

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. 080439

FEDERAL AID PROJECT NO. NHPP-0053(29)

BEAR CREEK & SO. FOURCHE LA FAVE RIVER STRS. & APPRS. (S)

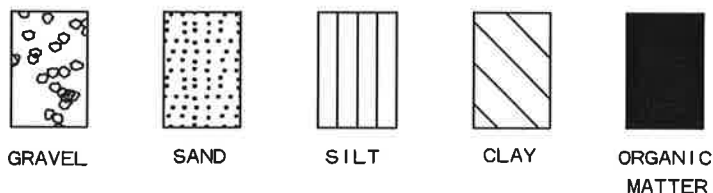
STATE HIGHWAY 7 SECTION 11

IN PERRY COUNTY

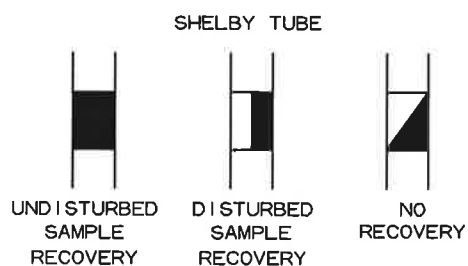
The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the 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.

LEGEND

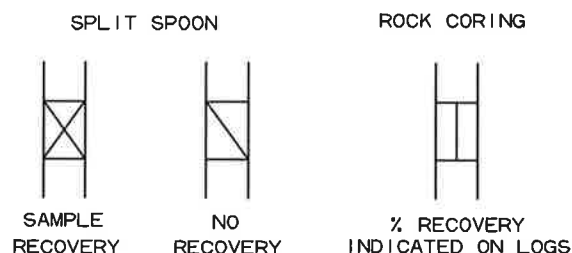
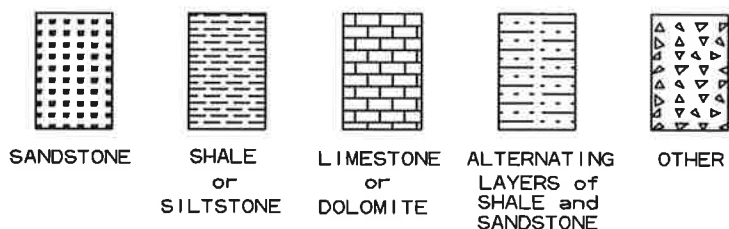
SOIL TYPES (SHOWN IN SYMBOL COLUMN) (PREDOMINANT TYPE SHOWN HEAVY)



SAMPLER TYPES (SHOWN IN SAMPLE COLUMN)



ROCK TYPES (SHOWN IN SYMBOL COLUMN)



TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
*N ^o Value	Density	*N ^o Value	Consistency	*N ^o Value	Consistency	*N ^o Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	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

1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring 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 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 performing the test are recorded for each 6 inches of penetration on the drill log. The field “N” Value (N_f) can be obtained by

adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{blows} / \text{ft}$. The “N” Value corrected to 60% efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

July 22, 2014

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 080439
Bear Creek and So. Fourche La Fave River Strs. & Apprs. (S)
Route 7 Section 11
Perry County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of replacing the existing bridges crossing Bear Creek and Fourche La Fave on Highway 7. Samples were taken in the existing travel lanes, ditch line and along the new location. There were no paved shoulders within the project limits.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of low to moderately plastic clay with some sand containing varying amounts of sandstone and shale fragments. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Rock was encountered at several locations within the project limits. Table 1 below shows the location and depth to rock.

Table 1 Depth to Rock

Table with 3 columns: Station, Location from centerline (ft.), and Depth (ft.). Rows include stations 101+00, 113+00, 116+00, 305+00, and 315+00 with their respective locations and depths.

Embankment and cut slope recommendations will be made when plans are further developed and cross-sections become available.

Listed below is the additional information requested for use in developing the plans:

- 1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers in the vicinity of Russellville.

- 2. Asphalt Concrete Hot Mix

Table with 3 columns: Type, Asphalt Cement %, and Mineral Aggregate %. Rows include Surface Course, Binder Course, and Base Course.

Handwritten signature of Michael C. Benson, Materials Engineer.

MCB:pt:bjj
Attachment

cc: State Constr. Eng. - Master File Copy
District 8 Engineer
Transportation Planning and Policy Div.
G. C. File

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY STRENGTH TEST REPORT ***

DATE - 07/17/2014
JOB NUMBER - 080439

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 24
DISTRICT NO. - 04

JOB NAME - BEAR CREEK & SO.FOUCHE LA FAVE RIVER

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 14

RESILIENT MODULUS
STA.113+00 14501
STA.208+00 9974

REMARKS -

AASHTO TESTS : T190

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES**

Job No.	080439	Material Code	SSRVPS
Date Sampled:	7/16/14	Station No.:	113+00
Date Tested:	July 16, 2014	Location:	20'RT
Name of Project:	BEAR CREEK & S.FOURCHE LA FAVE RIVER STRS.&APPRS.		
County:	Code: 53	Name: PERRY	
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20142431	AASHTO Class:	A-6(8)
Sample ID:	RV766	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

Preconditioning - Permanent Strain > 5% (Y=Yes or N= No)	N
Testing - Permanent Strain > 5% (Y=Yes or N=No)	N
Number of Load Sequences Completed (0-15)	15

2. Specimen Information:

Specimen Diameter (in):	
Top	3.92
Middle	3.92
Bottom	3.93
Average	3.92
Membrane Thickness (in):	0.11
Height of Specimen, Cap and Base (in):	8.04
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.04
Initial Area, Ao (sq. in):	11.42
Initial Volume, AoLo (cu. in):	91.82

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3134.20
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	14.2
Maximum Dry Density (pcf):	112
95% of MDD (pcf):	106.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3134.20
Compaction Moisture content (%):	13.8
Compaction Wet Density (pcf):	130.05
Compaction Dry Density (pcf):	114.28
Moisture Content After Mr Test (%):	13.8

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable):

#VALUE!

7. Resilient Modulus, Mr:

19248(S_c)^{-0.18146}(S₃)^{0.18077}

8. Comments

9. Tested By:

DT/MW _____

Date: July 16, 2014 _____

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES**

Job No. 080439 **Material Code** SSRVPS
Date Sampled: 7/16/14 **Station No.:** 113+00
Date Tested: July 16, 2014 **Location:** 20'RT
Name of Project: BEAR CREEK & S.FOURCHE LA FAVE RIVER STRS.&APPRS.
County: Code: 53 **Name:** PERRY
Sampled By: FAULKNER **Depth:** 0-5
Lab No.: 20142431 **AASHTO Class:** A-6(8)
Sample ID: RV766 **Material Type (1 or 2):** 2
LATITUDE: **LONGITUDE:**

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load		Actual Applied Contact Load		Actual Applied Max. Axial Stress		Actual Applied Cyclic Stress		Average Recov Def. LVD1 and 2		Resilient Strain		Resilient Modulus	
			S_3 psi	P_{max} lbs	P_{cyclic} lbs	$P_{contact}$ lbs	P_{cyclic} lbs	$P_{contact}$ lbs	S_{max} psi	S_{cyclic} psi	S_{cyclic} psi	$S_{contact}$ psi	H_{avg} in	ϵ_r in/in	M_r psi	
Sequence 1	6.0	2.0	23.7	21.0	2.7	2.1	1.8	0.2	0.00064	0.00008	23,065					
Sequence 2	6.0	4.0	44.4	41.6	2.8	3.9	3.6	0.2	0.00132	0.00016	22,151					
Sequence 3	6.0	6.0	65.1	62.0	3.1	5.7	5.4	0.3	0.00210	0.00026	20,773					
Sequence 4	6.0	8.0	86.8	81.4	5.4	7.6	7.1	0.5	0.00309	0.00038	18,516					
Sequence 5	6.0	10.0	107.5	99.8	7.7	9.4	8.7	0.7	0.00420	0.00052	16,722					
Sequence 6	4.0	2.0	23.7	21.1	2.6	2.1	1.8	0.2	0.00069	0.00009	21,423					
Sequence 7	4.0	4.0	44.1	41.5	2.6	3.9	3.6	0.2	0.00143	0.00018	20,355					
Sequence 8	4.0	6.0	64.1	61.5	2.6	5.6	5.4	0.2	0.00230	0.00029	18,785					
Sequence 9	4.0	8.0	85.2	80.8	4.5	7.5	7.1	0.4	0.00327	0.00041	17,399					
Sequence 10	4.0	10.0	106.1	99.5	6.7	9.3	8.7	0.6	0.00437	0.00054	16,014					
Sequence 11	2.0	2.0	23.5	21.0	2.6	2.1	1.8	0.2	0.00078	0.00010	18,872					
Sequence 12	2.0	4.0	43.7	41.1	2.7	3.8	3.6	0.2	0.00163	0.00020	17,703					
Sequence 13	2.0	6.0	63.4	60.8	2.7	5.6	5.3	0.2	0.00259	0.00032	16,537					
Sequence 14	2.0	8.0	83.3	79.7	3.6	7.3	7.0	0.3	0.00364	0.00045	15,392					
Sequence 15	2.0	10.0	104.1	98.2	5.9	9.1	8.6	0.5	0.00477	0.00059	14,501					

TESTED BY _____ DATE July 16, 2014
 REVIEWED BY _____ DATE _____

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED / THINWALL TUBE SAMPLES**

Job No.	080439	Material Code	SSRVPS
Date Sampled:	7/16/14	Station No.:	113+00
Date Tested:	July 16, 2014	Location:	20'RT
Name of Project:	BEAR CREEK & S.FOURCHE LA FAVE RIVER STRS.&APPRS.		
County:	Code: 53	Name:	PERRY
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20142431	AASHTO Class:	A-6(8)
Sample ID:	RV766	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

