ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO.	BR3714	
FEDERAL AID PROJECT NO.	STPB-0037(33)	
	LITTLE BODCAU CREEK STR. & APPRS. (S)	
COUNTY ROAD NO.	CR 25	
IN	LAFAYETTE	COUNTY

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

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

October 6, 2016

TO:

Mr. Rick Ellis, Bridge Engineer

SUBJECT:

Job No. BR3714

Little Bodcaw Creek Str. & Apprs. (S)

County Road 25 Lafayette County

Transmitted herewith are a brief summary of the geology and site conditions, 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.

It is anticipated that concrete piling will be utilized at all bents. 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 3 Engineer

G.C. File

GEOLOGY AND SITE CONDITIONS Job No. BR3714

Little Bodcaw Creek Str. & Apprs. (S) **Lafayette County**

County Road 25

Site Conditions

The existing bridge is a single span bridge that crosses over Little Bodcaw Creek. The main structure of the bridge consists of two rail cars covered by dirt and gravel. At the time of inspection the bridge contained both patched and unpatched holes in the decking. The bridge embankments are supported by concrete and rusted sheet metal held in place by timber pilings. There are timber pilings from a previous bridge under the existing bridge in the channel. There are no guardrails leading up to the bridge and the guardrails over the bridge consist of steel piping. Little Bodcaw is a black water creek that flows west to east under the bridge and is part of the Bodcaw Bottoms Watershed. particular section of the creek runs through a recently harvested pine plantation and multiple oil well pads exist to the north. Overhead powerlines and an underground telecommunication line parallel the east side of the bridge.

Site Geology

The project is located over Quaternary alluvial deposits (map symbol Qal). These are typically river deposits composed of gravels, sands, silts, clays, and mixtures of any and all of these. These alluvial deposits are located over the Cane River member of the Claiborne Group (map symbol Tc). Cane River Claiborne deposits are Tertiary in age and consist of locally lignitic sand, silt ,and clay with occasional glauconitic sand, ironstone layers, and interbedded sand in updip areas. The contact between the Quaternary alluvial deposits and the underlying Claiborne Group is an erosional surface and was encountered in borings at approximately 40' below ground level (bgl) during the subsurface investigation. The thickness of the Claiborne ranges from a thin edge to as much as 1,500 feet. At the project location, a cemented sandstone layer was encountered in two of the borings at approximately 50 feet bgl.

Subsurface Conditions

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

0 to 40 Feet:*

Varies from moist to wet, very loose to medium dense, brown to gray sand to

clayey sand with occasional gravel.

40 to 75 Feet:**

Varies from moist, dense to very dense, dark brown silty and clayey sand to

moist, very hard sandy clay with lignite and some gravel.

75 to 94 Feet:

Consists of moist, very dense, dark brown to gray silty to clayey sand with

some cemented seams to moist, hard to very hard, sandy clay with lignite.

94 to 101.2 Feet:

Varies from moist, very dense, dark brown to gray sand to moist, very hard, dark

brown sandy lignitic clay.

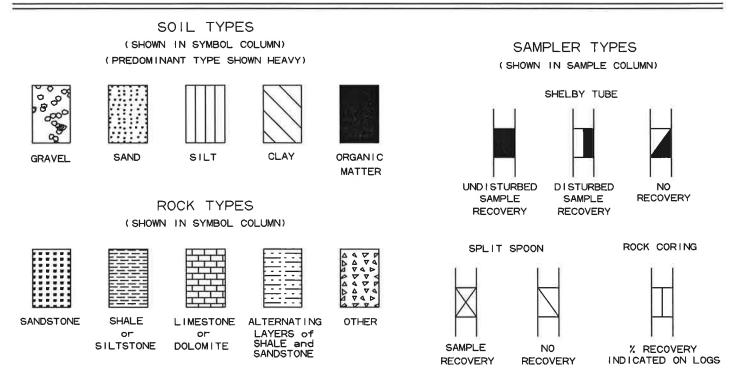
Cemented sandstone was encountered in borings 1 and 4 at approximately 50 feet (bgl).

Sampler advanced by the static weight of the hammer 1.5 feet.

