

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 061609

FEDERAL AID PROJECT NO. NHPP-0043(36)

MILL CREEK STR. & APPRS. (S)

STATE HIGHWAY 38 SECTION 0

IN LONOKE 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

June 19, 2019

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 061609
Mill Creek Str. & Apprs. (S)
Route 38 Section 0
Lonoke County

Attached is the requested soil survey, strength data, and Resilient Modulus test results for the above referenced job. The project consists of replacing the bridge at Mill Creek on Highway 38. Samples were taken in the existing travel lanes and ditch line.

The subgrade soils consist primarily of moderately plastic sandy clay. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Based on seasonal conditions the ditches may contain water.

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 of Cabot.
2. Asphalt Concrete Hot Mix

Table with 3 columns: Type, Asphalt Cement %, Mineral Aggregate %. Rows include Surface Course, Binder Course, and Base Course.

Handwritten signature of Michael C. Benson, Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. - Master File Copy
District 6 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 - 06/07/2019
JOB NUMBER - 061609

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 43
DISTRICT NO. - 06

JOB NAME - MILL CREEK STR. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 8

RESILIENT MODULUS
STA. 106+00 12775

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.	061609	Material Code	SSRVPS
Date Sampled:	5/7/19	Station No.:	106+00
Date Tested:	June 6, 2019	Location:	18'RT
Name of Project:	MILL CREEK STR. & APPRS. (S)		
County:	Code: 43	Name: LONOKE	
Sampled By:	FRAZIER / BATES		Depth: 0-5
Lab No.:	20191441	AASHTO Class:	A-4 (2)
Sample ID:	RV340	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	3.95
Middle	3.95
Bottom	3.95
Average	3.95
Membrane Thickness (in):	0.01
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):	12.18
Initial Volume, AoLo (cu. in):	97.68

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3231.10
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4. Soil Properties:

Optimum Moisture Content (%):	12.7
Maximum Dry Density (pcf):	116.4
95% of MDD (pcf):	110.6
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3231.10
Compaction Moisture content (%):	12.8
Compaction Wet Density (pcf):	126.03
Compaction Dry Density (pcf):	111.73
Moisture Content After Mr Test (%):	12.6

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

#VALUE!

7. Resilient Modulus, Mr:

12844(Sc)^{-0.09334}(S3)^{0.27247}

8. Comments

9. Tested By:

GW _____

Date: June 6, 2019

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

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

Job No.	061609	Material Code	SSRVPS
Date Sampled:	5/7/19	Station No.:	106+00
Date Tested:	June 6, 2019	Location:	18'RT
Name of Project:	MILL CREEK STR. & APPRS. (S)	Depth:	0-5
County:	Code: 43 LONOKE	AASHTO Class:	A-4 (2)
Sampled By:	FRAZIER / BATES	Material Type (1 or 2):	2
Lab No.:	20191441	LONGITUDE:	
Sample ID:	RV340		
LATITUDE:			

