# ARKANSAS DEPARTMENT OF TRANSPORTATION



# SUBSURFACE INVESTIGATION

FEDERAL AID PROJECT NO.		
OSAG	GE CREEK STR. & APPRS. NO. 2 (S	S)
COUNTY ROAD NO.	CR1785	
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 DEPARTMENT OF TRANSPORTATION

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### **MATERIALS DIVISION**

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

March 9, 2020

TO:

Mr. Rick Ellis, Bridge Engineer

**SUBJECT:** 

Job No. BR0406

Osage Creek Str. & Apprs. No. 2 (S)

**Benton County** County Road 1785

Transmitted herewith are a brief summary of the geology and site conditions, rock core unconfined compression test summary, RMR, D50 scour analysis, and the logs of the borings conducted for the structures 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 Benton County Road 1785 (Old Highway 68) Bridge crossing Osage Creek, east of Siloam Springs. The new bridge will be constructed on the same alignment as the existing. A total of six borings were requested for this bridge and six borings were obtained. They were offset left of centerline due to the low bridge clearance. Additionally, one boring was moved up-station due to high water levels in the channel.

Based on the depth at which bedrock was encountered and correspondence with Bridge Design, it is anticipated that both end bents will be founded on piling bearing on rock and all intermediate bents will be founded on spread footings. Preboring may be necessary to achieve minimum pile penetration requirements. Spread footings founded on competent Shale should be designed based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Nominal Bearing Resistance (KSF)	Congo Limit Ctata	
78	35	20

It is acceptable to utilize 2H:1V end slopes for the proposed embankments. This embankment geometry provides a satisfactory Factor of Safety for static conditions. If you have any questions concerning these recommendations, please contact the Geotechnical Section.

Michael C. Benson

Materials Engineer

MCB:rpt:mlg

State Construction Engineer - Master File Copy CC:

District 9 Engineer

G.C. File

# GEOLOGY AND SITE CONDITIONS Job BR0406 Osage Creek STR. & APPRS. No. 2 (S) Benton County County Road 1785

### **Site Conditions**

The existing County Road 1785 (Old Hwy. 68) Bridge is an approximately 300 feet long, 9 span, east to west oriented bridge that crosses Osage Creek. The superstructure consists of cast-in-place concrete decking, resting on steel beams, supported by pier walls on spread footings. The guardrails are composed of steel supported by steel posts leading up to the bridge and concrete posts on the bridge. The endwalls are composed of concrete with riprap placed on the abutments to help prevent erosion.

From the bridge, Osage Creek flows to the southwest for approximately one-third of a mile before reaching its confluence with the Illinois River. The channel is lined with trees and pastureland beyond. The river passes through a conservation easement to the north of the bridge. A buried telecommunication line parallels the south side of the roadway. It is buried upand down-station from the bridge and runs overhead over the channel.

# **Site Geology**

The project alignment is located in the Chattanooga Formation (mapped as MDcp). The Chattanooga is typically composed of black, fissile clay shale that weathers into thin flakes. The beds are usually cut by prominent joints creating polygonal blocks upon weathering. The upper part of the formation may be slightly sandy and usually contains abundant pyrite. The Chattanooga Shale is all Devonian in Arkansas. A lower sandstone member (Sylamore Sandstone) may dominate or fill the Chattanooga Shale interval in some areas. The Sylamore is a white to dark-gray phosphatic quartz sandstone. Its texture is fine-grained to sandy conglomerate. The thickness of the Chattanooga Shale (including the Sylamore Sandstone) ranges from 0 to about 85 feet, but normally averages about 30 feet. Shale was encountered in borings at depths ranging from 6.1 to 12.7 feet below ground level.

### **Scour Potential**

In October 2019, flooding occurred in many streams in northwest Arkansas, including Osage Creek. This high-flow event caused a great deal of scour in the stream banks and in the bridge abutments. The flow was high enough to deposit gravel in the fields outside of the streambed. Due to the tremendous scour created by the flood, it is impossible to discern how much scour is caused by normal flow conditions. The scour sample graded out to be gravelly lean clay with sand, which would not be expected to have a high scour potential under typical flow conditions.

