

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. 050275

FEDERAL AID PROJECT NO. NHPP-0067(23)

HARDY-OZARK ACRES STRS. & APPRS. (S)

STATE HIGHWAY 63 SECTION 2

IN SHARP 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

February 26, 2016

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 050275
Hardy – Ozark Acres Strs. & Apprs. (S)
Route 63 Section 2
Sharp County

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

Based on the depth at which bedrock was encountered, it is anticipated that end bents will be founded on piling and interior bents will be founded on spread footings. Piling should be tipped into the competent dolostone and preboring may be necessary to achieve minimum penetration requirements. Spread footings should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Bridges	Nominal Bearing Resistance (ksf)	Resistance Factor	Factored Bearing Resistance (ksf)	Presumptive Bearing Resistance at Service Limit State (ksf)
Flat Creek	524.6	0.45	236	40
Sugar Creek	54.9	0.45	24.7	20

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 5 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS
Job No. 050275

Hardy – Ozark Acres Strs. & Apprs.
Sharp County
Route 63 Section 2

Site Conditions

There are two bridges associated with this proposed job. The western bridge, **Bridge 1**, crosses over Flat Creek. The existing Bridge 1 is a two span bridge constructed of cast-in-place concrete deck supported by a concrete wall pier on a spread footing and concrete end walls. The guardrail is constructed of steel supported by concrete posts on the bridge and steel posts leading up to the bridge. A railway parallels the right side of the roadway. Overhead power lines and buried telecommunication lines parallel the left side of the bridge. A single overhead power line crosses over the roadway upstation from the bridge. An unimproved gravel road passes under span 1 of the bridge.

The stream flows in a southerly direction under span 2. Bedrock is exposed in the stream. On the right side of the roadway, small diameter trees grow in between the railway and the roadway. The area to the left of the roadway, on the downstation side of the channel, is mixed pastureland and woods. The area on the upstation side of the channel, to the left of the roadway, is pastureland and scattered trees with a small cemetery, Jackson Cemetery. The cemetery has three marked graves.

Existing **Bridge 2** is constructed similarly to Bridge 1. Bridge 2 crosses over Sugar Creek. The existing structure is a two span bridge constructed of cast-in-place concrete deck supported by a concrete wall pier on a spread footing and concrete end walls. The guardrail is constructed of steel supported by concrete posts on the bridge and steel posts leading up to the bridge. Buried telecommunication lines parallel the left side of the roadway.

The stream flows in a southerly direction under both spans. Highly jointed/fractured dolostone is extensively exposed along the creek. The left side of the bridge is moderately to heavily wooded. On the left side of the roadway, downstation from the bridge, there is a private residence gravel drive. On the right side of the roadway, downstation from the bridge is an area of close cut grasses and a gravel drive for a business. Upstation, on the right side of the road is a mixed area of pastureland and trees. The channel is lined with trees.

Site Geology

The project alignment is located in the mapped outcrop of the Ordovician Cotter and Jefferson City Formations, undifferentiated (Map Symbol Ocjc). The Cotter Formation is composed of dolostone of predominantly two types: a fine-grained, argillaceous, earthy textured, relatively soft, white to buff or gray dolostone called "cotton rock", and a more massive, medium-grained, gray dolostone that weathers to a somewhat hackly surface texture and becomes dark on exposure. The formation contains chert, some minor beds of greenish shale, and occasional thin interbedded sandstone. The chert nodules associated with the Cotter frequently have concentric light and dark bands. To date, there has been no success in differentiating the Cotter Formation from the Jefferson City Formation in Arkansas, although the contact is considered disconformable. The thickness is about 340 feet in the vicinity of Cotter, but the interval may range up to 500 feet thick in places.

Depth to bedrock in borings at Bridge 1 varied from 6.9 to 23.1 feet below ground level (bgl) with the elevation of the top of rock varying from 361.8.2 to 373.7 feet above MSL. At Bridge 2, bedrock was encountered at depths ranging from ground level to 5.5 feet bgl with the elevation of the top of rock varying from 333.2 to 343.3 feet above MSL. One boring at Bridge 2 encountered a soil-filled cavity from 2.3 to 2.9 feet bgl

Subsurface Conditions

Based on the results of the borings from Stations 107+18 to 108+65, **Bridge 1**, the subsurface stratigraphy may be generalized as follows:

- 0 to 6.9 Feet: Varies from moist to wet, loose to medium dense, brown **sand with gravel to gravel** to moist, soft to medium stiff, brown **sandy clay to clay**.
- 6.9 to 23.1 Feet: Varies from moist to wet, medium dense, reddish brown **sand with gravel** to stiff, reddish brown **clay with some gravel** to slightly weathered, hard, gray **dolostone to dolostone with occasional chert layers**. Some of the rock in this zone is fractured.
- 23.1 to 42.8 Feet: Consists of unweathered to slightly weathered, hard, gray **dolostone to dolostone with occasional chert layers**. There are layers of chert up 0.8 feet thick. There are occasional fractures and vugs in this zone.

Based on the results of the borings from Stations 238+21 to 239+87, **Bridge 2**, the subsurface stratigraphy may be generalized as follows:

- 0 to 5.5 Feet*: Varies from moist, stiff to hard, brown **clay with sand to gravel** to highly fractured, slightly weathered, hard, gray **dolostone** with occasional dolomite-filled vugs.
- 5.5 to 28.1 Feet: Consists of highly fractured, slightly weathered to unweathered, hard, gray **dolostone to dolostone with occasional chert layers**.

* One cavity was encountered from 2.3 and 2.9 feet below ground level.

Rock Core Unconfined Compression Test Summary

Project Number: 050275
Project Name: Hardy
Date Tested: 2/22/2016

Station	Location	Sample No.	Depth (ft)	Diameter (in)	Height (in)	Total Load (lbs)	Correction Factor	Stress (psi)	Remarks
107+18	4' LT	1	25'	1.75	3.78	43,560	1.00	18,074	Flat Creek
107+80	C.L.	2	10'	1.75	4.00	40,490	1.00	16,800	Flat Creek
108+65	3' LT	3	15'	1.75	3.85	26,330	1.00	10,925	Flat Creek
238+21	21' RT	4	5.5'	1.75	3.74	18,180	1.00	7,543	Sugar Creek
239+05	20' RT	5	0.5'	1.75	3.94	33,010	1.00	13,697	Sugar Creek
239+53	19' LT	6	17.5'	1.75	3.81	15,090	1.00	6,261	Sugar Creek
239+87	40' RT	7	11.0'	1.75	4.05	14,360	1.00	5,958	Sugar Creek - chip in core prior to testing

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

ROCK MASS RATING SUMMARY
JOB # 050275

SAMPLE #1

Station/Location	107+18/4' LT CL
Depth (ft)	25.0
Relative Rating	
Uniaxial Compressive Strength	12
RQD	20
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	79
Class Number	II
Description	GOOD ROCK

SAMPLE #2

Station/Location	107+80/CL
Depth (ft)	10.0
Relative Rating	
Uniaxial Compressive Strength	12
RQD	20
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	79
Class Number	II
Description	GOOD ROCK

