

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. 030428

FEDERAL AID PROJECT NO. NHPP-0066(28)

BURKE CREEK & COSSATOT RELIEF STRS. & APPRS. (S)

STATE HIGHWAY 71 SECTION 6

IN SEVIER COUNTY

LETTING OF AUGUST 10, 2016

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

June 12, 2013

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 030428
Burke Creek and Cossatot Relief Strs. & Apprs (S)
Route 71 Section 6
Sevier 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 Burke Creek and Cossatot Relief bridges and widening approximately 1.1 miles of Highway 71 from two lanes to five lanes. Samples were obtained in the existing travel lanes, shoulders and ditch line. Sample locations were measured from centerline of existing roadway and should be noted as such on the logs.

Based on laboratory results of samples obtained, the subgrade soils consist of low to moderately plastic sandy clay with varying amounts of gravel. Cross-sections are not currently available, but it is anticipated that the construction grade line will closely match that of the existing roadway. Subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Embankment 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 located in the vicinity of De Queen.
2. Asphalt Concrete Hot Mix

64-22		
<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.2	94.8
Binder Course	4.4	95.6
Base Course	4.0	96.0

70-22		
<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.2	94.8
Binder Course	4.4	95.6
Base Course	4.0	96.0

Type	76-22	
	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	4.4	95.6
Base Course	4.0	96.0


Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 3 Engineer
Planning 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 - 06/07/2013
JOB NUMBER - 030428

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 66
DISTRICT NO. - 03

JOB NAME - BURKE CREEK AND COSSATOT RELIEF STRS. & APPRS

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 15

RESILIENT MODULUS
STA.107+00 9159

REMARKS -
-

AASHTO TESTS : T190

JOB: 030428

Arkansas State Highway Transportation Department

JOB NAME: BURKE CREEK AND COSSATOT RELIEF STRS. & APPRS

Materials Division

COUNTY NO. 66 DATE TESTED 6/4/2013

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#					L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
107+00	33'RT	0-5	BROWN	92	89	83	77	65	18	2	A-4(0)	RV932	
107+00	6'RT	0-5	BROWN	93	84	72	64	52	23	10	A-4(2)	S915	12.9
107+00	18'RT	0-5	BR/GR	92	86	80	65	45	24	11	A-6(2)	S916	10.6
107+00	33'RT	0-5	BROWN	97	95	90	83	70	19	4	A-4(0)	S917	14.8
115+00	13'LT	0-5	BR/GR	87	76	61	53	45	21	8	A-4(0)	S918	12.4
115+00	25'LT	0-5	BROWN	74	64	54	48	41	21	8	A-4(0)	S919	11.2
115+00	36'LT	0-5	BROWN	83	77	69	63	54	21	6	A-4(0)	S920	15.5
123+00	5'RT	0-5	BROWN	99	98	96	92	81	23	11	A-6(6)	S921	16.4
123+00	17'RT	0-5	BROWN	98	97	94	89	78	21	9	A-4(4)	S922	15
123+00	26'LT	0-5	BROWN	93	88	85	76	64	24	9	A-4(3)	S923	10
131+00	6'LT	0-5	BR/GR	99	97	94	90	78	23	10	A-4(5)	S924	15.2
131+00	16'LT	0-5	BROWN	99	97	95	94	74	21	8	A-4(3)	S925	18.1
131+00	24'LT	0-5	BROWN	90	86	79	67	47	20	5	A-4(0)	S926	13.1
139+00	5'RT	0-5	BR/GR	82	71	61	54	43	27	12	A-6(2)	S927	10.9
139+00	16'RT	0-5	BROWN	93	89	82	74	60	28	12	A-6(4)	S928	13.1
147+00	6'LT	0-5	BROWN	99	98	95	84	65	ND	NP	A-4(0)	S929	14.5
147+00	16'LT	0-5	BROWN	99	97	93	82	63	23	10	A-4(3)	S930	14.5
147+00	26'LT	0-5	BROWN	94	91	89	83	67	22	9	A-4(3)	S931	12.8