### **Subsurface Conditions**

Based on the results of the borings the subsurface stratigraphy may be generalized as follows:

0 to 6.1 Feet:

Varies from moist to wet, very loose to medium dense, brown silty sand with some gravel to sand with gravel to very soft, brown sandy clay.

6.1 to 12.7 Feet: Varies from wet, very loose to medium dense, brown silty sand with

some gravel to sand with gravel to very soft, brown sandy clay to unweathered, medium hard, dark gray shale with occasional to frequent

fractures.

12.7 to 34.7 Feet: Consists of unweathered, medium hard, dark gray shale with occasional

to frequent fractures.

# Rock Core Unconfined Compression Test Summary

Project Number:

BR0406

Project Name:

Osage Creek Str. & Apprs. No. 2 (S)

Date Tested:

2/18/2020

Station	Location	Sample No.	Depth (ft.)	Diameter (in)	Height (in)	Total Load (lbs.)	Correction Factor	Stress (psi)	Remarks
106+80	24' Lt	1	9.7	1.75	3.87	25,540	1.00	10,641	Pyrite/Calcite/SH
106+80	24' Lt	2	14.3	1.75	3.26	4,640	1.00	1,933	SH
106+80	24' Lt	3	21.6	1.75	2.10	12,960	0.918	4,957	SH
107+80	18' Lt	4	10.3	1.75	3.50	22,420	1.00	9,341	Pyrite/Calcite/SH
107+80	18' Lt	5	15.6	1.75	3.75	5,130	1.00	2,137	SH
107+80	18' Lt	6	20.6	1.75	1.80	9,950	0.875	3,627	SH
109+50	22' Lt	7	11.0	1.75	2.33	8,050	0.940	3,152	SH
109+50	22' Lt	8	16.3	1.75	2.05	7,980	0.911	3,029	SH
109+50	22' Lt	9	22.7	1.75	3.55	4,250	1.00	1,770	SH
109+80	18' Lt	10	11.9	1.75	3.83	2,980	1.00	1,241	SH
109+80	18' Lt	11	15.8	1.75	3.96	11,070	1.00	4,612	SH
109+80	18' Lt	12	22.7	1.75	3.54	3,580	1.00	1,491	SH
						8			

**Terminology** 

SH = Shale

<sup>\*</sup> Please note any broken samples, fractures or other characteristics of sample in Remarks.

# ROCK MASS RATING SUMMARY JOB# BR0406

SAMPLE #1

# SAMPLE #1 Station/Location Depth (ft) Uniaxial Compressive Strength RQD Spacing of Joints Condition of Joints Groundwater Conditions Sum Class Number Description Station/Location 106+80/24' LT 9.7 Relative Rating 7 7 17 30 25 67 26 27 86 Class Number I VERY GOOD ROCK

### SAMPLE #2

Station/Location Depth (ft)	106+80/24' LT 14.3
	Relative Rating
Uniaxial Compressive Strength	2
RQD	20
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	84
Class Number	1
Description	VERY GOOD ROCK
V-	

### SAMPLE #3

Station/Location Depth (ft)	106+80/24' LT 21.6
	Relative Rating
Uniaxial Compressive Strength	4
RQD	17
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	73
Class Number Description	II GOOD ROCK
Description	GOOD ROCK

### SAMPLE #4

OAIII EE II T				
Station/Location Depth (ft)	107+80/18' LT 10.3			
	Relative Rating			
Uniaxial Compressive Strength	7			
RQD	13			
Spacing of Joints	20			
Condition of Joints	20			
Groundwater Conditions	7			
Sum	67			
Class Number	II			
Description	GOOD ROCK			

## SAMPLE #5

Station/Location	107+80/18' LT
Depth (ft)	15.6
	Relative Rating
Uniaxial Compressive Strength	2
RQD	13
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	52
Class Number	III
Description	FAIR ROCK

### SAMPLE #6

SAWI LL #0				
Station/Location Depth (ft)	107+80/18' LT 20.6			
	Relative Rating			
Uniaxial Compressive Strength	4			
RQD	13			
Spacing of Joints	25			
Condition of Joints	20			
Groundwater Conditions	7			
Sum	69			
Class Number				
Description	GOOD ROCK			
2 3 3 3 1 Pilot	2222230			

