ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO.		040622									
FEDERAL AID PROJ	ECT NO	NHPP-0072(46)									
WASHINGTON CO. LINE - SOUTH STRS. & APPRS. (S)											
STATE HIGHWAY	59	SECTION	5								
IN		CRAWFORD		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

August 21, 2017

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 040622 Washington Co. Line - South Strs. & Apprs. (S) Route 59 Section 5 Crawford County

Transmitted herewith are a brief summary of the geology and site conditions, D50 analysis test results, unconfined compressive strength results, RMR, and the logs of the borings conducted for the structures and approaches of the above referenced project. The samples obtained by Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. The rock cores are available for inspection at the Materials Division.

Site 1 – Mountain Fork Tributary Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. Preboring may be necessary to achieve minimum penetration requirements. No borings were obtained at intermediate bents 2 or 3, station 68+40 and 68+80, due to inaccessibility caused by low bridge clearance and high water in the channel. Correlating the elevation of bedrock between the bridge end boring logs, competent bedrock should be encountered less than 15 feet below ground level. Based on this information and plans provided by Bridge Division, it is anticipated that both intermediate bents will be founded on spread footings. Spread Footings founded in competent Limestone should be sized based on the values provided in Table 1.

Foundation Description		Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
Spread Footings	296	133	40

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Site 2 – Mountain Fork Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling and both intermediate bents will be founded on spread footings. Spread footings founded in competent shale should be sized based on the values provided in Table 2. The AASHTO Bridge Design Specification, 7th edition, specifies that bearing resistance for spread footings on rock can be designed utilizing the RMR system to determine the bearing resistance or "other visual systems that have proven to yield accurate results may be used in lieu of the specified method." The RMR system yields unreasonably low bearing resistances for the encountered shale material. Table C10.6.2.6.1-1 for "Compaction shale or other highly argillaceous rock in sound condition" and previous experience in similar conditions were used to determine the recommended bearing resistance.

TABLE 2 - Bearing	Capacity Recommendations	for	Spread Footings
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Foundation	Factored Bearing
Description	Resistance (ksf)
Spread Footings	20

Site 3 – Whitzen Hollow Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. No borings were obtained at intermediate bents 2 or 3, station 181+32 and 181+82, due to inaccessibility caused by low bridge clearance and conflict with overhead utilities. Correlating the elevation of bedrock between the bridge end boring logs, it is anticipated that competent bedrock should be shallower than 15 feet below ground level. Based on this information and correspondence from Bridge Design, it is anticipated that both intermediate bents will be founded on spread footings. Spread footings founded in competent shale should be sized based on the values provided in Table 3. The AASHTO Bridge Design Specification, 7th edition, specifies that bearing resistance for spread footings on rock can be designed utilizing the RMR system to determine the bearing resistance or "other visual systems that have proven to yield accurate results may be used in lieu of the specified method." The RMR system yields unreasonably low bearing resistances for the encountered shale material. Table C10.6.2.6.1-1 for "Compaction shale or other highly argillaceous rock in sound condition" and previous experience in similar conditions were used to determine the recommended bearing resistance.

TABLE 3 – Bearing	Capacity Recommendations	for Spread Footings
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Foundation	Factored Bearing
Description	Resistance (ksf)
Spread Footings	20

Site 4 – Huey Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. Preboring may be necessary to achieve minimum penetration requirements. An unmapped fault was discovered between stations 286+49 and 287+29. No boring was obtained at bent 2, station 286+89, due to inaccessibility caused by low bridge clearance and steep banks. Utilizing the data obtained from adjacent borings and assuming competent rock will be encountered at a depth shallower than 15 feet below ground level, it is anticipated that bent 2 will be founded on a spread footing. Based on plans provided by Bridge Division and the depth to competent rock, it is anticipated that bent 3 will also be founded on a spread footing. Spread Footings founded in competent Limestone should be sized based on the values provided in Table 4.

TABLE 4 – Bearing Capacity Recommendations for Spread Footings

Foundation Description		Nominal Bearing Resistance (ksf)	Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
	oread otings	358	161	40

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 4 Engineer G.C. File

GEOLOGY AND SITE CONDITIONS Job No. 040622

<u>Washington County Line – South Strs. & Apprs. (S)</u> <u>Route 59 Section 5</u> <u>Crawford County</u>

Site Conditions

There are four bridges associated with this job. **Bridge 1** is the northernmost bridge and crosses over Mountain Fork Tributary Creek. The existing bridge is a five span bridge constructed of concrete deck supported by spread footings and concrete end walls. The guardrail is composed of steel with concrete posts. Riprap has been placed on the abutment slopes. A telecommunication line parallels the west side of the roadway, buried north and south of the bridge and overhead over the channel. Limestone is exposed in the channel. A cave is located in a bluff a short distance east of the bridge. The channel was dry at the time of the subsurface investigation. The area around the bridge is primarily wooded with a residence located upstation and downstation of the bridge, on the right side of the roadway.

Bridge 2 crosses over Mountain Fork Creek. The existing bridge is a six span bridge constructed of cast-in-place concrete deck supported by spread footings. The guardrail is composed of steel with concrete posts. Overhead power lines cross the roadway a short distance upstation from the bridge. The upstation side of the channel is moderately wooded. The downstation side of the channel is lined with trees with pasture beyond. The stream flows to the southwest.

Bridge 3 crosses over Whitzen Hollow Creek. The existing bridge is a six span bridge constructed of cast-in-place concrete deck supported by spread footings. The guardrail is composed of steel with concrete posts. Overhead power lines parallel the east side of the bridge then cross the roadway north of the bridge. The area around the bridge is moderately to heavily wooded. The stream flows to the south-southwest.

Bridge 4 is the southernmost bridge and crosses over Huey Creek. The existing bridge is a four span bridge constructed of concrete deck supported by spread footings. The deck is supported by nine sets of steel beams. The guardrail is composed of steel with concrete posts. A buried telecommunication line parallels the west side of the roadway. The area around the bridge is moderately to heavily wooded. A residence is located downstation from the bridge on the right side of the roadway. The stream flows to the southwest.

Site Geology

Bridge 1 is located on the Pitkin Formation. The Pitkin Formation is usually a fine- to coarsegrained, oolitic, bioclastic limestone. Minor sandstone has been reported near the top of the unit in the northwest. The unit becomes shalier to the south. The thickness of the Pitkin Limestone ranges from a thin edge to over 400 feet. The average thickness is about 50 feet in the west and about 200 feet in the east. The Pitkin Formation occasionally has dissolutional features, such as sinkholes, caves, and enlarged fissures. Only one boring encountered a soil-filled cavity at 14.2 to 14.3 feet below ground level. Bedrock was encountered at depths of 11.0 to 16.0 feet below ground level. **Bridge 2** is located on the Fayetteville Shale. The Fayetteville is a black, fissile, concretionary, clay shale. Dark-gray, fine-grained limestones commonly are interbedded with the shales in north-central Arkansas. Septarian concretions are common in lower beds of the Fayetteville, but may be found throughout the formation. The Fayetteville Shale ranges in thickness from 10 to 400 feet. Bedrock was encountered at depths of 4.1 to 9.5 feet below ground level. There are east-west trending normal faults mapped to the south of Bridge 2. No faults were encountered during the subsurface investigation of this job site.

Bridge 3 is located on the Bloyd Formation. In western Arkansas, the Bloyd Formation consists of five members (in ascending order): the Brentwood Limestone, Woolsey, Dye shale, Kessler Limestone, and the Trace Creek. The Brentwood limestone is a sequence of limestones separated by thick intervals of dark shale. The Woolsey member is composed of terrestrial sediments comprised of dark-gray, fissile shale, often interbedded with thin siltstones. A thin coal bed, called the Baldwin coal, occurs at or near the top of the Woolsey member. The marine deposited Dye shale is predominantly a dark-gray shale with scattered calcareous concretions. Where underlain by the Woolsey Member, the Dye Shale frequently has a bed of calcareous sandstone with scattered clay pebbles and quartz granules, called the caprock, at its base. The Kessler member is either a single unit of limestone or a sequence of limestone and shale interbedded. The limestones are bioclastic, oolitic, traces of clay-pebble conglomerate, and minor amounts of calcareous sandstone. The Trace Creek Shale member is composed of dark-gray shales with some thin beds of sandstone. Typical thicknesses for the Bloyd Formation range from 175 to 200 feet.

At **Bridge 3**, the section of the Bloyd Formation encountered consists primarily of shales with some beds of sandy limestone (possibly part of the Brentwood limestone). Bedrock was encountered at depths of 19.0 to 20.0 feet below ground level. There are numerous east-west trending normal faults in the area. No faults were encountered during the subsurface investigation of this job site.

During the subsurface investigation of **Bridge 4**, an unmapped fault was discovered between stations 286+49 and 287+29. Borings at 287+29 and 287+69 encountered shales, limestones, and a coal seam of the Bloyd Formation. Boring at Station 286+49 encountered calcareous sandstone, most likely part of the Prairie Grove member of the Hale Formation. The Hale Formation is made up of two members: a lower Cane Hill member and an upper Prairie Grove member. The Prairie Grove member is composed of thin to massive, often crossbedded, light-gray to dark-brown, limy sandstone or variously sandy limestone with lenses of relatively pure, highly fossiliferous limestone and oolitic limestone. The reported thickness of the Hale Formation stratigraphically overlies the Hale Formation. Bedrock was encountered in borings at depths ranging from 14.0 to 17.0 feet below ground level.

Subsurface Conditions

Based on the results of the borings at stations 68+00 to 69+20 (**Bridge 1**-Mountain Fork Tributary Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 11.0 Feet: Consists of moist, stiff to hard, brown sandy clay with gravel to sandy clay with gravel and cobbles.
- 11.0 to 16.0 Feet*: Varies from moist hard to very hard, brown **sandy clay with gravel** to **sandy clay with gravel and cobbles** to unweathered to slightly weathered, moderately hard, gray **limestone**.
- 16.0 to 18.8 Feet: Consists of unweathered to weathered, moderately hard, gray limestone.
- 18.8 to 20.5 Feet: Consists of highly weathered to weathered, soft to medium hard, dark gray **shale**.
- 20.5 to 27.0 Feet: Consists of unweathered to slightly weathered, moderately hard, gray **limestone**.
- 27.0 to 35.0 Feet: Consists of unweathered to slightly weathered, moderately hard, gray **limestone with occasional to frequent shale seams and layers**.
- 35.0 to 42.0 Feet: Consists of weathered, medium hard, dark gray shale.

* A soil-filled cavity was encountered at 14.2 to 14.3 feet below ground level.

Based on the results of the borings at stations 111+80 to 113+13 (**Bridge 2**-Mountain Fork Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 4.1 Feet: Varies from moist, very hard, brown **sandy clay with gravel and cobbles** to medium dense, brown **sand with gravel and cobbles**.
- 4.1 to 9.5 Feet: Varies from moist, medium dense, brown **sand with gravel and cobbles** to slightly weathered, medium hard, dark gray **shale**.
- 9.5 to 28.7 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale** with occasional fractures.
- 28.7 to 43.7 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale** with occasional fractures. Some occasional limestone seams and layers are encountered in this zone.

Based on the results of the borings at 180+92 to 182+22 (**Bridge 3**-Whitzen Hollow Creek), the subsurface stratigraphy may be generalized as follows:

0 to 17.5 Feet: Varies from moist, medium dense to very dense, brown sand with clay

and gravel to gravel with sand to very stiff to very hard, brown sandy clay with gravel.

- 17.5 to 19.5 Feet: Varies from moist, very dense, brown sand with clay and gravel to cobbles and boulders.
- 19.5 to 32.1 Feet: Consists of highly weathered to weathered, soft to medium hard, dark gray **shale**.
- 32.1 to 41.9 Feet: Consists of weathered to slightly weathered, medium hard, dark gray **shale** with occasional limestone layers.

Based on the results of the boring at 286+49 (**Bridge 4**-Huey Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 9.0 Feet: Consists of moist, stiff, brown sandy clay with gravel.
- 9.0 to 15.2 Feet: Varies from moist, medium dense to very dense, brown **sand with gravel** to wet, very dense, brown **gravel with clay and sand**.
- 15.2 to 35.7 Feet: Consists of unweathered, well cemented, calcareous, gray sandstone.

Based on the results of the borings at 287+29 to 287+69 (**Bridge 4**-Huey Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 9.0 Feet: Consists of moist, stiff to very stiff, brown sandy clay.
- 9.0 to 14.0 Feet: Varies from moist, stiff, brown **sandy clay with gravel** to medium dense, brown **gravel with clay and sand**.
- 14.0 to 17.0 Feet: Varies from wet, dense, brown **gravel with clay and sand** to highly weathered, medium hard, dark gray **shale**.
- 17.0 to 20.8 Feet: Varies from slightly weathered, medium hard, dark gray **shale** to slightly weathered to unweathered, moderately hard, gray **limestone**.
- 20.8 to 24.8 Feet: Varies from slightly weathered, medium hard, dark gray **shale** to unweathered, moderately hard, gray **limestone**. A 0.3 foot coal seam was encountered in this zone.
- 24.8.0 to 27.9 Feet: Varies from weathered, medium hard, dark gray **shale** to unweathered, moderately hard, gray **limestone**.
- 27.9 to 40.0 Feet: Consists of unweathered, moderately hard, gray limestone.