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
	S ₃ psi	S _{cyclic} psi	P _{max} lbs	P _{cyclic} lbs	P _{contact} lbs	S _{max} psi	S _{cyclic} psi	S _{contact} psi	H _{avg} in	ε _r in/in	M _r psi
Sequence 1	6.0	2.0	25.2	22.4	2.8	2.1	1.8	0.2	0.00074	0.00009	20,034
Sequence 2	6.0	4.0	47.3	44.5	2.8	3.9	3.7	0.2	0.00151	0.00019	19,361
Sequence 3	6.0	6.0	69.9	66.3	3.6	5.7	5.4	0.3	0.00237	0.00030	18,420
Sequence 4	6.0	8.0	93.5	87.5	6.1	7.7	7.2	0.5	0.00334	0.00042	17,227
Sequence 5	6.0	10.0	117.0	108.5	8.5	9.6	8.9	0.7	0.00439	0.00055	16,278
Sequence 6	4.0	2.0	25.1	22.3	2.8	2.1	1.8	0.2	0.00086	0.00011	17,143
Sequence 7	4.0	4.0	47.0	44.2	2.8	3.9	3.6	0.2	0.00175	0.00022	16,583
Sequence 8	4.0	6.0	68.6	65.8	2.8	5.6	5.4	0.2	0.00269	0.00034	16,112
Sequence 9	4.0	8.0	92.3	87.1	5.2	7.6	7.2	0.4	0.00367	0.00046	15,628
Sequence 10	4.0	10.0	115.4	107.8	7.6	9.5	8.8	0.6	0.00474	0.00059	14,982
Sequence 11	2.0	2.0	24.8	22.0	2.8	2.0	1.8	0.2	0.00101	0.00013	14,367
Sequence 12	2.0	4.0	46.4	43.6	2.8	3.8	3.6	0.2	0.00208	0.00026	13,803
Sequence 13	2.0	6.0	67.7	64.9	2.8	5.6	5.3	0.2	0.00318	0.00040	13,424
Sequence 14	2.0	8.0	90.1	85.9	4.2	7.4	7.1	0.3	0.00430	0.00054	13,148
Sequence 15	2.0	10.0	113.2	106.5	6.7	9.3	8.7	0.6	0.00549	0.00068	12,775

TESTED BY _____ DATE June 6, 2019

REVIEWED BY _____ DATE _____

GW

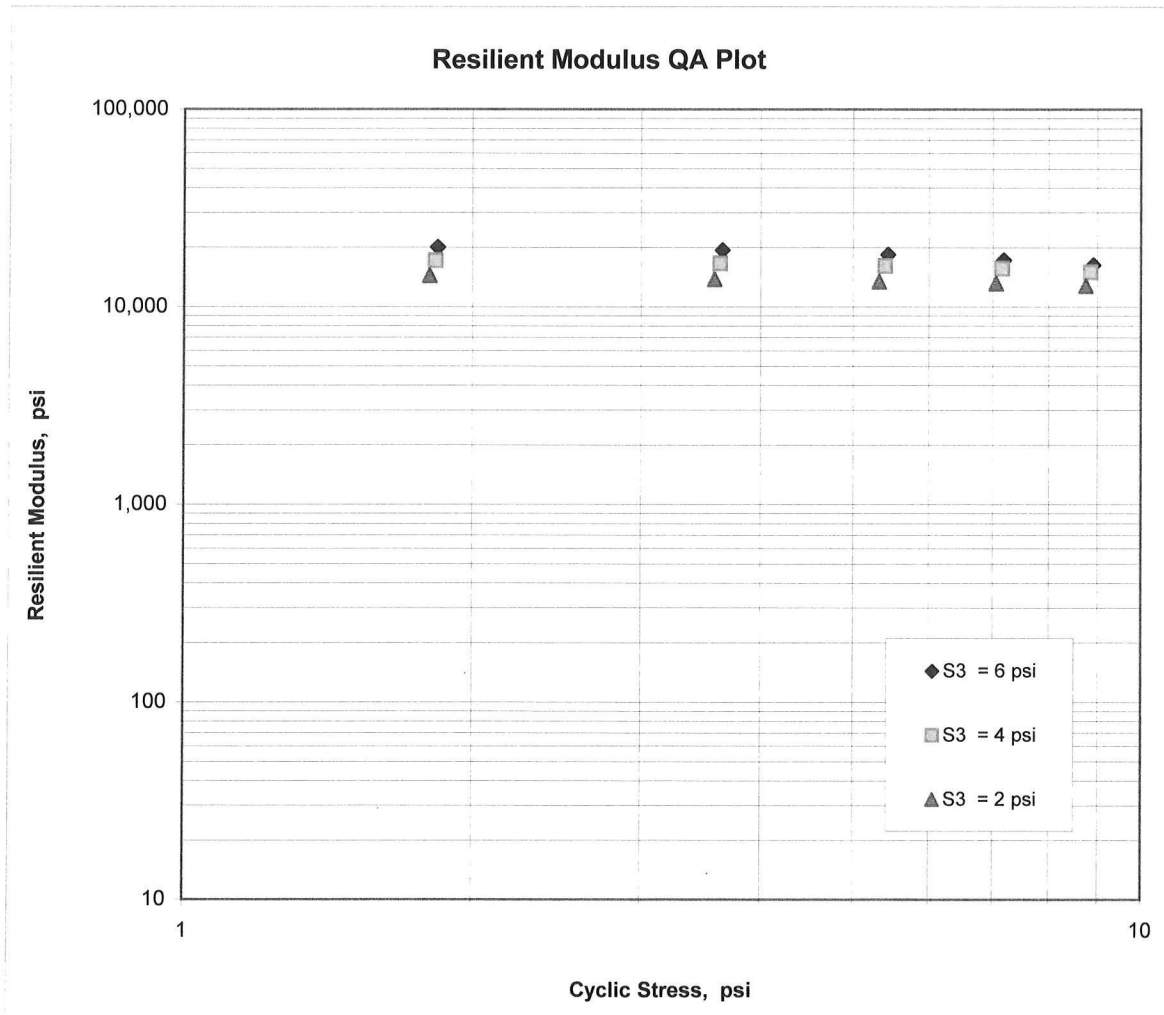
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	061609	Material Code	SSRVPS
Date Sampled:	5/7/19	Station No.:	106+00
Date Tested:	June 6, 2019	Location:	18'RT
Name of Project:	MILL CREEK STR. & APPRS. (S)		
County:	Code: 43	Name:	LONOKE
Sampled By:	FRAZIER / BATES		Depth: 0-5
Lab No.:	20191441	AASHTO Class:	A-4 (2)
Sample ID:	RV340	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$K_1 = 12,844$
 $K_2 = -0.09334$
 $K_5 = 0.27247$
 $R^2 = 0.97$