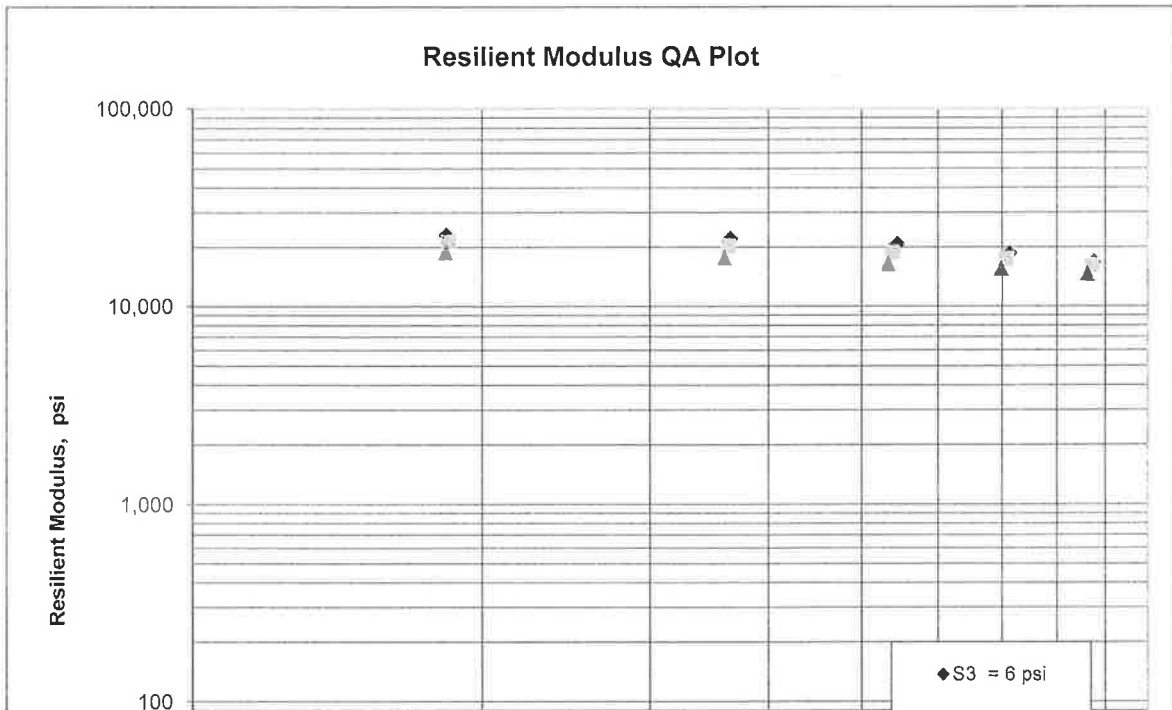
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = \underline{19,248}$$

$$K_2 = \underline{-0.18146}$$

$$K_5 = \underline{0.18077}$$

$$R^2 = \underline{0.92}$$



**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES**

Job No.	080439	Material Code	SSRVPS
Date Sampled:	7/16/14	Station No.:	208+00
Date Tested:	July 16, 2014	Location:	24'LT
Name of Project:	BEAR CREEK & S.FOURCHE LA FAVE RIVER STRS.&APPRS.		
County:	Code: 53	Name: PERRY	
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20142432	AASHTO Class:	A-6(6)
Sample ID:	RV767	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

Preconditioning - Permanent Strain > 5% (Y=Yes or N= No)	N
Testing - Permanent Strain > 5% (Y=Yes or N=No)	N
Number of Load Sequences Completed (0-15)	15

2. Specimen Information:

Specimen Diameter (in):	
Top	3.97
Middle	3.97
Bottom	3.97
Average	3.97
Membrane Thickness (in):	0.11
Height of Specimen, Cap and Base (in):	8.04
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.04
Initial Area, Ao (sq. in):	11.70
Initial Volume, AoLo (cu. in):	94.09

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3243.90
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	13.8
Maximum Dry Density (pcf):	112.9
95% of MDD (pcf):	107.3
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3243.90
Compaction Moisture content (%):	14.2
Compaction Wet Density (pcf):	131.37
Compaction Dry Density (pcf):	115.04
Moisture Content After Mr Test (%):	14.1

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALUE!

7. Resilient Modulus, Mr: 16386(Sc)^{-0.29383}(S3)^{0.22551}

8. Comments

9. Tested By:

DT/MW

Date: July 16, 2014

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES**

Job No. 080439 **Material Code** SSRVPS
Date Sampled: 7/16/14 **Station No.:** 208+00
Date Tested: July 16, 2014 **Location:** 24LT
Name of Project: BEAR CREEK & S.FOURCHE LA FAVE RIVER STRS.&APPRS.
County: Code: 53 **Name:** PERRY
Sampled By: FAULKNER **Depth:** 0-5
Lab No.: 20142432 **AASHTO Class:** A-6(6)
Sample ID: RV767 **Material Type (1 or 2):** 2
LATITUDE: **LONGITUDE:**

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied		Actual Applied Max. Axial Stress	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
			P _{max} lbs	P _{cyclic} lbs								
DESIGNATION	S ₃ psi	S _{cyclic} psi	P _{max} lbs	P _{cyclic} lbs	S _{max} psi	P _{contact} lbs	S _{cyclic} psi	S _{contact} psi	H _{avg} in	ε _r in/in	M _r psi	
Sequence 1	6.0	2.0	24.2	21.6	2.1	2.6	1.8	0.2	0.00075	0.00009	19,697	
Sequence 2	6.0	4.0	45.2	42.5	3.9	2.7	3.6	0.2	0.00163	0.00020	17,878	
Sequence 3	6.0	6.0	66.4	63.2	5.7	3.1	5.4	0.3	0.00268	0.00033	16,186	
Sequence 4	6.0	8.0	87.7	82.2	7.5	5.6	7.0	0.5	0.00415	0.00052	13,611	
Sequence 5	6.0	10.0	108.5	100.6	9.3	7.9	8.6	0.7	0.00571	0.00071	12,103	
Sequence 6	4.0	2.0	24.0	21.4	2.1	2.6	1.8	0.2	0.00082	0.00010	17,937	
Sequence 7	4.0	4.0	44.8	42.2	3.8	2.7	3.6	0.2	0.00179	0.00022	16,191	
Sequence 8	4.0	6.0	65.0	62.3	5.6	2.7	5.3	0.2	0.00299	0.00037	14,305	
Sequence 9	4.0	8.0	86.0	81.3	7.3	4.7	6.9	0.4	0.00444	0.00055	12,585	
Sequence 10	4.0	10.0	106.7	99.6	9.1	7.1	8.5	0.6	0.00608	0.00076	11,249	
Sequence 11	2.0	2.0	24.1	21.4	2.1	2.7	1.8	0.2	0.00096	0.00012	15,278	
Sequence 12	2.0	4.0	44.4	41.7	3.8	2.7	3.6	0.2	0.00208	0.00026	13,739	
Sequence 13	2.0	6.0	64.2	61.5	5.5	2.7	5.3	0.2	0.00345	0.00043	12,247	
Sequence 14	2.0	8.0	83.8	79.9	7.2	3.9	6.8	0.3	0.00503	0.00063	10,914	
Sequence 15	2.0	10.0	104.5	98.2	8.9	6.3	8.4	0.5	0.00677	0.00084	9,974	

TESTED BY _____ DATE July 16, 2014
 REVIEWED BY _____ DATE _____

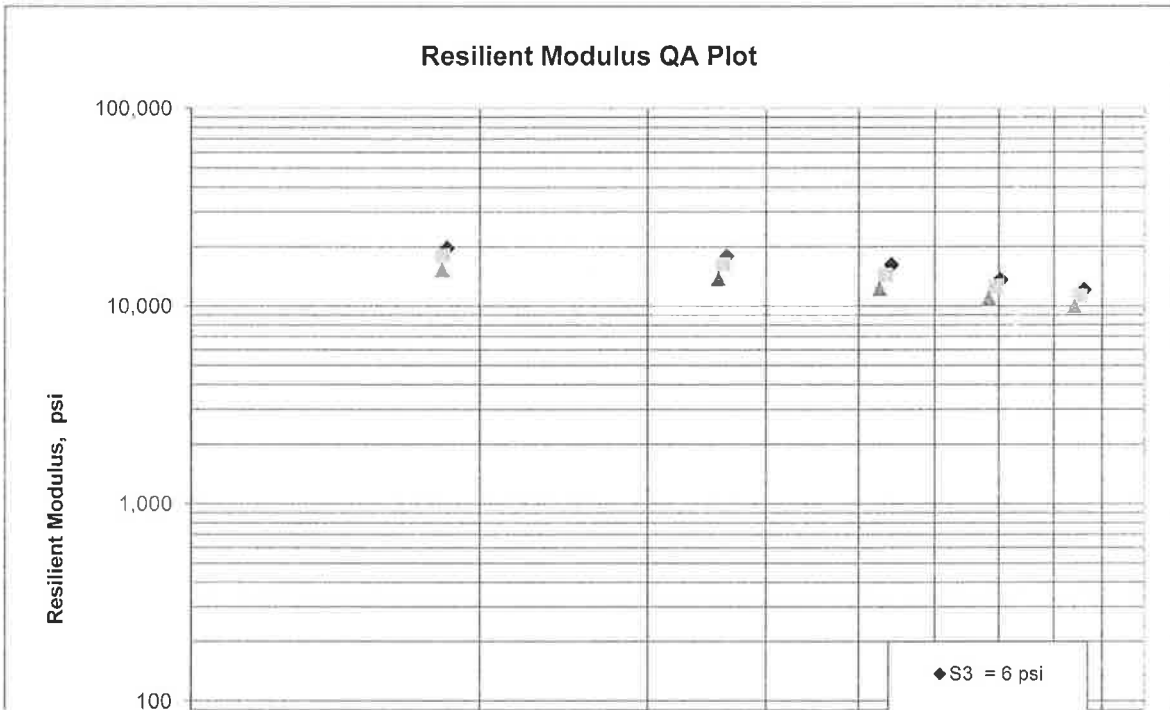
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED / THINWALL TUBE SAMPLES**