D₅₀ AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

Job No . 040622											
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)						
Mountain Fork Tributary Creek	68+66	Creek Bank	20' Rt. C.L. Construction	N/A	0.132						
Mountain Fork Creek	112+25	Creek Bank	32' Lt. C.L. Construction	N/A	0.110						
Whitzen Hollow Creek	181+77	Creek Bank	22' Lt. C.L. Construction	N/A	0.0070						
Huey Creek	286+89	Creek Bank	25' Lt. C.L. Construction	N/A	0.0469						

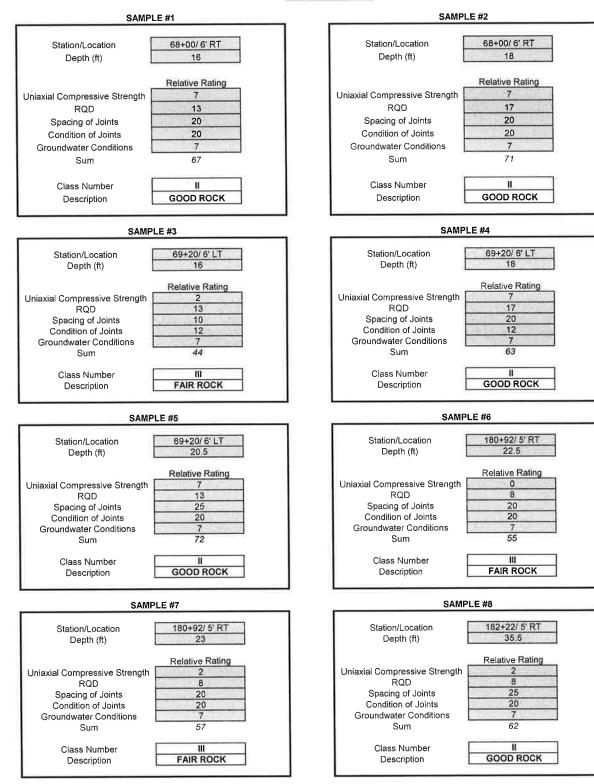
Rock Core Unconfined Compression Test Summary

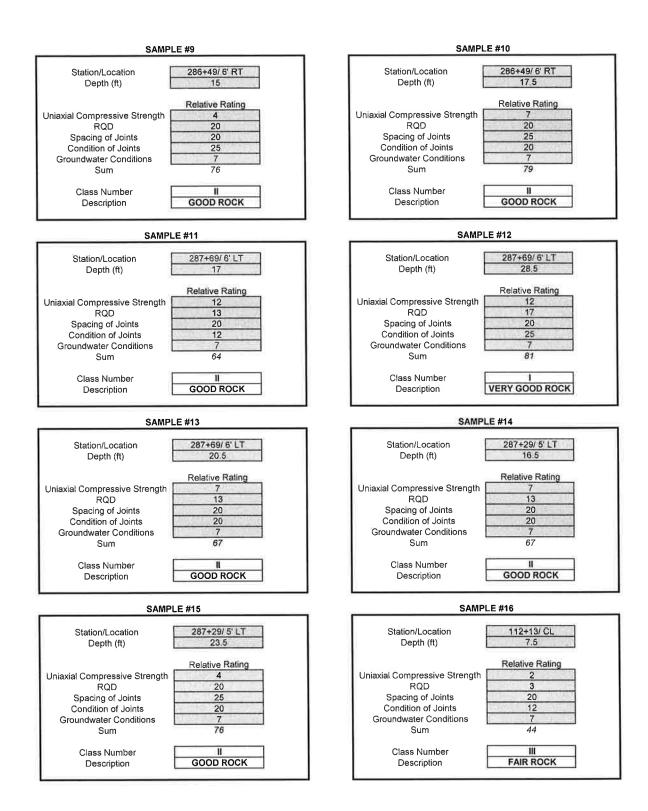
Project Number:040622Project Name:Washington Co. Line - South Strs. & Apprs. (S)Date Tested:7/3/2017

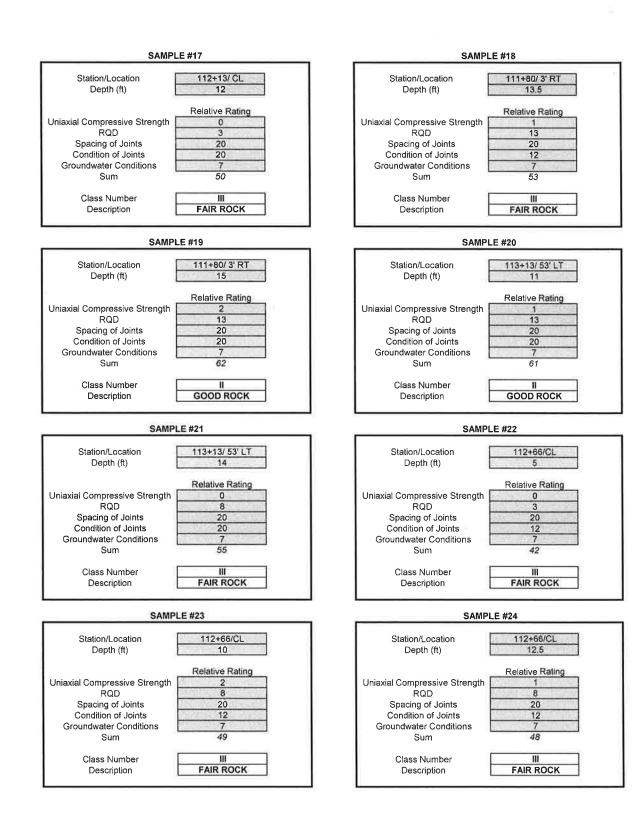
Station	Location	Sample No.	Depth (ft.)	Diameter (in)	Height (in)	Total Load (lbs.)	Correction Factor	Stress (psi)	Remarks
68+00	6' Rt	1	16.0	1.75	3.55	21,410	1.00	8,901	MFTC
68+00	6' Rt	2	18.0	1.75	3.50	34,470	1.00	14,331	MFTC
69+20	6' Lt	3	16.0	1.75	3.50	6,920	1.00	2,877	MFTC
69+20	6' Lt	4	18.0	1.75	3.50	21,310	1.00	8,860	MFTC
69+20	6' Lt	5	20.5	1.75	3.50	19,710	1.00	8,194	MFTC
180+92	5' Rt	6	22.7	1.75	X	Х	Х	Broken	WHC - Shale
180+92	5' Rt	7	23.2	1.75	4.40	5,740	1.00	2,386	WHC - Shale
182+22	5' Lt	8	35.5	1.75	3.60	4,580	1.00	1,904	WHC - Shale
286+49	6' Rt	9	15.2	1.75	4.00	10,620	1.00	4,415	Huey - SS
286+49	6' Rt	10	17.5	1.75	3.80	29,800	1.00	12,389	Huey - SS
287+69	6' Lt	11	17.0	1.75	3.80	37,800	1.00	15,715	Huey - LS
287+69	6' Lt	12	28.4	1.75	5.50	38,590	1.00	16,043	Huey - LS
287+69	6' Lt	13	20.6	1.75	5.40	23,880	1.00	9,928	Huey - LS
287+29	5' Lt	14	16.5	1.75	3.50	19,130	1.00	7,953	Huey - LS
287+29	5' Lt	15	23.5	1.75	3.80	15,470	1.00	6,431	Huey - LS
112+13	C.L.	16	7.5	1.75	3.90	4,710	1.00	1,958	MFC - Shale
112+13	C.L.	17	12.0	X	x	X	X	Broken	MFC - Shale
111+80	3' Rt	18	13.5	1.75	4.50	2,880	1.00	1,197	MFC - Shale
111+80	3' Rt	19	15.0	1.75	3.75	3,870	1.00	1,609	MFC - Shale
113+13	53' Lt	20	11.0	1.75	4.00	2,200	1.00	914	MFC - Shale
113+13	53' Lt	21	14.0	X	X	х	X	Broken	MFC - Shale
112+66	C.L.	22	4.9	X	Х	X	X	Broken	MFC - Shale
112+66	C.L.	23	10.0	1.75	3.50	3,850	1.00	1,601	MFC - Shale
112+66	C.L.	24	12.3	1.75	3.50	3,430	1.00	1,426	MFC - Shale

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

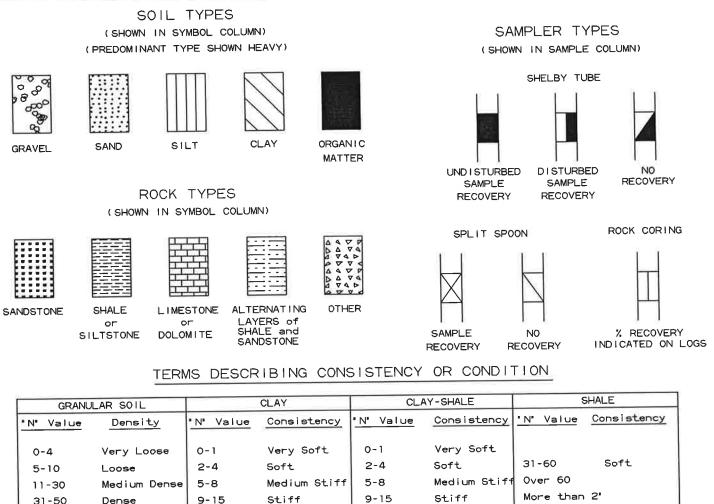
ROCK MASS RATING SUMMARY JOB # 040622







_EGEND



- Penetration Very Stiff 16-30 Verv Stiff 16-30 Over 50 Very Dense in 60 Blows Medium Hard 31-60 Hard 31-60 Hard Less than 2' 0ver 60 Very Hard 0ver 60 Very Hard 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, 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: $\frac{6}{8-9} \Rightarrow 8+9 = 17b lows / ft$. 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.

MATERIALS DIVISION - GEOTECHNICAL SEC. PAGE 1 OF 1 JOB NO. 040622 Crawford County DATE: March 22, 2017 JOB NAME: Washington County Line - South Strs. & Apprs. (S) Route 59 DATE: March 22, 2017 Hollow Stem Auger - Diamond Corr Hollow Stem Auger - Diamond Corr								
JOB NAME: Washington County Line - South Strs. & Apprs. (S) TYPE OF DRILLING:	PAGE 1 OF 1							
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Tonow Stein Auger - Diamond Con	A							
STATION: 68+00 EQUIPMENT: CME 75								
LOCATION: 6' Right of Construction Centerline								
LOGGED BY: Coty Campbell HAMMER CORRECTION FACTOR: 1.3	7							
COMPLETION DEPTH: 32								
$\begin{array}{c c} P & Y \\ T & M \\ \end{array}$ Description of material soil $\begin{array}{c c} & H \\ & S \\ \end{array}$	% R							
	Q							
R C OF I R C	D							
P Y M DESCRIPTION OF MATERIAL SOIL SOIL H SOIL SOIL <td></td>								
	1							
Moist, Very Stiff, Brown Sandy Clay with 17								
5 Gravel								
10 Noist, Very Stiff, Brown Sandy Clay with Moist, 2								
10 Stiff, Brown Sandy Clay with Moist, 2 Stiff, Brown Sandy Clay with Gravel and 5-6								
Cobbles	-							
70	35							
LIMESTONE - Slightly Weathered, Moderately								
15 Soil-Filled Cavity (14.2'-14.3') 97	56							
LIMESTONE - Unweathered, Moderately Hard,								
Gray								
	1							
20 SHALE - Weathered, Medium Hard, Dark Gray 93	70							
SHALE - Weathered, Medidin Haid, Dark Gray								
	1							
LIMESTONE - Unweathered, Moderately Hard,								
	95							
_25 Gray 95	35							
LIMESTONE WITH OCCASIONAL SHALE								
30 LAYERS - Unweathered, Moderately Hard, 95	80							
Gray								
Boring Terminated								
35								
REMARKS: Mountain Fork Tributary Creek								

			WY. & TRANS. DEPARTMENT				10. 2						
		_	DIVISION - GEOTECHNICAL SEC.		PAGE 1 OF 2								
JOB N JOB N			040622 Crawford County Washington County Line - South Strs. & Apprs. (S	۱ ۱	DATE: March 22, 2017 TYPE OF DRILLING:						£		
JOBIN	AIVIL.	,					ः er - l	Diam	ond	Core			
STAT	ION:		Route 59 Section 5 69+20		Hollow Stem Auger - Diamond Core EQUIPMENT: CME 75								
LOCA	TION:	(6' Left of Construction Centerline										
LOGG	ED BY	7: C	oty Campbell		HAM	IER C	CORRE	CTION	N FAC	CTOR:		1.37	
COM	PLET	ION	I DEPTH: 42										
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FT.	L	E S			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
- F 1 ₃₀	Nox	3	SURFACE ELEVATION: 1096.3		E E	%			Ĺ	z	E.		
	11111111111111111111111111111111111111	X	Moist, Stiff, Brown, Sandy Clay with Gravel								-		
	A CON	X	Moist, Hard, Brown Clay with Gravel and Cobbles							30-			
15	2	X	Moist, Very Hard, Brown Clay with Gravel							30-			
	20	$\left\{ \right\}$	LIMESTONE - Unweathered, Moderately Hard,	-						30-	40	85	65
 			Gray LIMESTONE - Weathered, Moderately Hard, Occasional Fractures, Gray SHALE - Highly Weathered to Weathered, Soft to Medium Hard, Dark Gray									91	50
			LIMESTONE - Unweathered, Hard, Dark Gray										
 			LIMESTONE - Unweathered, Hard, Occasional Fractures, Dark Gray									92	83
30			SHALE - Weathered, Moderately Hard, Dark Gray LIMESTONE - Unweathered, Hard, Gray									85	19
	日時日		Envicorone - Onweathered, Hard, Oray										
 35			LIMESTONE WITH FREQUENT SHALE SEAMS AND LAYERS - Unweathered, Hard, Gray									80	30
REM	ARK	S: N	Mountain Fork Tributary Creek						G				
										_		_	_

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.							BORING NO. 2 PAGE 2 OF 2						
JOB N		_	040622 Crawford County		DATE: March 22, 2017								
JOB N.			Washington County Line - South Strs. & Apprs. (S	5)	TYPE OF DRILLING:								
		l	Route 59 Section 5	Hollow Stem Auger - Diamond Core									
STATI	ON:		69+20		EQUIF	MEN	T:		C	CME	75		
LOCA			6' Left of Construction Centerline										
			oty Campbell		HAMN	AER C	CORREC	CTION	I FAC	CTOR:		1.37	
	PLET		DEPTH: 42		-			-	-	-	-		
D E	S	S A											
P	Y	Â						L L	FT.	WS		%	%
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FT.	Ĺ	E S			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
1 t.e.,			SURFACE ELEVATION: 1096.3		E E	%	ЦЦ		L	z	P	_	
			SHALE - Weathered, Medium Hard, Dark Gray										
			SHALE - Weathered, Medium Hard,									92	44
40			Occasional Fractures, Dark Gray									32	
			Boring Terminated			-		-					-
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60													
65													
70													
REM	ARKS	S: N	Jountain Fork Tributary Creek										

