

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 070380

FEDERAL AID PROJECT NO. NHPP-0070(39)

HAYNES CREEK STR. & APPRS. (S)

STATE HIGHWAY 335 SECTION 2

IN _____ UNION _____ 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

August 14, 2019

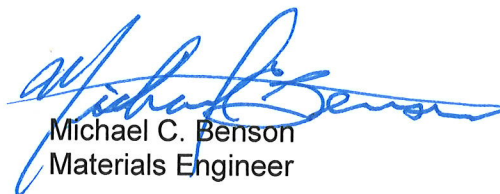
TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 070380
Haynes Creek Str. & Apprs. (S)
Union County
Route 335 Section 2

Transmitted herewith are a brief summary of the geology and site conditions, summary of percent material passing #200 sieve and Atterberg Limits test results (for liquefaction susceptibility analysis), D50 scour analysis, and the logs of the borings conducted for the structure and approaches of the above referenced project. The samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications.

This project consists of replacing the Highway 335 Bridge, over Haynes Creek, west of the town of Norphlet. The new bridge will be constructed to the south of the existing. Three of the five requested borings were inaccessible due to steep slopes and high water levels in the channel. The three borings that were not obtained were located at: 210+43 C.L. Construction, 211+08 C.L. Construction, and 211+73 C.L. Construction. The obtained borings are anticipated to represent uniform site conditions and should be adequate to design the proposed pile foundations.

Embankment analyses included global stability with seismic design consideration utilizing a horizontal acceleration coefficient of 0.157, as provided by Bridge Design. The proposed embankment configuration provides for a satisfactory Factor of Safety for seismic and static conditions. If you have any questions concerning these recommendations, please contact the Geotechnical Section.



Michael C. Benson
Materials Engineer

MCB:rpt:mlg

cc: State Construction Engineer - Master File Copy
District 7 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS

Job No. 070380

Haynes Creek Str. & Apprs. (S)

Union County

Route 335, Section 2

Site Conditions

The existing Route 335 Bridge is an 11 span bridge that crosses Haynes Creek, northeast of Norphlet. The superstructure of the bridge consists of pre-cast concrete decking with concrete curbs. The bridge decking is supported by octagonal concrete trestle pilings with concrete caps. There are old timber pilings under the existing bridge from a previous structure. There is steel guardrail leading up to the bridge and steel guardrail supported by concrete posts crossing the bridge. The east bridge endslope has been reinforced with asphalt millings. Haynes Creek runs south to north under the bridge. The project alignment is located in the El Dorado Oilfield and there are multiple pump jacks and oil tanks surrounding the existing bridge. A pump jack is located approximately 90 feet northwest of the bridge and a pump jack with overhead powerlines leading to it is located approximately 200 feet southeast of the bridge. Overhead powerlines and telephone lines parallel the left side of the bridge and the phone line runs underground crossing the river. There is buried fiber optic leading up to the northeast side of the bridge and running loose on the ground crossing the bridge. The area surrounding the bridge is primarily dense vegetation.

Site Geology

The existing bridge is located on Quaternary aged alluvial deposits overlying older Paleogene deposits of the Claiborne Group. Alluvial deposits consist of gravel, sand, silt, clay and mixtures of any and/or all of these. These deposits form as streams and rivers erode and rework older sediment. The Paleogene deposits below the alluvium are depicted on some maps as belonging to the Eocene aged Cook Mountain Formation of the Claiborne Group. The Cook Mountain Formation consists of carbonaceous and glauconitic clay with minor amounts of sand and silt.

Scour Potential

Based on the scour sample taken at the existing bridge, the banks of the channel consist primarily of silty sand (SM). This is considered a highly scourable sediment size due to the lack of cohesion in this type of soil. The only evidence of scour observed at the existing bridge was located on the west endslope under the bridge end (See Figure 1). This scour is most likely why the east bridge endslope was plated with asphalt millings (See Figure 2). It appears that the scour located under the west bridge end is due more to runoff than from the river current. However, due to the sediment size encountered in the scour sample, caution should be taken when designing the endslopes for the new bridge.



Figure 1. Scour of the west endslope.

