**ARKANSAS DEPARTMENT OF TRANSPORTATION** 



# SUBSURFACE INVESTIGATION

STATE JOB NO.		110646			
FEDERAL AID PROJE	CT NO.	NHPP-0048(27)			
CY		( & CANAL STRS. & APP	PRS. (S)		
STATE HIGHWAY	241		1 & 2		
IN	MONROE COU				

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

# ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

### January 31, 2017

# TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 110646 Cypress Creek & Canal Strs. & Apprs. (S) Route 241 Sections 1 & 2 Monroe 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 two bridges on Highway 241. Samples were obtained in the existing travel lanes and ditch line. There were no paved shoulders within the project limits

Based on laboratory results of samples obtained, the subgrade soils consist primarily of moderately to highly plastic clays containing some sand. Cross sections are not currently available, but it is anticipated that the construction grade line will closely match that of the existing roadway. The subgrade soils are expected to provide a stable working platform with normal drying and compactive efforts, if the weather is favorable during construction. If construction must proceed under adverse weather conditions or if a stable working platform cannot be obtained, stabilization with lime is the most appropriate remediation technique. It is recommended that the addition of 4% of lime (by dry weight) mixed to a depth of 16 inches be used for quantity estimation purposed. However, if the Engineer determines that soil stabilization is necessary, field trials or local experience may dictate that a stable working platform can be achieved at a lower lime content.

Additional earthwork requirements will be made upon request when plans are further developed.

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 near Little Rock.
- 2. Asphalt Concrete Hot Mix

Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	4.1	95.9
Base Course	3.9	96.1
	21	1

Michael C. Benson Materials Engineer

MCB:pt:bjj Attachment cc: State Constr. Eng. – Master File Copy District 1 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 = 01/20/2017 SEQUENCE NO. - 1 JOB NUMBER - 110646 MATERIAL CODE - SSRV SPEC. YEAR - 2014 SUPPLIER ID. - 1 COUNTY/STATE - 48

> BEGIN JOB - END JOB LESS THAN 5 RESILIENT MODULUS 109+00 7831

REMARKS =

AASHTO TESTS : T190

## ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

(a)

Job No. Date Sampled: Date Tested: Name of Project:	110646 12/29/2016 January 18, 2017 CYPRESS CREEK & CANAL STRS. & APPRS. (S)	Material Code Station No.: Location:	SSRVPS 109+00 18'RT
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code: 48 Name: MONROE Thornton/CAMPBELI. 20164188 RV546	Depth: AASHTO Class: Material Type (1 or 2): LONGITUDE:	0-5 A-6(12) 2
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=Yes Testing - Permanent Strain > 5% (Y=Yes or N=No Number of Load Sequences Completed (0-15)	,	N N 15
2. Specimen Info	ormation:		
	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):		3.91 3.90 3.91 3.91 0.01 8.04 0.00 8.04 11.91 95.78
3. Soil Specimer	Weight of Wet Soil Used (g):		3065.00
4. Soil Propertie	s:		
	Optimum Moisture Content (%): Maximum Dry Density (pcf): 95% of MDD (pcf): In-Situ Moisture Content (%):		18.0 103.3 98.1 N/A
5. Specimen Pro	perties:		
	Wet Weight (g): Compaction Moisture content (%): Compaction Wet Density (pcf): Compaction Dry Density (pcf): Moisture Content After Mr Test (%):		3065.00 18.4 121.93 102.98 18.9
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	12590(S	c)^-0.27331(S3)^0.17671
8. Comme <b>nts</b>			
9. Tested By:	B.H. G.W. Date	: January 18, 2017	

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES SSRVPS A-6(12)  $109 \div 00$ 18'RT Material Type (1 or 2): 2 AASHTO Class: LONGITUDE: Material Code Station No.: Location: Depth: CYPRESS CREEK & CANAL STRS. & APPRS, (S) MONROE Name: Thornton/CAMPBELL January 18, 2017 Code: 48 2/29/2016 20164188 110646 RV546 Name of Project; Date Sampled: Date Tested: Sampled By: LATITUDE: Sample ID: Lab No.: County: Job No.