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JOB N		_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE		1 ()F 2	_	3, 20	17		
JOB N			Washington County Line - South Strs. & Apprs. (S)			RILLIN		ay 2.	5, 20	17		
			Route 59 Section 5	,			Stem		er -]	Diam	iond	Core	
STATI	ON:		111+80		EQUII			-		ME			
LOCA			3' Right of Construction Centerline										
			tanley Bates		HAMN	AER C	CORRE	CTIO	N FAC	CTOR:	:	1.23	
	PLET		DEPTH: 43.2			_		<u>r</u>		<u> </u>			
D E	s	S A											
P	Y	M						E	FT.	MS		%	%
Т	M B	Ρ	DESCRIPTION OF MATERIAL	SOIL GROUP				IGH	CU	ILO		T C	R Q
н	0	F		GROOT		ISIC	la L	WE	PER	OF B	S-IN	R	Ď
FT.	L	E S	SURFACE ELEVATION: 873.5		PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
24	o rDi -	-	SURFACE ELEVATION. 873.3			6				2	-P		
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	0.00 0.00												
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5		$\overline{}$	Moist, Medium Dense, Brown Sand with Gravel							1	3		
	Og i	\bigtriangleup	and Cobbles							10)-6		
	0. pq												
	8.G												
	08 08												
10		×								6	0		
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						6						54	9
15													
					1							92	73
			SHALE - Weathered, Medium Hard, Dark Gray			1							
20													
							1					94	56
25			SHALE, Slightly Weathered Medium Hard										
			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray									98	55
_													
						4							
30													
												100	81
		_	SHALE - Unweathered, Medium Hard,										
			Occasional Fractures, Dark Gray										
35 REM		. N	l Jountain Fork Creek								_		
	~1717.2	J. I\											
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			IWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORI PAGE			of 2					
JOB N JOB N	O. AME:	1	040622 Crawford County Washington County Line - South Strs. & Apprs. (S Route 59 Section 5)	date: type Hol	of di low	RILLIN Stem	Ma G:	ay 23 er - I		ond	Core	
STATI LOCA	TION:	:	111+80 3' Right of Construction Centerline tanley Bates		EQUIF					ME 8		1.23	
			I DEPTH: 43.2		HAMN	AER C	CORREC		N FAC	TOR:		1.23	
D E P T H FT	SY MBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 873.5	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	% T C R	% R Q D
												97	60
40			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Unweathered, Medium Hard, Dark Gray									97	82
			Boring Terminated										
<u>45</u> 													
50													
55		×											
60													
70 REM	L ARKS	5: N	I Nountain Fork Creek										

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JOB NO		_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE DATE:		<u>1</u> C	DF 2	_	7, 20	17		
JOB N		١	Washington County Line - South Strs. & Apprs. (S Route 59 Section 5)	TYPE	OF D	RILLIN	G:	-			Corro	
STATI			Route 59 Section 5		EQUIE		Stem	Aug		ME :		Core	
LOCA			Construction Centerline		LQUI	IVILIN	1.		U		0.00		
			tanley Bates		HAMN	AER (ORRE	STIO	N FAC	CTOR:		1.23	
			DEPTH: 38.2										
D E	S	S A											
P T H	Y M B O	M P L	DESCRIPTION OF MATERIAL	SOIL GROUP	IX	IST.	Α.	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	-IN.	% T C R	% R Q D
FT.	L	E S	SURFACE ELEVATION: 868.5		PLASTIC LIMIT	% MOIST	LIQUID	DRY	LBS F	NO. C	PER 6-IN.		
	XON				1								
			Moist, Very Hard, Brown Sandy Clay with Gravel and Cobbles										
5	ωœ									2 6 (3	0		
												91	18
			SHALE - Weathered, Medium Hard, Dark Gray									78	20
 			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray									100	14
												92	56
			SHALE - Slightly Weathered, Medium Hard, Frequent Fractures, Dark Gray									100	36
<u>30</u>			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray									88	43
35			LIMESTONE WITH OCCASIONAL SHALE LAYERS - Slightly Weathered, Moderately Hard, Gray										
REM	ARKS	S: N	Nountain Fork Creek										

			WY. & TRANS. DEPARTMENT		BORI			- 0					
	_	_	DIVISION - GEOTECHNICAL SEC.		PAGE	_	2 C	F 2	_	7 00	17	_	-
JOB N			040622 Crawford County	`	DATE:				ay 17	7, 20	17		
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			Route 59 Section 5				Stem	Aug				Core	
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LOCA			Construction Centerline							mon		1 22	
		_	tanley Bates		НАМА	AER (CORREC	TION	N FAC	TOR	_	1.23	_
	PLET	_	DEPTH: 38.2										_
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	L	E			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6		
FT		S	SURFACE ELEVATION: 868.5		PL	%	EE	ā	LE	ž	PE		
			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Slightly Weathered,									100	62
			Medium Hard, Frequent Fractures, Dark Gray										
			Median Hara, Proquent Producto, Ban Cray										
			Boring Terminated					÷ ,					
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JOB N		_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County	_	DATE:	_	i (_	_	3, 20	17		
JOB N			Washington County Line - South Strs. & Apprs. (S)			RILLIN		ne i.	5, 20	17		
30D IV.	2 117112.		Route 59 Section 5	,			Stem		er - 1	Diam	ond	Core	
STATI	ON:	·	112+66		EQUIE			-		ME			
LOCA	TION:	(Construction Centerline										
		_	tanley Bates	_	HAMN	AER (CORREC	CTIO	N FAC	CTOR:		1.23	
COM	PLET	_	DEPTH: 38.4		r								
D E	s	S A											
P	Y	M	DESCRIPTION OF MATERIAL					E	.FT.	WS		%	%
Т	M B	Ρ	DESCRIPTION OF MATERIAL	SOIL GROUP		4		IGH	CU	3LO		T C	R Q
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FT.	L	E S	SURFACE ELEVATION: 867.7		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
	SPON	-	SOR ACE ELEVATION. 001.1			<u>°`</u>			1	~	-		
	2		Moist, Medium Dense, Brown Gravel, Cobbles,										
	8		and Boulders with Sandy Clay					i.					
		\sim	SHALE Highly Mosthered Soft Croy							6	^		
		T	SHALE - Highly Weathered, Soft, Gray							(5	")		
												94	15
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												76	32
			SHALE - Weathered, Medium Hard, Gray										02
		\vdash											-
15													
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		+											
20			SHALE - Slightly Weathered, Medium Hard,										
			Frequent Fractures, Occasional Calcite Seams,				h					100	60
			Gray										
				1								-	
25			SHALE WITH OCCASIONAL LIMESTONE										
			PARTINGS AND SEAMS - Slightly Weathered,									100	40
			Medium Hard, Gray										
						1							
30			SHALE WITH OCCASIONAL LIMESTONE			1							
			LAYERS AND SEAMS - Unweathered,		1		1					94	34
			Medium Hard, Gray										
25					1			1					
35 DEM		2	I Aountain Fork Creek		1	1	Ļ	1		1		L	
		י. ו											
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JOB N	_	_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE DATE:	_	<u> </u>		10.11	3, 20	17	-	
JOB N			Washington County Line - South Strs. & Apprs. (S)			RILLIN		10 1.	5, 20	17		
300 10			Route 59 Section 5	/			Stem		er - I	Diam	ond	Core	
STATI	ON:		112+66		EQUIF			6		ME 8			
LOCA			Construction Centerline		Ì								
			tanley Bates		HAMN	AER C	ORREG	CTION	I FAC	CTOR:		1.23	
COM	PLET	ION	DEPTH: 38.4										
D	s	s											
Е	S Y	A							H	S		%	%
P	M	M	DESCRIPTION OF MATERIAL	SOIL				HT	U.F	MO		% T	% R
T H	в	P L		GROUP	0	Ë.	_	EIG	R C	BL	ż	C	Q
	0	E			ITS TI	% MOIST		DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT.	L		SURFACE ELEVATION: 867.7		PLASTIC LIMIT	% N	LIQUID	DR	LBS	NO.	PER		
			SHALE WITH OCCASIONAL LIMESTONE									100	
			PARTINGS AND SEAMS - Unweathered,									100	20
			Frequent Fractures, Gray										
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40		6	Boring Terminated										
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70 DEM		2. M	I Aountain Fork Creek		I								
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MATERIALS DIVISION - GEOTECHNICAL SEC. JOB NO. 040622 Crawford County JOB NAME: Washington County Line - South Strs. & A Route 59 Section 5 STATION: 113+13 LOCATION: Construction Centerline LOGGED BY: Stanley Bates COMPLETION DEPTH: 43.7 D S P M T B H O O E FT. L S SURFACE ELEVATION: 873.1	Apprs. (S)) SOIL GROUP	EQUIP	OF DI low MEN	RILLIN Stem T:		er - 1 C	ME 8	ond 50	1.23	
LOCATION: Construction Centerline LOGGED BY: Stanley Bates COMPLETION DEPTH: 43.7 D S S A P M M P T B L H O L I E			HAMN	1ER C	ORRE		N FAC	CTOR:		%	
COMPLETION DEPTH: 43.7 D S S E Y A P M M T B L H O L I E										%	
E S A P M M T B P H O L I E			PLASTIC LIMIT	OIST.		IGHT	CU.FT.	SMO			%
				% M	LIMIT	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	T C R	R Q D
Moist, Medium Dense, Brown Gravel, C and Boulders with Sandy Clay								11 	13		
10 SHALE - Weathered, Medium Hard, Da - -						-	19	60 (2")	100 90	70 44
20 SHALE - Slightly Weathered, Medium H Occasional Fractures, Occasional Iron Concretions, Dark Gray	Hard,									100	76
25 SHALE - Slightly Weathered, Medium H Occasional Fractures, Dark Gray	Hard,									97	90
30 30 SHALE WITH OCCASIONAL LIMESTO SEAMS - Slightly Weathered, Hard, Oc Fractures, Dark Gray										99	62
35											

			IWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORI PAGE			of 2					
		_	040622 Crawford County				2 0		na 6	, 201	7		_
JOB N JOB N			Washington County Line - South Strs. & Apprs. (S)	DATE:		RILLIN		110 0	, 201	. /		
JOBIN			Route 59 Section 5	,			Stem		er - 1	Diam	iond	Core	
STATI	ON:		113+13		EQUIF			B		ME			
LOCA			Construction Centerline										
			tanley Bates		HAMN	IER C	CORREC	CTION	FAC	CTOR:		1.23	
			DEPTH: 43.7										
D E	S	S A							4				
P	Y M	Μ	DESCRIPTION OF MATERIAL	SOIL				HT	J.FT	SWC		% T	% R
Т Н	В	P		GROUP	0	E		EIG	R CI	BL(ż	C	Q
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FT,	L	S	SURFACE ELEVATION: 873.1		PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
			SHALE WITH OCCASIONAL LIMESTONE										
			SEAMS - Unweathered, Hard, Occasional									95	78
			Fractures, Dark Gray										
40						÷ .							
			SHALE WITH OCCASIONAL LIMESTONE										
			SEAMS AND LAYERS - Unweathered, Hard,									97	80
			Occasional Fractures, Dark Gray										
			Device Termineted			_	-						
45			Boring Terminated						- 8				
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REM	ARKS	S: N	Aountain Fork Creek										
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JOB N		_	040622 Crawford County		DATE:	_	. (_	_	28, 2	017		-
JOB N.	AME:		Washington County Line - South Strs. & Apprs. (S)			RILLIN					~	
STATI	ON		Route 59 Section 5 180+92		Ho. EQUIF		Stem	Aug		Diam CME		Core	
LOCA			5' Right of Construction Centerline		LQUI	WILIN	1.				15		
			oty Campbell		HAMN	AER C	CORREC	CTION	N FAC	CTOR	:	1.37	
COM	PLET		DEPTH: 38.5										
D E	s	S A											
P	Y M	Â	DESCRIPTION OF MATERIAL	0.011					.FT.	WS		%	%
Т	B	P	DEGORI HON OF MATERIAL	SOIL GROUP	U	н ^а		EIGF	s cu	BLO	Ż	T C	R Q
н	0	L E			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHI	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT _{set}	L		SURFACE ELEVATION: 829.7		PLAST LIMIT	% N	LIMIT	DR	LB(NO	PEF		
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	XX												
			Moist, Very Stiff, Brown Sandy Clay with								3		
_5	2	Х	Gravel							-	12		
— —	28												
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10	200	∇								-	5		
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	N												
	\sim		Moist, Very Hard, Brown Sandy Clay with										
15	20		Gravel							1	3		
15	200	A								17	-60		
	80.00									(8	3")		
	0.000	-	Boulder										
	80 80 80		Cobbles				10.5						
20	m e o		Cobbles										
												75	26
		_			6								
25			SHALE - Weathered, Medium Hard, Dark Gray										
												85	47
													11
	111		SHALE - Weathered with Highly Weathered										
30	777		Layers, Medium Hard with Soft Layers, Dark										
	777		Gray									75	18
	議論		SANDY LIMESTONE - Slightly Weathered,	-									
			Moderately Hard, Gray										
35			SHALE - Weathered, Medium Hard,										
REM	ARKS	S: V	Vhitzen Hollow Creek										
					_	_			_			_	