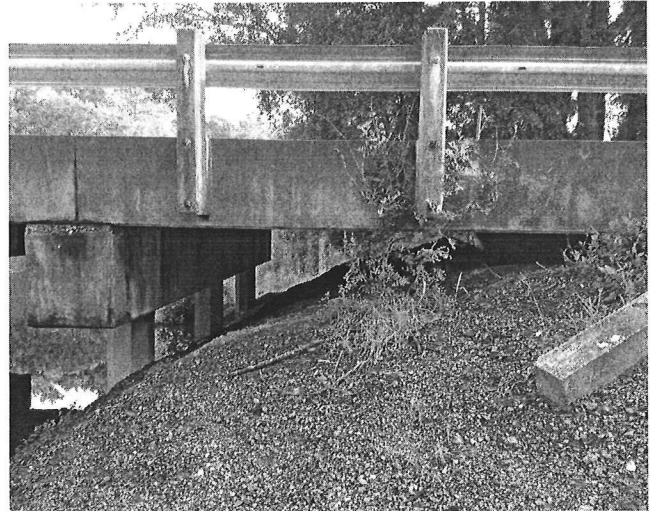


Figure 2. Plating on the east endslope.

Subsurface Conditions

Based on the boring logs, the subsurface stratigraphy may be generalized as follows:

- 0 - 29.7 Feet: Varies from moist to wet, very loose to medium dense, light brown to light gray **sandy silt to silt with some clay**.
- 29.7 - 40.0 Feet: Varies from wet, medium dense, gray **silt to sandy silt** to moist, very stiff, dark brown **clay with sand and traces of gravel**.
- 40.0 - 80.0 Feet: Consists of moist, very stiff to hard, gray **clay to clay with sand and some gravel**.
- 80.0 – 85.0 Feet: Varies from moist, very stiff to very hard, dark brown **clay with sand** to moist, dense, gray **silt with some lignite**.
- 85.0 – 121.5 Consists of moist, very stiff to very hard, dark brown to gray **clay to clay with sand and occasional cemented sand layers**.*

*Some poorly **cemented sandstone layers** were encountered between 95 and 100 feet below ground level in the boring at station 212+63.

Lab Test Summary

Project Number: 070380
 Project Name: Haynes Creek Str. & Apprs. (S)

Station	Location	Depth (ft.)	Plastic Limit	Liquid Limit	Plasticity Index	% Passing No. 200	Unified Soil Classification
212+63	37' Lt Const. C.L.	4.4	NP			12	SP-SM
212+63	37' Lt Const. C.L.	9.3	NP			16	SM
212+63	37' Lt Const. C.L.	14.3	NP			2	SP
212+63	37' Lt Const. C.L.	20	NP			14	SM
212+63	37' Lt Const. C.L.	25	26	35	9	86	ML
212+63	37' Lt Const. C.L.	30	27	31	4	93	ML
212+63	37' Lt Const. C.L.	35	NP			68	ML
212+63	37' Lt Const. C.L.	40	18	45	27	99	CL
212+63	37' Lt Const. C.L.	45	22	48	26	90	CL
212+63	37' Lt Const. C.L.	50	16	48	32	96	CL
212+63	37' Lt Const. C.L.	55	17	32	15	84	CL
212+63	37' Lt Const. C.L.	60	15	39	24	81	CL
212+63	37' Lt Const. C.L.	65	15	35	20	71	CL
212+63	37' Lt Const. C.L.	70	19	44	25	75	CL
212+63	37' Lt Const. C.L.	75	22	32	10	77	CL
212+63	37' Lt Const. C.L.	80	25	35	10	93	ML
212+63	37' Lt Const. C.L.	85	23	40	17	99	CL
212+63	37' Lt Const. C.L.	90	25	40	15	96	CL
212+63	37' Lt Const. C.L.	120	17	41	24	88	CL

**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

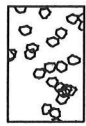
Job No. 070380

Creek Name	Station	Sample Type	Location	Depth (ft.)	Soil Description	Aggregate Size (D50) (in.)
Haynes Creek	211+92	Creek Bank	Lt Const. C.L.	N/A	SM Silty Sand	0.0049