comments: W=MULTIPLE LAYERS, X=STRIPPED

Friday, June 07, 2013

JOB: 030428

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: BURKE CREEK AND COSSATOT RELIEF STRS & APPRS

Materials Division

6/4/2013

COUNTY NO. 66

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

107+00	6'RT	ACHMSC 15.0W	AGG BASE CRS CL5 7
107+00	18'RT	ACHMSC 12.5W	AGG BASE CRS CL5 ---
107+00	33'RT	ACHMSC ---	AGG BASE CRS CL5 ---
115+00	13'LT	ACHMSC 14.0W	AGG BASE CRS CL5 5.0
115+00	25'LT	ACHMSC 12.0W	AGG BASE CRS CL5 7.0
115+00	36'LT	ACHMSC ---	AGG BASE CRS CL5 ---
123+00	5'RT	ACHMSC 10.0W	AGG BASE CRS CL5 8.0
123+00	17'RT	ACHMSC 5.0W	AGG BASE CRS CL5 7.0
123+00	26'LT	ACHMSC ---	AGG BASE CRS CL5 ---
131+00	5'LT	ACHMSC 10.25W	AGG BASE CRS CL5 7.0
131+00	16'LT	ACHMSC 5.5W	AGG BASE CRS CL5 7.0
131+00	24'LT	ACHMSC ---	AGG BASE CRS CL5 ---
139+00	5'RT	ACHMSC 9.5W	ACHMSC AGG BASE CRS CL5 7.0
139+00	16'RT	ACHMSC 6.0W	ACHMSC AGG BASE CRS CL5 12.0
147+00	6'LT	ACHMSC 5.0	ACHMSC AGG BASE CRS CL5 5.0
147+00	16'LT	ACHMSC 6.5	ACHMSC AGG BASE CRS CL5 8
147+00	26'LT	ACHMSC ---	AGG BASE CRS CL5 ---

Comments: W=MULTIPLE LAYERS, X=STRIPPED

Friday, June 07, 2013

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

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

Job No.	030428	Material Code	SSRVPS
Date Sampled:	06/06/13	Station No.:	107+00
Date Tested:	June 6, 2013	Location:	33'RT
Name of Project:	BURKE CREEK & COSSATOT RELIEF		
County:	Code: 66	Name:	SEVIER
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20132356	AASHTO Class:	A-4(0)
Sample ID:	RV932 (#2)	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	3.96
Middle	3.95
Bottom	3.95
Average	3.95
Membrane Thickness (in):	0.00
Height of Specimen, Cap and Base (in):	8.02
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.02
Initial Area, Ao (sq. in):	12.27
Initial Volume, AoLo (cu. in):	98.44

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3249.00
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4. Soil Properties:

Optimum Moisture Content (%):	11.4
Maximum Dry Density (pcf):	116.2
95% of MDD (pcf):	110.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3249.00
Compaction Moisture content (%):	11.6
Compaction Wet Density (pcf):	125.75
Compaction Dry Density (pcf):	112.68
Moisture Content After Mr Test (%):	11.5

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

#VALUE!

