

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. BB0620

FEDERAL AID PROJECT NO. NHPP-40-4-86)161

HWY. 391 INTCHNG. IMPVTS. (S)

STATE HIGHWAY 40 SECTION 33

IN PULASKI 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

June 21, 2016

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. BB0620
Hwy. 391 Intchng. Impvts. (S)
Route 40 Section 33
Pulaski County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of reconstructing the ramps for the Highway 391 Interchange on Interstate 40. Samples were obtained in the entrance and exits ramps and on Maybelline Road.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of moderately plastic sandy clay. Highly plastic clays were encountered at isolated locations within the project limits. Cross-sections are not currently available, but it is assumed 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 conventional processing if the weather conditions are favorable during construction. If embankment is to be placed within the existing ditch line, all soft unstable organic material will need to be undercut prior to embankment construction. It is anticipated that the undercut will be no more than two feet. The undercut may be back filled with locally available unspecified material.

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 at the river ports in Little Rock.

2. Asphalt Concrete Hot Mix

<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	4.9	95.1
Binder Course	4.2	95.8
Base Course	3.8	96.2


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 - 05/31/2016
JOB NUMBER - BB0620

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 60
DISTRICT NO. - 06

JOB NAME - HWY.391 INTCHNG. IMPVTS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB LESS THAN 5

RESILIENT MODULUS
12+00 7058

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.	BB0620	Material Code	SSRVPS
Date Sampled:	5/25/16	Station No.:	12+00
Date Tested:	May 25, 2016	Location:	21'RT
Name of Project:	HWY.391 INTCHNG. IMPVTS. (S)		
County:	Code: 60	Name: PULASKI	
Sampled By:	D.THORTON	Depth:	0-5'
Lab No.:	20161379	AASHTO Class:	A-6(3)
Sample ID:	RV231	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	3.97
Middle	3.96
Bottom	3.96
Average	3.96
Membrane Thickness (in):	0.00
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):	12.34
Initial Volume, AoLo (cu. in):	99.07

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3075.20
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	107.7
Maximum Dry Density (pcf):	16.4
95% of MDD (pcf):	15.6
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3075.20
Compaction Moisture content (%):	16.3
Compaction Wet Density (pcf):	118.28
Compaction Dry Density (pcf):	101.70
Moisture Content After Mr Test (%):	16.2

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

7. Resilient Modulus, Mr: 12749(Sc)^{-0.33838}(S3)^{0.21568}

8. Comments

9. Tested By: C.GARRETT **Date:** May 25, 2016

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

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

Job No. BB0620 **Material Code** SSRVPS
Date Sampled: 5/25/16 **Station No.:** 12+00
Date Tested: May 25, 2016 **Location:** 21'RT

Name of Project: HWY.391 INTCHNG. IMPVTS. (S)

