

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



**SUBSURFACE INVESTIGATION**

STATE JOB NO. 061333

FEDERAL AID PROJECT NO. NH-NHPP-430-2(265)9

I-430/HWY. 10 INTERCHANGE IMPVT. (L.R.) (S)

STATE HIGHWAY 10 & 430 SECTION 8 & 21

IN PULASKI COUNTY

LETTING OF DECEMBER 7, 2016

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 STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

May 15, 2013

**TO:** Mr. Carl Fuselier, Bridge Engineer

**SUBJECT:** Job No. 061333  
I-430/Hwy 10 Interchange Impvt. (L.R.)(F)  
Pulaski County  
Route 430 Section 21  
Route 10 Section 8

Transmitted herewith is a brief summary of the geology and site conditions, unconfined compressive strength test results, and logs of the borings conducted for bearing capacity and slope recommendations for the above referenced job. 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. The rock cores are available for inspection at the Materials Division.

This investigation was to obtain preliminary subsurface information for use in evaluating the retaining walls at Pine Buro Road and at Stations 503+00 to 513+00 for the I-430 Northbound On-Ramp. Based on meetings with Bridge Division, it is anticipated that the walls will be cast-in-place retaining walls. The maximum height of the proposed walls is approximately 20 feet on Pine Buro Road and 40 feet on I-430 Northbound On-Ramp. In cut sections, retaining walls should be founded on shale with sandstone fragments as indicated on the boring logs. In areas that have 3' to 8' of overburden at the retaining wall footing, it is recommended that all overburden be excavated to rock for the full width of the footing. This area should be backfilled in accordance with Section 207 of the Standard Specifications for Stone Backfill. The intention of this recommendation is to reduce the required wall height, provide a consistent bearing surface and elevation, and provide drainage for ground water. Drainage must be provided for the Stone Backfill material.

It is also recommended that the fill material for retaining wall be specified as SM-1 and that a chimney drain be required on both sides of the retained embankment to allow for proper drainage. Retained rock cut is not expected to exert significant forces on the retaining wall. Recommendations for bearing resistance are listed in Table 1. Location and elevations where rock was encountered during subsurface investigation is listed in Table 2.

Table 1: Bearing Capacity Recommendations

Location	Factored Bearing Capacity (ksf)	Stone Backfill Allowable Bearing Capacity (ksf)
Pine Buro Rd	10.5	9
I-430 Northbound On-Ramp	10.5	9

Table 2: Rock Locations

Location	Offset	Elevation
494+61	6' RT	557.0
495+18	112' RT	571.1
495+50	7' RT	553.4
503+50	17' LT	480.9
505+00	12' LT	469.3
506+59	16' LT	467.3
508+00	18' LT	455.9
510+00	18' LT	446.9
511+00	18' LT	442.6
512+00	18' LT	439.2
513+00	18' LT	438.6

The investigation was also to obtain information for recommendations on the cut slopes on the right side of the project from Stations 496+00 to 503+00. Table 3 indicates the location and elevation at which rock was encountered during drilling. The rock cut should be excavated using a 1/4H:1V slope. The rock will require blasting during excavation in order to achieve the recommended slopes. Soil should be excavated on a 2H:1V slope from its interface with rock continuing to top of backslope. It is also recommended that the backslopes from Stations 496+00 to 501+00 be plated with Dumped Riprap meeting the requirements of Section 816. Beginning at Station 501+00, a 10' bench is recommended at top of rock cut before transitioning to the 2H:1V slope. Cross-sections have been included to illustrate the above recommendation.

TABLE 3: Rock Locations

Station	Offset	Elevation
496+50	59' RT	559.9
497+50	80' RT	559.9
499+00	46' RT	546.1
500+00	Centerline	545.2
501+00	30' RT	550.0
502+00	46' RT	552.9
502+50	73' RT	566.6
502+50	103' RT	563.2
503+00	90' RT	566.8

It is also recommended that the fill slopes on the right side from Stations 514+00 to 523+00 be constructed using a 2H:1V slope with a rock fill extending from the 6H:1V slope to the toe of slope. An alternative to this recommendation would be to construct the entire embankment utilizing a 2H:1V slope using rock fill. This alternative would require the use of guardrail or concrete barrier wall for minimum safety requirements, but would substantially reduce the required fill and clearing of the existing slope. A Special Provision for Rock Fill will be provided upon request.

Cut slopes on the right side from Stations 525+00 to 529+70 should be constructed using a 1H:1V slope with a 10 foot horizontal bench every 20 feet of vertical cut, extending to top of backslope. A representative cross section has been attached.

If you have any questions concerning these recommendations, please contact the Geotechnical Section.



Michael C. Benson  
Materials Engineer

MCB:rpt:tgf

cc: State Construction Engineer - Master File Copy  
Roadway Design  
District 6 Engineer  
G.C. File



**GEOLOGY AND SITE CONDITIONS**  
**Job No. 061333**  
**I-430/Hwy. 10 Interchange Impvt. (LR) (F)**  
**Pulaski County**  
**Route 430 Section 21**  
**Route 10 Section 8**

**Site Geology**

The project alignment is located in the mapped outcrop of the Jackfork Formation of Pennsylvanian age (IPj). The Jackfork Sandstone is composed of thin- to massive-bedded, fine- to coarse-grained, brown, tan, or bluish-gray quartzitic sandstones with subordinate brown, silty sandstones and gray-black shales. Toward the north of its outcrop area the shale units of the lower and middle Jackfork Sandstone take up more of the section and the sandstones are more lenticular, often occurring as chaotic masses in the shale.

The current I-430 road cut at the job site consists primarily of sandstone on the northern half of the cut and primarily shale at the southern end of the cut. The contact between shale section of rock and the sandstone section is between stations 511+00 and 512+00. The rocks in the general area have been mapped as having dips ranging from 45 to 80 degrees. The exposed rocks are dipping in a northeasterly direction. The rocks are cut by numerous reverse faults producing numerous slickensides. The deep valleys associated with this job site may represent large thrust faults. These faults trend from northwest to southeast. The rocks here also contain several quartz veins.

**Subsurface Conditions**

Based on the results of the borings from **stations 494+61 to 495+50** (elevations ranging from 567.8 to 590.1 feet above MSL), the subsurface stratigraphy may be generalized as follows:

- 0 to 3.6 Feet:       Varies from moist, soft to very stiff, reddish brown **clay with some organic matter** to reddish brown **clay with gravel, cobbles (sandstone fragments), and some organic matter**.
- 3.6 to 7.5 Feet:    Varies from moist, very stiff, reddish brown **clay with gravel, cobbles (sandstone fragments), and some organic matter** to medium hard, highly weathered, reddish brown and dark gray **shale with sandstone cobbles** with traces of clay to medium hard, highly weathered, reddish brown and dark gray **shale**.
- 7.5 to 39.0 Feet:  Varies from poorly cemented to well cemented, reddish brown, slightly weathered to highly weathered **sandstone to sandstone with shale layers and clay layers** to soft to medium hard, highly weathered to weathered reddish brown and dark gray shale with sandstone partings and layers. These rocks have a steep dip and vertical fractures.

Based on the results of the borings from **stations 496+50 to 502+00** (elevations ranging from 554.4 to 571.5 feet above MSL), the subsurface stratigraphy may be generalized as follows:

0 to 33.6 Feet: Consists of soft to medium hard, highly weathered to slightly weathered, reddish brown to dark gray **shale**. These rocks have a steep dip and some vertical fractures. These rocks are cut by some quartz veins.

