ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO.		100842									
FEDERAL AID PROJECT NO. NHPP-0011(44)											
LI	TTLE CACHE R	IVER DITCH STR. & APP	RS. (S)								
STATE HIGHWAY	141	SECTION	6								
IN		CLAY	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 DEPARTMENT OF TRANSPORTATION

ARDOT.gov | IDriveArkansas.com | Scott E. Bennett, P.E., Director

MATERIALS DIVISION

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

December 12, 2018

TO:

Mr. Rick Ellis, Bridge Engineer

SUBJECT:

Job No. 100842

Little Cache River Ditch Str. & Apprs. (S)

Clay County

Route 141 Section 6

Transmitted herewith are a brief summary of the geology and site conditions, summary of percent material passing #200 sieve and Atterberg Limits test results (for liquefaction susceptibility analysis), D50 scour analysis, 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.

This project consists of replacing the Highway 141 Bridge, over the Little Cache River Ditch, around McDougal. The new bridge will be constructed on the existing alignment and a temporary detour bridge will be constructed to the east of the existing, to maintain traffic during construction. Two of the five requested borings for the proposed bridge were inaccessible due to steep slopes and high water levels in the channel. No borings were performed in the vicinity of the temporary detour bridge, due to conflicts with utilities and high water levels in the channel. The five borings that were not obtained were located at: 105+64 20' RT of C.L. Construction, 105+70 C.L. Temporary Bridge, and 106+70 C.L. Temporary Bridge. The two borings that were obtained had to be offset, due to traffic restrictions. The obtained borings are anticipated to represent uniform site conditions and should be adequate to design the proposed concrete filled shell pile foundations.

Embankment analyses included global stability with seismic design consideration utilizing a horizontal acceleration coefficient of 0.487, as provided by Bridge Design. It is assumed that the operational classification for this bridge is "other", as defined in Section 3.10.5 of the AASHTO LRFD Bridge Design Specification, Seventh Edition, 2014. Since this is not a "critical" or "essential" bridge the large expense and additional time associated with removing existing embankments and reconstructing reinforced embankments with significant ground improvement, to satisfy seismic consideration, is not recommended. Embankment displacement is expected to occur in a large seismic event. The proposed embankment configuration provides for a satisfactory Factor of Safety for static conditions. 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 10 Engineer

G.C. File



ARKANSAS DEPARTMENT OF TRANSPORTATION

ARDOT.gov | IDriveArkansas.com | Scott E. Bennett, P.E., Director

MATERIALS DIVISION

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

September 20, 2017

TO:

Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT:

Job No. 100842

Little Cache River Ditch Strs. & Apprs. (S)

Route 141 Section 6

Clay 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 bridge crossing the Little Cache River Ditch on Highway 141. Samples were obtained in the existing travel lanes and ditch line.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of low plasticity clayey sands with varying amounts of gravel. The construction grade line is approximately four feet above the existing roadway; cross sections are not currently available. The subgrade soils are expected to provide a stable working platform with conventional processing, if the weather is favorable during construction. If embankment is to be placed within the existing ditch line the soft unstable organic material will need to be undercut prior to construction (anticipated to be no more than two feet). The undercut and embankment may be constructed with locally available unspecified material.

Additional earthwork recommendations will be made upon request when plans are further developed and cross sections are 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 Pocahontas.

2. Asphalt Concrete Hot Mix

riopriale delitorate riot i		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	4.1	95.9
Base Course	3.9	_~ 96.1

Michael C. Berison Materials Engineer

MCB:pt:bjj Attachment

cc: State Constr. Eng. – Master File Copy

District 9 Engineer

System Information and Research 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 - 09/05/2017 SEQUENCE NO. - 1

MATERIAL CODE - SSRV JOB NUMBER - 100842

SPEC. YEAR - 2014

SUPPLIER ID. - 1

COUNTY/STATE = 11

DISTRICT NO. - 10

JOB NAME - LITTLE CACHE RIVER DITCH STR. & APPRS. (S)

