ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 080617

FEDERAL AID PROJECT NO. NHPP-0036(26)

WOLF PEN CREEK STR. & APPRS. (S)

STATE HIGHWAY 215 **SECTION** 4

IN JOHNSON **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

October 14, 2019

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 080617
Wolf Pen Creek Str. & Apprs. (S)
Route 215 Section 4
Johnson 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 crossing Wolf Pen Creek on Highway 215. Samples were taken in the existing travel lanes, and ditch line.

The subgrade soils consist primarily of highly plastic clay with shale fragments. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction.

Rock was not encountered during the investigation, but rock outcrops were observed near the project location. Rock may be encountered during construction. There is a slide near Wolf Pen Creek bridge. The approximate slide limits are between log mile 5.35 to 5.85.

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 in the vicinity of Lamar.

2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.4	95.6
Base Course	4.0	96.0

Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
District 8 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 - 09/19/2019
JOB NUMBER - 080617

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 36
DISTRICT NO. - 08

JOB NAME - WOLF PEN CREEK STR. & APPRS.(S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	LESS THAN 5
RESILIENT MODULUS STA. LM 6.01	12228

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.	080617	**Material Code**	SSRVPS
Date Sampled:	7/23/19	**Station No.:**	LM 6.01
Date Tested:	September 4, 2019	**Location:**	15'LT
Name of Project:	WOLF PEN CREEK STR. & APPRS. (S)		
County:	**Code:** 36 **Name:** JOHNSON		
Sampled By:	FRAZIER / DICKERSON	**Depth:**	0-5
Lab No.:	20192329	**AASHTO Class:**	A-7-6 (18)
Sample ID:	RV783	**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	3.94
Middle	3.96
Bottom	3.96
Average	3.95
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):	12.20
Initial Volume, AoLo (cu. in):	98.09

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3052.00

4. Soil Properties:

Optimum Moisture Content (%):	18.2
Maximum Dry Density (pcf):	104.9
95% of MDD (pcf):	99.7
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3052.00
Compaction Moisture content (%):	18.1
Compaction Wet Density (pcf):	118.55
Compaction Dry Density (pcf):	100.38
Moisture Content After Mr Test (%):	18.1

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

7. Resilient Modulus, Mr: 15818(Sc)^-0.15574(S3)^0.13725

8. Comments _____

9. Tested By: GW **Date:** September 4, 2019

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	080617	**Material Code**	SSRVPS
Date Sampled:	7/23/19	**Station No.:**	LM 6.01
Date Tested:	September 4, 2019	**Location:**	15'LT
Name of Project:	WOLF PEN CREEK STR. & APPRS. (S)		
County:	**Code:** 36 **Name:** JOHNSON		
Sampled By:	FRAZIER / DICKERSON	**Depth:**	0-5
Lab No.:	20192329	**AASHTO Class:**	A-7-6 (18)
Sample ID:	RV783	**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	25.4	22.8	2.6	2.1	1.9	0.2	0.00082	0.00010	18,302
Sequence 2	6.0	4.0	47.4	44.7	2.7	3.9	3.7	0.2	0.00168	0.00021	17,490
Sequence 3	6.0	6.0	70.1	66.5	3.6	5.7	5.4	0.3	0.00269	0.00033	16,306
Sequence 4	6.0	8.0	93.5	87.4	6.0	7.7	7.2	0.5	0.00394	0.00049	14,637
Sequence 5	6.0	10.0	115.6	107.1	8.5	9.5	8.8	0.7	0.00543	0.00067	13,008
Sequence 6	4.0	2.0	25.2	22.4	2.8	2.1	1.8	0.2	0.00088	0.00011	16,846
Sequence 7	4.0	4.0	47.5	44.7	2.8	3.9	3.7	0.2	0.00181	0.00022	16,285
Sequence 8	4.0	6.0	69.2	66.4	2.8	5.7	5.4	0.2	0.00283	0.00035	15,453
Sequence 9	4.0	8.0	92.9	87.7	5.2	7.6	7.2	0.4	0.00403	0.00050	14,328
Sequence 10	4.0	10.0	115.6	107.9	7.6	9.5	8.8	0.6	0.00548	0.00068	12,985
Sequence 11	2.0	2.0	25.2	22.4	2.8	2.1	1.8	0.2	0.00100	0.00012	14,734
Sequence 12	2.0	4.0	47.4	44.6	2.8	3.9	3.7	0.2	0.00204	0.00025	14,407
Sequence 13	2.0	6.0	69.1	66.3	2.8	5.7	5.4	0.2	0.00315	0.00039	13,868
Sequence 14	2.0	8.0	91.9	87.6	4.3	7.5	7.2	0.4	0.00440	0.00055	13,115
Sequence 15	2.0	10.0	114.4	107.6	6.7	9.4	8.8	0.6	0.00580	0.00072	12,228