D₅₀ AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

		Job No.	BR3714		
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Little Bodcaw Creek	101+58	Creek Bank	9' Lt. C.L. Construction	N/A	0.0041

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TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANU	LAR SOIL		CLAY	CL/	Y-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	0ver 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than	2'
0ver 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetrati	on
1		31-60	Hard	31-60	Hard	in 60 Blow	ws: Medium Hard
		0ver 60	Very Hard	0ver 60	Very Hard	Less than	2'
						Penetrati	on
						in 60 Blow	wsı 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.
- 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: $\frac{6}{8-9} \Rightarrow 8+9=17 blows/ft$. The "N" Value corrected to 60% efficiency (N₆₀) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

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 95			Moist, Very Dense, Dark Brown Sand							30 48-9 (6"	50		
		X	Moist, Very Hard, Dark Brown Lignitic Clay							25 39-4	40		
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ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC. JOB NO. BR3714 Lafayette County JOB NAME: Little Bodcaw Creek Str. & Apprs. (S)						10. 3							
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P	м	М	DESCRIPTION OF MATERIAL	SOIL				E	F	WS	- 1	%	%
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FT,	L	s	SURFACE ELEVATION: 262.8		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.		
					1		ДН	п		10	_		
	$\backslash \backslash$	\triangle								24-			
			Moist, Very Hard, Dark Gray Sandy Clay with										
			Trace Gravel										
75													
		X								40			
										60	$\sum_{i=1}^{n}$		
			Moist, Very Dense, Gray Silty Sand with							(5'	'		
			Cemented Seams										
80													
		\bigvee								15	5		
		\hookrightarrow								37-6			
			Moist, Very Dense, Dark Brown Silty Sand							(10	''		
			and start and st										
 85											- 1		
	777	\bigvee								19			
	1999	\hookrightarrow								27-6 (11	06		
			Moist, Very Dense, Dark Brown Clayey Sand							(11	' l		
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90	11/1												
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		\triangle								26-4	45		
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95		- 1											
		∇	Moist, Very Hard, Dark Brown Sandy Clay							17	.		
		\triangle								30-5	56		
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100	//												
		\times	Moist, Very Dense, Dark Brown Sand							60 (5"	1	_	
			Boring Terminated							(5"			
=													
105													
REM/	RKS	: '						_					-
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ARKANSAS HWY. & TRANS. DEPARTMENT						BORING NO. 4									
MATERIALS DIVISION - GEOTECHNICAL SEC. JOB NO. BR3714 Lafavette County						PAGE 1 OF 3									
						DATE: September 13 and 14, 2016									
100 M	JOB NAME: Little Bodcaw Creek Str. & Apprs. (S) Co. Rd. No. 25						TYPE OF DRILLING:								
GT (TYO) 407.00						Hollow Stem Auger - Rotary Wash									
LOCATION: 8' Left of Construction Centerline					EQUIPMENT: CME 750										
			Raymond Taylor		ITAMA	(ED (Chne	771/1	TEAC)TOD		1.00			
			N DEPTH: 101.5		HAMI	AEK (CORREC	TION	YFAC	JIUK;		1.23			
D		s							_						
E	S Y	Ā							72						
Р	M	М	DESCRIPTION OF MATERIAL	COM					FT.	WS		%	%		
I I	В	P		SOIL GROUP		, :		<u> </u>	CC			T C	R Q		
Н	0	E			T	OIS	ایوا	WE	PER)FB	Z	R	Ď		
FT.	L	S	SURFACE ELEVATION: 260.8		PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.				
	11.11		7514716E EEEV711614. 200.0		T T	%	77	Q		Z	<u> </u>				
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 5			Wet, Very Loose, Brown Clayey Sand with												
5	999	Х	Some Gravel							2-					
	111										۱ ۱				
-,-	777	_									- 1				
10		Х								3 4-			21		
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15		_	Wet, Loose, Brown Sand							_					
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20															
		XI								6-6					
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			Wet, Medium Dense, Gray Sand												
25															
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			Wet, Very Loose, Gray Sand												
30															
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]	.::.:¥									24-2	22				
			Wet, Dense, Brown Sand												
35															
REMA	RKS										4_		_		
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ARKANSAS HWY. & TRANS. DEPARTMENT MATERIAL S DIVISION - GEOTECHNICAL SEC BORING NO. 4 PAGE 2 OF 2														
MATERIALS DIVISION - GEOTECHNICAL SEC. JOB NO. BR3714 Lafayette County					PAGE 2 OF 3									
JOB NAME: Little Bodcaw Creek Str. & Apprs. (S)						DATE: September 13 and 14, 2016								
Co. Rd. No. 25						TYPE OF DRILLING: Hollow Stem Auger - Rotary Wash								
STAT	ION:		107+63		EQUI			6		ME 750	aon	- 1		
LOCA			8' Left of Construction Centerline									- 1		
			aymond Taylor		HAMI	AER (CORRE	CTION	V FAC	CTOR:	1.23			
	PLET		DEPTH: 101.5	r										
D E	s	S A												
P	Y M	м	DESCRIPTION OF MATERIAL					ь	Ę.	WS	%	%		
I T	B	Р	DEGORII HON OF WATERIAL	SOIL GROUP	ļ.,	ی		IGH	S	. [0]	T C	R Q		
Н	ō	L E		011001	STIC	OIST	E L	WE	PER	OF B	R	Ď		
FT.	L		SURFACE ELEVATION: 260.8		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS PER 6-IN.				
	J99 [J	∇				- 0 -				6		\neg		
	50	\triangle								13-18		- 1		
	96. g		Moist, Dense, Dark Brown Silty Sand with Gravel											
			Slavei											
40	ob													
_ =		Χ								12 23-23				
			M : 1 5							20 20				
			Moist, Dense, Silty Sand with Some Gravel											
<u> </u>												- 1		
45		abla								29		- 1		
		Д	Moist, Very Dense, Silty Sand with Some							48-60		- 1		
			Lignite									- 1		
												- 1		
50			Cemented Sand									- 1		
		\bigvee								22		- 1		
		\hookrightarrow	Moist, Very Dense, Dark Brown Sand with							38-54				
			Lignite									- 1		
												- 1		
55			-							22				
<u> </u>		X								23 28-33				
— -			Moist, Very Dense, Dark Brown Sand with							34				
-			Lignite and Some Clay											
60										20		- 1		
		\triangle								33-52				
												- 1		
65			Moist, Very Dense, Dark Brown Sand with Clay									- 1		
		\bigvee	and Lignite							21				
		\hookrightarrow								28-41				
	88											- 1		
70														
REM/	ARKS	:												

