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.
August 24, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 020614
Mills Bayou Str. & Apprs. (S)
Route 54 Section 3
Lincoln County

Transmitted herewith is the requested Soil Survey, strength data and Resilient Modulus test results for the above referenced job. The project consists of replacing the bridge crossing Mills Bayou on Highway 54. Samples were obtained in the existing travel lanes and ditch line. There were no paved shoulders within the project limits.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of highly plastic clay with some sand. Cross sections are not currently available, but it is assumed the construction grade line will closely match that of the existing roadway. The subgrade soils are expected to provide a stable working platform with conventional processing, if the weather is favorable during construction. If soil remediation is needed to allow construction to proceed during adverse weather conditions or if a stable working platform cannot be obtained with normal drying and compactive effort, stabilization with lime is the most appropriate remediation technique. It is recommended that the addition of 4% Lime (by dry weight) mixed to a depth of 16" be used for soil stabilization quantity estimation purposes; however, if the Engineer determines that stabilization is necessary, field trials or local experience may dictate that a stable working platform can be achieved at a lower lime content.

Additional earthwork recommendations will be made upon request when plans are further developed and cross sections are available.

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

1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located at the river port near Dumas.

2. Asphalt Concrete Hot Mix

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<th>Mineral Aggregate %</th>
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<td>Base Course</td>
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Michael C. Benson  
Materials Engineer

Attachment

cc: State Constr. Eng. – Master File Copy  
District 2 Engineer  
System Information and Research Div.  
G. C. File
DATE - 08/16/2017
JOB NUMBER - 020614

SEQUENCE NO. - 2
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 40
DISTRICT NO. - 02

JOB NAME - MILLS BAYOU STR. & APPRS.(S)

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

BEGIN JOB - END JOB 9

RESILIENT MODULUS
STA. 108+00 9258

---

REMARKS -
-

AASHTO TESTS : T190
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

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<td>LONGITUDE</td>
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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 3.94
     - Middle 3.95
     - Bottom 3.95
     - Average 3.95
   - Membrane Thickness (in): 0.01
   - Height of Specimen, Cap and Base (in): 8.02
   - Height of Cap and Base (in): 0.00
   - Initial Length, Lo (in): 8.02
   - Initial Area, Ao (sq. in): 12.16
   - Initial Volume, AoLo (cu. in): 97.52

3. Soil Specimen Weight:
   - Weight of Wet Soil Used (g): 3199.10

4. Soil Properties:
   - Optimum Moisture Content (%): 14.5
   - Maximum Dry Density (pcf): 111.9
   - 95% of MDD (pcf): 106.3
   - In-Situ Moisture Content (%): N/A

5. Specimen Properties:
   - Wet Weight (g): 3199.10
   - Compaction Moisture content (%): 14.7
   - Compaction Wet Density (pcf): 125.00
   - Compaction Dry Density (pcf): 108.98
   - Moisture Content After Mr Test (%): 14.3

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

7. Resilient Modulus, Mr:
   - $13064(Sc)^{-0.21959(S3)}0.22284$

8. Comments

9. Tested By: GW Date: August 11, 2017
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<th>Actual Applied Max. Axial Load</th>
<th>Actual Applied Cyclic Load</th>
<th>Actual Applied Contact Load</th>
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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.: 020614                                  Material Code: SSRVPS
Date Sampled: 7/19/17                                Station No.: 108+00
Date Tested: August 11, 2017                           Location: 21°LT
Name of Project: MILLS BAYOU STR. & APPRS. (S)
County:                   Code: 40    Name: LINCOLN
Sampled By: THORNTON/BATES
Lab No.: 20172437
Sample ID: RV494
LATITUDE:

\[ M_R = K_1 \left( S_C \right)^{K_2} \left( S_3 \right)^{K_5} \]

\[ K_1 = 13.064 \]
\[ K_2 = -0.21959 \]
\[ K_5 = 0.22284 \]
\[ R^2 = 0.93 \]