Chamber Confining	Nominal Maximum	Actual Applied	Actual Applied	Actual Applied	Actual Applied	Actual Applied	Actual Applied	Average Recov Def.	Resilient Strain	Resilient Modulus
Pressure		Max. Axial	Cyclic Load	Contact	Max	Cyclic	Contact	LVDT 1		
	Stress	Load		Load	Axia/	Stress	Stress	and 2		
					Stress					
လိ	S <sub>cyclic</sub>	Р <sub>тах</sub>	P <sub>cyclic</sub>	Pcontact	S <sub>max</sub>	S <sub>cyclic</sub>	Scontact	H <sub>avg</sub>	ε	Mr
psi	psi	lbs	lbs	lbs	psi	psi	psi	E.	in/in	psi
6.0	2.0	24.7	21.9	2.7	2.1	1.8	0.2	0.00102	0.00013	14,507
6.0	4.0	46.3	43.5	2.8	3.9	3.7	0.2	0.00220	0.00027	13,375
6.0	6.0	67.6	64.2	3.4	5.7	5.4	0.3	0.00364	0.00045	11,895
6.0	8.0	89.1	83.4	5.8	7.5	7.0	0.5	0.00560	0.00070	10,039
6.0	10.0	109.3	101.2	8.1	9.2	8.5	0.7	0.00790	0.00098	8,638
4.0	2.0	24.6	21.9	2.7	2.1	1.8	0.2	0.00116	0.00014	12,697
4.0	4.0	45.9	43,2	2.7	3.8	3.6	0.2	0.00252	0.00031	11,545
4.0	6.0	66.2	63.6	2.7	5.6	5.3	0.2	0.00408	0.00051	10,505
4.0	8.0	87.7	82.9	4.8	7.4	7.0	0.4	0.00594	0.00074	9,414
4.0	10.0	108.5	101.4	7.1	9.1	8.5	0.6	0.00815	0.00101	8,396
2.0	2.0	24.6	22.0	2.6	2.1	1.8	0.2	0.00131	0.00016	11,369
2.0	4.0	45.7	43.0	2.6	3.8	3.6	0.2	0.00280	0.00035	10,379
2.0	6.0	65.8	63.1	2.7	5.5	5.3	0.2	0.00451	0.00056	9,436
2.0	8.0	86.0	82.1	3.9	7.2	6.9	0.3	0.00644	0.00080	8,606
2.0	10.0	106.5	100.2	6.3	8.9	8.4	0.5	0.00863	0.00107	7,831

B.H. G.W.

**REVIEWED BY** 

TESTED BY

January 18, 2017

DATE DATE

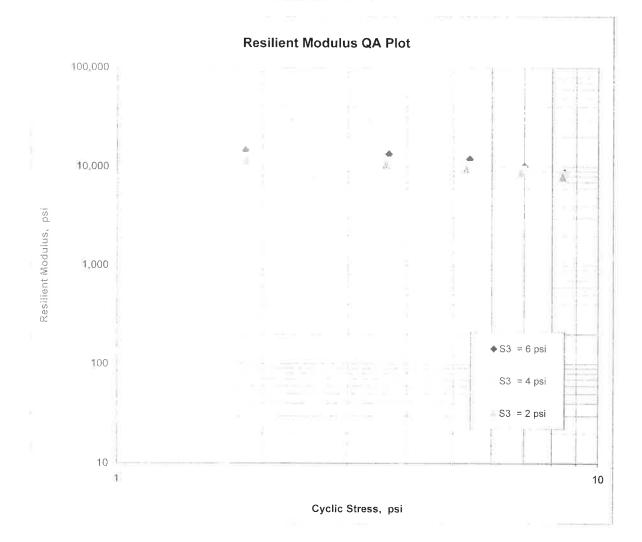
# ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

Job No. Date Sampled:	110646 12/29/2016	Material Code SSRVPS Station No.: 109+00
Date Tested:	January 18, 2017	Location: 18'RT
Name of Project:	CYPRESS CREEK & CANA	L STRS. & APPRS. (S)
County:	Code: 48 Name:	MONROE
Sampled By:	Thornton/CAMPBELL	<b>Depth:</b> 0-5
Lab No.:	20164188	AASHTO Class: A-6(12)
Sample ID:	RV546	Material Type (1 or 2): 2
LATITUDE:		LONGITUDE:

