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.
TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 080507
Ditch at LM 4.3 Str. & Apprs. (S)
Route 155 Section 4
Perry 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 at log mile 4.3 on Highway 155. 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 low plasticity sandy clay. Based on currently available cross sections the construction grade line closely matches that of the existing roadway. The subgrade soils are expected to provide a stable working platform with normal drying and compactive efforts, if the weather is favorable during construction.

The maximum embankment height is approximately 8 feet. All soft unstable organic material within the existing ditch line should be undercut prior to construction, anticipated to be no more than two feet. The embankment may be constructed with locally available unspecified material utilizing a 3:1 slope configuration.

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 Russellville.

2. Asphalt Concrete Hot Mix

<table>
<thead>
<tr>
<th>Type</th>
<th>Asphalt Cement %</th>
<th>Mineral Aggregate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Course</td>
<td>5.5</td>
<td>94.5</td>
</tr>
<tr>
<td>Binder Course</td>
<td>4.4</td>
<td>95.6</td>
</tr>
<tr>
<td>Base Course</td>
<td>4.0</td>
<td>96.0</td>
</tr>
</tbody>
</table>

Michael C. Benson
Materials Engineer
DATE - 06/16/2017
JOB NUMBER - 080507

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 53
DISTRICT NO. - 08

JOB NAME - DITCH @ L.M. 4.3 STR. & APPRS.(S)

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

BEGIN JOB - END JOB  7

RESILIENT MODULUS
STA. 113+90  9690

REMARKS -

AASHTO TESTS : T190
<table>
<thead>
<tr>
<th>Job No.</th>
<th>080507</th>
<th>Material Code</th>
<th>SSRVPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Sampled:</td>
<td>5/31/17</td>
<td>Station No.:</td>
<td>113+90</td>
</tr>
<tr>
<td>Date Tested:</td>
<td>June 15, 2017</td>
<td>Location:</td>
<td>23'LT</td>
</tr>
<tr>
<td>Name of Project:</td>
<td>DITCH AT L.M. 4.3 STR. &amp; APPRS. (S)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>County:</td>
<td>Code: 53</td>
<td>Name: PERRY</td>
<td></td>
</tr>
<tr>
<td>Sampled By:</td>
<td>THORNTON/TAYLOR</td>
<td>Depth:</td>
<td>0-5</td>
</tr>
<tr>
<td>Lab No.:</td>
<td>20171806</td>
<td>AASHTO Class:</td>
<td>A-4(2)</td>
</tr>
<tr>
<td>Sample ID:</td>
<td>RV411</td>
<td>Material Type (1 or 2):</td>
<td>2</td>
</tr>
<tr>
<td>LATITUDE:</td>
<td></td>
<td>LONGITUDE:</td>
<td></td>
</tr>
</tbody>
</table>

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 3.95
     - 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): 12.18
   - Initial Volume, AoLo (cu. in): 97.68

3. Soil Specimen Weight:
   - Weight of Wet Soil Used (g): 3255.50

4. Soil Properties:
   - Optimum Moisture Content (%): 12.0
   - Maximum Dry Density (pcf): 117
   - 95% of MDD (pcf): 111.2
   - In-Situ Moisture Content (%): N/A

5. Specimen Properties:
   - Wet Weight (g): 3255.50
   - Compaction Moisture content (%): 12.3
   - Compaction Wet Density (pcf): 126.99
   - Compaction Dry Density (pcf): 113.08
   - Moisture Content After Mr Test (%): 12.0