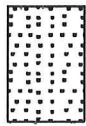
LEGEND

SOIL TYPES

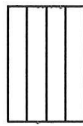
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL



SAND



SILT



CLAY



ORGANIC
MATTER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)

SHELBY TUBE



UNDISTURBED
SAMPLE
RECOVERY



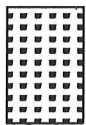
DISTURBED
SAMPLE
RECOVERY



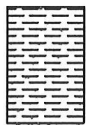
NO
RECOVERY

ROCK TYPES

(SHOWN IN SYMBOL COLUMN)



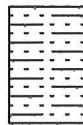
SANDSTONE



SHALE
or
SILTSTONE



LIMESTONE
or
DOLOMITE



ALTERNATING
LAYERS of
SHALE and
SANDSTONE



OTHER

SPLIT SPOON



SAMPLE
RECOVERY



NO
RECOVERY

ROCK CORING



% RECOVERY
INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
"N" Value	Density	"N" Value	Consistency	"N" Value	Consistency	"N" Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	2-4	Soft	31-60	Soft
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2'	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows: Medium Hard	
		Over 60	Very Hard	Over 60	Very Hard	Less than 2'	
						Penetration	
						in 60 Blows: Hard	

1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by

adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows/ft}$. The "N" Value corrected to 60% efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1
PAGE 1 OF 3

JOB NO. 070380 Union County
JOB NAME: Haynes Creek Str. & Apprs. (S)
Route 335, Section 2
STATION: 209+69
LOCATION: 28' Left of Construction Centerline
LOGGED BY: Austin Dillman

DATE: July 23, 2019
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 8400
HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 101.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 106.1									
5			Sand with Gravel									
10			Moist, Very Loose, Brown Clayey Sand							3 2-2		
15			Moist, Soft, Gray Sandy Clay*									
20			Wet, Loose, Gray Sand with Silt							2 3-3		
25			Wet, Loose, Gray Sand with Silt and Trace Organic Matter (Wood)							1 4-4		
30			Wet, Loose, Gray Sand with Silt							3 3-2		
35			Wet, Loose, Gray Sand with Silt							3 4-4		

REMARKS: * No blow counts recorded.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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PAGE 2 OF 3

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			SURFACE ELEVATION: 106.1									
40		X	Moist, Very Stiff, Dark Brown Clay with Sand and Trace Gravel							4 7-10		
45		X								5 10-12		
50		X	Moist, Very Stiff, Dark Brown Clay with Sand							7 12-15		
55		X								4 8-13		
60		X								5 9-14		
65		X								8 14-16		
70		X								8 14-16		

REMARKS: * No blow counts recorded.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1
PAGE 3 OF 3

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			SURFACE ELEVATION: 106.1									
75			Moist, Hard, Dark Brown Clay with Sand							9 14-21		
80			Moist, Hard, Dark Gray Silty Clay							14 21-25		
85			Moist, Very Hard, Dark Brown Clay with Sand							14 20-44		
90			Moist, Very Stiff to Hard, Dark Brown Clay with Sand							9 10-20		
95			Moist, Very Stiff to Hard, Dark Brown Clay with Sand							9 18-20		
100			Boring Terminated							8 14-15		
105												

REMARKS: * No blow counts recorded.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 1 OF 4

JOB NO. 070380 Union County
JOB NAME: Haynes Creek Str. & Apprs. (S)
Route 335, Section 2
STATION: 212+63
LOCATION: 37' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: July 16 and 17, 2019
TYPE OF DRILLING:
Hollow Stem Auger - Rotary Wash
EQUIPMENT: CME 75
HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 106.7									
			Asphalt									
5		X	Moist, Loose, Light Brown Poorly Graded Sand with Silt	SP-SM	NP					$\frac{3}{3-2}$		
10		X	Wet, Loose, Light Brown Silty Sand	SM	NP					$\frac{3}{3-3}$		
15		X	Wet, Very Loose, Light Gray Poorly Graded Sand	SP	NP					$\frac{0}{0-1}$		
20		X	Wet, Medium Dense, Light Brown Silty Sand	SM	NP					$\frac{5}{6-7}$		
25		X		ML	26		35			$\frac{4}{5-7}$		
30		X	Wet, Medium Dense, Gray Silt	ML	27		31			$\frac{6}{9-16}$		
35												