## SAMPLE #7

Station/Location	109+50/22' LT
Depth (ft)	11.0
	Relative Rating
Iniaxial Compressive Strength	2
RQD	13
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	72
Class Number	II
Description	GOOD ROCK

### SAMPLE #8

Station/Location	109+50/22' LT
Depth (ft)	16.3
	Relative Rating
Uniaxial Compressive Strength	2
RQD	17
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	76
Class Number	II
Description	GOOD ROCK

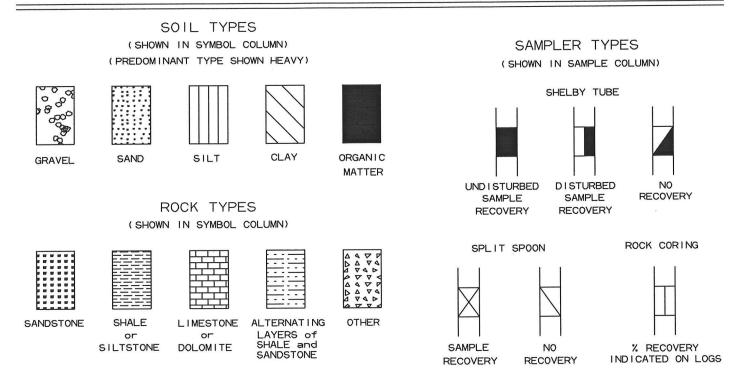
# ROCK MASS RATING SUMMARY JOB # BR0406

SAMPLE #9	SAMPLE #10
Station/Location 109+50/22' LT Depth (ft) 22,7	Station/Location 106+80/24' LT Depth (ft) 11.9
Uniaxial Compressive Strength RQD 20 Spacing of Joints 30 Condition of Joints 25 Groundwater Conditions Sum 84  Class Number Description Relative Rating  Relative Rating  2  7  7  84  Class Number I VERY GOOD ROCK	Uniaxial Compressive Strength RQD 8 Spacing of Joints 20 Condition of Joints 20 Groundwater Conditions 56  Class Number Description FAIR ROCK
SAMPLE #11	SAMPLE #12
Station/Location 106+80/24' LT Depth (ft) 15.8	Station/Location 109+80/18' LT Depth (ft) 22.7
Uniaxial Compressive Strength RQD 13 Spacing of Joints 10 Condition of Joints 20 Groundwater Conditions 7 Sum 54	Uniaxial Compressive Strength RQD 17 Spacing of Joints 20 Condition of Joints 20 Groundwater Conditions 7 Sum 65
Class Number III Description FAIR ROCK	Class Number II Description GOOD ROCK
SAMPLE #13	SAMPLE #14
SAMPLE #13  Station/Location Depth (ft)	SAMPLE #14  Station/Location Depth (ft)
Station/Location	Station/Location
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Station/Location Depth (ft)  Uniaxial Compressive Strength RQD Spacing of Joints Condition of Joints Groundwater Conditions Sum  Class Number Description  SAMPLE #15	Station/Location Depth (ft)  Uniaxial Compressive Strength RQD Spacing of Joints Condition of Joints Groundwater Conditions Sum  Class Number Description  SAMPLE #16

# D<sub>50</sub> AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

<b>Job No.</b> BR0406						
Creek Name	Station	Sample Type	Location	Depth (FT)	Soil Description	Aggregate Size (D50) (IN)
Osage Creek	110+25	Creek Bank	80' Left of Const. C.L.	N/A	CL Gravelly Lean Clay with Sand	Less than 0.0029

# LEGEND



TERMS DESCRIBING CONSIST	ENCY OR	CONDITION
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GRANU	LAR SOIL		CLAY	CLA	Y-SHALE	8	HALE
"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	Penetratio	on .
		31-60	Hard	31-60	Hard	in 60 Blow	s Medium Hard
		0ver 60	Very Hard	0ver 60	Very Hard	Less than	2'
						Penetrati	on
						in 60 Blow	vs: 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  $2.0^{\circ}$  O.D.,  $1-3/8^{\circ}$  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:  $\frac{6}{8-9} \Rightarrow 8+9=17 blows / ft$ . The "N" Value corrected to 60% efficiency (N<sub>60</sub>) can be obtained by multiplying N<sub>f</sub> by the hammer correction factor published on the boring log.