Based on the results of the borings from **stations 502+47 to 502+95** (elevation 568.8 to 571.7), the subsurface stratigraphy may be generalized as follows:

0 to 27.5 Feet: Consists of poorly cemented to cemented, reddish brown to brown sandstone to sandstone with shale layers. These rocks have a moderate to steep dip and vertical fractures. These rocks are cut by some quartz veins.

27.5 to 32.5 Feet: Varies from cemented, brown and gray sandstone with occasional shale layers to hard, dark gray shale with some sandstone layers. These rocks have a steep dip and vertical fractures.

Based on the results of the borings from **stations 503+50 to 511+00** (elevations ranging from 451.8 to 485.9), the subsurface stratigraphy may be generalized as follows:

0 to 3.7 Feet: Varies from moist, stiff, brown and gray clay with gravel (sandstone and shale fragments) to soft to medium hard, highly weathered, brown and gray shale.

3.7 to 23.7 Feet: Consists of medium hard to hard, highly weathered to slightly weathered, dark gray shale to shale with frequent sandstone layers. These rocks have a steep dip and vertical fractures. These rocks are cut by some quartz veins. The shale contains slickensides.

Based on the results of the borings from **stations 512+00 to 516+53** (elevations ranging from 425.5 to 445.8), the subsurface stratigraphy may be generalized as follows:

0 to 12.1 Feet: Varies from moist, very dense, brown **sand with gravel (sandstone fragments)** to **sandstone boulders with reddish brown clay seams** to soft, highly weathered, dark gray **shale** to well cemented, slightly weathered, gray and reddish brown **sandstone**. These rocks have a moderate to steep dip and vertical fractures

12.1 to 49.1 Feet: Consists of soft, highly weathered, dark gray **shale** to poorly to well cemented, highly to slightly weathered, gray to reddish brown **sandstone**. Some of the sandstone has clay seams. These rocks have a moderate to steep dip and vertical fractures. These rocks are cut by some quartz veins.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1  
PAGE 1 OF 1

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 494+61  
LOCATION: 6' Right of Center Line of Construction  
LOGGED BY: Paul Christenberry

DATE: April 23, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 750 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.28

COMPLETION DEPTH: 24.3

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C C R	
											%	R Q D
			SURFACE ELEVATION: 567.8									
			Moist, Soft, Reddish Brown Clay with some Organic Matter									
5			SHALE WITH SANDSTONE COBBLES - Reddish Brown and Dark Gray, Highly Weathered, Medium Hard							60 (5")		
10			SANDSTONE WITH DARK GRAY SHALE PARTINGS - Reddish Brown, Weathered, Poorly-Cemented							36 48-40 (1")		
			SHALE WITH SANDSTONE PARTINGS - Reddish Brown and Dark Gray, Laminated, Highly Weathered, Medium Hard, with Steep Dip and Fractured Layers									67
15			SHALE WITH SANDSTONE LAYERS - Reddish Brown and Dark Gray, Laminated, Highly Weathered, Soft, with Steep to Vertical Dip and Fractured Layers								48	0
20			SANDSTONE WITH DARK GRAY SHALE LAYERS - Reddish Brown, Very Thick Bedded, Slightly Weathered, Well-Cemented, with Steep Dip and Fractured Layers								76	20
25			Boring Terminated									
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2  
PAGE 1 OF 2

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 495+18  
LOCATION: 112' Right of Center Line of Construction  
LOGGED BY: Paul Christenberry

DATE: April 22, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 750 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.28

COMPLETION DEPTH: 39

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 590.1									
5			Moist, Very Stiff, Reddish Brown Clay with Gravel (Sandstone Fragments), Cobbles and some Organic Matter							8 10-10		
10			SANDSTONE WITH TRACE OF CLAY - Reddish Brown, Highly Weathered, Poorly-Cemented							40 60 (5")		
15			SANDSTONE - Reddish Brown, Highly Weathered, Poorly-Cemented							60 (3")		
20			SANDSTONE WITH CLAY SEAMS AND LAYERS - Reddish Brown, Thick Bedded, Weathered, Cemented, Moderate Dip and Fractured Layers							60 (5")	78	0
25			SANDSTONE WITH CLAY LAYERS - Reddish Brown, Thick Bedded, Weathered, Cemented, Steep Dip and Fractured Layers								34	0
30			SANDSTONE WITH CLAY LAYERS - Reddish Brown, Thick Bedded, Weathered, Cemented, Steep Dip and Fractured Layers								30	0
35			SANDSTONE WITH CLAY LAYERS - Reddish Brown, Thick Bedded, Weathered, Cemented, Steep Dip and Fractured Layers									

REMARKS:

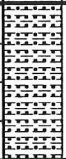
**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2  
PAGE 2 OF 2

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 495+18  
LOCATION: 112' Right of Center Line of Construction  
LOGGED BY: Paul Christenberry

DATE: April 22, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 750 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.28



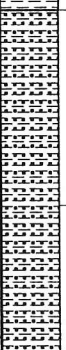
COMPLETION DEPTH: 39

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 590.1									
			SHALE WITH SANDSTONE LAYERS - Dark Gray and Reddish Brown, Laminated, Slightly Weathered, Medium Hard, with Steep Dip and Fractured Layers								80	0
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:

<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		<b>BORING NO. 3</b>	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		<b>PAGE 1 OF 1</b>	
JOB NO. 061333	Pulaski County	DATE:	April 23, 2013
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING:	Hollow Stem Auger & Diamond Coring
STATION: 495+50		EQUIPMENT:	CME 750 w/ CME Automatic Hammer
LOCATION: 7' Right of Center Line of Construction		HAMMER CORRECTION FACTOR:	1.28
LOGGED BY: Paul Christenberry			

COMPLETION DEPTH: 18.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLCWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 563.0									
0			Moist, Very Stiff, Reddish Brown and Dark Gray Clay with Gravel (Sandstone Fragments), Cobbles and some Organic Matter									
5			SHALE - Reddish Brown and Dark Gray, Highly Weathered, Medium Hard							60 (5")		
10			SHALE WITH SANDSTONE LAYERS - Reddish Brown and Dark Gray, Laminated, Weathered, Medium Hard, with Steep Dip and Fractured Layers							10 (.01")	86	18
15											95	0
20			Boring Terminated									
25												
30												
35												

REMARKS:



<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		BORING NO. 4	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		PAGE 1 OF 1	
JOB NO. 061333	Pulaski County	DATE:	April 24, 2013
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING:	Hollow Stem Auger & Diamond Coring
STATION: 496+50		EQUIPMENT:	CME 850 w/ CME Automatic Hammer
LOCATION: 59' Right of Center Line of Construction		HAMMER CORRECTION FACTOR:	1.29
LOGGED BY: David Allen			

COMPLETION DEPTH: 23.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 571.5									
5		X	SHALE - Brown and Gray, Highly Weathered, Soft							8 12-10		
10		X	SHALE - Brown and Gray, Highly Weathered, Medium Hard							32 54-60 (3")		
15			SHALE - Reddish Brown and Gray, Laminated, Highly Weathered, Medium Hard to Soft, with Moderate Dip to Steep Dip								16	0
20			SHALE - Dark Gray, Laminated, Weathered, Medium Hard, with Steep Dip								52	0
											76	8
25			Boring Terminated									
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 497+50  
LOCATION: 80' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 24, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 22.8