SAMPLE #3

Station/Location	108+65/3' LT CL
Depth (ft)	15.0
Relative Rating	
Uniaxial Compressive Strength	7
RQD	17
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	71
Class Number	II
Description	GOOD ROCK

SAMPLE #4

Station/Location	238+21/21' RT CL
Depth (ft)	5.5
Relative Rating	
Uniaxial Compressive Strength	7
RQD	20
Spacing of Joints	5
Condition of Joints	20
Groundwater Conditions	7
Sum	59
Class Number	III
Description	FAIR ROCK

SAMPLE #5

Station/Location	239+05 20' RT CL
Depth (ft)	0.5
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #6

Station/Location	239+53 19' LT CL
Depth (ft)	17.5
Relative Rating	
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	5
Condition of Joints	20
Groundwater Conditions	7
Sum	44
Class Number	III
Description	FAIR ROCK

SAMPLE #7

Station/Location	239+87 40' RT CL
Depth (ft)	11
Relative Rating	
Uniaxial Compressive Strength	4
RQD	3
Spacing of Joints	5
Condition of Joints	12
Groundwater Conditions	7
Sum	31
Class Number	IV
Description	POOR ROCK

SAMPLE #8

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

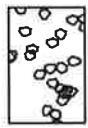
**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

Job No. 050275					
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Flat Creek	108+24	Creek Bank	28' Lt. C.L. Construction	N/A	Less than 0.0029
Sugar Creek	239+47	Creek Bank	28' Lt. C.L. Construction	N/A	0.0165

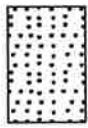
LEGEND

SOIL TYPES

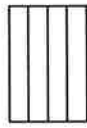
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



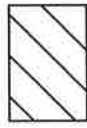
GRAVEL



SAND



SILT



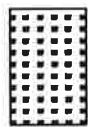
CLAY



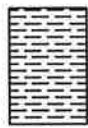
ORGANIC
MATTER

ROCK TYPES

(SHOWN IN SYMBOL COLUMN)



SANDSTONE



SHALE
or
SILTSTONE



LIMESTONE
or
DOLOMITE



ALTERNATING
LAYERS of
SHALE and
SANDSTONE



OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)

SHELBY TUBE



UNDISTURBED
SAMPLE
RECOVERY



DISTURBED
SAMPLE
RECOVERY



NO
RECOVERY

SPLIT SPOON



SAMPLE
RECOVERY



NO
RECOVERY

ROCK CORING



% RECOVERY
INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

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

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

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, 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: $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows} / \text{ft}$. The "N" Value corrected to 60% efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

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

BORING NO. 1
PAGE 1 OF 2

JOB NO. 050275 Sharp County
JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
Route 63 Section 2
STATION: 107+18
LOCATION: 4' Left of Construction Centerline
LOGGED BY: Raymond Taylor

DATE: January 27 and 28, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 42.8

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.	% T C R	% R Q D
			SURFACE ELEVATION: 356.3									
5			Moist, Loose, Brown Gravel with Clay and Sand							1 3-4		
10			Moist, Medium Stiff, Reddish Brown Sandy Clay with Some Gravel							1 3-3		
15			Moist, Medium Dense, Reddish Brown Sand with Gravel							5 5-6		
20			Wet, Medium Dense, Reddish Brown Sand with Gravel							2 8-19		
25			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Slightly Weathered, Hard, Occasional Fractures, Light Gray								91	60
30			DOLOSTONE - Slightly Weathered, Hard, Occasional Fractures, Occasional Dolomite-Filled Vugs, Light Gray								98	72
35			DOLOSTONE WITH OCCASIONAL CHERT									

REMARKS: Flat Creek

JOB NO. 050275 Sharp County JOB NAME: Hardy - Ozark Acres Strs. & Apprs. Route 63 Section 2 STATION: 107+18 LOCATION: 4' Left of Construction Centerline LOGGED BY: Raymond Taylor	DATE: January 27 and 28, 2016 TYPE OF DRILLING: Hollow Stem Auger - Diamond Core EQUIPMENT: CME 850 HAMMER CORRECTION FACTOR: 1.23
---	--

COMPLETION DEPTH: 42.8

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.	% TCR	% RQD
			SURFACE ELEVATION: 356.3									
	[Brick Pattern]		LAYERS - Unweathered, Hard, Light Gray								94	91
	[Triangle Pattern]		CHERT - Unweathered, Hard, Gray									
40	[Brick Pattern]		DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Light Gray								100	78
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: Flat Creek

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

BORING NO. 2

PAGE 1 OF 1

JOB NO. 050275 Sharp County
 JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
 Route 63 Section 2
 STATION: 107+80
 LOCATION: Construction Centerline
 LOGGED BY: Raymond Taylor

DATE: January 27, 2016
 TYPE OF DRILLING:
 Hollow Stem Auger - Diamond Core
 EQUIPMENT: CME 850
 HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 28.4

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.	% T C R	% R Q D
			SURFACE ELEVATION: 342.4									
5			Dry, Medium Dense, Brown Gravel									
			Wet, Medium Dense, Brown Gravel							5 5-7		
			DOLOSTONE									
10			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Slightly Weathered, Hard, Occasional Fractures, Light Gray								85	57
15			DOLOSTONE - Slightly Weathered, Hard, Frequent Fractures, Light Gray								100	62
20			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Light Gray								96	78
25			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Frequent Fractures, Light Gray								96	82
30			Boring Terminated									
35												

REMARKS: Flat Creek

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

BORING NO. 3
PAGE 1 OF 1

JOB NO. 050275 Sharp County
JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
Route 63 Section 2
STATION: 108+65
LOCATION: 3' Left of Construction Centerline
LOGGED BY: Raymond Taylor

DATE: January 26, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 33.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 356.6								
			Moist, Soft, Brown Clay with Gravel, Cobbles, and Boulders								
5			Moist, Soft, Reddish Brown, Clay						0 0-2		
10			Moist, Stiff, Reddish Brown Clay with Some Gravel (Chert Fragments)						1 5-7		
15			DOLOSTONE								99 74
20			DOLOSTONE - Slightly Weathered, Hard, Occasional Fractures, Light Gray								100 86
25			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Occasional Fractures, Light Gray								96 86
30			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Occasional Fractures, Light Gray								98 76
35			Boring Terminated								

REMARKS: Flat Creek

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


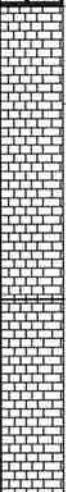
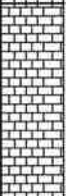
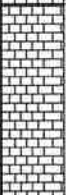
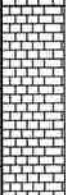
BORING NO. 4

PAGE 1 OF 1

JOB NO. 050275 Sharp County
 JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
 Route 63 Section 2
 STATION: 238+21
 LOCATION: 21' Right of Construction Centerline
 LOGGED BY: Raymond Taylor

DATE: February 2, 2016
 TYPE OF DRILLING:
 Hollow Stem Auger - Diamond Core
 EQUIPMENT: CME 850
 HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 27.9

