

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 050478

FEDERAL AID PROJECT NO. NHPP-0032(40)

HWY. 167 EMERGENCY ROUTE (RAMSEY MOUNTAIN) (S)

STATE HIGHWAY 167 SECTION 17

IN INDEPENDENCE COUNTY

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

January 26, 2001

TO: Mr. Lyndal Waits, District 5 Engineer

SUBJECT: Hwy. 167 Slide (Batesville)
U.S. 167, Section
Independence County

Transmitted herewith are the logs of rotary wash borings conducted in the vicinity of the Hwy. 167 Slide near Batesville. The Stations are referenced to the center of a cross drain, located North of the slide area, with an assumed Station 0+00 and an assumed elevation of 1000.0' on the culvert headwall. Figure 1 illustrates a plan view of boring locations.

Discussions with you and your staff indicated that cracking and subsidence have been visually observed for several years. However, only recently have cracks in the roadway become more prevalent. In 1975 your staff indicated that a row of piling were driven within the slope and cabled together to help resist movement at that time. Figure 2 illustrates the piling locations after installation. Also, it was revealed that the septic field lines from the "Scenic Motel" crossed Highway 167 and drained into the area at the toe of the embankment slope. This area is presently being cleared for future development.

A subsurface investigation was conducted in November 2000 to determine properties of existing soil and bedrock conditions. A total of eight borings were drilled along both shoulders of the existing Highway 167 and at the toe of the embankment slope. The existing material consists of a Soft to Medium Stiff Clay intermixed with Sandstone fragments and underlain by a Highly Weathered Shale and Hard Shale. The depth of the Hard Shale is greater than 20 feet. Only two borings indicated saturated layers within the slope (Borings 1 & 6). Observations of the slope, pavement, adjacent area and boring logs do not reveal an obvious slippage plane. A predicted failure plane is at the Soil and Weathered Shale interface.

The samples obtained by the Standard Penetration tests were brought to the laboratory and visually classified. The rock cores are available for inspection at the Materials Division.

Attached on Figures 3, 4 and 5 are several recommendations for the repair of the slope for your consideration.



Jim Gee, Materials Engineer

JG: lw
Cc: Roadway Design Engineer

Repair Alternatives

Before any final alternative is accepted, the field lines for the adjacent motel should be located and inspected to determine if they are broken or leaking into the roadway embankment. If possible, these lines should be relocated.

The most positive correction would be to excavate all of the soft unstable material above the Hard Shale and backfill and reconstruct the slope with buttress material. However, due to the excessive excavation required this alternative does not appear to be reasonable to construct and keep the traffic lanes open. Therefore, the following alternatives are presented for your review.

- Alternate 1: Construct a buttress on stone columns to resist movement of the roadway and provide drainage. The Stone Columns could be installed through the existing softer materials and founded on the harder Shale. With minimal excavation and additional right-of-way, the buttress could be constructed on top of the Stone Columns. Figure 3 illustrates the proposed configuration.
- Alternate 2: Construct a longitudinal drainage wall within existing right-of-way and connect horizontal drains to the wall for water outlets. The depth of the wall would be dependant on equipment capabilities, but is recommended that it extend into the Weathered Shale layer. This would be less effective than Alternate 1, however, it would provide drainage to the existing slope and ultimately strengthen the material. Figure 4 illustrates the proposed configuration.
- Alternate 3: Construct a tiered berm utilizing a combination of lightweight and crushed stone material. This alternative would require minimal excavation and a large amount of additional right-of-way. Figure 5 illustrates the proposed configuration.
- Alternate 4: Other specialized repair methods to consider include Soil Nailing, Anchored Walls and Roadway Relocation.