Resilient Modulus QA Plot

Cyclic Stress, psi

- S3 = 6 psi
- S3 = 4 psi
- S3 = 2 psi
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<th>COLOR</th>
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<th>#10</th>
<th>#40</th>
<th>#80</th>
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<th>P.I.</th>
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<td>NP</td>
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Comments: W=MULTIPLE LAYERS

Arkansas State Highway Transportation Department
Materials Division

Michael Benson, Materials Engineer

Monday, August 21, 2017
**SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT**

**DATE** - 08/21/17  
**SEQUENCE NO.** - 1

**JOB NUMBER** - 020614  
**MATERIAL CODE** - RV

**FEDERAL AID NO.** - TO BE ASSIGNED  
**SPEC. YEAR** - 2014

**PURPOSE** - SOIL SURVEY SAMPLE  
**SUPPLIER ID.** - 1

**SPEC. REMARKS** - NO SPECIFICATION CHECK  
**COUNTY/STATE** - 40

**SUPPLIER NAME** - STATE  
**DISTRICT NO.** - 02

**NAME OF PROJECT** - MILLS BAYOU STR. & APPR.S.(S)

**PROJECT ENGINEER** - NOT APPLICABLE

**PIT/QUARRY** - ARKANSAS

**LOCATION** - LINCOLN COUNTY  
**DATE SAMPLED** - 07/19/17

**SAMPLED BY** - THORNTON/BATES  
**DATE RECEIVED** - 07/25/17

**SAMPLE FROM** - TEST HOLE  
**DATE TESTED** - 08/01/17

**MATERIAL DESC.** - SOIL SURVEY - RESISTANCE R-VALUE

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<th>Sample ID</th>
<th>Test Status</th>
<th>Station</th>
<th>Location</th>
<th>Depth in Feet</th>
<th>Material Color</th>
<th>Material Type</th>
<th>Latitude Deg-Min-Sec</th>
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**Liquid Limit** - ND  
**Plasticity Index** - NP  
**AASHTO Soil** - A-4(0)  
**Unified Soil** -  

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**Remarks** - W=MULTIPLE LAYERS

**AASHTO TESTS** - T24 T88 T89 T90 T265
### Soil Survey / Pavement Sounding Test Report

**Date:** 08/21/17  
**Sequence No.:** 1  
**Job Number:** 020614  
**Material Code:** SSRVPS  
**Federal Aid No.:** To Be Assigned  
**Spec. Year:** 2014  
**Purpose:** Soil Survey Sample  
**Supplier ID.:** 1  
**Spec. Remarks:** No Specification Check  
**Supplier Name:** State  
**Name of Project:** Mills Bayou Str. & Apprs. (S)  
**County/State:** 40  
**District No.:** 02  
**Project Engineer:** Not Applicable  
**Pit/Quarry:** Arkansas  
**Location:** Lincoln County  
**Date Sampled:** 07/19/17  
**Sampled By:** Thornton/Bates  
**Date Received:** 07/25/17  
**Sample From:** Test Hole  
**Date Tested:** 08/01/17  
**Material Desc.:** Soil Survey, R Value, Pavement Soundings

<table>
<thead>
<tr>
<th>Lab Number</th>
<th>Sample ID</th>
<th>Test Status</th>
<th>Station</th>
<th>Location</th>
<th>Depth in Feet</th>
<th>Mat'l Color</th>
<th>Mat'l Type</th>
<th>Latitude Deg-Min-Sec</th>
<th>Longitude Deg-Min-Sec</th>
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<td>S487</td>
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<td>102+00</td>
<td>0-5</td>
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<td>33 52 39.90</td>
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<td>33 52 43.40</td>
<td>91 36 13.70</td>
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<th>% Passing</th>
<th>2 IN.</th>
<th>1 1/2 IN.</th>
<th>3/4 IN.</th>
<th>3/8 IN.</th>
<th>NO. 4</th>
<th>NO. 10</th>
<th>NO. 40</th>
<th>NO. 80</th>
<th>NO. 200</th>
<th>Liquid Limit</th>
<th>Plasticity Index</th>
<th>AASHTO Soil</th>
<th>Unified Soil</th>
<th>% Moisture Content</th>
<th>BST (IN)</th>
<th>ACHMSC (IN)</th>
<th>Agg. Base CRS CL-7 (IN)</th>
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<tbody>
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<td>97</td>
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<td>2.0W</td>
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<td>A-4(4)</td>
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</table>