TESTED BY GW DATE September 4, 2019

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.	080617	**Material Code**	SSRVPS
Date Sampled:	7/23/19	**Station No.:**	LM 6.01
Date Tested:	September 4, 2019	**Location:**	15'LT
Name of Project:	WOLF PEN CREEK STR. & APPRS. (S)		
County:	**Code:** 36 **Name:** JOHNSON		
Sampled By:	FRAZIER / DICKERSON	**Depth:**	0-5
Lab No.:	20192329	**AASHTO Class:**	A-7-6 (18)
Sample ID:	RV783	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

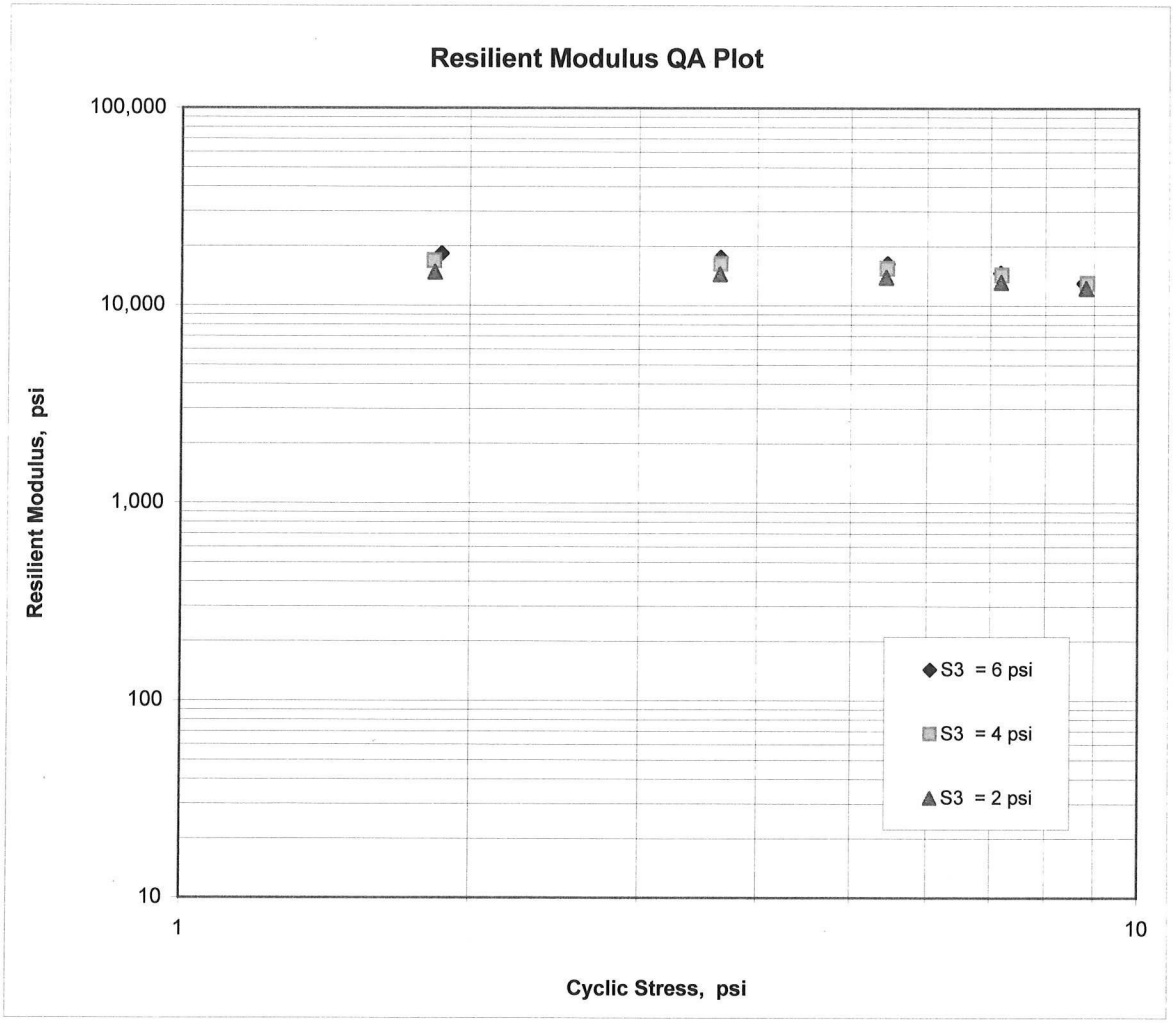
$$M_R = K1\ (S_C)^{K2}\ (S_3)^{K5}$$

K1 = 15,818

K2 = -0.15574

K5 = 0.13725

R^2 = 0.84



JOB: 080617

JOB NAME: WOLF PEN CREEK STR. & APPRS.(S)

COUNTY NO. 36 **DATE TESTED** 9/17/2019

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
				SIEVE									
LM 6.01	15 LT	0-5	BROWN	84	80	76	73	70	46	28	A-7-6(18)	RV783	
LM 5.85	05 RT	0-5	BROWN	94	93	90	87	86	31	10	A-4(8)	S779	8
LM 5.85	15 RT	0-5	BROWN	72	60	48	43	36	28	12	A-6(1)	S780	5.7
LM 6.01	05 LT	0-5	BROWN	98	91	83	79	73	45	28	A-7-6(19)	S781	17.1
LM 6.01	15 LT	0-5	BROWN	91	87	80	76	72	44	26	A-7-6(17)	S782	15.2

comments: W=MULTIPLE LAYERS

Tuesday, October 01, 2019

JOB: 080617
JOB NAME: WOLF PEN CREEK STR. & APPRS.(S)
COUNTY NO. 36

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

DATE TESTED
9/17/2019

STA.# LOC.