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.	% T C R	% R Q D
			SURFACE ELEVATION: 379.0									
5			Moist, Stiff, Brown Clay with Sand							2 4-6		
			DOLOSTONE								92	0
10			DOLOSTONE - Slightly Weathered, Hard, Frequent Fractures, Light Gray								91	0
15			DOLOSTONE WITH OCCASIONAL CHERT LAYERS- Slightly Weathered, Hard, Frequent Fractures, Light Gray								78	17
20			DOLOSTONE - Unweathered, Hard, Frequent Fractures, Light Gray								97	91
25			DOLOSTONE WITH OCCASIONAL CHERT LAYERS- Unweathered, Hard, Frequent Fractures, Light Gray								98	91
30			Boring Terminated									
35												

REMARKS: Sugar Creek

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

BORING NO. 5
PAGE 1 OF 1

JOB NO. 050275 Sharp County
JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
Route 63 Section 2
STATION: 239+05
LOCATION: 20' Right of Construction Centerline
LOGGED BY: Raymond Taylor

DATE: February 3, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 23.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 363.1									
			DOLOSTONE - Slightly Weathered, Hard, Frequent Fractures, Occasional Dolomite-Filled Vugs, Light Gray								94	50
			Soil-Filled Cavity (2.3' to 2.9')*									
5			DOLOSTONE - Slightly Weathered, Hard, Frequent Fractures, Occasional Dolomite-Filled Vugs, Light Gray									
			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Slightly Weathered, Hard, Frequent Fractures, Light Gray								99	70
10			DOLOSTONE WITH OCCASIONAL CHERT NODULES - Unweathered, Hard, Frequent Fractures								98	46
15			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Frequent Fractures, Occasional Dolomite-Filled Vugs, Light Gray								97	54
20			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Unweathered, Hard, Frequent Fractures, Occasional Dolomite Veins, Light Gray								100	98
25			Boring Terminated									
30												
35												

REMARKS: Sugar Creek

* A Soil-Filled Cavity was encountered from 2.3 to 2.9 feet below ground level.

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

BORING NO. 6
PAGE 1 OF 1

JOB NO. 050275 Sharp County
JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
Route 63 Section 2
STATION: 239+53
LOCATION: 19' Left of Construction Centerline
LOGGED BY: Raymond Taylor

DATE: February 3, 2016
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 28



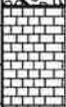
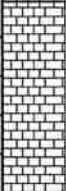



DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 363.8									
			Gravel									
			DOLOSTONE - Weathered, Medium Hard*									
5			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Slightly Weathered, Hard, Frequent Fractures, Light Gray								37	0
10			DOLOSTONE - Slightly Weathered, Hard, Frequent Fractures								16	0
15											38	16
20			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Slightly Weathered, Hard, Frequent Fractures, Light Gray**								95	46
25											74	34
30			Boring Terminated									
35												

REMARKS: Sugar Creek
* Auger refusal at 3.9 feet below ground level ** Some of the fractures in this zone are open

JOB NO. 050275 Sharp County
 JOB NAME: Hardy - Ozark Acres Strs. & Apprs.
 Route 63 Section 2
 STATION: 239+87
 LOCATION: 40' Right of Construction Centerline
 LOGGED BY: Raymond Taylor

DATE: February 8, 2016
 TYPE OF DRILLING:
 Hollow Stem Auger - Diamond Core
 EQUIPMENT: CME 850
 HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 28.1

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.	% T C R	% R Q D
			SURFACE ELEVATION: 367.9									
			Moist, Hard, Brown Clay									
5			Moist, Hard, Brown Clay with Gravel (Rock Fragments)							10 60 (4")		
			DOLOSTONE WITH OCCASIONAL CHERT LAYERS - Slightly Weathered, Hard, Frequent Fractures, Gray								92	0
10			DOLOSTONE - Slightly Weathered, Hard, Frequent Fractures, Gray								90	24
15			DOLOSTONE WITH OCCASIONAL CHERT NODULES - Slightly Weathered, Hard, Frequent Fractures and Occasional Vugs, Gray *								80	16
20			DOLOSTONE - Unweathered, Hard, Frequent Fractures, Occasional Vugs, Gray								100	13
25			DOLOSTONE - Unweathered, Hard, Frequent Fractures, Occasional Dolomite Veins, Gray								100	66
30			Boring Terminated									
35												

REMARKS: Sugar Creek
 * Some fractures in this zone are open.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

November 25, 2013

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 050275
Hardy – Ozark Acres Strs. & Apprs. (S)
Route: 63 Section 2
Sharp County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of replacing 3 bridges on Highway 63. Samples were obtained in the existing travel lanes, shoulder and ditch line.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of low to moderately plastic sandy clay with varying amounts of chert and limestone fragments. Cross-sections are not currently available, but it is assumed that the construction grade line will closely match that of the existing roadway. Rock was encountered at station 107+00 at 6' right, 17' right, and 35' right of centerline at a depth of 3.0', 2.5', and 3.0' respectively. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Embankment 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 Ash Flat.
2. Asphalt Concrete Hot Mix

PG 64-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.4	94.6
Binder Course	4.3	95.7
Base Course	3.8	96.2

PG 70-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.4	94.6
Binder Course	4.5	95.5
Base Course	4.1	95.9

PG 76-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	4.3	95.7
Base Course	4.3	95.7



Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 5 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 - 11/19/2013
JOB NUMBER - 050275

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 67
DISTRICT NO. - 05

JOB NAME - HARDY-OZARK ACRES STR. & APPRS.

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB LESS TAHN 5

RESILIENT MODULUS	
STA.115+00	10635
STA.162+00	8216
STA.239+00	7825

REMARKS -

-
AASHTO TESTS : T190

JOB: 050275

Arkansas State Highway Transportation Department

JOB NAME: HARDY-OZARK ACRES STR. & APPRS.

Materials Division

COUNTY NO. 67 DATE TESTED 11/18/2013

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				S	I	E	V	E					
115+00	21lt	0-5	RD/BR	90	79	67	69	63	50	34	A-7-6(15)	RV1917	
162+00	23rt	0-5	RD/BR	85	82	73	63	64	39	23	A-6(12)	RV1918	
239+00	24rt	0-5	RED	96	94	92	90	83	65	41	A-7-6(40)	RV1919	
107+00	06rt	0-3Z	BR/GR	80	69	67	62	23	ND	NP	A-2-4(0)	S1902	3.4
107+00	17rt	0-2.5Z	BR/GR	77	64	66	27	23	ND	NP	A-1-B(0)	S1903	3.1
107+00	35rt	0-3Z	BR/GR	49	30	22	19	17	17	03	A-1-B(0)	S1904	4.8
115+00	06lt	0-5	BR/GR	98	89	77	67	62	41	27	A-7-6(14)	S1905	20.9
115+00	21lt	0-5	BR/GR	90	79	69	62	57	41	24	A-7-6(10)	S1906	20.4
162+00	06rt	0-5	BR/GR	94	84	79	73	70	41	27	A-7-6(17)	S1907	24.8
162+00	23rt	0-5	BR/GR	86	71	60	57	49	36	22	A-6(7)	S1908	11.2
169+00	06lt	0-5	BR/GR	94	80	63	55	50	14	01	A-4(0)	S1909	13
169+00	22lt	0-5	BR/GR	93	82	68	60	54	13	NP	A-4(0)	S1910	10.7
239+00	07rt	0-5	BR/GR	100				91	54	28	A-7-6(29)	S1911	29.2
239+00	14rt	0-5	BR/GR	94	88	81	76	71	59	36	A-7-6(25)	S1912	31
239+00	24rt	0-5	BR/GR	95	91	86	84	82	68	41	A-7-6(37)	S1913	37.5
246+00	06lt	0-5	BR/GR	96	89	81	70	67	39	23	A-6(13)	S1914	13.2
246+00	14lt	0-5	BR/GR	83	68	51	42	36	22	08	A-4(0)	S1915	10.6
246+00	27lt	0-5	BR/GR	77	62	49	36	31	24	09	A-2-4(0)	S1916	14.7

comments: W=MULTIPLE LAYERS, Z= AUGER REFUSAL

Tuesday, November 19, 2013

JOB: 050275

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: HARDY-OZARK ACRES STR. & APPRS.