REMARKS: *Water loss at approximately 118.5' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 2 OF 4

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			SURFACE ELEVATION: 106.7									
40		X	Wet, Medium Dense, Gray Sandy Silt	ML	NP					5 6-12		
45		X	Moist, Very Stiff, Gray Lean Clay (Claiborne Group)	CL	18		45			6 10-14		
50		X	Moist, Hard, Gray Lean Clay with Some Sand	CL	22		48			10 13-19		
55		X	Moist, Very Stiff, Gray Clay	CL	16		48			8 11-16		
60		X	Moist, Very Stiff, Gray Lean Clay with Sand	CL	17		32			7 11-13		
65		X		CL	15		39			8 12-18		
70		X		CL	15		35			10 16-20		

REMARKS: *Water loss at approximately 118.5' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 3 OF 4

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			SURFACE ELEVATION: 106.7									
75			Moist, Hard, Gray Lean Clay with Sand	CL	16		44			9 15-19		
80				CL	22		32			9 14-21		
85			Moist, Dense, Gray Silt with Some Lignite	ML	25		35			12 20-28		
90			Moist, Hard, Gray Lean Clay	CL	23		40			11 16-23		
95			Moist, Very Hard, Gray Lean Clay	CL	25		40			11 16-30 (11")		
			Gray, Cemented Sand							20 (0")		
100			Sandy Clay with Frequent Cemented Sand Layers									
105												

REMARKS: *Water loss at approximately 118.5' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**




BORING NO. 2
PAGE 4 OF 4

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			SURFACE ELEVATION: 106.7									
110			Sandy Clay*	-								
115												
120			Moist, Hard, Gray Lean Clay with Some Sand	CL	17		41			19 21-21		
			Boring Terminated									
125												
130												
135												
140												

REMARKS: *Water loss at approximately 118.5' below ground level.



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

June 6, 2018

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 070380
Haynes Creek Str. & Apprs. (S)
Route 335 Section 2
Union 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 Haynes Creek on Highway 335. Samples were taken in the existing travel lanes and ditch line. The shoulders are not paved within the project limits.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of non-plastic sands. Cross-sections are not currently available, but it is assumed the construction grade line will closely match that of the existing roadway.

The proposed new location is south of the existing road and crosses an area that floods based on seasonal conditions. Subgrade stabilization will most likely be required to provide a stable working platform. It is recommended that 7% Portland cement (by dry wt.) mixed to a depth of 16 inches be used for quantity estimation purposes. Earthwork recommendations will be made upon requests 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 of Little Rock.
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 7 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 - 05/02/2018
JOB NUMBER - 070380

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 70
DISTRICT NO. - 07

JOB NAME - HAYNES CREEK STR. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 28
RESILIENT MODULUS
STA. 204+00 5364

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.	070380	Material Code	SSRVPS
Date Sampled:	3/19/18	Station No.:	204+00
Date Tested:	May 1, 2018	Location:	21'RT
Name of Project:	HAYNES CREEK STR. & APPRS. (S)		
County:	Code: 70	Name:	UNION
Sampled By:	THORNTON/BATES	Depth:	0-5
Lab No.:	20180578	AASHTO Class:	A-2-4 (0)
Sample ID:	RV 144	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	3.95
Middle	3.95
Bottom	3.95
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):	3209.40
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	11.0
Maximum Dry Density (pcf):	116.3
95% of MDD (pcf):	110.5
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3209.40
Compaction Moisture content (%):	10.7
Compaction Wet Density (pcf):	125.19
Compaction Dry Density (pcf):	113.09
Moisture Content After Mr Test (%):	10.7

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

#VALUE!