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	_	_	DIVISION - GEOTECHNICAL SEC.		PAGE		2 C	F 2	al 1	00 70	017	_	
JOB N JOB N			040622 Crawford County Washington County Line - South Strs. & Apprs. (S)	DATE:		RILLIN		cn 2	28, 20	J1/		
JOB N	AME:		Route 59 Section 5)			Stem.			Jiam	ond	Core	
STATI	ON		180+92		EQUIP			Augo		ME .		COIC	
LOCA			5' Right of Construction Centerline		LQUII	IVALAIN	1.		C	14117	15		
			oty Campbell		HAMN	AER C	ORREG	CTION	FAC	TOR:		1.37	
		_	DEPTH: 38.5										
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Ε	S Y	А							E.	S		%	%
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	0	Ē			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT.,	L	S	SURFACE ELEVATION: 829.7		PL/ LIN	% N	FIN	DR	LB	NON	PEI		
			Occasional Concretions, Dark Gray									96	75
	1 994-1		SANDY LIMESTONE WITH FREQUENT									90	15
	3335		SHALE LAYERS - Weathered, Moderately										
		4	Hard, Gray SHALE - Slightly Weathered, Medium Hard,					-			-		
40			Dark Gray										
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REM	ARKS	S: V	Vhitzen Hollow Creek										
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JOB NO.		OIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE		1 C	F 2	_	0 201	7	
JOB NAN	ME:	Washington County Line - South Strs. & Apprs. (S) Route 59 Section 5)		of Di	RILLIN Stem	G:	er - I	29, 201 Diamor	id Core	;
STATION		182+22		EQUIP	MEN	T:		C	CME 75		
LOCATIO		5' Left of Construction Centerline Coty Campbell				CORREC	אראדי	IEAC	ידרים.	1.37	,
		N DEPTH: 41.9		HAM	IER (UKKE	TION	TAC	TOR:	1.57	
		S									
E P T H	S Y B O	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	RY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	% T C R	% R Q D
	86.1	SURFACE ELEVATION: 829.5			%		Ω	L	Z		
		Dry, Medium Dense, Brown Gravel with Sand							11 13-15		
10 	200 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Moist, Dense, Sand with Clay and Gravel							8		
15 		Moist, Very Dense, Sand with Clay and Gravel				9			11 30-27	-	
20	77	SHALE - Highly Weathered, Medium Hard,							60 (5")		-
		\Dark Gray								84	0
25		SHALE - Weathered, Medium Hard, Dark Gray							10	98	16
30										80	34
										80	36
REMAR	RKS	Whitzen Hollow Creek									
	_							_			

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		_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE		2 C	DF 2	_	29, 20	017		_
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JODIN			Route 59 Section 5	/			Stem		er - I	Diam	ond	Core	
STATI	ON:		182+22		EQUIP			1145		ME		0010	
LOCA		:	5' Left of Construction Centerline		Ì								- 1
LOGG	ED BY	: C	oty Campbell		HAMN	1ER C	CORREC	CTION	I FAC	TOR:		1.37	
COM	PLET	ION	DEPTH: 41.9					·					
D	s	S											
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г Т	М	M P	DESCRIPTION OF MATERIAL	SOIL				GHI	CU.I	MO		Т	R
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	L	E			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		-
FT.		S	SURFACE ELEVATION: 829.5		PL LI	%	11	Ď	LE	ž	PE		
			SHALE - Weathered, Medium Hard, Occasional Concretions and Pyrite Nodules,			6							
			Dark Gray										
			SANDY LIMESTONE WITH FREQUENT										
40			SHALE LAYERS - Slightly Weathered,			1						98	82
			Moderately Hard, Gray SHALE - Slightly Weathered, Medium Hard,			C							
		_	Occasional Concretions, Dark Gray			_		-	_			_	
			Boring Terminated		0						U		
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			WY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORING NO. 9 PAGE 1 OF 2										
JOB N		_	040622 Crawford County		DATE: April 12, 2017										
JOB N			Washington County Line - South Strs. & Apprs. (S)	TYPE OF DRILLING:										
Route 59 Section 5							Hollow Stem Auger - Diamond Core								
STATI	ION:	:	286+49		EQUIPMENT: CME 75										
LOCA	TION:	(6' Right of Construction Centerline												
LOGG	ED BY	': C	oty Campbell		HAMM	MER (CORREC	CTION	N FAC	TOR:		1.37			
COM	PLET	ION	DEPTH: 35.7												
D	s	S													
E	Ŷ	A							Ľ.	S		%	%		
P T	M	M P	DESCRIPTION OF MATERIAL	SOIL				HE	- D	NO,		Т	R		
н	B	Ľ		GROUP		ST.		/EIC	RO	BI	ż	C R	Q D		
	0	Ē			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	к	D		
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	40:00										_				
15	8.00.0	X	Wet, Very Dense, Brown Gravel with Clay and							1: 18-					
	<u> </u>	Ŧ	Sand	-						(8	")	100	100		
		1.													
												100	100		
20															
20															
												100	100		
25			SANDSTONE - Unweathered, Well Cemented,												
			Calcareous, Gray												
												100	100		
												001	100		
30			2												
					- 0							98	98		
35															
		<u>. </u>	l luey Creek		I				_		-		Y		
		. г	idey Oleen												

			IWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORING NO. 9 PAGE 2 OF 2										
JOB NO		_	040622 Crawford County		DATE: April 12, 2017										
JOB NAME: Washington County Line - South Strs. & Apprs. (S)						TYPE OF DRILLING:									
Route 59 Section 5						Hollow Stem Auger - Diamond Core									
							EQUIPMENT: CME 75								
LOCA			6' Right of Construction Centerline							-		1 27			
			toty Campbell I DEPTH: 35.7		HAMN	AER C	CORREC	CTION	N FAC	STOR:		1.37	-		
	LEI	_	DEPTH: 35.7	[_		-		
D E	S	S A													
P	Y M	Μ	DESCRIPTION OF MATERIAL	TO1				H	LFT.	MS		%	%		
Т	B	Ρ		SOIL GROUP		г.		IGF	r cu	BLO	;	T C	R Q		
н	ō	L E			NITS FI	OIS'	E E	ME	PER	OF I	-II-9	R	D		
FT.	L		SURFACE ELEVATION: 777.7		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.				
						<u>.</u>		_	_	~					
			Boring Terminated												
40			9												
45															
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55															
60															
65															
- 55										11					
70															
	ARKS	S: H	luey Creek												
			-									_			

			WY. & TRANS. DEPARTMENT	BORING NO. 10													
		_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE 1 OF 2												
JOB N	IO. IAME:		040622 Crawford County Washington County Line - South Strs. & Apprs. (S)	DATE: April 11, 2017 TYPE OF DRILLING:												
1001			Route 59 Section 5)	Hollow Stem Auger - Diamond Core												
STAT	ION:		287+29		EQUIPMENT: CME 75												
	TION:		5' Left of Construction Centerline		EQUIPMENT: CIME /3												
LOGG	ED BY	7: C	oty Campbell		HAMN	AER C	CORRE	CTIOI	N FAC	CTOR:		1.37					
COMPLETION DEPTH: 36.5							HAMMER CORRECTION FACTOR: 1.37										
D	s	S															
E	Y	A							Τ.	S		%	%				
P T	M	M P	DESCRIPTION OF MATERIAL	SOIL		l I		GHT	U.F	NO.		Т	R				
н́н́	В	L L		GROUP		ST.		EIC	R C	BL	ż	C R	Q				
	0	Ē			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	K	D				
FT,	L	S	SURFACE ELEVATION: 777.8		LIN LIN	% N	EIN C	DR	LB	NO	PEJ						
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	\mathbb{N}																
	\mathbb{N}																
	\mathbb{N}																
5	\mathbb{N}	∇	Moist, Stiff, Brown Sandy Clay							4							
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10	NON	∇								4							
	X	\bowtie								6-	•/						
			Moist, Stiff, Brown Sandy Clay with Gravel														
	200																
	XX																
15	112	${ \times }$	SHALE - Highly Weathered, Medium Hard,							2	1.000						
	11		Dark Gray							6 (2	U !")						
	設置							ľ									
	蓝白		LIMESTONE - Slightly Weathered, Moderately														
	日日		Hard, Gray										70				
20			SHALE - Slightly Weathered, Medium Hard,									94	72				
			Calcareous, Dark Gray														
			SHALE WITH OCCASIONAL LIMESTONE														
			Calcareous, Dark Gray LIMESTONE - Unweathered, Moderately Hard,	-								100	00				
25	斑											100	96				
			Gray														
	日本日本	+		i.													
										6							
			LIMESTONE WITH OCCASIONAL SHALE									400	0.5				
30	出出		LAYERS - Unweathered, Moderately Hard, Gray					1				100	85				
	躍幸																
			LIMESTONE - Unweathered, Moderatly Hard,														
35			Occasional Fractures, Gray									100	89				
	REMARKS: Huey Creek																
			····· , ·····														
-	_	_							_		-	-					

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.							BORING NO. 10 PAGE 2 OF 2								
						PAGE 2 OF 2 DATE: April 11, 2017 11									
· · · · ·						TYPE OF DRILLING:									
Route 59 Section 5						Hollow Stem Auger - Diamond Core									
						EQUIPMENT: CME 75									
LOCA			5' Left of Construction Centerline			(55)		-				1 27			
			oty Campbell DEPTH: 36.5		HAMN	AER C	ORREG	CTION	V FAC	TOR		1.37			
D		s	DEI III. 50.5		r		1	[
E	S Y	A							1000						
P	M	М	DESCRIPTION OF MATERIAL	SOIL				HT	U.FT	SWC		% T	% R		
Т Н	В	P L		GROUP	2	ST.		EIG	R CI	BL(ż	C	Q		
	0	E			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D		
FT.	L	S	SURFACE ELEVATION: 777.8		PL/ LIN	% N	LIN	DR	LB	0N N	PEF				
			Boring Terminated												
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	j i														
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45												1			
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					1										
50															
55															
60															
65															
					6										
											1				
70 REM/	LARKS	L S:	luey Creek		I			I							

			WY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.				NO. 1									
JOB NO. 040622 Crawford County							PAGE 1 OF 2 DATE: April 11, 2017									
JOB N			Washington County Line - South Strs. & Apprs. (S)	DATE: April 11, 2017 TYPE OF DRILLING:											
			Route 59 Section 5	,	Hollow Stem Auger - Diamond Croe											
STATI	ON:		287+69		EQUIPMENT: CME 7											
LOCA	TION:	(6' Left of Construction Centerline													
LOGG	ED BY	: C	oty Campbell		HAM	MER (CORRE	CTIO	N FAG	CTOR:		1.37				
COM	PLET	ION	DEPTH: 40													
D	s	S					1									
E	Ŷ	A							Ľ.	S		%	%			
P T	M	M P	DESCRIPTION OF MATERIAL	SOIL				THE	U.F	NO.		Т	R			
н	B	Ľ		GROUP		ST.		/EIC	SR C	BL	z	C R	Q D			
	0 L	Е			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	ĸ	D			
FT _a	L	S	SURFACE ELEVATION: 778.2		LIN	%	LIN	DR	LB	2 N	PEI					
	$\backslash /$															
	$\backslash \backslash$															
	\mathbb{N}															
	\mathbb{N}															
5	\mathbb{N}	\bigtriangledown	Moist, Very Stiff, Brown Sandy Clay							7						
	$\langle \rangle$	\bigtriangleup								8-	.9					
	\mathbb{N}															
-	\mathbb{N}															
10	Sel.	\bigtriangledown								1						
10	0000	\bigtriangleup								17-	·10					
			Moist, Medium Dense, Gravel with Clay and													
	10/10		Sand					÷								
	20.10															
15	1990	\bigtriangledown					6		1	1	3					
15	S.S.	\bigtriangleup	Wet, Dense, Gravel with Clay and Sand							15-	16					
	2/2		wet, Dense, Graver with Gray and Sand													
	18.8%		LIMESTONE - Unweathered, Moderately Hard,													
			∖Gray									99	27			
			SHALE - Slightly Weathered, Medium Hard,									99	21			
20			Calcareous, Dark Gray									_	_			
	51111															
			LIMESTONE WITH OCCASIONAL SHALE										- 4			
			SEAMS - Unweathered, Moderately Hard, Gray								3	95	74			
			,,,,, ,, ,, ,, ,, ,, ,													
25		_	COAL WITH OCCASIONAL SHALE LAYERS													
			LIMESTONE - Unweathered, Moderately Hard,													
			\Gray SHALE - Weathered, Medium Hard, Dark Gray													
												100	78			
	曲臣															
30	班臣															
	斑		LIMESTONE - Unweathered, Moderately Hard,													
			Gray													
												100	76			
35	驿吞		LIMESTONE WITH FREQUENT SHALE													
REMARKS: Huey Creek																
		-	•													
	_	_					_		_		-		-			

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.						BORING NO. 11 PAGE 2 OF 2								
JOB NO. 040622 Crawford County DATE: April 11, 2017 JOB NAME: Washington County Line - South Strs. & Apprs. (S) DATE: April 11, 2017 Route 59 Section 5 Hollow Stem Auger - Diamond Crow STATION: 287+60 CME 7							Croe							
STATION:287+69EQUIPMENT:CME 7LOCATION:6' Left of Construction CenterlineHAMMER CORRECTION FACTOR:1.37LOGGED BY:Coty CampbellHAMMER CORRECTION FACTOR:1.37														
-			DEPTH: 40											
DEPTH FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 778.2	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	% T C R	% R Q D	
			PARTINGS AND SEAMS - Unweathered, Moderately Hard, Gray LIMESTONE - Unweathered, Moderately Hard, Gray									100	92	
			Boring Terminated											
REM	REMARKS: Huey Creek													

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

May 19, 2016

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 040622 Washington Co. Line – South Strs. & Apprs. (S) Route 59 Section 5 Crawford County

Transmitted herewith are the requested Soil Survey, strength data and Resilient Modulus test results for the above referenced job. The project consists of replacing four bridges on Highway 59. Samples were obtained in the existing travel lanes, shoulder and ditch line.

Based on laboratory results of samples obtained, the subgrade soils primarily consist of low plasticity sandy clays with varying amounts of gravel. Isolated locations of highly plastic clay were encountered within the project limits. Cross-sections are not currently available, but it is assumed that the construction grade line will closely match that of the existing roadway. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Rock was encountered at station 178+00, 5 feet right of centerline at a depth of 1.5 feet, and at station 185+00, 12 feet left of centerline at a depth of 0.5 feet.

If embankment is to be placed in the existing ditch line all soft unstable organic material should be undercut prior to embankment construction. The undercut is anticipated to be no more than two feet and may be backfilled with locally available unspecified material. Further recommendations will be made when plans are further developed and cross-sections become available.