Materials Division

11/18/2013

COUNTY NO. 67

Michael Benson, Materials Engineer

PAVEMENT SOUNDINGS

STA.#	LOC.	ACHMSC	ACHMBC	AGG.BASE CRS CL-7
107+00	06ft	3.75W	9.0	10.0
107+00	17ft	2.0	ACHMBC	AGG.BASE CRS CL-7
107+00	35ft	ACHMSC	ACHMBC	10.0
115+00	06ft	3.5W	ACHMBC	AGG.BASE CRS CL-7
115+00	21ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
162+00	06ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
162+00	23ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
169+00	06ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
169+00	22ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
239+00	07ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
239+00	14ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
239+00	24ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
246+00	06ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
246+00	14ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC
246+00	27ft	ACHMSC	AGG.BASE CRS CL-7	ACHMBC

Comments: W=MULTIPLE LAYERS, Z= AUGER REFUSAL

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

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

Job No.	050275	Material Code	SSRVPS
Date Sampled:	11/15/13	Station No.:	115+00
Date Tested:	November 15, 2013	Location:	21'LT
Name of Project:	HARDY - OZARK ACRES STR. & APPRS.(S)		
County:	Code: 67	Name: SHARP	
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20135171	AASHTO Class:	A-7-6(15)
Sample ID:	RV1917	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

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

2. Specimen Information:

Specimen Diameter (in):	
Top	3.95
Middle	3.94
Bottom	3.95
Average	3.95
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.02
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.02
Initial Area, Ao (sq. in):	12.17
Initial Volume, AoLo (cu. in):	97.57

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3174.20
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	18.4
Maximum Dry Density (pcf):	106.4
95% of MDD (pcf):	101.1
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3174.20
Compaction Moisture content (%):	18.3
Compaction Wet Density (pcf):	123.96
Compaction Dry Density (pcf):	104.79
Moisture Content After Mr Test (%):	18.3

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

#VALUE!

7. Resilient Modulus, Mr:

14892(Sc)^{-0.21351(S3)^{0.18547}}

8. Comments

9. Tested By:

DEB _____

Date: November 15, 2013

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

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

Job No. 050275 **Material Code** SSRVPS
Date Sampled: 11/15/13 **Station No.:** 115+00
Date Tested: November 15, 2013 **Location:** 21'LT
Name of Project: HARDY - OZARK ACRES STR. & APPRS.(S)
County: Code: 67 **Name:** SHARP
Sampled By: FAULKNER
Lab No.: 20135171
Sample ID: RV1917
LATITUDE:
Depth: 0-5
AASHTO Class: A-7-6(15)
Material Type (1 or 2): 2
LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION	S ₃	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	S _{contact}	H _{avg}	ε _r	M _r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	24.7	22.1	2.6	2.0	1.8	0.2	0.00079	0.00010	18,412
Sequence 2	6.0	4.0	46.4	43.8	2.6	3.8	3.6	0.2	0.00170	0.00021	17,019
Sequence 3	6.0	6.0	68.3	64.9	3.4	5.6	5.3	0.3	0.00275	0.00034	15,566
Sequence 4	6.0	8.0	90.2	84.2	6.0	7.4	6.9	0.5	0.00414	0.00052	13,416
Sequence 5	6.0	10.0	110.7	102.3	8.4	9.1	8.4	0.7	0.00581	0.00072	11,616
Sequence 6	4.0	2.0	24.6	21.9	2.6	2.0	1.8	0.2	0.00088	0.00011	16,396
Sequence 7	4.0	4.0	46.1	43.4	2.6	3.8	3.6	0.2	0.00189	0.00024	15,189
Sequence 8	4.0	6.0	66.9	64.2	2.7	5.5	5.3	0.2	0.00301	0.00037	14,093
Sequence 9	4.0	8.0	89.1	84.1	5.0	7.3	6.9	0.4	0.00431	0.00054	12,854
Sequence 10	4.0	10.0	110.0	102.4	7.6	9.0	8.4	0.6	0.00583	0.00073	11,584
Sequence 11	2.0	2.0	24.6	21.8	2.8	2.0	1.8	0.2	0.00106	0.00013	13,619
Sequence 12	2.0	4.0	45.9	43.1	2.8	3.8	3.5	0.2	0.00217	0.00027	13,125
Sequence 13	2.0	6.0	66.5	63.7	2.9	5.5	5.2	0.2	0.00336	0.00042	12,511
Sequence 14	2.0	8.0	87.9	83.5	4.4	7.2	6.9	0.4	0.00472	0.00059	11,679
Sequence 15	2.0	10.0	108.7	101.9	6.8	8.9	8.4	0.6	0.00632	0.00079	10,635

