ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO.	B NO080529			
FEDERAL AID PROJEC	CT NO!	NHPP-0058(44)		
HECTOR	, ISABELL & AI	LEWINE CREEKS ST	RS. & APPF	RS. (S)
STATE HIGHWAY	105	SECTION	1	
IN		POPE		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 29, 2019

TO:

Mr. Rick Ellis, Bridge Engineer

SUBJECT:

Job No. 080529

Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S)

Pope County

Route 105 Section 1

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 bridge crossing Isabell Creek, on Highway 105, in Oak Grove. The new bridge will be constructed on the existing alignment. Two of the eight requested borings, both intermediate bents, were inaccessible due to steep slopes and high water levels in the channel. The borings that were not obtained were located at: 204+29 12' Rt. of Construction C.L. and 204+41 12' Lt. of Construction C.L.. Both proposed bridge end borings were located on the centerline of the existing roadway and had to be offset.

The subsurface investigation revealed that bedrock is less than 5 feet deep on the north bridge end and over 20 feet deep on the south bridge end. Based on this information, it is anticipated that the north bridge end bent, at approximately station 203+94, will be founded on a spread footing and the south bridge end will be founded on piling. A spread footing founded in competent Sandstone should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for North Bridge End Spread Footing

Nominal Bearing	Factored Bearing	Bearing Resistance at
Resistance (ksf)	Resistance (ksf)	Service Limit State (ksf)
2,200	990	40

Based on the depth at which bedrock was encountered in the intermediate bents and correspondence with Bridge Division, it is anticipated that intermediate bents will be founded on drilled shafts. Drilled Shafts socketed in competent Shale to Sandstone should be designed based on the values provided in Table 2.

TABLE 2 – Bearing Capacity Recommendations for Drilled Shafts

Nominal Shaft Side	Factored Shaft Side	Nominal Shaft Tip	Factored Shaft Tip
Resistance (ksf)	Resistance (ksf)	Resistance (ksf)	Resistance (ksf)
32.7	18	235	117.5

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 8 Engineer

G.C. File

GEOLOGY AND SITE CONDITIONS Job No. 080529 Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S) Pope County Route 105 Section 1

Site Conditions

The existing bridge is a five span, north-south oriented bridge on Route 105, south of the intersection of Bradfield Rd., in Oak Grove. The superstructure consists of cast-in-place concrete decking and concrete guardrail. The decking is supported by pre-cast concrete beams and concrete columns on spread footings. The north bridge end is resting on a sandstone and shale bluff. The fourth bridge span consists of a pre-cast concrete arch that spans Isabell Creek. There are old timber pilings, from a previous bridge, in the creek channel. Isabell Creek flows from the northwest to the southeast and has a rocky bottom. Overhead powerlines parallel the east side of the bridge and a gas line, suspended by cables, parallels the west side of the bridge and runs underground at the bridge ends. The Isabell Creek channel is primarily lined with trees. There is a church down-station and east of the existing bridge. There are dispersed residences up-station from the bridge on both sides of the road.

Site Geology

The project alignment is located in the mapped outcrop of the Atoka Formation (mapped symbol Pa). This unit is a sequence of marine, mostly tan to gray silty sandstones and grayish-black shales. It is the surface rock of the Boston Mountains and dominates the exposures in the Arkansas River Valley and the frontal Ouachita Mountains. It is also present in the southern part of the Ouachita Mountains. An outcrop of this unit, located on the north side of Isabell Creek, consists of a 7.8 feet thick layer of sandstone overlying shale with frequent sandstone partings and seams, down to the base of the creek channel.

The proposed location for the new bridge is on the southwest limb of the Lee Mountain Syncline and the northeast limb of the Solgohachia Anticline. A number of faults parallel these structural features and measured dips rarely exceed 5 degrees. It is possible that the Solgohachia Anticline joins the Dover Anticline to the west.

Scour Potential

The channel at this location cuts into a rocky bluff consisting of sandstone and shale (See figure 1). D50 analysis of the sediment in the channel yielded a median value of 0.0029 inches, which is not considered a highly scourable sediment size. Based on grain size analysis and visual observation, scour is not anticipated at the new bridge.



Figure 1. Isabell Creek Cutting into the sandstone and shale bluff on the north bridge end.

Subsurface Conditions

Based on the results of the boring for station 204+04 (north bridge end), the subsurface stratigraphy may be generalized as follows:

0 to 7.8 Feet:

Consists of weathered, cemented, brown **sandstone**.

7.8 to 21.8 Feet:

Consists of unweathered, well-cemented, gray sandstone with frequent

shale partings and seams.

Based on the results of the borings for stations 205+02 to 205+70, the subsurface stratigraphy may be generalized as follows:

0 to 9.5 Feet:

Varies from moist, stiff, brown sandy clay with gravel (rock fragments) to

moist, loose to medium dense, brown clayey sand with gravel (rock

fragments).

9.5 to 34.8 Feet:

Consists of weathered to unweathered, medium hard to hard, frequently to

occasionally fractured and slickensided gray shale with frequent to

occasional sandstone partings, seams, and layers.*

*A well-cemented 1.0 to 1.5 feet thick **sandstone layer** was encountered in all four of these borings between 12.0 and 14.2 feet below ground level.

Based on the results of the boring for station 206+20 (south bridge end), the subsurface stratigraphy may be generalized as follows:

0 to 22.0 Feet:

Varies from moist, very loose, reddish brown clayey sand to moist, medium

dense to very dense brown sand with gravel (rock fragments).

22.0 to 44.3 Feet:

Consists of weathered to unweathered, medium hard, gray shale with

frequent to occasional sandstone partings, seams, and layers.

Rock Core Unconfined Compression Test Summary

Project Number:

080529

Project Name:

Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S)

Date Tested:

10/22/2019

Station	Location	Sample No.	Depth (ft.)	Diameter (in)	Height (in)	Total Load (lbs.)	Correction Factor	Stress (psi)	Remarks
204+04	18' Lt	1	4.3	1.75	4.61	55,950	1.00	23,261	SS
204+04	18' Lt	2	9.2	1.75	4.09	32,840	1.00	13,653	SS w/ SH
205+02	14' Rt	3	14.0	1.75	4.50	8,730	1.00	3,630	SH
205+02	14' Rt	4	18.0	Broke	Before '	Testing	N/A	No Test	SH
205+02	14' Rt	5	23.7	1.75	3.94	11,770	1.00	4,893	SH
205+02	14' Rt	6	31.3	Broke	Before [*]	Testing	N/A	No Test	SH
205+20	16' Lt	7	13.0	1.75	4.53	40,710	1.00	16,925	SS w/ SH
205+20	16' Lt	8	17.2	Broke	Before	Testing	N/A	No Test	SH w/ SS P,L,&S
205+20	16' Lt	9	23.5	Broke	Before	Testing	N/A	No Test	SH
205+20	16' Lt	10	28.3	Broke	Before	Testing	N/A	No Test	SH
205+59	20' Rt	11	12.7	1.75	4.57	66,420	1.00	27,614	SS
205+59	20' Rt	12	16.9	Broke	Before '	Testing	N/A	No Test	SH w/ SS
205+59	20' Rt	13	23.0	1.75	4.02	8,380	1.00	3,484	SH
205+59	20' Rt	14	31.1	1.75	4.32	5,650	1.00	2,349	SH
205+70	15' Lt	15	13.1	1.75	4.17	11,440	1.00	4,756	SS w/ SH
205+70	15' Lt	16	16.8	1.75	4.28	19,420	1.00	8,074	SH
205+70	15' Lt	17	21.3	1.75	3.81	8,600	1.00	3,575	SH
205+70	15' Lt	18	27.0	Broke	Before	Testing	N/A	No Test	SH
205+70	15' Lt	19	31.2	Broke	Before	Testing	N/A	No Test	SH

			12						

Terminology

SS = Sandstone

L & S = Layers and Seams

SH = Shale

P & S = Partings and Seams

^{*} Please note any broken samples, fractures or other characteristics of sample in Remarks.

