

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 090474

FEDERAL AID PROJECT NO. HSIP-0008(38)

HWY. 412 – BERRYVILLE (SAFETY IMPVTS.) (S)

STATE HIGHWAY 21 SECTION 5

IN CARROLL 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 18, 2018

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 090474
Hwy. 412 – Berryville (Safety Impvts.)(Sel. Secs.) (S)
Route 21 Section 5
Carroll County

Transmitted herewith is the requested Soil Survey, strength data and Resilient Modulus test results for the above referenced job. The project consists of making safety improvements at select selections of Highway 21. Samples were taken in the existing travel lanes, and ditch line. The shoulders were not paved within the project limits.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of highly plastic cherty clay. Cross sections are not currently available, but it is assumed the construction grade line will closely match that the existing roadway. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. There were not any slide areas observed within the project limits.

Earthwork recommendations will be made upon request when plans are further developed and cross sections become 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 Berryville.
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 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 - 10/02/2018
JOB NUMBER - 090474

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 08
DISTRICT NO. - 09

JOB NAME - HWY. 412 - BERRYVILLE (SAFETY IMPVTS.)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 7

RESILIENT MODULUS
STA. 114+00 7948

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.	090474	Material Code	SSRVPS
Date Sampled:	8/9/18	Station No.:	114+00
Date Tested:	August 29, 2018	Location:	15'LT
Name of Project:	HWY. 412 - BERRYVILLE (SAFETY IMPVTS.) (SEL. SEC.)(S)		
County:	Code: 8	Name:	CARROLL
Sampled By:	FRAZIER/BATES	Depth:	0-5
Lab No.:	20181809	AASHTO Class:	A-6 (9)
Sample ID:	RV468	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	3.94
Bottom	3.94
Average	3.94
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):	12.12
Initial Volume, AoLo (cu. in):	97.19

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3091.90
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4. Soil Properties:

Optimum Moisture Content (%):	18.2
Maximum Dry Density (pcf):	104.8
95% of MDD (pcf):	99.6
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3091.90
Compaction Moisture content (%):	18.1
Compaction Wet Density (pcf):	121.22
Compaction Dry Density (pcf):	102.64
Moisture Content After Mr Test (%):	18.0

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

7. Resilient Modulus, Mr: 11043(Sc)^{-0.21067}(S3)^{0.19727}

8. Comments

9. Tested By: GW **Date:** August 29, 2018

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
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RECOMPACTED SAMPLES**

Job No. 090474 **Material Code** SSRVPS
Date Sampled: 8/9/18 **Station No.:** 114+00
Date Tested: August 29, 2018 **Location:** 15'LT
Name of Project: HWY. 412 - BERRYVILLE (SAFETY IMPVTS.) (SEL. SEC.)(S)
County: **Name:** CARROLL
Sampled By: FRAZIER/BATES **Depth:** 0-5
Lab No.: 20181809 **AASHTO Class:** A-6 (9)
Sample ID: RV468 **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 Def. LVD T 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	25.0	22.2	2.8	2.1	1.8	0.2	0.00107	0.00013	13,769
Sequence 2	6.0	4.0	47.0	44.2	2.8	3.9	3.6	0.2	0.00225	0.00028	12,998
Sequence 3	6.0	6.0	69.2	65.6	3.6	5.7	5.4	0.3	0.00369	0.00046	11,761
Sequence 4	6.0	8.0	92.0	86.0	6.0	7.6	7.1	0.5	0.00555	0.00069	10,261
Sequence 5	6.0	10.0	113.5	105.1	8.4	9.4	8.7	0.7	0.00773	0.00096	8,998
Sequence 6	4.0	2.0	25.0	22.2	2.8	2.1	1.8	0.2	0.00120	0.00015	12,231
Sequence 7	4.0	4.0	46.6	43.8	2.8	3.8	3.6	0.2	0.00254	0.00032	11,433
Sequence 8	4.0	6.0	67.9	65.1	2.8	5.6	5.4	0.2	0.00411	0.00051	10,486
Sequence 9	4.0	8.0	90.8	85.6	5.1	7.5	7.1	0.4	0.00589	0.00073	9,628
Sequence 10	4.0	10.0	112.8	105.2	7.5	9.3	8.7	0.6	0.00802	0.00100	8,686
Sequence 11	2.0	2.0	25.0	22.2	2.8	2.1	1.8	0.2	0.00142	0.00018	10,319
Sequence 12	2.0	4.0	46.6	43.7	2.8	3.8	3.6	0.2	0.00291	0.00036	9,934
Sequence 13	2.0	6.0	67.6	64.8	2.8	5.6	5.3	0.2	0.00458	0.00057	9,367
Sequence 14	2.0	8.0	89.1	84.9	4.2	7.4	7.0	0.3	0.00652	0.00081	8,612
Sequence 15	2.0	10.0	110.9	104.3	6.6	9.2	8.6	0.5	0.00868	0.00108	7,948

TESTED BY _____ DATE August 29, 2018
 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.	090474	Material Code	SSRVPS
Date Sampled:	8/9/18	Station No.:	114+00
Date Tested:	August 29, 2018	Location:	15'LT
Name of Project:	HWY. 412 - BERRYVILLE (SAFETY IMPVTS.) (SEL. SEC.)(S)		
County:	Code: 8	Name:	CARROLL
Sampled By:	FRAZIER/BATES	Depth:	0-5
Lab No.:	20181809	AASHTO Class:	A-6 (9)
Sample ID:	RV468	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