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLCWS PER 6-IN.	% C R	% R Q D
			SURFACE ELEVATION: 569.5									
5		X	SHALE - Reddish Brown, Highly Weathered, Medium Hard							35 48-53		
10		X								60 (5")	68	0
15			SHALE - Reddish Brown and Gray, Laminated, Weathered, Medium Hard, with Steep Dip								56	0
20											54	0
25			Boring Terminated									
30												
35												

REMARKS:



<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		BORING NO. 6	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		PAGE 1 OF 1	
JOB NO. 061333	Pulaski County	DATE:	April 24, 2013
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING:	Hollow Stem Auger & Diamond Coring
STATION: 499+00		EQUIPMENT:	CME 850 w/ CME Automatic Hammer
LOCATION: 46' Right of Center Line of Construction		HAMMER CORRECTION FACTOR:	1.29
LOGGED BY: David Allen			

COMPLETION DEPTH: 26.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 560.5									
5		X	SHALE - Brown and Gray, Highly Weathered, Soft							15 17-20		
10		X	SHALE - Brown and Dark Gray, Highly Weathered, Medium Hard							27 40-39		
15		X	SHALE - Reddish Brown and Dark Gray, Highly Weathered, Medium Hard							60 (5")	23	0
			SHALE - Reddish Brown and Dark Gray, Laminated, Highly Weathered, Medium Hard, with Steep Dip									
20			SHALE WITH WEATHERED SHALE LAYERS - Dark Gray, Laminated, Medium Hard, with Steep Dip								84	8
25											44	12
			Boring Terminated									
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 7  
PAGE 1 OF 1

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 499+90  
LOCATION: 30' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 23, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 27.8

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S.C.R.	% R.Q.D.
			SURFACE ELEVATION: 554.4									
5		X	SHALE - Reddish Brown, Highly Weathered, Soft							5 9-15		
10		X	SHALE - Reddish Brown and Gray, Highly Weathered, Medium Hard							60 (5")	26	0
15			SHALE - Dark Gray and Brown, Laminated, Highly Weathered, Medium Hard to Soft, with Moderate to Steep Dip								48	0
20			SHALE WITH OCCASIONAL QUARTZ SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Steep Dip								94	10
25											100	84
30			Boring Terminated									
35												

REMARKS:

<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		<b>BORING NO. 8</b>	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		<b>PAGE 1 OF 1</b>	
JOB NO. 061333	Pulaski County	DATE: April 23, 2013	
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring	
STATION: 500+98		EQUIPMENT: CME 850 w/ CME Automatic Hammer	
LOCATION: 30' Right of Center Line of Construction		HAMMER CORRECTION FACTOR: 1.29	
LOGGED BY: David Allen			

COMPLETION DEPTH: 32.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S.C.R.	% R.O.D
			SURFACE ELEVATION: 561.1									
5		X	SHALE - Brown and Gray, Highly Weathered, Soft							10 19-26		
10		X	SHALE - Reddish Brown and Gray, Highly Weathered, Medium Hard							19 35-60 (5")		
15			SHALE - Gray and Reddish Brown, Laminated, Highly Weathered, Medium Hard, with Moderate to Steep Dip								3	0
20			SHALE - Gray and Brown, Laminated, Highly Weathered, Medium Hard to Hard, with Steep Dip								62	0
25			SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip								64	16
30			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip								100	70
35			Boring Terminated									

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 9  
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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 502+00  
LOCATION: 46' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 23, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 33.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
5		X	SHALE - Reddish Brown and Gray, Highly Weathered, Soft							5 9-12		
10		X	SHALE - Reddish Brown and Gray, Highly Weathered, Medium Hard							13 34-60 (4")		
			SHALE - Reddish Brown and Gray, Laminated, Highly Weathered, Soft, with Moderate Dip and Fractured Layers								30	0
15			SHALE - Reddish Brown and Gray, Laminated, Highly Weathered, Medium Hard, with Moderate Dip and Fractured Layers								38	0
20			SHALE - Brown and Dark Gray, Laminated, Highly Weathered, Medium Hard, with Moderate Dip and Fractured Layers								46	0
25			SHALE - Dark Gray, Laminated, Highly Weathered, Medium Hard, with Steep Dip and Fractured Layers								52	0
30			SHALE - Dark Gray, Laminated, Weathered, Medium Hard, with Steep Dip and Fractured Layers								62	0
35			Boring Terminated									

REMARKS:

<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		<b>BORING NO. 10</b>	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		<b>PAGE 1 OF 1</b>	
JOB NO. 061333	Pulaski County	DATE:	April 22, 2013
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING:	Hollow Stem Auger & Diamond Coring
STATION: 502+47		EQUIPMENT:	CME 850 w/ CME Automatic Hammer
LOCATION: 103' Right of Center Line of Construction		HAMMER CORRECTION FACTOR:	1.29
LOGGED BY: David Allen			

COMPLETION DEPTH: 32.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 571.7									
5		X	SANDSTONE - Reddish Brown, Poorly-Cemented							34 60 (6")		
10			SANDSTONE WITH QUARTZ SEAMS - Reddish Brown, Thin Bedded, Weathered, Poorly-Cemented, with Steep Dip and Fractured Layers								25	0
15			SANDSTONE WITH QUARTZ SEAMS - Brown, Thin Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								34	0
20			SANDSTONE WITH SHALE LAYERS - Reddish Brown and Gray, Thin Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								56	0
25			SANDSTONE WITH SHALE LAYERS - Reddish Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								52	0
30			SHALE WITH WEATHERED SHALE LAYERS AND SOME SANDSTONE - Dark Gray, Laminated, Hard, with Steep Slope								62	0
			Boring Terminated									
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 502+50  
LOCATION: 73' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 22-23, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 12.9

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 568.8									
			SANDSTONE - Brown, Poorly-Cemented							60 (.01")	98	0
5			SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip								98	10
10			SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers								88	30
15			Boring Terminated									
20												
25												
30												
35												

REMARKS:



**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 502+95  
LOCATION: 90' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 22, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 32.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 571.0									
			SANDSTONE - Brown, Poorly-Cemented							43		
5			SANDSTONE WITH OCCASIONAL QUARTZ SEAMS - Reddish Brown, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers							60 (2")	75	10
10			SANDSTONE WITH OCCASIONAL CLAY SEAMS - Reddish Brown, Thin Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers								50	0
15			SANDSTONE WITH OCCASIONAL SHALE AND QUARTZ LAYERS AND CLAY PARTINGS - Brown and Gray, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers								64	0
20			SANDSTONE WITH FREQUENT SHALE AND QUARTZ LAYERS - Reddish Brown and Gray, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers								72	8
25			SANDSTONE WITH OCCASIONAL QUARTZ LAYERS - Brown, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers								26	0
30			SANDSTONE WITH OCCASIONAL SHALE LAYERS - Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								92	18
			Boring Terminated									
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 503+50  
LOCATION: 17' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: March 20, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 14.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% C R	% R. Q/D
			SURFACE ELEVATION: 485.9									
5			SHALE - Brown and Gray, Highly Weathered, Medium Hard *									
			SHALE - Brown and Gray, Weathered, Medium Hard to Hard							60 (1")		
10			SHALE WITH FREQUENT GRAY SANDSTONE LAYERS - Dark Gray, Laminated, Slightly Weathered, Medium Hard, with Moderate to Steep Dip, with frequent Fractured Layers and some Slickensides								75	0
15			SHALE WITH FREQUENT GRAY SANDSTONE LAYERS - Dark Gray, Laminated, Slightly Weathered, Medium Hard, with Moderate to Steep Dip, with frequent Fractured Layers, occasional Quartz Seams and some Slickensides								100	32
			Boring Terminated									
20												
25												
30												
35												

REMARKS: \* A water stratum was encountered at 3.3'.