ROCK MASS RATING SUMMARY JOB # 080529

SAMPLE #1 204+04, 18' LT Station/Location Depth (ft.) 4.3 Relative Rating Uniaxial Compressive Strength 12 RQD 13 Spacing of Joints 25 Condition of Joints 25 **Groundwater Conditions** Sum 82 Class Number VERY GOOD ROCK Description

SAMPLE #2

Station/Location Depth (ft.)	204+04, 18' LT 9.2	
	Relative Rating	
Uniaxial Compressive Strength RQD	20	
Spacing of Joints	25	W1
Condition of Joints	25	
Groundwater Conditions	7	
Sum	84	
Class Number Description	I VERY GOOD ROCK	

SAMPLE #3

Station/Location	205+02, 14' RT
Depth (ft.)	14
Uniaxial Compressive Strength RQD Spacing of Joints Condition of Joints Groundwater Conditions Sum Class Number Description	Relative Rating 2 13 25 25 7 72 II GOOD ROCK

SAMPLE #4

Station/Location Depth (ft.)	205+02, 14 ¹ RT 18
	Relative Rating
Uniaxial Compressive Strength	Broke before testing
RQD	13
Spacing of Joints	10
Condition of Joints	10
Groundwater Conditions	7
Sum	40
Class Number	IV
Description	POOR ROCK

SAMPLE #5

Station/Location	205+02, 14' RT
Depth (ft.)	23.7
	Relative Rating
Uniaxial Compressive Strength	4
RQD	17
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	78
Class Number	II
Description	GOOD ROCK

SAMPLE #6

Station/Location	205+02, 14' RT
Depth (ft.)	31.1
Uniaxial Compressive Strength RQD Spacing of Joints Condition of Joints Groundwater Conditions Sum Class Number Description	Relative Rating Broke before testing 20 25 25 7 77 II GOOD ROCK

SAMPLE #7

Station/Location Depth (ft.)	205+20, 16' LT 13
	Relative Rating
Uniaxial Compressive Strength	12
RQD	13
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	82
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #8			
Station/Location Depth (ft.)	205+20, 16' LT 17.2		
	Relative Rating		
Uniaxial Compressive Strength	Broke before testing		
RQD	13		
Spacing of Joints	20		
Condition of Joints	25		
Groundwater Conditions	7		
Sum	65		
Class Number	II		
Description	GOOD ROCK		

SAMPLE #9

Station/Location Depth (ft.)	205+20, 16' LT 23.5
	Relative Rating
Uniaxial Compressive Strength	Broke before testing
RQD	17
Spacing of Joints	20
Condition of Joints	25
Groundwater Conditions	7
Sum	69
Class Number	11
Description	GOOD ROCK

SAMPLE #10

Station/Location Depth (ft.)	205+20, 16' LT 28.3
	Relative Rating
Uniaxial Compressive Strength	Broke before testing
RQD	17
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	79
Class Number Description	II GOOD ROCK
and a second sec	

SAMPLE #11

205+59, 20' RT 12.7
Relative Rating
12
17
20
25
7
81
ı
VERY GOOD ROCK

SAMPLE #12

Station/Location	205+59, 20' RT
Depth (ft.)	16.9
	Relative Rating
Uniaxial Compressive Strength	Broke before testing
RQD	17
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	11
Description	GOOD ROCK

SAMPLE #13

O/MII EE // 10				
Station/Location Depth (ft.)	205+59, 20' RT 23			
	Relative Rating			
Uniaxial Compressive Strength	2			
RQD	20			
Spacing of Joints	25			
Condition of Joints	25			
Groundwater Conditions	7			
Sum	79			
Class Number	II			
Description	GOOD ROCK			

SAMPLE #14

OAIIII EE II 14					
Station/Location Depth (ft.)	205+59, 20' RT 31.1				
	Relative Rating				
Uniaxial Compressive Strength	2				
RQD	20				
Spacing of Joints	25				
Condition of Joints	25				
Groundwater Conditions 7					
Sum	79				
Class Number	11				
Description	GOOD ROCK				

SAMPLE #15

Station/Location 205+70, 15' LT Depth (ft.) 13.1							
Relative Rating							
4							
8							
25							
25							
7							
69							
II							
GOOD ROCK							

SAMPLE #16

SAMPLE #16						
Station/Location 205+70, 15' LT Depth (ft.) 16.8						
	Relative Rating					
Uniaxial Compressive Strength	7					
RQD	13					
Spacing of Joints	25					
Condition of Joints	25					
Groundwater Conditions	7					
Sum	77					
Class Number	l l					
Description	GOOD ROCK					

SAMPLE #17

Station/Location Depth (ft.)	205+70, 15' LT 21.3
ø	Relative Rating
Uniaxial Compressive Strength	2
RQD	20
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
Sum	84
Class Number Description	I VERY GOOD ROCK

SAMPLE #19

SAMPLE #19				
Station/Location Depth (ft.)	205+70, 15' LT 31.2			
	Relative Rating			
Uniaxial Compressive Strength	Broke before testing			
RQD	20			
Spacing of Joints	25			
Condition of Joints	25			
Groundwater Conditions 7				
Sum	77			
Class Number Description	II GOOD ROCK			

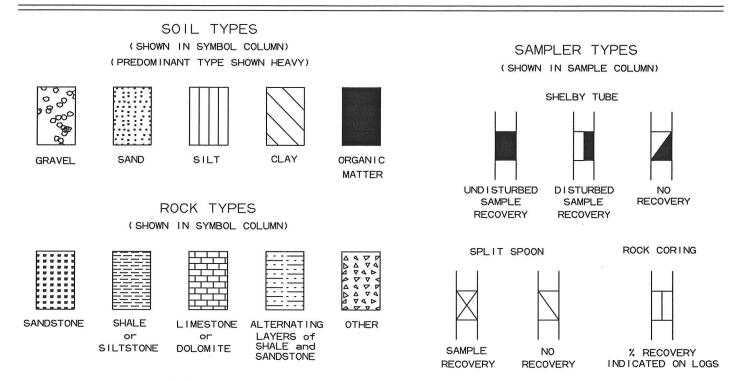
SAMPLE #18

Station/Location Depth (ft.)	205+70, 15' LT 27
	Relative Rating
Uniaxial Compressive Strength	Broke before testing
RQD	20
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	77
Class Number Description	II GOOD ROCK

D₅₀ AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

Job No. 080529						
Creek Name Station Sample Location Depth (FT) Aggregate Size (D50)						
Isabell Creek	205+20	Creek Bank	24' LT Const. C.L.	N/A	0.0029	

LEGEND



TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANU	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"	
0ver 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows: Medium Hard	
		0ver 60	Very Hard	0ver 60	Very Hard	Less than 2'	
						Penetration	
						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" 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: $\frac{6}{8-9} \Rightarrow 8+9=17 blows/ft$. The "N" Value corrected to 60% efficiency (N₆₀) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

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STATI			204+04		EQUIPM	ENT:			Ack	cer 20)94		
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10												100	84
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			SANDSTONE WITH FREQUENT SHALE									400	100
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			Cemented, Gray										
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1021			Route 105 Section 1	′ I			tem A		- Di	iamo	nd C	ore	
STATI	ON:		205+02		EQUIPM			U		cer 20			
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			roy Frazier		HAMMI	ER CO	RRECT	ION I	FACT	OR:		N/A	_
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		\bigcap	SHALE WITH FREQUENT SANDSTONE PARTINGS AND SEAMS - Slightly Weathered,							1: (4	o ")		
			Medium Hard, Frequent Fractures, Gray									100	-
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15			PARTINGS AND SEAMS -Slightly Weathered, Well Cemented, Frequent Fractures, Gray										
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STATION: LOCATION: LOGGED BY:	205+02 14' Right of Construction Centerline Troy Frazier		EQUIPM HAMME					cer 20 OR:		N/A	
COMPLETIO	N DEPTH: 34.8										
D S S A M M P H B L E S T . S	DESCRIPTION OF MATERIAL S SURFACE ELEVATION: 531.8	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
40 40 45 50 55 60 65 70	Boring Terminated										