HIGHWAY 167 SLIDE

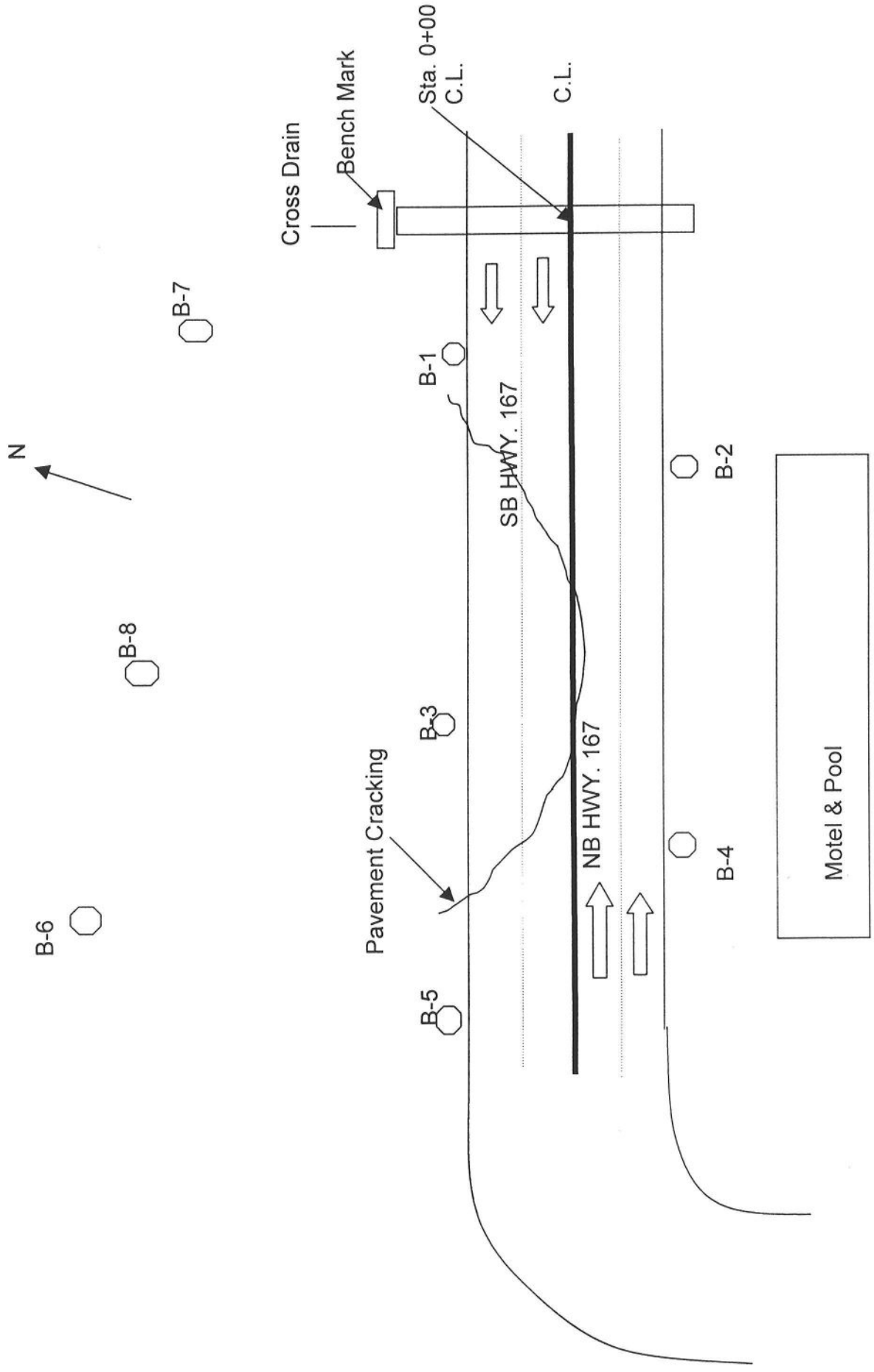


Figure 1: PLAN VIEW

HIGHWAY 167 SLIDE

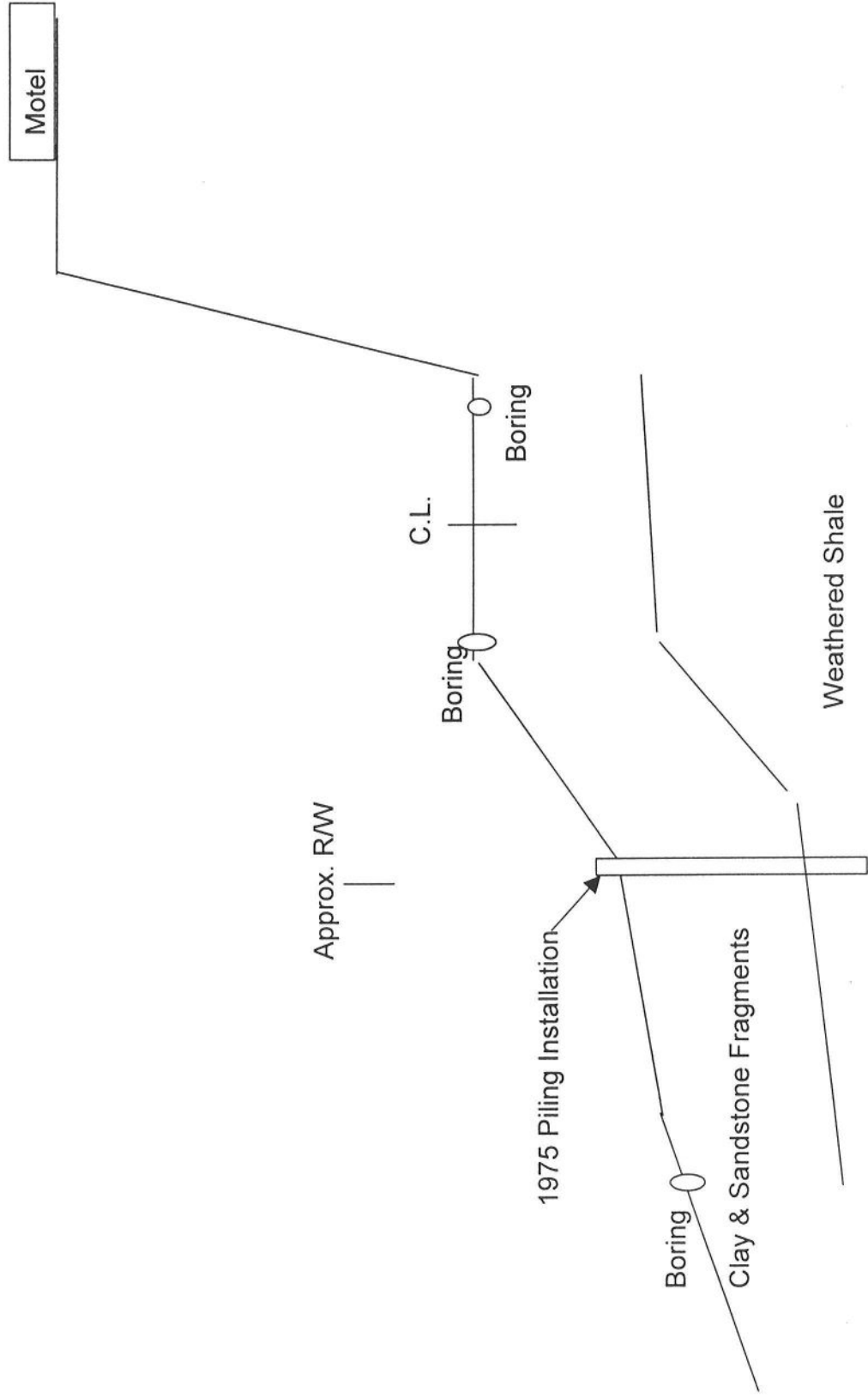