JOB: 061609

Arkansas State Highway Transportation Department

JOB NAME: MILL CREEK STR. & APPRS. (S)

Materials Division

COUNTY NO. 43 DATE TESTED 6/7/2019

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR						L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
				S	I	E	V	E	S				
106+00	18 RT	0-5	BROWN	93	91	87	74	62	24	7	A-4(2)	RV340	
106+00	06 RT	0-5	BR/GR	99	98	96	84	72	21	5	A-4(1)	S336	18.8
106+00	18 RT	0-5	BROWN	96	94	91	83	74	27	12	A-6(6)	S337	20.5
114+00	06 LT	0-5	BR/GR	99	99	97	93	84	25	8	A-4(5)	S338	23
114+00	18 LT	0-5	BR/GR	95	94	91	77	69	23	8	A-4(3)	S339	22

comments: W=MULTIPLE LAYERS

Wednesday, June 12, 2019

JOB: 061609

*Arkansas State Highway Transportation Department
Materials Division*

DATE TESTED
6/7/2019

JOB NAME: MILL CREEK STR. & APPRS. (S)

COUNTY NO. 43

Michael Benson, Materials Engineer

STA.# LOC. PAVEMENT SOUNDINGS

106+00	06 RT	ACHM SC 8.0W	ACHM BC 1.5	AGG.BASE CRS.CL-7 2.0
106+00	18 RT	ACHM SC ---	ACHM BC ---	AGG.BASE CRS.CL-7 ---
114+00	06 LT	ACHM SC 7.0W	ACHM BC 3.0	AGG.BASE CRS.CL-7 2.0