Listed below is the additional information requested for use in developing the plans:

- 1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located in the vicinity of Van Buren.
- 2. Asphalt Concrete Hot Mix

	PG 64-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.4	94.6
Base Course	4.5	95.5

	PG 70-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.5	94.5
Base Course	4.5	95.5

Job No. 040622 May 19, 2016

	PG 76-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.5	94.5
Base Course	4.7	95.3

0

Michael C. Benson Materials Engineer

MCB:pt:bjj Attachment

cc: State Constr. Eng. – Master File Copy District 4 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 - 05/19/2016 SEQUENCE NO. - 1 MATERIAL CODE - SSRVPS JOB NUMBER - 040622 SPEC. YEAR - 2014 SUPPLIER ID. - 1 COUNTY/STATE - 17 DISTRICT NO. - 04 JOB NAME - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S) * STATION LIMITS R-VALUE AT 240 psi *

10

RESILIENT MODULEUS 017+00 6,174 071+00 6,118 178+00 6,010 290+00 7,938

BEGIN JOB - END JOB

REMARKS -

AASHTO TESTS : T190

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

Job No.	040622	Material Code	SSRVPS
Date Sampled:	5/11/16	Station No.:	017+00
Date Tested:	May 11, 2016	Location:	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPF Code: 17 Name: CRAWFORD	(5)	
County: Sampled By:	GW	Depth:	0-5
Lab No.:	20161159	AASHTO Class:	A-2-4 (0)
Sample ID:	RV210	Material Type (1 or 1	• •
LATITUDE:		LONGITUDE:	-)
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=	Yes or N= No)	Ν
	Testing - Permanent Strain > 5% (Y=Yes or N		Ν
	Number of Load Sequences Completed (0-15)		15
2. Specimen Info	rmation:		
	Specimen Diameter (in):		
	Тор		3.97
	Middle		3.96
	Bottom		3.94
	Average		3.96
	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
			12.22
	Initial Area, Ao (sq. in):		
	Initial Volume, AoLo (cu. in):		98.01
3. Soil Specimen			
	Weight of Wet Soil Used (g):		3259.80
4. Soil Properties			
	Optimum Moisture Content (%):		13.8
	Maximum Dry Density (pcf):		114.9
	95% of MDD (pcf):		109.2
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro			
	Wet Weight (g):		3259.80
	Compaction Moisture content (%):		13.8
	Compaction Wet Density (pcf):		126.72
	Compaction Dry Density (pcf):		111.36
	Moisture Content After Mr Test (%):		13.9
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Modu	ulus, Mr:	9055	(Sc)^-0.32147(S3)^0.39045
8. Comments			
9. Tested By:	G. WENDLAND	ate: May 11, 2016	

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

Job No.	040622			de	SSRVPS
Date Sampled:	5/11/16				017 + 00
Date Tested:	May 11, 2016			Location:	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)	SOUTH	STR. + APPRS (S)		
County:	Code: 17 Nan	me:	Name: CRAWFORD		
Sampled By:	GW			Depth:	0-5
Lab No.:	20161159			AASHTO Class:	A-2-4 (0)
Sample ID:	RV210			Material Type (1 or 2): 2	7
LATITUDE:				LONGITUDE:	

	Chamber	Nominal	Actual	Actual Annlied	Actual Annlied	Actual Annlied	Actual Annlied	Actual Annlied	Average Recov Def	Resilient Strain	Resilient
PARAMETER	Pressure	Axial	a	Cyclic Load	Contact	Max.	Cyclic	Contact	LVDT 1		
		Stress	Load		Load	Axial Stress	Stress	Stress	and 2		
DESIGNATION	လိ	Scyclic	P _{max}	P _{cyclic}	Pcontact	Smax	S _{cyclic}	Scontact	Havg	చ	Å
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	i	in/in	psi
Sequence 1	6.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00099	0.00012	14,700
Sequence 2	6.0	4.0	46.9	44.1	2.8	3.8	3.6	0.2	0.00226	0.00028	12,824
Sequence 3	6.0	6.0	68.9	65.2	3.7	5.6	5.3	0.3	0.00375	0.00047	11,397
Sequence 4	6.0	8.0	91.3	85.2	6.1	7.5	7.0	0.5	0.00568	0.00071	9,846
Sequence 5	6.0	10.0	113.4	104.8	8.6	9.3	8.6	0.7	0.00776	0.00097	8,867
Sequence 6	4.0	2.0	24.7	22.0	2.7	2.0	1.8	0.2	0.00116	0.00014	12,473
Sequence 7	4.0	4.0	45.9	43.1	2.8	3.8	3.5	0.2	0.00275	0.00034	10,276
Sequence 8	4.0	6.0	66.0	63.2	2.9	5.4	5.2	0.2	0.00465	0.00058	8,922
Sequence 9	4.0	8.0	88.3	82.9	5.4	7.2	6.8	0.4	0.00672	0.00084	8,098
Sequence 10	4.0	10.0	110.5	102.6	7.9	9.0	8.4	0.6	0.00880	0.00110	7,645
Sequence 11	2.0	2.0	24.5	21.6	2.8	2.0	1.8	0.2	0.00143	0.00018	9,958
Sequence 12	2.0	4.0	44.8	41.9	2.9	3.7	3.4	0.2	0.00338	0.00042	8,138
Sequence 13	2.0	6.0	63.9	60.9	3.0	5.2	5.0	0.2	0.00565	0.00070	7,083
Sequence 14	2.0	8.0	84.5	80.1	4.5	6.9	6.6	0.4	0.00807	0.00101	6,515
Sequence 15	2.0	10.0	105.9	98.9	7.0	8.7	8.1	0.6	0.01051	0.00131	6,174

DATE May 11, 2016 DATE

TESTED BY REVIEWED BY

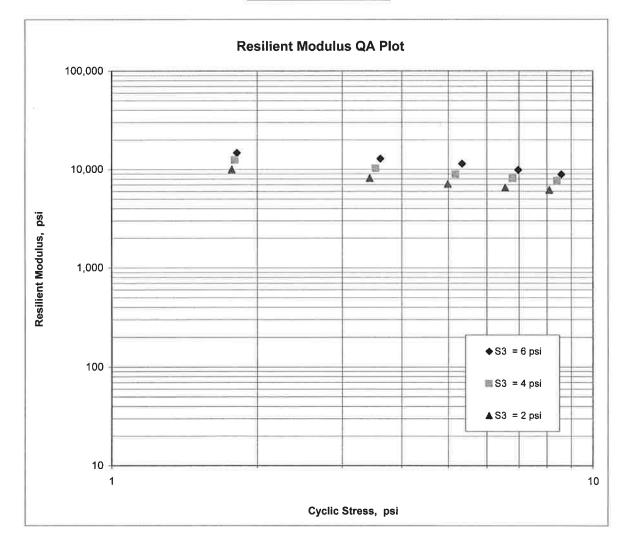
. WENDLAND

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

Job No.	040622			Material Code	SSRVPS
Date Sampled:	5/11/16			Station No.:	017+00
Date Tested:	May 11, 2016			Location:	15'RT
Name of Project:	WASHINGTON CO	LINE - S	SOUTH STR. + API	PRS (S)	
County:	Code: 17	Name:	CRAWFORD		
Sampled By:	GW			Depth:	0-5
Lab No.:	20161159		A	ASHTO Class:	A-2-4 (0)
Sample ID:	RV210		Materia	al Type (1 or 2):	2
LATITUDE:				LONGITUDE:	

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	9,055
K2 =	-0.32147
K5 =	0.39045
$R^2 =$	0.98



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

Job No.	040622	Material Code	SSRVPS
Date Sampled: Date Tested:	5/11/16 May 11, 2016	Station No.: Location:	071+00 15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPF		15.21
County:	Code: 17 Name: CRAWFORD	(0)	
Sampled By:	D. DICKERSON	Depth:	0-5
Lab No.:	20161160	AASHTO Class:	A-4 (0)
Sample ID:	RV211	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation:		
	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 Inf	ormation:		
	Specimen Diameter (in):		
	Тор		3.97
	Middle		3.94
	Bottom		3.96
	Average		3.96
	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):		12.22
	Initial Volume, AoLo (cu. in):		98.01
3. Soil Specime	-		
	Weight of Wet Soil Used (g):		3161.20
4. Soil Propertie			
	Optimum Moisture Content (%):		15.8
	Maximum Dry Density (pcf):		111.4
	95% of MDD (pcf):		105.8
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro			
	Wet Weight (g):		3161.20
	Compaction Moisture content (%):		15.6
	Compaction Wet Density (pcf):		122.89
	Compaction Dry Density (pcf):		106.31
	Moisture Content After Mr Test (%):		15.9
6. Quick Shear 1	「est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	12157(8	c)^-0.40566(83)^0.27538
8. Comments	3		
	î		
9. Tested By:	G. WENDLAND	Date: May 11, 2016	

9. Tested By: G. WENDLAND

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

Job No.	040622	Material Code	SSRVPS
Date Sampled:	5/11/16	Station No.:	071 + 00
Date Tested:	May 11, 2016	Location:	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	Code: 17 Name: CRAWFORD		
Sampled By:	D. DICKERSON	Depth:	0-5
Lab No.:	20161160	AASHTO Class:	A-4 (0)
Sample ID:	RV211	Material Type (1 or 2): 2	2): 2
LATITUDE:		LONGITUDE:	

	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	Cyclic Load	Contact	Max.	Cyclic	Contact	LVDT 1		
		Stress	Load		Load	Axial	Stress	Stress	and 2		
						Stress					
DESIGNATION	Ŝ	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	Scontact	H _{avg}	Ψ	Mr
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	'n	in/in	psi
Sequence 1	6.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00100	0.00012	14,617
Sequence 2	6.0	4.0	47.0	44.2	2.8	3.8	3.6	0.2	0.00223	0.00028	13,045
Sequence 3	6.0	6.0	69.2	65.5	3.7	5.7	5.4	0.3	0.00382	0.00048	11,251
Sequence 4	6.0	8.0	90.4	84.2	6.2	7.4	6.9	0.5	0.00611	0.00076	9,040
Sequence 5	6.0	10.0	110.7	102.0	8.7	9.1	8.3	0.7	0.00862	0.00107	7,769
Sequence 6	4.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00111	0.00014	13,122
Sequence 7	4.0	4.0	46.4	43.6	2.8	3.8	3.6	0.2	0.00260	0.00032	11,003
Sequence 8	4.0	6.0	66.7	63.8	2.8	5.5	5.2	0.2	0.00448	0.00056	9,340
Sequence 9	4.0	8.0	88.1	82.9	5.2	7.2	6.8	0.4	0.00678	0.00084	8,027
Sequence 10	4.0	10.0	109.3	101.5	7.8	8.9	8.3	0.6	0.00942	0.00117	7,076
Sequence 11	2.0	2.0	24.8	22.1	2.7	2.0	1.8	0.2	0.00128	0.00016	11,323
Sequence 12	2.0	4.0	45.9	43.2	2.7	3.8	3.5	0.2	0.00303	0.00038	9,342
Sequence 13	2.0	6.0	65.2	62.4	2.8	5.3	5.1	0.2	0.00521	0.00065	7,851
Sequence 14	2.0	8.0	84.9	80.5	4.4	6.9	6.6	0.4	0.00776	0.00097	6,807
Sequence 15	2.0	10.0	105.4	98.5	6.9	8.6	8.1	0.6	0.01056	0.00132	6,118

DATE May 11, 2016 DATE _____

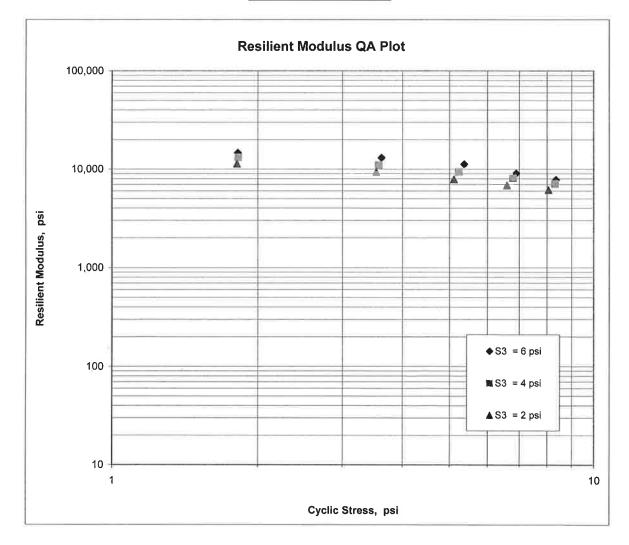
WENDLAND

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

Job No.	040622			Material Code SSRVPS
Date Sampled:	5/11/16			Station No.: 071+00
Date Tested:	May 11, 2016			Location: 15'LT
Name of Project:	WASHINGTON CO	D.LINE - S	SOUTH STR. + AI	PPRS (S)
County:	Code: 17	Name:	CRAWFORD	
Sampled By:	D. DICKERSON			Depth: 0-5
Lab No.:	20161160			AASHTO Class: A-4 (0)
Sample ID:	RV211		Mater	ial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	12,157	
K2 =	-0.40566	
K5 =	0.27538	
$R^2 =$	0.95	