Figure 2: Cross Section View

HIGHWAY 167 SLIDE

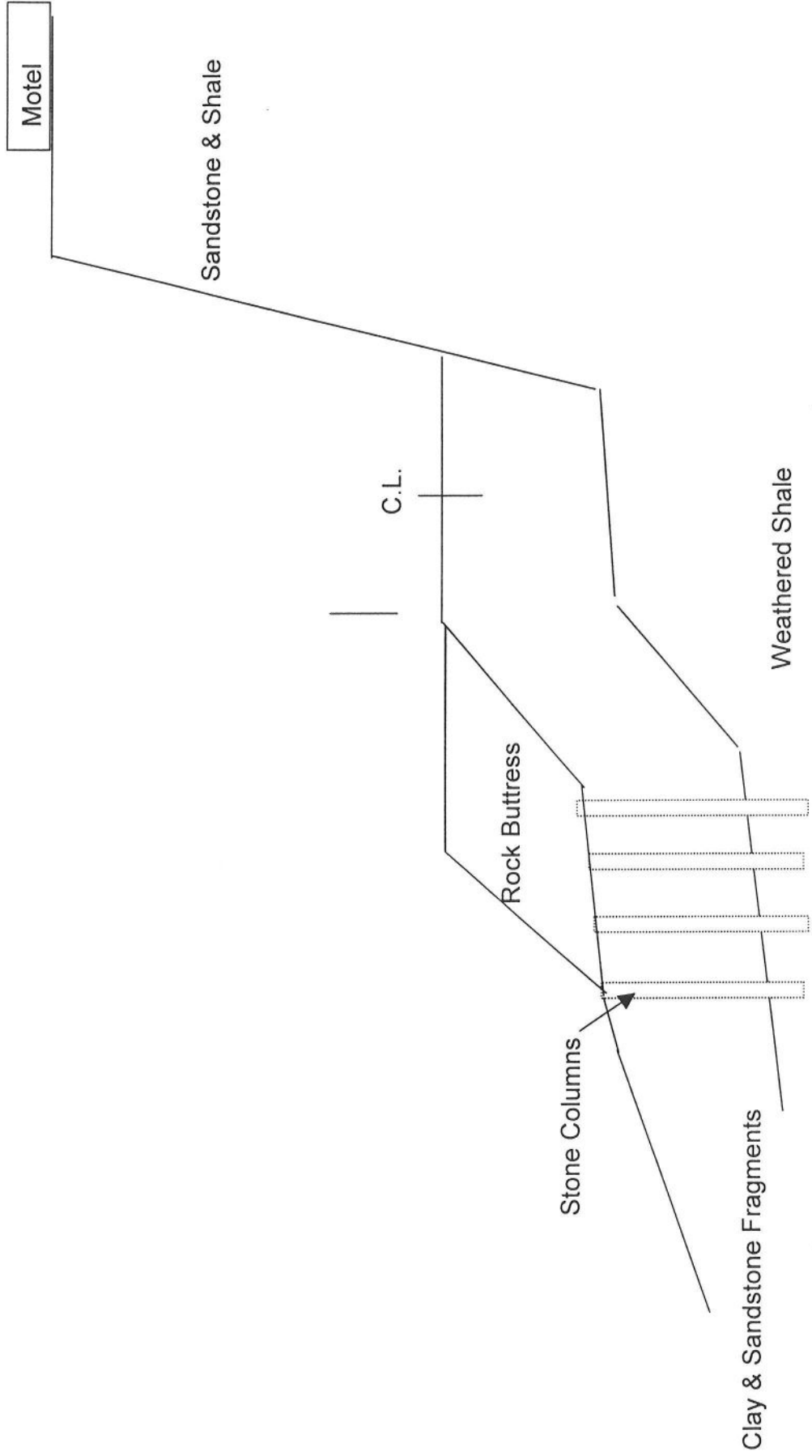


Figure 3: Buttress & Stone Columns

HIGHWAY 167 SLIDE

