

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. 009814

FEDERAL AID PROJECT NO. NHPP-0003(50)

E. PIGEON CREEK STR. & APPRS. (S)

STATE HIGHWAY 201 SECTION 1

IN BAXTER COUNTY

LETTING OF SEPTEMBER 21, 2016

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

May 15, 2014

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 009814
E. Pigeon Creek Str. & Apprs. (S)
Route 201 Section 1
Baxter 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 Pigeon Creek on Highway 201. 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 plastic clay with sand and varying amounts of limestone fragments. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction.

Based on currently available cross-sections the maximum embankment height is approximately 12 feet. All soft unstable organic material should be undercut prior to embankment construction, anticipated to be no more than two feet. The embankment may be constructed using locally available unspecified material utilizing a 3:1 slope configuration.

The maximum cut depth is approximately 17 feet. The 3:1 cut slope configuration is acceptable as shown in the currently available cross-sections.

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 Mountain Home.
2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.3	94.7
Binder Course	4.3	95.7
Base Course	4.1	95.9


Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 9 Engineer
Transportation Planning and Policy 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 - 05/14/2014
JOB NUMBER - 009814

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 03
DISTRICT NO. - 09

JOB NAME - E. PIGEON CREEK STRS. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN OB - END JOB LESS THAN 5

RESILIENT MODULUS
STA.112+00 7758

REMARKS -
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AASHTO TESTS : T190

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

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

Job No.	009814	Material Code	SSRVPS
Date Sampled:	04/30/14	Station No.:	112+00
Date Tested:	April 30, 2014	Location:	17'LT
Name of Project:	E.PIGEON CREEK STRS. & APPRS.(S)		
County:	Code: 3	Name: BAXTER	
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20141194	AASHTO Class:	A-6(13)
Sample ID:	RV362	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	3.96
Middle	3.94
Bottom	3.95
Average	3.95
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.03
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.03
Initial Area, Ao (sq. in):	12.18
Initial Volume, AoLo (cu. in):	97.80

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3230.00
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4. Soil Properties:

Optimum Moisture Content (%):	15.9
Maximum Dry Density (pcf):	110.4
95% of MDD (pcf):	104.9
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3230.00
Compaction Moisture content (%):	16.6
Compaction Wet Density (pcf):	125.83
Compaction Dry Density (pcf):	107.92
Moisture Content After Mr Test (%):	16.6

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

#VALUE!

7. Resilient Modulus, Mr:

10241(S_c)^{-0.22815}(S₃)^{0.29219}

8. Comments

9. Tested By:

MW/DT

Date: April 30, 2014

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

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

Job No. 009814 Material Code SSRVPS
 Date Sampled: 04/30/14 Station No.: 112+00
 Date Tested: April 30, 2014 Location: 17'LT
 Name of Project: E.PIGEON CREEK STRS. & APPRS.(S)
 County: Code: 3 Name: BAXTER
 Sampled By: FAULKNER Depth: 0-5
 Lab No.: 20141194 AASHTO Class: A-6(13)
 Sample ID: RV362 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 _{eyclic}	P _{max}	P _{eyclic}	P _{contact}	S _{max}	S _{eyclic}	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	25.0	22.3	2.7	2.1	1.8	0.2	0.00096	0.00012	15,228
Sequence 2	6.0	4.0	46.7	43.9	2.8	3.8	3.6	0.2	0.00203	0.00025	14,220
Sequence 3	6.0	6.0	68.7	65.0	3.7	5.6	5.3	0.3	0.00335	0.00042	12,814
Sequence 4	6.0	8.0	90.8	84.7	6.1	7.5	7.0	0.5	0.00510	0.00064	10,942
Sequence 5	6.0	10.0	111.7	103.1	8.6	9.2	8.5	0.7	0.00713	0.00089	9,531
Sequence 6	4.0	2.0	24.9	22.1	2.7	2.0	1.8	0.2	0.00118	0.00015	12,392
Sequence 7	4.0	4.0	46.2	43.4	2.8	3.8	3.6	0.2	0.00247	0.00031	11,559
Sequence 8	4.0	6.0	67.1	64.2	2.8	5.5	5.3	0.2	0.00393	0.00049	10,766
Sequence 9	4.0	8.0	89.3	84.0	5.2	7.3	6.9	0.4	0.00563	0.00070	9,841
Sequence 10	4.0	10.0	110.4	102.8	7.6	9.1	8.4	0.6	0.00758	0.00094	8,936
Sequence 11	2.0	2.0	24.7	22.0	2.7	2.0	1.8	0.2	0.00138	0.00017	10,492
Sequence 12	2.0	4.0	45.6	42.8	2.8	3.7	3.5	0.2	0.00295	0.00037	9,562
Sequence 13	2.0	6.0	66.0	63.1	2.8	5.4	5.2	0.2	0.00466	0.00058	8,929
Sequence 14	2.0	8.0	87.1	82.8	4.3	7.2	6.8	0.4	0.00655	0.00082	8,334
Sequence 15	2.0	10.0	108.1	101.2	6.9	8.9	8.3	0.6	0.00860	0.00107	7,758