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ARKANSAS DEPARTMENT OF TRANSPORTATION MATERIALS DIVISION - GEOTECHNICAL SEC.  JOB NO. BR0406 Benton County  JOB NAME: Osage Creek Str. & Apprs. No.2 (S)  BORING NO. 4 PAGE 1 OF 1  DATE: January 14, 2020  TYPE OF DRILLING:													
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REMA	RKS:	* V	Nater was encountered at 5.2 ft below ground level										

JORNOL   BR0406   Benton County   DATE   January 27, 2020   TYPE OF DRILLING.   Hollow Stem Auger - Diamond Core EQUIPMENT   Acker 2094   HAMMER CORRECTION FACTOR: N/A				DEPARTMENT OF TRANSPORTATION		BORIN								
JOB NAME   Osage Creek Str. & Apprs. No.2 (S)	Name and Address of the Owner, where the Owner, which is the Ow					PAGE	1		albana (en al	,	- 0			
Co. Rd. 1785 109-80 109-80 18' Left of Construction Centerline LOGGED BY: Stanley Bates COMPLETION DEPTH: 30-3  DESTRICTION STANLE SURFACE ELEVATION: 980.3  Silty Sand  Wet, Very Loose, Brown Silty Sand with Some Gravel  SHALE - Unweathered, Medium Hard, Frequent Fractures, Occasional Pyrite Seams, Dark Gray  SHALE - Unweathered, Medium Hard, Cocasional Pyrite Seams, Dark Gray  SHALE - Unweathered, Medium Hard, Cocasional Pyrite Seams, Dark Gray  Boring Terminated  Boring Terminated  Hollow Stem Auger - Diamond Core EQUIPMENT: Acker 2094  BAMMER CORRECTION FACTOR: N/A  BAMMER CORREC				Section 1 and 1 an			W = 1.			ary 2	27, 20	020		
STATION: 109+80   LOCATION: 18 Left of Construction Centerline   LOGGID By: Stanley Bates   LOCATION: 18 Left of Construction Centerline   LOGGID By: Stanley Bates   LOCATION: 18 Left of Construction Centerline   LOGGID By: Stanley Bates   N/A	JORIN	AME:								. D	·!-mo	1 (	7-40	
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ARKANSAS DEPARTMENT OF TRANSPORTATION MATERIALS DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G NO		2					
JOB NO. BR0406 Benton County		DATE:	-			ary 2	28, 20	20		_
JOB NAME: Osage Creek Str. & Apprs. No.2 (S)		ТҮРЕ О	F DRI			•				
Co. Rd. 1785		Holle	ow S	tem A	uger	- Di	iamoı	nd Co	ore	
STATION: 110+80		EQUIPM	IENT:			Acl	cer 20	)94		
LOCATION: 55' Left of Construction Centerline										
LOGGED BY: Stanley Bates		HAMME	ER CC	RRECT	ION I	FACT	OR:	N	I/A	
COMPLETION DEPTH: 34.7				<b>p</b> 2000 100 100 100 100 100 100 100 100 100						
	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	7	% T C R	% R Q D
Moist, Very Soft, Brown Sandy Clay		I	6	1	I	I	0 0-1			
Wet, Medium Dense, Brown Sand with Silt and Gravel	*						5-6	3		
SHALE										
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20  SHALE - Unweathered, Medium Hard, Frequent Fractures, Occasional Calcite Layers, Dark Gray								1	00	26
SHALE - Unweathered, Medium Hard, Frequent Fractures, Occasional Pyrite Nodules, Dark Gray								1	00	57
SHALE - Unweathered, Medium Hard, Occasional Fractures, Occasional Pyrite Nodules, Dark Gray								1	00	88
REMARKS:										