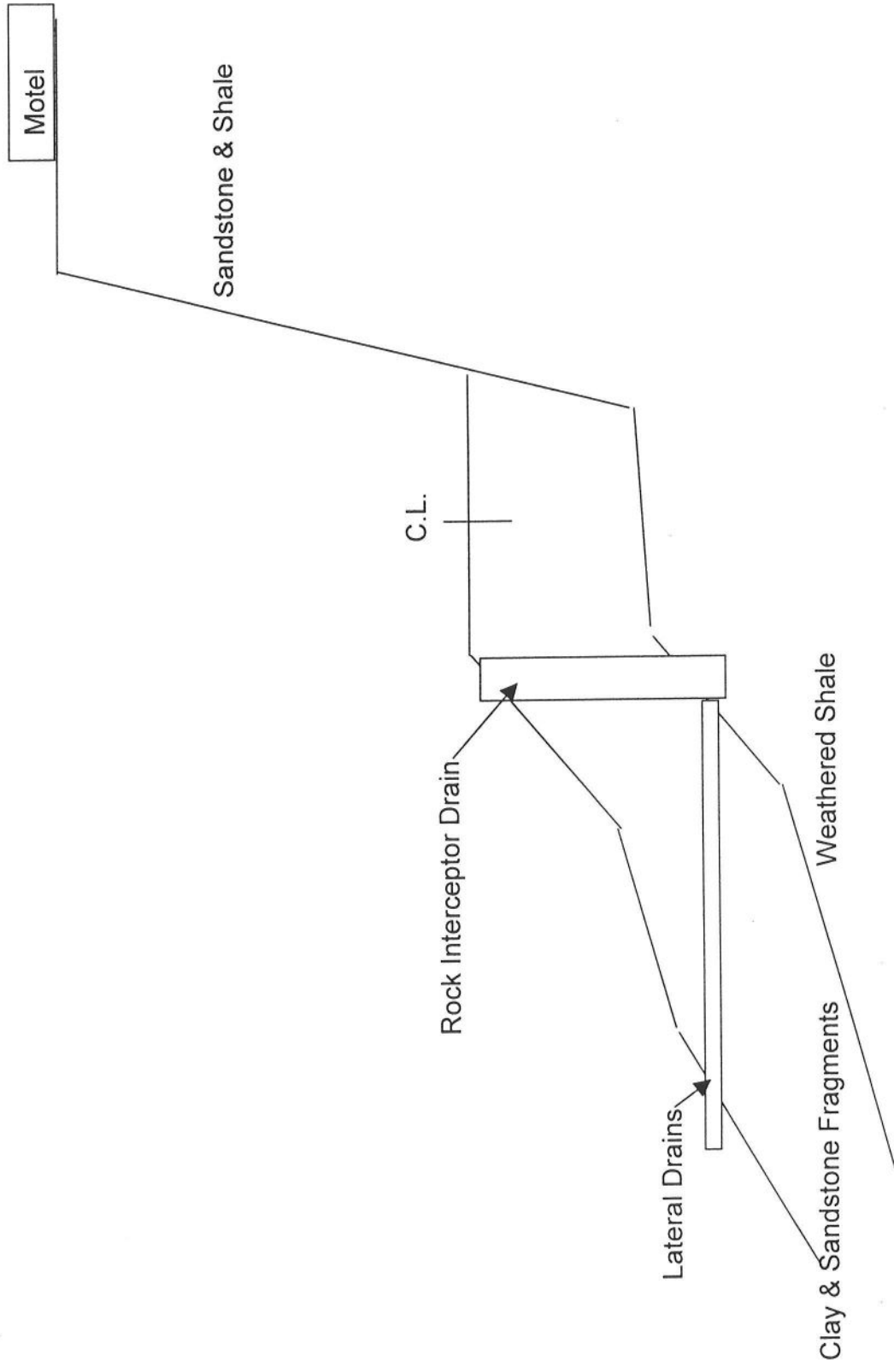


Figure 4: Rock Drain

HIGHWAY 167 SLIDE

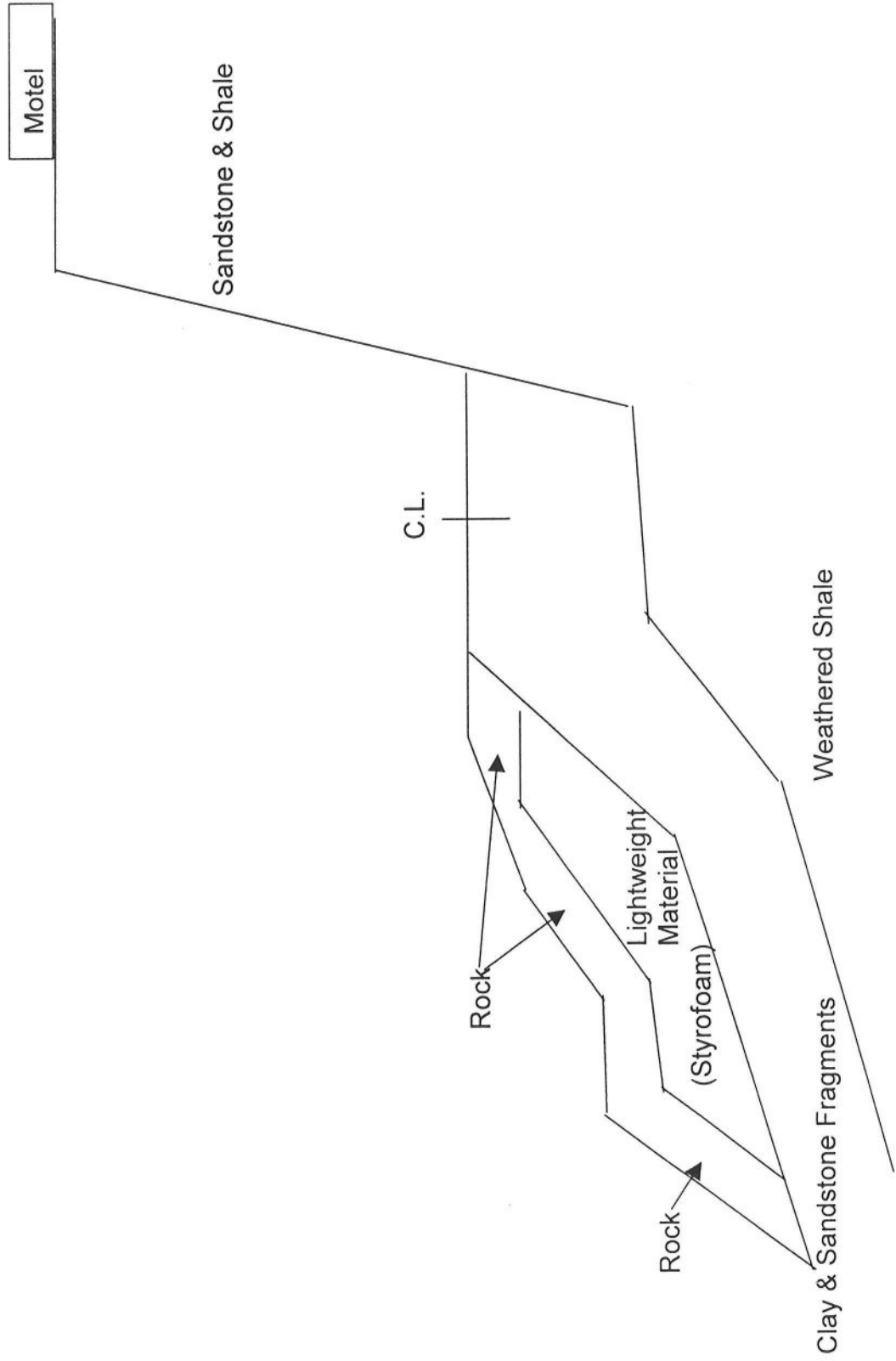
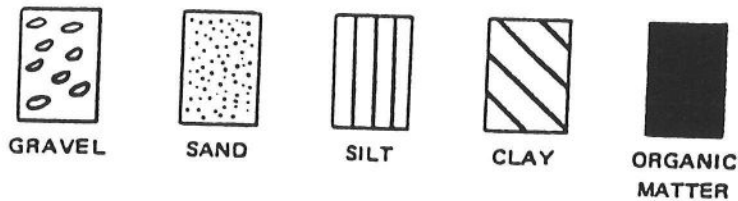