Job No.	080439	Material Code	SSRVPS
Date Sampled:	7/16/14	Station No.:	208+00
Date Tested:	July 16, 2014	Location:	24'LT
Name of Project:	BEAR CREEK & S.FOURCHE LA FAVE RIVER STRS.&APPRS.		
County:	Code: 53	Name:	PERRY
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20142432	AASHTO Class:	A-6(6)
Sample ID:	RV767	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$K_1 =$	<u>16,386</u>
$K_2 =$	<u>-0.29383</u>
$K_5 =$	<u>0.22551</u>
$R^2 =$	<u>0.94</u>



JOB: 080439

Arkansas State Highway Transportation Department

JOB NAME: BEAR CREEK & SO.FOUCHE LA FAVE RIVER

Materials Division

COUNTY NO. 53 DATE TESTED 7/15/2014

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR						L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
				S	I	E	V	E	S				
113+00	20RT	0-5	BROWN	100	94	86	80	67	29	17	A-6(8)	RV766	
208+00	24LT	0-5	RD/BR	100	91	72	64	56	34	15	A-6(6)	RV767	
101+00	05RT	0-5	BROWN	93	87	82	74	60	26	09	A-4(3)	S753	15
101+00	20RT	0-5	BR/RD	93	86	80	74	60	31	11	A-6(4)	S754	17.6
113+00	20RT	0-4Z	BROWN	87	80	72	66	56	29	11	A-6(3)	S755	8.3
116+00	06LT	0-5	GRAY	92	84	72	65	53	32	17	A-6(3)	S756	10.7
116+00	26LT	0-4Z	GRAY	94	85	75	68	55	32	17	A-6(6)	S757	9.1
202+00	06RT	0-5	BROWN	99	97	90	88	85	48	26	A-7-6(23)	S758	18.1
202+00	23RT	0-5	BROWN	99	94	89	74	65	44	24	A-7-6(14)	S759	16.4
208+00	05LT	0-5	GRAY	91	84	68	61	55	34	15	A-6(5)	S760	10.1
208+00	24LT	0-5	RD/BR	97	92	80	74	69	38	17	A-6(10)	S761	13.1
217+00	05RT	0-5	BROWN	96	95	91	84	63	30	15	A-6(7)	S762	13.6
217+00	18RT	0-5	BROWN	96	93	87	80	65	28	12	A-6(5)	S763	15.8
305+00	CL	0-2Z	BROWN	87	75	60	55	52	34	13	A-6(4)	S764	12.9
315+00	CL	0-1Z	BROWN	98	89	78	48	42	34	14	A-6(2)	S765	11.1

JOB: 080439

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: BEAR CREEK & SO. FOUICHE LA FAVE RIVER

Materials Division

7/15/2014

COUNTY NO. 53

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

101+00	05RT	ACHMSC	ACHMBC	ACHMBC	AGG.BASE CRS CL-7	3.0	
		6.0	2.0				
101+00	20RT	ACHMSC	ACHMBC	ACHMBC	AGG.BASE CRS CL-7		
113+00	20RT	ACHMSC	ACHMBC	ACHMBC	AGG.BASE CRS CL-7		
116+00	06LT	ACHMSC	CHIP SEAL	ACHMBC	AGG.BASE CRS CL-7	4.0	
		4.5					
116+00	26LT	ACHMSC	CHIP SEAL	ACHMBC	AGG.BASE CRS CL-7		
202+00	06RT	ACHMSC	CHIP SEAL	ACHMBC	AGG.BASE CRS CL-7	6.0	
		5.0	.25				
202+00	23RT	ACHMSC	CHIP SEAL	ACHMBC	AGG.BASE CRS CL-7		
208+00	05LT	ACHMSC	CHIP SEAL	ACHMBC	AGG.BASE CRS CL-7	4.0	
		6.25W	.25				
208+00	24LT	ACHMSC	CHIP SEAL	ACHMBC	AGG.BASE CRS CL-7		
217+00	05RT	ACHMSC	ACHMBC	ACHMBC	AGG.BASE CRS CL-7	4.0	
		9.0W	2.0				
217+00	18RT	ACHMSC	ACHMBC	ACHMBC	AGG.BASE CRS CL-7		
305+00	CL	ACHMSC	ACHMBC	ACHMBC	AGG.BASE CRS CL-7		

comments: W=MULTIPLE LAYERS

Thursday, July 17, 2014

Page 1 of 1

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE	- 07/17/14	SEQUENCE NO.	- 2
JOB NUMBER	- 080439	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 53
SUPPLIER NAME	- STATE	DISTRICT NO.	- 08
NAME OF PROJECT	- BEAR CREEK & SO.FOUCHE LA FAVE RIVER		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- PERRY, COUNTY	DATE SAMPLED	- 07/01/14
SAMPLED BY	- S.FAULKNER	DATE RECEIVED	- 07/07/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 07/15/14
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20142421	- 20142422	- 20142423
SAMPLE ID	- S756	- S757	- S758
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 116+00	- 116+00	- 202+00
LOCATION	- 06LT	- 26LT	- 06RT
DEPTH IN FEET	- 0-5	- 0-4Z	- 0-5
MAT'L COLOR	- GRAY	- GRAY	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 51 6.80	- 34 51 6.90	- 34 52 8.40
LONGITUDE DEG-MIN-SEC	- 93 05 59.80	- 93 05 59.90	- 93 06 33.80
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. - 100	- 100	-
	3/8 IN. - 99	- 99	- 100
	NO. 4 - 92	- 94	- 99
	NO. 10 - 84	- 85	- 97
	NO. 40 - 72	- 75	- 90
	NO. 80 - 65	- 68	- 88
	NO. 200 - 53	- 55	- 85
LIQUID LIMIT	- 32	- 32	- 48
PLASTICITY INDEX	- 17	- 17	- 26
AASHTO SOIL	- A-6(3)	- A-6(6)	- A-7-6(23)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 10.7	- 9.1	- 18.1
ACHMSC (IN)	- 4.5	- --	- 5.0
CHIP SEAL (IN)	- --	- --	- .25
ACHMBC (IN)	- 6.0	- --	- 1.50
AGG.BASE CRS CL-7 (IN)	- 4.0	- --	- 6.0
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - W=MULTIPLE LAYERS

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE	- 07/17/14	SEQUENCE NO.	- 3
JOB NUMBER	- 080439	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 53
SUPPLIER NAME	- STATE	DISTRICT NO.	- 08
NAME OF PROJECT - BEAR CREEK & SO.FOUCHE LA FAVE RIVER			
PROJECT ENGINEER - NOT APPLICABLE			
PIT/QUARRY - ARKANSAS			
LOCATION	- PERRY, COUNTY	DATE SAMPLED	- 07/01/14
SAMPLED BY	- S.FAULKNER	DATE RECEIVED	- 07/07/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 07/15/14
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS			

LAB NUMBER	- 20142424	- 20142425	- 20142426
SAMPLE ID	- S759	- S760	- S761
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 202+00	- 208+00	- 208+00
LOCATION	- 23RT	- 05LT	- 24LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BROWN	- GRAY	- RD/BR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 52 8.60	- 34 52 13.10	- 34 52 13.10
LONGITUDE DEG-MIN-SEC	- 93 06 33.70	- 93 06 38.00	- 93 06 38.10
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. -	100	100
	3/8 IN. - 100	94	99
	NO. 4 - 99	91	97
	NO. 10 - 94	84	92
	NO. 40 - 89	68	80
	NO. 80 - 74	61	74
	NO. 200 - 65	55	69
LIQUID LIMIT	- 44	- 34	- 38
PLASTICITY INDEX	- 24	- 15	- 17
AASHTO SOIL	- A-7-6(14)	- A-6(5)	- A-6(10)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 16.4	- 10.1	- 13.1
ACHMSC (IN)	- --	- 6.25W	- --
CHIP SEAL (IN)	- --	- .25	- --
ACHMBC (IN)	- --	- 1.50	- --
AGG.BASE CRS CL-7 (IN)	- --	- 4.0	- --
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - W=MULTIPLE LAYERS

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE	- 07/17/14	SEQUENCE NO.	- 4
JOB NUMBER	- 080439	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 53
SUPPLIER NAME	- STATE	DISTRICT NO.	- 08
NAME OF PROJECT	- BEAR CREEK & SO.FOUCHE LA FAVE RIVER		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- PERRY, COUNTY	DATE SAMPLED	- 07/01/14
SAMPLED BY	- S.FAULKNER	DATE RECEIVED	- 07/07/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 07/15/14
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20142427	- 20142428	- 20142429
SAMPLE ID	- S762	- S763	- S764
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 217+00	- 217+00	- 305+00
LOCATION	- 05RT	- 18RT	- CL
DEPTH IN FEET	- 0-5	- 0-5	- 0-2Z
MAT'L COLOR	- BROWN	- BROWN	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 52 22.20	- 34 52 22.20	- 34 52 11.90
LONGITUDE DEG-MIN-SEC	- 93 06 38.40	- 93 06 38.20	- 93 06 36.80
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. - 100	- 100	- 100
	3/8 IN. - 97	- 99	- 96
	NO. 4 - 96	- 96	- 87
	NO. 10 - 95	- 93	- 75
	NO. 40 - 91	- 87	- 60
	NO. 80 - 84	- 80	- 55
	NO. 200 - 63	- 65	- 52
LIQUID LIMIT	- 30	- 28	- 34
PLASTICITY INDEX	- 15	- 12	- 13
AASHTO SOIL	- A-6(7)	- A-6(5)	- A-6(4)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 13.6	- 15.8	- 12.9
ACHMSC (IN)	- 9.0W	- --	- --
ACHMBC (IN)	- 2.0	- --	- --
AGG.BASE CRS CL-7 (IN)	- 4.0	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

May 25, 2016

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 080439
Bear Creek & So. Fourche La Fave River Strs. & Apprs. (S)
Route 7 Section 11
Perry County

Transmitted herewith are summaries of the site geology and subsurface conditions, unconfined compressive strength test results, RMR, D50 analysis test results, and the logs of the borings conducted for the structure and approaches of the above referenced project. The samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. The rock cores are available for inspection at the Materials Division.