TESTED BY _____ MW/DT _____ DATE April 30, 2014
 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.	009814	Material Code	SSRVPS
Date Sampled:	04/30/14	Station No.:	112+00
Date Tested:	April 30, 2014	Location:	17'LT
Name of Project:	E.PIGEON CREEK STRS. & APPRS.(S)		
County:	Code: 3	Name:	BAXTER
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20141194	AASHTO Class:	A-6(13)
Sample ID:	RV362	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

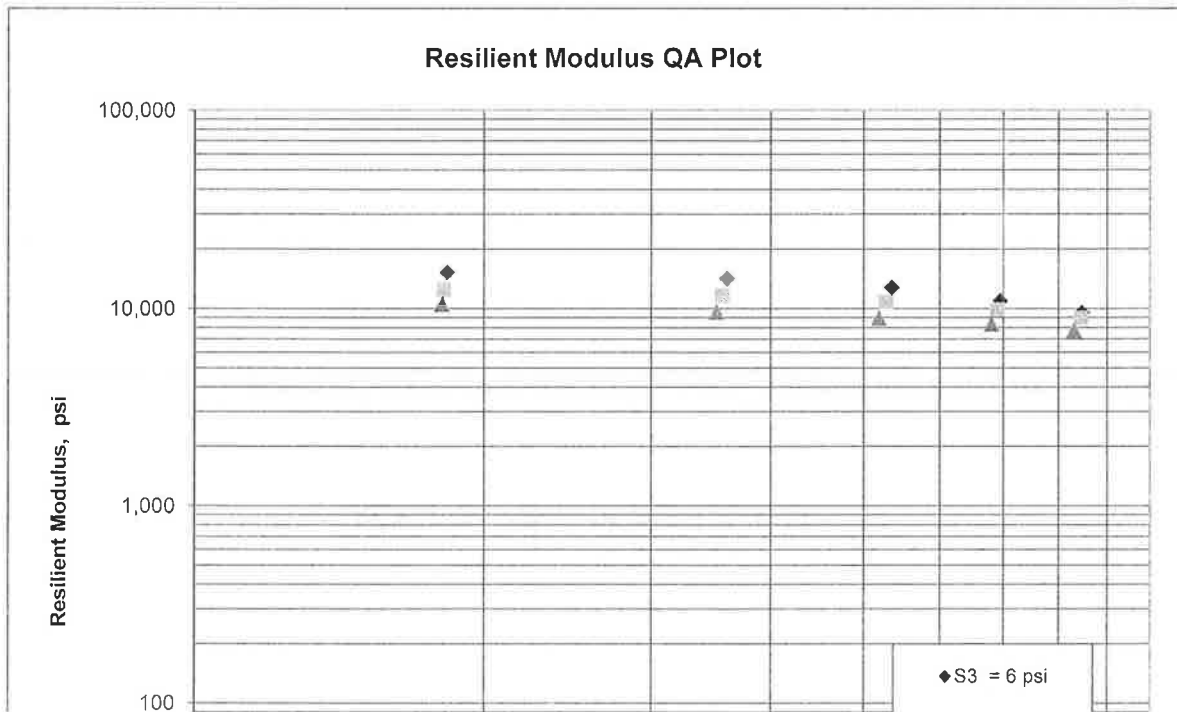
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = 10,241$$

$$K_2 = -0.22815$$

$$K_5 = 0.29219$$

$$R^2 = 0.92$$



JOB: 009814

Arkansas State Highway Transportation Department

JOB NAME: E. PIGEON CREEK STRS. & APPRS. (S)

Materials Division

COUNTY NO. 3 DATE TESTED 4/23/2014

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				
112+00	17LT	0-5	BR/GR	90	96	89	75	65	36	25	A-6(13)	RV362	
103+00	05RT	0-5	BR/GR	100	99	91	89	86	35	22	A-6(17)	S358	25.4
103+00	17RT	0-5	BR/GR	98	88	83	72	57	34	21	A-6(8)	S359	22.2
112+00	05LT	0-5	BR/GR	97	84	76	66	57	37	24	A-6(10)	S360	20.5
112+00	17LT	0-5	BR/GR	82	78	73	63	56	40	27	A-6(11)	S361	19.9

comments:

Friday, May 02, 2014

JOB: 009814

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: E. PIGEON CREEK STRS. & APPRS. (S)