 $M_{R} = K1 (S_{C})^{K_{2}} (S_{3})^{K_{5}}$ 

K1 =	12,590
K2 =	-0.27331
K5 =	0.17671
$R^2 =$	0.90



# JOB: 110646

COUNTY NO. 48 DATE TESTED

Arkansas State Highway Transporation Department

JOB NAME: CYPRESS CREEK & CANAL STRS. & APPRS. (S)

Michael Benson, Materials Engineer

Materials Division

STA.#	LOC.	DEPTH	COLOR	#4	#10	# <b>4</b> 0	#80	#200	L.L.	<b>P.I</b> .	SOIL CLASS	<i>LAB</i> #:	%MOISTURE
109+00	18RT	0-5	GRAY	99	98	95	87	<u>E S</u> 78	34	17	A-6(12)	RV546	
109+00	06RT	0-5	GRAY	99	99	97	95	91	31	15	A-6(12)	S538	25.7
109+00	17RT	0-5	GRAY	96	93	90	81	70	30	16	A-6(9)	S539	22.6
112+00	06LT	0-5	GRAY	100				90	46	30	A-7-6(28)	S540	27
112+00	15LT	0-5	GRAY	99	97	95	89	82	46	31	A-7-6(25)	S541	18.9
209+00	06RT	0-5	GRAY		SR. 3		1012-3	97	41	24	A-7-6(24)	S542	31.3
209+00	15RT	0-5	GRAY	94	88	80	76	72	44	27	A-7-6(18)	S543	25
212+00	06LT	0-5	GRAY	97	95	91	87	83	38	19	A-6(15)	S544	26.1
212+00	18LT	0-5	GRAY	100		303	5. N. C.	94	34	18	A-6(16)	S545	28.6

1/11/2017

# Arkansas State Highway Transporation Department Materials Division

				o. (o)	
COUNT	COUNTY NO. 48	48			Michael Benson, Materials Engineer
STA.# LOC.	LOC.				PAVEMENT SOUNDINGS
109+00	17RT	BST	CTCSB		
		I	I		
109+00	06RT	BST	CTCSB		
		1.25	5.0		
112+00	15LT	BST	ACHMSC	BST	CTCSB
		1	1	1	1
112+00	06LT	BST	CTCSB		
		2.0	4.0		
209+00	15RT	BST	ACHMSC	BST	CTCSB
			I	I	
209+00	06RT	BST	ACHMSC	BST	CTCSB
		0.75	4.0	1.0	6.5
212+00	18LT	BST	ACHMSC	BST	ASPSA
		1	1	1	
212+00	06LT	BST	ACHMSC	BST	ASPSA
		1.0	2.25	1.0X	7.0

Friday, January 20, 2017

Page 1 of 1

comments: X=STRIPPED

ARKANSAS STATE	HIGHWAY	Y AND TRANSPORTATI MATERIALS I			ΓLE	ROCK, ARKANSAS
*		HAEL BENSON, MATER SURVEY / PAVEMENT			T *	**
DATE - 01 JOB NUMBER - 11 FEDERAL AID NO TO PURPOSE - SO SPEC. REMARKS - NO SUPPLIER NAME - ST NAME OF PROJECT - PROJECT ENGINEER - T PIT/QUARRY - ARKA	0646 BE ASSI IL SURVE SPECIFI ATE CYPRESS NOT APPI	Y SAMPLE CATION CHECK CREEK & CANAL STR		MATER SPEC. SUPPL COUNT DISTR	IAL YEZ IER Y/ST	NO 1 CODE - SSRVPS AR - 2014 ID 1 FATE - 48 NO 01
LOCATION - MONR SAMPLED BY - THORN SAMPLE FROM - TEST MATERIAL DESC SO	DE, COUN TON/CAMI HOLE	PBELL	EMI	DATE DATE	REC	PLED - 12/29/16 EIVED - 12/30/16 TED - 01/11/17
LAB NUMBER	-	20164100		2016/101	-	00164100
SAMPLE ID				S539		
	-					
TEST STATUS STATION	_	109+00		109+00		112+00
LOCATION	_	06RT	$\simeq$	17RT	-	06LT
DEPTH IN FEET			-	0-5	- <b>-</b>	0-5
MAT'L COLOR			-	GRAY	5 <del>4</del> 5	GRAY
MAT'L TYPE					- 2	
LATITUDE DEG-MIN				34 46 51.10	-	34 46 51.20
LONGITUDE DEG-MIN	-SEC -	91 15 9.60		91 15 9.80		91 15 6.10
% PASSING 2	IN		_		_	
1 1/2	2 IN		-		_	
3/4	1 IN		-		-	
3/8	3 IN	100	-	100	-	
NO.	4 -	99	_	96	_	100
	10 -		-	93	-	
	40 -		-	90	-	
	80 -		-	81	-	<b>A A</b>
NO.	200 -	91		70		90
LIQUID LIMIT	-	31	Ē	30	-	46
PLASTICITY INDEX	-	15	Ξ.	16	-	30
AASHTO SOIL	-	A-6(12)	-	A-6(9)	-	A-7-6(28)
UNIFIED SOIL	-	05 5	12	00 C		
% MOISTURE CONTENT		25.7		22.6		27.0
BST	(IN) -	1.25	-		12	2.0
CTCSB	(IN) -	5.0	×		28	4.0
	_		1		-	
	-		20 22		12	
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	-		-		÷	
	-				1995 1915	
	-				275 294	
REMARKS - X=STRIPP	ED					