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	3000												
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		X	(Rock Fragments)							5-			
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	1861												
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			SHALE WITH OCCASIONAL SANDSTONE							(1	,		
			PARTINGS AND SEAMS - Weathered, Medium		9							100	64
			\Hard, Gray SANDSTONE WITH FREQUENT SHALE									100	٠.
15			PARTINGS AND SEAMS - Slightly Weathered,										
			Well Cemented, Occasional Fractures, Gray										
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			DEPARTMENT OF TRANSPORTATION DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G NC). 4 OF	1					
JOB N		The later	080529 Pope County		DATE:				nber	17, 2	2019	- //	-
JOB N			Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S		TYPE O	F DRI				, -			
		Ì	Route 105 Section 1		Holle	ow S	tem A	uger	- Di	amoı	nd Co	ore	
STATI	ON:		205+59		EQUIPM	IENT:			Acl	er 20)94		
LOCA			20' Right of Construction Centerline									.,,	
-		THE RESERVE	roy Frazier		HAMMI	ER CO	RRECT	ION I	FACT	OR:		I/A	_
	PLET	_	DEPTH: 33.9			-				Z.12-0-11-			
D E	S	S A											
Р	Y	M	DESCRIPTION OF MATERIAL					Н	FT.	WS		%	%
Τ	M B	Р	DESCRIPTION OF WATERIAL	SOIL GROUP	7.	نے		IGH	CU	3F0	ان	T C	R Q
Н	O	L		011001	T T	SIC	OL T	WE	PER	OF E	NI-9	R	D
FT.	L	0.000	SURFACE ELEVATION: 531.5		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
												-	
	100												
5			Moist, Medium Dense, Brown Clayey Sand with							6			
		X	Gravel (Rock Fragments)							6-1			
												v.	
10		\times	SHALE WITH OCCASIONAL SANDSTONE							4			
		\top	PARTINGS - Slightly Weathered, Medium Hard,							35 (4'	5		
			Occasional Fractures, Gray SANDSTONE WITH FREQUENT SHALE							(4		100	77
			PARTINGS - Slightly Weathered, Well									100	''
		2	Cemented, Gray										
15													
												06	20
												96	80
- -													
													-
20													
												96	92
<u> </u>			SHALE WITH OCCASIONAL SANDSTONE PARTINGS, LAYERS, AND SEAMS -										
 25			Unweathered, Medium Hard, Gray								f		
_20			,,,										
											-	100	100
30													
											-	100	99
	莊				_								
35			Boring Terminated										
REM	ARKS	:											

			DEPARTMENT OF TRANSPORTATION		BORIN								- 1
			DIVISION - GEOTECHNICAL SEC.		PAGE	1	OF	-Konskinski					-
JOB N			080529 Pope County		DATE:				nber	11, 2	2019		
JOB N	AME:		Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S))	TYPE O						. ~		- 1
			Route 105 Section 1				tem A	uger				ore	
STATI			205+70		EQUIPM	IENT:			Ack	ker 20)94		
LOCA			15' Left of Construction Centerline									×7.4	
		Y	roy Frazier		HAMMI	ER CC	RRECT	'ION	FACT	OR:	1	N/A	_
COM	PLET.		DEPTH: 33.3		_								
D	s	S											
E	Ÿ	A						l .	۲	S		%	%
P T	М	M P	DESCRIPTION OF MATERIAL	SOIL)HI	Ŭ.	, V		T	R
Н	В	Ĺ		GROUP	2	ST.		Œ	SR C	BI	6-IN.	C R	Q D
	0	E			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	92	K	D
FT.	L	S	SURFACE ELEVATION: 531.1		PLAST LIMIT	1%	LIQUII	DR	LB	N 0	PER		
	::::::												
											1		
- -											ł		
			Moist, Medium Dense, Brown Sand with Some										
5		\bigvee	Clay and Gravel							6			
		\triangle	oray and oravor							8-	9		
L -													
10	:::::::	><	∽SHALE - Highly Weathered, Medium Hard, Gray							60	o		
			SHALE WITH OCCASIONAL SANDSTONE							(4'	")		
			PARTINGS AND SEAMS - Slightly Weathered,										44
			Medium Hard, Occasional Fractures, Gray*									62	41
			SANDSTONE WITH FREQUENT SHALE										
 15			¬ PARTINGS AND SEAMS - Slightly Weathered,								t		
15			Well Cemented, Occasional Fractures, Gray							1			
 												98	50
<u> </u>												90	50
L -											-		
20													
												100	96
			CHALE Unweathered Hard Occasional										
			SHALE - Unweathered, Hard, Occasional Sandstone Partings and Seams, Occasional										
25			Fractures, Gray										
												100	100
												. 55	
		+									-		
30													
<u> </u>												100	97
<u> </u>													٠.
			Boring Terminated										
35	A DICC		Tatalanatan lana atau atau atau atau atau atau atau a		<u> </u>								
KEM	AKKS	: *	Total water loss at approximately 12.9 feet below g	round le	evel.								

		DEPARTMENT OF TRANSPORTATION DIVISION - GEOTECHNICAL SEC.		BORIN	G NC		2					
JOB NO.	1000	080529 Pope County		PAGE	L	A 1/4 / COLO 10	10-11-11-11-11	her '	10, 2	010		
JOB NO. JOB NAMI		Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S	、 I	DATE: TYPE O	c DDI			ber .	10, 2	019		
JOB NAMI		Route 105 Section 1	' ·			tem A		- D	iamo	nd C	ore	
STATION:		206+20		EQUIPM			ugei		ker 2		ore	
LOCATION.		9' Left of Constructiion Centerline		LQUIIN	ILIVI.			7101	CI Z	UJT		
9		roy Frazier		HAMMI	ER CC	RRECT	ION I	FACT	OR:		N/A	
		N DEPTH: 44.3										_
	S			T								
	A											
P M	M	DESCRIPTION OF MATERIAL	SOIL				ŦŦ	I.FT	MS		% T	% D
l I B		BEGGINI HON OF WATERIAL	GROUP		Γ.		1GF	7	31.0	<u>.</u> ;	C	R Q
Н о	L			\subseteq	SIC	E L	WE	PER	OF I	4-in	R	Ď
FT. L	E S	SURFACE ELEVATION: 547.0		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
1 1.	0	Asphalt		L P	%	77	Ω		Z	Ь		
— - <i>XX</i>	\overline{S}	riopridit										
<u> </u>												
5		Moist, Very Loose, Reddish Brown Clayey Sand							,	,		
<i>```````</i> ``	$\mathbb{S} \times$	Worst, Very Loose, Reddish Brown Clayey Sand							2.	2		
									_			
10												
										2		
									7.	-7		
		Moist, Medium Dense, Reddish Brown Sand										
		with Some Clay										
15										7		
008										2		
- 688									15	5-6		
	0	Moist, Medium Dense, Riddish Brown Sand with										
	0	Gravel (Rock Fragments)										
00	00											
20	ö.	Day Very Design Brown Conductity Consul							2	5		
— — · · · · ·	6	Dry, Very Dense, Brown Sand with Gravel (Sandstone Fragments)							20	-25		
	P6	(Canastone Fragments)							(/	"")		
<u> </u>	3	SHALE - Weathered, Medium Hard, Gray					9				100	22
<u> </u>		, , , , , , , , , , , , , , , , , , , ,										
25	=											
— - <u> </u>		SHALE WITH OCCASIONAL CALCAREOUS										
		SANDSTONE PARTINGS AND SEAMS -									100	88
		Unweathered, Medium Hard, Gray										
	E											
30		SANDSTONE WITH FREQUENT SHALE										
		PARTINGS AND SEAMS -Unweathered, Well										
		\Cemented, Gray									100	76
	를										.00	. 5
35	=											
REMARK	S:				l							