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

Job No.	040622	Material Code	SSRVPS
Date Sampled:	4/19/16 Marc 12, 2016	Station No.:	178+00
Date Tested: Name of Project:	May 12, 2016 WASHINGTON CO. LINE SOUTH STDS. & AD	Location:	15'RT
County:	WASHINGTON CO. LINE-SOUTH STRS. & AP Code: 17 Name: CRAWFORD	FK5.(5)	
Sampled By:	CHRISENBERRY	Depth:	0-5'
Lab No.:	20161161	AASHTO Class:	A-6(1)
Sample ID:	RV212	Material Type (1 or 2):	
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation		
	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.		
2. Opecimen inte	Specimen Diameter (in):		
	Тор		3.97
	Middle		3.95
	Bottom		3.95
	Average		3.96
	Membrane Thickness (in):		0.00
	Height of Specimen, Cap and Base (in):		8
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		8
	Initial Area, Ao (sq. in):		12.30
	Initial Volume, AoLo (cu. in):		98.36
3. Soil Specimer	n Weight:		
or een opeenier	Weight of Wet Soil Used (g):		3213.10
4. Soil Propertie			
	Optimum Moisture Content (%):		15.2
	Maximum Dry Density (pcf):		112.5
	95% of MDD (pcf):		106.9
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	perties:		
	Wet Weight (g):		3213.10
	Compaction Moisture content (%):		15.4
	Compaction Wet Density (pcf):		124.46
	Compaction Dry Density (pcf):		107.85
	Moisture Content After Mr Test (%):		15.4
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	12580(S	c)^-0.41736(S3)^0.21690
		- (-	
8. Comments	· · · · · · · · · · · · · · · · · · ·		
9. Tested By:	C.GARRETT	Date: May 12, 2016	

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

Job No.	040622			Material Code	SSRVPS
Date Sampled:	4/19/16			Station No.:	178 + 00
Date Tested:	May 12, 2016			Location:	15'RT
Name of Project:	WASHINGTON CO.	LINE-SOUT	WASHINGTON CO. LINE-SOUTH STRS. & APPRS.(S)		
County:	Code: 17	Name:	CRAWFORD		
Sampled By:	CHRISENBERRY			Depth:	0-5'
Lab No.:	20161161			AASHTO Class:	A-6(1)
Sample ID:	RV212			Material Type (1 or 2): 2	2): 2
LATITUDE:				LONGITUDE:	

		-											-								
Resilient	Modulus				Mr	psi	13,705	11,699	10,082	8,205	7,270	12,623	10,306	8,586	7,364	6,661	11,292	9,041	7,503	6,530	6,010
Resilient	Strain				εr	in/in	0.00013	0.00031	0.00053	0.00084	0.00117	0.00014	0.00035	0.00061	0.00093	0.00126	0.00016	0.00039	0.00069	0.00103	0.00138
Average	Recov Def.	LVDT 1	and 2		H _{avg}	. <u>c</u>	0.00106	0.00247	0.00424	0.00676	0.00934	0.00115	0.00277	0.00486	0.00742	0.01012	0.00129	0.00313	0.00548	0.00821	0.01101
Actual	Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	0.6	0.2	0.2	0.2	0.4	0.6
Actual	Applied	Cyclic	Stress		S _{cyclic}	psi	1.8	3.6	5.3	6.9	8.5	1.8	3.6	5.2	6.8	8.4	1.8	3.5	5.1	6.7	8.3
Actual	Applied	Max.	Axial	Stress	S _{max}	psi	2.0	3.8	5.6	7.4	9.2	2.0	3.8	5.5	7.3	9.1	2.0	3.8	5.4	7.1	8.8
Actual	Applied	Contact	Load		P _{contact}	sdi	2.8	2.8	3.7	6.2	8.7	2.8	2.8	2.9	5.3	7.9	2.7	2.8	2.8	4.4	7.0
Actual	Applied	Cyclic Load			P _{cyclic}	sdl	22.4	44.4	65.7	85.2	104.4	22.3	43.9	64.2	84.0	103.6	22.3	43.5	63.2	82.4	101.7
Actual	Applied	Max. Axial	Load		P _{max}	lbs	25.2	47.2	69.4	91.4	113.1	25.1	46.7	67.0	89.4	111.4	25.1	46.3	66.1	86.8	108.7
Nominal	Maximum	Axial	Stress		S _{cyclic}	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			S3	psi	6.0	6.0	6.0	6.0	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	Sequence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

May 12, 2016 DATE DATE

REVIEWED BY TESTED BY

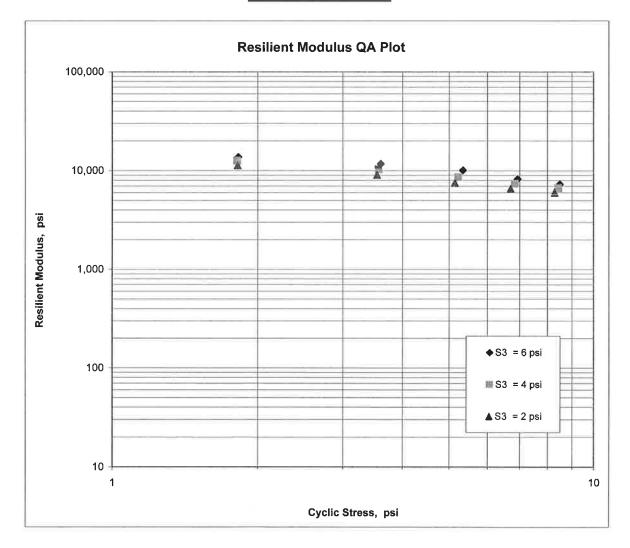
C.GARRETT

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

Job No.	040622			Material Code SSRVPS
Date Sampled:	4/19/16			Station No.: 178+00
Date Tested:	May 12, 2016			Location: 15'RT
Name of Project:	WASHINGTON CC). LINE-S	OUTH STRS. & A	APPRS.(S)
County:	Code: 17	Name:	CRAWFORD	
Sampled By:	CHRISENBERRY			Depth: 0-5'
Lab No.:	20161161			AASHTO Class: A-6(1)
Sample ID:	RV212		Mater	ial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_{R} = K1 (S_{C})^{K_{2}} (S_{3})^{K_{5}}$

K1 =	12,580
K2 =	-0.41736
K5 =	0.21690
$R^2 =$	0.97



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

Job No.	040622	Material Code	SSRVPS
Date Sampled:	5/11/16	Station No.:	290+00
Date Tested:	May 11, 2016	Location:	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APP	K5 (5)	
County:	Code: 17 Name: CRAWFORD	Dantha	0.5
Sampled By: Lab No.:	D. DICKERSON 20161162	Depth: AASHTO Class:	0-5 A-2-4 (0)
Sample ID:	RV213	Material Type (1 or 2)	
LATITUDE:	RV215	LONGITUDE:	• 2
1. Testing Inform			
	Preconditioning - Permanent Strain > 5% (Y		N
	Testing - Permanent Strain > 5% (Y=Yes or №		N
	Number of Load Sequences Completed (0-15)	15
2. Specimen Info	ormation:		
	Specimen Diameter (in):		
	Тор		3.95
	Middle		3.94
	Bottom		3.95
	Average		3.95
	Membrane Thickness (in):		0.00
	Height of Specimen, Cap and Base (in):		8
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		0.00
			-
	Initial Area, Ao (sq. in):		12.16
	Initial Volume, AoLo (cu. in):		97.27
3. Soil Specimer	-		
	Weight of Wet Soil Used (g):		3171.90
4. Soil Propertie	s:		
	Optimum Moisture Content (%)		13.8
	Maximum Dry Density (pcf):		113.6
	95% of MDD (pcf):		107.9
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	perties:		
opcontion / 10	Wet Weight (g):		3171.90
	Compaction Moisture content (%):		13.7
	Compaction Wet Density (pcf):		124.24
	Compaction Dry Density (pcf):		109.27
	Moisture Content After Mr Test (%):		13.3
6. Quick Shear 1	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	12679(5	Sc)^-0.30387(S3)^0.28324
8. Comments	8	·	
	· · · · · · · · · · · · · · · · · · ·		
9. Tested By:	C.GARRETT	Date: May 11, 2016	

9. Tested By: C.GARRETT

Date: May 11, 2016

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

Job No.	040622			Material Code	SSRVPS
Date Sampled:	5/11/16			Station No.:	290+00
Date Tested:	May 11, 2016			Location:	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)	JNE - SOUT	H STR. + APPRS (S)		
County:	Code: 17	Name:	CRAWFORD		
Sampled By:	D. DICKERSON			Depth:	0-5
Lab No.:	20161162			AASHTO Class:	A-2-4 (0)
Sample ID:	RV213			Material Type (1 or 2): 2	5
LATITUDE:				LONGITUDE:	

	Actual Actual Actual		Actual	Actual	Average	Resilient	Resilient
Pressure Axial Max. Axial Cyclic Load Contact Max. Axial Stress Load $F_{contact}$ $F_{contact}$ $F_{contact}$ $Axial$ S Sycie P_{max} P_{ovic} $P_{contact}$ $Axial$ S Sycie $P_{contact}$ $P_{contact}$ $P_{contact}$ $Axial$ S Sycie $P_{contact}$ $P_{contact}$ $P_{contact}$ $P_{contact}$ S S $P_{contact}$ $P_{contact}$ $P_{contact}$ $P_{contact}$ S S $P_{contact}$ $P_{contact}$ $P_{contact}$ $P_{contact}$ S S $P_{contact}$ P_{co	Applied	d Applied	Applied	Applied	Recov Def.	Strain	Modulus
Stress Load $Axial$ Sa Sycic P_{max} P_{ovlict} P_{max} Sa Sycic P_{max} P_{ovlict} P_{max} bpsi bpsi bbs bbs bbs bbs 6:0 2:0 2:5:0 22:3 2:8 2:1 6:0 4:0 47:0 44:2 2:8 3:9 6:0 6:0 6:0 6:0 6:0 5:7 5:7 6:0 8:0 92:0 85:9 6:1 7:6 5:7 6:0 10:0 113:8 105:2 8:5 9:4 5:7 6:0 10:0 113:8 105:2 8:5 9:4 5:7 6:0 8:0 8:5 6:1 7:6 9:4 5:7 5:4 7:0 10:0 113:8 105:2 8:5 9:4 5:5 7:4 8:0 8:0 8:0 8:0 5:2 7:4 5:2	Cyclic Load		Cyclic	Contact	LVDT 1		
No. Stress Stress Stress S3 Scyclic P_{max} P_{cyclic} P_{max} S_{max} psi psi lbs lbs lbs lbs psi 6.0 2.0 25.0 25.3 2.8 2.1 6.0 4.0 47.0 44.2 2.8 2.1 6.0 6.0 6.0 6.3 65.7 3.6 5.7 6.0 8.0 92.0 85.9 6.1 7.6 1 6.0 10.0 113.8 105.2 3.6 5.7 2.1 4.0 2.0 25.0 22.3 2.8 5.7 1 4.0 10.0 113.8 105.2 8.5 9.4 1 4.0 4.0 2.0 2.1 2.1 2.1 2 4.0 8.0 88.3 2.7 3.8 5.5 7.4 4.0 10.0 111.8 104.2 2.7			Stress	Stress	and 2		
S3 Seyclic P_{max} P_{cyclic} P_{max} P_{cyclic} P_{max} S_{max} 6 0 2.0 25.0 22.3 2.8 2.1 S_{max} 6 6.0 4.0 47.0 24.2 2.8 2.1 S_{max} 6 6.0 4.0 47.0 44.2 2.8 2.1 S_{max} 6 6.0 8.0 22.0 22.3 2.8 5.7 S_{max} 6 6.0 8.0 92.0 85.9 6.1 7.6 S_{max} 6 6.0 10.0 113.8 105.2 3.6 S_{max} S_{max} 6 6.0 8.0 92.0 85.9 6.1 7.6 S_{max} 6 6.0 10.0 113.8 105.2 2.8 S_{max} 6 6.0 8.0 92.0 84.7 2.8 S_{max} 6 4.0 8.0 2.0 <		Stress					
psi psi lbs lbs lbs psi psi 6.0 2.0 25.0 22.3 2.8 2.1 6.0 4.0 47.0 44.2 2.8 3.9 6.0 4.0 47.0 44.2 2.8 3.9 6.0 6.0 6.0 6.0 6.0 5.7 3.6 6.0 10.0 113.8 105.2 8.5 9.4 7.6 6.0 10.0 113.8 105.2 8.5 9.4 7.6 1 4.0 2.0 2.0 2.3 2.1 7.6 1 4.0 10.0 113.8 105.2 8.5 9.4 1 4.0 2.0 2.0 2.1 3.8 5.5 1 4.0 6.0 6.7.4 64.7 2.8 5.4 1 4.0 10.0 111.8 104.2 7.6 9.2 1 4.0 80.8 84.7	P _{cyclic}		S _{cyclic}	Scontact	H _{avg}	εr	Mr
6.0 2.0 25.0 2.3 2.8 6.0 4.0 47.0 44.2 2.8 6.0 6.0 6.0 69.3 65.7 3.6 6.0 6.0 69.3 65.7 3.6 5.7 3.6 6.0 8.0 92.0 85.9 6.1 3.6 5.7 3.6 6.0 10.0 113.8 105.2 8.5 5.7 3.6 4.0 2.0 25.0 22.3 2.7 3.6 3.7 4.0 2.0 2.0 25.0 22.3 2.7 3.6 4.0 6.0 67.4 64.7 2.8 3.7 3.7 4.0 8.0 89.8 84.7 5.2 3.6 3.6 4.0 10.0 111.8 104.2 7.6 3.7 3.7 4.0 2.0 2.0 2.0 2.0 2.7 3.7 3.7 2.0 2.0 2.0 2.1<	lbs		psi	psi	. <u>c</u>	in/in	psi
6.0 4.0 47.0 44.2 2.8 6.0 6.0 69.3 65.7 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 10.0 113.8 105.2 8.5 5.7 4.0 2.0 25.0 22.3 2.7 5.7 4.0 2.0 25.0 22.3 2.7 5.2 4.0 4.0 46.5 43.8 2.7 5.2 4.0 8.0 89.8 84.7 5.2 5.2 4.0 10.0 111.8 104.2 7.6 7.6 4.0 10.0 111.8 104.2 7.6 7.6 2.0 2.0 2.0 2.0 2.7 5.2 7.6 2.0 2.0 2.0 2.0 2.7 5.2 7.6 7.6 2.0 2.0 2.0 2.0 2.	22.3		1.8	0.2	0.00088	0.00011	16,745
6.0 6.0 69.3 65.7 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 10.0 113.8 105.2 8.5 5.7 4.0 2.0 25.0 22.3 2.7 5.7 4.0 2.0 25.0 22.3 2.7 5.7 4.0 4.0 2.0 25.0 2.7 5.7 4.0 8.0 89.8 84.7 5.2 5.2 4.0 10.0 111.8 104.2 7.6 5.2 2.0 2.0 2.0 2.0 2.7 5.2 4.0 10.0 111.8 104.2 7.6 5.2 2.0 2.0 2.0 2.0 2.7 5.2 5.2 2.0 2.0 2.0 2.0 2.7 5.2 5.2 5.2 2.0 2.0 2.0 2.0 </td <td>44.2</td> <td></td> <td>3.6</td> <td>0.2</td> <td>0.00192</td> <td>0.00024</td> <td>15,107</td>	44.2		3.6	0.2	0.00192	0.00024	15,107
6.0 8.0 92.0 85.9 6.1 6.0 10.0 113.8 105.2 8.5 4.0 2.0 25.0 22.3 2.7 4.0 2.0 25.0 22.3 2.7 4.0 4.0 4.0 2.0 25.0 2.7 4.0 2.0 25.0 2.3 2.7 5.2 4.0 6.0 67.4 64.7 2.8 5.2 4.0 8.0 89.8 84.7 5.2 5.2 4.0 10.0 111.8 104.2 7.6 5.2 2.0 2.0 2.0 2.0 2.7 5.2 4.0 10.0 111.8 104.2 7.6 7.6 2.0 2.0 2.0 2.0 2.7 5.2 5.7 2.0 2.0 2.0 2.0 2.7 5.2 5.7 2.0 2.0 2.0 2.0 2.7 5.7 5.7	65.7		5.4	0.3	0.00316	0.00039	13,697
6.0 10.0 113.8 105.2 8.5 4.0 2.0 25.0 22.3 2.7 4.0 2.0 25.0 22.3 2.7 4.0 4.0 46.5 43.8 2.7 4.0 6.0 67.4 64.7 2.8 4.0 8.0 89.8 84.7 2.8 4.0 10.0 111.8 104.2 7.6 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 2.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	85.9	7.6	7.1	0.5	0.00482	0.00060	11,732
4.0 2.0 25.0 22.3 2.7 4.0 4.0 4.0 46.5 43.8 2.7 4.0 4.0 46.5 43.8 2.7 2.7 4.0 6.0 67.4 64.7 2.8 2.7 4.0 8.0 89.8 84.7 2.8 2.8 4.0 10.0 111.8 104.2 7.6 2.8 2.0 2.0 2.4.7 22.0 2.7 2.8 2.0 2.0 2.4.7 22.0 2.7 2.7 2.0 2.0 2.4.7 22.0 2.7 2.7 2.0 2.0 43.2 2.7 2.7 2.7 2.0 6.0 66.0 63.3 2.7 2.7 2.0 8.0 86.8 82.6 4.1 1.1	105.2		8.7	0.7	0.00669	0.00084	10,347
4.0 4.0 46.5 43.8 2.7 4.0 6.0 67.4 64.7 2.8 4.0 8.0 89.8 84.7 2.8 4.0 8.0 89.8 84.7 5.2 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	22.3	2.1	1.8	0.2	0.00098	0.00012	14,918
4.0 6.0 67.4 64.7 2.8 4.0 8.0 89.8 84.7 5.2 4.0 8.0 89.8 84.7 5.2 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	43.8	3.8	3.6	0.2	0.00223	0.00028	12,887
4.0 8.0 89.8 84.7 5.2 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 4.0 4.0 4.2 2.7 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	64.7		5.3	0.2	0.00371	0.00046	11,461
4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	84.7		7.0	0.4	0.00544	0.00068	10,246
2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	104.2		8.6	0.6	0.00735	0.00092	9,331
2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	22.0	2.0	1.8	0.2	0.00113	0.00014	12,799
2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	43.2	3.8	3.5	0.2	0.00260	0.00032	10,936
2.0 8.0 86.8 82.6 4.1	63.3	5.4	5.2	0.2	0.00438	0.00055	9,516
	82.6	7.1	6.8	0.3	0.00633	0.00079	8,587
Sequence 15 2.0 10.0 108.5 101.8 6.7 8.9	101.8	8.9	8.4	0.6	0.00844	0.00105	7,938