comments: W=MULTIPLE LAYERS

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 06/07/19	SEQUENCE NO.	- 1
JOB NUMBER	- 061609	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 43
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- MILL CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 05/07/19
LOCATION	- LONOKE, COUNTY	DATE RECEIVED	- 05/13/19
SAMPLED BY	- FRAZIER/BATES	DATE TESTED	- 06/07/19
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20191437	- 20191438	- 20191439
SAMPLE ID	- S336	- S337	- S338
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 106+00	- 106+00	- 114+00
LOCATION	- 06 RT	- 18 RT	- 06 LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BR/GR	- BROWN	- BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 59 13.70	- 34 59 13.60	- 34 59 14.60
LONGITUDE DEG-MIN-SEC	- 91 57 .70	- 91 57 .70	- 91 56 51.50
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. - 100	- 100	- 100
	3/8 IN. - 99	- 98	- 99
	NO. 4 - 99	- 96	- 99
	NO. 10 - 98	- 94	- 99
	NO. 40 - 96	- 91	- 97
	NO. 80 - 84	- 83	- 93
	NO. 200 - 72	- 74	- 84
LIQUID LIMIT	- 21	- 27	- 25
PLASTICITY INDEX	- 5	- 12	- 8
AASHTO SOIL	- A-4 (1)	- A-6 (6)	- A-4 (5)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 18.8	- 20.5	- 23.0
ACHM SC (IN)	- 8.0W	- ---	- 7.0W
ACHM BC (IN)	- 1.5	- ---	- 3.0
AGG.BASE CRS.CL-7 (IN)	- 2.0	- ---	- 2.0
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS

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 ***

DATE - 06/07/19 SEQUENCE NO. - 2
 JOB NUMBER - 061609 MATERIAL CODE - SSRVPS
 FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2014
 PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID. - 1
 SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 43
 SUPPLIER NAME - STATE DISTRICT NO. - 06
 NAME OF PROJECT - MILL CREEK STR. & APPRS. (S)
 PROJECT ENGINEER - NOT APPLICABLE
 PIT/QUARRY - ARKANSAS
 LOCATION - LONOKE, COUNTY DATE SAMPLED - 05/07/19
 SAMPLED BY - FRAZIER/BATES DATE RECEIVED - 05/13/19
 SAMPLE FROM - TEST HOLE DATE TESTED - 06/07/19
 MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	-	20191440	-	-
SAMPLE ID	-	S339	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	114+00	-	-
LOCATION	-	18 LT	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	BR/GR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	34 59 14.80	-	-
LONGITUDE DEG-MIN-SEC	-	91 56 51.60	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	100
	3/8	IN.	-	98
	NO. 4		-	95
	NO. 10		-	94
	NO. 40		-	91
	NO. 80		-	77
	NO. 200		-	69
LIQUID LIMIT	-	23	-	-
PLASTICITY INDEX	-	8	-	-
AASHTO SOIL	-	A-4 (3)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-	22.0	-	-
	-		-	-
	-		-	-
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REMARKS - W=MULTIPLE LAYERS
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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 ***

DATE	- 06/07/19	SEQUENCE NO.	- 1
JOB NUMBER	- 061609	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	- 43
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- MILL CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 05/07/19
LOCATION	- LONOKE, COUNTY	DATE RECEIVED	- 05/13/19
SAMPLED BY	- FRAZIER/BATES	DATE TESTED	- 06/07/19
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - RESISTANCE R-VALUE	ACTUAL RESULTS	

LAB NUMBER	-	20191441	-	-
SAMPLE ID	-	RV340	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	106+00	-	-
LOCATION	-	18 RT	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	BROWN	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	34 59 13.60	-	-
LONGITUDE DEG-MIN-SEC	-	91 57 .70	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	100
	3/8	IN.	-	99
	NO. 4		-	93
	NO. 10		-	91
	NO. 40		-	87
	NO. 80		-	74
	NO. 200		-	62
LIQUID LIMIT	-	24	-	-
PLASTICITY INDEX	-	7	-	-
AASHTO SOIL	-	A-4 (2)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
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REMARKS - W=MULTIPLE LAYERS
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AASHTO TESTS : T24 T88 T89 T90 T265
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