TESTED BY _____ **DATE** November 15, 2013
REVIEWED BY _____ **DATE** _____

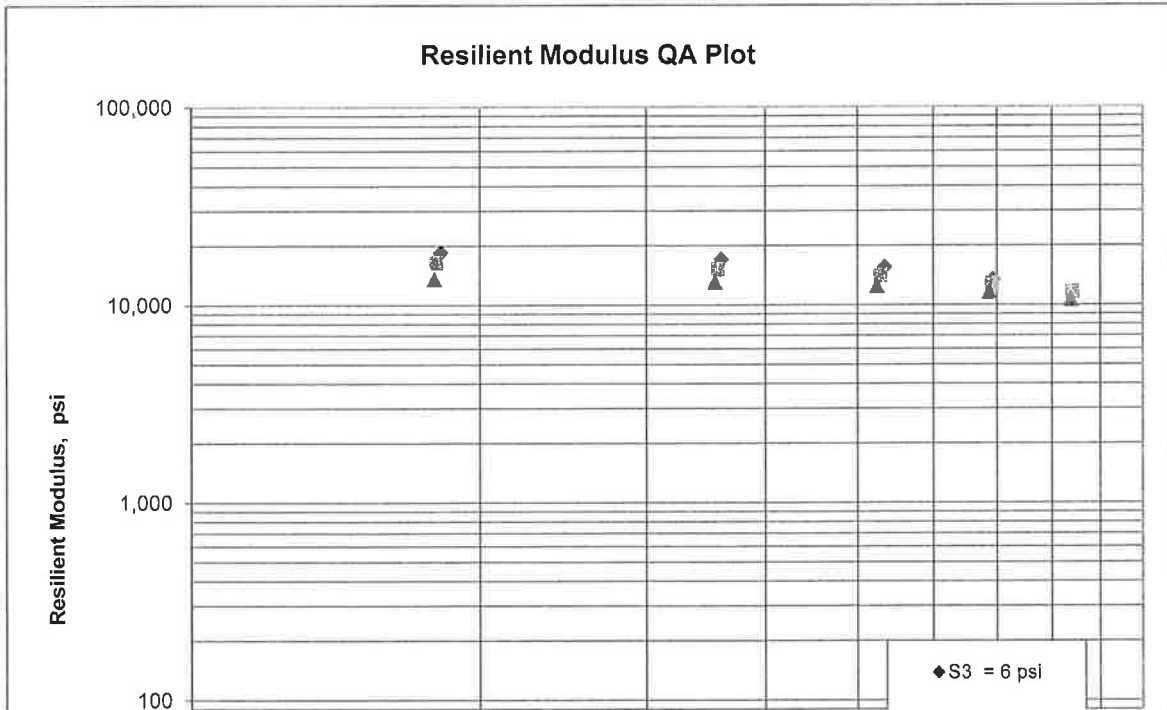
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	050275	Material Code	SSRVPS
Date Sampled:	11/15/13	Station No.:	115+00
Date Tested:	November 15, 2013	Location:	21'LT
Name of Project:	HARDY - OZARK ACRES STR. & APPRS.(S)		
County:	Code: 67	Name:	SHARP
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20135171	AASHTO Class:	A-7-6(15)
Sample ID:	RV1917	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$K_1 =$	<u>14,892</u>
$K_2 =$	<u>-0.21351</u>
$K_5 =$	<u>0.18547</u>
$R^2 =$	<u>0.87</u>



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

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

Job No.	050275	Material Code	SSRVPS
Date Sampled:	11/15/13	Station No.:	162+00
Date Tested:	November 15, 2013	Location:	23'RT
Name of Project:	HARDY - OZARK ACRES STR. & APPRS.(S)		
County:	Code: 67	Name: SHARP	
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20135172	AASHTO Class:	A-6(9)
Sample ID:	RV1918	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

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

2. Specimen Information:

Specimen Diameter (in):	
Top	3.96
Middle	3.95
Bottom	3.94
Average	3.95
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.04
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.04
Initial Area, Ao (sq. in):	12.19
Initial Volume, AoLo (cu. in):	97.98

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3018.30
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	18.1
Maximum Dry Density (pcf):	104.6
95% of MDD (pcf):	99.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3018.30
Compaction Moisture content (%):	17.6
Compaction Wet Density (pcf):	117.38
Compaction Dry Density (pcf):	99.81
Moisture Content After Mr Test (%):	17.5

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

#VALUE!

7. Resilient Modulus, Mr:

12861(Sc)^{-0.26411}(S3)^{0.19887}

8. Comments

9. Tested By:

DEB _____

Date: November 15, 2013

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

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

Job No. 050275 **Material Code** SSRVPS
Date Sampled: 11/15/13 **Station No.:** 162+00
Date Tested: November 15, 2013 **Location:** 23'RT
Name of Project: HARDY - OZARK ACRES STR. & APPRS.(S)
County: Code: 67 **Name:** SHARP
Sampled By: FAULKNER
Lab No.: 20135172
Sample ID: RV1918
LATITUDE:
Depth: 0-5
AASHTO Class: A-6(9)
Material Type (1 or 2): 2
LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION	S ₃	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	S _{contact}	H _{avg}	ε _r	M _r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	24.7	22.1	2.6	2.0	1.8	0.2	0.0096	0.00012	15,247
Sequence 2	6.0	4.0	46.5	43.9	2.6	3.8	3.6	0.2	0.00204	0.00025	14,219
Sequence 3	6.0	6.0	68.3	64.9	3.5	5.6	5.3	0.3	0.00332	0.00041	12,878
Sequence 4	6.0	8.0	90.1	84.0	6.0	7.4	6.9	0.5	0.00504	0.00063	10,997
Sequence 5	6.0	10.0	110.7	102.1	8.5	9.1	8.4	0.7	0.00702	0.00087	9,596
Sequence 6	4.0	2.0	24.8	22.1	2.6	2.0	1.8	0.2	0.00107	0.00013	13,642
Sequence 7	4.0	4.0	46.0	43.3	2.7	3.8	3.6	0.2	0.00233	0.00029	12,291
Sequence 8	4.0	6.0	66.6	63.9	2.7	5.5	5.2	0.2	0.00377	0.00047	11,186
Sequence 9	4.0	8.0	88.6	83.4	5.2	7.3	6.8	0.4	0.00541	0.00067	10,183
Sequence 10	4.0	10.0	109.6	101.9	7.7	9.0	8.4	0.6	0.00735	0.00091	9,154
Sequence 11	2.0	2.0	24.8	22.1	2.7	2.0	1.8	0.2	0.00119	0.00015	12,221
Sequence 12	2.0	4.0	45.6	42.9	2.7	3.7	3.5	0.2	0.00258	0.00032	10,967
Sequence 13	2.0	6.0	65.8	63.0	2.8	5.4	5.2	0.2	0.00417	0.00052	9,963
Sequence 14	2.0	8.0	86.5	82.2	4.3	7.1	6.7	0.4	0.00599	0.00075	9,046
Sequence 15	2.0	10.0	107.2	100.4	6.8	8.8	8.2	0.6	0.00806	0.00100	8,216

TESTED BY _____
REVIEWED BY _____

DATE _____
DATE _____

November 15, 2013

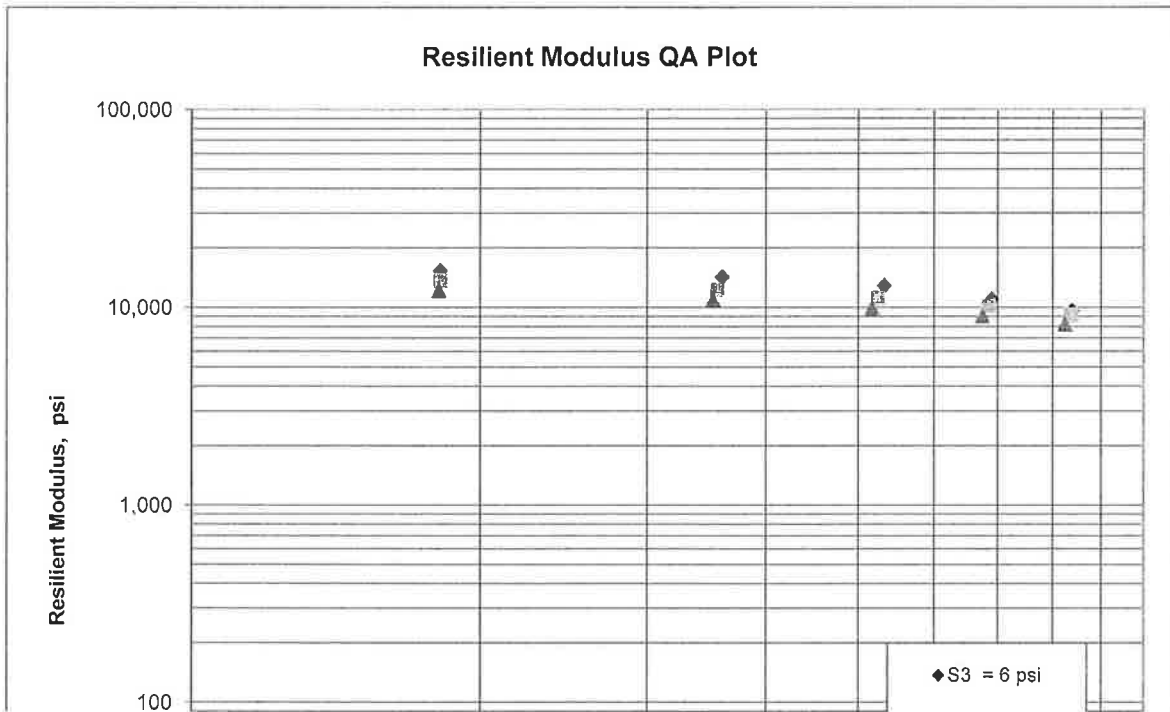
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	050275	Material Code	SSRVPS
Date Sampled:	11/15/13	Station No.:	162+00
Date Tested:	November 15, 2013	Location:	23'RT
Name of Project:	HARDY - OZARK ACRES STR. & APPRS.(S)		
County:	Code: 67	Name:	SHARP
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20135172	AASHTO Class:	A-6(9)
Sample ID:	RV1918	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