			DEPARTMENT OF TRANSPORTATION DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G NC 2		2					
JOB N			080529 Pope County		DATE:		No. of the last of		ber 1	10, 20	019		-
JOB N			Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S)	TYPE O	F DRI				,			
			Route 105 Section 1	, l	Holl	ow S	tem A	uger	- Di	iamo	nd C	ore	
STATI	ON:	;	206+20		EQUIPN	1ENT:			Acl	cer 2	094		
LOCA			9' Left of Constructiion Centerline										
_			roy Frazier		HAMM	ER CO	RRECT	ION I	FACT	OR:		N/A	_
COM	PLET	ION	DEPTH: 44.3					, and the same of					
D	S	S											
E P	S Y	A							Τ.	S		%	%
T	M	M P	DESCRIPTION OF MATERIAL	SOIL				H	U.F	OW		T	R
Ĥ	В	Ĺ		GROUP	\subseteq	ST.		ÆIC	3R C	BIL	ż	C R	Q D
	O L	Ε			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	K	ا تا
FT.		S	SURFACE ELEVATION: 547.0		P.L.	%	CIN	DR	LB	NO	PE]		
			SHALE WITH FREQUENT TO OCCASIONAL									100	82
			SANDSTONE PARTINGS AND SEAMS -									.00	
			Unweathered, Hard, Gray										
40													
												100	99
45			Boring Terminated		1								
			ga.c.										
50													
55													
60													
65													
					1								
70													
REMA	ARKS	:											



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

November 20, 2017

TO:

Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT:

Job No. 080529

Hector, Isabell, & Alewine Creeks Strs. & Apprs. (S)

Route 105 Section 1

Pope 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 bridges crossing Hector, Isabel and Alewine creeks on Highway 105. 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 non-plastic sands and moderately plastic clayey sands with gravel. Isolated locations of highly plastic clay were encountered within the project limits. 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 normal processing if the weather is favorable during construction. Rock was encountered at station 202+00 6 feet right of centerline at a depth of 0.7 feet, and at station 208+00 6 feet left of centerline at a depth of 0.8 feet.

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 near Gum Log.
- 2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.4	95.6
Base Course	4.0	96.0

Michael C. Benson Materials Engineer

MCB:pt:bjj Attachment

CC:

State Constr. Eng. – Master File Copy

District 8 Engineer

System Information and Research Div.

G. C. File

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY STRENGTH TEST REPORT ***

DATE - 10/30/2017 SEQUENCE NO. - 1

JOB NUMBER - 080529 MATERIAL CODE - SSRV

SPEC. YEAR - 2014 SUPPLIER ID. - 1

COUNTY/STATE - 58 DISTRICT NO. - 08

JOB NAME - HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS.

BEGIN JOB - END JOB 8

RESILIENT MODULUS

STA. 102 + 00 7128 STA. 208 + 00 6175 STA. 301 + 00 7764

REMARKS -

-

AASHTO TESTS : T190

JOB NAME: HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS.

Materials Division

COUNTY NO. 58 **DATE TESTED** 10/5/2017

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #: %	%MOISTURE
102+10	18 RT	0-5	BROWN	82	74	66	61	57	36	16	A-6(6)	RV604	
208+00	18 LT	0-5	BROWN	87	81	75	65	36	ND	NP	A-4-0	RV605	
301+10	18 RT	0-5	BROWN	92	89	86	83	76	ND	NP	A-4-0	RV606	
102+00	06 RT	0-5	BROWN	96	93	85	78	73	37	21	A-6(13)	S592	14.9
102+00	18 RT	0-5	BROWN	86	81	74	70	66	37	19	A-6(10)	S593	14
108+00	18 LT	0-5	BROWN	93	87	77	70	59	28	13	A-6(5)	S595	13.2
202+00	06 RT	0-0.7Z	BROWN	93	84	78	67	40	ND	NP	A-4-0	S596	16.9
202+00	18 RT	0-5	BROWN	88	77	68	61	39	ND	NP	A-4-0	S597	5.8
208+00	06 LT	0-0.8Z	BROWN	82	74	67	57	30	ND	NP	A-2-4(0)	S598	15.2
208+00	18 LT	0-5	BROWN	80	67	57	50	29	ND	NP	A-2-4(0)	S599	11.4
301+00	06 RT	0-5	BROWN	96	91	86	77	65	25	10	A-4(4)	S600	17.1
301+00	18 RT	0-5	BROWN	97	94	88	81	71	27	6	A-4(3)	S601	15.2
306+00	06 LT	0-5	BROWN	98	95	90	82	67	24	10	A-4(4)	S602	22.4
306+00	24 LT	0-5	BROWN	92	90	86	78	63	21	5	A-4(1)	S603	25.4
108+00	06 LT	0-5	BROWN	95	87	74	70	67	35	17	A-6(9)	S94	16.3

DATE TESTED

10/5/2017

Arkansas State Highway Transporation Department

Materials Division

 $JOB\ NAME$: HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS.

COUNTY NO. 58

080529

JOB:

Michael Benson, Materials Engineer

PAVEMENT SOUNDINGS AGG. BASE CRS CL-7 AGG. BASE CRS CL-7 AGG. BASE CRS CL-7 5.0 AGG. BASE CRS CL-7 AGG, BASE CRS CL-7 AGG. BASE CRS CL-7 AGG. BASE CRS CL-7 AGG, BASE CRS CL-7 AGG. BASE CRS CL-7 AGG.BASE CRS CL-7 AGG.BASE CRS CL-7 AGG.BASE CRS CL-7 ACHIMBC ACHIMBC ACHIMBC 4.0 1.0 4.0 ACHIMBC ACHMBC ACHIMBC ACHIMBC ACHIMBC ACHIMBC BST BST BST BST BST BST 0.5 1.0 ACHIMSC ACHIMSC ACHMSC ACHMSC ACHMSC ACHIMSC ACHIMSC ACHIMSC ACHIMSC ACHMSC ACHIMSC ACHMSC 8.0W 6.0W 9.0W 9.0W 10.0 6.0W 06 RT 18 RT 06 RT 18 RT 06 LT 18 LT 06 RT 06 LT 18 LT 18 RT 06 LT 24 LT STA.# LOC. 102+00 108+00 102+00 108+00 202+00 202+00 208+00 208+00 301+00 306+00 301+00 306+00

Monday, October 30, 2017

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:	080529 9/18/17 October 13, 2017 HECTOR, ISABELL & ALEWINE CREEKS STRS. 4	Material Code Station No.: Location: & APPRS.	SSRVPS 208+00 18'LT
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code: 58 Name: POPE THORNTON/BUIE 20173025 RV605	Depth: AASHTO Class: Material Type (1 or 2): LONGITUDE:	0-5 A-4 (0) 2
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=Ye Testing - Permanent Strain > 5% (Y=Yes or N=N Number of Load Sequences Completed (0-15)	·	N N 15
2. Specimen Info	ermation:		
Soil Speciment Soil Properties	Specimen Diameter (in): Top Middle Bottom Average Membrane Thickness (in): Height of Specimen, Cap and Base (in): Height of Cap and Base (in): Initial Length, Lo (in): Initial Area, Ao (sq. in): Initial Volume, AoLo (cu. in): Weight: Weight of Wet Soil Used (g):		3.94 3.95 3.94 3.94 0.01 8.03 0.00 8.03 12.14 97.47
	Optimum Moisture Content (%):		13.0
	Maximum Dry Density (pcf): 95% of MDD (pcf): In-Situ Moisture Content (%):		115.1 109.3 N/A
5. Specimen Pro	narties:		
o. opecimen rro	Wet Weight (g): Compaction Moisture content (%): Compaction Wet Density (pcf): Compaction Dry Density (pcf): Moisture Content After Mr Test (%):		3273.20 12.7 127.95 113.53 12.9
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	5792(S	c)^-0.14838(S3)^0.48592
8. Comments			
9. Tested By:	<u>GW</u> Date	e: October 13, 2017	

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

SSRVPS 208+00 18'LT Material Code Station No.: Location: 9/18/17 080529 Date Sampled:

Job No.

HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS. October 13, 2017 Name of Project: Date Tested:

POPE Name: Code: 58 County:

0-5

Material Type (1 or 2): 2 LONGITUDE: Depth: THORNTON/BUIE 20173025 RV605 Sampled By: LATITUDE: Sample ID: Lab No.:

	Chamber	Nominal	Actual	Actual	Actual	Actual	Actual	Actual	Average	Resilient	Resilient
	Confining	Maximum	Applied	Applied	Applied	Applied	Applied	Applied	Recov Def.	Strain	Modulus
PARAMETER	Pressure	Axial	Max. Axial	Max. Axial Cyclic Load	Contact	Max.	Cyclic	Contact	LVDT 1		
		Stress	Load		Load	Axial	Stress	Stress	and 2		
						Stress					
DESIGNATION	လိ	Scyclic	P _{max}	P _{cyclic}	P _{contact}	S _{max}	Scyclic	Scontact	Havg	టా	Ā
LIND	psi	psi	sql	sql	sql	psi	psi	psi	in	in/in	psi
Sequence 1	0.9	2.0	25.2	22.5	2.7	2.1	1.9	0.2	0.00118	0.00015	12,585
Sequence 2	0.0	4.0	47.4	44.7	2.7	3.9	3.7	0.2	0.00252	0.00031	11,727
Sequence 3	0.0	0.9	8.69	66.4	3.5	5.8	5.5	0.3	0.00401	0.00050	10,950
Sequence 4	0.0	8.0	93.5	97.8	5.9	7.7	7.2	0.5	0.00573	0.00071	10,108
Sequence 5	0.9	10.0	117.3	109.0	8.3	9.7	9.0	0.7	0.00729	0.00091	9,891
Sequence 6	4.0	2.0	25.0	22.4	2.7	2.1	1.8	0.2	0.00140	0.00017	10,582
Sequence 7	4.0	4.0	46.6	43.9	2.7	3.8	3.6	0.2	0.00311	0.00039	9,335
Sequence 8	4.0	0.9	67.7	65.0	2.7	5.6	5.4	0.2	0.00500	0.00062	8,590
Sednence 9	4.0	8.0	91.5	86.4	5.1	7.5	7.1	0.4	0.00680	0.00085	8,400
Sequence 10	4.0	10.0	115.3	107.6	9.2	9.5	8.9	9.0	0.00861	0.00107	8,267
Sequence 11	2.0	2.0	24.5	21.7	2.8	2.0	1.8	0.2	0.00192	0.00024	7,462
Sequence 12	2.0	4.0	45.0	42.2	2.9	3.7	3.5	0.2	0.00428	0.00053	6,518
Sequence 13	2.0	0.9	65.3	62.4	2.9	5.4	5.1	0.2	0.00662	0.00082	6,240
Sequence 14	2.0	8.0	87.5	83.2	4.3	7.2	6.9	0.4	0.00891	0.00111	6,178
Seguence 15	2.0	10.0	110.3	103.5	6.8	9.1	8.5	0.6	0.01109	0.00138	6.175

October 13, 2017	
DATE	DATE
MD	
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.

080529

Material Code SSRVPS

Date Sampled:

9/18/17

Station No.: 208+00

Date Tested:

October 13, 2017

Location: 18'LT

Name of Project: HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS.

County:

Code: 58

Sampled By:

THORNTON/BUIE

Name: POPE

Depth: 0-5

Lab No.:

20173025

AASHTO Class: A-4 (0)

Sample ID:

RV605

Material Type (1 or 2): 2

LATITUDE:

LONGITUDE:

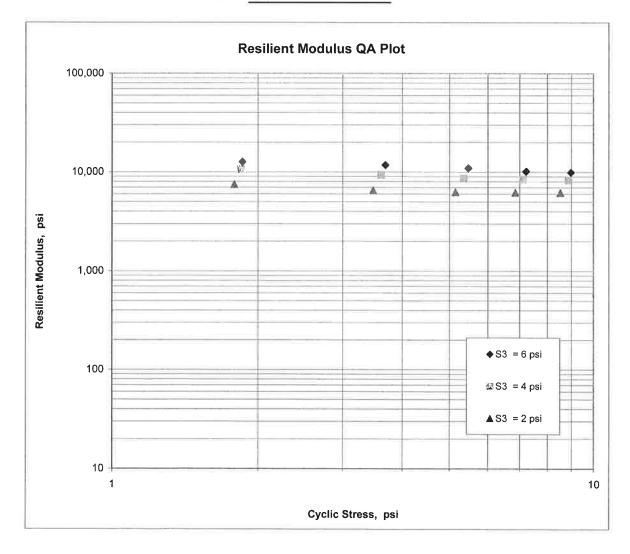
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

$$K1 = 5,792$$

$$K2 = -0.14838$$

$$K5 = 0.48592$$

$$R^2 = 0.99$$



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:	080529 9/18/17 October 13, 2017 HECTOR, ISABELL & ALEWINE CREEKS STRS. &	Material Code Station No.: Location:	SSRVPS 102+00 18'RT
Name of Project: County:	Code: 58 Name: POPE	APPRS.	
Sampled By:	THORNTON/BUIE	Depth:	0-5
Lab No.:	20173024	AASHTO Class:	A-6 (6)
Sample ID:	RV604	Material Type (1 or 2):	
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation:		•
	Preconditioning - Permanent Strain > 5% (Y=Yes	•	N
	Testing - Permanent Strain > 5% (Y=Yes or N=No	p)	N
	Number of Load Sequences Completed (0-15)		15
2. Specimen Info	ormation:		
	Specimen Diameter (in):		
	Тор		3.96
	Middle		3.96
	Bottom		3.95
	Average		3.96
	Membrane Thickness (in):		0.01
	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):		12.22
	Initial Volume, AoLo (cu. in):		98.14
3. Soil Specime	n Weight:		
	Weight of Wet Soil Used (g):		3170.70
4. Soil Propertie	s:		
	Optimum Moisture Content (%):		17.3
	Maximum Dry Density (pcf):		107.8
	95% of MDD (pcf):		102.4
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	operties:		
•	Wet Weight (g):		3170.70
	Compaction Moisture content (%):		17.6
	Compaction Wet Density (pcf):		123.11
	Compaction Dry Density (pcf):		104.68
	Moisture Content After Mr Test (%):		17.6
6. Quick Shear 1	Test (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus. Mr:	14134(S	Sc)^-0.36377(S3)^0.18121
			-, 3,000,7,(50) 0,10,121
8. Comments	: 		
9. Tested By:	GW Date	October 13, 2017	

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: October 13, 2017 080529 9/18/17 Date Sampled: Date Tested: Job No.

HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS. Name of Project:

POPE Name: Code: 58 County:

Material Type (1 or 2): 2 LONGITITIES Depth: THORNTON/BUIE 20173024 **RV604** Sampled By: Sample ID: Lab No.:

0-5

LATITUDE:

			_								-		_	_		-	_	-		_
Modulus				M	psi	15,058	13,550	11,471	9,260	8,069	13,761	12,089	10,495	8,860	7,698	11,808	10,528	9,244	8,017	7 128
Strain				ä	in/in	0.00012	0.00027	0.00047	0.00076	0.00107	0.00013	0.00030	0.00051	0.00079	0.00112	0.00016	0.00034	0.00058	0.00087	0.00119
Recov Def.	LVDT 1	and 2		Havg	ŗ	0.00098	0.00216	0.00380	0.00612	0.00858	0.00108	0.00242	0.00412	0.00637	0.00896	0.00125	0.00277	0.00464	0.00697	0 00958
Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	9.0	0.2	0.2	0.2	0.4	0.6
Applied	Cyclic	Stress		S _{cyclic}	psi	1.8	3.7	5.4	7.1	9.8	1.8	3.6	5.4	7.0	8.6	1.8	3.6	5.3	7.0	8.5
Applied	Мах.	Axial	Stress	S _{max}	psi	2.1	3.9	5.7	9.2	9.3	2.1	3.9	5.6	7.5	9.2	2.1	3.9	5.6	7.3	1 6
Applied	Contact	Load		P _{contact}	lbs	2.8	2.9	3.7	6.1	8.5	2.8	2.8	2.8	5.2	9.7	2.8	2.8	2.8	4.3	89
Applied	Cyclic Load			P _{cyclic}	sql	22.6	44.6	66.3	86.3	105.4	22.5	44.5	65.8	85.9	104.9	22.5	44.4	65.3	85.0	103.9
Applied	Max. Axial	Load		P _{max}	sql	25.3	47.5	70.0	92.4	113.9	25.3	47.3	68.6	91.1	112.6	25.3	47.2	68.1	89.4	110.7
Maximum	Axial	Stress		Scyclic	psi	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Confining	Pressure			Š	psi	6.0	0.9	0.9	0.9	6.0	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	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Seguence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15
	Maximum Applied Applied Applied Applied Applied Recov Def. Strain	ConfiningMaximumAppliedAppliedAppliedAppliedAppliedAppliedAppliedRecov Def.StrainPressureAxialMax. AxialCyclic LoadContactMax.CyclicContactLVDT 1	Confining Maximum Applied Applied Applied Applied Applied Applied Recov Def. Strain Pressure Axial Max. Axial Contact Max. Cyclic Load Contact LVDT 1 Load Load Load Axial Stress and 2	Confining Maximum Applied Applied Applied Applied Applied Applied Applied Applied Applied Recov Def. Strain Pressure Axial Axial Contact LVDT 1 LVDT 1 Axial Stress and 2 Axial Stress and 2	Confining Maximum Applied Recov Def. Strain Pressure Axial Stress Load Load Load Axial Stress and 2 Saycite Pmax Pcyclic Pcontact Pcontact Pcontact Pcyclic Pcyclic Pcyclic	Confining Maximum Applied Applied	Confining Maximum Applied Recov Def. Strain N Pressure Axial Stress Load Load Axial Stress Stress and 2 Recov Def. Strain N Same Squelic Pmax Poyclic Pcontact Smax Soyclic Scontact Havg Er psi psi lbs lbs psi in in/lin in/lin 6.0 2.0 2.0 2.5.3 2.2.6 2.8 2.1 1.8 0.2 0.00098 0.00012	Confining Naximum Applied Axial Stress Applied Applied Applied Applied Applied Applied Applied Axial Stress Applied Applied Applied Applied Applied Axial Stress Applied Applied Applied Applied Axial Stress Applied Applied Applied Applied Axial Stress Applied Axial Stress	Confining Maximum Applied Appl	Confining Maximum Applied Applied	Confining Pressure Axial Axial Applied Applied Applied Contact Axial Applied Contact Contact Axial Applied Applied Contact Axial Stress Applied Axial Stress Applied Axial Contact Axial Stress Applied Contact Axial Stress Applied Contact Axial Stress Bx Bx	Confining Maximum Applied Applied	Confining Maximum Applied Recov Def. Contact Strain A Pressure Axial Axial Axial Axial Axial Stress Stress Stress And 2 Sa Scyclic Pmax Poyclic Poyclic Poyclic Poyclic Pmax Stress Stress Stress And 2 And 3 And 3	Confining Maxinum Applied Applied	Confining Maximum Applied Applied	Confining Maximum Applied Applied Applied Applied Applied Applied Applied Applied Applied Applied Axial Stress Applied Axial Axial Contact Load Contact Contact Contact LVD7 1 Strain Axial Axial Contact	Confining Maximum Applied Applied	Confining Maximum Applied Applied	Confining Maximum Applied Applied Applied Contact Applied Applied Contact Applied Applied Applied Contact Applied Applied Contact Applied Applied Contact Applied Contact LVDT 1 Stress Stress	Confining Maximum Applied Applied Applied Applied Applied Applied Applied Applied Applied Applied Applied Stress Applied Applied Stress Applied Stress Applied Stress Applied Stress Stress

October 13, 2017	: 1/\$(
DATE	DATE
GW	
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.080529Material Code SSRVPSDate Sampled:9/18/17Station No.: 102+00Date Tested:October 13, 2017Location: 18'RT

Name of Project: HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS.

County: Code: 58 Name: POPE

Sampled By:THORNTON/BUIEDepth: 0-5Lab No.:20173024AASHTO Class: A-6 (6)Sample ID:RV604Material Type (1 or 2): 2LATITUDE:LONGITUDE:

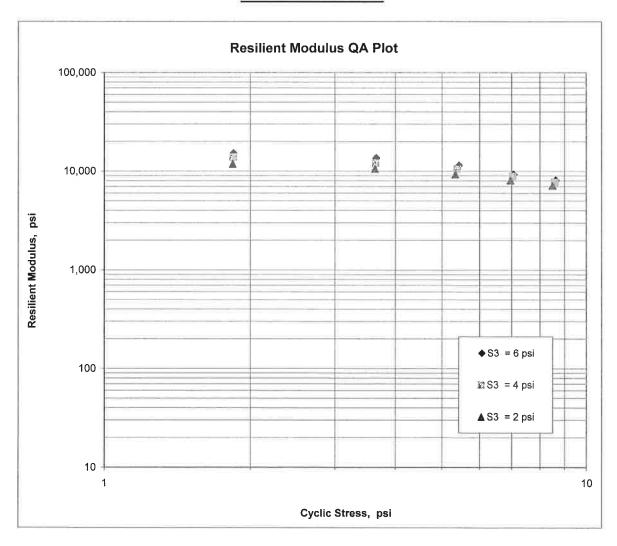
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

K1 = 14,134

K2 = -0.36377

K5 = 0.18121

 $R^2 = 0.92$



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: County:	080529 9/18/17 October 17, 2017 HECTOR, ISABELL & ALEWINE CREEKS STRS Code: 58 Name: POPE	Material Code Station No.: Location: S. & APPRS.	SSRVPS 301+10 18'RT
Sampled By:	THORNTON/BUIE	Depth:	0-5
Lab No.:	20173026	AASHTO Class:	A-4 (0)
Sample ID:	RV606	Material Type (1 or	2):
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation:		
g	Preconditioning - Permanent Strain > 5% (Y=)	Yes or N= No)	N
	Testing - Permanent Strain > 5% (Y=Yes or N=	·	N
	Number of Load Sequences Completed (0-15)	·	15
2. Specimen Info	ormation: Specimen Diameter (in):		
	Top		3.93
	Middle		3.94
	Bottom		3.95
	Average		3.94
	Membrane Thickness (in):		0.01
	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):		12.12
	Initial Volume, AoLo (cu. in):		97.31
3. Soil Specimer			
	Weight of Wet Soil Used (g):		3143.70
4. Soil Properties	s:		
,	Optimum Moisture Content (%):		15.0
	Maximum Dry Density (pcf):		111.6
	95% of MDD (pcf):		106.0
	In-Situ Moisture Content (%):		N/A
5. O			
5. Specimen Pro	•		0440 70
	Wet Weight (g):		3143.70
	Compaction West Descrits (not):		14.7
	Compaction Wet Density (pcf): Compaction Dry Density (pcf):		123.10
	Moisture Content After Mr Test (%):		107.32 14.9
	Moisture Content Alter Mil Test (70).		14.5
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	942	0(Sc)^-0.19473(S3)^0.31562
8. Comments			
o. comments			
9. Tested By:	GW D	ate: October 17, 2017	

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

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

SSRVPS 301+10 18'RT Material Code Station No.: Location: October 17, 2017 080529 9/18/17 Date Sampled:

Job No.

HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS. Name of Project: Date Tested:

Material Type (1 or 2): 2 Depth: POPE Name: THORNTON/BUIE Code: 58 Sampled By: County:

0-5

RV606 LATITUDE: Sample ID:

20173026

Lab No.:

LONGITUDE:

			_	_	_	_	_	_			_	_	_	_		_			_	_
Resilient Modulus				Mr	psi	14,331	13,394	12,219	11,171	10,432	13,125	11,663	10,614	9,867	9,357	10,049	9,242	8,505	8,067	7.764
Resilient Strain				చ్	in/in	0.00013	0.00027	0.00045	0.00064	0.00086	0.00014	0.00031	0.00051	0.00072	0.00095	0.00018	0.00039	0.00062	0.00087	0.00112
Average Recov Def.	LVDT 1	and 2		H _{avg}	.⊑	0.00102	0.00219	0.00358	0.00517	0.00687	0.00112	0.00250	0.00408	0.00581	0.00759	0.00146	0.00312	0.00501	0.00698	0.00899
Actual Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	9.0	0.2	0.2	0.2	0.3	0.5
Actual Applied	Cyclic	Stress		Scyclic	psi	1.8	3.7	5.4	7.2	8.9	1.8	3.6	5.4	7.1	8.8	1.8	3.6	5.3	7.0	8.7
Actual Applied	Max.	Axial	Stress	S _{max}	psi	2.1	3.9	5.7	7.7	9.6	2.1	3.9	5.6	9.7	9.5	2.1	3.8	5.5	7.4	9.2
Actual Applied	Contact	Load		Pcontact	lbs	2.8	2.8	3.6	0.9	8.4	2.8	2.8	2.8	5.1	9.7	2.8	2.8	2.8	4.2	6.6
Actual Applied	Ō,			P _{cyclic}	sql	22.1	44.2	0.99	87.1	108.1	22.2	44.0	65.4	86.5	107.2	22.1	43.5	64.3	85.0	105.4
Actual Applied	Max. Axial	Load		P _{max}	lbs	24.9	47.0	9.69	93.1	116.6	25.0	46.8	68.2	91.7	114.7	24.8	46.3	67.1	89.2	112.0
Nominal Maximum	Axial	Stress		Scyclic	psi	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber Confining	Pressure			Š	psi	6.0	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	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

October 17, 2017	
DATE	DATE
GW	
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.

080529

Material Code SSRVPS

Date Sampled:

9/18/17

Station No.: 301+10

Date Tested:

Location: 18'RT

October 17, 2017

Name of Project: HECTOR, ISABELL & ALEWINE CREEKS STRS. & APPRS. County:

Code: 58

Name: POPE

Sampled By:

THORNTON/BUIE

Depth: 0-5

Lab No.:

20173026

AASHTO Class: A-4 (0)

Sample ID:

RV606

Material Type (1 or 2): 2

LATITUDE:

LONGITUDE:

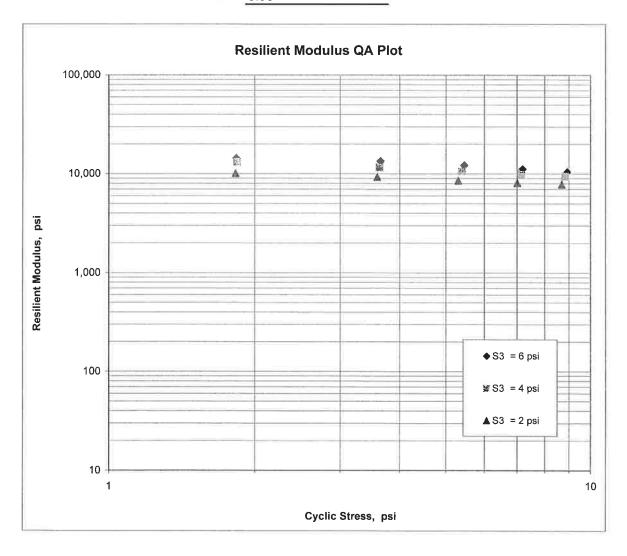
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

$$K1 = 9,420$$

$$K2 = -0.19473$$

$$K5 = 0.31562$$

$$R^2 = 0.98$$



MICHAEL BENSON, MATERIALS ENGINEER

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

JOB NUMBER - 080 FEDERAL AID NO TO	BE ASSI L SURVE SPECIFI ATE HECTOR, NOT APPL ISAS COUNTY TON/BUILE HOLE	Y SAMPLE CATION CHECK ISABELL & ALE ICABLE	WINE C			MATERI SPEC. SUPPLI COUNTY DISTRI & APPRI DATE S DATE S DATE S	AL YEA ER /ST CT S. SAM:	NO 1 CODE - SSRVPS AR - 2014 ID 1 TATE - 58 NO 08 PLED - 09/18/17 EIVED - 10/02/17 FED - 10/05/17
LAB NUMBER	-	20173012	,	=	20173013		:=:	20173014
SAMPLE ID	-	S592	,	_	S593		-	S94
TEST STATUS	-	INFORMATION	ONLY		INFORMATIO	ON ONLY	-	INFORMATION ONLY
STATION	-	102+00		-	102+00		-	108+00
LOCATION	-	00 111			18 RT		-	06 LT
DEPTH IN FEET	-	• •		-	0-5		_	0-5
MAT'L COLOR	-	BROWN		-	BROWN		-	BROWN
MAT'L TYPE	-	25 05 0	57.0		25		-	25 04 50 50
LATITUDE DEG-MIN- LONGITUDE DEG-MIN-		35 25 2.		7	35 25 92 57			35 24 58.50 92 57 38.20
LONGITUDE DEG-MIN-	SEC -	92 57 40.	. 10		92 57	40.20		92 57 38.20
% PASSING 2	IN			-				
·	! IN			~			-	
-	IN		7	2	100		: E:	
·	3 IN			_	95		-	100
	4 -		,	-	86		-	95
NO.		93		=	81		=	87
	40 -	85	2	-	74 70		*	74
NO.	80 - 200 -	78 73			66		_	70 67
110.	200 -	7.5			00			0 /
LIQUID LIMIT	-	37		-	37		-	35
PLASTICITY INDEX	-				19		-	17
AASHTO SOIL	_	A-6(13)			A-6(10)		-	A-6(9)
UNIFIED SOIL	-			_			_	
% MOISTURE CONTENT	-	14.9			14.0			16.3
ACHMSC	(IN) -	8.0W	9	= 1	***		**	10.0
ACHMBC	(IN) -	1.0		-			7	1.0
AGG. BASE CRS CL-7	(IN) -	4.0	9	-			-	4.0
	25			-			_	
	·			-			77	
	(=		i	ů.			=	
	100		9	-			-	
	(2) (2)			-			=	

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

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AASHTO TESTS : T24 T88 T89 T90 T265