TESTED BY REVIEWED BY

C.GARRETT

May 11, 2016

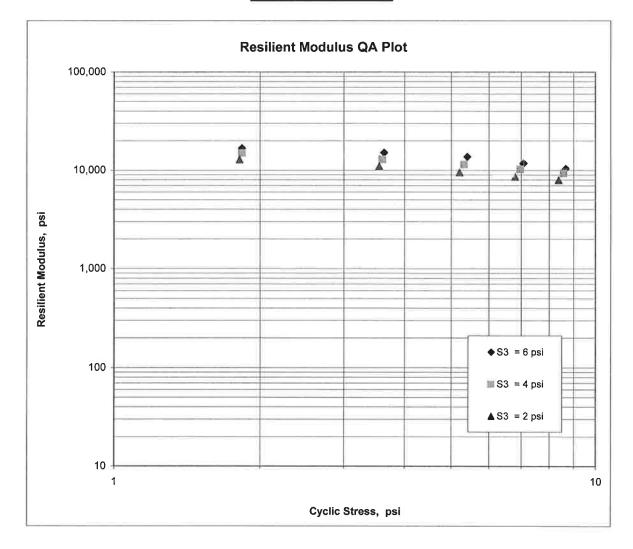
DATE DATE

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

Job No.	040622			Material Code SSRVPS
Date Sampled:	5/11/16			Station No.: 290+00
Date Tested:	May 11, 2016			Location: 15'LT
Name of Project:	WASHINGTON CO	D.LINE - S	SOUTH STR. + AF	PPRS (S)
County:	Code: 17	Name:	CRAWFORD	
Sampled By:	D. DICKERSON			Depth: 0-5
Lab No.:	20161162			AASHTO Class: A-2-4 (0)
Sample ID:	RV213		Mater	ial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	12,679
K2 =	-0.30387
K5 =	0.28324
$R^2 =$	0.97



JOB: 040622

Arkansas State Highway Transporation Department

JOB NAME: WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)

Materials Division Michael Benson, Materials Engineer

COUN	TY NO.	17	DATE TESTE	D	5/2/	2016			M	ichael B	enson, Materia	ls Engin	eer
STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	<i>L.L</i> .	<i>P.I</i> .	SOIL CLASS	LAB #:	%MOISTURE
017+00	15RT	0-5	BROWN	60	52	Е 45	ν 36	<i>E S</i> 26	24	06	A-2-4(0)	RV210	
071+00	15LT	0-5	BROWN	77	72	67	59	48	25	03	A-4(0)	RV211	
178+00	15RT	0-5	BROWN	65	56	47	43	38	32	13	A-6(1)	RV212	
290+00	15LT	0-5	BROWN	57	49	44	41	34	25	09	A-2-4(0)	RV213	
017+00	05RT	0-5	BROWN	95	86	77	67	40	21	06	A-4(0)	S191	16.8
017+00	15RT	0-5	BROWN	99	94	86	70	50	29	13	A-6(3)	S192	18.1
031+00	05LT	0-5	GRAY	99	95	86	81	76	40	23	A-6(16)	S193	12.5
031+00	15LT	0-5	GRAY	98	93	80	75	71	37	19	A-6(12)	S194	11.5
063+00	05RT	0-5	RD/BR	98	94	90	79	60	23	09	A-4(2)	S195	15.3
063+00	15RT	0-5	BROWN	86	77	67	58	44	23	07	A-4(0)	S196	16.2
071+00	05LT	0-5	BROWN	96	89	83	74	55	22	07	A-4(1)	S197	11.9
071+00	15LT	0-5	BROWN	95	85	76	71	59	23	08	A-4(2)	S198	15.9
178+00	05RT	1-1.5Z	RD/BR	93	85	79	69	52	28	14	A-6(4)	S199	14.2
178+00	12RT	0-5	RED	89	75	66	62	49	22	07	A-4(1)	S200	12.4
178+00	15RT	0-5	BROWN	77	64	56	52	43	24	02	A-4(0)	S201	9.8
185+00	05LT	0-5	BROWN	86	69	58	52	32	ND	NP	A-2-4(0)	S202	11.4
185+00	12LT	05Z	BROWN	78	61	47	39	25	21	03	A-1-B(0)	S203	
185+00	14LT	0-5	BROWN	88	80	71	62	41	25	06	A-4(0)	S204	15.3
284+00	05RT	0-5	RD/BR	96	90	84	76	60	25	10	A-4(3)	S205	15.5
284+00	11RT	0-5	RED	94	85	77	70	52	23	09	A-4(2)	S206	13
284+00	15RT	0-5	RD/BR	91	82	74	66	47	22	06	A-4(0)	S207	12
290+00	05LT	0-1.5Z	RD/BR	97	86	76	71	50	23	07	A-4(1)	S208	16.4
290+00	15LT	0-5	BROWN	97	95	90	86	81	37	16	A-6(12)	S209	13.3

JOB: JOB N	0 1 <i>ME:</i> w	040622 WASHINGTON CO.I	JOB: 040622 JOB NAME: WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)		Arkansas State Highway Transporation Department Materials Division	DATE TESTED 5/3/2016
COUN	COUNTY NO.	17			Michael Benson, Materials Engineer	
STA.# LOC.	LOC.				PAVEMENT SOUNDINGS	
017+00	15RT	ACHMSC	ACHMBC	CHIP SEAL	AGG.BASE CRS CL-7	
017+00	05RT	ACHMSC 5.5	ACHMBC 1.0	CHIP SEAL	AGG.BASE CRS CL-7 3.0	
031+00	05LT	ACHMSC 7.0	ACHMBC	CHIP SEAL 1.5	AGG.BASE CRS CL-7 4.0	
031+00	15LT	ACHMSC -	ACHMBC -	AGG.BASE CRS CL-5 -		
063+00	05RT	ACHMSC 6.5	ACHMBC 1.5	AGG.BASE CRS CL-5 5.0		
063+00	15RT	ACHMSC -	ACHMBC	AGG.BASE CRS CL-5		
071+00	15LT	ACHMSC -	ACHMBC -	AGG.BASE CRS CL-7 -		
071+00	05LT	ACHMSC 7.75	ACHMBC 2.0	AGG.BASE CRS CL-7 7.0		
178+00	12RT	ACHMSC 3.5	AGG.BASE CRS CL-7 7.0			
178+00	15RT	ACHMSC -	AGG.BASE CRS CL-7			
178+00	05RT	ACHMSC 4.0	ACHMBC 1.5	AGG.BASE CRS CL-7 6.0		
185+00	05LT	ACHMSC 6.0	AGG.BASE CRS CL-7 6.0			
185+00	12LT	ACHMSC 2.75	ACHMBC .75	AGG.BASE CRS CL-7 7.0		
185+00	14LT	ACHMSC -	ACHMBC	AGG.BASE CRS CL-7		
284+00	05RT	ACHMSC 4.5	ACHMBC	AGG.BASE CRS CL-7 8.0		
284+00	11RT	ACHMSC 2.5	ACHMBC 2.0	AGG.BASE CRS CL-5	AGG.BASE CRS CL-7 7.0	
284+00	15RT	ACHMSC -	ACHMBC	AGG.BASE CRS CL-5 -	AGG.BASE CRS CL-7	
comments:		Z=AUGER REFUSAL			Monday, May 16, 2016	

Page I of 2

PAVEMENT SOUNDINGS		Monday, May 16, 2016
	AGG.BASE CRS CL-5 6.0	
	I ACHMBC	EFUSAL
C.	05LT ACHMSC 3.5	Z=AUGER REFUSAL
STA.# LOC.	230+00	comments:

Page 2 of 2

ARKANSAS STATE		Y AND TRANSPORTAT MATERIALS HAEL BENSON, MATER	DIVISION		ROCK, ARKANSAS	
* *		SURVEY / PAVEMENT			**	
DATE - 05/09/16 SEQUENCE NO 1 JOB NUMBER - 040622 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 - 17 SUPPLIER NAME - STATE DISTRICT NO 04 NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S) PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS						
LOCATION - CRAWI SAMPLED BY - CHRIS	FORD, CO				PLED - 04/19/16 EIVED - 04/25/16	
SAMPLE FROM - TEST MATERIAL DESC SO	HOLE		VEMENT SOUNDIN	DATE TES	TED - 05/03/16	
LAB NUMBER					20161142	
SAMPLE ID			= S192			
TEST STATUS						
			- 017+00		031+00	
LOCATION			_ 15RT _ 0-5	10. 14	05LT 0-5	
DEPTH IN FEET MAT'L COLOR		BROWN	BROWN	-	GRAY	
MAT'L TYPE		BICOMIN	- Bitonit	-	Giuli	
LATITUDE DEG-MIN-	SEC -				35 42 16.00	
LONGITUDE DEG-MIN-	SEC -	94 29 .60	94 29	.70	94 28 53.80	
<pre>% PASSING 2</pre>	IN:		-			
	2 IN		三 り たい	15. 1.1		
	IN		- 100		100	
	3 IN 4 -		- 99 - 99		100 99	
	10 -		94	1975 1921	95	
	40 -		- 86	1	86	
NO.	80 -	67	- 70		81	
NO.	200 =	40	50		76	
LIQUID LIMIT	2	21	- 29	-	40	
PLASTICITY INDEX	~	06	13	-	23	
AASHTO SOIL	5	A-4(0)	- A-6(3)	-	A-6(16)	
UNIFIED SOIL	ਲ ਪੁ	16.8	- 18.1	-	12.5	
% MOISTURE CONTENT						
ACHMSC ACHMBC	(IN) - (IN) -	5.5 1.0			7.0	
CHIP SEAL	(IN) -	1.0	14) 14)	-	1.5	
AGG.BASE CRS CL-7	(IN) -	3.0	-		4.0	
	음 (10) 등 문			-		
	+		2 4 5	-		
	5. 		()	2		
	100 E		27. 12.	- 		
REMARKS = Z=AUGER	REFUSAL					