Materials Division

4/23/2014

COUNTY NO. 3

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

103+00	05RT	CHIP SEAL	ACHMSC	AGG.BASE CRS CL-7
		.25	3.5	5.0
103+00	17RT	CHIP SEAL	ACHMSC	AGG.BASE CRS CL-7
		--	--	--
112+00	05LT	CHIP SEAL	ACHMSC	AGG.BASE CRS CL-7
		.25	3.0	5.0
112+00	17LT	CHIP SEAL	ACHMSC	AGG.BASE CRS CL-7
		--	--	--

Comments:

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 04/24/14	SEQUENCE NO.	- 1
JOB NUMBER	- 009814	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 03
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT	- E. PIGEON CREEK STRS. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- BAXTER, COUNTY	DATE SAMPLED	- 04/10/14
SAMPLED BY	- S. FAULKNER	DATE RECEIVED	- 04/11/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 04/23/14
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20141190	- 20141191	- 20141192
SAMPLE ID	- S358	- S359	- S360
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 103+00	- 103+00	- 112+00
LOCATION	- 05RT	- 17RT	- 05LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BR/GR	- BR/GR	- BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 27 43.10	- 36 27 43.00	- 36 27 46.20
LONGITUDE DEG-MIN-SEC	- 92 21 44.70	- 92 21 44.70	- 92 21 34.50
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. -	100	100
	3/8 IN. -	97	99
	NO. 4 - 100	93	97
	NO. 10 - 99	88	84
	NO. 40 - 91	83	76
	NO. 80 - 89	72	66
	NO. 200 - 86	57	57
LIQUID LIMIT	- 35	- 34	- 37
PLASTICITY INDEX	- 22	- 21	- 24
AASHTO SOIL	- A-6(17)	- A-6(8)	- A-6(10)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 25.4	- 22.2	- 20.5
CHIP SEAL (IN)	- .25	-	- .25
ACHMSC (IN)	- 3.5	-	- 3.0
AGG. BASE CRS CL-7 (IN)	- 5.0	-	- 5.0
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
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	-	-	-
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	-	-	-
	-	-	-

REMARKS -

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 04/24/14	SEQUENCE NO.	- 2
JOB NUMBER	- 009814	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 03
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT	- E. PIGEON CREEK STRS. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- BAXTER, COUNTY	DATE SAMPLED	- 04/10/14
SAMPLED BY	- S.FAULKNER	DATE RECEIVED	- 04/11/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 04/23/14
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20141193	-	-
SAMPLE ID	- S361	-	-
TEST STATUS	- INFORMATION ONLY	-	-
STATION	- 112+00	-	-
LOCATION	- 17LT	-	-
DEPTH IN FEET	- 0-5	-	-
MAT'L COLOR	- BR/GR	-	-
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 27 46.30	-	-
LONGITUDE DEG-MIN-SEC	- 92 21 34.60	-	-

% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	- 100	-
	3/8	IN.	- 90	-
	NO. 4	-	- 82	-
	NO. 10	-	- 78	-
	NO. 40	-	- 73	-
	NO. 80	-	- 63	-
	NO. 200	-	- 56	-

LIQUID LIMIT	- 40	-	-
PLASTICITY INDEX	- 27	-	-
AASHTO SOIL	- A-6 (11)	-	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 19.9	-	-

CHIP SEAL	(IN)	-	--	-
ACHMSC	(IN)	-	--	-
AGG.BASE CRS CL-7	(IN)	-	--	-
		-		-
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REMARKS -
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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 - 04/24/14 SEQUENCE NO. - 1
JOB NUMBER - 009814 MATERIAL CODE - RV
FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2003
PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID. - 1
SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 03
SUPPLIER NAME - STATE DISTRICT NO. - 09
NAME OF PROJECT - E. PIGEON CREEK STRS. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - BAXTER, COUNTY DATE SAMPLED - 04/10/14
SAMPLED BY - S.FAULKNER DATE RECEIVED - 04/11/14
SAMPLE FROM - TEST HOLE DATE TESTED - 04/23/14
MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

LAB NUMBER	-	20141194	-	-
SAMPLE ID	-	RV362	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	112+00	-	-
LOCATION	-	17LT	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	BR/GR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	36 27 46.30	-	-
LONGITUDE DEG-MIN-SEC	-	92 21 34.60	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	-
	3/8	IN.	-	-
		100	-	-
	NO. 4	99	-	-
	NO. 10	96	-	-
	NO. 40	89	-	-
	NO. 80	75	-	-
	NO. 200	65	-	-
LIQUID LIMIT	-	36	-	-
PLASTICITY INDEX	-	25	-	-
AASHTO SOIL	-	A-6(13)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
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REMARKS -
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AASHTO TESTS : T24 T88 T89 T90 T265
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