STATION LIMITS R-VALUE AT 240 psi

12 BEGIN JOB - END JOB

RESILIENT MODULUS

STA. 104+30 6353

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. Date Sampled: Date Tested: Name of Project:	100842 8/2/2017 August 31, 2017 Little Cache River Ditch STR. & APPR. (S)	Material Code Station No.: Location:	SSRVPS 104+30 23'RT
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code: 11 Name: CLAY Thornton/Bates 20172568 RV529	Depth: AASHTO Class: Material Type (1 or 2): LONGITUDE:	0-5 A-6(3) 2
1. Testing Inform			
	Preconditioning - Permanent Strain > 5% (Y= Testing - Permanent Strain > 5% (Y=Yes or N Number of Load Sequences Completed (0-15	I=No)	N N 15
2. Specimen Info	ormation:		
Soil Specimer Soil Propertie	Specimen Diameter (in): Top Middle Bottom Average Membrane Thickness (in): Height of Specimen, Cap and Base (in): Height of Cap and Base (in): Initial Length, Lo (in): Initial Area, Ao (sq. in): Initial Volume, AoLo (cu. in): Weight: Weight of Wet Soil Used (g):		3.95 3.94 3.94 3.94 0.01 8.02 0.00 8.02 12.14 97.35
	95% of MDD (pcf):		109.6
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	nartias:		
o. opecimen Pro	Wet Weight (g): Compaction Moisture content (%): Compaction Wet Density (pcf): Compaction Dry Density (pcf): Moisture Content After Mr Test (%):		3255.20 13.3 127.40 112.45 13.2
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod 8. Comments			c)^-0.21106(S3)^0.37276
o. Comments	38		
9. Tested By:	B.H.	Date: August 31, 2017	

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

SSRVPS

104+30 23'RT Material Code Station No.: Location: Little Cache River Ditch STR. & APPR. (S) August 31, 2017 8/2/2017 100842 Name of Project: Date Sampled: Date Tested: Job No.

CLAY Name: Code: 11 County:

Thornton/Bates 20172568 RV529 Sampled By: Sample ID: Lab No.:

LATITUDE:

Material Type (1 or 2): 2 LONGITIME

LONGITUDE:

0-5

Depth:

	_	_	_				_	_		_							_	_	_		_
Resilient	Modulus				Mr	psi	12,906	11,975	10,875	9,598	8,822	10,632	9,546	8,680	8,149	7,853	8,612	7,468	6,878	6,558	6,353
Resilient	Strain				3	in/in	0.00014	0.00031	0.00050	0.00075	0.00101	0.00017	0.00038	0.00062	0.00087	0.00113	0.00021	0.00047	0.00076	0.00106	0.00136
Average	Recov Def.	LVDT 1	and 2		Havg	.⊑	0.00114	0.00246	0.00403	0.00601	0.00810	0.00138	0.00305	0.00497	0.00700	0.00907	0.00169	0.00381	0.00611	0.00849	0.01092
Actual	Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	9.0	0.2	0.2	0.2	0.3	0.5
Actual	Applied	Cyclic	Stress		S _{cyclic}	psi	1.8	3.7	5.5	7.2	8.9	1.8	3.6	5.4	7.1	8.9	1.8	3.5	5.2	6.9	8.6
Actual	Applied	Мах.	Axial	Stress	S _{max}	psi	2.1	3.9	5.8	7.7	9.6	2.1	3.9	5.6	7.5	9.5	2.0	3.8	5.5	7.3	9.2
Actual	Applied	Contact	Load		Pcontact	sql	2.8	2.8	3.6	0.9	8.4	2.8	2.8	2.7	5.1	7.4	2.7	2.7	2.7	4.2	6.6
Actual	Applied	Cyclic Load			P _{cyclic}	sql	22.3	44.5	66.3	87.4	108.1	22.2	44.1	65.3	86.4	107.8	22.0	43.0	63.6	84.3	105.0
Actual	Applied	Max. Axial	Load		P _{max}	sql	25.1	47.3	6.69	93.4	116.6	24.9	46.8	68.0	91.4	115.2	24.7	45.8	66.3	88.4	111.6
Nominal	Maximum	Axial	Stress		Scyclic	psi	2.0	4.0	0.9	8.0	10.0	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber	Confining	Pressure			လိ	psi	6.0	0.9	0.9	6.0	6.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
		PARAMETER			DESIGNATION	UNIT	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

August 31, 2017	
DATE	DATE
B.H.	
TESTED BY	EVIEWED BY

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

Job No.

