

ARKANSAS DEPARTMENT OF TRANSPORTATION



**SUBSURFACE INVESTIGATION**

STATE JOB NO. 090445

FEDERAL AID PROJECT NO. HSIP-0004(66)

HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S)

STATE HIGHWAY 12 & 43 SECTION 0 & 1

IN BENTON 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 22, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 090445
Hwy. 12/Hwy. 43 Inters. Safety Impvts. (S)
Routes 12 & 43 Sections 1 & 0
Benton County

Transmitted herewith is the requested Soil Survey, strength data and Resilient Modulus test results for the above referenced job. The project consists of constructing a roundabout at the intersection of Highway 12 and Highway 43. 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 plasticity cherty clay. Cross sections are not currently available, but it is assumed 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 is favorable during construction. Rock was encountered at several locations within the project limits. The locations and depths are listed in Table 1 below.

Table 1 Location and Depth of Rock

Table with 3 columns: Station, Location from Centerline (ft.), and Depth (ft.). Rows include stations 13+00 and 58+00 with their respective locations and depths.

Additional 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 Gravette.

- 2. Asphalt Concrete Hot Mix

Table with 3 columns: Type, Asphalt Cement %, and 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 9 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 - 06/15/2017  
JOB NUMBER - 090445

SEQUENCE NO. - 1  
MATERIAL CODE - SSRV  
SPEC. YEAR - 2014  
SUPPLIER ID. - 1  
COUNTY/STATE - 04  
DISTRICT NO. - 09

JOB NAME - HWY.12/HWY.43 INTERS. SAFETY IMPVTS.(S)

\*\*\*\*\*  
\* STATION LIMITS R-VALUE AT 240 psi \*  
\*\*\*\*\*

BEGIN JOB - END JOB 6

RESILIENT MODULUS  
STA. 58+00 8537

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REMARKS -  
-

AASHTO TESTS : T190

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

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

<b>Job No.</b>	090445	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	5/15/17	<b>Station No.:</b>	58+00
<b>Date Tested:</b>	June 12, 2017	<b>Location:</b>	21RT
<b>Name of Project:</b>	HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S)		
<b>County:</b>	<b>Code:</b> 4	<b>Name:</b>	BENTON
<b>Sampled By:</b>	THORNTON/TAYLOR		
<b>Lab No.:</b>	20171661	<b>Depth:</b>	0-5
<b>Sample ID:</b>	RV379	<b>AASHTO Class:</b>	A-6(20)
<b>LATITUDE:</b>		<b>Material Type (1 or 2):</b>	2
		<b>LONGITUDE:</b>	

**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	3.95
Bottom	3.94
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):	3152.90
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**4. Soil Properties:**

Optimum Moisture Content (%):	17.2
Maximum Dry Density (pcf):	107
95% of MDD (pcf):	101.7
In-Situ Moisture Content (%):	N/A

**5. Specimen Properties:**

Wet Weight (g):	3152.90
Compaction Moisture content (%):	17.7
Compaction Wet Density (pcf):	122.98
Compaction Dry Density (pcf):	104.49
Moisture Content After Mr Test (%):	17.3

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

**7. Resilient Modulus, Mr:** 10620(Sc)<sup>-0.18803</sup>(S3)<sup>0.26341</sup>

**8. Comments** \_\_\_\_\_  
\_\_\_\_\_

**9. Tested By:** GW **Date:** June 12, 2017

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
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**AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS  
RECOMPACTED SAMPLES**

**Job No.** 090445      **Material Code** SSRVPS  
**Date Sampled:** 5/15/17      **Station No.:** 58+00  
**Date Tested:** June 12, 2017      **Location:** 21RT