**Remarks:** W = Multiple Layers

**AASHTO Tests:** T24 T88 T89 T90 T265
DATE - 08/21/17
JOB NUMBER - 020614
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - MILLS BAYOU STR. & APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - LINCOLN COUNTY
SAMPLED BY - THORNTON/BATES
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS
LAB NUMBER - 20172433 - 20172434 - 20172435
SAMPLE ID - S490 - S491 - S492
TEST STATUS - INFORMATION ONLY - INFORMATION ONLY - INFORMATION ONLY
STATION - 108+00 - 112+00 - 119+00
LOCATION - 21 LT - 21 RT - 06 LT
DEPTH IN FEET - 0-5 - 0-5 - 0-5
MAT’L COLOR - BROWN - BROWN - BROWN
MAT’L TYPE - - -
LATITUDE DEG-MIN-SEC - 33 52 43.40 - 33 52 46.20 - 33 52 52.90
LONGITUDE DEG-MIN-SEC - 91 36 13.80 - 91 36 10.40 - 91 36 8.60
% PASSING 2 IN. - - -
1 1/2 IN. - - -
3/4 IN. - - 100 -
3/8 IN. - - 99 -
NO. 4 - 100 - 100 - 97
NO. 10 - 98 - - 95
NO. 40 - 94 - - 91
NO. 80 - 91 - - 89
NO. 200 - 88 - 93 - 80
LIQUID LIMIT - 35 - 37 - 33
PLASTICITY INDEX - 20 - 32 - 18
AASHTO SOIL - A-6(17) - A-6(28) - A-6(13)
UNIFIED SOIL - - -
% MOISTURE CONTENT - 16.7 - 19.6 - 20.7
BST (IN) - -- - -- - 1.5
AGG.BASE CRS CL-7 (IN) - -- - -- - 9.0

REMARKS - W=MULTIPLE LAYERS

AASHTO TESTS : T24 T88 T89 T90 T265
DATE - 08/21/17
JOB NUMBER - 020614
FEDERAL AID NO. - TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - MILLS BAYOU STR. & APPR.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - LINCOLN COUNTY
SAMPLED BY - THORNTON/BATES
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 07/19/17
DATE RECEIVED - 07/25/17
DATE TESTED - 08/01/17
MATERIAL DESC. - SOIL SURVEY - R VALUE - PAVEMENT SOUNDINGS

LAB NUMBER - 20172436
SAMPLE ID - S493
TEST STATUS - INFORMATION ONLY
STATION - 119+00
LOCATION - 21 LT
DEPTH IN FEET - 0-5
MAT'L COLOR - BROWN
MAT'L TYPE -
LATITUDE DEG-MIN-SEC - 33 52 53.00
LONGITUDE DEG-MIN-SEC - 91 36 8.80

% PASSING 2 IN. -
1 1/2 IN. -
3/4 IN. -
3/8 IN. -
NO. 4 - 100
NO. 10 -
NO. 40 -
NO. 80 -
NO. 200 - 97

LIQUID LIMIT - ND
PLASTICITY INDEX - NP
AASHTO SOIL - A-4(0)
UNIFIED SOIL -
% MOISTURE CONTENT - 20.8

REMARKS - W=MULTIPLE LAYERS

AASHTO TESTS : T24 T88 T89 T90 T265