This project contains two structures. The first spans Bear Creek and the second the South Fourche La Fave River. Although these bridges are located less than two miles apart their subsurface stratigraphies vary greatly. Based on the depth at which bedrock was encountered, at both bridge locations, it is anticipated that the end bents will be founded on piling and interior bents will be founded on drilled shafts. Piling should be tipped into the competent sandstone at Bear Creek and competent shale to sandstone with shale at the South Fourche La Fave River. Preboring may be necessary to achieve minimum penetration requirements. Drilled shafts should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Drilled Shafts

Bridges	Nominal Tip Resistance (ksf)	Factored Tip Resistance (ksf)	Nominal Side Resistance (ksf)	Factored Side Resistance (ksf)
Bear Creek	44	22	14.2	7.8
So. Fourche La Fave River	30	15	9.7	5.3

The Geotechnical Section has reviewed the proposed cross-sections for the above referenced project and has the following recommendations:

1. From station 200+00 to 204+00, left of centerline, it is acceptable to utilize 2H:1V cut slopes.
2. Embankments located in the flood plain should be constructed on a 2H:1V out of Rock Fill, meeting the minimum requirements of the attached Special Provision. The Rock Fill should extend a minimum of two feet above the high water mark and the remaining 2H:1V slope should be plated with filter fabric covered with dumped riprap. Figure 1 illustrates the recommended cross-sectional configuration.

If you have any questions concerning these recommendations, please contact the Geotechnical Section.



Michael C. Benson
Materials Engineer

MCB:rpt:mlg

cc: State Construction Engineer - Master File Copy
District 8 Engineer
G.C. File

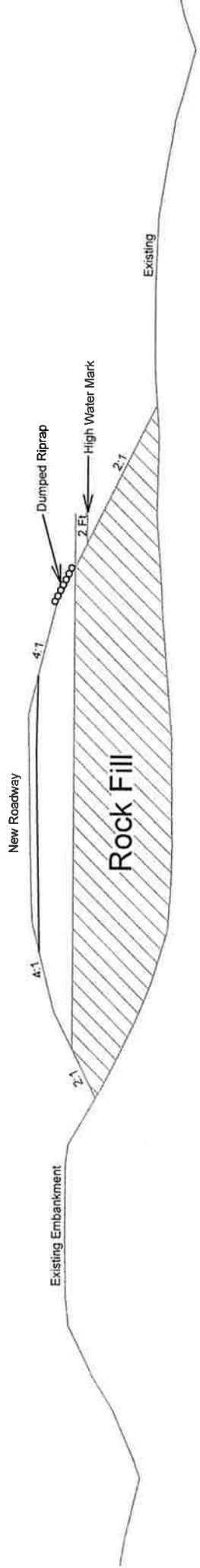


Figure 1 - Rock Fill

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT**SPECIAL PROVISION****JOB NO. 080439****ROCK FILL**

Description: This item shall consist of the construction of embankments at the locations shown on the plans or as directed by the Engineer as Rock Fill. Embankments designated as Rock Fill shall comply with Section 210, Excavation and Embankment, of the Standard Specifications, Edition of 2014. Where there is a conflict between these Special Provisions and Section 210, these Special Provisions shall govern.

Materials and Construction Requirements: Embankments requiring Rock Fill shall be constructed of materials meeting the following requirements:

- (1) Material for Rock Fill shall include stone obtained from an approved source and shall consist of hard and durable limestone, sandstone, dolomite, or rock-like shale. Shale shall have a minimum slake durability index (SDI) of 95% as tested according to AHTD Test Method 399. The SDI shall be determined by the Engineer using the above method at least once per 3000 cubic yards. The stone shall be greater than 1½” and less than 30” reasonably well-graded and angular, with fractured faces on at least 75% of the surface and shall not contain more than 10% overburden or fines less than 1½” in maximum cross-section. The stone shall weigh not less than 150 pounds per solid cubic foot and shall have a percent of wear not greater than 45 by Los Angeles Test (AASHTO T 96).
- (2) The following shall be added to the third paragraph of Section 801.08 of the Standard Specifications. Material placed immediately adjacent to Pipe Culverts or Box Culverts including a minimum of 6 inches on top of the culvert, shall meet the material requirements of Aggregate Base Course (Class 7).
- (3) Material Placed in the vicinity of piling shall be constructed in accordance with Sections 303.02, 303.03, and 303.04 of the Standard Specifications, Edition of 2014. It shall meet the material requirements of Aggregate Base Course (Class 7).
- (4) The top layer of Rock Fill shall be in accordance with Section 303 of the Standard Specifications for Aggregate Base Course (Class 7). It shall be placed to provide a barrier for preventing the migration of fines from the overlaying embankment material into the rock fill embankment. The layer shall be at least 6 inches in thickness. The layer will not be required on the exterior side slopes (the exterior surface that daylight and is not covered with fill). The Engineer will inspect the completed surface of the rock fill embankment prior to allowing placement of additional embankment material. Density testing will not be required for the Aggregate Base Course (Class 7) material used to cap Rock Fill. The stone shall be spread, shaped, and consolidated to provide a firm and unyielding foundation for the subgrade and/or base course. The Contractor shall not place overlaying embankment material without approval of the Engineer.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

SPECIAL PROVISION

JOB NO. 080439

ROCK FILL

Method of Measurement: Rock Fill, which includes all embankment material types described above, including Aggregate Base Course (Class 7), will be measured by the cubic yard in place as provided for in Section 210, Excavation and Embankment, Subsection 210.12(c) of the Standard Specifications.

Basis of Payment: Placement and compaction of Rock Fill embankment material shall be paid for under the item "Rock Fill", which price shall be full compensation for all costs involved in furnishing all materials for constructing the embankments in accordance with Section 210 and this Special Provision; and for all labor, tools, equipment, quality control sampling and testing, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Rock Fill	Cubic Yard

GEOLOGY AND SITE CONDITIONS
Job No. 080439

Bear Creek & So. Fourche La Fave River STRS. & APPRS. (S)
Perry County
Route 7 Section 11

Site Conditions

There are 2 bridges on this project:

Bridge 1:

The existing Bear Creek Bridge is located on Route 7 in Perry County. The existing structure is a 6 span bridge approximately 270 feet in length. The superstructure is supported by 5 wall piers on spread footings with concrete end bents. Decking is cast-in-place reinforced concrete over spans 2 through 5 with steel guardrails leading up to stone and mortar guardrails. There are arched steel trusses over spans 3 and 4. Stream flow under the bridge runs west to east and is capable of maintaining a large sediment load as indicated by large rounded cobbles and boulders in the channel and surrounding the project location. Observed outcrops are primarily massive sandstone beds. Both sides of the bridge are heavily wooded and no utilities were observed at the jobsite.

Bridge 2:

Bridge 2 crosses the South Fourche La Fave River and is located on Route 7, south of Hollis in Perry County. This bridge is approximately 2 miles north of bridge 1. It is a 9 span bridge approximately 500 feet in length, crossing a broad flood plain of the South Fork Fourche La Fave River. The 8 intermediate bents consist of concrete and are constructed at an angle with the bridge to parallel river flow. The superstructure consists of cast in place reinforced concrete decking with steel guardrails leading up to the bridge. The bridge end walls are concrete with stone and mortar guardrails leading up to steel I-beam guardrails with steel trusses over spans 3 and 4. Buried telecommunication lines run under span 7 of the bridge and parallel the right side of the bridge, running overhead when crossing the river. Overhead power lines parallel the left side of the bridge. The river flows from the west to the east and has massive vertically dipping sandstone beds exposed in the channel. Downstation and to the left of the existing bridge there is a steeply sloped hill with massive sandstone beds outcropping that correlate with beds observed in the channel. South Fourche Campground is located downstation on the right side of the bridge and Cemetery Road, an unimproved gravel road, is approximately one tenth of a mile upstation on the right. Both sides of the existing bridge are moderately to heavily vegetated.

Site Geology

Both proposed bridges are located in Pennsylvanian Aged rocks of the Ouachita Mountain Orogeny. These rocks are primarily sandstones and shales of the Jackfork Formation. Surrounding geology consists primarily of extensively faulted and folded rocks with a general east to west trend of ridges and valleys. Observed outcrops consist primarily of steeply dipping, highly deformed, massively bedded sandstones and shales. **Bridge 1** lies south of the Fourche

La Fave Syncline. At this location, Pennsylvanian Aged rock of the Jackfork Formation lies conformable on top of older Mississippian age Stanley Shale. **Bridge 2** is located in the Fourche La Fave Syncline and is also constructed on top of Pennsylvanian rock; however, at this location older rocks of the Jackfork Formation overlie younger Pennsylvanian aged rocks of the Johns Valley Shale. This is due to thrust faulting that occurred as a result of Late Paleozoic tectonism.