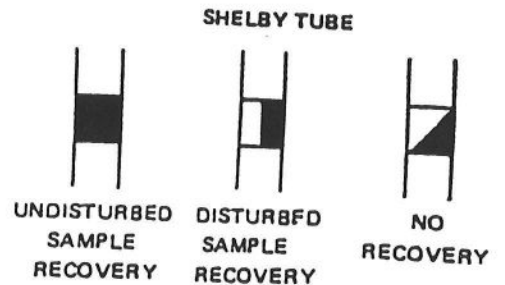
Figure 5: Multi-Level Berm

LEGEND

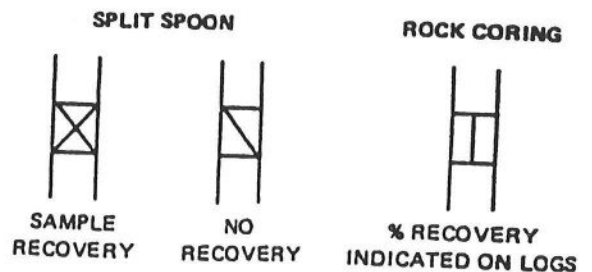
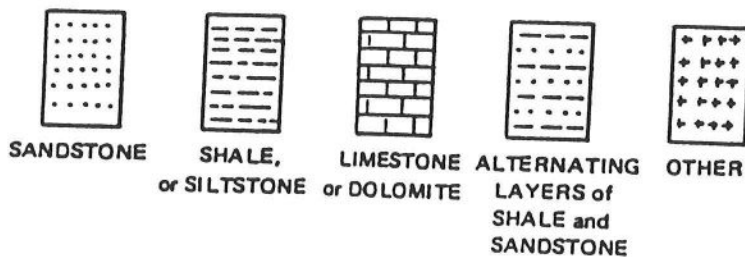
SOIL TYPES (SHOWN IN SYMBOL COLUMN) (PREDOMINANT TYPE SHOWN HEAVY)



SAMPLER TYPES (SHOWN IN SAMPLE COLUMN)



ROCK TYPES (SHOWN IN SYMBOL COLUMN)



TERMS DESCRIBING CONSISTENCY OR CONDITION

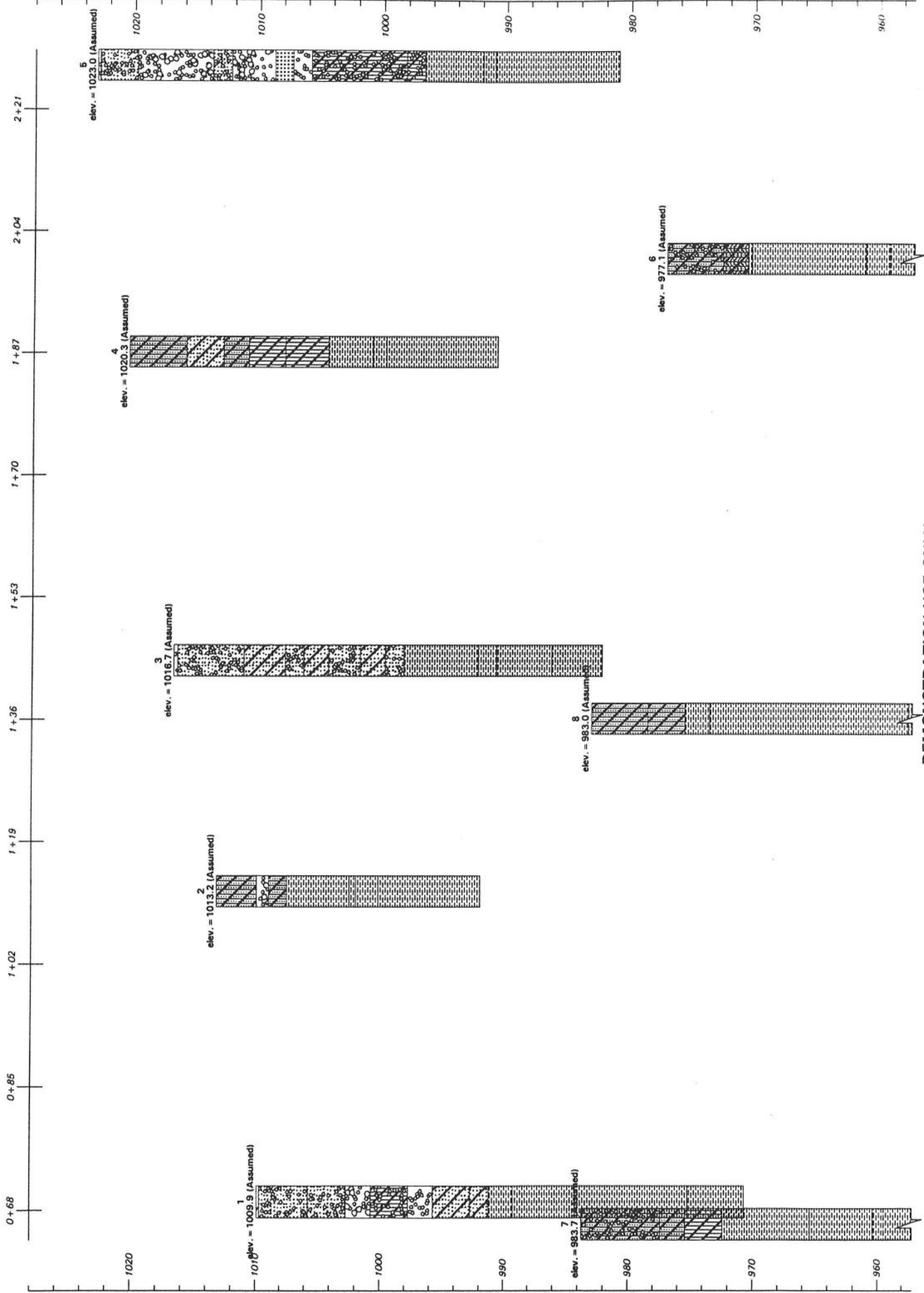
GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
"N" Value	Density	"N" Value	Consistency	"N" Value	Condition	"N" Value	Condition
0-4	Very Loose	0-1	Very Soft				
5-10	Loose	2-4	Soft			31-60	Soft
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2"	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows:	Medium Hard
		Over 60	Very Hard	Over 60	Very Hard	Less than 2"	
						Penetration	
						in 60 Blows:	Hard