7. Resilient Modulus, Mr:

9247(Sc)^{-0.14015}(S3)^{-0.38969}

8. Comments

9. Tested By:

DEB

Date: June 6, 2013

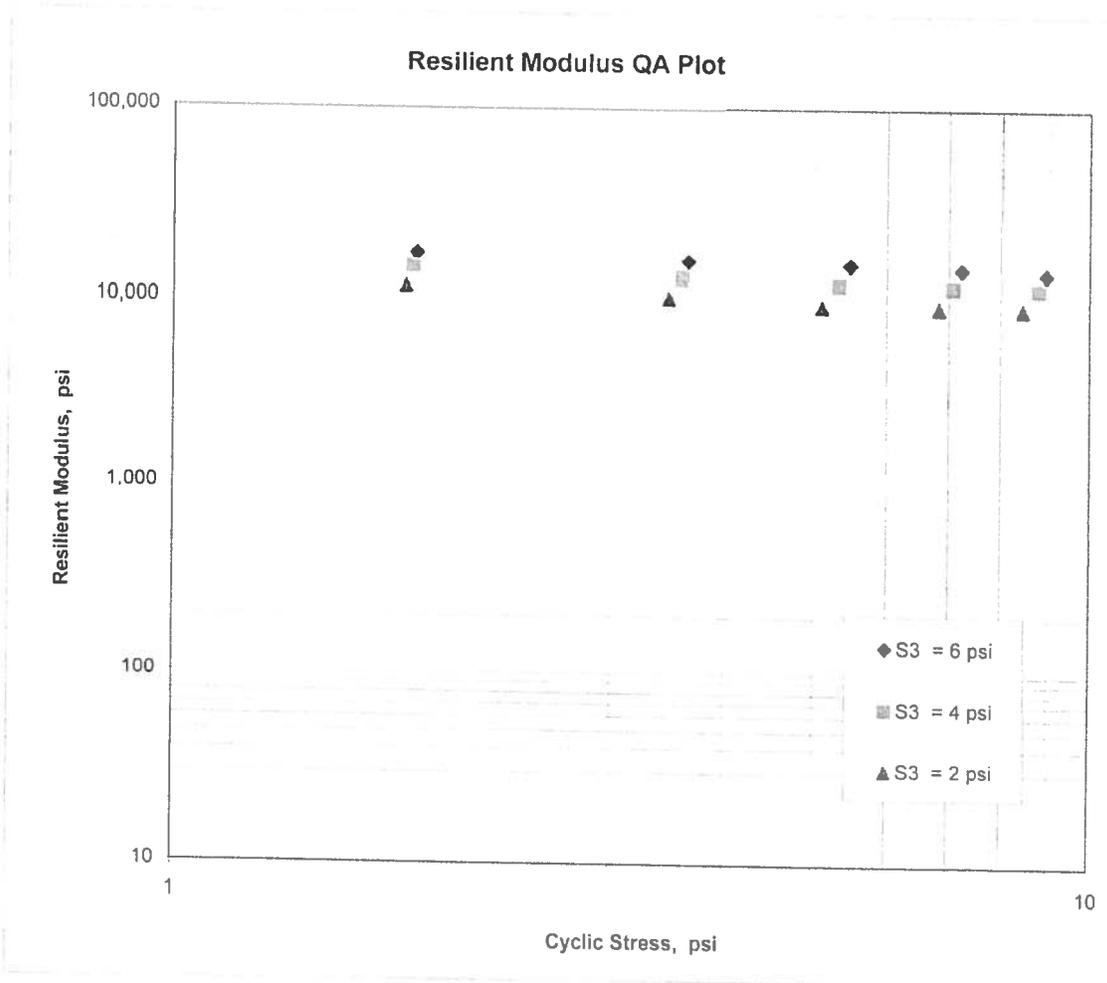
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	030428	Material Code	SSRVPS
Date Sampled:	06/06/13	Station No.:	107+00
Date Tested:	June 6, 2013	Location:	33'RT
Name of Project:	BURKE CREEK & COSSATOT RELIEF		
County:	Code: 66	Name:	SEVIER
Sampled By:	FAULKNER		
Lab No.:	20132356	Depth:	0-5
Sample ID:	RV932 (#2)	AASHTO Class:	A-4(0)
LATITUDE:		Material Type (1 or 2):	2
		LONGITUDE:	

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

K1 =	<u>9,247</u>
K2 =	<u>-0.14015</u>
K5 =	<u>0.38969</u>
R ² =	<u>0.99</u>



ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

August 7, 2015

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 030428
Burke Creek and Cossatot Relief Strs. & Apprs. (S)
Route 71, Section 6
Sevier County

Transmitted herewith is a brief summary of the geology and site conditions, D50 analysis test results, unconfined compressive strength test results, and logs of the rotary wash borings conducted for the structures and approaches of the above job. 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.

It is anticipated the bridge ends will be founded on piling and the interior bents will be founded on drilled shafts. It is recommended that the shafts be designed for side resistance, based on the values provided in Table 1. No recommendation for tip resistance was made due to the extreme variability of the underlying soil and rock strata and the inability to obtain a boring at Bent 2.

Table 1- Side Resistance Recommendation for Drilled Shafts

Foundation Description	Nominal Side Resistance (ksf)	Resistance Factor	Factored Side Resistance (ksf)
Drilled Shaft	10.2	0.55	5.6

If you have any questions about this information or recommendations please feel free to contact the Geotechnical Section.


Michael C. Benson
Materials Engineer

MCB:rpt:mlg

cc: State Construction Engineer - Master File Copy
District 3 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS

Job No. 030428

Burke Creek and Cossatot Relief Strs. & Apprs. (S)

Sevier County

Route 71 Section 6

Site Conditions

The existing bridge over Burke Creek is a four span bridge. The bridge is constructed of concrete deck supported by 5 sets of steel beams with concrete wall bents on spread footings. The end bents are constructed of concrete supported by piling. The guardrail is constructed of concrete on the bridge and steel leading up to the bridge. A telecommunication line parallels the right side of the bridge. It is located overhead crossing the channel and buried up- and down-station from the bridge. There is a pipeline crossing over the channel approximately 150 feet to the left of the existing bridge.