The Jackfork Formation encountered at both job sites can be described as thin to massively bedded, fine to coarse, brown, tan, or bluish-gray quartzitic sandstones and gray black shales. These units often occur as chaotic masses from 3,500 to 6,000 feet thick. The Johns Valley Shale can be described as gray-black clay shale with numerous silty thin to massive sandstone intervals. The Stanley Shale can be summarized as dark-gray shale with interbedded fine grained sandstone and varies in thickness from 3,500 feet up to 10,000 feet thick in some areas. Core samples extracted from both job site locations show evidence of high levels of deformation; including numerous slickensides, fractures, and quartz filled veins. Mapped thrust faults are abundant along the project alignment and there may be multiple unmapped faults in the area. Overall, the lithology for both bridges changes dramatically from borehole to borehole due to vertical bedding and faulting and therefore makes any generalization of the sampled rock difficult and impractical.

Subsurface Conditions

Based on boring results for Stations 107+91 to 112+11, the subsurface stratigraphy for **Bridge 1** may be generalized as follows:

- 0-10.0 Feet: Consists primarily of sandy clay and gravel with occasional sandstone and shale layers at approximately 5 feet.
- 10.0 - 41.0 Feet: Varies from sandstone to shale, to sandstone with interbedded shale. Cores from this depth range contain abundant fractures, slickensides, and quartz filled partings and seams.

Based on the boring results for **Bridge 2**, subsurface stratigraphy for Stations 211+72 to 216+70 varies significantly from the north side to the south side of the bridge due to the steep dip of the beds and may be generalized as follows:

Stations 211+72 to 215+03

- 0 to 10.5 Feet: Moist, reddish brown, sand and clay with gravel (rock fragments)
- 3.1 to 35.0 Feet: Steeply dipping sandstone with interbedded shale layers, fractures, slickensides, and quartz filled veins.

Stations 215+93 to 216+70

- 0 to 9.3 Feet: Moist, brown, sandy clay with gravel to clayey gravel with sand
- 9.3 to 49.0 Feet: Consists primarily of medium hard, dark gray, steeply dipping, highly weathered to unweathered shale with frequent slickensides, fractures, and quartz veins.

Rock Core Unconfined Compression Test Summary

Project Number: 080439
 Project Name: Bear Creek & So. Fourche La Fave River Strs. & Apprs. (S)
 Date Tested:

Station	Location	Sample No.	Depth (ft.)	Diameter (in.)	Height (in.)	Total Load (lbs.)	Correction Factor	Stress (psi)	Remarks
108+43	2' LT	1	13.5	1.75	3.80	36,420	1.000	15,142	SS
108+43	2' LT	2	19.5			NT		Broken	Shale
108+43	2' LT	3	32.5	1.75	4.10	29,800	1.000	12,389	SS
108+43	2' LT	4	37.5	1.75	3.95	25,180	1.000	10,469	SS w/ Shale
109+55	C.L.	5	14.0	1.75	4.05	3,170	1.000	1,318	SS
109+55	C.L.	6	32.5	1.75	4.00	27,760	1.000	11,541	SS
109+55	C.L.	7	38.0	1.75	2.76	3,670	0.966	1,474	Shale
110+45	2' RT	8	24.0	1.75	4.18	8,840	1.000	3,675	SS w/ Shale & quartz seams
110+45	2' RT	9	36.0	1.75	3.61	500	1.000	208	Shale
110+45	2' RT	10	40.0	1.75	4.25	2,500	1.000	1,039	SS
111+35	C.L.	11	30.0			NT		Broken	Shale
111+35	C.L.	12	35.0	1.75	3.00	4,090	0.977	1,661	Shale
212+38	C.L.	13	13.0	1.75	3.85	14,680	1.000	6,103	SS
212+38	C.L.	14	28.0	1.75	3.91	22,280	1.000	9,263	SS
213+75	C.L.	15	13.5	1.75	3.86	9,100	1.000	3,783	SS w/ Shale
213+75	C.L.	16	21.0	1.75	3.88	48,440	1.000	20,139	SS w/ Shale
213+75	C.L.	17	35.0			NT		Broken	SS w/ Shale
214+28	C.L.	18	28.0			NT		Broken	Shale
214+28	C.L.	19	35.0			NT		Broken	SS w/ Shale
214+28	C.L.	20	38.0			NT		Broken	Shale
215+03	C.L.	21	13.0	1.75	5.20	26,640	1.000	11,076	SS
215+03	C.L.	22	35.0	1.75	3.95	29,780	1.000	12,381	SS
215+93	C.L.	23	29.0			NT		Broken	Shale
215+93	C.L.	24	36.5			NT		Broken	Shale
215+93	C.L.	25	47.0			NT		Broken	Shale

* Please note any broken samples, fractures or other characteristics of sample in Remarks.

ROCK MASS RATING SUMMARY
JOB # 080439

SAMPLE #1

Station/Location	108+43/2' LT
Depth (ft)	13.5
	Relative Rating
Uniaxial Compressive Strength	12
RQD	13
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	77
Class Number	II
Description	GOOD ROCK

SAMPLE #1

Station/Location	108+43/2' LT
Depth (ft)	19.5
	Relative Rating
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #3

Station/Location	108+43/2' LT
Depth (ft)	32.5
	Relative Rating
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	10
Condition of Joints	12
Groundwater Conditions	7
Sum	49
Class Number	III
Description	FAIR ROCK

SAMPLE #4

Station/Location	108+43/2' LT
Depth (ft)	37.5
	Relative Rating
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	10
Condition of Joints	12
Groundwater Conditions	7
Sum	49
Class Number	III
Description	FAIR ROCK

SAMPLE #5

Station/Location	109+55/CL
Depth (ft)	14
	Relative Rating
Uniaxial Compressive Strength	1
RQD	3
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	31
Class Number	IV
Description	POOR ROCK

SAMPLE #6

Station/Location	109+55/CL
Depth (ft)	32.5
	Relative Rating
Uniaxial Compressive Strength	7
RQD	3
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	47
Class Number	III
Description	FAIR ROCK

SAMPLE #7

Station/Location	109+55/CL
Depth (ft)	38
	Relative Rating
Uniaxial Compressive Strength	1
RQD	8
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	36
Class Number	IV
Description	POOR ROCK

SAMPLE #8

Station/Location	110+45/2' RT
Depth (ft)	24
	Relative Rating
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	49
Class Number	III
Description	FAIR ROCK

SAMPLE #9

Station/Location	110+45/2' RT
Depth (ft)	36
	Relative Rating
Uniaxial Compressive Strength	0
RQD	17
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	44
Class Number	III
Description	FAIR ROCK

SAMPLE #10

Station/Location	110+45/2' RT
Depth (ft)	40
	Relative Rating
Uniaxial Compressive Strength	1
RQD	17
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	65
Class Number	II
Description	GOOD ROCK

SAMPLE #11

Station/Location	111+35/CL
Depth (ft)	30
	Relative Rating
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #12

Station/Location	111+35/CL
Depth (ft)	35
	Relative Rating
Uniaxial Compressive Strength	2
RQD	8
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	37
Class Number	IV
Description	POOR ROCK

SAMPLE #13

Station/Location	212+38/CL
Depth (ft)	13
	Relative Rating
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	49
Class Number	III
Description	FAIR ROCK

SAMPLE #14

Station/Location	212+38/CL
Depth (ft)	28
	Relative Rating
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #15

Station/Location	213+75/CL
Depth (ft)	13.5
	Relative Rating
Uniaxial Compressive Strength	4
RQD	3
Spacing of Joints	5
Condition of Joints	10
Groundwater Conditions	7
Sum	29
Class Number	IV
Description	POOR ROCK

SAMPLE #16

Station/Location	213+75/CL
Depth (ft)	21
	Relative Rating
Uniaxial Compressive Strength	12
RQD	3
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	42
Class Number	III
Description	FAIR ROCK

SAMPLE #17

Station/Location	213+75/CL
Depth (ft)	35
Relative Rating	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #18

Station/Location	214+28/CL
Depth (ft)	28
Relative Rating	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #19

Station/Location	214+28/CL
Depth (ft)	35
Relative Rating	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #20

Station/Location	214+28/CL
Depth (ft)	38
Relative Rating	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #21

Station/Location	215+03/CL
Depth (ft)	13
Relative Rating	
Uniaxial Compressive Strength	7
RQD	3
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	52
Class Number	III
Description	FAIR ROCK

SAMPLE #22

Station/Location	215+03/CL
Depth (ft)	35
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	42
Class Number	III
Description	FAIR ROCK

SAMPLE #23

Station/Location	215+93/CL
Depth (ft)	29
Relative Rating	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #24

Station/Location	215+93/CL
Depth (ft)	36.5
Relative Rating	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #25

Station/Location	215+93/CL
Depth (ft)	47
	Relative Rating
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	Broke Prior to Test

SAMPLE #26

Station/Location	
Depth (ft)	
	Relative Rating
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

SAMPLE #27

Station/Location	
Depth (ft)	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

SAMPLE #28

Station/Location	
Depth (ft)	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

SAMPLE #29

Station/Location	
Depth (ft)	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

SAMPLE #30

Station/Location	
Depth (ft)	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

SAMPLE #31

Station/Location	
Depth (ft)	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

SAMPLE #32

Station/Location	
Depth (ft)	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

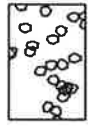
**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

Job No. 080439					
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
South Fourche River	214+05	River Bank	20' Left of Existing Bridge C.L.	N/A	0.0059
Bear Creek	109+25	Creek Bank	C.L. Construction	N/A	0.0035

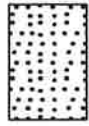
LEGEND

SOIL TYPES

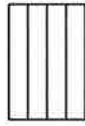
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