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# AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS STATE HIGHWAY AND	TRANSPORTATION DEPARTN MATERIALS DIVISION	MENT - LITTLE ROCH	K, ARKANSAS
MICHAEL B	MATERIALS DIVISION ENSON, MATERIALS ENGIN	IEER	
*** SOIL SURVEY	( / PAVEMENT SOUNDING	TEST REPORT ***	
DATE - 01/23/17 JOB NUMBER - 110646 FEDERAL AID NO TO BE ASSIGNED PURPOSE - SOIL SURVEY SAME SPEC. REMARKS - NO SPECIFICATION SUPPLIER NAME - STATE NAME OF PROJECT - CYPRESS CREEK PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS	V CHECK & CANAL STRS. & APPRS	SEQUENCE NO. MATERIAL CODI SPEC. YEAR SUPPLIER ID. COUNTY/STATE DISTRICT NO. (S)	E = SSRVPS - 2014 - 1 - 48
LOCATION - MONROE, COUNTY		DATE SAMPLED	- 12/29/16
SAMPLED BY - THORNTON/CAMPBELL SAMPLE FROM - TEST HOLE		DATE RECEIVE DATE TESTED	
MATERIAL DESC SOIL SURVEY - 1	R VALUE- PAVEMENT SOUN		
	183 = 201641		
SAMPLE ID = S541 TEST STATUS = INFOR	MATION ONLY - INFORM	042	
STATION = 112+0 LOCATION = 15LT DEPTH IN FEET = 0-5 MAT'L COLOR = GRAY MAT'L TYPE =			+00 T
LATITUDE DEG-MIN-SEC - 34 LONGITUDE DEG-MIN-SEC - 91		45 52.70 - 3 09 39.60 9	4 45 52.60 1 09 39.60
% PASSING 2 IN 1 1/2 IN 3/4 IN 3/8 IN 100 NO. 4 - 99 NO. 10 - 97 NO. 40 - 95 NO. 80 - 89 NO. 200 - 82	100	- - 10	0 4 8 0 6
LIQUID LIMIT = 46	- 41	- 44	
	- 24 -6(25) - A-7-6	- 27 (24) - A-	7-6(18)
UNIFIED SOIL - % MOISTURE CONTENT - 18	3.9 - 31.	3	25.0
BST (IN) -	- 0.75		
ACHMSC (IN)	- 4.0	2 a	
BST (IN) CTCSB (IN)			i el el
	C+0	ä	
-		77 12	
~		-	
	5) 21	<del></del>	