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 10/ JOB NUMBER - 080 FEDERAL AID NO TO PURPOSE - SOI SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - H PROJECT ENGINEER - N PIT/QUARRY - ARKAN	529 BE ASSI L SURVE SPECIFI TE ECTOR, OT APPL SAS	Y SAMPLE CATION CHEC ISABELL & <i>F</i> ICABLE	CK	'RI	EEKS STRS.	MATERI SPEC. SUPPLI COUNTY DISTRI	AL YEA ER /ST CT	NO 2 CODE - SSRVPS R - 2014 ID 1 PATE - 58 NO 08
LOCATION - POPE, SAMPLED BY - THORNT SAMPLE FROM - TEST MATERIAL DESC SOI	ON/BUIE HOLE		UE- PAVEM	ΊĒΊ	NT SOUNDIN	DATE I	RECE	PLED - 09/17/17 BIVED - 10/02/17 FED - 10/05/17
LAB NUMBER SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET MAT'L COLOR MAT'L TYPE	- - - -	20173015 S595 INFORMATIO 108+00 18 LT 0-5 BROWN	ON ONLY		S596			20173017 S597 INFORMATION ONLY 202+00 18 RT 0-5 BROWN
LATITUDE DEG-MIN- LONGITUDE DEG-MIN-	SEC - SEC -	35 24 5 92 57	58.50 - 38.20		35 21 92 57			35 21 34.20 92 57 33.00
3/4 3/8 NO. NO. NO. NO.	IN IN IN	99 93 87 77 70 59			100 93 84 78 67 40			100 88 77 68 61 39
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT	- - -	28 13 A-6(5)	- - -		ND NP A-4-0			ND NP A-4-0 5.8
ACHMSC BST ACHMBC AGG. BASE CRS CL-7	(IN) - (IN) - (IN) - - - -		3 3 3 3 3 3 3 3		6.0W 0.5 1.0 5.0		2013 1 1 1 20 30 31 1 1 2 20 3	

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

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AASHTO TESTS : T24 T88 T89 T90 T265

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MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 10/ JOB NUMBER - 080 FEDERAL AID NO TO	529 BE ASSI L SURVE SPECIFI TE ECTOR, OT APPL SAS COUNTY ON/BUIE HOLE	Y SAMPLE CATION CHECK ISABELL & ALEW ICABLE	INE CF		MATERIAL SPEC. YEA SUPPLIER COUNTY/ST DISTRICT & APPRS. DATE SAM DATE REC DATE TES	NO 3 CODE - SSRVPS AR - 2014 ID 1 FATE - 58 NO 08 PLED - 09/18/17 EIVED - 10/02/17 TED - 10/05/17
LAB NUMBER	_	20173018	~	20173019	-	20173020
SAMPLE ID	_			S599		S600
TEST STATUS	-	INFORMATION ON	MLY -	INFORMATIO		INFORMATION ONLY
STATION	_	208+00	-	208+00	77	301+00
LOCATION		06 LT	_	18 LT	=	06 RT
DEPTH IN FEET		0-0.8Z	-	0-5	-	0-5
MAT'L COLOR	-	BROWN	-	BROWN	=	BROWN
MAT'L TYPE LATITUDE DEG-MIN-	- CEC	25 21 20 0	0	35 21	20.70	35 16 15.70
LATITUDE DEG-MIN-					28.70 <i>-</i> 32.60	35 16 15.70 92 56 7.90
		J2 37 32 7	0	32 37	32.60	JZ 30 7.30
% PASSING 2			-		-	
·	IN	100	_	100	_	100
•	IN IN		-	91	_	100 99
•	4 -		-	80	-	96
	10 -		-	67	_	91
	40 -		_	57	_	86
NO.	80 -	57	_	50	_	77
NO.	200 -	30		29		65
LIQUID LIMIT	_	ND	_	ND	_	25
PLASTICITY INDEX	_		:=:		-	10
AASHTO SOIL	-	A-2-4(0)	5 44 5	A-2-4(0)	-	A-4(4)
UNIFIED SOIL	-		-		五 火。	
% MOISTURE CONTENT	_	15.2	-	11.4	-	17.1
ACHMSC	(IN) -	6.0W	-		_	9.0W
BST	(IN) -	1.0	-		-	IREE
AGG. BASE CRS CL-7	(IN) -	4.0	-		-	4.0
	_		(e)		: : ::::::::::::::::::::::::::::::::::	
	_		3		-	
	-				-	
	-		87		-	
	_		· •			

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

AASHTO TESTS : T24 T88 T89 T90 T265

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MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 10/ JOB NUMBER - 080 FEDERAL AID NO TO PURPOSE - SOI SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - H PROJECT ENGINEER - N PIT/QUARRY - ARKAN LOCATION - POPE, SAMPLED BY - THORNT SAMPLE FROM - TEST MATERIAL DESC SOI	529 BE ASSI L SURVE SPECIFI TE ECTOR, OT APPL SAS COUNTY CON/BUIE HOLE	Y SAMPLE CATION CHECK ISABELL & ALEWINE ICABLE		SPEC. YEAR SUPPLIER OUNTY/STATE APPRS. DATE SAMP DATE RECE DATE TEST	CODE - SSRVPS R - 2014 ID 1 ATE - 58 NO 08 LED - 09/18/17 IVED - 10/02/17
LAB NUMBER SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET MAT'L COLOR MAT'L TYPE LATITUDE DEG-MIN-	- - - SEC -	S601 INFORMATION ONLY 301+00 18 RT 0-5 BROWN	- 306+00 - 06 LT - 0-5 - BROWN - 35 16	ON ONLY - - - - - - - -	20173023 S603 INFORMATION ONLY 306+00 24 LT 0-5 BROWN
3/4 3/8 NO. NO. NO.	IN IN IN IN 4 - 10 - 40 -	100 98 97 94 88 81	92 56 100 - 98 - 95 - 90 - 82 - 67	7.00	92 56 6.90 100 95 92 90 86 78 63
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT ACHMSC ACHMBC AGG.BASE CRS CL-7	(IN) - (IN) - - - -	6 A-4(3)	- 24 - 10 - A-4(4) - 22.4 - 9.0W - 2.0 - 4.0		21 5 A-4(1) 25.4

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

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AASHTO TESTS : T24 T88 T89 T90 T265

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 10/05/17 JOB NUMBER - 080529 FEDERAL AID NO TO BE AS PURPOSE - SOIL SUE SPEC. REMARKS - NO SPECT SUPPLIER NAME - STATE NAME OF PROJECT - HECTOR PROJECT ENGINEER - NOT AN PIT/QUARRY - ARKANSAS LOCATION - POPE, COUR SAMPLED BY - THORNTON/BR SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SU	SSIGNED EVEY SAMPLE EFICATION CHECK R, ISABELL & ALEWINE PPLICABLE STY JIE	MASSPI SUI COU DISCREEKS STRS. & A DA DA DA	TE SAMPLED - 09/18/17 TE RECEIVED - 10/02/17 TE TESTED - 10/05/17
LAB NUMBER SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET MAT'L COLOR MAT'L TYPE LATITUDE DEG-MIN-SEC LONGITUDE DEG-MIN-SEC	- RV604 - INFORMATION ONLY - 102+10 - 18 RT - 0-5 - BROWN - 35 25 2.70	- 208+00 - 18 LT - 0-5 - BROWN - 35 21 28.7	
<pre>% PASSING 2 IN.</pre>	- 100 - 89 - 82 - 74 - 66 - 61	- 100 - 96 - 87 - 81 - 75 - 65 - 36	- 100 95 92 89 86 86 83
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT	- 36 - 16 - A-6(6) - - - - - -	- ND - NP - A-4-0 -	- ND - NP - A-4-0 -

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

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AASHTO TESTS : T24 T88 T89 T90 T265

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