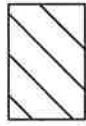
GRAVEL



SAND



SILT



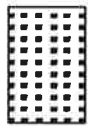
CLAY



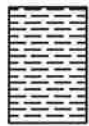
ORGANIC
MATTER

ROCK TYPES

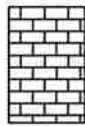
(SHOWN IN SYMBOL COLUMN)



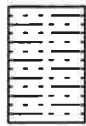
SANDSTONE



SHALE
or
SILTSTONE



LIMESTONE
or
DOLOMITE



ALTERNATING
LAYERS of
SHALE and
SANDSTONE



OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)

SHELBY TUBE



UNDISTURBED
SAMPLE
RECOVERY



DISTURBED
SAMPLE
RECOVERY



NO
RECOVERY

SPLIT SPOON

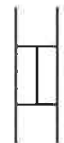


SAMPLE
RECOVERY



NO
RECOVERY

ROCK CORING



½ RECOVERY
INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
'N' Value	Density	'N' Value	Consistency	'N' Value	Consistency	'N' Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	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	

1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring 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 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 performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by

adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows/ft}$. The "N" Value corrected to 60%

efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

JOB NO. 080439 Perry County JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11 STATION: 107+91 LOCATION: 3' Left of Construction Centerline LOGGED BY: Steve Faulkner	DATE: March 23, 2016 TYPE OF DRILLING: Hollow Stem Auger - EQUIPMENT: CME 850 HAMMER CORRECTION FACTOR: 1.23
---	---

COMPLETION DEPTH: 32.4

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.	% T C R	% R Q D
			SURFACE ELEVATION: 536.6									
			Brown and Gray Clay with Gravel and Cobbles (Sandstone Fragments)									
5			SANDSTONE - Weathered, Cemented, Frequent Fractures, Moderately Dipping, Light Gray							10 (0")	98	0
10			SANDSTONE - Unweathered, Well Cemented, Moderately Dipping, Light Gray								92	76
			SHALE INTERBEDDED WITH SANDSTONE - Slightly Weathered, Medium Hard, Moderately Dipping, Dark Gray									
15			SANDSTONE WITH OCCASIONAL SHALE SEAMS AND LAYERS - Unweathered, Well Cemented, Moderately Dipping, Light Gray								90	35
20			SHALE INTERBEDDED WITH SANDSTONE - Unweathered, Medium Hard, Moderately Dipping, Dark Gray								88	26
25			SANDSTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Well Cemented, Moderately Dipping, Light Gray								98	95
30			SANDSTONE - Unweathered, Well Cemented, Moderately Dipping, Light Gray								100	100
35			Boring Terminated									

REMARKS: Bear Creek

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

BORING NO. 2
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 108+43
LOCATION: 2' Left of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: March 22, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 37.5

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.	% T C R	% R Q D
			SURFACE ELEVATION: 535.4									
			Brown and Gray Clayey Cobbles and Boulders									
5			SHALE - Weathered, Medium Hard, Dark Gray							19 32-60 (7")		
			SHALE INTERBEDDED WITH SANDSTONE - Weathered, Medium Hard, Cemented, Steeply Dipping, Gray								40	0
10			SHALE WITH OCCASIONAL SANDSTONE LAYERS - Slightly Weathered, Medium Hard, Steeply Dipping, Dark Gray								88	14
15			SANDSTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Well Cemented, Steeply Dipping, Occasional Fractures, Light Gray								95	60
20			SHALE - Slightly Weathered, Medium Hard, Steeply Dipping, Frequent Fractures, Dark Gray								76	10
			SANDSTONE - Unweathered, Well Cemented, Steeply Dipping, Frequent Fractures, Light Gray									
25			SHALE - Slightly Weathered, Medium Hard, Steeply Dipping, Frequent Fractures, Dark Gray								93	24
			SANDSTONE WITH OCCASIONAL SHALE LAYERS - Unweathered, Well Cemented, Steeply Dipping, Occasional Fractures, Light Gray									
30			SHALE - Slightly Weathered, Medium Hard, Steeply Dipping, Occasional Fractures, Dark Gray								93	39
			SANDSTONE WITH FREQUENT SHALE SEAMS AND LAYERS - Unweathered, Well Cemented, Steeply Dipping, Frequent Fractures, Gray									
35			SANDSTONE - Unweathered, Well Cemented,									

REMARKS: Bear Creek

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.					BORING NO. 2 PAGE 2 OF 2							
JOB NO. 080439 Perry County JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11 STATION: 108+43 LOCATION: 2' Left of Construction Centerline LOGGED BY: Steve Faulkner					DATE: March 22, 2016 TYPE OF DRILLING: Hollow Stem Auger - Diamond Core EQUIPMENT: CME 850 HAMMER CORRECTION FACTOR: 1.23							
COMPLETION DEPTH: 37.5												
D E P T H FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROUP	P L A S T I C L I M I T	% M O I S T.	L I Q U I D L I M I T	D R Y W E I G H T	L B S P E R C U. F T.	N O. O F B L O W S P E R 6- I N.	% T C R	% R Q D
			SURFACE ELEVATION: 535.4									
			Steeply Dipping, Frequent Fractures, Light Gray								98	62
40			Boring Terminated									
45												
50												
55												
60												
65												
70												
REMARKS: Bear Creek												

ARKANSAS HWY. & TRANS. DEPARTMENT		BORING NO. 3	
MATERIALS DIVISION - GEOTECHNICAL SEC.		PAGE 1 OF 3	
JOB NO. 080439	Perry County	DATE:	April 14, 2016
JOB NAME:	Bear Creek & So Fourche La Fave River Strs & Apprs (S)	TYPE OF DRILLING:	Hollow Stem Auger - Diamond Core
STATION:	109+55	EQUIPMENT:	CME 850
LOCATION:	Construction Centerline	HAMMER CORRECTION FACTOR: 1.23	
LOGGED BY:	Paul Christenberry		

COMPLETION DEPTH: 72.6

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.	% T C R	% R Q D
			SURFACE ELEVATION: 531.6									
5		X	Wet, Medium Dense, Brown Sand and Gravel with Organic Matter							7 10-8		
10		X	SHALE - Highly Weathered, Soft, Gray							15 27-24		
			SHALE WITH OCCASSIONAL SANDSTONE LAYERS - Highly Weathered, Soft to Medium Hard, Steeply Dipping, Gray								48	0
15			SHALE - Highly Weathered, Soft, Steeply Dipping, Gray								68	16
20			SANDSTONE - Slightly Weathered, Cemented, Frequent Fractures and Quartz Filled Veins, Steeply Dipping, Gray								62	16
25			SANDSTONE WITH OCCASSIONAL SHALE LAYERS - Slightly Weathered, Well Cemented with Occasional Soft Layers (Shale), Frequent Fractures, Steeply Dipping, Gray *								18	0
30											96	34
35												

REMARKS: Bear Creek * Poor recovery from 22.6' to 27.6' below ground level due to blocked core barrel.
 ** Poor recovery from 52.6' to 62.6' below ground level.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.					BORING NO. 3 PAGE 2 OF 3							
JOB NO. 080439 Perry County			DATE: April 14, 2016									
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11			TYPE OF DRILLING: Hollow Stem Auger - Diamond Core									
STATION: 109+55			EQUIPMENT: CME 850									
LOCATION: Construction Centerline			HAMMER CORRECTION FACTOR: 1.23									
LOGGED BY: Paul Christenberry												
COMPLETION DEPTH: 72.6												
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.	% T C R	% R Q D
			SURFACE ELEVATION: 531.6									
40			SANDSTONE WITH FREQUENT SHALE LAYERS - Slightly Weathered, Well Cemented with Occasional Soft Layers (Shale), Frequent Fractures, Steeply Dipping, Gray								56	22
45			SHALE - Highly Weathered, Soft, Steeply Dipping, Steeply Dipping, Dark Gray								88	36
50			SHALE - Highly Weathered, Soft with Occasional Medium Hard Layers, Steeply Dipping, Dark Gray								26	0
55			SHALE - Highly Weathered, Soft, Steeply Dipping, Dark Gray **								88	0
60			SANDSTONE - Slightly Weathered, Well Cemented, Frequent Fractures, Steeply Dipping, Gray								64	0
65			SHALE INTERBEDDED WITH SANDSTONE - Slightly Weathered to Highly Weathered, Soft to Medium Hard, Frequent Fractures, Steeply Dipping, Gray								18	0
70											94	30

REMARKS: Bear Creek * Poor recovery from 22.6' to 27.6' below ground level due to blocked core barrel.
** Poor recovery from 52.6' to 62.6' below ground level.

JOB NO. 080439 Perry County
 JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
 Route 7 Section 11
 STATION: 109+55
 LOCATION: Construction Centerline
 LOGGED BY: Paul Christenberry

DATE: April 14, 2016
 TYPE OF DRILLING:
 Hollow Stem Auger - Diamond Core
 EQUIPMENT: CME 850
 HAMMER CORRECTION FACTOR: 1.23





COMPLETION DEPTH: 72.6

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.	% TCR	% RQD
			SURFACE ELEVATION: 531.6								70	0
75			Boring Terminated									
80												
85												
90												
95												
100												
105												

REMARKS: Bear Creek * Poor recovery from 22.6' to 27.6' below ground level due to blocked core barrel.
 ** Poor recovery from 52.6' to 62.6' below ground level.