**Name of Project:** HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S)

**County:** Code: 4      **Name:** BENTON

**Sampled By:** THORNTON/TAYLOR

**Lab No.:** 20171661

**Sample ID:** RV379

**LATITUDE:**

**Depth:** 0-5  
**AASHTO Class:** A-6(20)  
**Material Type (1 or 2):** 2  
**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
			P <sub>max</sub> lbs	P <sub>max</sub> lbs								
Sequence 1	6.0	2.0	25.3	22.5	2.7	2.1	1.9	0.2	0.00098	0.00012	15,130	
Sequence 2	6.0	4.0	47.5	44.7	2.8	3.9	3.7	0.2	0.00205	0.00026	14,347	
Sequence 3	6.0	6.0	70.0	66.4	3.6	5.7	5.5	0.3	0.00335	0.00042	13,068	
Sequence 4	6.0	8.0	93.2	87.1	6.0	7.7	7.2	0.5	0.00498	0.00062	11,529	
Sequence 5	6.0	10.0	115.9	107.4	8.5	9.5	8.8	0.7	0.00673	0.00084	10,506	
Sequence 6	4.0	2.0	25.3	22.5	2.8	2.1	1.8	0.2	0.00113	0.00014	13,133	
Sequence 7	4.0	4.0	47.0	44.3	2.8	3.9	3.6	0.2	0.00241	0.00030	12,115	
Sequence 8	4.0	6.0	68.6	65.8	2.8	5.6	5.4	0.2	0.00385	0.00048	11,268	
Sequence 9	4.0	8.0	91.9	86.7	5.1	7.5	7.1	0.4	0.00540	0.00067	10,578	
Sequence 10	4.0	10.0	114.7	107.1	7.6	9.4	8.8	0.6	0.00717	0.00089	9,834	
Sequence 11	2.0	2.0	25.1	22.4	2.8	2.1	1.8	0.2	0.00135	0.00017	10,891	
Sequence 12	2.0	4.0	46.6	43.9	2.7	3.8	3.6	0.2	0.00285	0.00036	10,143	
Sequence 13	2.0	6.0	67.8	65.0	2.7	5.6	5.3	0.2	0.00445	0.00056	9,612	
Sequence 14	2.0	8.0	89.4	85.2	4.2	7.3	7.0	0.3	0.00627	0.00078	8,948	
Sequence 15	2.0	10.0	112.1	105.5	6.7	9.2	8.7	0.5	0.00814	0.00101	8,537	

TESTED BY \_\_\_\_\_ DATE June 12, 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**

<b>Job No.</b>	090445	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	5/15/17	<b>Station No.:</b>	58+00
<b>Date Tested:</b>	June 12, 2017	<b>Location:</b>	21RT
<b>Name of Project:</b>	HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S)		
<b>County:</b>	<b>Code:</b> 4	<b>Name:</b>	BENTON
<b>Sampled By:</b>	THORNTON/TAYLOR		<b>Depth:</b> 0-5
<b>Lab No.:</b>	20171661	<b>AASHTO Class:</b>	A-6(20)
<b>Sample ID:</b>	RV379	<b>Material Type (1 or 2):</b>	2
<b>LATITUDE:</b>		<b>LONGITUDE:</b>	