7. Resilient Modulus, Mr:

3807(S_c)^{0.06884}(S₃)^{0.48059}

8. Comments

9. Tested By:

GW

Date: May 1, 2018

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

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

Job No. 070380 **Material Code** SSRVPS
Date Sampled: 3/19/18 **Station No.:** 204+00
Date Tested: May 1, 2018 **Location:** 21'RT

Name of Project: HAYNES CREEK STR. & APPRS. (S)

County: Code: 70 **Name:** UNION

Sampled By: THORNTON/BATES

Lab No.: 20180578

Sample ID: RV 144

LATTITUDE:

Depth: 0-5

AAASHTO Class: A-2-4 (0)

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
	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	22.1	2.8	2.0	1.8	0.2	0.00148	0.00018	9,859
Sequence 2	6.0	4.0	47.2	44.4	2.9	3.9	3.6	0.2	0.00295	0.00037	9,917
Sequence 3	6.0	6.0	69.9	66.2	3.7	5.7	5.4	0.3	0.00436	0.00054	10,005
Sequence 4	6.0	8.0	94.0	87.8	6.1	7.7	7.2	0.5	0.00565	0.00070	10,232
Sequence 5	6.0	10.0	118.3	109.8	8.6	9.7	9.0	0.7	0.00693	0.00086	10,428
Sequence 6	4.0	2.0	24.4	21.6	2.8	2.0	1.8	0.2	0.00175	0.00022	8,130
Sequence 7	4.0	4.0	45.6	42.8	2.8	3.7	3.5	0.2	0.00359	0.00045	7,845
Sequence 8	4.0	6.0	66.8	63.9	2.9	5.5	5.2	0.2	0.00544	0.00068	7,736
Sequence 9	4.0	8.0	91.0	85.7	5.3	7.5	7.0	0.4	0.00682	0.00085	8,273
Sequence 10	4.0	10.0	115.3	107.6	7.7	9.5	8.8	0.6	0.00806	0.00101	8,786
Sequence 11	2.0	2.0	23.1	20.3	2.8	1.9	1.7	0.2	0.00247	0.00031	5,423
Sequence 12	2.0	4.0	42.8	39.9	2.8	3.5	3.3	0.2	0.00490	0.00061	5,364
Sequence 13	2.0	6.0	63.3	60.4	2.9	5.2	5.0	0.2	0.00690	0.00086	5,771
Sequence 14	2.0	8.0	86.0	81.6	4.4	7.1	6.7	0.4	0.00846	0.00105	6,355
Sequence 15	2.0	10.0	108.9	102.0	6.9	8.9	8.4	0.6	0.01004	0.00125	6,689

TESTED BY _____ DATE May 1, 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.:	070380	Material Code:	SSRVPS
Date Sampled:	3/19/18	Station No.:	204+00
Date Tested:	May 1, 2018	Location:	21'RT
Name of Project:	HAYNES CREEK STR. & APPRS. (S)		
County:	Code: 70	Name:	UNION
Sampled By:	THORNTON/BATES		
Lab No.:	20180578	Depth:	0-5
Sample ID:	RV 144	AASHTO Class:	A-2-4 (0)
LATITUDE:		Material Type (1 or 2):	2
		LONGITUDE:	