JOB NO. 080439 Perry County JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11 STATION: 110+45 LOCATION: Construction Centerline LOGGED BY: Paul Christenberry	DATE: April 5, 2016 TYPE OF DRILLING: Hollow Stem Auger - Diamond Core EQUIPMENT: CME 850 HAMMER CORRECTION FACTOR: 1.23
--	--




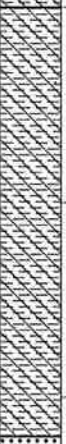



COMPLETION DEPTH: 24.5

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.	% TCR	% RQD
			SURFACE ELEVATION: 531.6									
			Gravel, Cobbles, and Boulders									
5			Moist, Cemented, Gray Sandstone Cobbles and Boulders							10 (0")	7	0
10			No Recovery								0	0
15			SHALE - Highly Weathered, Soft to Medium Hard, Steeply Dipping, Gray								8	0
20			No Recovery								0	0
			SHALE - Highly Weathered, Soft, Steeply Dipping, Gray								40	0
25			SANDSTONE - Slightly Weathered, Cemented Frequent Fractures, Steeply Dipping, Gray *									
			Boring Terminated									
30												
35												

REMARKS: Bear Creek * Hole abandoned due to poor core recovery. Relocated to 110+45 2' left of Construction Centerline.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.		BORING NO. 4A PAGE 1 OF 2
JOB NO. 080439 Perry County	DATE: March 6, 2016	
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11	TYPE OF DRILLING: Hollow Stem Auger, Diamond Core	
STATION: 110+45	EQUIPMENT: CME 850	
LOCATION: 2' Left of Construction Centerline	HAMMER CORRECTION FACTOR: 1.23	
LOGGED BY: Paul Christenberry		

COMPLETION DEPTH: 57.7

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.	% TCR	% RQD
			SURFACE ELEVATION:									
			Gravel, Cobbles, and Boulders with Clay and Organic Matter									
5		X	SHALE - Highly Weathered, Soft, Gray							7 22-34		
10		X	SHALE - Highly Weathered, Medium Hard, Gray							50 60 (5")		
			SHALE - Highly Weathered (No Recovery)*								0	0
15			SHALE - Highly Weathered, Soft, Steeply Dipping, Dark Gray								28	0
20											30	0
25			SANDSTONE - Slightly Weathered, Well Cemented, Frequent Quartz Veins, Frequent Fractures, Steeply Dipping, Gray								84	30
30			SANDSTONE WITH OCCASIONAL SHALE SEAMS - Slightly Weathered, Occasional Fractures, Frequent Quartz Veins, Occasional Slickensides, Steeply Dipping, Gray								92	28
35												

REMARKS: Bear Creek * No recovery from 9.6' to 12.7' below ground level.
 **Limited recovery from 52.7' to 57.7' below ground level due to core barrel malfunction.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.						BORING NO. 4A PAGE 2 OF 2						
JOB NO. 080439 Perry County				DATE: March 6, 2016								
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11				TYPE OF DRILLING: Hollow Stem Auger, Diamond Core								
STATION: 110+45				EQUIPMENT: CME 850								
LOCATION: 2' Left of Construction Centerline				HAMMER CORRECTION FACTOR: 1.23								
LOGGED BY: Paul Christenberry												
COMPLETION DEPTH: 57.7												
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.	% T C R	% R Q D
			SURFACE ELEVATION:									
			SHALE - Slightly Weathered, Medium Hard, Frequent Slickensides, Occasional Talc Veins, Steeply Dipping, Dark Gray								96	60
40											100	94
45			SANDSTONE - Slightly Weathered, Cemented, Occasional Fractures, Steeply Dipping, Gray								94	82
50											98	64
			SHALE - Highly Weathered, Soft to Medium Hard, Steeply Dipping, Dark Gray									
55			SANDSTONE WITH OCCASIONAL SHALE SEAMS AND LAYERS - Slightly Weathered, Cemented, Occasional Quartz Veins and Quartz-Lined Voids, Steeply Dipping, Gray								78	22
60			Boring Terminated									
65												
70												

REMARKS: Bear Creek * No recovery from 9.6' to 12.7' below ground level.

**Limited recovery from 52.7' to 57.7' below ground level due to core barrel malfunction.





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

BORING NO. 5
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 111+35
LOCATION: Construction Centerline
LOGGED BY: Paul Christenberry

DATE: March 4, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 42.6

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.	% T C R	% R Q D
			SURFACE ELEVATION: 535.1									
			Gravel, Cobbles, and Boulders with Sand									
5			Very Dense, Sandstone Cobbles and Boulders							10 (0")	45	0
10											18	0
15			SHALE - Highly Weathered to Weathered, Soft to Medium Hard, Occasional Slickensides, Occasional Quartz Veins, Moderately to Steeply Dipping, Gray								70	0
20											98	0
25			SHALE - Weathered, Medium Hard, Frequent Fractures, Moderately to Steeply Dipping, Occasional Slickensides, Dark Gray								98	46
30											99	66
35												

REMARKS: Bear Creek

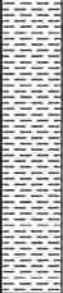
**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 5
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 111+35
LOCATION: Construction Centerline
LOGGED BY: Paul Christenberry

DATE: March 4, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 42.6

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.	% FCR	% RQD
			SURFACE ELEVATION: 535.1									
40											97	50
											96	28
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: Bear Creek

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

BORING NO. 6
PAGE 1 OF 1

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 112+11
LOCATION: Construction Centerline
LOGGED BY: Steve Faulkner

DATE: March 28, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 18.5

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.	% T C R	% R Q D
			SURFACE ELEVATION: 539.6									
5			Moist, Medium Dense, Brown Sand with Gravel (Rock Fragments)							5 7-9		
10			SANDSTONE - Weathered, Well Cemented, Occasional Quartz Veins, Steeply Dipping, Gray							10 (0")	63	0
15			SHALE - Weathered, Medium Hard, Moderate Dip, Frequent Slickensides, Steeply Dipping, Dark Gray *								56	0
18.5			Boring Terminated								32	0
20												
25												
30												
35												

REMARKS: Bear Creek
* Hole abandoned at 18.5' below ground level due to bit failure.

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

BORING NO. 6A
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 112+11
LOCATION: 3' Left of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: March 29, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 48.3

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.	% T C R	% R O D
			SURFACE ELEVATION: 539.6									
5			Moist, Very Dense, Brown and Gray Gravel with Clay and Sand							9 49-60 (9")		
			SANDSTONE - Weathered, Well Cemented, Frequent Quartz Veins, Steeply Dipping, Gray *								28	0
10			SANDSTONE - Weathered, Well Cemented, Frequent Quartz Veins, Frequent Fractures, Steeply Dipping, Gray								60	12
15			SANDSTONE - Weathered, Well Cemented, Frequent Quartz Veins, Frequent Fractures, Steeply Dipping, Gray								34	0
20			SHALE - Unweathered, Hard, Frequent Slickensides, Steeply Dipping, Gray								90	42
25			SHALE - Unweathered, Hard, Frequent Slickensides, Frequent Quartz Veins, Steeply Dipping, Gray								82	16
30			SHALE - Weathered with Highly Weathered Layers, Medium Hard with Soft Layers, Frequent Slickensides, Frequent Quartz Veins, Steeply Dipping, Gray								86	26
35			SHALE - Weathered with Highly Weathered Layers, Medium Hard with Soft Layers, Frequent Slickensides, Frequent Quartz Veins, Steeply Dipping, Gray									

REMARKS: Bear Creek
*Total water loss throughout coring due to auger not properly seated and fractured rock.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.						BORING NO. 6A PAGE 2 OF 2						
JOB NO. 080439 Perry County						DATE: March 29, 2016						
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S) Route 7 Section 11						TYPE OF DRILLING: Hollow Stem Auger - Diamond Core						
STATION: 112+11						EQUIPMENT: CME 850						
LOCATION: 3' Left of Construction Centerline						HAMMER CORRECTION FACTOR: 1.23						
LOGGED BY: Steve Faulkner												
COMPLETION DEPTH: 48.3												
D E P T H FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROUP	P L A S T I C L I M I T	% M O I S T.	L I Q U I D L I M I T	D R Y W E I G H T	L B S P E R C U. F T.	N O. O F B L O W S P E R 6- I N.	% T C R	% R Q D
			SURFACE ELEVATION: 539.6									
40			SHALE - Weathered with Highly Weathered Layers, Medium Hard with Soft Layers, Occasional Slickensides, Steeply Dipping, Gray								74	10
45											74	18
50				Boring Terminated								66
55												
60												
65												
70												
REMARKS: Bear Creek *Total water loss throughout coring due to auger not properly seated and fractured rock.												

