end of next April. Those plans must be provided within these timeframes.

One issue which we understand has not been resolved involves interchanges or grade separations for coal truck traffic at designated locations. The primary purpose is to eliminate the left turns across the new four-lane road. There is no typical detail for this method of coal truck traffic access, and some work is required before it can be resolved. Therefore, we agree that any work required for this new type of access accommodation can be handled through a right of way plan change. The critical action is to define the right of way required for mainline construction. This needs to be our primary focus at this time.

This appears to be a project which has been designated for review under the Federal Value Engineering requirements. We will take those steps necessary to

ensure that these requirements will not impact your proposed schedule for providing right of way plans as set forth above.

One of the most pressing concerns which you raised is the response from our staff on the preferred location of the alignment. No additional comments were received; therefore, you should finalize the alignment based on the recorded minutes of the October meeting. Along those lines, you noted a need for cooperation in setting inspection dates as quickly as possible. The person designated as the Project Manager for this project will cooperate to the fullest extent on that matter.

As a result of our discussion on these issues and commitments as outlined above, right of way plans for Section 1 and Section 2 are to be provided by the end of February 1997 and the end of April 1997, respectively. A field inspection is set for 9:00 a.m. on January 7, 1997, for the purpose of reviewing information necessary for establishing the bulk of right of way required for this project. Your assistance in providing plans by these dates is expected to ensure that we can fully utilize all funding.

Thank you for your cooperation and willingness to adhere to the schedules requested. We look forward to working with your associates and you in the future.

Sincerely,

James C. Codell, III
Secretary of Transportation

c: Kevin Flanery
J. M. Yowell
Mike Hancock
Denton Biliter
John Sacksteder
Ralph Divine