100842

Material Code SSRVPS

Date Sampled:

8/2/2017

Station No.: 104+30

Date Tested:

Name of Project: Little Cache River Ditch STR. & APPR. (S)

August 31, 2017

Location: 23'RT

County:

Code: 11

Name: CLAY

Sampled By:

Thornton/Bates

Depth: 0-5

Lab No.:

20172568

AASHTO Class: A-6(3)

Sample ID:

RV529

Material Type (1 or 2): 2

LATITUDE:

LONGITUDE:

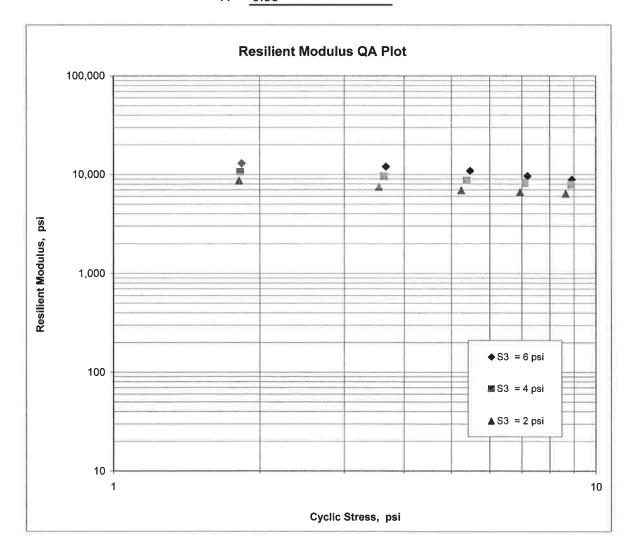
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

K1 = 7,532

K2 = -0.21106

K5 = 0.37276

 $R^2 = 0.98$



JOB NAME: LITTLE CACHE RIVER DITCH STR. & APPRS. (S)

Materials Division

COUNTY NO. 11 DATE TESTED

9/5/2017

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	<i>LAB</i> #:	%MOISTURE
104+30	23 RT	0-5	BR/GR	84	77	67	54	E S 42	30	17	A-6(3)	RV529	
102+00	06 RT	0-5	BROWN	92	89	86	69	56	22	09	A-4(2)	S525	13.6
102+00	18 RT	0-5	BROWN	99	99	98	67	45	ND	NP	A-4(0)	S526	17.3
110+00	06 LT	0-5	GRAY	97	93	88	81	64	28	15	A-6(7)	S527	15
110+00	18 LT	0-5	BR/GR	96	93	84	72	48	24	09	A-4(1)	S528	20.9

DATE TESTED

9/5/2017

Arkansas State Highway Transporation Department

Materials Division

 $JOB\ NAME$: LITTLE CACHE RIVER DITCH STR. & APPRS. (S)

COUNTY NO. 11

100842

JOB:

Michael Benson, Materials Engineer

PAVEMENT SOUNDINGS AGG.BASE CRS CL-7 AGG.BASE CRS CL-7 AGG.BASE CRS CL-7 ACHMBC 1.25X ACHIMBC ACHIMBC 1.25 ACHMSC 2.5W ACHMSC 3.0W ACHIMSC 06 RT 18 RT 06 LT STA.# LOC. 110+00 102+00 102+00

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

MICHAEL BENSON, MATERIALS ENGINEER

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

SPEC. REMARKS - NO SUPPLIER NAME - STANNAME OF PROJECT - L PROJECT ENGINEER - N PIT/QUARRY - ARKAN LOCATION - CLAY, SAMPLED BY - THORNT SAMPLE FROM - TEST	842 BE ASSI L SURVE SPECIFI TE ITTLE C OT APPL SAS COUNTY ON/BATE HOLE	Y SAMPLE CATION CHECK ACHE RIVER DITCH ICABLE S			MATERIAL SPEC. YEA SUPPLIER COUNTY/ST DISTRICT (S) DATE SAM DATE REC DATE TES	ID 1 PATE - 11 NO 10 PLED - 08/02/17 EIVED - 08/03/17
MATERIAL DESC SOI	L SURVE		EME		GS	
3/4	IN IN IN IN	102+00 06 RT 0-5 BROWN 36 25 33.00		102+00 18 RT 0-5 BROWN		20172566 S527 INFORMATION ONLY 110+00 06 LT 0-5 GRAY 36 25 40.50 90 23 21.50
NO.		92 89	-	99	-	97
NO.		86	-	98	=:	88
NO.	80 -	69	177	67	(20)	81
NO.	200 -	56		45		64
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL	- - -	22 09 A-4(2)	-	ND NP A-4(0)	20 20 20 20 20 20 20 20 20 20 20 20 20 2	28 15 A-6(7)
% MOISTURE CONTENT	-	13.6		17.3		15.0
ACHMSC ACHMBC	(IN) -	3.0W 1.25	-		-	2.5W 1.25X
AGG.BASE CRS CL-7	(IN) -	6.0	-		-	7.0
	-		_		_	
	-		_		_	
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	_		_		_	