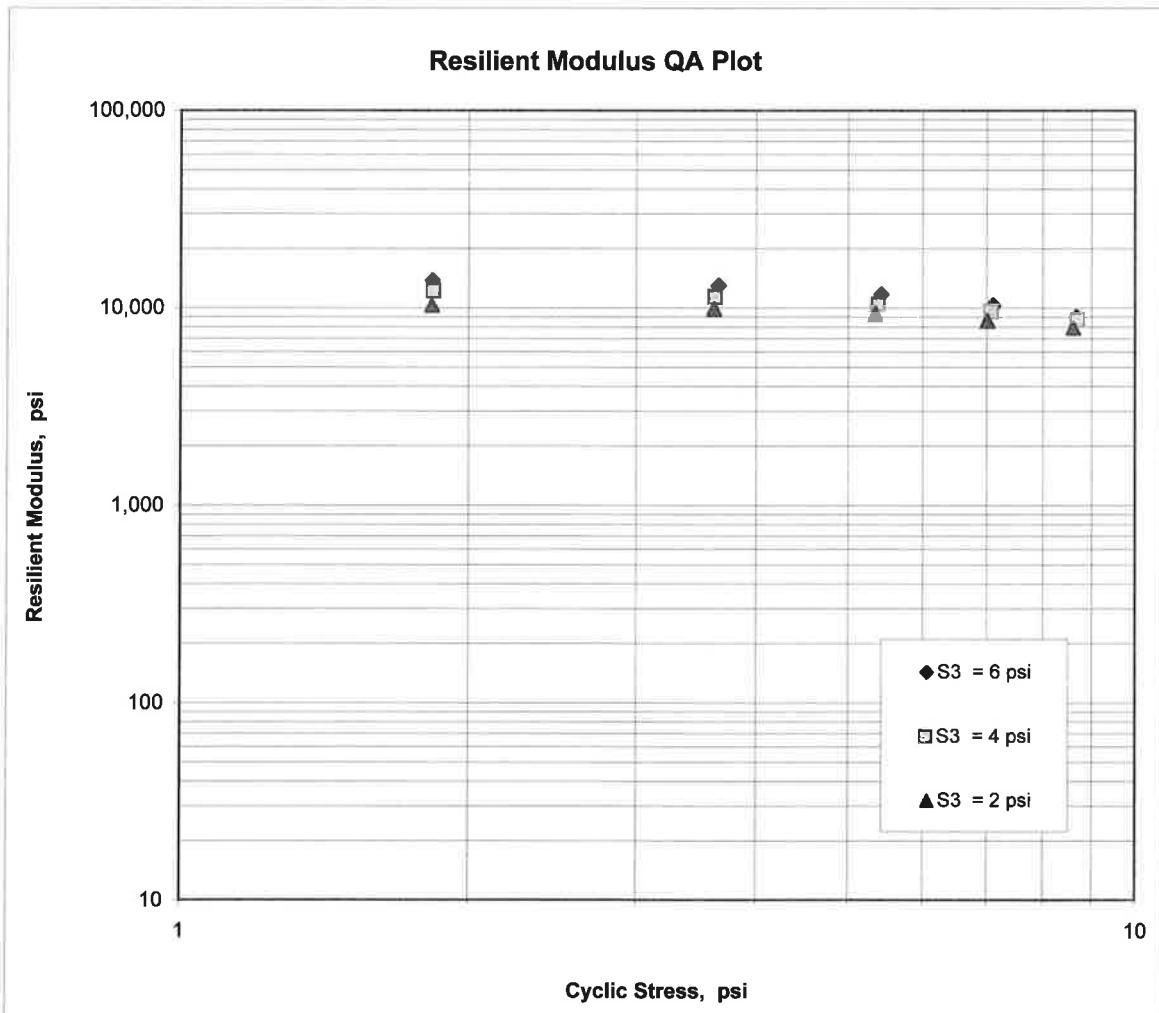
$$M_R = K_1 (S_c)^{K_2} (S_3)^{K_5}$$

$$K_1 = \underline{\underline{11,043}}$$

$$K_2 = \underline{\underline{-0.21067}}$$

$$K_5 = \underline{\underline{0.19727}}$$

$$R^2 = \underline{\underline{0.89}}$$



JOB: 090474

Arkansas State Highway Transportation Department

JOB NAME: HWY. 412 - BERRYVILLE (SAFETY IMPVTS.)

Materials Division

COUNTY NO. 8 DATE TESTED 9/28/2018

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					
114+00	15 LT	0-5	RD/BR	81	69	62	59	56	39	23	A-6 (9)	RV468	
106+00	05 RT	0-5	RD/BR	79	64	57	47	44	39	26	A-6 (6)	S464	21.5
106+00	15 RT	0-5	RD/BR	80	70	62	55	51	39	25	A-6 (9)	S465	16.5
114+00	05 LT	0-5	RD/BR	87	78	73	69	66	48	31	A-7-6(18)	S466	20.7
114+00	15 LT	0-5	RD/BR	77	62	55	51	46	42	25	A-7-6 (7)	S467	24.7

JOB: 090474

**Arkansas State Highway Transportation Department
Materials Division**

DATE TESTED
9/28/2018

JOB NAME: HWY. 412 - BERRYVILLE (SAFETY IMPVTS.)

COUNTY NO. 8

Michael Benson, Materials Engineer

STA.# LOC. [Redacted] **PAVEMENT SOUNDINGS**

106+00	05 RT	ACHMSC 4.5W	ACHMBC 5.5W	AGG. BASE CRS. CL-7 5.0
106+00	15 RT	ACHMSC	ACHMBC	AGG. BASE CRS. CL-7
114+00	05 LT	ACHMSC 5.0W	ACHMBC 3.0	AGG. BASE CRS. CL-7 6.0

comments: W=MULTIPLE LAYERS