			DEPARTMENT OF TRANSPORTATION DIVISION - GEOTECHNICAL SEC.		BORIN			- 0					
JOB N		AND DESCRIPTION OF THE PARTY OF	BR0406 Benton County		PAGE	2	Additional Control of the Control of	₹ 2 Janu	om/	28 21	020		mentana.
JOB N			Osage Creek Str. & Apprs. No.2 (S)		DATE: TYPE C	F DRI			ary 2	40, 41	020		
			Co. Rd. 1785				Stem A		- D	iamo	nd C	Core	
STATI	ON:		110+80		EQUIPN			U		ker 2			
LOCA			55' Left of Construction Centerline										
			tanley Bates		HAMM	ER CC	ORREC'	LION I	FACT	OR:		N/A	
	PLET	7	DEPTH: 34.7						-			_	
D E	S	S											
Р	Y	M	DESCRIPTION OF MATERIAL					T	FT.	S/M		%	%
Т	M B	Р	DESCRIPTION OF MATERIAL	SOIL GROUP		r.:		IGH	CO	ILO.		T C	R Q
Н	ō	L		GROOT	T	LSIC		WE	PER	)F B	NI-9	R	D
FT.	L	S	SURFACE ELEVATION: 984.3		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.		
			Boring Terminated			<u> </u>			_				***************************************
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# 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 17, 2018

TO:

Mr. Claude Klinck, Engineer of State Aid

SUBJECT:

Job No. BR0406

Osage Creek Strs. & Apprs. No. 2 (S)

Co. Rd. 1785 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 replacing the bridge crossing Osage Creek on County Road 1785 in Benton County. Samples were taken in the existing travel lanes, shoulders and ditch line.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of low plasticity cherty clay. 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 19 feet. Prior to embankment construction all soft unstable organic material should be undercut, anticipated to be no more than two feet. The embankment may be constructed with locally available unspecified material utilizing the 3:1 slope configuration shown.

The proposed cut slopes are 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 Gravette.

2. Asphalt Concrete Hot Mix

Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.5	95.5

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

SEQUENCE NO. - 1

JOB NUMBER - BR0406

MATERIAL CODE - SSRV SPEC. YEAR - 2014

SUPPLIER ID. = 1

COUNTY/STATE - 04

DISTRICT NO. - 09

JOB NAME - OSAGE CREEK STR. & APPRS. NO. 2 (S)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

BEGIN JOB = END JOB 11

RESILIENT MODULUS

STA. 102+00 5254

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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

Job No. Date Sampled: Date Tested: Name of Project:	BR0406 8/7/18 August 29, 2018 OSAGE CREEK STR. & APPRS. NO. 2 (S)	Material Code Station No.: Location:	SSRVPS 102+00 18'RT
County:	Code: 4 Name: BENTON		
Sampled By:	FRAZIER/BATES	Depth:	0-5
Lab No.:	20181816	AASHTO Class:	A-4 (0)
Sample ID:	RV463	Material Type (1 or	
LATITUDE:		LONGITUDE:	
1. Testing Inform			
	Preconditioning - Permanent Strain > 5%	•	N
	Testing - Permanent Strain > 5% (Y=Yes of		N
	Number of Load Sequences Completed (0-	-15)	15
2. Specimen Info	ormation:		
	Specimen Diameter (in):		
	Тор		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):		3051.60
4. Soil Properties	s:		
	Optimum Moisture Content (%)		16.2
	Maximum Dry Density (pcf):		104.9
	95% of MDD (pcf):		99.7
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	perties:		
	Wet Weight (g):		3051.60
	Compaction Moisture content (%):		16.0
	Compaction Wet Density (pcf):		119.03
	Compaction Dry Density (pcf):		102.61
	Moisture Content After Mr Test (%):		16.1
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Modu	ılus, Mr:	47390	(Sc)^-0.10794(S3)^0.44873
8. Comments			
9. Tested By:	GW	Date: August 29, 2018	

# ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

SSRVPS

102+00 18'RT

Material Code Station No.: Location: August 29, 2018 **BR0406** 8/7/18 Date Sampled: Date Tested: Job No.