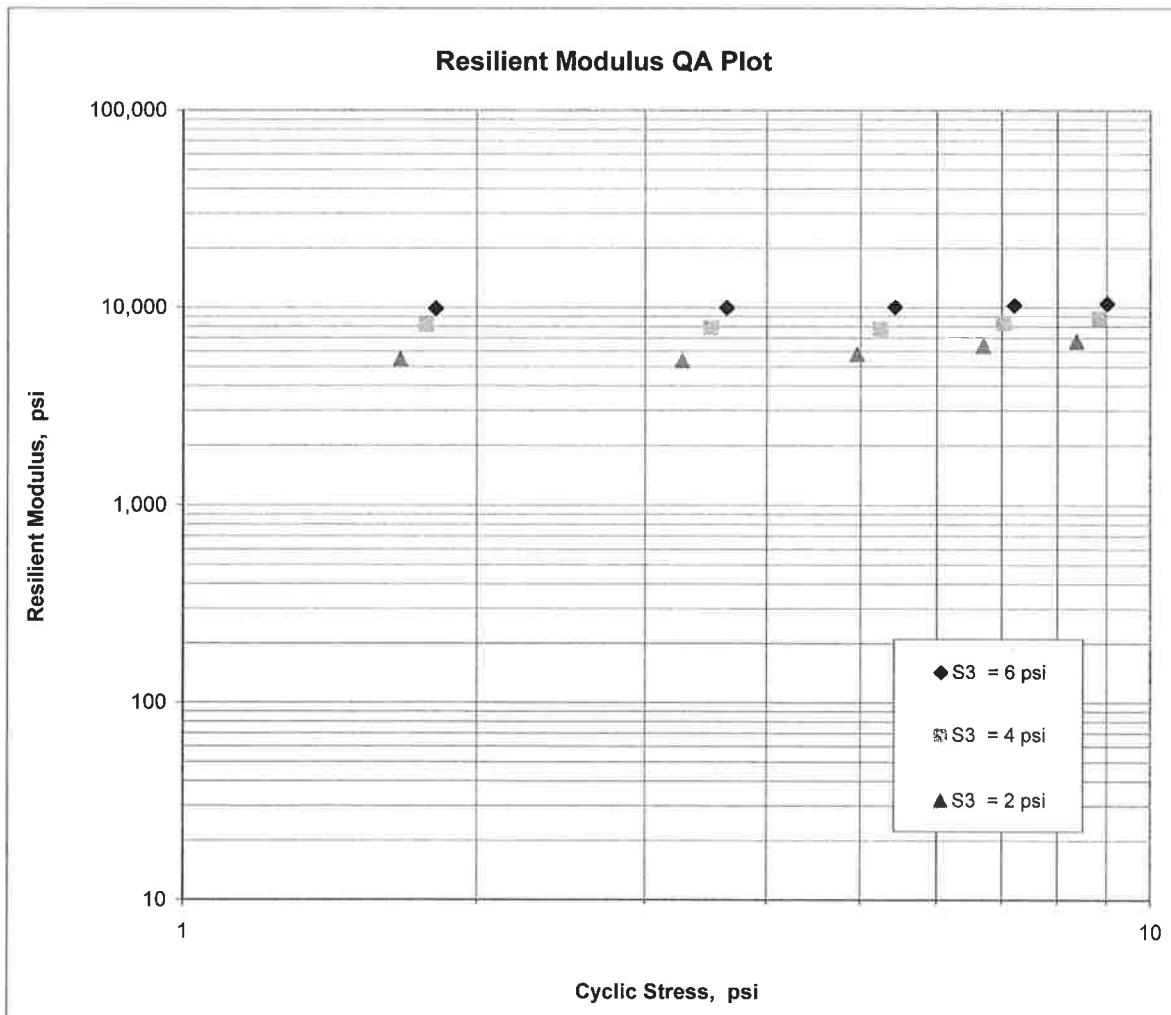
$$M_R = K_1 (S_c)^{K_2} (S_3)^{K_5}$$

$$K_1 = \underline{3,807}$$

$$K_2 = \underline{0.06884}$$

$$K_5 = \underline{0.48059}$$

$$R^2 = \underline{0.96}$$



JOB: 070380

Arkansas State Highway Transportation Department

JOB NAME: HAYNES CREEK STR. & APPRS. (S)

Materials Division

COUNTY NO. 70 DATE TESTED

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				
204+00	21 RT	0-5	BROWN										
204+00	06 RT	0-5	BROWN	98	97	95	76	39	ND	NP	A-4(0)	S140	16.8
204+00	21 RT	0-5	BROWN	99	99	98	81	37	ND	NP	A-4(0)	S141	18.8
221+00	06 LT	0-5	BROWN	88	83	74	55	23	ND	NP	A-2-4(0)	S142	16.8
221+00	25 LT	0-5	BROWN	99	97	92	64	42	ND	NP	A-4(0)	S143	13

comments: W=MULTIPLE LAYERS, X=STRIPPED

Tuesday, May 15, 2018

JOB: 070380

JOB NAME: HAYNES CREEK STR. & APPRS. (S)