The channel is heavily lined with trees. The area around the channel on the right side of the bridge consists of scrubland. The area on the left side of the bridge on the up-station side of the channel is pastureland, and the down-station side consists of a wooded area and scrubland.

Site Geology

The project alignment is located over sediment mapped as alluvial deposits (map symbols Qal). The alluvial sediment has been deposited by present streams and includes gravels, sands, silts, clays, and mixtures of any and all of these clastic materials. Depth to bedrock at the bridge ranges from 11.5 to 29.0 feet below ground level (bgl) (ranging in elevation from 332.2 to 336.7 feet above MSL).

The De Queen Formation varies in thickness from 0 to 100 feet and represents the middle part of the Trinity Group in Arkansas. The De Queen is composed of interbedded green and gray calcareous clay, limestone, gypsum, and celestine. The limestones are thin-bedded and sandy, but crystalline and fossiliferous intervals are present.

Gypsum is a soft calcium sulfate mineral (none was encountered during the subsurface investigation). Celestine, also known as celestite, is a strontium sulfate mineral which was found in abundance at the job site. Celestine has a similar hardness to calcite (the mineral that makes up limestone), but has a higher specific gravity than calcite.

The De Queen Formation overlies a sandstone formation referred to as the Holly Creek Formation in Oklahoma. The Holly Creek is described as being composed of lenticular beds of gravel, clay, and sandy clay in Oklahoma. The Holly Creek ranges in thickness from 30 to 100 feet in its outcrop area. The formation at the job site is composed of clayey sand. The Holly Creek was encountered in borings at depths ranging from 61.4 to 79.4 feet bgl (ranging in elevation from 282.3 to 287.5 feet above MSL)

Subsurface Conditions

Based on the results of the borings, the subsurface stratigraphy may be generalized as follows:

- 0 to 11.5 Feet: Consists of moist, soft to very hard, reddish brown **sandy clay to sandy clay with gravel**.
- 11.5 to 28.8 Feet: Varies from soil consisting of moist to wet, very soft to very stiff, gray **clay to reddish brown sandy clay to sandy clay with gravel** to rock consisting primarily of **alternating beds** of hard, gray **limestone** and medium hard, gray **claystone** with **occasional beds** of cemented, gray, **calcareous sandstone**.
- 28.8 to 61.4 Feet: Varies from hard, gray **limestone interbedded with claystone and celestine seams and layers** to medium hard, gray **claystone with limestone seams and layers**. Some zones have an **occasional layer of sandstone**. Also some zones contain **occasional to frequent layers of celestine**.
- 61.4 to 79.4 Feet: Varies from hard, gray **limestone interbedded with claystone seams and layers** to medium hard, gray **claystone with limestone seams and layers** to cemented, reddish brown to gray, **clayey sandstone**.
- 79.4 to 93.2 Feet: Consists of cemented, reddish brown to gray, **clayey sandstone**.

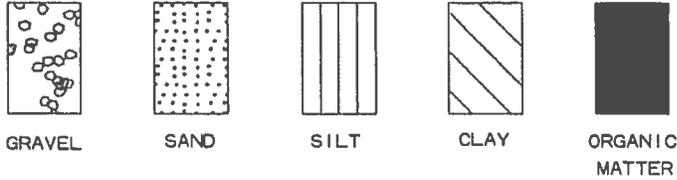
**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

Job No. 030428					
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Burke Creek	118+61	Creek Bank	38' Rt. C.L. Construction	NA	Less Than 0.0029

LEGEND

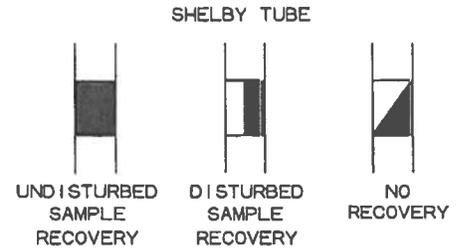
SOIL TYPES

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



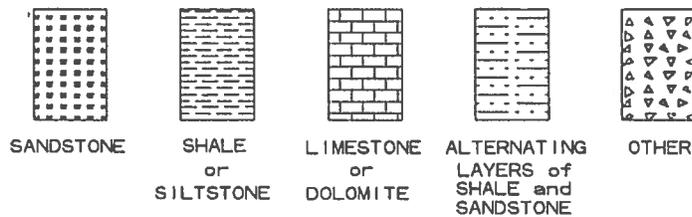
SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)