Name of Project: OSAGE CREEK STR. & APPRS. NO. 2 (S)

County: Code: 4 Name: BENTON
Sampled By: FRAZIER/BATES

Lab No.:20181816Sample ID:RV463LATITUDE:

Depth: 0-5
AASHTO Class: A-4 (0)
Material Type (1 or 2): 2
LONGITUDE:

Resilient	Modulus		Σ̈́	psi	9,877	9,463	9,062	8,699	8,398	8,415	7,294	6,930	6,919	7,024	6,289	5,530	5,254	5,295	5,411
Resilient	Strain		చ్	in/in	0.00019	0.00039	0.00060	0.00083	0.00108	0.00022	0.00049	0.00077	0.00103	0.00127	0.00029	0.00063	0.00098	0.00130	0.00160
Average	Recov Def. LVDT 1	and 2	Havg	in	0.00149	0.00312	0.00484	0.00669	0.00865	0.00177	0.00397	0.00620	0.00828	0.01021	0.00230	0.00501	0.00782	0.01042	0.01285
Actual	Applied Contact	Stress	Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.5	4.0	9.0	0.2	0.2	0.2	0.3	0.5
Actual	Applied Cyclic	Stress	Scyclic	psi	1.8	3.7	5.5	7.3	9.1	1.9	3.6	5.4	7.1	8.9	1.8	3.5	5.1	6.9	8.7
Actual	Applied Max.	Axial Stress	S <sub>max</sub>	psi	2.1	3.9	5.8	7.7	9.7	2.1	3.8	5.6	7.5	9.5	2.0	3.7	5.3	7.2	9.2
Actual	Applied Contact	Load	Pcontact	sql	2.7	2.7	3.5	5.9	8.2	2.4	2.5	2.5	8.4	7.1	2.3	2.5	5.6	4.2	9.9
Actual	Applied Cyclic Load		P <sub>cyclic</sub>	sql	22.4	44.8	2.99	88.4	110.3	52.6	43.9	65.2	87.0	109.0	21.9	42.1	62.4	83.8	105.6
Actual	Applied Max. Axial	Load	P <sub>max</sub>	sql	25.1	47.5	70.2	94.3	118.6	25.0	46.4	2'.29	91.8	116.1	24.3	44.6	65.0	87.9	112.2
Nominal	Maximum Axial	Stress	Scyclic	psi	2.0	4.0	0.9	8.0	10.0	2.0	0.4	0.9	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber	Confining Pressure		လ်	psi	0.9	0.9	0.9	0.9	0.9	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
	PARAMETER		DESIGNATION	UNIT	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Sednence 5	Sequence 6	Sequence 7	Sednence 8	Sednence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

August 29, 2018	
DATE	DATE
MS	
TESTED BY	REVIEWED BY

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

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

Job No.

BR0406

**Material Code SSRVPS** 

**Date Sampled:** 

8/7/18

**Station No.:** 102+00

**Date Tested:** 

August 29, 2018

Location: 18'RT

Name of Project: OSAGE CREEK STR. & APPRS. NO. 2 (S)

County:

Code: 4

Name: BENTON

Sampled By:

FRAZIER/BATES

**Depth:** 0-5

Lab No.:

AASHTO Class: A-4 (0)

20181816

Sample ID:

**RV463** 

Material Type (1 or 2): 2

LATITUDE:

LONGITUDE:

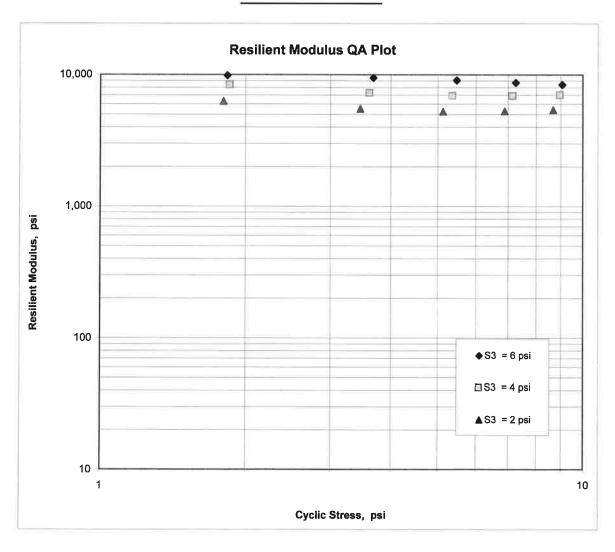
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

$$K1 = 4,739$$

$$K2 = -0.10794$$

$$K5 = 0.44873$$

$$R^2 = 0.98$$



JOB: BR0406

Arkansas State Highway Transporation Department

JOB NAME: OSAGE CREEK STR. & APPRS. NO. 2 (S)