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.					BORING NO. 4 PAGE 3 OF 3									
JOB NO. BR3714 Lafayette County						DATE: September 13 and 14, 2016								
JOB NAME: Little Bodcaw Creek Str. & Apprs. (S) Co. Rd. No. 25						TYPE OF DRILLING:								
STAT	ION:	107+63		Hollow Stem Auger - Rotary Wash EQUIPMENT: CME 750										
LOCA			8' Left of Construction Centerline		LQUII	WILIT	1.		<u> </u>	IVIL 750				
		_	Raymond Taylor		HAMN	IER (CORRE	CTION	V FAC	CTOR:	1.23			
	PLET	$\overline{}$	DEPTH: 101.5											
D E P T H	SYMBO∟	のAMPLm	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		
FT.		S	SURFACE ELEVATION: 260.8		PL	1 %	H	DR	LB	NO PER		, ,		
		\times	Moist, Very Dense, Dark Brown Silty Sand							20 60 (5")				
 		\times	Moist, Very Dense, Dark Brown Sand with Clay and Lignite							17 41-60 (8")				
		X	Moist, Hard, Dark Brown Sandy Clay		is a					21 27-30				
		X								20 49-58				
90 		X	Moist, Very Hard, Dark Brown Sandy Clay with Lignite							22 26-38				
95 			Moist, Very Dense, Dark Brown Sand							60 (2")				
100		X	Paring Torminated							17 17-50				
105 REM/	ARKS	- P	Boring Terminated				ļ							