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ARKANSAS STATE HIGHWAY AND TRANSPORTATIO MATERIALS D					
MICHAEL BENSON, MATERI *** SOIL SURVEY / PAVEMENT					
DATE- 05/09/16SEQUENCE NO 2JOB NUMBER- 040622MATERIAL CODE - SSRVPSFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR - 2014PURPOSE- SOIL SURVEY SAMPLESUPPLIER ID 1SPEC. REMARKS- NO SPECIFICATION CHECKCOUNTY/STATE - 17SUPPLIER NAME- STATEDISTRICT NO 04NAME OF PROJECT- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER- NOT APPLICABLEPIT/QUARRY- ARKANSAS					
LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - R VALUE- PAVE	DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/03/16 EMENT SOUNDINGS				
TEST STATUS - INFORMATION ONLY STATION - 031+00 LOCATION - 15LT DEPTH IN FEET - 0-5 MAT'L COLOR - GRAY MAT'L TYPE - - LATITUDE DEG-MIN-SEC - 35 42 16.00 LONGITUDE DEG-MIN-SEC - 94 28 54.00 % PASSING 2 IN 3/4 IN - 3/4 IN 3/8 IN 100 NO. 40 98 NO. 10 - 93 NO. 40 - 80 NO. 80 - 75 NO. 200 - 71 LIQUID LIMIT - 37 PLASTICITY INDEX - 19	S195 S196 INFORMATION ONLY INFORMATION ONLY 063+00 063+00 05RT 15RT 0-5 0-5 RD/BR BROWN 35 45 28.20 94 28 15.30 94 28 94 28 15.30 94 28 15.40 98 100 95 86 100 95 86 94 94 67 58 60 44 90 67 58 60 44				
AASHTO SOIL - A-6(12) UNIFIED SOIL - % MOISTURE CONTENT - 11.5	- A-4(2) - A-4(0) - 15.3 - 16.2				
ACHMSC (IN) ACHMBC (IN) AGG.BASE CRS CL-5 (IN) 					

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ARKANSAS STATE HIGHWAY AND TRANSPORTATI MATERIALS	DIVISION					
MICHAEL BENSON, MATER *** SOIL SURVEY / PAVEMENT						
DATE05/09/16SEQUENCE NO.3JOB NUMBER040622MATERIAL CODESSRVPSFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR2014PURPOSESOIL SURVEY SAMPLESUPPLIER ID.1SPEC. REMARKSNO SPECIFICATION CHECKCOUNTY/STATE17SUPPLIER NAMESTATEDISTRICT NO.04NAME OF PROJECT-WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER-NOT APPLICABLE						
PIT/QUARRY - ARKANSAS LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - R VALUE- PAV	DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/03/16 VEMENT SOUNDINGS					
LAB NUMBER - 20161146	- 20161147 - 20161148 S198 - S199 - INFORMATION ONLY - INFORMATION ONLY 071+00 - 178+00 15LT - 05RT 0-5 - 1-1.5Z BROWN - RD/BR - 35 45 19.50 - 35 41 35.10					
LIQUID LIMIT - 22 PLASTICITY INDEX - 07 AASHTO SOIL - A-4(1) UNIFIED SOIL - % MOISTURE CONTENT - 11.9 ACHMSC (IN) - 7.75 ACHMBC (IN) - 2.0 AGG.BASE CRS CL-7 (IN) - 7.0 - - - - - - - - - -	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					

-AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS STATE	HIGHWAY		SPORTATIO FERIALS DI			- LITTLE	ROCK,	ARKA	NSAS
**		AEL BENSO	N, MATERI	AL	S ENGINEER		* * *		
JOB NUMBER-040622MATERIAFEDERAL AID NOTO BE ASSIGNEDSPEC. YPURPOSE-SOIL SURVEY SAMPLESUPPLIESPEC. REMARKS-NO SPECIFICATION CHECKCOUNTY/							CE NO 4 AL CODE - SSRVPS (EAR - 2014 ER ID 1 (STATE - 17 CT NO 04		
LOCATION - CRAWF SAMPLED BY - CHRIST SAMPLE FROM - TEST MATERIAL DESC SOI	ORD, CON ENBERRY HOLE		LUE- PAVE	ME	NT SOUNDIN	DATE SA DATE RE DATE TE GS	CEIVED	- 04	/25/16
LAB NUMBER SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET MAT'L COLOR MAT'L TYPE LATITUDE DEG-MIN-: LONGITUDE DEG-MIN-:	- - - - - - - - - - - - - - - -	INFORMATI 178+00 12RT 0-5 RED 35 41	CON ONLY 35.00		20161150 S201 INFORMATIC 178+00 15RT 0-5 BROWN 35 41 94 28	ON ONLY -	185+ 05L1 0-5 BROW	PRMATI 000 VN 5 41	
<pre>% PASSING 2 1 1/2 3/4 3/8 NO. NO. NO. NO. NO.</pre>	IN IN IN IN 4 - 10 - 40 -	100 99 89			100 91 77 64 56 52 43	-	- 100 95 86 - 69 - 58 - 52 32		
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT	- - -	22 07 A-4(1) 12.4			24 02 A-4(0) 9.8		•	2-4(0) L1.4	
ACHMSC AGG.BASE CRS CL-7	(IN) - (IN) - - - - - - - - - - - - - - - - - - -	3.5 7.0						.0.0	

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MATER	ORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS RIALS DIVISION MATERIALS ENGINEER						
	VEMENT SOUNDING TEST REPORT ***						
DATE - 05/09/16 SEQUENCE NO 5 JOB NUMBER - 040622 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 - 17 SUPPLIER NAME - STATE DISTRICT NO 04 NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S) PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS							
LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE	DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/02/16						
MATERIAL DESC SOIL SURVEY - R VALU							
SAMPLE ID-S203TEST STATUS-INFORMATIONSTATION-185+00LOCATION-12LTDEPTH IN FEET-05ZMAT'L COLOR-BROWNMAT'L TYPE-LATITUDE DEG-MIN-SEC-354135	$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
LIQUID LIMIT - 21 PLASTICITY INDEX - 03 AASHTO SOIL - A-1-B(0) UNIFIED SOIL - % MOISTURE CONTENT - ACHMSC (IN) - 2.75 ACHMBC (IN)75 AGG.BASE CRS CL-7 (IN) - 7.0 - - - - -	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$						

AASHTO TESTS 🕴 T24 T88 T89 T90 T265

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ARKANSAS STAT	MICH	MA AEL BENSO	ATERIALS I ON, MATERI	IAL		٤		RANSAS
DATE - 05 JOB NUMBER - 04 FEDERAL AID NO TO PURPOSE - SO SPEC. REMARKS - NO SUPPLIER NAME - ST NAME OF PROJECT - PROJECT ENGINEER -	/09/16 0622 DE ASSI DIL SURVE DSPECIFI CATE WASHINGT	GNED Y SAMPLE CATION CH ON CO.LIN	IECK			SEQUENCE MATERIAL SPEC. YE SUPPLIER COUNTY/S DISTRICT	NO CODE - AR - ID TATE -	SSRVPS 2014 1 17
PIT/QUARRY - ARKA LOCATION - CRAN SAMPLED BY - CHRIS SAMPLE FROM - TEST MATERIAL DESC SO	IFORD, CO STENBERRY HOLE		ALUE- PAVI	EME		DATE SAI DATE REC DATE TES IGS	CEIVED -	04/25/16
LAB NUMBER	-	20161155		2 0	20161156	8 	2016115	7
SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET	- - -	S206 INFORMAT 284+00 11RT 0-5	ION ONLY	=	S207 INFORMATI 284+00 15RT 0-5	- ON ONLY -	S208 INFORMA 290+00 05LT 0-1.5Z	
MAT'L COLOR MAT'L TYPE		RED		-	RD/BR	9 7 . 200	RD/BR	
LATITUDE DEG-MIN LONGITUDE DEG-MIN	-SEC -							
3/ 3/ NO. NO. NO.	IN 2 IN 4 IN 8 IN 4 - 10 - 40 - 80 - 200 -	94 85 77			100 99 91 82 74 66 47		100 97 86 76 71 50	
LIQUID LIMIT	×	23		1 0	22		23	
PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL	- - -	09 A-4(2)			06 A-4(0)	-	07 A-4(1)	
% MOISTURE CONTEN	т -	13.0		7	12.0		16.4	
ACHMSC ACHMBC AGG.BASE CRS CL-5	(IN) - (IN) - (IN) -	2.5 2.0		- - -		-	3.5 6.0	
AGG.BASE CRS CL-7	(IN) –	7.0		-		-	а 2 тели	
	-			_		2	57 15	
	-			-		+		
	-			-				
	-			-		2		
REMARKS - Z=AUGER	REFUSAL							

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ARKANSAS		Y AND TRANSPORTATI MATERIALS I HAEL BENSON, MATER	DIVISION	- LITTLE ROCK, ARKAN	SAS
		SURVEY / PAVEMENT		REPORT ***	
JOB NUMBER FEDERAL AID NO PURPOSE SPEC. REMARKS SUPPLIER NAME NAME OF PROJECT PROJECT ENGINE PIT/QUARRY -	TO BE ASS - SOIL SURV - NO SPECIF - STATE F - WASHING ER - NOT APP ARKANSAS	EY SAMPLE ICATION CHECK TON CO.LINE-SOUTH LICABLE	STRS.& APPRS.(1
LOCATION - SAMPLED BY - SAMPLE FROM -	CHRISTENBERR			DATE SAMPLED - 04/2 DATE RECEIVED - 04/2 DATE TESTED - 05/0	25/16
MATERIAL DESC.	- SOIL SURV	EY - R VALUE- PAV	EMENT SOUNDING	S	
LAB NUMBER	-	20161158	<u></u>	2	
SAMPLE ID			-	-	
		INFORMATION ONLY	H)	-	
	-		E .	1.55	
LOCATION	-	15LT			
DEPTH IN FEE			-	-	
MAT'L COLOR	-	BROWN		3 	
	-		-	1	
		35 40 43.10 94 26 27.30	-	-	
<pre>% PASSING</pre>	2 IN -		_	- 20m	
1 INDING	1 1/2 IN		-	-	
	3/4 IN		-	22	
	3/8 IN	100	-		
	NO. 4 -		-	2-	
	NO. 10 -		-) 코- (요)	
	NO. 40 -		_		
	NO. 80 -	86	-		
	NO. 200 -	81			
LIQUID LIMIT		37	1	2 <u>-</u>	
PLASTICITY I	NDEX -	16		2	
AASHTO SOIL	-	A-6(12)	-	-	
UNIFIED SOIL			-		
% MOISTURE C	ONTENT -	13.3			
	-				
	-		-	-	
	-		-	-	
	-		-		
	-		-	-	
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	-			17 11	
REMARKS - Z=A					
	AGGEN NEFUSAL	J			
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AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS STATE HIGHWAY AND TRANSPORTATIO MATERIALS D	
MICHAEL BENSON, MATERI *** SOIL SURVEY / PAVEMENT	
DATE - 05/09/16 JOB NUMBER - 040622 FEDERAL AID NO TO BE ASSIGNED PURPOSE - SOIL SURVEY SAMPLE SPEC. REMARKS - NO SPECIFICATION CHECK SUPPLIER NAME - STATE NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH S PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS	SEQUENCE NO 1
LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - RESISTANCE R-V	DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/02/16 WALUE ACTUAL RESULTS
LAB NUMBER-20161159SAMPLE ID-RV210TEST STATUS-INFORMATION ONLYSTATION-017+00LOCATION-15RTDEPTH IN FEET-0-5MAT'L COLOR-BROWN	- 20161160 - 20161161 - RV211 - RV212
MAT'L TYPE - LATITUDE DEG-MIN-SEC - 35 42 27.40 LONGITUDE DEG-MIN-SEC - 94 29 .70	- 35 45 19.50 - 35 41 35.00 94 28 16.10 94 28 7.90
<pre>% PASSING 2 IN 1 1/2 IN 3/4 IN 100 3/8 IN 78 NO. 4 - 60 NO. 10 - 52 NO. 40 - 45 NO. 80 - 36 NO. 200 - 26</pre>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
LIQUID LIMIT - 24 PLASTICITY INDEX - 06 AASHTO SOIL - A-2-4(0) UNIFIED SOIL - % MOISTURE CONTENT - - - - - - - - - - - - - -	- 25 - 32 - 03 - 13 - A-4(0) - A-6(1)
REMARKS - - - -	

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AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS			MATERIALS	DIVISION	- LITTLE ROCK, ARKANSAS
			AEL BENSON, MATER SURVEY / PAVEMENT		
JOB NUMBER FEDERAL AID NO PURPOSE SPEC. REMARKS SUPPLIER NAME	TO BE AS - SOIL SUN - NO SPEC - STATE T - WASHIN ER - NOT AN	SSI RVE LFI NGT	Y SAMPLE CATION CHECK ON CO.LINE-SOUTH		SEQUENCE NO 2 MATERIAL CODE - RV SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 17 DISTRICT NO 04 (S)
LOCATION - SAMPLED BY - SAMPLE FROM -	CHRISTENBE				DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/02/16
		RVE	Y - RESISTANCE R		
LAB NUMBER				a .	65
SAMPLE ID			RV213	<u>a</u>	38
			INFORMATION ONLY		
STATION LOCATION					-
DEPTH IN FEE					
MAT'L COLOR				14) 141	-
MAT'L TYPE		_		-	-
LATITUDE DE	G-MIN-SEC	-	35 40 43.10		22
LONGITUDE DE	G-MIN-SEC	-	94 26 27.30		
% PASSING	2 IN.	_		_	_
	1 1/2 IN.	_		-	_
	3/4 IN.	-	100	-	-
	3/8 IN.	-	81	-	-
	NO. 4			_	-
	NO. 10			-	-
3	NO. 40			-	-
	NO. 80 NO. 200	_	41 34	-	-
			54		
LIQUID LIMIT		-	25	94.	1.5.
PLASTICITY I	NDEX	-	09	気)) (23)	
AASHTO SOIL UNIFIED SOIL		-	A-2-4(0)		-
% MOISTURE C		_		=):	. च
· NOISIONE C	ONTENT				
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		-		-	-
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		-		-	-
		-		-	-
REMARKS -					
-					
-					
-					
-					

AASHTO TESTS : T24 T88 T89 T90 T265

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