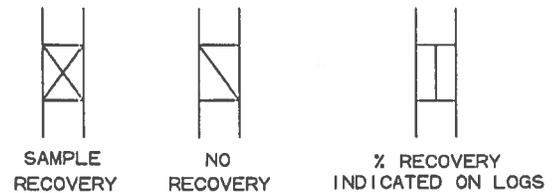
ROCK TYPES

(SHOWN IN SYMBOL COLUMN)



SPLIT SPOON

ROCK CORING



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.

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.	BORING NO. 1 PAGE 1 OF 3
JOB NO. 030428 Sevier County	DATE: January 12-13, 2015
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs. U.S. 71	TYPE OF DRILLING: Hollow Stem Auger &
STATION: 117+32	EQUIPMENT: CME 850 w/ CME Automatic
LOCATION: 5' Left of Center Line of Construction	HAMMER CORRECTION FACTOR: 1.23
LOGGED BY: Tracy Henderson	

COMPLETION DEPTH: 98.4

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.	% S C R	% R O D
SURFACE ELEVATION: 363.2												
5		X	Moist, Medium Stiff, Reddish Brown Sandy Clay with Gravel							3 4-3		
10		X	Moist, Soft, Reddish Brown Sandy Clay with Gravel							0 1-2		
15		X	Moist, Very Soft, Gray Clay							1 0-0		
20		X	Moist, Stiff, Reddish Brown Clay with Sand with Trace of Gravel							1 6-8		
25		X	Moist to Wet, Very Stiff, Reddish Brown Sandy Clay with Gravel							2 11-16		
30			Limestone							30 (1")		
			Hard, Gray, Slightly Weathered Limestone with occasional Clay Layers								84	27
35												

REMARKS:

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

BORING NO. 1
PAGE 2 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 117+32
LOCATION: 5' Left of Center Line of Construction
LOGGED BY: Tracy Henderson

DATE: January 12-13, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 98.4

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.	% S C R	% R Q D
			SURFACE ELEVATION: 363.2									
			Hard, Gray, Slightly Weathered Limestone with occasional Clay Seams and Layers								100	47
40			Medium Hard, Light Gray Claystone								46	0
45			Medium Hard, Light Gray Limestone Interbedded with Medium Hard, Claystone with occasional Layers of Sandstone								72	10
50											50	28
55			Medium Hard, Dark Gray Claystone								100	0
60			Hard, Light Gray Limestone Interbedded with Medium Hard Claystone with frequent Layers of Celestite								66	36
65											100	11
70												

REMARKS:

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

BORING NO. 1
PAGE 3 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 117+32
LOCATION: 5' Left of Center Line of Construction
LOGGED BY: Tracy Henderson

DATE: January 12-13, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 98.4

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.	% S C R	% R Q D
			SURFACE ELEVATION: 363.2									
75			Medium Hard, Gray Claystone with frequent Limestone Layers								78	0
											100	0
80			CLAYEY SANDSTONE - Reddish Brown to Gray, Thick Bedded, Poorly-Cemented to Cemented, Slightly Calcareous, with Slight Dip								100	61
85											90	41
90											24	8
95											92	71
100			Boring Terminated									
105												

REMARKS:

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

BORING NO. 2
PAGE 1 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 118+78
LOCATION: 39' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: January 21, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 78.8

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.	% S C R	% R Q D
			SURFACE ELEVATION: 343.7									
5			Moist, Soft, Reddish Brown Sandy Clay							2 2-2		
10			Moist, Very Hard, Reddish Brown Sandy Clay with Gravel							2 60 (1")		
			Hard, Gray Limestone with Clay Seams								87	22
15			Medium Hard, Gray Claystone with occasional Layers of Limestone								36	0
20			Cemented, Gray, Clayey Sandstone Interbedded with Limestone with frequent Clay Seams and Layers								56	18
25			Cemented, Gray, Calcareous Sandstone Interbedded Limestone and Claystone								60	18
30			Cemented, Gray, Calcareous Sandstone Interbedded with Limestone and Claystone								90	18
35												