K1 =	12,861
K2 =	-0.26411
K5 =	0.19887
R ² =	0.92



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

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

Job No.	050275	Material Code	SSRVPS
Date Sampled:	11/15/13	Station No.:	239+00
Date Tested:	November 15, 2013	Location:	24'RT
Name of Project:	HARDY - OZARK ACRES STR. & APPRS.(S)		
County:	Code: 67	Name: SHARP	
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20135173	AASHTO Class:	A-7-6(40)
Sample ID:	RV1919	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

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

2. Specimen Information:

Specimen Diameter (in):	
Top	3.96
Middle	3.95
Bottom	3.96
Average	3.96
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.01
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.01
Initial Area, Ao (sq. in):	12.23
Initial Volume, AoLo (cu. in):	97.94

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	2840.30
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	29.2
Maximum Dry Density (pcf):	88.9
95% of MDD (pcf):	84.5
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	2840.30
Compaction Moisture content (%):	29.1
Compaction Wet Density (pcf):	110.50
Compaction Dry Density (pcf):	85.59
Moisture Content After Mr Test (%):	29.1

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

#VALUE!

7. Resilient Modulus, Mr:

11457(S_c)^{-0.20486}(S₃)^{0.12147}

8. Comments

9. Tested By:

DEB _____

Date: November 15, 2013 _____

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

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

Job No. 050275 **Material Code** SSRVPS
Date Sampled: 11/15/13 **Station No.:** 239+00
Date Tested: November 15, 2013 **Location:** 24RT
Name of Project: HARDY - OZARK ACRES STR. & APPRS.(S)
County: Code: 67 **Name:** SHARP
Sampled By: FAULKNER **Depth:** 0-5
Lab No.: 20135173 **AASHTO Class:** A-7-6(40)
Sample ID: RV1919 **Material Type (1 or 2):** 2
LATITUDE: **LONGITUDE:**

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION	S ₃	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	S _{contact}	H _{avg}	ε _r	M _r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.1	22.4	2.6	2.1	1.8	0.2	0.00118	0.00015	12,456
Sequence 2	6.0	4.0	47.1	44.4	2.6	3.8	3.6	0.2	0.00251	0.00031	11,576
Sequence 3	6.0	6.0	69.2	65.7	3.5	5.7	5.4	0.3	0.00399	0.00050	10,773
Sequence 4	6.0	8.0	91.4	85.4	6.0	7.5	7.0	0.5	0.00591	0.00074	9,473
Sequence 5	6.0	10.0	112.4	103.9	8.5	9.2	8.5	0.7	0.00818	0.00102	8,316
Sequence 6	4.0	2.0	25.1	22.4	2.7	2.1	1.8	0.2	0.00127	0.00016	11,535
Sequence 7	4.0	4.0	46.9	44.1	2.7	3.8	3.6	0.2	0.00269	0.00034	10,726
Sequence 8	4.0	6.0	68.0	65.2	2.8	5.6	5.3	0.2	0.00426	0.00053	10,026
Sequence 9	4.0	8.0	90.4	85.2	5.3	7.4	7.0	0.4	0.00603	0.00075	9,246
Sequence 10	4.0	10.0	112.0	104.3	7.7	9.2	8.5	0.6	0.00824	0.00103	8,297
Sequence 11	2.0	2.0	24.9	22.2	2.7	2.0	1.8	0.2	0.00140	0.00018	10,367
Sequence 12	2.0	4.0	46.5	43.8	2.8	3.8	3.6	0.2	0.00293	0.00037	9,801
Sequence 13	2.0	6.0	67.6	64.7	2.9	5.5	5.3	0.2	0.00457	0.00057	9,267
Sequence 14	2.0	8.0	89.2	84.8	4.5	7.3	6.9	0.4	0.00646	0.00081	8,590
Sequence 15	2.0	10.0	111.1	104.2	6.9	9.1	8.5	0.6	0.00872	0.00109	7,825

TESTED BY DEB DATE November 15, 2013
 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.	050275	Material Code	SSRVPS
Date Sampled:	11/15/13	Station No.:	239+00
Date Tested:	November 15, 2013	Location:	24'RT
Name of Project:	HARDY - OZARK ACRES STR. & APPRS.(S)		
County:	Code: 67	Name:	SHARP
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20135173	AASHTO Class:	A-7-6(40)
Sample ID:	RV1919	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

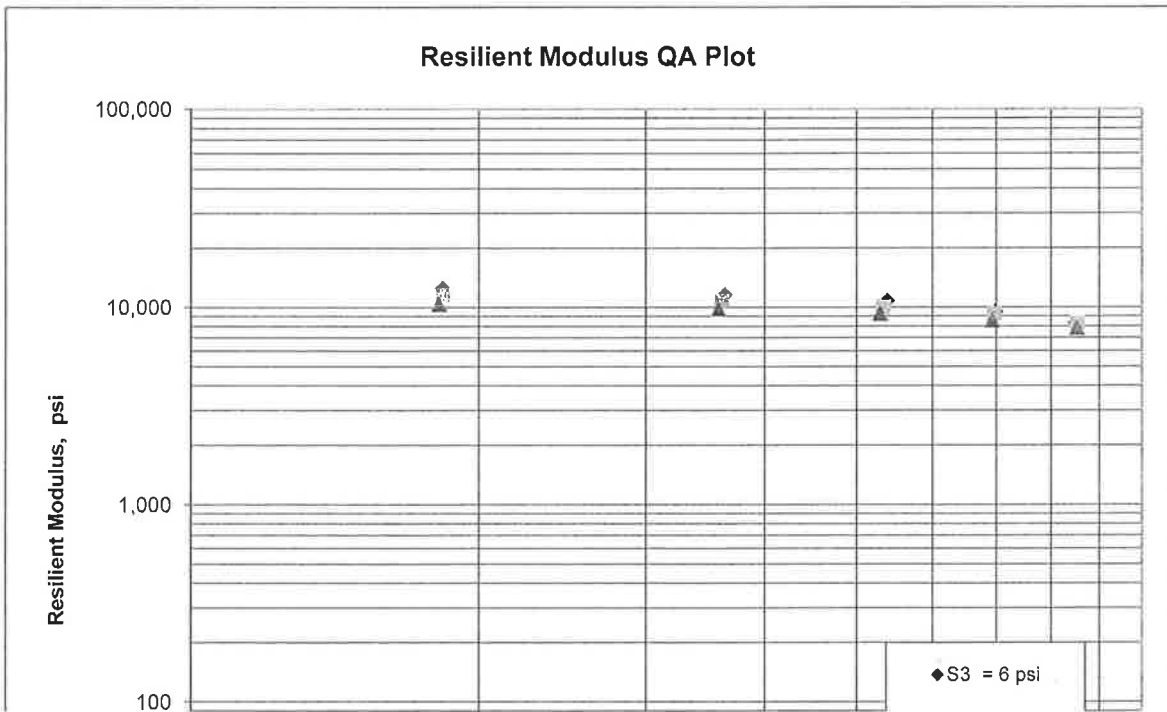
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = 11,457$$