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

7. Resilient Modulus, Mr:
   - $12062(Sc)^{0.21053(S3)}^{0.32591}$

8. Comments

9. Tested By: B.H.  Date: June 15, 2017
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
MATERIALS DIVISION  

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

**Job No.**  080507  
**Date Sampled:**  5/31/17  
**Date Tested:**  June 15, 2017  
**Name of Project:**  DITCH AT L.M. 4.3 STR. & APPRS. (S)  
**County:**  
**Code:**  53  
**Name:**  PERRY  
**Sampled By:**  THORNTON/TAYLOR  
**Lab No.:**  20171806  
**Sample ID:**  RV411  
**LATITUDE:**  
**Material Code:**  SSRVPS  
**Station No.:**  113+90  
**Location:**  23LT  
**Depth:**  0-5  
**AASHTO Class:**  A-4(2)  
**Material Type (1 or 2):**  2  
**LONGITUDE:**  

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>Chamber Confining Pressure</th>
<th>Nominal Maximum Axial Stress</th>
<th>Actual Applied Max. Axial Load</th>
<th>Actual Applied Cyclic Load</th>
<th>Actual Applied Contact Load</th>
<th>Actual Applied Max. Axial Stress</th>
<th>Actual Applied Cyclic Stress</th>
<th>Actual Applied Contact Stress</th>
<th>Average Recov Def. LVDT 1 and 2</th>
<th>Resilient Strain</th>
<th>Resilient Modulus</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGNATION</td>
<td>$S_3$</td>
<td>$S_{cyclic}$</td>
<td>$P_{max}$</td>
<td>$P_{cyclic}$</td>
<td>$P_{contact}$</td>
<td>$S_{max}$</td>
<td>$S_{cyclic}$</td>
<td>$S_{contact}$</td>
<td>$H_{avg}$</td>
<td>$e_r$</td>
<td>$M_r$</td>
</tr>
<tr>
<td>UNIT</td>
<td>psi</td>
<td>psi</td>
<td>lbs</td>
<td>lbs</td>
<td>lbs</td>
<td>psi</td>
<td>psi</td>
<td>psi</td>
<td>in</td>
<td>in/in</td>
<td>psi</td>
</tr>
<tr>
<td>Sequence 1</td>
<td>6.0</td>
<td>2.0</td>
<td>25.2</td>
<td>22.5</td>
<td>2.8</td>
<td>2.1</td>
<td>1.8</td>
<td>0.2</td>
<td>0.0079</td>
<td>0.0010</td>
<td>18,627</td>
</tr>
<tr>
<td>Sequence 2</td>
<td>6.0</td>
<td>4.0</td>
<td>47.6</td>
<td>44.9</td>
<td>2.7</td>
<td>3.9</td>
<td>3.7</td>
<td>0.2</td>
<td>0.0169</td>
<td>0.0021</td>
<td>17,433</td>
</tr>
<tr>
<td>Sequence 3</td>
<td>6.0</td>
<td>6.0</td>
<td>70.3</td>
<td>66.7</td>
<td>3.6</td>
<td>5.8</td>
<td>5.5</td>
<td>0.3</td>
<td>0.0278</td>
<td>0.0035</td>
<td>15,815</td>
</tr>
<tr>