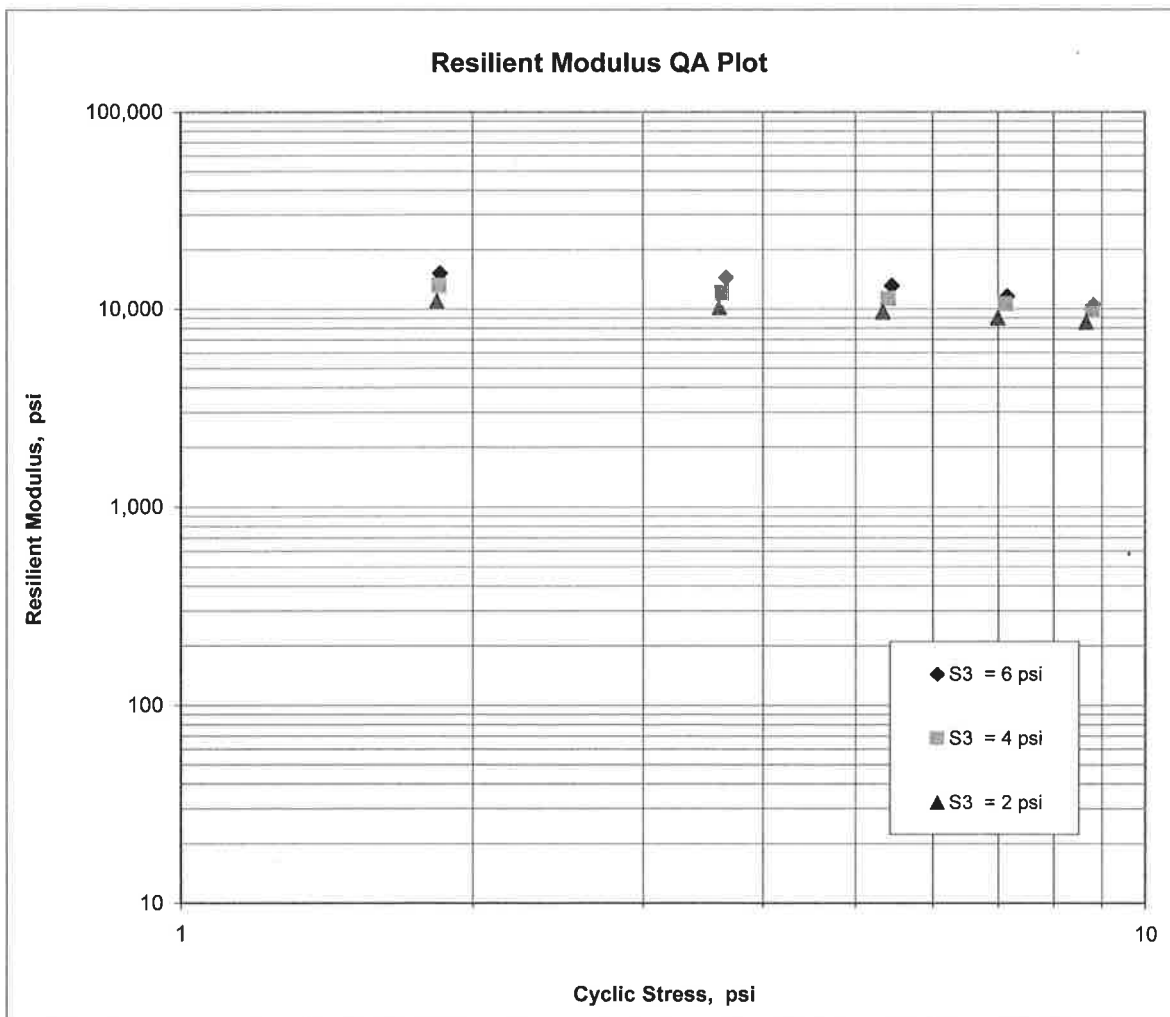
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = \frac{10,620}{\quad}$$

$$K_2 = \frac{-0.18803}{\quad}$$

$$K_5 = \frac{0.26341}{\quad}$$

$$R^2 = \frac{0.95}{\quad}$$



JOB: 090445

Arkansas State Highway Transportation Department

JOB NAME: HWY.12/HWY.43 INTERS. SAFETY IMPVTS.(S)

Materials Division

COUNTY NO. 4 DATE TESTED 6/6/2017

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					
58+00	21 RT	0-4Z	BROWN	100					91	39	22	A-6(20)	RV379	
07+00	06 RT	0-5	BROWN	95	86	78	74	70		30	15	A-6(8)	S371	20
07+00	18 RT	0-5	BROWN	95	88	76	70	65		30	15	A-6(7)	S372	19.7
13+00	06 LT	0-3.5Z	BROWN	96	85	67	62	56		23	9	A-4(2)	S373	13.6
13+00	18 LT	0-4Z	BROWN	90	79	66	60	55		40	21	A-6(8)	S374	14.8
58+00	06 RT	0-4Z	BROWN	98	92	83	80	77		41	24	A-7-6(17)	S375	19.1
58+00	18 RT	0-4Z	BROWN	92	83	77	74	70		35	17	A-6(10)	S376	20.5
63+00	06 LT	0-5	BROWN	89	83	75	71	65		28	11	A-6(5)	S377	13.8
63+00	18 LT	0-5	BROWN	96	92	86	81	77		23	6	A-4(2)	S378	19.9

JOB: 090445

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS.(S)

Materials Division

6/6/2017

COUNTY NO. 4

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

07+00	06 RT	ACHMSC.	ACHMBC	AGG BASE CRS CL-7
		3.75X	---	7.0
07+00	18 RT	ACHMSC.	ACHMBC	AGG BASE CRS CL-7
		---	---	---
13+00	06 LT	ACHMSC.	ACHMBC	AGG BASE CRS CL-7
		3.5W	---	8.0
13+00	18 LT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		---	---	---
58+00	06 RT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		1.0	3.0	8.0
58+00	18 RT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		---	---	---
63+00	06 LT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		1.25	2.75	8.0
63+00	18 LT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
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Comments: X=STRIPPED, Z=AUGER REFUSAL

Monday, June 19, 2017