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

BORING NO. 7
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 211+72
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: December 8, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 51.8

DEPTH FT.	SYMBOLS	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
		SURFACE ELEVATION: 485.9									
5		Moist, Very Stiff, Reddish Brown Clay with Gravel (Shale Fragments)							6 9-12		
10		Moist, Stiff, Reddish Brown Sandy Clay							3 4-5		
15		Moist, Very Hard, Gray and Reddish Brown Sandy Clay with Gravel (Sandstone Fragments)							17 36-30 (9")		
20		SANDSTONE - Weathered, Cemented, Frequent Quartz Veins, Steeply Dipping, Gray and White								11	0
25		SANDSTONE WITH FREQUENT SHALE LAYERS - Weathered, Cemented with Frequent Soft Layers (Shale), Occasional Quartz Veins, Steeply Dipping, Gray								44	0
30		SANDSTONE WITH FREQUENT SHALE LAYERS - Weathered, Cemented with Frequent Soft Layers (Shale), Occasional Quartz Veins, Steeply Dipping, Gray								79	0
35		SHALE - Highly Weathered, Soft, Frequent								82	0

REMARKS: South Fourche La Fave River

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

BORING NO. 7
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 211+72
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: December 8, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 51.8

DEPTH FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R O D
			SURFACE ELEVATION: 485.9									
			Quartz Veins, Steeply Dipping, Dark Gray								25	0
40			SHALE - Highly Weathered, Soft to Medium Hard, Occasional Quartz Veins, Steeply Dipping, Dark Gray								100	0
45											100	12
			SANDSTONE - Slightly Weathered, Well Cemented, Steeply Dipping, Light Gray									
50			SANDSTONE - Unweathered, Well Cemented, Steeply Dipping, Gray								100	100
55			Boring Terminated									
60												
65												
70												

REMARKS: South Fourche La Fave River

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

BORING NO. 8
PAGE 1 OF 1

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 212+38
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: December 15, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 33.4

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.	% TCR	% RQD
			SURFACE ELEVATION: 472.5									
5			Wet, Very Stiff, Gray and Reddish Brown Sandy Clay with Gravel (Shale and Sandstone Fragments)							5 10-18		
10			SANDSTONE WITH OCCASIONAL SHALE SEAMS- Slightly Weathered, Well Cemented, Frequent Fractures, Steeply Dipping, Light Gray							10 (0")	94	8
15			SANDSTONE WITH FREQUENT SHALE SEAMS - Slightly Weathered with Highly Weathered Seams, Well Cemented with Soft Seams, Steeply Dipping, Gray								41	24
20			SANDSTONE WITH FREQUENT SHALE SEAMS AND LAYERS - Slightly Weathered, Well Cemented, Steeply Dipping, Gray								100	31
25			SANDSTONE WITH OCCASIONAL SHALE PARTINGS - Unweathered, Well Cemented, Steeply Dipping, Dark Gray								100	86
30			SANDSTONE WITH FREQUENT SHALE PARTINGS - Slightly Weathered, Well Cemented, Frequent Fractures, Steeply Dipping, Gray								96	45
35			Boring Terminated									

REMARKS: South Fourche La Fave River

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

BORING NO. 9
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 213+75
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: November 19, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 47.8

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.	% T C R	% R Q D
			SURFACE ELEVATION: 473.1									
5		X	Moist, Medium Stiff, Gray Sandy Clay with Some Organic Matter							1 2-4		
10		X	Moist, Hard, Gray Clay with Gravel (Shale and Sandstone Fragments)							8 4-50		
15			SANDSTONE AND SHALE INTERBEDDED - Slightly to Highly Weathered, Well Cemented (Sandstone) to Soft (Shale), Steeply Dipping, Frequent Slickensides, Gray							10 (0")	49	8
20											97	20
25											100	14
30				SANDSTONE WITH FREQUENT SHALE LAYERS - Slightly Weathered, Well Cemented, Steeply Dipping, Frequent Slickensides, Frequent Fractures, Gray								97
35												

REMARKS: South Fourche La Fave River

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

BORING NO. 9
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 213+75
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: November 19, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 47.8

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.	% FCR	% RQD
			SURFACE ELEVATION: 473.1									
			SANDSTONE AND SHALE INTERBEDDED - Unweathered, Well Cemented (Sandstone) and Medium Hard (Shale), Steeply Dipping, Frequent Slickensides, Gray								96	10
40			SHALE WITH FREQUENT SANDSTONE SEAMS AND LAYERS - Unweathered, Medium Hard, Steeply Dipping, Frequent Slickensides, Dark Gray								57	12
45											96	26
50			Boring Terminated									
55												
60												
65												
70												

REMARKS: South Fourche La Fave River

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

BORING NO. 10
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 214+28
LOCATION: Centerline of Construction
LOGGED BY: Stanley Bates

DATE: November 23, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.5

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.	% F C R	% R Q D
			SURFACE ELEVATION: 476.6									
5			Moist, Hard, Sandy Clay with Some Gravel and Organic Matter							9 19-41		
10			SHALE - Highly Weathered, Soft, Gray							39 60 (6")		
15			SANDSTONE WITH OCCASSIONAL CLAY LAYERS - Weathered, Well Cemented, Steeply Dipping, Gray								50	0
20			SANDSTONE WITH OCCASSIONAL SHALE LAYERS - Slightly Weathered, Well Cemented, Steeply Dipping, Gray								40	0
25			SANDSTONE - Slightly Weathered, Well Cemented, Steeply Dipping, Gray								34	0
30			SANDSTONE WITH FREQUENT SHALE LAYERS - Slightly Weathered, Well Cemented, Steeply Dipping, Gray								78	14
35			SANDSTONE WITH FREQUENT SHALE LAYERS - Slightly Weathered, Well Cemented, Steeply Dipping, Gray								66	7

REMARKS: South Fourche La Fave River

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

BORING NO. 10
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 214+28
LOCATION: Centerline of Construction
LOGGED BY: Stanley Bates

DATE: November 23, 2015
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.5

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.	% TCR	% RQD
			SURFACE ELEVATION: 476.6									
40			SHALE WITH FREQUENT SANDSTONE SEAMS AND LAYERS - Slightly Weathered, Medium Hard, Steeply Dipping, Frequent Slickensides, Dark Gray								88	8
											99	0
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: South Fourche La Fave River

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

BORING NO. 11
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 215+03
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: December 1, 2015
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 37.9

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.	% T C R	% R Q D
			SURFACE ELEVATION: 476.3									
			Gray and Brown Clayey Gravel with Sand									
5			SHALE - Highly Weathered, Medium Hard, Dark Gray							11 60 (6")		
			SHALE WITH OCCASIONAL SANDSTONE LAYERS - Highly Weathered, Medium Hard with Soft Layers, Steeply Dipping, Dark Gray								85	0
10			SANDSTONE WITH OCCASIONAL SHALE LAYERS - Weathered with Occasional Highly Weathered Layers, Well Cemented, Steeply Dipping, Dark Gray								44	0
15			SANDSTONE - Slightly Weathered, Well Cemented, Occasional Fractures, Occasional Quartz Veins, Steeply Dipping, Dark Gray								61	8
20			SANDSTONE WITH OCCASIONAL SHALE LAYERS - Weathered with Occasional Highly Weathered Layers, Well Cemented, Steeply Dipping, Gray								68	48
25			SHALE INTERBEDDED WITH SANDSTONE - Slightly Weathered to Unweathered, Medium Hard, Well Cemented, Highly Fractured, Steeply Dipping, Dark Gray								22	0
30			SHALE INTERBEDDED WITH SANDSTONE - Slightly Weathered to Unweathered, Medium Hard, Well Cemented, Highly Fractured, Steeply Dipping, Dark Gray								66	22
35												

REMARKS: South Fourche La Fave River

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

BORING NO. 11
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 215+03
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry

DATE: December 1, 2015
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 37.9

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.	% FCR	% RQD
			SURFACE ELEVATION: 476.3									
			SANDSTONE WITH FREQUENT SHALE LAYERS AND SEAMS - Unweathered, Well Cemented, Occasional Fractures, Steeply Dipping, Gray								99	43
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: South Fourche La Fave River

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

BORING NO. 12
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 215+93
LOCATION: Centerline of Construction
LOGGED BY: Raymond Taylor, Paul Campbell

DATE: December 2, 2015
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 48.7

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.	% TCR	% RQD
			SURFACE ELEVATION: 477.8									
5			Wet, Soft, Brown Sandy Clay with Some Organic Matter							21 51-23		
10			Wet, Very Hard, Light Brown to Gray Sandy Clay with Gravel (Shale and Sandstone Fragments)							25 33-55		
10			SHALE - Highly Weathered, Medium Hard, Dark Gray									
15			SHALE - Weathered, Medium Hard, Steeply Dipping, Frequent Slickensides, Dark Gray								22	0
20											28	0
25											80	14
30											64	8
35											78	8

REMARKS: South Fourche La Fave River


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

BORING NO. 12
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 215+93
LOCATION: Centerline of Construction
LOGGED BY: Raymond Taylor, Paul Campbell

DATE: December 2, 2015
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 48.7

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.	% TCR	% RQD
			SURFACE ELEVATION: 477.8									
40			SHALE - Unweathered, Medium Hard, Steeply Dipping, Frequent Slickensides, Dark Gray								80	15
45											94	8
50												88
55			Boring Terminated									
60												
65												
70												

REMARKS: South Fourche La Fave River

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

BORING NO. 13
PAGE 1 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Aprs (S)
Route 7 Section 11
STATION: 216+70
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry, Paul Campbell

DATE: December 3, 2015
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.9

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.	% TCR	% RQD
			SURFACE ELEVATION: 478.6									
5			Moist, Hard, Brown Sandy Clay with Gravel (Rock Fragments)							9 30-23		
10			SHALE - Highly Weathered, Medium Hard, Dark Gray*							31 56-44 (10")		
			SHALE - Weathered, Medium Hard, Gray								50	0
15			SHALE - Highly Weathered to Weathered, Medium Hard with Soft Layers, Steeply Dipping, Gray								100	34
20			SHALE - Weathered, Medium Hard, Steeply Dipping, Frequent Slickensides, Dark Gray **								92	8
25											100	66
30											96	60
35												

REMARKS: South Fourche La Fave River * Groundwater encountered at approximately 11' below ground level. ** Partial water loss from 28.9' to 33.9' below ground level.

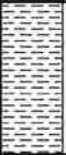
**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 13
PAGE 2 OF 2

JOB NO. 080439 Perry County
JOB NAME: Bear Creek & So Fourche La Fave River Strs & Apprs (S)
Route 7 Section 11
STATION: 216+70
LOCATION: Centerline of Construction
LOGGED BY: Paul Christenberry, Paul Campbell

DATE: December 3, 2015
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.9

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.	% TCR	% RQD
			SURFACE ELEVATION: 478.6									
			SHALE - Weathered, Medium Hard, Occasional Fractures, Frequent Slickensides, Dark Gray								90	7
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: South Fourche La Fave River * Groundwater encountered at approximately 11' below ground level. ** Partial water loss from 28.9' to 33.9' below ground level.