$$K_2 = -0.20486$$

$$K_5 = 0.12147$$

$$R^2 = 0.88$$



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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 11/19/13	SEQUENCE NO. - 1
JOB NUMBER - 050275	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 - 67
SUPPLIER NAME - STATE	DISTRICT NO. - 05
NAME OF PROJECT - HARDY-OZARK ACRES STR. & APPRS.	
PROJECT ENGINEER - NOT APPLICABLE	
PIT/QUARRY - ARKANSAS	
LOCATION - SHARP COUNTY	DATE SAMPLED - 10/30/13
SAMPLED BY - FAULKNER/BOUGHNER	DATE RECEIVED - 11/01/13
SAMPLE FROM - TEST HOLE	DATE TESTED - 11/18/13
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS	

LAB NUMBER	-	20135156	-	20135157	-	20135158
SAMPLE ID	-	S1902	-	S1903	-	S1904
TEST STATUS	-	INFORMATION ONLY	-	INFORMATION ONLY	-	INFORMATION ONLY
STATION	-	107+00	-	107+00	-	107+00
LOCATION	-	06rt	-	17rt	-	35rt
DEPTH IN FEET	-	0-3Z	-	0-2.5Z	-	0-3Z
MAT'L COLOR	-	BR/GR	-	BR/GR	-	BR/GR
MAT'L TYPE	-		-		-	
LATITUDE DEG-MIN-SEC	-	36 18 43.80	-	36 18 43.70	-	36 18 43.60
LONGITUDE DEG-MIN-SEC	-	91 27 53.20	-	91 27 53.30	-	91 27 53.40
% PASSING						
2 IN.	-		-		-	
1 1/2 IN.	-		-		-	
3/4 IN.	-	100	-	100	-	100
3/8 IN.	-	95	-	93	-	82
NO. 4	-	80	-	77	-	49
NO. 10	-	59	-	54	-	30
NO. 40	-	37	-	33	-	22
NO. 80	-	32	-	27	-	19
NO. 200	-	28	-	23	-	17
LIQUID LIMIT	-	ND	-	ND	-	17
PLASTICITY INDEX	-	NP	-	NP	-	03
AASHTO SOIL	-	A-2-4 (0)	-	A-1-B (0)	-	A-1-B (0)
UNIFIED SOIL	-		-		-	
% MOISTURE CONTENT	-	3.4	-	3.1	-	4.8
ACHMSC (IN)	-	3.75W	-	2.0	-	--
ACHMBC (IN)	-	9.0	-	--	-	--
AGG.BASE CRS CL-7 (IN)	-	10.0	-	10.0	-	--
-	-		-		-	
-	-		-		-	
-	-		-		-	
-	-		-		-	
-	-		-		-	
-	-		-		-	
-	-		-		-	

REMARKS - W=MULTIPLE LAYERS, Z= AUGER REFUSAL

AASHTO TESTS : T24 T88 T89 T90 T265

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 11/19/13 SEQUENCE NO. - 2
 JOB NUMBER - 050275 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 - 67
 SUPPLIER NAME - STATE DISTRICT NO. - 05
 NAME OF PROJECT - HARDY-OZARK ACRES STR. & APPRS.
 PROJECT ENGINEER - NOT APPLICABLE
 PIT/QUARRY - ARKANSAS
 LOCATION - SHARP COUNTY DATE SAMPLED - 10/30/13
 SAMPLED BY - FAULKNER/BOUGHNER DATE RECEIVED - 11/01/13
 SAMPLE FROM - TEST HOLE DATE TESTED - 11/18/13
 MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20135159	20135160	20135161
SAMPLE ID	S1905	S1906	S1907
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	115+00	115+00	162+00
LOCATION	061t	211t	06rt
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BR/GR	BR/GR	BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	36 18 41.00	36 18 41.20	36 18 14.80
LONGITUDE DEG-MIN-SEC	91 27 44.20	91 27 44.10	91 26 56.80
% PASSING			
2 IN.	-	-	-
1 1/2 IN.	-	-	-
3/4 IN.	-	100	100
3/8 IN.	100	99	99
NO. 4	98	90	94
NO. 10	89	79	84
NO. 40	77	69	79
NO. 80	67	62	74
NO. 200	62	57	70
LIQUID LIMIT	41	41	41
PLASTICITY INDEX	27	24	27
AASHTO SOIL	A-7-6(14)	A-7-6(10)	A-7-6(17)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	20.9	20.4	24.8
ACHMSC (IN)	3.5W	--	8.75W
AGG.BASE CRS CL-7 (IN)	22.0	--	10.0

REMARKS - W=MULTIPLE LAYERS, Z= AUGER REFUSAL

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 11/19/13 SEQUENCE NO. - 3
JOB NUMBER - 050275 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 - 67
SUPPLIER NAME - STATE DISTRICT NO. - 05
NAME OF PROJECT - HARDY-OZARK ACRES STR. & APPRS.
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - SHARP COUNTY DATE SAMPLED - 10/30/13
SAMPLED BY - FAULKNER/BOUGHNER DATE RECEIVED - 11/01/13
SAMPLE FROM - TEST HOLE DATE TESTED - 11/18/13
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	-	20135162	-	20135163	-	20135164
SAMPLE ID	-	S1908	-	S1909	-	S1910
TEST STATUS	-	INFORMATION ONLY	-	INFORMATION ONLY	-	INFORMATION ONLY
STATION	-	162+00	-	169+00	-	169+00
LOCATION	-	23rt	-	061t	-	221t
DEPTH IN FEET	-	0-5	-	0-5	-	0-5
MAT'L COLOR	-	BR/GR	-	BR/GR	-	BR/GR
MAT'L TYPE	-	-	-	-	-	-
LATITUDE DEG-MIN-SEC	-	36 18 14.70	-	36 18 12.00	-	36 18 12.10
LONGITUDE DEG-MIN-SEC	-	91 26 56.90	-	91 26 48.90	-	91 26 48.80
% PASSING						
2 IN.	-	-	-	-	-	-
1 1/2 IN.	-	-	-	-	-	-
3/4 IN.	-	100	-	-	-	100
3/8 IN.	-	97	-	100	-	98
NO. 4	-	86	-	94	-	93
NO. 10	-	71	-	80	-	82
NO. 40	-	60	-	63	-	68
NO. 80	-	54	-	55	-	60
NO. 200	-	49	-	50	-	54
LIQUID LIMIT	-	36	-	14	-	13
PLASTICITY INDEX	-	22	-	01	-	NP
AASHTO SOIL	-	A-6(7)	-	A-4(0)	-	A-4(0)
UNIFIED SOIL	-	-	-	-	-	-
% MOISTURE CONTENT	-	11.2	-	13.0	-	10.7
ACHMSC (IN)	-	--	-	7.5W	-	--
AGG.BASE CRS CL-7 (IN)	-	--	-	10.0	-	--
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