County: Code: 60 **Name:** PULASKI

Sampled By: D.THORTON
Lab No.: 20161379
Sample ID: RV231

Depth: 0-5'
AASHTO Class: A-6(3)
Material Type (1 or 2): 2
LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied		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
			P _{max} lbs	P _{cyclic} lbs							
DESIGNATION	S ₃	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
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.2	22.6	2.5	2.0	1.8	0.2	0.00100	0.00012	14,789
Sequence 2	6.0	4.0	47.1	44.5	2.6	3.8	3.6	0.2	0.00219	0.00027	13,227
Sequence 3	6.0	6.0	69.7	66.2	3.5	5.6	5.4	0.3	0.00360	0.00045	11,951
Sequence 4	6.0	8.0	91.9	85.9	6.0	7.4	7.0	0.5	0.00566	0.00070	9,872
Sequence 5	6.0	10.0	112.4	103.8	8.6	9.1	8.4	0.7	0.00820	0.00102	8,237
Sequence 6	4.0	2.0	25.0	22.4	2.6	2.0	1.8	0.2	0.00112	0.00014	13,074
Sequence 7	4.0	4.0	46.5	43.9	2.6	3.8	3.6	0.2	0.00251	0.00031	11,386
Sequence 8	4.0	6.0	67.4	64.7	2.7	5.5	5.2	0.2	0.00421	0.00052	10,001
Sequence 9	4.0	8.0	89.8	84.6	5.2	7.3	6.9	0.4	0.00628	0.00078	8,772
Sequence 10	4.0	10.0	111.2	103.4	7.8	9.0	8.4	0.6	0.00864	0.00108	7,787
Sequence 11	2.0	2.0	25.0	22.4	2.5	2.0	1.8	0.2	0.00125	0.00016	11,700
Sequence 12	2.0	4.0	46.3	43.7	2.7	3.8	3.5	0.2	0.00282	0.00035	10,086
Sequence 13	2.0	6.0	66.8	63.9	2.8	5.4	5.2	0.2	0.00470	0.00059	8,858
Sequence 14	2.0	8.0	88.0	83.4	4.6	7.1	6.8	0.4	0.00687	0.00086	7,904
Sequence 15	2.0	10.0	109.1	102.1	7.1	8.8	8.3	0.6	0.00941	0.00117	7,058

TESTED BY _____
 REVIEWED BY _____

C.GARRETT

DATE May 25, 2016
 DATE _____

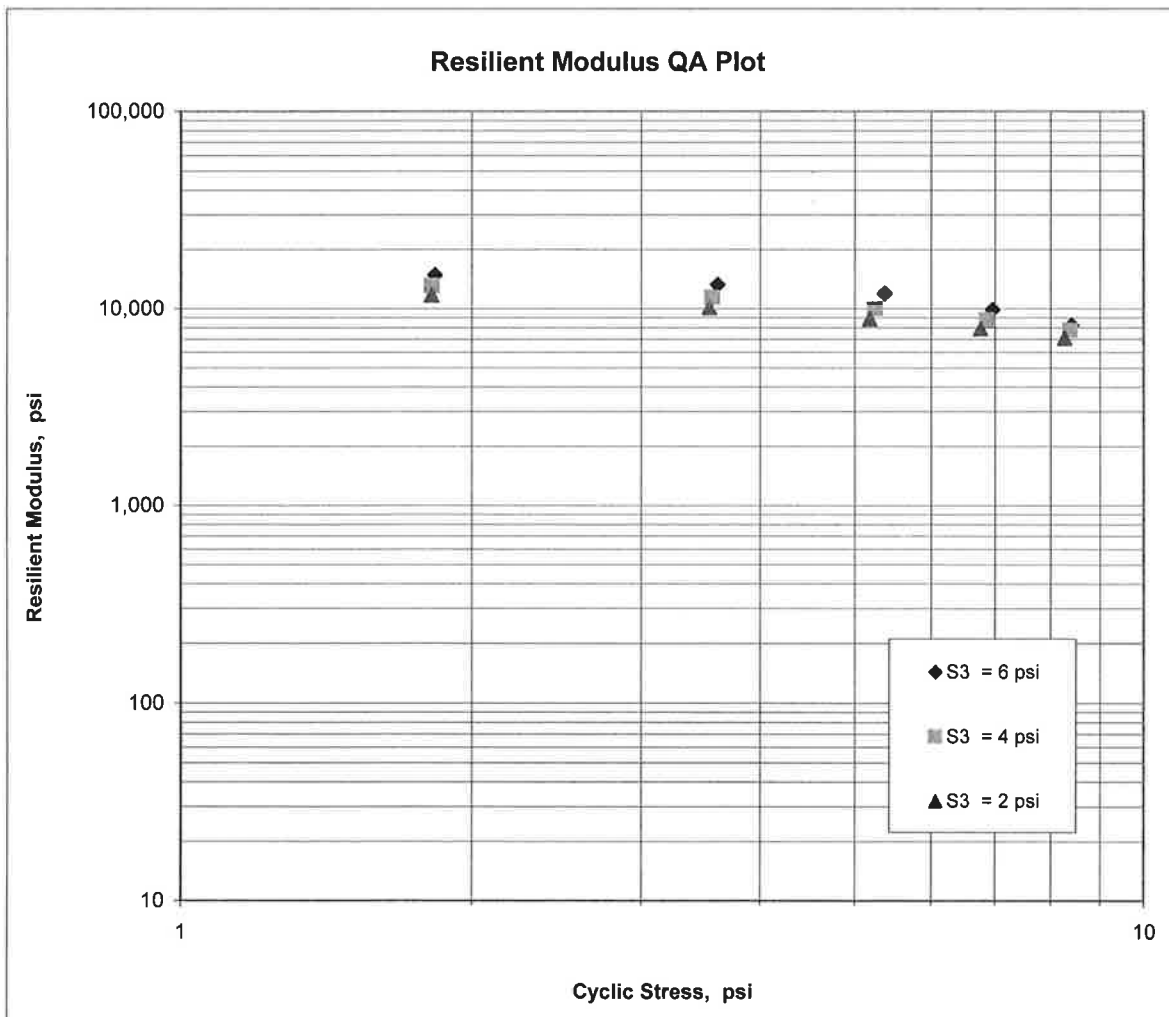
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	BB0620	Material Code	SSRVPS
Date Sampled:	5/25/16	Station No.:	12+00
Date Tested:	May 25, 2016	Location:	21'RT
Name of Project:	HWY.391 INTCHNG. IMPVTS. (S)		
County:	Code: 60	Name:	PULASKI
Sampled By:	D.THORTON	Depth:	0-5'
Lab No.:	20161379	AASHTO Class:	A-6(3)
Sample ID:	RV231	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$K_1 = \underline{12,749}$
 $K_2 = \underline{-0.33838}$
 $K_5 = \underline{0.21568}$
 $R^2 = \underline{0.93}$