GENERAL NOTES

1. Ground water elevations indicated on boring logs represent ground water elevation at date or time shown on drilling log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (Example – The "N" Value can be obtained by adding the bottom two numbers (i.e., $\frac{6}{8} + 9 = 17$ blows/ft)

LOG OF BORINGS 1



DEMONSTRATION USE ONLY

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1
PAGE 1 OF 2

JOB NO. District 5 Slide Independence County
JOB NAME: Hwy. 167 Slide (Batesville)
U.S. 167
STATION: 0+67 *
LOCATION: 28' Right of Center Line of Hwy. 167

DATE: November 14, 2000
TYPE OF DRILLING: Hollow Stem Auger
EQUIPMENT: CME AT Drill
LOGGED BY: Steven Faulkner

COMPLETION DEPTH: 39.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S&C	% R&O
			SURFACE ELEVATION: 1009.9 (Assumed)								
			Asphalt Pavement								
			Moist, Very Loose, Black and Gray Sand and Gravel with Asphalt Fragments (Fill Material)								
5		X	Moist, Very Loose, Black and Gray Sand and Gravel with Asphalt Fragments and some Clay Seams (Fill Material)						2 1-2		
			Moist, Loose, Brown and Gray Sandstone Fragments and Cobbles with some Sandy Clay						2 4-6		
10		X	Moist, Stiff, Brown and Gray Silty Clay with Sandstone Fragments						3 3-4		
			Moist to Wet, Loose, Brown and Gray Sandstone Fragments with some Sandy Clay						1 1-3		
15		X	Wet, Soft, Brown and Gray Sandy Clay with some Sandstone Fragments						3 5-7		
			Moist, Stiff, Brown and Gray Sandy Clay						3 7-9		
20		X	Soft, Brown and Gray Highly Weathered Shale								
			Soft to Medium Hard, Gray Weathered Shale							10	0
25											
										50	0
30			Hard, Dark Gray and Brown to Dark Gray Fractured Shale								
										30	0

REMARKS: Hollow stem augers were utilized to a depth of 20.7'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0+00 and Assumed Elevation 1000.0'.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.		BORING NO. 1 PAGE 2 OF 2
JOB NO. District 5 Slide Independence County JOB NAME: Hwy. 167 Slide (Batesville) U.S. 167 STATION: 0+67 * LOCATION: 28' Right of Center Line of Hwy. 167	DATE: November 14, 2000 TYPE OF DRILLING: Hollow Stem Auger EQUIPMENT: CME AT Drill LOGGED BY: Steven Faulkner	

COMPLETION DEPTH: 39.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 1009.9 (Assumed)								
---	[Hatched Pattern]		Hard, Dark Gray Shale with some Fractured Shale							84	35

40			Boring Terminated								

45											

50											

55											

60											

65											

REMARKS: Hollow stem augers were utilized to a depth of 20.7'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0+00 and Assumed Elevation 1000.0'.

ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 2
PAGE 1 OF 1

JOB NO. District 5 Slide Independence County
JOB NAME: Hwy. 167 Slide (Batesville)
U.S. 167
STATION: 1 + 10 *
LOCATION: 29' Left of Center Line of Hwy. 167

DATE: November 15, 2000
TYPE OF DRILLING: Hollow Stem Auger
EQUIPMENT: CME AT Drill
LOGGED BY: Steven Faulkner

COMPLETION DEPTH: 21.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 1013.2 (Assumed)								
0			Moist, Medium Stiff, Brown and Gray Sandy, Silty Clay								
5			Moist, Loose, Brown and Gray Sandstone Fragments and Cobbles with some Sandy Clay					5			
			Moist, Stiff, Brown and Gray Sandy, Silty Clay with some Sandstone Fragments and Traces of Highly Weathered Shale					4-5			
10			Soft, Brown and Gray Highly Weathered Shale						13		
			Medium Hard, Brown and Gray Weathered Shale						20-17		
			Medium Hard, Dark Gray Shale							66	30
15											
			Hard, Dark Gray Shale							99	50
20											
			Boring Terminated								
25											
30											

REMARKS: Hollow stem augers were utilized to a depth of 11.2'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0 + 00 and Assumed Elevation 1000.0'.