REMARKS - W=MULTIPLE LAYERS, Z= AUGER REFUSAL
-
-
-
-

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 11/19/13	SEQUENCE NO.	- 4
JOB NUMBER	- 050275	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	- 67
SUPPLIER NAME	- STATE	DISTRICT NO.	- 05
NAME OF PROJECT	- HARDY-OZARK ACRES STR. & APPRS.		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- SHARP COUNTY	DATE SAMPLED	- 10/30/13
SAMPLED BY	- FAULKNER/BOUGHNER	DATE RECEIVED	- 11/01/13
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 11/18/13
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20135165	- 20135166	- 20135167
SAMPLE ID	- S1911	- S1912	- S1913
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 239+00	- 239+00	- 239+00
LOCATION	- 07rt	- 14rt	- 24rt
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BR/GR	- BR/GR	- BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 18 9.00	- 36 18 8.90	- 36 18 8.90
LONGITUDE DEG-MIN-SEC	- 91 25 42.60	- 91 25 42.50	- 91 25 42.50
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. -	100	100
	3/8 IN. -	99	99
	NO. 4 - 100	94	95
	NO. 10 -	88	91
	NO. 40 -	81	86
	NO. 80 -	76	84
	NO. 200 - 91	71	82
LIQUID LIMIT	- 54	- 59	- 68
PLASTICITY INDEX	- 28	- 36	- 41
AASHTO SOIL	- A-7-6(29)	- A-7-6(25)	- A-7-6(37)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 29.2	- 31.0	- 37.5
ACHMSC (IN)	- 8.0W	- 5.0W	- --
AGG.BASE CRS CL-7 (IN)	- 12.0	- 10.0	- --
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - W=MULTIPLE LAYERS, Z= AUGER REFUSAL
-
-
-
-

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 11/19/13	SEQUENCE NO.	- 5
JOB NUMBER	- 050275	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	- 67
SUPPLIER NAME	- STATE	DISTRICT NO.	- 05
NAME OF PROJECT	- HARDY-OZARK ACRES STR. & APPRS.		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- SHARP COUNTY	DATE SAMPLED	- 10/30/13
SAMPLED BY	- FAULKNER/BOUGHNER	DATE RECEIVED	- 11/01/13
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 11/18/13
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	-	20135168	-	20135169	-	20135170	
SAMPLE ID	-	S1914	-	S1915	-	S1916	
TEST STATUS	-	INFORMATION ONLY	-	INFORMATION ONLY	-	INFORMATION ONLY	
STATION	-	246+00	-	246+00	-	246+00	
LOCATION	-	061t	-	141t	-	271t	
DEPTH IN FEET	-	0-5	-	0-5	-	0-5	
MAT'L COLOR	-	BR/GR	-	BR/GR	-	BR/GR	
MAT'L TYPE	-		-		-		
LATITUDE DEG-MIN-SEC	-	36 18 11.40	-	36 18 11.50	-	36 18 11.50	
LONGITUDE DEG-MIN-SEC	-	91 25 34.70	-	91 25 34.70	-	91 25 34.70	
% PASSING	2	IN.	-		-		
	1 1/2	IN.	-		-		
	3/4	IN.	-	100	-	100	
	3/8	IN.	-	95	-	96	
	NO. 4	-	96	-	83	-	77
	NO. 10	-	89	-	68	-	62
	NO. 40	-	81	-	51	-	49
	NO. 80	-	73	-	42	-	38
	NO. 200	-	67	-	36	-	31
LIQUID LIMIT	-	39	-	22	-	24	
PLASTICITY INDEX	-	23	-	08	-	09	
AASHTO SOIL	-	A-6 (13)	-	A-4 (0)	-	A-2-4 (0)	
UNIFIED SOIL	-		-		-		
% MOISTURE CONTENT	-	13.2	-	10.6	-	14.7	
ACHMSC (IN)	-	6.75W	-	4.5W	-	--	
AGG.BASE CRS CL-7 (IN)	-	8.0	-	8.0	-	--	

REMARKS - W=MULTIPLE LAYERS, Z= AUGER REFUSAL

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 11/19/13	SEQUENCE NO.	- 1
JOB NUMBER	- 050275	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	- 67
SUPPLIER NAME	- STATE	DISTRICT NO.	- 05
NAME OF PROJECT	- HARDY-OZARK ACRES STR. & APPRS.		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- SHARP COUNTY	DATE SAMPLED	- 10/30/13
SAMPLED BY	- FAULKNER/BOUGHNER	DATE RECEIVED	- 11/01/13
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 11/18/13
MATERIAL DESC.	- SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS		

LAB NUMBER	-	20135171	-	20135172	-	20135173
SAMPLE ID	-	RV1917	-	RV1918	-	RV1919
TEST STATUS	-	INFORMATION ONLY	-	INFORMATION ONLY	-	INFORMATION ONLY
STATION	-	115+00	-	162+00	-	239+00
LOCATION	-	21lt	-	23rt	-	24rt
DEPTH IN FEET	-	0-5	-	0-5	-	0-5
MAT'L COLOR	-	RD/BR	-	RD/BR	-	RED
MAT'L TYPE	-	-	-	-	-	-
LATITUDE DEG-MIN-SEC	-	36 18 41.20	-	36 18 14.70	-	36 18 8.90
LONGITUDE DEG-MIN-SEC	-	91 27 44.10	-	91 26 56.90	-	91 25 42.50
% PASSING	2	IN.	-	-	-	-
	1 1/2	IN.	-	-	-	-
	3/4	IN.	-	100	-	100
	3/8	IN.	-	98	-	99
	NO. 4	-	-	90	-	96
	NO. 10	-	-	79	-	94
	NO. 40	-	-	67	-	92
	NO. 80	-	-	59	-	90
	NO. 200	-	-	55	-	88
LIQUID LIMIT	-	50	-	39	-	65
PLASTICITY INDEX	-	34	-	23	-	41
AASHTO SOIL	-	A-7-6(15)	-	A-6(12)	-	A-7-6(40)
UNIFIED SOIL	-	-	-	-	-	-
% MOISTURE CONTENT	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

REMARKS -

-
-
-
-
-

AASHTO TESTS : T24 T88 T89 T90 T265