Materials Division

**COUNTY NO.** 4 **DATE TESTED** 9/28/2018

Michael Benson, Materials Engineer

,	STA.#	LOC.	<b>DEPTH</b>	COLOR	#4	#10	#40	#80	#200	L.L.	<i>P.I.</i>	SOIL CLASS	<i>LAB</i> #:	%MOISTURE
	102+00	18 RT	0-5	BROWN	75	59	50	46	<i>E S</i> 43	ND	NP	A-4 (0)	RV463	
	102+00	06 RT	0-5	RD/BR	76	67	60	57	56	23	6	A-4 (1)	S457	17.8
	102+00	14 RT	0-5	RD/BR	79	72	65	64	63	23	5	A-4 (1)	S458	21.3
•	102+00	18 RT	0-5	BROWN	58	50	44	42	40	24	5	A-4 (0)	S459	17.7
	115+00	06 LT	0-5	RD/BR	92	79	61	60	58	30	14	A-6 (5)	S460	16.4
,	115+00	14 LT	0-5	RD/BR	91	79	68	65	62	27	11	A-6 (4)	S461	14.7
1	15+00	18 LT	0-5	BROWN	67	48	45	33	17	ND	NP	A-1-B (0)	S462	10.1

JOB NAME: OSAGE CREEK STR. & APPRS. NO. 2 (S) JOB: **BR0406** 

Arkansas State Highway Transporation Department Materials Division

DATE TESTED 9/28/2018

COUNTY NO.

Michael Benson, Materials Engineer

STA.# LOC.	LOC.			PAVEMENT SOUNDINGS
102+00	06 RT	ACHMSC 3.5W	ACHMBC	ACHMSC
102+00	14 RT	ACHMSC 2.5W	ACHMBC 5.0	ACHMSC
102+00	18 RT	ACHMSC	ACHMBC	ACHMSC
		1	1	1
115+00	06 LT	ACHMSC 5.0WX	ACHMBC 1.5	AGG. BASE CRS. CL-7
115+00	14 LT	ACHMSC 2.0	ACHMBC 1.0	AGG. BASE CRS. CL-7
115+00	18 LT	ACHMSC	ACHMBC	AGG. BASE CRS. CL-7
		1	1	1

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

# MICHAEL BENSON, MATERIALS ENGINEER

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

		V211	/ -		0001.01	1201			
DATE - 09/28/18							SEQUENCE NO.	-	1
JOB NUMBER - BR0406							MATERIAL CODE		RV
FEDERAL AID NO TO BE AS	SIGI	NED					SPEC. YEAR		2014
PURPOSE - SOIL SUR			LE.				SUPPLIER ID.		1
SPEC. REMARKS - NO SPECI				CK					_
	FICA	HITON	Сп	LCK			COUNTY/STATE		
SUPPLIER NAME - STATE	an H		<b>1</b> 0		270	(0)	DISTRICT NO.	_	09
NAME OF PROJECT - OSAGE				APPRS.	NO. Z	(S)			
PROJECT ENGINEER - NOT AP	PLI	CABLE							
PIT/QUARRY - ARKANSAS									
LOCATION - BENTON COU	NTY						DATE SAMPLED	_	08/07/18
SAMPLED BY - FRAZIER/BAT	ES						DATE RECEIVED	) –	08/10/18
SAMPLE FROM - TEST HOLE							DATE TESTED		
MATERIAL DESC SOIL SUR	VEY	- RF	STS'	TANCE R-	VALUE	ACTUAL			
				111110111	*******	11010111	111001110		
LAB NUMBER	- 2	201818	816		_		-		
SAMPLE ID	– I	RV463			-		_		
TEST STATUS	- ]	INFORI	ITAN	ON ONLY	-		_		
STATION	- 1	L02+00	0		_		_		
LOCATION	- 1	L8 RT			_		_		
DEPTH IN FEET	- (	)-5			-		-		
MAT'L COLOR	_ F	BROWN			_		_		
MAT'L TYPE	_				_		<del>-</del>		
LATITUDE DEG-MIN-SEC	_	36	10	49.80	_		_		
LONGITUDE DEG-MIN-SEC				11.60					
		3.							
% PASSING 2 IN.					_		-		
1 1/2 IN.	-				-		_		
3/4 IN.	_	100			_		_		
3/8 IN.	-	90			_		_		
NO. 4	_	75			=		_		
NO. 10	_	59			_		_		
NO. 40		50			_		_		
NO. 80	_	46			_		_		
NO. 200	_	43							
	-	ND			-		_		
PLASTICITY INDEX		NP			::-		_		
11101110 0011	-	A-4	(0)		-		_		
UNIFIED SOIL ·	_				7 <u>=</u>		_		
% MOISTURE CONTENT -	-				=				
	_				-		_		
	_								
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REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