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

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AASHTO TESTS : T24 T88 T89 T90 T265

5

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

MICHAEL BENSON, MATERIALS ENGINEER

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

SPEC. REMARKS - NO SPECIE SUPPLIER NAME - STATE	SIGNED VEY SAMPLE FICATION CHECK CACHE RIVER DITCH STR. & APPRS. PLICABLE	SEQUENCE NO 2 MATERIAL CODE - SSRVPS SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 11 DISTRICT NO 10 (S) DATE SAMPLED - 08/02/17											
SAMPLED BY - THORNTON/BAY		DATE RECEIVED - 08/03/17											
SAMPLE FROM - TEST HOLE		DATE TESTED - 09/05/17											
MATERIAL DESC SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS													
LAB NUMBER -	20172567	골4											
SAMPLE ID -		w/											
	- INFORMATION ONLY -	-											
	- 110+00	#**											
	- 18 LT	5)											
	- 0-5	₩1											
	- BR/GR	- 1:											
MAT'L TYPE -		<u> </u>											
LATITUDE DEG-MIN-SEC -	- 36 25 40.50 -	*** ##											
LONGITUDE DEG-MIN-SEC -	90 23 21.50												
% PASSING 2 IN													
1 1/2 IN													
3/4 IN		-											
3/8 IN		-											
NO. 4 -	·	-											
NO. 10 -	-	-											
NO. 40 -		-											
NO. 80 -	- 72 -	-											
NO. 200 -	- 48												
LIQUID LIMIT -	- 24	_											
-	- 09	- -											
	- A-4(1)	-											
UNIFIED SOIL -	A 1(1)	-											
% MOISTURE CONTENT -	- 20.9	-											
6 MOIDIONE CONTENT	20.3												
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REMARKS = W=MULTIPLE LAYERS, X=STRIPPED

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AASHTO TESTS : T24 T88 T89 T90 T265

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

MICHAEL BENSON, MATERIALS ENGINEER

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

FEDERAL AID NO. PURPOSE SPEC. REMARKS SUPPLIER NAME NAME OF PROJECT PROJECT ENGINEE PIT/QUARRY -	- SOIL SUR - NO SPECI - STATE - LITTLE R - NOT AP ARKANSAS	VE FI C PL	Y SAMP: CATION ACHE R ICABLE	CHI IVEI		STR. δ	APPRS.	MATERI SPEC. SUPPLI COUNTY DISTRI	ICE NO. AL CODE YEAR ER ID. 7/STATE CT NO.	#: #:	2014 1
	CLAY, COUN THORNTON/BA								SAMPLED RECETVED		08/02/17 08/03/17
SAMPLE FROM -									TESTED		09/05/17
MATERIAL DESC.	- SOIL SUR	VE	Y - RE	SIS	TANCE R-	VALUE	ACTUAL	RESULT	S		
LAB NUMBER		_	20172	568		-			-		
SAMPLE ID		-	RV529			396			360		
TEST STATUS		-			ON ONLY	: #					
STATION		-		0					-		
LOCATION		-				·			-		
DEPTH IN FEET	=		0-5			-			=		
MAT'L COLOR MAT'L TYPE		_	BR/GR			-			-		
LATITUDE DEC	Z_MTN_SEC	_	36	25	34.90	: 			= 2		
LONGITUDE DEC					21.20	1000			-		
% PASSING	2 IN.					.57) 100			₹ 0		
	1 1/2 IN.		100			=			5		
	3/4 IN. 3/8 IN.		100 92			3#1			*		
	NO. 4		84			-5			250		
	NO. 10		77			2			-		
	NO. 40		67			3 4 :			-		
	NO. 80		54			:=:: :=::			-		
			42								
LIQUID LIMIT		_	30			022			=		
PLASTICITY I	NDEX	_				(E)			-		
AASHTO SOIL		-	A-6(3)		100			=:		
UNIFIED SOIL		-				15			2		
% MOISTURE CO	ONTENT	-				-			-		
		_				=			_		
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REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

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AASHTO TESTS : T24 T88 T89 T90 T265

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