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 3
PAGE 1 OF 2

JOB NO. District 5 Slide Independence County
JOB NAME: Hwy. 167 Slide (Batesville)
U.S. 167
STATION: 1 + 42 *
LOCATION: 28' Right of Center Line of Hwy. 167

DATE: November 7 & 13, 2000
TYPE OF DRILLING: Hollow Stem Auger
EQUIPMENT: CME AT Drill
LOGGED BY: Steven Faulkner

COMPLETION DEPTH: 34.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% D O R
			SURFACE ELEVATION: 1016.7 (Assumed)								
			Asphalt Pavement								
5			Moist, Very Dense, Brown and Gray Sand and Gravel (Fill Material)						60 (0.2')		
			Moist, Stiff, Brown and Gray Sandy Clay with some Sandstone Fragments and Cobbles								
10			Moist, Loose, Brown and Gray Sand and Sandstone Fragments						14 7-3		
			Moist, Stiff, Brown and Gray Sandy Clay with some Sandstone Fragments and Cobbles								
15			Moist, Very Dense, Brown and Gray Sand and Sandstone Fragments						60 (0.2')		
			Moist, Very Stiff, Brown and Gray Sandy Clay								
			Moist, Medium Dense, Brown and Gray Sand and Sandstone Fragments						7 8-9 6 5-6 6 4-4		
20			Soft, Brown and Gray Highly Weathered Shale						3 11-19 21 35-60 (0.2')		
			Medium Hard, Brown and Gray Weathered Shale								
			Medium Hard to Hard, Dark Gray Shale							73	34
30			Hard, Dark Gray Shale							98	25

REMARKS: Hollow stem augers were utilized to a depth of 24.0'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0 + 00 and Assumed Elevation 1000.0'. Water level 23.0' (24 in).

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.		BORING NO. 3 PAGE 2 OF 2
JOB NO. District 5 Slide Independence County JOB NAME: Hwy. 167 Slide (Batesville) U.S. 167 STATION: 1 +42 * LOCATION: 28' Right of Center Line of Hwy. 167	DATE: November 7 & 13, 2000 TYPE OF DRILLING: Hollow Stem Auger EQUIPMENT: CME AT Drill LOGGED BY: Steven Faulkner	

COMPLETION DEPTH: 34.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 1016.7 (Assumed)									
			Boring Terminated									
40												
45												
50												
55												
60												
65												
70												

REMARKS: Hollow stem augers were utilized to a depth of 24.0'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0+00 and Assumed Elevation 1000.0'. Water level 23.0' (24 in).

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 4
PAGE 1 OF 1

JOB NO. District 5 Slide Independence County
JOB NAME: Hwy. 167 Slide (Batesville)
U.S. 167
STATION: 1 + 85 *
LOCATION: 28' Left of Center Line of Hwy. 167

DATE: November 15, 2000
TYPE OF DRILLING: Hollow Stem Auger
EQUIPMENT: CME AT Drill
LOGGED BY: Steven Faulkner

COMPLETION DEPTH: 29.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 1020.3 (Assumed)									
5			Moist, Medium Stiff, Brown and Gray Sandy, Silty Clay with some Sandstone Fragments, Cobbles and Boulders							3		
			Moist, Medium Stiff, Brown and Gray Sandy Clay with some Sandstone Fragments							2-3		
			Moist, Medium Stiff, Brown and Gray Sandy, Silty Clay							3		
10			Moist, Stiff, Brown and Gray Silty Clay							3-4		
			Moist, Stiff, Brown and Gray Silty Clay							3		
			Moist, Very Stiff, Brown and Gray Silty Clay							5-7		
15			Moist, Very Stiff, Brown and Gray Silty Clay							6		
			Moist, Very Stiff, Brown and Gray Silty Clay							10-9		
			Moist, Very Stiff, Brown and Gray Silty Clay							7		
			Moist, Very Stiff, Brown and Gray Silty Clay							8-13		
20			Soft, Brown and Gray Highly Weathered Shale							5		
			Soft, Brown and Gray Highly Weathered Shale							7-12		
			Medium Hard to Hard, Brown and Gray Weathered Shale							15		
			Medium Hard to Hard, Brown and Gray Weathered Shale							17-60 (0.1')		
			Medium Hard to Hard, Brown and Gray Weathered Shale								70	10
25			Hard, Dark Gray Shale									
			Hard, Dark Gray Shale								88	36
30			Boring Terminated									

REMARKS: Hollow stem augers were utilized to a depth of 19.5'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0 + 00 and Assumed Elevation 1000.0'.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.		BORING NO. 5 PAGE 1 OF 2
JOB NO. District 5 Slide Independence County JOB NAME: Hwy. 167 Slide (Batesville) U.S. 167 STATION: 2+25 * LOCATION: 28' Right of Center Line of Hwy. 167	DATE: November 6-7, 2000 TYPE OF DRILLING: Hollow Stem Auger EQUIPMENT: CME AT Drill LOGGED BY: Steven Faulkner	