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AASHTO TESTS : T24 T88 T89 T90 T265

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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 \*\*\*

SPEC. REMARKS - NO S SUPPLIER NAME - STAT NAME OF PROJECT - OS PROJECT ENGINEER - NO PIT/QUARRY - ARKANS	406 BE ASSIGNED L SURVEY SAMPLE SPECIFICATION CHECK TE SAGE CREEK STR. & APPRS. OT APPLICABLE	NO. 2 (S)	SEQUENCE NO 1  MATERIAL CODE - SSRVPS  SPEC. YEAR - 2014  SUPPLIER ID 1  COUNTY/STATE - 04  DISTRICT NO 09
SAMPLED BY - FRAZIES SAMPLE FROM - TEST I		EMENT SOUNDING	DATE SAMPLED - 08/07/18 DATE RECEIVED - 08/10/18 DATE TESTED - 09/28/18 GS
LAB NUMBER  SAMPLE ID  TEST STATUS  STATION  LOCATION  DEPTH IN FEET  MAT'L COLOR  MAT'L TYPE	- 20181810 - S457 - INFORMATION ONLY - 102+00 - 06 RT - 0-5 - RD/BR	- 20181811 - S458 - INFORMATIC - 102+00 - 14 RT - 0-5 - RD/BR	- 20181812 - S459 - INFORMATION ONLY - 102+00 - 18 RT - 0-5 - BROWN
LATITUDE DEG-MIN-S LONGITUDE DEG-MIN-S	SEC - 94 24 11.50		49.90 - 36 10 49.80 11.60 94 24 11.60
3/4	10 - 67 40 - 60 80 - 57	- 100 - 88 - 79 - 72 - 65 - 64 - 63	- - 100 - 73 - 58 - 50 - 44 - 42 40
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL	- 23 - 6 - A-4 (1)	- 23 - 5 - A-4 (1) -	- 24 - 5 - A-4 (0)
% MOISTURE CONTENT ACHMSC ACHMSC ACHMSC	- 17.8  (IN) - 3.5W  (IN) - 2.5  (IN) - 3.0	21.3 - 2.5W - 5.0  -	17.7

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 SURVEY / PAVEMENT SOUNDING TEST REPORT \*\*\*

SEQUENCE NO 2  MATERIAL CODE - SSRVPS  SPEC. YEAR - 2014  SUPPLIER ID 1  COUNTY/STATE - 04  DISTRICT NO 09  PRS. NO. 2 (S)  DATE SAMPLED - 08/07/18  DATE RECEIVED - 08/10/18  DATE TESTED - 09/28/18  - PAVEMENT SOUNDINGS
- 20181814 - 20181815 - S461 - S462 ONLY - INFORMATION ONLY - INFORMATION ONLY - 115+00 - 115+00 - 14 LT - 18 LT - 0-5 - 0-5 - RD/BR - BROWN 36 10 47.60 - 94 23 56.00 94 23 56.00
- 100 - 100 - 98 - 91 - 91 - 67 - 79 - 48 - 68 - 45 - 65 - 33 62 17
- 27 - ND - NP - 11 - NP - A-6 (4) - A-1-B (0) 10.1

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

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AASHTO TESTS : T24 T88 T89 T90 T265