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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 06/07/16	SEQUENCE NO.	- 1
JOB NUMBER	- BB0620	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	- 60
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- HWY.391 INTCHNG. IMPVTS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- PULASKI COUNTY	DATE SAMPLED	- 05/10/16
SAMPLED BY	- D.THORTON	DATE RECEIVED	- 05/16/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/31/16
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20161372	- 20161373	- 20161374
SAMPLE ID	- S224	- S225	- S226
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 02+00	- 07+00	- 09+00
LOCATION	- CL	- 05LT	- 06LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BR/GR	- BR/GR	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 47 10.00	- 34 47 9.40	- 34 47 1.60
LONGITUDE DEG-MIN-SEC	- 92 07 37.00	- 92 07 37.20	- 92 07 40.00
% PASSING	2 IN.	-	-
	1 1/2 IN.	-	-
	3/4 IN.	-	- 100
	3/8 IN.	- 100	- 99
	NO. 4	- 99	- 91
	NO. 10	- 99	- 83
	NO. 40	- 98	- 78
	NO. 80	- 96	- 74
	NO. 200	- 79	- 50
LIQUID LIMIT	- 29	- 29	- 25
PLASTICITY INDEX	- 15	- 15	- 8
AASHTO SOIL	- A-6(10)	- A-6(8)	- A-4(1)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 20.6	- 23.9	- 17.3
ACHMSC (IN)	- ---	- ---	- 4.5W
ACHMBC (IN)	- ---	- ---	- 12.5W
PCCP (IN)	- 9.0	- 9.5	- ---
AGG.BASE CRS. CL-7 (IN)	- 5.0	- 7.0	- 5.0