<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		BORING NO. 14	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		PAGE 1 OF 1	
JOB NO. 061333	Pulaski County	DATE:	March 20, 2013
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING:	Hollow Stem Auger & Diamond Coring
STATION: 505+00		EQUIPMENT:	CME 850 w/ CME Automatic Hammer
LOCATION: 12' Left of Center Line of Construction		HAMMER CORRECTION FACTOR:	1.29
LOGGED BY: David Allen			

COMPLETION DEPTH: 18.6

D E P T H  FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROUP	P L A S T I C L I M I T	% M O I S T.	L I Q U I D L I M I T	D R Y W E I G H T	L B S P E R C U. F T.	N O. O F B L O W S  P E R 6- I N.	% S C R	% R Q D
			SURFACE ELEVATION: 479.0									
5			SHALE - Brown and Gray, Highly Weathered, Medium Hard							34 35-52		
		X	SHALE - Dark Gray, Weathered, Medium Hard									
10			SHALE WITH WEATHERED SHALE LAYERS - Dark Gray, Medium Hard							60 (2")	66	10
15			SHALE WITH WEATHERED SHALE AND OCCASIONAL GRAY SANDSTONE LAYERS - Dark Gray, Laminated, Medium Hard, with Moderate Dip, with frequent Fractured Layers								86	38
20			Boring Terminated									
25												
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 15  
PAGE 1 OF 1

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 506+59  
LOCATION: 16' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: March 21, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 13

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 471.7									
			SHALE - Brown and Gray, Highly Weathered, Medium Hard									
			SHALE - Dark Gray, Weathered, Medium Hard									
5			SHALE WITH WEATHERED SHALE AND FREQUENT GRAY SANDSTONE LAYERS - Dark Gray, Laminated, Medium Hard, with Moderate to Steep Dip, with frequent Fractured Layers						60 (1")		86	0
10											100	74
15			Boring Terminated									
20												
25												
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 508+00  
LOCATION: 18' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 8, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 23.7

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 465.5									
5			Moist, Stiff, Brown and Gray Clay with Gravel (Sandstone and Shale Fragments)									
		X	SHALE - Dark Gray, Highly Weathered, Medium Hard							53 43-46		
10			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Moderate to Steep Dip and Vertically Fractured Layers							60 (1")	98	52
15			SHALE WITH WEATHERED SHALE LAYERS - Dark Gray, Laminated, Hard, with Moderate to Steep Dip and Vertically Fractured Layers								100	76
20			SHALE WITH WEATHERED SHALE LAYERS - Dark Gray, Laminated, Hard, with Moderate to Steep Dip and Vertically Fractured Layers								100	8
25			Boring Terminated									
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 17  
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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 510+00  
LOCATION: 18' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 8, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 23.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 456.5									
			Moist, Stiff, Brown and Gray Clay with Gravel (Sandstone and Shale Fragments)									
			Wet, Stiff, Brown and Gray Clay with Gravel (Sandstone and Shale Fragments) *									
5			SHALE - Dark Gray, Highly Weathered, Soft							4 5-4		
10			SHALE - Dark Gray, Highly Weathered, Medium Hard							60 (5")	85	0
15			SHALE WITH WEATHERED SHALE SEAMS - Dark Gray, Laminated, Medium Hard, with Steep Dip, Vertically Fractured Layers and Slickensides								90	0
20			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip, Vertically Fractured Layers and Slickensides								100	48
25			Boring Terminated									
30												
35												

REMARKS: \* A water stratum was encountered at 2.6'.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 18  
PAGE 1 OF 1

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 511+00  
LOCATION: 18' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 8, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 22.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
5			SHALE WITH GRAY SANDSTONE SEAMS - Dark Gray, Highly Weathered, Soft							7 22-20		
10			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Moderate Dip and Vertically Fractured Layers *							60 (1")	85	26
15			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip, Vertically Fractured Layers and Slickensides *								100	10
20			SHALE - Dark Gray, Laminated, Weathered, Hard, with Steep Dip, Vertically Fractured Layers and Slickensides								75	0
25			Boring Terminated									
30												
35												

REMARKS: \* Partial water loss was encountered from 13.0' to 16.8'.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 512+00  
LOCATION: 18' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 8-9, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 18.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 445.5									
5			SHALE - Dark Gray, Highly Weathered, Soft							11 6-21		
			SANDSTONE - Gray and Brown, Thin Bedded, Slightly Weathered, Cemented, with Slight Dip							60 (.01")	98	0
10			SANDSTONE - Gray, Medium Bedded, Slightly Weathered, Well-Cemented, with Moderate Dip and Fractured Layers								100	24
15			SANDSTONE - Gray and Reddish Brown, Medium Bedded, Slightly Weathered, Well- Cemented, with Steep Dip and Vertically Fractured Layers								89	8
20			Boring Terminated									
25												
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 513+00  
LOCATION: 18' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 9, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 29.3

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% C R	% R Q D
			SURFACE ELEVATION: 445.8									
5			SHALE WITH GRAY SANDSTONE SEAMS - Dark Gray, Highly Weathered, Soft							7 7-11		
10			SHALE WITH GRAY SANDSTONE SEAMS - Dark Gray, Highly Weathered, Medium Hard SANDSTONE - Gray and Reddish Brown, Thin Bedded, Slightly Weathered, Well-Cemented, with Slight Dip and Fractured Layers							4 60 (2")	42	0
15			SHALE WITH GRAY AND BROWN SANDSTONE LAYERS - Dark Gray, Laminatede Highly Weathered, Medium Hard, with Steep Dip								68	0
20			SANDSTONE - Gray and Reddish Brown, Thin Bedded, Weathered, Poorly-Cemented, with Steep Dip and Fractured Layers								96	0
25			SANDSTONE - Gray and Brown, Medium Bedded, Weathered, Cemented, with Steep Dip								32	0
30			Boring Terminated								100	0
35												

REMARKS:




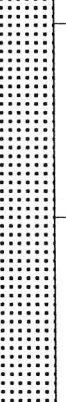
**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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PAGE 1 OF 1

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 514+00  
LOCATION: 25' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 15, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 13.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R		% R Q D
											% S	% C	
			SURFACE ELEVATION: 436.2										
			Very Dense, Gravel (Sandstone and Shale Fragments) with Brown Clay							7			
5			SANDSTONE - Gray, Medium Bedded, Slightly Weathered, Well-Cemented, with Moderate Dip and occasional Fractured Layers							60 (2")		71	0
10												100	20
15			Boring Terminated									100	46
20													
25													
30													
35													

REMARKS:



ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.						BORING NO. 22 PAGE 1 OF 1						
JOB NO. 061333 Pulaski County JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.) I-430 STATION: 514+65 LOCATION: 7' Left of Center Line of Construction LOGGED BY: David Allen				DATE: April 15, 2013 TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring EQUIPMENT: CME 850 w/ CME Automatic Hammer HAMMER CORRECTION FACTOR: 1.29								
COMPLETION DEPTH: 22.1												
DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 437.3									
5			Moist, Very Dense, Brown Sand with Gravel (Sandstone Fragments)							48		
10			GRAY SANDSTONE BOULDERS WITH REDDISH BROWN CLAY SEAMS							60 (2") 60 (.01")	66	0
15			SANDSTONE WITH REDDISH BROWN CLAY SEAMS AND OCCASIONAL QUARTZ LAYERS - Gray, Medium Bedded, Slightly Weathered, Cemented to Well- Cemented, with Moderate Dip and Fractured Layers								96	20
20			SANDSTONE WITH REDDISH BROWN CLAY SEAMS AND OCCASIONAL QUARTZ LAYERS - Gray, Medium Bedded, Slightly Weathered, Cemented to Well- Cemented, with Moderate Dip and Fractured Layers								78	0
25			Boring Terminated								100	10
30												
35												
REMARKS:												

<b>ARKANSAS HWY. &amp; TRANS. DEPARTMENT</b>		<b>BORING NO. 23</b>	
<b>MATERIALS DIVISION - GEOTECHNICAL SEC.</b>		PAGE 1 OF 1	
JOB NO. 061333	Pulaski County	DATE:	April 15-16, 2013
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)	I-430	TYPE OF DRILLING:	Hollow Stem Auger & Diamond Coring
STATION: 515+50		EQUIPMENT:	CME 850 w/ CME Automatic Hammer
LOCATION: 10' Left of Center Line of Construction		HAMMER CORRECTION FACTOR:	1.29
LOGGED BY: David Allen			

COMPLETION DEPTH: 33.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 432.5									
5		X	SHALE - Gray and Brown, Highly Weathered, Soft							6 19-20		
10		X								7 4-5		
15		X	SHALE - Dark Gray, Highly Weathered, Soft							6 6-7		
20		X	Moist, Very Dense, Brown Sand with Gravel (Sandstone and Gray Shale Fragments)							12 60 (3") 60 (.01")	100	0
25			SANDSTONE - Gray and Brown, Thin Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers *								72	0
30			SANDSTONE - Gray and Brown, Medium Bedded, Slightly Weathered, Well-Cemented, with Moderate Dip and Fractured Layers *								100	14
35			Boring Terminated									

REMARKS: \* Total water loss was encountered from 21.4' to 28.5' and at 31.2'.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

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JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 516+00  
LOCATION: 5' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 16, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 49.1

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 425.5									
5		X	SHALE - Dark Gray, Highly Weathered, Soft							7 6-7		
10		X								7 13-11		
15		X								7 18-8		
20		X								7 9-9		
25		X	SHALE WITH HARD WHITE QUARTZ LAYERS - Dark Gray, Highly Weathered, Soft							5 33-18		
30		X	SHALE WITH BROWN SANDSTONE SEAMS - Dark Gray, Highly Weathered, Soft							4 6-5		
35		X								26		

REMARKS: \* Total water loss was encountered at 37.2'.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 24  
PAGE 2 OF 2

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 516+00  
LOCATION: 5' Right of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 16, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 49.1

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLCWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 425.5									
			Moist, Very Dense, Brown Sand with Gravel (Sandstone Fragments)							23-60 (4")		
			SANDSTONE - Brown, Thin Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers *								100	0
40			SANDSTONE WITH POORLY-CEMENTED SANDSTONE LAYERS AND OCCASIONAL CLAY PARTINGS - Brown, Thick Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers								76	28
45			SANDSTONE WITH OCCASIONAL WHITE QUARTZ PARTINGS - Brown, Thick Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers								98	44
50			Boring Terminated									
55												
60												
65												
70												

REMARKS: \* Total water loss was encountered at 37.2'.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 25  
PAGE 1 OF 2

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 516+53  
LOCATION: 3' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 17, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 62.8

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 427.6									
5		X	SHALE - Dark Gray, Highly Weathered, Soft							7 18-12		
10		X	SHALE WITH TRACE OF BROWN CLAY - Dark Gray, Highly Weathered, Soft							3 5-6		
15		X	SHALE WITH TRACE OF BROWN CLAY - Dark Gray, Highly Weathered, Soft							8 6-11		
20		X	SHALE - Dark Gray, Highly Weathered, Soft							16 19-10		
25			SANDSTONE WITH DARK GRAY SHALE SEAMS - Gray, Thin Bedded, Slightly Weathered, Cemented, with Steep Dip							60 (.01")		
			Soil-filled Cavity (26.5' to 27.8') *									
30			SANDSTONE WITH DARK GRAY SHALE SEAMS - Gray, Thin Bedded, Slightly Weathered, Cemented, with Steep Dip								18	0
			Soil-filled Cavity (28.8' to 32.6')									
35			SHALE - Dark Gray and Brown, Laminated, Highly Weathered, Medium Hard, with Moderate Dip									

REMARKS: \* Total water loss was encountered at 27.6'.

**ARKANSAS HWY. & TRANS. DEPARTMENT  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 25  
PAGE 2 OF 2

JOB NO. 061333 Pulaski County  
JOB NAME: I-430/Hwy. 10 Interchange Impvt. (L.R.)  
I-430  
STATION: 516+53  
LOCATION: 3' Left of Center Line of Construction  
LOGGED BY: David Allen

DATE: April 17, 2013  
TYPE OF DRILLING: Hollow Stem Auger &  
Diamond Coring  
EQUIPMENT: CME 850 w/ CME  
Automatic Hammer  
HAMMER CORRECTION FACTOR: 1.29

COMPLETION DEPTH: 62.8

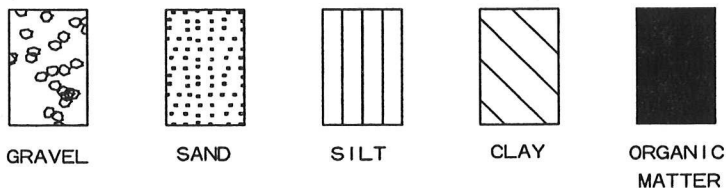
DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 427.6									
			Soil-filled Cavity (33.3' to 36.5')								34	0
			SHALE WITH GRAY SANDSTONE LAYERS - Dark Gray, Laminated, Highly Weathered, Medium Hard, with Moderate Dip									
40			Soil-filled Cavity (36.8' to 40.0')								42	0
			SHALE WITH WEATHERED SHALE LAYERS - Dark Gray, Laminated, Medium Hard, with Moderate Dip and Fractured Layers									
45			SANDSTONE WITH OCCASIONAL QUARTZ AND CLAY SEAMS - Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								70	24
50											100	0
55			SANDSTONE - Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								74	0
60			SANDSTONE WITH DARK GRAY HIGHLY WEATHERED SHALE LAYERS - Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								64	0
65			Boring Terminated									
70												

REMARKS: \* Total water loss was encountered at 27.6'.