COMPLETION DEPTH: 42

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 1023.0 (Assumed)								
			Asphalt Pavement								
			Moist, Very Dense, Brown and Gray Sand and Gravel (Fill Material)								
5			Moist, Very Dense, Brown and Gray Sandstone Fragments and Cobbles with some Clay Seams								
10		X	Moist, Medium Dense, Brown and Gray Sand and Sandstone Fragments						28 8-5		
			Moist, Medium Dense, Brown and Gray Sandstone Fragments and Cobbles with some Clay Seams								
15			Hard, Brown and Gray Sandstone Cap							80	33
		X	Moist, Medium Dense, Brown and Gray Sandstone Fragments with some Clay Seams						8 11-3		
20			Moist, Medium Stiff, Brown and Gray Silty Clay with Sandstone Fragments							10	0
			Moist, Medium Stiff, Brown and Gray Silty Clay with Sandstone Fragments with Traces of Highly Weathered Shale							18	0
25		X	Moist, Medium Stiff, Brown and Gray Silty Clay with Sandstone Fragments with Traces of Highly Weathered Shale						3 4-3		
			Soft, Brown and Gray Highly Weathered Shale								
30		X	Medium Hard, Brown and Gray Weathered Shale						3 5-60 (0.3')		
										90	42

REMARKS: Hollow stem augers were utilized to a depth of 32.0'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0+00 and Assumed Elevation 1000.0'.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.		BORING NO. 5 PAGE 2 OF 2	
JOB NO. District 5 Slide Independence County		DATE: November 6-7, 2000	
JOB NAME: Hwy. 167 Slide (Batesville) U.S. 167		TYPE OF DRILLING: Hollow Stem Auger	
STATION: 2 + 25 *		EQUIPMENT: CME AT Drill	
LOCATION: 28' Right of Center Line of Hwy. 167		LOGGED BY: Steven Faulkner	

COMPLETION DEPTH: 42

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 1023.0 (Assumed)									
32			Hard, Dark Gray Shale								99	64
40												
45			Boring Terminated									
50												
55												
60												
65												

REMARKS: Hollow stem augers were utilized to a depth of 32.0'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0 + 00 and Assumed Elevation 1000.0'.

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 6
PAGE 1 OF 1

JOB NO. District 5 Slide Independence County
JOB NAME: Hwy. 167 Slide (Batesville)
U.S. 167
STATION: 1 + 98 *
LOCATION: 132' Right of Center Line of Hwy. 167

DATE: December 4-5, 2000
TYPE OF DRILLING: Rotary Wash
EQUIPMENT: CME AT Drill
LOGGED BY: Tim Wilson

COMPLETION DEPTH: 25.9

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% C C R	% O R D
			SURFACE ELEVATION: 977.1 (Assumed)									
5			Wet, Medium Stiff, Brown and Gray Sandy, Silty Clay with Sandstone Fragments							2 2-4		
			Moist, Medium Stiff, Brown and Gray Sandy, Silty Clay with Organic Matter (Wood)									
			Soft, Brown and Gray Weathered Shale									
10			Medium Hard, Brown and Gray Weathered Shale							24 47-60 (0.4')	90	0
15			Medium Hard, Brown and Gray Shale with some Weathered Shale Seams								80	28
20			Hard, Dark Gray Shale								99	60
25												
			Boring Terminated									
30												

REMARKS: Hollow stem augers were utilized to a depth of 9.5'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0 + 00 and Assumed Elevation 1000.0'.

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 7
PAGE 1 OF 1

JOB NO. District 5 Slide Independence County
JOB NAME: Hwy. 167 Slide (Batesville)
U.S. 167
STATION: 0+64 *
LOCATION: 112' Right of Center Line of Hwy. 167

DATE: December 5-6, 2000
TYPE OF DRILLING: Rotary Wash
EQUIPMENT: CME AT Drill
LOGGED BY: Tim Wilson

COMPLETION DEPTH: 34.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	RCS%	UCR%
			SURFACE ELEVATION: 983.7 (Assumed)								
5			Moist, Stiff, Brown and Gray Sandy, Silty Clay with Sandstone Fragments						2 4-5		
			Moist, Stiff, Brown and Gray Sandy, Silty Clay with Traces of Sandstone Fragments						3 5-9		
10			Moist, Stiff, Brown and Gray Silty Clay with some Highly Weathered Shale						4 5-6		
15			Soft, Brown and Gray Highly Weathered Shale						14 20-20		
									4 16-21		
20			Soft, Brown and Gray Weathered Shale						16 23-26		
									12 14-14		
25			Medium Hard, Brown and Gray Weathered Shale						6 12-29		
			Hard, Brown and Gray Fractured Shale						48 60 (0.4')		76 38
30			Hard, Dark Gray Shale								80 58
Boring Terminated											

REMARKS: Hollow stem augers were utilized to a depth of 23.3'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0+00 and Assumed Elevation 1000.0'.

ARKANSAS HWY. & TRANS. DEPARTMENT		BORING NO. 8	
MATERIALS DIVISION - GEOTECHNICAL SEC.		PAGE 1 OF 1	
JOB NO. District 5 Slide	Independence County	DATE: December 6, 2000	
JOB NAME: Hwy. 167 Slide (Batesville)		TYPE OF DRILLING: Rotary Wash	
U.S. 167			
STATION: 1 + 34 *		EQUIPMENT: CME AT Drill	
LOCATION: 122' Right of Center Line of Hwy. 167		LOGGED BY: Tim Wilson	

COMPLETION DEPTH: 26.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	RCS%	DQR%
			SURFACE ELEVATION: 983.0 (Assumed)									
5		X	Moist, Medium Stiff, Brown and Gray Sandy, Silty Clay							7 6-8		
		X	Moist, Stiff, Brown and Gray Sandy, Silty Clay with some Highly Weathered Shale							7 9-12		
10		X	Soft, Brown and Gray Highly Weathered Shale							14 26-35		
15											35	0
20			Medium Hard, Brown and Gray Weathered Shale								48	0
25											38	18
			Hard, Dark Gray Shale									
			Boring Terminated									
30												

REMARKS: Hollow stem augers were utilized to a depth of 16.5'. * Station referenced to Top of Cross Drain, North of Slide Area, with Assumed Station 0+00 and Assumed Elevation 1000.0'.