PAVEMENT SOUNDINGS

LM 5.85	05 RT	ACHMSC	AGG.BASE CRS CL-7
		4.5W	**6.0**
LM 5.85	15 RT	ACHMSC	AGG.BASE CRS CL-7
		---	---
LM 6.01	05 LT	ACHMSC	AGG.BASE CRS CL-7
		2.5W	**6.0**

comments: W=MULTIPLE LAYERS

Tuesday, October 01, 2019

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 09/19/19
JOB NUMBER - 080617
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - WOLF PEN CREEK STR. & APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - JOHNSON COUNTY
SAMPLED BY - FRAZIER/DICKERSON
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 36
DISTRICT NO. - 08

DATE SAMPLED - 07/24/19
DATE RECEIVED - 07/25/19
DATE TESTED - 09/17/19

LAB NUMBER	20192325	20192326	20192327
SAMPLE ID	S779	S780	S781
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	LM 5.85	LM 5.85	LM 6.01
LOCATION	05 RT	15 RT	05 LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	BROWN
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 41 12.30	35 41 12.30	35 41 15.20
LONGITUDE DEG-MIN-SEC	93 36 27.40	93 36 27.40	93 36 17.80
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.	100	100	
3/8 IN.	98	90	100
NO. 4	94	72	98
NO. 10	93	60	91
NO. 40	90	48	83
NO. 80	87	43	79
NO. 200	86	36	73
LIQUID LIMIT	31	28	45
PLASTICITY INDEX	10	12	28
AASHTO SOIL	A-4(8)	A-6(1)	A-7-6(19)
UNIFIED SOIL			
% MOISTURE CONTENT	8.0	5.7	17.1
ACHMSC (IN)	4.5W	---	2.5W
AGG.BASE CRS CL-7 (IN)	6.0	---	6.0

REMARKS - W=MULTIPLE LAYERS

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	- 09/19/19	SEQUENCE NO.	- 2
JOB NUMBER	- 080617	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	- 36
SUPPLIER NAME	- STATE	DISTRICT NO.	- 08
NAME OF PROJECT	- WOLF PEN CREEK STR. & APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- JOHNSON COUNTY	DATE SAMPLED	- 07/24/19
SAMPLED BY	- FRAZIER/DICKERSON	DATE RECEIVED	- 07/25/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 09/17/19

MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20192328
SAMPLE ID	S782
TEST STATUS	INFORMATION ONLY
STATION	LM 6.01
LOCATION	15 LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 41 15.30
LONGITUDE DEG-MIN-SEC	93 36 17.80
% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	100
3/8 IN.	95
NO. 4	91
NO. 10	87
NO. 40	80
NO. 80	76
NO. 200	72
LIQUID LIMIT	44
PLASTICITY INDEX	26
AASHTO SOIL	A-7-6(17)
UNIFIED SOIL	
% MOISTURE CONTENT	15.2

REMARKS - W=MULTIPLE LAYERS

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	- 09/19/19	SEQUENCE NO.	- 1
JOB NUMBER	- 080617	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	- 36
SUPPLIER NAME	- STATE	DISTRICT NO.	- 08
NAME OF PROJECT	- WOLF PEN CREEK STR. & APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- JOHNSON COUNTY	DATE SAMPLED	- 07/24/19
SAMPLED BY	- FRAZIER/DICKERSON	DATE RECEIVED	- 07/25/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 09/17/19

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

LAB NUMBER	20192329	
SAMPLE ID	RV783	
TEST STATUS	INFORMATION ONLY	
STATION	LM 6.01	
LOCATION	15 LT	
DEPTH IN FEET	0-5	
MAT'L COLOR	BROWN	
MAT'L TYPE		
LATITUDE DEG-MIN-SEC	35 41 15.30	
LONGITUDE DEG-MIN-SEC	93 36 17.80	
% PASSING 2 IN.		
1 1/2 IN.	100	
3/4 IN.	94	
3/8 IN.	86	
NO. 4	84	
NO. 10	80	
NO. 40	76	
NO. 80	73	
NO. 200	70	
LIQUID LIMIT	46	
PLASTICITY INDEX	28	
AASHTO SOIL	A-7-6(18)	
UNIFIED SOIL		
% MOISTURE CONTENT		

REMARKS - W=MULTIPLE LAYERS

AASHTO TESTS : T24 T88 T89 T90 T265