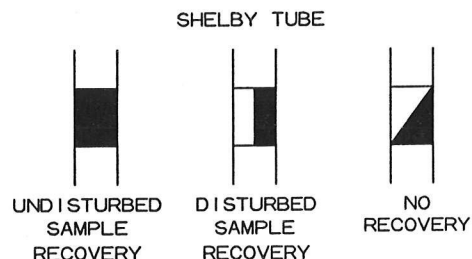


# LEGEND

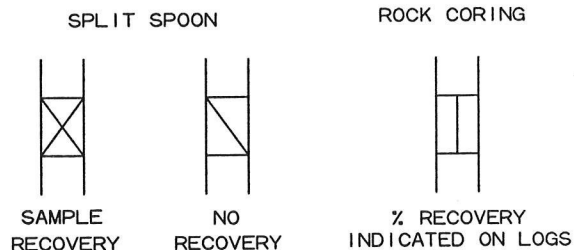
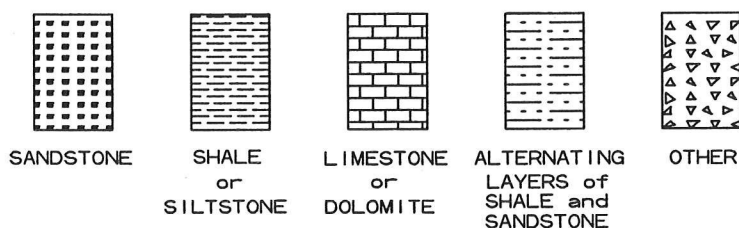
## SOIL TYPES (SHOWN IN SYMBOL COLUMN) (PREDOMINANT TYPE SHOWN HEAVY)



## SAMPLER TYPES (SHOWN IN SAMPLE COLUMN)



## ROCK TYPES (SHOWN IN SYMBOL COLUMN)



## TERMS DESCRIBING CONSISTENCY OR CONDITION

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

- 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.
- Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
- 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:  $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows/ft}$ . The "N" Value corrected to 60% efficiency ( $N_{60}$ ) can be obtained by multiplying  $N_f$  by the hammer correction factor published on the boring log.





## ROCK MASS RATING SUMMARY

JOB # 061333

**SAMPLE #1**

Station/Location	505+00/12 ft LT
Depth (ft)	15
<b>Relative Rating</b>	
Uniaxial Compressive Strength	2
RQD	8
Spacing of Joints	10
Condition of Joints	6
Groundwater Conditions	7
Sum	33
Class Number	IV
Description	POOR ROCK

**SAMPLE #2**

Station/Location	506+59/16 ft LT
Depth (ft)	7
<b>Relative Rating</b>	
Uniaxial Compressive Strength	2
RQD	13
Spacing of Joints	20
Condition of Joints	6
Groundwater Conditions	7
Sum	48
Class Number	III
Description	FAIR ROCK

**SAMPLE #3**

Station/Location	508+00/18 ft LT
Depth (ft)	10
<b>Relative Rating</b>	
Uniaxial Compressive Strength	1
RQD	13
Spacing of Joints	20
Condition of Joints	6
Groundwater Conditions	7
Sum	47
Class Number	III
Description	FAIR ROCK

**SAMPLE #4**

Station/Location	510+00/18 ft LT
Depth (ft)	19
<b>Relative Rating</b>	
Uniaxial Compressive Strength	2
RQD	8
Spacing of Joints	5
Condition of Joints	6
Groundwater Conditions	7
Sum	28
Class Number	IV
Description	POOR ROCK

**SAMPLE #5**

Station/Location	511+00/18 ft LT
Depth (ft)	11
<b>Relative Rating</b>	
Uniaxial Compressive Strength	2
RQD	3
Spacing of Joints	10
Condition of Joints	6
Groundwater Conditions	7
Sum	28
Class Number	IV
Description	POOR ROCK

**SAMPLE #6**

Station/Location	512+00/18 ft LT
Depth (ft)	10
<b>Relative Rating</b>	
Uniaxial Compressive Strength	2
RQD	3
Spacing of Joints	5
Condition of Joints	20
Groundwater Conditions	7
Sum	37
Class Number	IV
Description	POOR ROCK

**SAMPLE #7**

Station/Location	
Depth (ft)	
<b>Relative Rating</b>	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

**SAMPLE #8**

Station/Location	
Depth (ft)	
<b>Relative Rating</b>	
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

November 19, 2012

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 061333  
I-430/Hwy. 10 Interchange Impvts. (L.R.)(F)  
Route 430 Section 21  
Route 10 Section 8  
Pulaski County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of adding a north bound entrance ramp from Highway 10 to I-430 and an auxiliary lane on Highway 10. Samples were obtained in the existing travel lanes, shoulders and ditch line. Locations were measured from centerline of construction and should be noted as such on the logs.

Based on laboratory results of samples obtained, the subgrade soils consist of moderately plastic sandy clay with varying amounts of shale fragments. The subgrade soils are expected to provide a stable working platform during construction with normal drying and compactive efforts. Cross-sections are currently not available. According to the proposed grade line there is an embankment of 30 feet between stations 502+50 to 516+00 and a cut 30 feet deep between stations 498+00 to 502+00. Cut slope and embankment recommendations will be made when cross-sections are further developed.

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

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

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.1	94.9
Binder Course	4.3	95.7
Base Course	4.0	96.0

  
Michael C. Benson  
Materials Engineer

MCB:pt:bjj  
Attachment

cc: State Constr. Eng. – Master File Copy  
District 6 Engineer  
Planning 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 - 11/07/2012  
JOB NUMBER - 061333

SEQUENCE NO. - 1  
MATERIAL CODE - SSRVPS  
SPEC. YEAR - 2003  
SUPPLIER ID. - 1  
COUNTY/STATE - 60  
DISTRICT NO. - 06

JOB NAME - I-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.) (F)

\*\*\*\*\*  
\* STATION LIMITS R-VALUE AT 240 psi \*  
\*\*\*\*\*

BEGIN JOB - END JOB 20

RESILIENT MODULUS  
STA.513+00 5914

-----  
REMARKS -

-  
AASHTO TESTS : T190

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

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

<b>Job No.</b>	061333	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	11/5/12	<b>Station No.:</b>	513+00
<b>Date Tested:</b>	November 6, 2012	<b>Location:</b>	CL
<b>Name of Project:</b>	I-430/HWY. 10 INTERCHANGE IMPRVT. (LR)		
<b>County:</b>	<b>Code:</b> 6	<b>Name:</b>	BRADLEY
<b>Sampled By:</b>	FUALKNER	<b>Depth:</b>	0-2.0Z
<b>Lab No.:</b>	20124241	<b>AASHTO Class:</b>	A-4 (2)
<b>Sample ID:</b>	RV1221	<b>Material Type (1 or 2):</b>	2
<b>LATITUDE:</b>		<b>LONGITUDE:</b>	

**1. Testing Information:**

Preconditioning - Permanent Strain > 5% (Y=Yes or N= No)	N
Testing - Permanent Strain > 5% (Y=Yes or N=No)	N
Number of Load Sequences Completed (0-15)	15

**2. Specimen Information:**

Specimen Diameter (in):	
Top	4.00
Middle	3.97
Bottom	4.00
Average	3.99
Membrane Thickness (in):	0.00
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):	12.50
Initial Volume, AoLo (cu. in):	100.40

**3. Soil Specimen Weight:**

Weight of Wet Soil Used (g):	3223.90
------------------------------	---------

**4. Soil Properties:**

Optimum Moisture Content (%):	13.2
Maximum Dry Density (pcf):	114.5
95% of MDD (pcf):	108.8
In-Situ Moisture Content (%):	N/A

**5. Specimen Properties:**

Wet Weight (g):	3223.90
Compaction Moisture content (%):	13.2
Compaction Wet Density (pcf):	122.34
Compaction Dry Density (pcf):	108.08
Moisture Content After Mr Test (%):	13.1

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

#VALUE!