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	- 06/07/16	SEQUENCE NO.	= 2
JOB NUMBER	- BB0620	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	= 60
SUPPLIER NAME	- STATE	DISTRICT NO.	= 06
NAME OF PROJECT	- HWY.391 INTCHNG. IMPVTS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- PULASKI COUNTY	DATE SAMPLED	= 05/10/16
SAMPLED BY	- D.THORTON	DATE RECEIVED	= 05/16/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	= 05/31/16
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20161375	- 20161376	- 20161377
SAMPLE ID	- S227	- S228	- S229
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 10+00	- 12+00	- 12+00
LOCATION	- 05RT	- 06RT	- 21RT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BR/GR	- BROWN	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 47 2.10	- 34 47 2.40	- 34 47 2.30
LONGITUDE DEG-MIN-SEC	- 92 07 53.40	- 92 07 47.70	- 92 07 47.80
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. -	-	-
	3/8 IN. - 100	- 100	- 100
	NO. 4 - 99	- 99	- 97
	NO. 10 - 99	- 98	- 93
	NO. 40 - 85	- 95	- 86
	NO. 80 - 61	- 92	- 83
	NO. 200 - 50	- 81	- 75
LIQUID LIMIT	- 31	- 29	- 50
PLASTICITY INDEX	- 18	- 15	- 34
AASHTO SOIL	- A-6(5)	- A-6(10)	- A-7-6(24)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 22.3	- 22.6	- 28.1
ACHMSC (IN)	- 4.0	- 2.5	- ---
ACHMBC (IN)	- 2.0	- 5.0	- ---
AGG.BASE CRS. CL-7 (IN)	- 8.0	- ---	- ---

REMARKS - W=MULTIPLE LAYERS

JOB: BB0620

Arkansas State Highway Transportation Department

JOB NAME: HWY.391 INTCHNG. IMPVTS. (S)

Materials Division

COUNTY NO. 60 DATE TESTED 5/31/2016

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					
12+00	21RT	0-5	BROWN	69	59	49	44	37	37	24	A-6(3)	RV231	
02+00	CL	0-5	BR/GR	99	99	98	96	79	29	15	A-6(10)	S224	20.6
07+00	05LT	0-5	BR/GR	98	96	94	91	71	29	15	A-6(8)	S225	23.9
09+00	06LT	0-5	BROWN	91	83	78	74	50	25	8	A-4(1)	S226	17.3
10+00	05RT	0-5	BR/GR	99	99	85	61	50	31	18	A-6(5)	S227	22.3
12+00	06RT	0-5	BROWN	99	98	95	92	81	29	15	A-6(10)	S228	22.6
12+00	21RT	0-5	BROWN	97	93	86	83	75	50	34	A-7-6(24)	S229	28.1
14+00	06RT	0-5	BR/GR	99	97	95	90	61	18	3	A-4(0)	S230	19.4

comments: W=MULTIPLE LAYERS

Tuesday, June 07, 2016

JOB: BB0620

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: HWY.391 INTCHNG. IMPVTS. (S)

5/31/2016

COUNTY NO. 60

Michael Benson, Materials Engineer

Materials Division

STA.# LOC.

PAVEMENT SOUNDINGS

02+00	CL	ACHMSC	ACHMBC	PCCP	AGG.BASE CRS. CL-7
		---	---	9.0	5.0
07+00	05LT	ACHMSC	ACHMBC	PCCP	AGG.BASE CRS. CL-7
		---	---	9.5	7.0
09+00	06LT	ACHMSC	ACHMBC	PCCP	AGG.BASE CRS. CL-7
		4.5W	12.5W	---	5.0
10+00	05RT	ACHMSC	ACHMBC	AGG.BASE CRS. CL-7	
		4.0	2.0	8.0	
12+00	21RT	ACHMSC	ACHMBC	AGG.BASE CRS. CL-7	
		---	---	---	
12+00	06RT	ACHMSC	ACHMBC	AGG.BASE CRS. CL-7	
		2.5	5.0	---	
14+00	06RT	ACHMSC	ACHMBC	ACHMSC	AGG.BASE CRS. CL-7
		2.0	5.0	2.0	5.0

comments: W=MULTIPLE LAYERS

Tuesday, June 07, 2016

Page 1 of 1