<td>Sequence 4</td>
<td>6.0</td>
<td>8.0</td>
<td>93.8</td>
<td>87.8</td>
<td>6.1</td>
<td>7.7</td>
<td>7.2</td>
<td>0.5</td>
<td>0.0408</td>
<td>0.0051</td>
<td>14,181</td>
</tr>
<tr>
<td>Sequence 5</td>
<td>6.0</td>
<td>10.0</td>
<td>117.1</td>
<td>108.7</td>
<td>8.5</td>
<td>9.6</td>
<td>8.9</td>
<td>0.7</td>
<td>0.0542</td>
<td>0.0068</td>
<td>13,212</td>
</tr>
<tr>
<td>Sequence 6</td>
<td>4.0</td>
<td>2.0</td>
<td>25.2</td>
<td>22.5</td>
<td>2.7</td>
<td>2.1</td>
<td>1.8</td>
<td>0.2</td>
<td>0.0092</td>
<td>0.0011</td>
<td>16,173</td>
</tr>
<tr>
<td>Sequence 7</td>
<td>4.0</td>
<td>4.0</td>
<td>47.1</td>
<td>44.4</td>
<td>2.8</td>
<td>3.9</td>
<td>3.6</td>
<td>0.2</td>
<td>0.0202</td>
<td>0.0025</td>
<td>14,465</td>
</tr>
<tr>
<td>Sequence 8</td>
<td>4.0</td>
<td>6.0</td>
<td>68.6</td>
<td>65.9</td>
<td>2.7</td>
<td>5.6</td>
<td>5.4</td>
<td>0.2</td>
<td>0.0326</td>
<td>0.0041</td>
<td>13,304</td>
</tr>
<tr>
<td>Sequence 9</td>
<td>4.0</td>
<td>8.0</td>
<td>91.9</td>
<td>86.9</td>
<td>5.0</td>
<td>7.5</td>
<td>7.1</td>
<td>0.4</td>
<td>0.0465</td>
<td>0.0058</td>
<td>12,293</td>
</tr>
<tr>
<td>Sequence 10</td>
<td>4.0</td>
<td>10.0</td>
<td>114.9</td>
<td>107.5</td>
<td>7.4</td>
<td>9.4</td>
<td>8.8</td>
<td>0.6</td>
<td>0.0606</td>
<td>0.0076</td>
<td>11,677</td>
</tr>
<tr>
<td>Sequence 11</td>
<td>2.0</td>
<td>2.0</td>
<td>25.0</td>
<td>22.4</td>
<td>2.6</td>
<td>2.1</td>
<td>1.8</td>
<td>0.2</td>
<td>0.0111</td>
<td>0.0014</td>
<td>13,243</td>
</tr>
<tr>
<td>Sequence 12</td>
<td>2.0</td>
<td>4.0</td>
<td>46.1</td>
<td>43.5</td>
<td>2.7</td>
<td>3.8</td>
<td>3.6</td>
<td>0.2</td>
<td>0.0245</td>
<td>0.0031</td>
<td>11,683</td>
</tr>
<tr>
<td>Sequence 13</td>
<td>2.0</td>
<td>6.0</td>
<td>66.9</td>
<td>64.3</td>
<td>2.6</td>
<td>5.5</td>
<td>5.3</td>
<td>0.2</td>
<td>0.0394</td>
<td>0.0049</td>
<td>10,733</td>
</tr>
<tr>
<td>Sequence 14</td>
<td>2.0</td>
<td>8.0</td>
<td>88.7</td>
<td>84.6</td>
<td>4.1</td>
<td>7.3</td>
<td>6.9</td>
<td>0.3</td>
<td>0.0552</td>
<td>0.0069</td>
<td>10,093</td>
</tr>
<tr>
<td>Sequence 15</td>
<td>2.0</td>
<td>10.0</td>
<td>111.7</td>
<td>105.2</td>
<td>6.6</td>
<td>9.2</td>
<td>8.6</td>
<td>0.5</td>
<td>0.0715</td>
<td>0.0089</td>
<td>9,690</td>
</tr>
</tbody>
</table>