**7. Resilient Modulus, Mr:**

9541(S<sub>c</sub>)<sup>-0.33194</sup>(S<sub>3</sub>)<sup>0.29411</sup>

**8. Comments**

\_\_\_\_\_

\_\_\_\_\_

**9. Tested By:**

AD \_\_\_\_\_

**Date:** November 6, 2012

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

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

**Job No.** 061333 **Material Code** SSRVPS  
**Date Sampled:** 11/5/12 **Station No.:** 513+00  
**Date Tested:** November 6, 2012 **Location:** CL  
**Name of Project:** I-430/HWY. 10 INTERCHANGE IMPRV.T. (LR)  
**County:** Code: 6 **Name:** BRADLEY  
**Sampled By:** FUALKNER **Depth:** 0-2.0Z  
**Lab No.:** 20124241 **AASHTO Class:** A-4 (2)  
**Sample ID:** RV1221 **Material Type (1 or 2):** 2  
**LATITUDE:** LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Axial Stress	Actual Applied Load		Actual Applied Contact Load		Actual Applied Cyclic Stress		Actual Applied Contact Stress		Average Recov Def. LVD1 and 2	Resilient Strain	Resilient Modulus
			Max. Axial Load	P <sub>max</sub> lbs	Max. Axial Load	P <sub>contact</sub> lbs	Cyclic Load	P <sub>cyclic</sub> lbs	Cyclic Stress	S <sub>cyclic</sub> psi			
DESIGNATION	S <sub>3</sub> psi	S <sub>cyclic</sub> psi	P <sub>max</sub> lbs	P <sub>contact</sub> lbs	P <sub>cyclic</sub> lbs	P <sub>contact</sub> lbs	S <sub>cyclic</sub> psi	S <sub>cyclic</sub> psi	S <sub>contact</sub> psi	H <sub>avg</sub> in	ε <sub>r</sub> in/in	M <sub>r</sub> psi	
Sequence 1	6.0	2.0	25.6	2.7	22.9	2.7	1.8	1.8	0.2	0.00114	0.00014	12,901	
Sequence 2	6.0	4.0	48.2	2.8	45.4	2.8	3.6	3.6	0.2	0.00265	0.00033	10,999	
Sequence 3	6.0	6.0	71.1	3.8	67.2	3.8	5.4	5.4	0.3	0.00450	0.00056	9,595	
Sequence 4	6.0	8.0	94.0	6.4	87.6	6.4	7.0	7.0	0.5	0.00662	0.00082	8,496	
Sequence 5	6.0	10.0	117.4	8.9	108.4	8.9	8.7	8.7	0.7	0.00882	0.00110	7,895	
Sequence 6	4.0	2.0	25.6	2.8	22.8	2.8	1.8	1.8	0.2	0.00127	0.00016	11,545	
Sequence 7	4.0	4.0	47.6	2.8	44.7	2.8	3.6	3.6	0.2	0.00304	0.00038	9,437	
Sequence 8	4.0	6.0	68.5	3.0	65.5	3.0	5.2	5.2	0.2	0.00521	0.00065	8,071	
Sequence 9	4.0	8.0	91.1	5.6	85.6	5.6	6.8	6.8	0.4	0.00753	0.00094	7,294	
Sequence 10	4.0	10.0	114.7	8.1	106.6	8.1	8.5	8.5	0.6	0.00990	0.00123	6,911	
Sequence 11	2.0	2.0	25.5	2.8	22.6	2.8	1.8	1.8	0.2	0.00150	0.00019	9,681	
Sequence 12	2.0	4.0	46.6	2.9	43.8	2.9	3.5	3.5	0.2	0.00356	0.00044	7,887	
Sequence 13	2.0	6.0	66.7	2.9	63.8	2.9	5.1	5.1	0.2	0.00606	0.00075	6,767	
Sequence 14	2.0	8.0	88.2	4.7	83.5	4.7	6.7	6.7	0.4	0.00868	0.00108	6,179	
Sequence 15	2.0	10.0	110.8	7.3	103.5	7.3	8.3	8.3	0.6	0.01124	0.00140	5,914	

**TESTED BY** AD **DATE** November 6, 2012  
**REVIEWED BY** \_\_\_\_\_ **DATE** \_\_\_\_\_

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
MATERIALS DIVISION

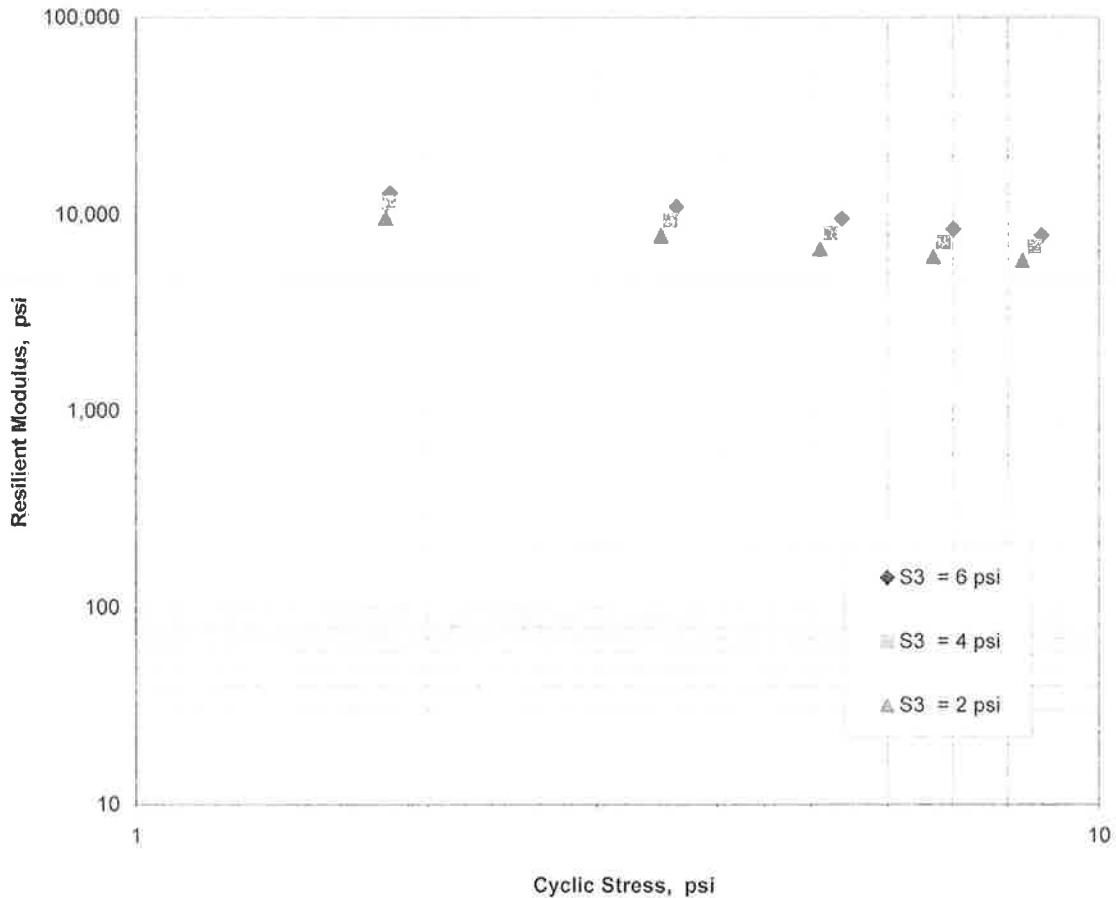
AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS  
RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	061333	Material Code SSRVPS
Date Sampled:	11/5/12	Station No.: 513+00
Date Tested:	November 6, 2012	Location: CL
Name of Project:	I-430/HWY. 10 INTERCHANGE IMPRVT. (LR)	
County:	Code: 6	Name: BRADLEY
Sampled By:	FUALKNER	Depth: 0-2.0Z
Lab No.:	20124241	AASHTO Class: A-4 (2)
Sample ID:	RV1221	Material Type (1 or 2): 2
LATITUDE:		LONGITUDE:

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

$K_1 = 9,541$   
 $K_2 = -0.33194$   
 $K_5 = 0.29411$   
 $R^2 = 0.99$

**Resilient Modulus QA Plot**



JOB: 061333

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: I430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F)

Materials Division

11/6/2012

COUNTY NO. 60

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

489+00	6LT	ACHMSC	12.0	AGG.BASE CRS.CL7	8
497+00	CL	ACHMSC	---	AGG.BASE CRS.CL7	---
513+00	CL	ACHMSC	---	AGG.BASE CRS.CL7	---
521+00	CL	ACHMBC	8.0	PCCP	8.75

Comments:

LOCATIONS MEASURED FROM CL OF CONST.  
Z= AUGER

Wednesday, November 07, 2012



**JOB: 061333**

**Arkansas State Highway Transportation Department**

*Materials Division*

*Michael Benson, Materials Engineer*

**JOB NAME: I-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F)**

**COUNTY NO. 60 DATE TESTED 11/6/2012**

**STA# LOC. DEPTH COLOR #4 #10 #40 #80 #200 L.T. P.I. SOIL CLASS LAB #: %MOISTURE**

STA#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.T.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
513+00	CL	0-2.0Z	BR/GR	87	80	73	64	51	30	10	A-4(2)	RV1221	
489+00	6LT	0-5	BR/GR	94	84	69	64	57	29	9	A-4(3)	S1217	9
497+00	CL	0-2.5Z	BR/GR	72	62	51	47	43	33	11	A-6(2)	S1218	11.5
513+00	CL	0-2.0Z	BR/GR	85	76	59	54	47	32	11	A-6(2)	S1219	11.4
521+00	CL	0-5	GR/BR	86	70	50	44	37	25	9	A-4(0)	S1220	5.1

*comments:* LOCATIONS MEASURED FROM CL OF CONST.

Z= AUGER

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 11/06/12	SEQUENCE NO.	- 1
JOB NUMBER	- 061333	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 60
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- I-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- PULASKI COUNTY	DATE SAMPLED	- 10/25/12
SAMPLED BY	- FAULKNER/BOUGHNER	DATE RECEIVED	- 10/29/12
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 11/06/12
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20124237	- 20124238	- 20124239
SAMPLE ID	- S1217	- S1218	- S1219
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 489+00	- 497+00	- 513+00
LOCATION	- 6'LT	- CL	- CL
DEPTH IN FEET	- 0-5	- 0-2.5Z	- 0-2.0Z
MAT'L COLOR	- BR/GR	- BR/GR	- BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 47 13.20	- 34 47 15.30	- 34 47 27.50
LONGITUDE DEG-MIN-SEC	- 92 23 12.70	- 92 23 21.60	- 92 23 20.60
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	100	100
	3/4 IN. - 100	99	86
	3/8 IN. - 99	81	90
	NO. 4 - 94	72	85
	NO. 10 - 84	62	76
	NO. 40 - 69	51	59
	NO. 80 - 64	47	54
	NO. 200 - 57	43	47
LIQUID LIMIT	- 29	- 33	- 32
PLASTICITY INDEX	- 9	- 11	- 11
AASHTO SOIL	- A-4(3)	- A-6(2)	- A-6(2)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 9.0	- 11.5	- 11.4
ACHMSC (IN)	- 12.0	- ----	- ----
AGG.BASE CRS.CL7 (IN)	- 8	- ----	- ----
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - LOCATIONS MEARSURED FROM CL OF CONST.  
- Z= AUGER  
-  
-  
-

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 11/06/12 SEQUENCE NO. - 2  
JOB NUMBER - 061333 MATERIAL CODE - SSRVPS  
FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2003  
PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID. - 1  
SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 60  
SUPPLIER NAME - STATE DISTRICT NO. - 06  
NAME OF PROJECT - I-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F)  
PROJECT ENGINEER - NOT APPLICABLE  
PIT/QUARRY - ARKANSAS  
LOCATION - PULASKI COUNTY DATE SAMPLED - 10/25/12  
SAMPLED BY - FAULKNER/BOUGHNER DATE RECEIVED - 10/29/12  
SAMPLE FROM - TEST HOLE DATE TESTED - 11/06/12  
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	-	20124240	-	-
SAMPLE ID	-	S1220	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	521+00	-	-
LOCATION	-	CL	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	GR/BR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	34 47 37.00	-	-
LONGITUDE DEG-MIN-SEC	-	92 23 19.00	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	100
	3/8	IN.	-	99
	NO. 4		-	86
	NO. 10		-	70
	NO. 40		-	50
	NO. 80		-	44
	NO. 200		-	37
LIQUID LIMIT	-	25	-	-
PLASTICITY INDEX	-	9	-	-
AASHTO SOIL	-	A-4(0)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-	5.1	-	-
ACHMBC	(IN)	-	8.0	-
PCCP	(IN)	-	8.75	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
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		-	-	-
		-	-	-
		-	-	-
		-	-	-

REMARKS - LOCATIONS MEASURED FROM CL OF CONST.  
- Z= AUGER

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 11/06/12	SEQUENCE NO.	- 1
JOB NUMBER	- 061333	MATERIAL CODE	- RV
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 60
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- I-430/HWY.10 INTERCHANGE IMPROVEMENT (L.R.) (F)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 10/25/12
LOCATION	- PULASKI COUNTY	DATE RECEIVED	- 10/29/12
SAMPLED BY	- FAULKNER/BOUGHNER	DATE TESTED	- 11/06/12
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS		

LAB NUMBER	-	20124241	-	-
SAMPLE ID	-	RV1221	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	513+00	-	-
LOCATION	-	CL	-	-
DEPTH IN FEET	-	0-2.0Z	-	-
MAT'L COLOR	-	BR/GR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	34 47 13.20	-	-
LONGITUDE DEG-MIN-SEC	-	92 23 12.70	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	100
	3/4	IN.	-	96
	3/8	IN.	-	90
	NO. 4		-	87
	NO. 10		-	80
	NO. 40		-	73
	NO. 80		-	64
	NO. 200		-	51
LIQUID LIMIT	-	30	-	-
PLASTICITY INDEX	-	10	-	-
AASHTO SOIL	-	A-4 (2)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-
	-		-	-
	-		-	-
	-		-	-
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REMARKS - LOCATIONS MEARSURED FROM CL OF CONST.  
 - Z= AUGER  
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