REMARKS - X=STRIPPED

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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION							
* * *	MICHAEL BENSON, MATE SOIL SURVEY / PAVEMEN						
DATE - 01/11 JOB NUMBER - 11064 FEDERAL AID NO TO BE PURPOSE - SOIL SPEC. REMARKS - NO SE SUPPLIER NAME - STATE NAME OF PROJECT - CYE PROJECT ENGINEER - NOT PIT/QUARRY - ARKANSA	46 E ASSIGNED SURVEY SAMPLE PECIFICATION CHECK E PRESS CREEK & CANAL ST I APPLICABLE		SEQUENCE NO 3 MATERIAL CODE - SSRVPS SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 48 DISTRICT NO 01 S)				
LOCATION - MONROE, SAMPLED BY - THORNTON SAMPLE FROM - TEST HC	, COUNTY N/CAMPBELL DLE		DATE SAMPLED - 12/29/16 DATE RECEIVED - 12/30/16 DATE TESTED - 01/11/17				
MATERIAL DESC SOIL		VEMENT SOUNDIN	IGS				
LAB NUMBER SAMPLE ID	<b>aaaaa</b>	0545	1955 1957				
TEST STATUS	- S544 - INFORMATION ONL - 212+00	Y - INFORMATI	ON ONLY -				
STATION	- 212+00	- 212+00					
LOCATION	- 06LT	- 18LT	28				
DEPTH IN FEET	- 0-5	0-5					
MAT'L COLOR	- GRAY	GRAY	-				
MAT'L TYPE	-	( <b>=</b> )					
LATITUDE DEG-MIN-SE	EC - 34 45 52,80	- 34 45 91 09					
LONGITUDE DEG-MIN-SE	EC - 91 09 36.00	91 09	36.00				
	IN		-				
1 1/2 I		<del></del>	-				
	IN 100		-				
	IN 99	- 100	_				
	4 - 97 10 - 95	- 100	-				
	40 - 91	20 1993	-				
NO. 8		-	-				
	00 - 83	94					
LIQUID LIMIT	- 38	- 34	1.5				
PLASTICITY INDEX	- 19	- 18					
AASHTO SOIL	- A-6(15)	- A-6(16)					
UNIFIED SOIL	-	-					
% MOISTURE CONTENT		28.6					
	IN) - 1.0		-				
	IN) - 2.25						
	IN) - 1.0X IN) - 7.0		= (				
ASEBA (.	/.U	-	-2				
	-	57 L					
	-	-	-				
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	-		<b>A</b>				

REMARKS - X=STRIPPED

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- AASHTO TESTS : T24 T88 T89 T90 T265
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		MATERIALS I	DIVISION	- LITTLE ROCK, ARKANSAS
MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***				
DATE - 01/11/17 JOB NUMBER - 110646 FEDERAL AID NO TO BE ASSIGNED PURPOSE - SOIL SURVEY SAMPLE SPEC. REMARKS - NO SPECIFICATION CHECK SUPPLIER NAME - STATE NAME OF PROJECT - CYPRESS CREEK & CANAL STRS, & APPRS, (S PROJECT ENGINEER - NOT APPLICABLE PTT/QUARRY - ARKANSAS				SEQUENCE NO 1 MATERIAL CODE - RV SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 48 DISTRICT NO 01
SAMPLED BY - THORNTON/CAMPBELL				DATE SAMPLED - 12/29/16 DATE RECEIVED - 12/30/16 DATE TESTED - 01/11/17 RESULTS
LAB NUMBER	- 0	0164100	-	-
SAMPLE ID				
TEST STATUS				-
STATION	- 1	09+00	2	-
	- 1			-
DEPTH IN FEET	- 1	C C C	÷:	-
DEPIH IN FEEL	- 0	- 2	æ.	-
MAT'L COLOR MAT'L TYPE	- G	RAY	<del>.</del>	-
			- <u></u>	-
LATITUDE DEG-MIN-SEC	-	34 46 51.10		-
LONGITUDE DEG-MIN-SEC - 91 15 9.80				
% PASSING 2 IN.	-		-	-
1 1/2 IN.	-		-	-
3/4 IN.				
3/8 IN.		100	-	
NO. 4				-
NO. 10			8	
NO. 40	_	95	¥1	-
NO. 80			-	-
NO. 200		78	-	
LIOUID LIMIT	-	34		
	_			-
AASHTO SOIL		A-6(12)		-
UNIFIED SOIL	_	A-0(12)	-	
	-		8	
% MOISTURE CONTENT	-			
	-			22 #
	-		5 <b>=</b> 3	-
	-			-
	-			
	-		-	-
	_			-
	_		-	-
	_		20 20	2 2
	_			== =
REMARKS - X=STRIPPED				
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- AASHTO TESTS : T24 T88 T89 T90	) T265			

# AASHTO TESTS : T24 T88 T89 T90 T265

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