*Arkansas State Highway Transportation Department
Materials Division*

DATE TESTED

4/10/2018

COUNTY NO. 70

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

204+00	06 RT	BST	BST	AGG. BASE CRS CL-7
		3.0W	---	6.0
204+00	21 RT	BST	BST	AGG. BASE CRS CL-7
		---	---	---
221+00	06 LT	BST	BST	AGG. BASE CRS CL-7
		2.0XW	2.0	7.0

comments: W=MULTIPLE LAYERS, X=STRIPPED

Tuesday, May 15, 2018

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 05/08/18	SEQUENCE NO.	- 1
JOB NUMBER	- 070380	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	- 70
SUPPLIER NAME	- STATE	DISTRICT NO.	- 07
NAME OF PROJECT	- HAYNES CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 03/19/18
LOCATION	- UNION COUNTY	DATE RECEIVED	- 03/20/18
SAMPLED BY	- THORNTON/BATES	DATE TESTED	- 04/10/18
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20180574	- 20180575	- 20180576
SAMPLE ID	- S140	- S141	- S142
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 204+00	- 204+00	- 221+00
LOCATION	- 06 RT	- 21 RT	- 06 LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BROWN	- BROWN	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 33 19 23.00	- 33 19 22.90	- 33 19 27.30
LONGITUDE DEG-MIN-SEC	- 92 37 31.10	- 92 37 31.10	- 92 37 14.30
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. - 100	- 100	- 100
	3/8 IN. - 99	- 99	- 99
	NO. 4 - 98	- 99	- 88
	NO. 10 - 97	- 99	- 83
	NO. 40 - 95	- 98	- 74
	NO. 80 - 76	- 81	- 55
	NO. 200 - 39	- 37	- 23
LIQUID LIMIT	- ND	- ND	- ND
PLASTICITY INDEX	- NP	- NP	- NP
AASHTO SOIL	- A-4 (0)	- A-4 (0)	- A-2-4 (0)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 16.8	- 18.8	- 16.8
BST (IN)	- 3.0W	- ---	- 2.0XW
BST (IN)	- ---	- ---	- 2.0
AGG. BASE CRS CL-7 (IN)	- 6.0	- ---	- 7.0
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265
:

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS

MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL ANALYSIS TEST REPORT ***

DATE - 05/02/2018 SEQUENCE NO. - 1
 JOB NUMBER - 070380 MATERIAL CODE - RV
 FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2014
 PURPOSE - INFORMATION ONLY SAMPLE SUPPLIER ID. - 1
 SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 70
 SUPPLIER NAME - STATE DISTRICT NO. - 07
 NAME OF PROJECT - HAYNES CREEK STR. & APPRS. (S)
 PROJECT ENGINEER - NOT APPLICABLE
 PIT/QUARRY - ARKANSAS
 LOCATION - UNION COUNTY SAMPLED - 03/19/2018
 SAMPLED BY - THORNTON/BATES RECEIVED - 03/20/2018
 SAMPLE FROM - TEST HOLE TESTED - 04/10/2018
 MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

DESCRIPTIONS	SAMPLE 1	SAMPLE 2	SAMPLE 3
LAB NUMBER	20180578	-	-
SAMPLE ID	RV144	-	-
TEST STATUS	INFORMATION ONLY	-	-
STATION	204+00	-	-
LOCATION	21'RT	-	-
DEPTH IN FEET	0-5	-	-
COLOR	BROWN	-	-
% PASS 2 IN.	-	-	-
1 1/2 IN.	100	-	-
3/4 IN.	90	-	-
3/8 IN.	90	-	-
NO. 4	89	-	-
NO. 10	88	-	-
NO. 40	87	-	-
NO. 80	70	-	-
NO. 200	34	-	-
LIQUID LIMIT	ND	-	-
PLASTICITY INDEX	NP	-	-
AASHTO SOIL CLS.	A-2-4(0)	-	-
UNIFIED SOIL CLS.	-	-	-
SOIL PH	()	()	()
LIME (TONS/ACRE)	-	-	-
SPECIFIC GRAVITY	-	-	-
% ABSORPTION	-	-	-
MAX. DEN. #/CF	-	-	-
% OPT. MOISTURE	-	-	-
% MOISTURE CONT.	-	-	-

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED