ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 110646

FEDERAL AID PROJECT NO. NHPP-0048(27)

CYPRESS CREEK & CANAL STRS. & APPRS. (S)

STATE HIGHWAY 241 **SECTION** 1 & 2

IN MONROE **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

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

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. 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
JOB NUMBER - 110646

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 48
DISTRICT NO. - 01

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

STATION LIMITS	R-VALUE AT 240 psi
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

Job No.	110646	**Material Code**	SSRVPS
Date Sampled:	12/29/2016	**Station No.:**	109+00
Date Tested:	January 18, 2017	**Location:**	18'RT
Name of Project:	CYPRESS CREEK & CANAL STRS. & APPRS. (S)		
County:	**Code:** 48 **Name:** MONROE		
Sampled By:	Thornton/CAMPBELL	**Depth:**	0-5
Lab No.:	20164188	**AASHTO Class:**	A-6(12)
Sample ID:	RV546	**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	3.91
Middle	3.90
Bottom	3.91
Average	3.91
Membrane Thickness (in):	0.01
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):	11.91
Initial Volume, AoLo (cu. in):	95.78

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3065.00

4. Soil Properties:

Optimum Moisture Content (%):	18.0
Maximum Dry Density (pcf):	103.3
95% of MDD (pcf):	98.1
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3065.00
Compaction Moisture content (%):	18.4
Compaction Wet Density (pcf):	121.93
Compaction Dry Density (pcf):	102.98
Moisture Content After Mr Test (%):	18.9

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

7. Resilient Modulus, Mr: 12590(Sc)^-0.27331(S3)^0.17671

8. Comments

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

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

PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	24.7	21.9	2.7	2.1	1.8	0.2	0.00102	0.00013	14,507
Sequence 2	6.0	4.0	46.3	43.5	2.8	3.9	3.7	0.2	0.00220	0.00027	13,375
Sequence 3	6.0	6.0	67.6	64.2	3.4	5.7	5.4	0.3	0.00364	0.00045	11,895
Sequence 4	6.0	8.0	89.1	83.4	5.8	7.5	7.0	0.5	0.00560	0.00070	10,039
Sequence 5	6.0	10.0	109.3	101.2	8.1	9.2	8.5	0.7	0.00790	0.00098	8,638
Sequence 6	4.0	2.0	24.6	21.9	2.7	2.1	1.8	0.2	0.00116	0.00014	12,697
Sequence 7	4.0	4.0	45.9	43.2	2.7	3.8	3.6	0.2	0.00252	0.00031	11,545
Sequence 8	4.0	6.0	66.2	63.6	2.7	5.6	5.3	0.2	0.00408	0.00051	10,505
Sequence 9	4.0	8.0	87.7	82.9	4.8	7.4	7.0	0.4	0.00594	0.00074	9,414
Sequence 10	4.0	10.0	108.5	101.4	7.1	9.1	8.5	0.6	0.00815	0.00101	8,396
Sequence 11	2.0	2.0	24.6	22.0	2.6	2.1	1.8	0.2	0.00131	0.00016	11,369
Sequence 12	2.0	4.0	45.7	43.0	2.6	3.8	3.6	0.2	0.00280	0.00035	10,379
Sequence 13	2.0	6.0	65.8	63.1	2.7	5.5	5.3	0.2	0.00451	0.00056	9,436
Sequence 14	2.0	8.0	86.0	82.1	3.9	7.2	6.9	0.3	0.00644	0.00080	8,606
Sequence 15	2.0	10.0	106.5	100.2	6.3	8.9	8.4	0.5	0.00863	0.00107	7,831

TESTED BY B.H. G.W. DATE January 18, 2017

REVIEWED BY _____ DATE _____

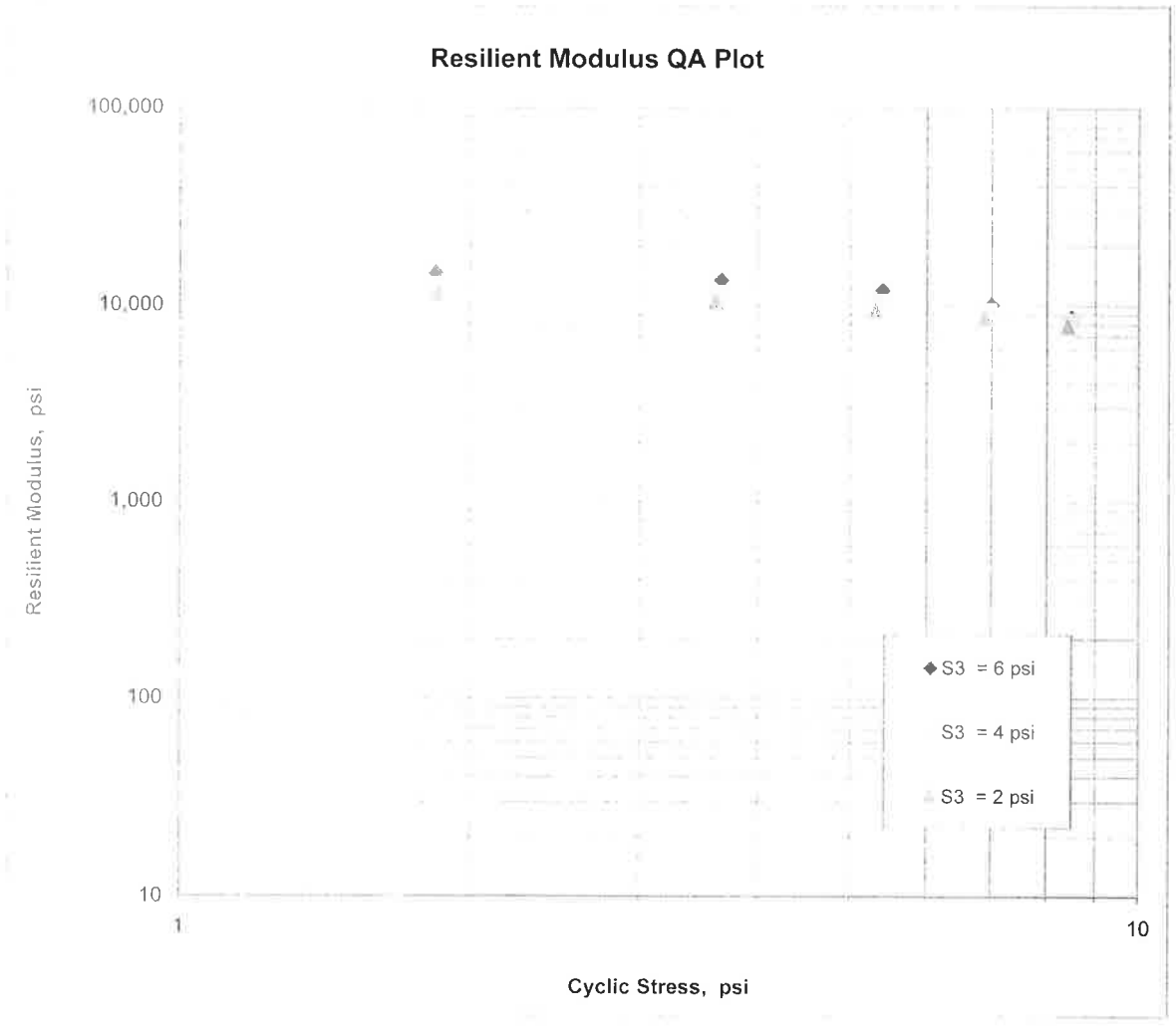
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

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

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

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



JOB: 110646

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

COUNTY NO. 48 **DATE TESTED** 1/11/2017

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				S	I	E	V	E S					
109+00	18RT	0-5	GRAY	99	98	95	87	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					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				94	34	18	A-6(16)	S545	28.6

comments: X=STRIPPED

Monday, January 23, 2017

JOB: 110646
JOB NAME: CYPRESS CREEK & CANAL STRS. & APPRS. (S)

COUNTY NO. 48

Arkansas State Highway Transporation Department
Materials Division
Michael Benson, Materials Engineer

DATE TESTED
1/11/2017

STA.#	LOC.	PAVEMENT SOUNDINGS			
109+00	17RT	BST	CTCSB		
		---	---		
109+00	06RT	BST	CTCSB		
		1.25	5.0		
112+00	15LT	BST	ACHMSC	BST	CTCSB
		---	---	---	---
112+00	06LT	BST	CTCSB		
		2.0	4.0		
209+00	15RT	BST	ACHMSC	BST	CTCSB
		---	---	---	---
209+00	06RT	BST	ACHMSC	BST	CTCSB
		0.75	4.0	1.0	6.5
212+00	18LT	BST	ACHMSC	BST	ASPSA
		---	---	---	---
212+00	06LT	BST	ACHMSC	BST	ASPSA
		1.0	2.25	1.0X	7.0

comments: X=STRIPPED

Friday, January 20, 2017

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
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
SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 48
DISTRICT NO. - 01
NAME OF PROJECT - CYPRESS CREEK & CANAL STRS. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - MONROE, COUNTY
SAMPLED BY - THORNTON/CAMPBELL
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 12/29/16
DATE RECEIVED - 12/30/16
DATE TESTED - 01/11/17
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20164180	20164181	20164182
SAMPLE ID	S538	S539	S540
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	109+00	109+00	112+00
LOCATION	06RT	17RT	06LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	GRAY	GRAY	GRAY
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	34 46 51.10	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 IN.			
3/4 IN.			
3/8 IN.	100	100	
NO. 4	99	96	100
NO. 10	99	93	
NO. 40	97	90	
NO. 80	95	81	
NO. 200	91	70	90
LIQUID LIMIT	31	30	46
PLASTICITY INDEX	15	16	30
AASHTO SOIL	A-6(12)	A-6(9)	A-7-6(28)
UNIFIED SOIL			
% MOISTURE CONTENT	25.7	22.6	27.0
BST (IN)	1.25	---	2.0
CTCSB (IN)	5.0	---	4.0

REMARKS - X=STRIPPED

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 - 01/23/17
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
PIT/QUARRY - ARKANSAS
LOCATION - MONROE, COUNTY
SAMPLED BY - THORNTON/CAMPBELL
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

SEQUENCE NO. - 2
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 48
DISTRICT NO. - 01

DATE SAMPLED - 12/29/16
DATE RECEIVED - 12/30/16
DATE TESTED - 01/11/17

LAB NUMBER	20164183	20164184	20164185
SAMPLE ID	S541	S542	S543
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	112+00	209+00	209+00
LOCATION	15LT	06RT	15RT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	GRAY	GRAY	GRAY
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	34 46 51.30	34 45 52.70	34 45 52.60
LONGITUDE DEG-MIN-SEC	91 15 6.10	91 09 39.60	91 09 39.60
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.			
3/8 IN.	100	100	100
NO. 4	99		94
NO. 10	97		88
NO. 40	95		80
NO. 80	89		76
NO. 200	82	97	72
LIQUID LIMIT	46	41	44
PLASTICITY INDEX	31	24	27
AASHTO SOIL	A-7-6(25)	A-7-6(24)	A-7-6(18)
UNIFIED SOIL			
% MOISTURE CONTENT	18.9	31.3	25.0
BST (IN)	---	0.75	---
ACHMSC (IN)	---	4.0	---
BST (IN)	---	1.0	---
CTCSB (IN)	---	6.5	---

REMARKS - X=STRIPPED

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 - 01/11/17
JOB NUMBER - 110646
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
SEQUENCE NO. - 3
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 48
DISTRICT NO. - 01
NAME OF PROJECT - CYPRESS CREEK & CANAL STRS. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - MONROE, COUNTY
SAMPLED BY - THORNTON/CAMPBELL
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 12/29/16
DATE RECEIVED - 12/30/16
DATE TESTED - 01/11/17
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20164186	20164187
SAMPLE ID	S544	S545
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY
STATION	212+00	212+00
LOCATION	06LT	18LT
DEPTH IN FEET	0-5	0-5
MAT'L COLOR	GRAY	GRAY
MAT'L TYPE		
LATITUDE DEG-MIN-SEC	34 45 52.80	34 45 52.90
LONGITUDE DEG-MIN-SEC	91 09 36.00	91 09 36.00
% PASSING 2 IN.		
1 1/2 IN.		
3/4 IN.	100	
3/8 IN.	99	
NO. 4	97	100
NO. 10	95	
NO. 40	91	
NO. 80	87	
NO. 200	83	94
LIQUID LIMIT	38	34
PLASTICITY INDEX	19	18
AASHTO SOIL	A-6(15)	A-6(16)
UNIFIED SOIL		
% MOISTURE CONTENT	26.1	28.6

BST	(IN)	1.0	---
ACHMSC	(IN)	2.25	---
BST	(IN)	1.0X	---
ASPSA	(IN)	7.0	---

REMARKS - X=STRIPPED

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	- 01/11/17	SEQUENCE NO.	- 1
JOB NUMBER	- 110646	MATERIAL CODE	- RV
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 48
SUPPLIER NAME	- STATE	DISTRICT NO.	- 01
NAME OF PROJECT	- CYPRESS CREEK & CANAL STRS. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- MONROE, COUNTY	DATE SAMPLED	- 12/29/16
SAMPLED BY	- THORNTON/CAMPBELL	DATE RECEIVED	- 12/30/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 01/11/17

MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

LAB NUMBER	- 20164188	-	-
SAMPLE ID	- RV546	-	-
TEST STATUS	- INFORMATION ONLY	-	-
STATION	- 109+00	-	-
LOCATION	- 18RT	-	-
DEPTH IN FEET	- 0-5	-	-
MAT'L COLOR	- GRAY	-	-
MAT'L TYPE	-	-	-
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	- 99	-	-
NO. 10	- 98	-	-
NO. 40	- 95	-	-
NO. 80	- 87	-	-
NO. 200	- 78		
LIQUID LIMIT	- 34	-	-
PLASTICITY INDEX	- 17	-	-
AASHTO SOIL	- A-6(12)	-	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	-		

REMARKS - X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265