**TESTED BY**  
**REVIEWED BY**  
**DATE**  June 15, 2017
M_R = K1 (S_C)^K2 (S_3)^K5

K1 = 12,062
K2 = -0.21053
K5 = 0.32591
R^2 = 0.98
<table>
<thead>
<tr>
<th>STA.#</th>
<th>LOC.</th>
<th>DEPTH</th>
<th>COLOR</th>
<th>#4</th>
<th>#10</th>
<th>#40</th>
<th>#80</th>
<th>#200</th>
<th>L.L.</th>
<th>P.I.</th>
<th>SOIL CLASS</th>
<th>LAB #</th>
<th>%MOISTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>113+90</td>
<td>23 LT</td>
<td>0-5</td>
<td>BROWN</td>
<td>87</td>
<td>81</td>
<td>79</td>
<td>74</td>
<td>60</td>
<td>24</td>
<td>8</td>
<td>A-4(2)</td>
<td>RV411</td>
<td></td>
</tr>
<tr>
<td>110+00</td>
<td>06 RT</td>
<td>0-5</td>
<td>BR/GR</td>
<td>99</td>
<td>97</td>
<td>89</td>
<td>83</td>
<td>70</td>
<td>27</td>
<td>13</td>
<td>A-6(6)</td>
<td>S407</td>
<td>17.6</td>
</tr>
<tr>
<td>110+00</td>
<td>23 RT</td>
<td>0-5</td>
<td>BR/GR</td>
<td>88</td>
<td>77</td>
<td>67</td>
<td>65</td>
<td>57</td>
<td>27</td>
<td>11</td>
<td>A-6(3)</td>
<td>S408</td>
<td>18.1</td>
</tr>
<tr>
<td>114+00</td>
<td>06 LT</td>
<td>0-5</td>
<td>BROWN</td>
<td>97</td>
<td>93</td>
<td>90</td>
<td>84</td>
<td>67</td>
<td>22</td>
<td>8</td>
<td>A-4(2)</td>
<td>S409</td>
<td>21.1</td>
</tr>
<tr>
<td>114+00</td>
<td>23 LT</td>
<td>0-5</td>
<td>BROWN</td>
<td>88</td>
<td>83</td>
<td>80</td>
<td>79</td>
<td>62</td>
<td>25</td>
<td>8</td>
<td>A-4(2)</td>
<td>S410</td>
<td>20.4</td>
</tr>
</tbody>
</table>

**comments:** W=MULTIPLE LAYERS, X=STRIPPED

*Monday, June 19, 2017*
<table>
<thead>
<tr>
<th>STA.#</th>
<th>LOC.</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>110+00</td>
<td>06 RT</td>
<td>ACHMSC AGG. BASE CRS. CL-7</td>
</tr>
<tr>
<td></td>
<td>6.5W</td>
<td>9.0</td>
</tr>
<tr>
<td>110+00</td>
<td>23 RT</td>
<td>ACHMSC AGG. BASE CRS. CL-7</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>114+00</td>
<td>06 LT</td>
<td>ACHMSC AGG. BASE CRS. CL-7</td>
</tr>
<tr>
<td></td>
<td>4.5WX</td>
<td>7.0</td>
</tr>
</tbody>
</table>
**SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT**

**DATE** - 06/19/17  
**SEQUENCE NO.** - 1

**JOB NUMBER** - 080507  
**MATERIAL CODE** - SSRVPS

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

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

**SPEC. REMARKS** - NO SPECIFICATION CHECK  
**COUNTY/STATE** - 53

**SUPPLIER NAME** - STATE  
**DISTRICT NO.** - 08

**NAME OF PROJECT** - DITCH @ L.M. 4.3 STR. & APPRS.(S)  
**DATE SAMPLED** - 05/31/17

**PROJECT ENGINEER** - NOT APPLICABLE  
**DATE RECEIVED** - 06/02/17

**PIT/QUARRY** - ARKANSAS  
**DATE TESTED** - 06/12/17

**LOCATION** - PERRY, COUNTY  
**SAMPLED BY** - THORNTON/TAYLOR

**SAMPLE FROM** - TEST HOLE  
**DATE TESTED** - 06/12/17

**MATERIAL DESC.** - SOIL SURVEY  
**R VALUE** - PAVEMENT SOUNDINGS

| LAB NUMBER | 20171802 | 20171803 | 20171804 |
| SAMPLE ID | S407 | S408 | S409 |
| TEST STATUS | INFORMATION ONLY | INFORMATION ONLY | INFORMATION ONLY |
| STATION | 110+00 | 110+00 | 114+00 |
| LOCATION | 06 RT | 23 RT | 06 LT |
| DEPTH IN FEET | 0-5 | 0-5 | 0-5 |
| MAT' L COLOR | BR/GR | BR/GR | BROWN |
| LATITUDE DEG-MIN-SEC | 35 3 18.00 | 35 03 18.10 | 35 3 17.90 |
| LONGITUDE DEG-MIN-SEC | 93 02 13.20 | 93 02 13.10 | 93 02 17.90 |
| % PASSING | 2 IN. | 1 1/2 IN. | 3/4 IN. |
| | | 3/8 IN. | 100 |
| NO. 4 | 99 | 88 | 97 |
| NO. 10 | 97 | 77 | 93 |
| NO. 40 | 89 | 67 | 90 |
| NO. 200 | 70 | 57 | 67 |
| LIQUID LIMIT | 27 | 27 | 22 |
| PLASTICITY INDEX | 13 | 11 | 8 |
| AASHTO SOIL | A-6(6) | A-6(3) | A-4(2) |
| UNIFIED SOIL | | | |
| % MOISTURE CONTENT | 17.6 | 18.1 | 21.1 |
| ACHMSC | (IN) | 6.5W | --- |
| AGG. BASE CRS. CL-7 (IN) | 9.0 | --- | 4.5WX |

**REMARKS** - W=MULTIPLE LAYERS, X=STRIPPED

**AASHTO TESTS**: T24 T88 T89 T90 T265
DATE - 06/12/17  SEQUENCE NO. - 2
JOB NUMBER - 080507  MATERIAL CODE - SSRVPS
FEDERAL AID NO.- TO BE ASSIGNED  SPEC. YEAR - 2014
PURPOSE - SOIL SURVEY SAMPLE  SUPPLIER ID. - 1
SPEC. REMARKS - NO SPECIFICATION CHECK  COUNTY/STATE - 53
SUPPLIER NAME - STATE  DISTRICT NO. - 08
NAME OF PROJECT - DITCH @ L.M. 4.3 STR. & APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - PERRY, COUNTY  DATE SAMPLED - 05/31/17
SAMPLED BY - THORNTON/TAYLOR  DATE RECEIVED - 06/02/17
SAMPLE FROM - TEST HOLE  DATE TESTED - 06/12/17
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER - 20171805
SAMPLE ID - S410
TEST STATUS - INFORMATION ONLY
STATION - 114+00
LOCATION - 23 LT
DEPTH IN FEET - 0-5
MAT'L COLOR - BROWN
MAT'L TYPE
LATITUDE DEG-MIN-SEC - 35 3 17.80
LONGITUDE DEG-MIN-SEC - 93 02 17.90
% PASSING 2 IN. -
1 1/2 IN. -
3/4 IN. - 100
3/8 IN. - 98
NO. 4 - 88
NO. 10 - 83
NO. 40 - 80
NO. 80 - 76
NO. 200 - 62
LIQUID LIMIT - 25
PLASTICITY INDEX - 8
AASHTO SOIL - A-4(2)
UNIFIED SOIL

% MOISTURE CONTENT - 20.4

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265
DATE - 06/12/17
JOB NUMBER - 080507
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - DITCH @ L.M. 4.3 STR. & APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - PERRY, COUNTY
SAMPLED BY - THORNTON/TAYLOR
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

LAB NUMBER - 20171806
SAMPLE ID - RV411
TEST STATUS - INFORMATION ONLY
STATION - 113+90
LOCATION - 23 LT
DEPTH IN FEET - 0-5
MAT'L COLOR - BROWN
MAT'L TYPE -
LATITUDE DEG-MIN-SEC - 35 3 17.80
LONGITUDE DEG-MIN-SEC - 93 02 17.80

% PASSING 2 IN. -
1 1/2 IN. -
3/4 IN. - 100
3/8 IN. - 98
NO. 4 - 87
NO. 10 - 81
NO. 40 - 79
NO. 80 - 74
NO. 200 - 60

LIQUID LIMIT - 24
PLASTICITY INDEX - 8
AASHTO SOIL - A-4(2)
UNIFIED SOIL -
% MOISTURE CONTENT -

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

AASHTO TESTS: T24 T88 T89 T90 T265