REMARKS:

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

BORING NO. 2
PAGE 2 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 118+78
LOCATION: 39' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: January 21, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 78.8

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.	% S C R	% R Q D
			SURFACE ELEVATION: 343.7									
			Medium Hard, Gray Claystone Interbedded with Limestone, and Celestite								100	0
40			Medium Hard, Gray Claystone								98	44
			Hard, Gray Limestone and Celestite Interbedded									
45			Medium Hard, Gray Claystone with frequent Layers of Limestone and Celestite								100	0
50			Medium Hard, Claystone with occassional Limestone Layers								100	0
55			Medium Hard, Claystone with occassional Limestone Layers								86	0
60			Medium Hard, Claystone with occassional Limestone Layers								86	56
65											88	58
70												

REMARKS:

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

BORING NO. 2
PAGE 3 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 118+78
LOCATION: 39' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: January 21, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 78.8

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.	% S C R	% R Q D
			SURFACE ELEVATION: 343.7									
	[Pattern]		CLAYEY SANDSTONE - Reddish Brown to Gray, Thick Bedded, Poorly-Cemented to Cemented, Slightly Calcareous, with Slight Dip								98	56
75												
			Boring Terminated								100	98
80												
85												
90												
95												
100												
105												

REMARKS:

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.		BORING NO. 3
		PAGE 1 OF 3
JOB NO. 030428	Sevier County	DATE: January 14, 2015
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs. U.S. 71		TYPE OF DRILLING: Hollow Stem Auger &
STATION: 119+56		EQUIPMENT: CME 850 w/ CME Automatic
LOCATION: 4' Left of Center Line of Construction		HAMMER CORRECTION FACTOR: 1.23
LOGGED BY: David Allen		

COMPLETION DEPTH: 93.2

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 Q D
			SURFACE ELEVATION: 363.4									
5		X	Moist, Soft, Reddish Brown Clay with Sand							0 0-2		
10		X								1 2-2		
15		X								0 5-5		
20		X	Moist, Stiff, Reddish Brown Clay with Sand							3 5-6		
25		X	Moist, Very Stiff, Reddish Brown Gravelly Clay with Sand							4 6-12		
			Limestone									
30			Limestone with frequent Clay Seams and Layers							60 (2")	100	57
35												

REMARKS:

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

BORING NO. 3
PAGE 2 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 119+56
LOCATION: 4' Left of Center Line of Construction
LOGGED BY: David Allen

DATE: January 14, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 93.2

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 Q D
			SURFACE ELEVATION: 363.4									
			Medium Hard, Gray Claystone								60	0
40			Hard, Gray Limestone Interbedded with Medium Hard, Gray Claystone								70	18
45			Hard, Gray Limestone with frequent Layers of Claystone								52	20
50			Medium Hard, Gray Claystone Interbedded with well-cemented, calcareous Sandstone								100	8
55			Hard, Gray Limestone Interbedded with Medium Hard, Gray Claystone and Celestite								96	10
60			Hard, Gray Limestone								100	36
65			Medium Hard, Gray Claystone with frequent Layers of Limestone and Celestite								88	0
70												

REMARKS:

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

BORING NO. 3
PAGE 3 OF 3

JOB NO. 030428 Sevier County
JOB NAME: Burke Creek & Cossatot Relief Strs. & Apprs.
U.S. 71
STATION: 119+56
LOCATION: 4' Left of Center Line of Construction
LOGGED BY: David Allen

DATE: January 14, 2015
TYPE OF DRILLING: Hollow Stem Auger &
EQUIPMENT: CME 850 w/ CME Automatic
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 93.2

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 Q D
			SURFACE ELEVATION: 363.4									
			Medium Hard, Gray Claystone with occasional Layers of Limestone								80	0
75			Medium Hard, Gray Claystone with frequent Layers of Limestone								86	45
			CLAYEY SANDSTONE - Reddish Brown to Gray, Thick Bedded, Poorly-Cemented to Cemented, Slightly Calcareous								60	30
80											98	24
85			CLAYEY SANDSTONE - Reddish Brown to Gray, Thick Bedded, Poorly-Cemented to Cemented, Slightly Calcareous								98	67
90												
95			Boring Terminated									
100												
105												

REMARKS: