

Project #:
Project Name:

Revision Date: 9/29/08

### CBR (California Bearing Ratio) of Laboratory Compacted Soil



AASHTO T 193

Quality Assurance

|   | S&ME, Inc. ~ 9751 Southern Pine Bou | levard ~ Charlotte, NC 28273 |           |
|---|-------------------------------------|------------------------------|-----------|
|   | 3735-14-001                         | Report Date:                 | 3/12/14   |
| : | Ecusta Mill Site                    | Test Date(s)                 | 3/6-12/14 |

Client Name: Shaw Environmental & Infrastructure, Inc.

Client Address: 11560 Great Oaks Way, Suite 500, Alpharetta, GA

Boring #: Area 1 Sample #: P-2 Sample Date: 2/21-26/14

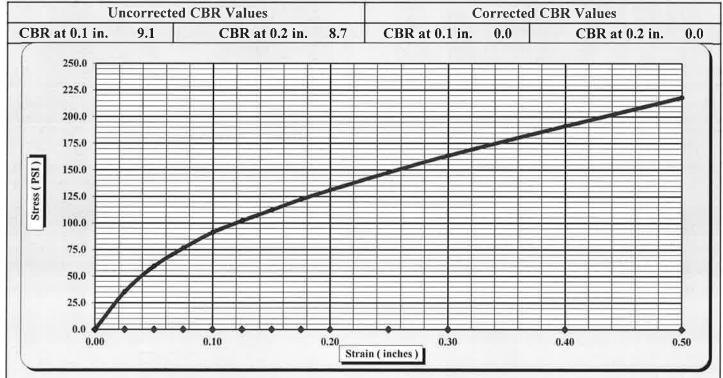
Location: On-site Offset: NI Elevation: NI

Sample Description: Red Black Brown Silty Coarse to Fine Sand

AASHTO T99 Method A Maximum Dry Density: 101.3 PCF Optimum Moisture Content: 20.3%

Compaction Test performed on the Fine Fraction only

% Retained on the 3/4" sieve: 0.3%



CBR Sample Preparation:

Performed on the fine fraction

Grading was in accordance with the above method and compacted using the 6" diameter CBR mold. AASHTO T 193, Section 5.1.1

| Before Soaking                             | After Soaking |   |       |  |
|--|---------------|---|-------|--|
| Compactive Effort (Blows per Layer)        | 30            | Final Dry Density (PCF)                 | 93.3  |  |
| Initial Dry Density (PCF)                  | 96.3          | Average Final Moisture Content          | 23.8% |  |
| Moisture Content of the Compacted Specimen | 20.6%         | Moisture Content (top 1" after soaking) | 24.9% |  |
| Percent Compaction                         | 95.1%         | Percent Swell                           | 0.2%  |  |

Soak Time: 96 Hours Surcharge Weight 30.5 Surcharge Wt. per sq. Ft. 155.0 Liquid Limit ND Plastic Index ND Apparent Relative Density ND

Notes/Deviations/References: NI = No information provided. ND = No determined.

Technician: Jennifer Olsen Jennifer I Claud / Date: 3/12/14

Ron Harris / Ron Rothfuss

Technical Responsibility

Staff Professional

3/17/2014

Revision Date: 9/29/08

### **CBR** Compaction



ASTM D1883 □ AASHTO T193 ⊠ Compaction and Swell Data **Ouality Assurance** S&ME, Inc. ~ 9751 Southern Pine Boulevard ~ Charlotte, NC 28273 3735-14-001 3/12/14 Project #: Report Date: Test Date(s) 3/6-12/14 Project Name: Ecusta Mill Site Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpharetta, GA 2/21-26/14 Boring #: Area 1 Sample #: P-2 Sample Date: Location: On-site Offset: NI Elevation: NI Sample Description: Red Black Brown Silty Coarse to Fine Sand S&ME ID # Type and Specification Type and Specification Cal Date: S&ME ID # Cal Date: Balance (0.1 g) Compaction Mold 3609 7/5/2013 22182 6/18/2013 Balance 22182 6/18/2013 Compaction Hammer 20120 10/14/2013 1/20/2014 27831 2/5/2014 Oven 22152 Straightedge AASHTO T180 Moisture-Density Relationship ASTM D1557 AASHTO T99 🗵 ASTM D 698  $\square$ Method A  $\square$ Method B Method C П Method D Compaction Test performed on the Fine Fraction only  $\times$ Compaction Test performed on grading complying with CBR spec. Optimum Moisture Content 20.3% Maximum Dry Density 101.3 PCF **CBR Sample** Compaction performed on the Fine Fraction: Replacement Method ASTM D 1883, Section 6.1.1 □ AASHTO T 193 Section 5.1.1 ⊠ Entire Sample Mechanical Hammer Manual Hammer Moist Preparation □ Dry Preparation 🗵 AASHTO T265 ASTM D4959 Water Content **ASTM D2216** X **ASTM D4643** Sample Note/Tare No.: 5E HK CBR Test 5E A. Tare Weight (grams) 158.0 159.1 158.0 A. B. Wet Wt + Tare Wt (grams) В. 761.2 1122.3 761.2 C. Dry Wt. + Tare Wt. (grams) C. 658.3 955.4 658.3 D. Water Weight (grams) B-C 102.9 166.9 102.9 796.3 E. Dry Weight (grams) C-A 500.3 500.3 F. Moisture Content (%) 100\*D/E 20.6% 21.0% 20.6% % Compaction 95.0% Moisture Content 20.3% Sample Preparation Targets: MDD x % Compaction Target Dry Density (Lbs./cu.ft.) 96.2 Mold # 3609 Dry Density (grams/ cu.ft.) 43652.2 Mold Diameter (in.) 6.005 В 453.6 x A D Mold volume Factor (MVF) 1/Volume Mold Height (in.) 4.583 13.37 Wet Density (grams/ cu.ft.) 0.3819 Е 52630.4 B x (1+ Moisture Content) Mold Height (ft.) F Wt. of Soil in Mold (grams) 3936.8 E/D Mold Area (sq.ft.) 0.1967 G # of Lifts 3 used to compact sample Mold Volume (Linear) 0.0751 Wt. of Soil per Lift (grams) 1312.3 Mold Volume (Water) 0.0748 Η F/G # of Blows per Lift Time Date 30 Soak Mold Weight (Lbs. or grams) 7008 Start 3/7/2014 I Mold Wt. + Soil Wt. (Lbs. or g.) 10949 End 3/11/2014 J After Compaction K Soil Weight (Lbs. or grams) 3941.0000 J-I Total 96 Hours K\*453.6 or K L Wet Soil Wt. (grams) 3941.0 % Swell Dry Soil Wt. (grams) 3268.7 L/(1+MC) Reading 1 0.0000 M N **Percent Compaction** 95.1% Percentage of MDD Reading 2 0.0090 0 Dry Density (Lbs./cu.ft.) 96.3 O = (M/453.6)\*DDifference 0.0090 0.2% Wet Density (Lbs./cu.ft.) 116.2 O\*(1+MC) % Swell NI = No information provided. ND = Not determined. Notes/Deviations: Jennifer Olsen Juniow L Oban 3/12/2014 Ron Harris / Ron Rothfuss

Technical Responsibility

Technician Name

Revision Date: 9/29/08

#### **CBR** Penetration



ASTM D 1883 □ AASHTO T 193 ⊠ Quality Assurance S&ME, Inc. ~ 9751 Southern Pine Boulevard ~ Charlotte, NC 28273 3/12/14 Project #: 3735-14-001 Report Date: 3/6-12/14 Ecusta Mill Site Test Date(s) Project Name: Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpharetta, GA Sample #: P-2 Sample Date: 2/21-26/14 Boring #: Area 1 Offset: NI Elevation: NI Location: On-site Sample Description: Red Black Brown Silty Coarse to Fine Sand Type and Specification Cal Date: Type and Specification S&ME ID # Cal Date: S&ME ID # Penetration Piston 6/11/2013 Balance (0.1 g) 22182 20227 6/18/2013 Balance 6/18/2013 Strain Gauge 22182 Oven 22152 1/20/2014 Proving Ring Volume of Soil after Swell Moisture Sample After Soaking and Penetration: Top 1 inch Average Tare #: JB JC New Height (in.) 4.592 162.2 New Height (ft.) 0.3827 A. Tare Weight (grams) A. 156.5 B. Wet Wt + Tare Wt (grams) 842.4 1378.5 New Volume (cu.ft.) 0.0753 B. C. Dry Wt. + Tare Wt. (grams) C. 705.7 1144.9 Final Wet Density 115.4 Piston # D. Water Weight (grams) B-C 136.7 233.6 20227 E. Dry Weight (grams) C-A 549.2 982.7 Piston Diameter (in.) 1.951 Piston Area (sq.in.) F. Moisture Content (%) 100\*D/E 24.9% 23.8% 2.990

| Sample Parameters                  |          | Before Soaking                             |       |  |  |
|------------------------------------|----------|--|-------|--|--|
| Maximum Dry Density (PCF)          | 101.3    | Initial Dry Density (PCF)                  | 96.3  |  |  |
| Optimum Moisture Content           | 20.3%    | Moisture Content of the Compacted Specimen | 20.6% |  |  |
| Percent Retained on 3/4 inch sieve | 0.3%     | Percent Compaction                         | 95.1% |  |  |
| Soak Time:                         | 96 Hours | After Soaking                              |       |  |  |
| Surcharge Weight (Lbs.)            | 30.5     | Final Dry Density (PCF)                    | 93.3  |  |  |
| Surcharge Wt. per sq. Ft.          | 155.0    | Percent Swell                              | 0.2%  |  |  |

Strain Rate: .05 inches/minute Proving Ring Capacity: Proving Ring ID #: Stress **Bearing Ratio** Penetration Time Load Load inches minutes divisions Lbs. **PSI** % 0 0 0 0.0 0.025 0.5 106 35.5 0.050 1.0 178 59.5 0.075 1.5 229 76.6 0.100 2.0 273 91.3 9.1 306 102.4 0.125 2.5 0.150 3.0 336 112.4 0.175 3.5 366 122.4 0.200 4.0 392 131.1 8.7 5.0 147.8 0.250 442 0.300 6.0 489 163.6 572 191.3 8.0 0.400 0.500 10.0 652 218.1

Notes/Deviations NI = No information provided. ND = Not determined.

Jennifer Olsen
Technician Name

Jennifer I (Nor 3/12/2014)

Date

Ron Harris / Ron Rothfuss

Technical Responsibility

3/17/2014

Date

Revision Date: 9/29/08

Revision No. 1

### CBR (California Bearing Ratio) of Laboratory **Compacted Soil**



AASHTO T 193

Quality Assurance

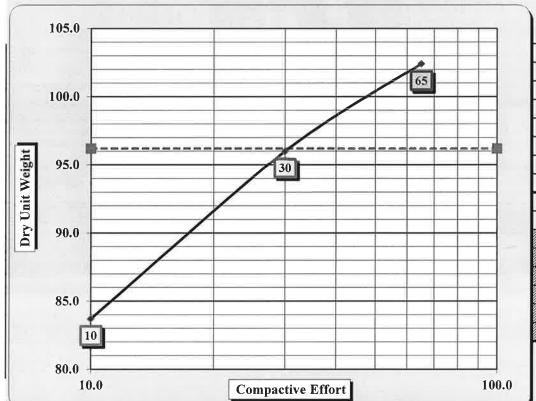
| S&ME, Inc. ~ 9751 Southern Pine Boulevard ~ Charlotte, NC 28273 |   |              |           |  |  |  |
|---|---|--------------|-----------|--|--|--|
| Project #:  | 3735-14-001                                     | Report Date: | 3/12/14   |  |  |  |
| Project Name:   | Ecusta Mill Site                                | Test Date(s) | 3/6-12/14 |  |  |  |
| Client Name:  | Shaw Environmental & Infrastructure, Inc.       |              |           |  |  |  |
| Client Address:   | 11560 Great Oaks Way, Suite 500, Alpharetta, GA |              |           |  |  |  |

Sample #: P-2 Boring #: Sample Date: 2/21-26/14 Area 1

On-site Offset: NI Elevation: NI Location:

Red Black Brown Silty Coarse to Fine Sand Sample Description:

## Compactive Effort vs. Dry Unit weight



| Series 1          |             |  |  |  |  |  |  |
|-------------------|-------------|--|--|--|--|--|--|
| Compactive effort | Dry Wt. PCF |  |  |  |  |  |  |
| 10                | 83.7        |  |  |  |  |  |  |
| 30                | 96.0        |  |  |  |  |  |  |
| 65                | 102.4       |  |  |  |  |  |  |
|                   |             |  |  |  |  |  |  |
|                   |             |  |  |  |  |  |  |
|                   |             |  |  |  |  |  |  |

| Series 2: MDD |      |  |  |  |  |  |
|---------------|------|--|--|--|--|--|
| 10            | 96.2 |  |  |  |  |  |
| 100           | 96.2 |  |  |  |  |  |
|               |      |  |  |  |  |  |
|               |      |  |  |  |  |  |
|               |      |  |  |  |  |  |
|               |      |  |  |  |  |  |

NI = No information provided. ND = Not determined. Notes / Deviations / References:

Date: 3/12/14 Technician: Jennifer Olsen

Ron Harris / Ron Rothfuss

Technical Responsibility

Staff Professional 3/17/2014

Position Date

This record is for internal use only.

Revision Date: 9/29/08

Revision No. 1

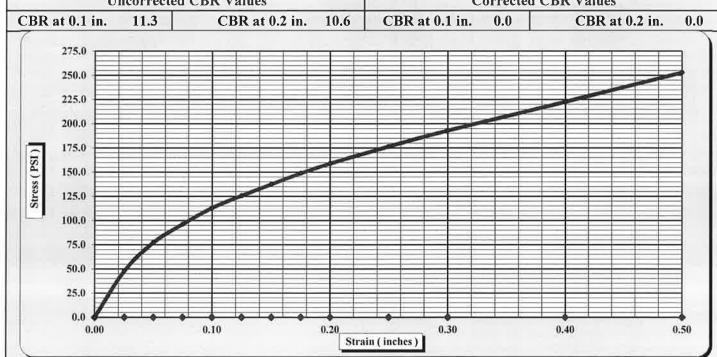
# CBR (California Bearing Ratio) of Laboratory Compacted Soil



AASHTO T 193

Quality Assurance

|                 |   | AABITI                              | 0 1 193            |              | Quality As         | surunce  |  |
|-----------------|---|-------------------------------------|--------------------|--------------|--------------------|----------|--|
|                 | S&  | ME, Inc. ~ 9751 Southern Pin        | e Boulevard ~ Cha  | rlotte, NC 2 | 8273               |          |  |
| Project #:      | 3735-14-                                    | -001                                |                    | Report       | Date: 3/           | 5/14     |  |
| Project Name:   | Ecusta N                                    | Iill Site                           |                    | Test Da      | ate(s) 2/27/1      | 4-3/5/14 |  |
| Client Name:    | Shaw En                                     | vironmental & Infrastructure, Ir    | ic.                | (0.1)        |                    | 1        |  |
| Client Address: | 11560 G                                     | reat Oaks Way, Suite 500, Alph      | eretta, GA         |              |                    |          |  |
| Boring #: Are   | ea 2  | Sample #:                           | P-1                | Sample       | Date: 2/19-20/1    | 4        |  |
| Location: On    | -site                                       | Offset                              | NI                 | Eleva        | ation: NI          |          |  |
| Sample Descript | ion: Blac                                   | k Gray Clayey Silty Coarse to I     | ine Sand with Grav | el           |                    |          |  |
| AASHTO T99      | Method D                                    | Maximum Dry Density: 10             | 08.3 PCF C         | ptimum Moi   | isture Content:    | 16.0%    |  |
| Compact         | ion Test perfe                              | ormed on grading complying with CBR | spec.              | % Retained   | on the 3/4" sieve: | 2.9%     |  |
| 17              | Uncorrected CBR Values Corrected CBR Values |                                     |                    |              |                    |          |  |
| CBR at 0.1 in.  | 11.3  | CBR at 0.2 in. 10.6                 | CBR at 0.1 in.     | 0.0          | CBR at 0.2         | in. 0.0  |  |
| (               |   |                                     |                    |              |                    |          |  |



CBR Sample Preparation:

Performed on the fine fraction

Grading was in accordance with the above method and compacted using the 6" diameter CBR mold. AASHTO T 193, Section 5.1.1

| Before Soaking                             | After Soaking  |   |              |  |
|--|----------------|---|--------------|--|
| Compactive Effort (Blows per Layer)        | 30             | Final Dry Density (PCF)                 | 97.8         |  |
| Initial Dry Density (PCF)                  | 102.0          | Average Final Moisture Content          | 20.0%        |  |
| Moisture Content of the Compacted Specimen | 15.8%          | Moisture Content (top 1" after soaking) | 21.1%        |  |
| Percent Compaction                         | 94.2%          | Percent Swell                           | 0.2%         |  |
| Soak Time: 96 Hours Sun                    | rcharge Weight | 30.5 Surcharge Wt. per so               | ı. Ft. 155.0 |  |

Liquid Limit ND Plastic Index ND

Notes/Deviations/References: NI = No information provided. ND = Not determined.

Technician: Jennifer Olsen Jung LOUS 11 Date: 3/5/14

Ron Harris / Ron Rothfuss

Technical Responsibility Signature

Staff Professional

Apparent Relative Density

3/7/14 Date

ND

Revision Date: 9/29/08

#### **CBR** Penetration



ASTM D 1883 □

AASHTO T 193 🖾

Quality Assurance

|                                 |                    | ASTM D      | 1883 □     |                                 | AASHTO T 193          |                 | Juality A  | ssurance  |
|---------------------------------|--------------------|-------------|------------|---------------------------------|-----------------------|-----------------|------------|-----------|
|                                 | S&ME, Inc          | ~ 9751 S    | outhern    | Pine Bou                        | ılevard ~ Charlot     | te, NC 28273    |            |           |
| Project #: 37                   | 35-14-001          |             |            |                                 |                       | Report Date:    | 3          | 3/5/14    |
| Project Name: Ed                | custa Mill Site    |             |            |                                 |                       | Test Date(s)    | 2/27/      | 14-3/5/14 |
| Client Name: Sh                 | naw Environme      | ntal & Infi | rastructur | e, Inc.                         |                       |                 |            |           |
| Client Address: 11              | 560 Great Oaks     | s Way, Su   | ite 500, A | lpheretta                       | ı, GA                 |                 |            |           |
| Boring #: Area 2                |                    |             | Samp       | le #: P-1                       |                       | Sample Date: 2  | /19-20/    | 14        |
| Location: On-site               | е                  |             | Of         | fset: NI                        |                       | Elevation: N    | 1I         |           |
| Sample Description:             | Black Gray (       | Clayey Sil  | ty Coarse  | to Fine S                       | Sand with Gravel      |                 |            |           |
| Type and Specification          | S&ME I             | D#          | Cal Date:  | Туре                            | e and Specification   | S&ME ID         | #          | Cal Date: |
| Balance (0.1 g)                 | 2218               | 2           | 6/18/2013  | Pene                            | etration Piston       | 20227           |            | 6/11/2013 |
| Balance                         | 2218               | 2           | 6/18/2013  | Stra                            | in Gauge              |                 |            |           |
| Oven                            | 2215               | 2           | 1/20/2014  | Prov                            | ing Ring              |                 |            |           |
| Moisture Sample A               | fter Soaking and P | enetration: | Top 1      | l inch                          | Average               | Volume o        | f Soil aft | er Swell  |
|                                 |                    | Tare #:     | 5          | E                               | JDM                   | New Height      | (in.)      | 4.591     |
| A. Tare Weight (grams           | s)                 | A.          | 15         | 7.8                             | 159.6                 | New Height      | (ft.)      | 0.3826    |
| B. Wet Wt + Tare Wt             | (grams)            | В,          | 71         | 8.1                             | 1602.0                | New Volume (    | cu.ft.)    | 0.0752    |
| C. Dry Wt. + Tare Wt.           | (grams)            | C,          | 62         | 0.6                             | 1361.6                | Final Wet De    | nsity      | 117.4     |
| D. Water Weight (grams) B-C     |                    | В-С         | 97         | 7.5                             | 240.4                 | Piston #        |            | 20227     |
| E. Dry Weight (grams) C-A       |                    | 46          | 2.8        | 1202.0                          | Piston Diameter (in.) |                 | 1.951      |           |
| F. Moisture Content (%) 100*D/E |                    |             | 21.        | 1%                              | 20.0%                 | Piston Area (s  | sq.in.)    | 2.990     |
| Sa                              | mple Parameters    |             |            |                                 | Be                    | efore Soaking   |            |           |
| Maximum Dry Density (F          | PCF)               | 10          | 8.3        | Initial Dry Density (PCF) 102.0 |                       |                 |            | 102.0     |
| Optimum Moisture Conte          | ent                | 16.         | 0%         | Moisture                        | Content of the Com    | pacted Specimen |            | 15.8%     |
|                                 |                    |             |            |                                 |                       |                 |            |           |

| Strain Rate:  | .05 inches/minute         | Proving Ring Capacity: | Proving Ring ID #: |
|---------------|---------------------------|------------------------|--------------------|
| Strain ztatet | 100 111011100/11111111111 | Trotting cupucity      |                    |

2.9%

96 Hours

30.5

155.0

| Penetration | Time    | Load      | Load | Stress | Bearing Ratio |
|-------------|---------|-----------|------|--------|---------------|
| inches      | minutes | divisions | Lbs. | PSI    | %             |
| 0           | 0       |           | 0    | 0.0    |               |
| 0.025       | 0.5     |           | 143  | 47.8   |               |
| 0.050       | 1.0     |           | 231  | 77.3   |               |
| 0.075       | 1.5     |           | 288  | 96.3   |               |
| 0.100       | 2.0     |           | 338  | 113.1  | 11.3          |
| 0.125       | 2.5     |           | 376  | 125.8  |               |
| 0.150       | 3.0     |           | 411  | 137.5  |               |
| 0.175       | 3.5     |           | 445  | 148.9  |               |
| 0.200       | 4.0     |           | 475  | 158.9  | 10.6          |
| 0.250       | 5.0     |           | 528  | 176.6  |               |
| 0.300       | 6.0     |           | 577  | 193.0  |               |
| 0.400       | 8.0     |           | 666  | 222.8  |               |
| 0.500       | 10.0    |           | 756  | 252.9  |               |

Percent Compaction

Percent Swell

Final Dry Density (PCF)

After Soaking

NI = No information provided. ND = Not determined. Notes/Deviations

Technician Name

Percent Retained on 3/4 inch sieve

Surcharge Weight (Lbs.)

Surcharge Wt. per sq. Ft.

Soak Time:

Jennifer Olsen Jenny & Olie

3/5/2014 Date

Ron Harris / Ron Rothfuss Technical Responsibility

Date

94.2%

97.8

0.2%

#### Revision Date: 9/29/08

## **CBR** Compaction



| Compaction and Swell Data AST  | TM D1883     | _                                 | 71/1011                                 | TO T193   | 441                  | Quality A       | ssurance   |  |  |  |
|--|--------------|-----------------------------------|---|-----------|----------------------|-----------------|------------|--|--|--|
| S&ME, Inc. ~ 9751 Southern Pine Boulevard ~ Charlotte, NC 28273  |              |                                   |   |           |                      |                 |            |  |  |  |
| Project #: 3735-14-001   |              |                                   |   |           | Report D             | Pate:           | 3/5/14     |  |  |  |
| Project Name: Ecusta Mill Site   |              |                                   |   |           | Test Dat             | te(s) 2/27/     | 14-3/5/14  |  |  |  |
| Client Name: Shaw Environmental &  | & Infrastru  | cture, In                         | ıc.                                     |           |                      |                 |            |  |  |  |
| Client Address: 11560 Great Oaks Way   | y, Suite 50  | 00, Alpho                         | eretta, GA                              |           |                      |                 |            |  |  |  |
| Boring #: Area 2   | S            | ample #:                          | P-1                                     |           | Sample D             | oate: 2/1       | 9-20/14    |  |  |  |
| Location: On-site  |              | Offset:                           | NI                                      |           | Elevat               | ion;            | NI         |  |  |  |
| Sample Description: Black Gray Clayer  | y Silty Co   | arse to F                         | ine Sand with                           | Gravel    |                      |                 |            |  |  |  |
| Type and Specification S&ME ID #   | Cal L        | Date:                             | Type and Speci                          | ification | S&i                  | ME ID #         | Cal Date:  |  |  |  |
| Balance (0.1 g) 22182  | 6/18/        | 2013                              | Compaction M                            |           |                      | 3609            | 6/7/2013   |  |  |  |
| Balance 22182  | 6/18/        |                                   | Compaction Ha                           | ammer     |                      |                 | 10/14/2013 |  |  |  |
| Straightedge 27831   | 2/5/2        |                                   | Oven                                    |           |                      | 22152           | 1/20/2014  |  |  |  |
| Moisture-Density Relationship ASTM D 698 ☐ ASTM D 1557 ☐ AASHTO T99 ☒ AASHTO T180 ☐ Method A ☐ Method B ☐ Method C ☐ Method D ☒ Compaction Test performed on the Fine Fraction only ☐ Compaction Test performed on grading complying with CBR spec. ☒ Maximum Dry Density 108.3 PCF Optimum Moisture Content 16.0% |              |                                   |   |           |                      |                 |            |  |  |  |
| CBR Sample Compaction pe   |              |                                   |   | mum wio   | isture Con           | itent 10.076    |            |  |  |  |
|  | HTO T 193    |                                   |   | Entire Sa | mnle 🗆               | Renlaceme       | nt Method  |  |  |  |
| · ·  | ıl Hammer    |                                   | Moist Prepara                           |           |                      | Ory Preparation |            |  |  |  |
| Water Content ASTM D2216   |              | SHTO T                            | 41 - 41 - 41 - 41 - 41 - 41 - 41 - 41 - | STM D49   |                      | ASTM D46        |            |  |  |  |
| Sample Note/   |              |                                   | 5E                                      | adjusted  | KH                   | CBR Test        | KH         |  |  |  |
| A. Tare Weight (grams)   | Α.           |                                   | 157.9                                   |           | 159.5                |                 | 159.5      |  |  |  |
| B. Wet Wt + Tare Wt (grams)  | B.           |                                   | 914.9                                   |           | 1331.7               |                 | 1331.7     |  |  |  |
| C. Dry Wt. + Tare Wt. (grams)  | C.           |                                   | 811.6                                   |           | 1171.9               |                 | 1171.9     |  |  |  |
| D. Water Weight (grams)  | <b>B-C</b> 1 |                                   | 103.3                                   |           | 159.8                |                 | 159.8      |  |  |  |
| E. Dry Weight (grams)  | C-A 653.7    |                                   |   | 1012.4    |                      | 1012.4          |            |  |  |  |
| F. Moisture Content (%)  | 00*D/E       |                                   |   | 15.8%     |                      | 15.8%           |            |  |  |  |
| Sample Preparation Targets: %  | Compaction   | on 95.0                           | % Moisture                              | Content   | 16.0%                | ó               |            |  |  |  |
| A Target Dry Density (Lbs./cu.ft.)   | 102          |                                   | MDD x % Compa                           | ction     | I A                  | Iold #          | 3609       |  |  |  |
| B Dry Density (grams/ cu.ft.)  | 4666         | 58.6                              | 453.6 x A                               |           | Mold D               | iameter (in.)   | 6.005      |  |  |  |
| D Mold volume Factor (MVF)   | 13.          | 37                                | 1/Volume                                |           | Mold Height (in.)    |                 | 4.583      |  |  |  |
| E Wet Density (grams/ cu.ft.)  | 5403         | 54034.9 B x (1+ Moisture Content) |   | Content)  | Mold Height (ft.)    |                 | 0.3819     |  |  |  |
| F Wt. of Soil in Mold (grams)  | 404          | 1.8                               | E/D                                     |           | Mold Area (sq.ft.)   |                 | 0.1967     |  |  |  |
| G # of Lifts   | 3            | ,                                 | used to compact sample                  |           | Mold Volume (Linear) |                 | 0.0751     |  |  |  |
| H Wt. of Soil per Lift (grams)   | 134          | 7.3                               | F/G                                     |           | Mold Volume (Water)  |                 | 0.0748     |  |  |  |
| # of Blows per Lift  | 30           | 0                                 |   |           | Soak                 | Time            | Date       |  |  |  |
| I Mold Weight (Lbs. or grams)  | 700          | 08                                |   |           | Start                |                 | 2/28/2014  |  |  |  |
| J Mold Wt. + Soil Wt. (Lbs. or g.)   | 110          | 14                                | After Compaction                        | n         | End                  |                 | 3/4/2014   |  |  |  |
| K Soil Weight (Lbs. or grams)  | 4006.        | 0000                              | J-I                                     |           | Total                | 96 I            | Iours      |  |  |  |
| L Wet Soil Wt. (grams)   | 400          | 6.0                               | K*453.6 or K                            |           |                      | % Swell         |            |  |  |  |
| M Dry Soil Wt. (grams)   | 345          | 9.9                               | L/(1+MC)                                |           | Re                   | ading 1         | 0.0000     |  |  |  |
| N Percent Compaction   | 94.2         | 2%                                | Percentage of MDI                       | )         | Reading 2            |                 | 0.0080     |  |  |  |
| O Dry Density (Lbs./cu.ft.)  | 102          | 2.0                               | O = (M/453.6)*D                         |           | Di                   | fference        | 0.0080     |  |  |  |
| P Wet Density (Lbs./cu.ft.)  | 118          |                                   | O*(1+MC)                                |           | %                    | Swell           | 0.2%       |  |  |  |
| Notes/Deviations: NI = No information  | n provided.  | ND = N                            | ot determined.                          |           |                      |                 |            |  |  |  |

Jennifer Olsen Lung LOgu 3/5/2014
Technician Name

Jennifer Olsen Logue 3/5/2014

Date

Ron Harris / Ron Rothfuss
Technical Responsibility

i i

Page 1 of 1

Revision Date: 9/29/08

### CBR (California Bearing Ratio) of Laboratory Compacted Soil



AASHTO T 193

Quality Assurance

|                 | 11115111 0 1 175                         | 20                       | attity 713347 tinee |
|-----------------|--|--------------------------|---------------------|
|                 | S&ME, Inc. ~ 9751 Southern Pine Bouleva  | rd ~ Charlotte, NC 28273 |                     |
| Project #:      | 3735-14-001                              | Report Date:             | 4/9/14              |
| Project Name:   | Ecusta Mill Site                         | Test Date(s)             | 4/3-9/14            |
| Client Name:    | NI                                       |                          |                     |
| Client Address: | NI                                       |                          |                     |
| Boring #: Are   | ea 3 Sample #: P-3                       | Sample Date: 3/          | 18-27/14            |
| Location: On    | -site Offset: NI                         | Elevation: N             | [                   |
| C1- Di4         | Died Dues City Comme to Fine Conducity C | Nan1                     |                     |

Sample Description: Black Brown Silty Coarse to Fine Sand with Gravel

AASHTO T99 Method D Maximum Dry Density: 112.5 PCF Optimum Moisture Content: 14.9%

Compaction Test performed on grading complying with CBR spec.

% Retained on the 3/4" sieve: 3.5%

| Uncorrected CBR Values         |               |      |             |              | Corrected CBR Values |            |     |            |         |
|--------------------------------|---------------|------|-------------|--------------|----------------------|------------|-----|------------|---------|
| CBR at 0.1 in.                 | 7.4           | CBR  | at 0.2 in.  | 8.1          | CBR                  | at 0.1 in. | 7.6 | CBR at 0.2 | in. 8.2 |
| 250.0                          |               |      |             |              |                      |            |     |            | ==      |
| 225.0                          |               |      |             |              |                      |            |     |            |         |
| 200.0                          |               |      |             |              |                      |            |     |            |         |
| 175.0                          |               |      |             | 1            |                      |            |     |            |         |
| 150.0                          |               |      | Corrected V | /alue at .2' | <b>J</b>             |            |     |            |         |
| 150.0 Loss 125.0 Correct 100.0 | eted Value at | .1"  |             |              |                      |            |     |            |         |
| 100.0                          |               |      |             |              |                      |            |     |            |         |
| 75.0                           |               |      |             |              |                      |            |     |            |         |
| 50.0                           |               |      |             |              |                      |            |     |            |         |
| 25.0                           |               |      |             |              |                      |            |     |            |         |
| 0.0                            | •             | 0.10 | •           | 0.20<br>Stra | in ( inches          | 0.30       |     | 0.40       | 0.50    |

CBR Sample Preparation:

Performed on the fine fraction

Grading was in accordance with the above method and compacted using the 6" diameter CBR mold. AASHTO T 193, Section 5.1.1

ND

| Before Soaking                             | After Soaking  |   |           |  |
|--|----------------|---|-----------|--|
| Compactive Effort (Blows per Layer)        | 22             | Final Dry Density (PCF)                 | 104.6     |  |
| Initial Dry Density (PCF)                  | 107.0          | Average Final Moisture Content          | 17.0%     |  |
| Moisture Content of the Compacted Specimen | 15.0%          | Moisture Content (top 1" after soaking) | 17.5%     |  |
| Percent Compaction                         | 95.1%          | Percent Swell                           | 0.1%      |  |
| Soak Time: 96 Hours Sur                    | rcharge Weight | 30.5 Surcharge Wt. per so               | Ft. 155.0 |  |

Plastic Index

Notes/Deviations/References: NI = No information provided. ND = Not determined.

ND

Technician: Jennifer Olsen January LOUN Date: 4/9/14

Ron Harris / Ron Rothfuss
Technical Responsibility

Liquid Limit

nsibility Signatus

Staff Professiona

Apparent Relative Density

4.10,2014

ND

Revision Date: 9/29/08

### **CBR** Penetration



ASTM D 1883 □

AASHTO T 193 🗵

Quality Assurance

|  | ASTM D           | 1883 □     |                  | AASHTO T 19                             | S IXI (               | Quality A            | ssurance  |
|--|------------------|------------|------------------|---|-----------------------|----------------------|-----------|
| S&ME                                   | , Inc. ~ 9751 S  | outhern    | Pine Bou         | levard ~ Charlo                         | tte, NC 28273         |                      |           |
| Project #: 3735-14-001                 |                  |            |                  |   | Report Date:          | 4                    | /9/14     |
| Project Name: Ecusta Mill              | Site             |            |                  |   | Test Date(s)          | 4/                   | 3-9/14    |
| Client Name: NI                        |                  |            |                  |   |                       |                      |           |
| Client Address: NI                     |                  |            |                  |   |                       |                      |           |
| Boring #: Area 3                       |                  | Samp       | le #: P-3        | *************************************** | Sample Date: 3        | /18-27/1             | 14        |
| Location: On-site                      |                  |            | fset: NI         |   | Elevation: N          | 1I                   |           |
| Sample Description: Black B            | rown Silty Coa   | rse to Fin | ne Sand w        | ith Gravel                              |                       |                      |           |
|  |                  | Cal Date:  |                  | and Specification                       | S&ME ID               | #                    | Cal Date: |
| Balance (0.1 g)                        | 22182            | 6/18/2013  | Penet            | ration Piston                           | 20227                 |                      | 6/11/2013 |
| Balance                                | 22182            | 6/18/2013  | Strair           | n Gauge                                 |                       |                      |           |
| Oven                                   | 10844            | 1/20/2014  | Provi            | ng Ring                                 |                       |                      |           |
| Moisture Sample After Soaking          | and Penetration: | Top 1      | linch            | Average                                 | Volume o              | Volume of Soil after |           |
|  | M                | JD         | 18               | New Height                              | (in.)                 | 4.589                |           |
| A. Tare Weight (grams)                 | A.               | 160.6      |                  | 155.7                                   | New Height (ft.)      |                      | 0.3824    |
| B. Wet Wt + Tare Wt (grams)            | В.               | 69:        | 2.1              | 1432.7                                  | New Volume (          | (cu.ft.)             | 0.0752    |
| C. Dry Wt. + Tare Wt. (grams)          | C.               | 613.0      |                  | 1247.2                                  | Final Wet Density     |                      | 122.3     |
| D. Water Weight (grams)                | В-С              | 79         | 0.1              | 185.5                                   | Piston #              |                      | 20227     |
| E. Dry Weight (grams)                  | C-A              | 45:        | 2.4              | 1091.5                                  | Piston Diameter (in.) |                      | 1.951     |
| F. Moisture Content (%)                | 100*D/E          | 17.:       | 5%               | 17.0%                                   | Piston Area (s        | sq.in.)              | 2.990     |
| Sample Paran                           | neters           |            |                  | В                                       | efore Soaking         |                      |           |
| Maximum Dry Density (PCF)              | 112              | 2.5        | Initial Dry      | Density (PCF)                           | 107.0                 |                      | 107.0     |
| Optimum Moisture Content 14.9          |                  |            | Moisture (       | Content of the Com                      | mpacted Specimen 15.0 |                      | 15.0%     |
| Percent Retained on 3/4 inch sieve 3.5 |                  |            | Percent Co       | mpaction                                | 95.1%                 |                      | 95.1%     |
| Soak Time: 96 H                        |                  |            |                  |   | After Soaking         |                      |           |
| Surcharge Weight (Lbs.) 30.            |                  |            |                  | Density (PCF)                           |                       |                      | 104.6     |
| Surcharge Wt. per sq. Ft.              | 155              | 5.0        | Percent Swell 0. |   |                       |                      | 0.1%      |

| trai | n Rate: .05 in | ches/minute | <b>Proving Ring Capac</b> | city: | Proving Ring ID #: |               |  |
|------|----------------|-------------|---------------------------|-------|--------------------|---------------|--|
|      | Penetration    | Time        | Load                      | Load  | Stress             | Bearing Ratio |  |
|      | inches         | minutes     | divisions                 | Lbs.  | PSI                | %             |  |
|      | 0              | 0           |                           | 0     | 0.0                |               |  |
|      | 0.025          | 0.5         |                           | 59    | 19.7               |               |  |
|      | 0.050          | 1.0         |                           | 127   | 42.5               |               |  |
|      | 0.075          | 1.5         |                           | 180   | 60.2               |               |  |
|      | 0.100          | 2.0         |                           | 222   | 74.3               | 7.4           |  |
|      | 0.125          | 2.5         |                           | 262   | 87.6               |               |  |
|      | 0.150          | 3.0         |                           | 300   | 100.3              |               |  |
|      | 0.175          | 3.5         |                           | 333   | 111.4              |               |  |
|      | 0.200          | 4.0         |                           | 365   | 122.1              | 8.1           |  |
| Г    | 0.250          | 5.0         |                           | 426   | 142.5              |               |  |
|      | 0.300          | 6.0         |                           | 485   | 162.2              |               |  |
| Г    | 0.400          | 8.0         |                           | 597   | 199.7              |               |  |
| Г    | 0.500          | 10.0        |                           | 703   | 235.2              |               |  |

NI = No information provided. ND = Not determined. Notes/Deviations

> Jennifer Olsen Jennifer Hohr 4/9/2014 Technician Name

Date

Kon Harris / Ron Rothfuss

Technical Responsibility

Revision Date: 9/29/08

## **CBR** Compaction



| Compactio  | n and Swell Date                 | а                 | AST       | M D1883                  |                  | AASI             | HTO T193             | $\times$            | Quality A       | ssurance   |
|------------|----------------------------------|-------------------|-----------|--------------------------|------------------|------------------|----------------------|---------------------|-----------------|------------|
|            |                                  | S&ME, Inc.        | ~ 97      | 751 South                | ern Pin          | e Boulevard ~    | Charlot              | te, NC 28           | 273             |            |
| Project #  | <b>#</b> : 3735                  |                   |           |                          |                  |                  | Report I             | Date:               | 1/9/14          |            |
| Project N  | lame: Ecus                       | sta Mill Site     |           |                          |                  |                  |                      | Test Da             | te(s) 4/        | /3-9/14    |
| Client Na  | ame: NI                          |                   |           |                          |                  |                  |                      |                     |                 |            |
| Client Ac  | ddress: NI                       |                   |           |                          |                  |                  |                      |                     |                 |            |
| Boring #:  | Area 3                           |                   |           | S                        | ample #          | : P-3            |                      | Sample I            | Date: 3/1       | 8-27/14    |
| Location   |                                  |                   |           |                          | Offset           | : NI             |                      | Elevat              |                 | NI         |
| Sample I   | Description:                     | Black Brown       | Silty     | Coarse t                 | o Fine S         | and with Grav    | el                   |                     |                 |            |
|            | Specification                    | S&ME II           |           | Cal I                    |                  | Type and Spec    |                      | S&                  | ME ID #         | Cal Date:  |
| Balance (  | 0.1 g)                           | 22182             | ?         | 6/18/                    | 2013             | Compaction M     | lold                 |                     | 3609            | 7/5/2013   |
| Balance    |                                  | 22182             | _         | 6/18/                    |                  | Compaction H     | ammer                | 2                   | 20120           | 10/14/2013 |
| Straighted | ~                                | 27831             | _         | 2/5/2                    |                  | Oven             |                      |                     |                 | 1/20/2014  |
| Moisture-  | Density Relati                   |                   |           | 698                      |                  | TM D1557         |                      | НТО Т99             |                 | ITO T180 🗆 |
|            |                                  |                   | ethod     |                          |                  | Method B         |                      | lethod C            |                 | od D       |
| Compa      |                                  | med on the Fine I |           |                          | DCE              | Compaction Tes   |                      |                     |                 | CBR spec.  |
| CBR Sam    |                                  |                   |           |                          |                  | e Fraction:      | ımum ivto            | isture Con          | itent 14.9%     |            |
|            | 1883, Section 6                  | -                 |           |                          |                  |                  | Entire Sa            | mple 🗆              | Renlacemen      | nt Method  |
|            | nical Hammer                     |                   |           | l Hammer                 |                  | Moist Prepar     |                      |                     | Ory Preparation |            |
| Water Co   |                                  | ASTM D221         |           |                          | SHTO T           |                  | STM D49              |                     | ASTM D46        |            |
|            | Sample Note                      |                   |           |                          |                  | 691              | adjusted             | PMB                 |                 | PMB        |
| A. Tare W  | eight (grams)                    | 1                 |           | Α.                       |                  | 157.3            |                      | 160.6               |                 | 160.6      |
|            | Wet Wt + Tare Wt (grams)         |                   |           | B.                       |                  | 789.3            |                      | 1409.1              | 1               | 409.1      |
|            | . + Tare Wt. (gr                 |                   |           | <b>C</b> . 70            |                  | 704.3            |                      | 1246.5              |                 | 246.5      |
|            | Weight (grams)                   |                   |           | B-C 85.0                 |                  | 85.0             |                      | 162.6               |                 | 162.6      |
| E. Dry We  | eight (grams)                    |                   |           | C-A 547.0                |                  | 1085.9           |                      | 1                   | .085.9          |            |
| F. Moistur | e Content (%)                    |                   | 10        | 00*D/E                   | 15.5%            |                  |                      | 15.0%               |                 | 5.0%       |
| Sample Pr  | reparation                       | Targets:          | %         | Compaction               | on 95.0          | 0% Moisture      | Content              | 14.9%               | ó               |            |
| A          | Target Dry Den                   | sity (Lbs./cu.ft. | )         | 106                      | 5.9              | MDD x % Compa    | ection               | I A                 | Iold #          | 3609       |
| В          | Dry Density (gr                  | rams/ cu.ft.)     |           | 4847                     | 78.5             | 453.6 x A        |                      | Mold Diameter (in.) |                 | 6.005      |
| D I        | Mold volume F                    | actor (MVF)       |           | 13.                      | 37               | 1/Volume         |                      | Mold Height (in.)   |                 | 4.583      |
|            | Wet Density (gr                  |                   |           | 5573                     | 37.6             | B x (1+ Moisture | Content)             | Mold Height (ft.)   |                 | 0.3819     |
| F          | Wt. of Soil in M                 | Aold (grams)      |           | 416                      | 4169.2 E/D       |                  |                      | Mold Area (sq.ft.)  |                 | 0.1967     |
| G          | # of Lifts                       |                   | 3         | 3 used to compact sample |                  | ımple            | Mold Volume (Linear) |                     | 0.0751          |            |
| Н          | Wt. of Soil per Lift (grams)     |                   | 138       | 9.7                      | F/G              |                  | Mold Volume (Water)  |                     | 0.0748          |            |
| i          | # of Blows per Lift              |                   | 22        | 2                        |                  |                  | Soak                 | Time                | Date            |            |
| I          | Mold Weight (Lbs. or grams)      |                   | 70        | 07                       |                  |                  | Start                |                     | 4/4/2014        |            |
| J ]        | Mold Wt. + Soil Wt. (Lbs. or g.) |                   | 11180     |                          | After Compaction |                  | End                  |                     | 4/8/2014        |            |
|            | Soil Weight (Lbs. or grams)      |                   | 4173.0000 |                          | J-I              |                  | Total                | 96 H                | lours           |            |
|            |                                  |                   | 417       |                          | K*453.6 or K     |                  |                      | % Swell             |                 |            |
|            |                                  |                   |           | 362                      |                  | L/(1+MC)         |                      | Re                  | ading 1         | 0.0000     |
|            | Percent Compa                    |                   |           | 95.1                     |                  | Percentage of MD | D                    |                     | ading 2         | 0.0055     |
|            | Dry Density (Ll                  |                   |           | 107                      |                  | O = (M/453.6)*D  |                      |                     | fference        | 0.0055     |
| -          | Wet Density (L                   |                   |           | 123                      |                  | O*(1+MC)         |                      | %                   | Swell           | 0.1%       |
| Notes/Dev  | iations:                         | NI = No inform    | ation     | ı provided.              | ND = N           | lot determined.  |                      |                     |                 |            |
|            |                                  |                   |           |                          |                  |                  |                      |                     |                 |            |

Technician Name

Jennifer Olsen Lunder 1 Our 4/9/2014
Technician Name

on Harris / Ron Rothfuss Technical Responsibility

4.10.201

Revision Date: 9/29/08

## CBR (California Bearing Ratio) of Laboratory **Compacted Soil**



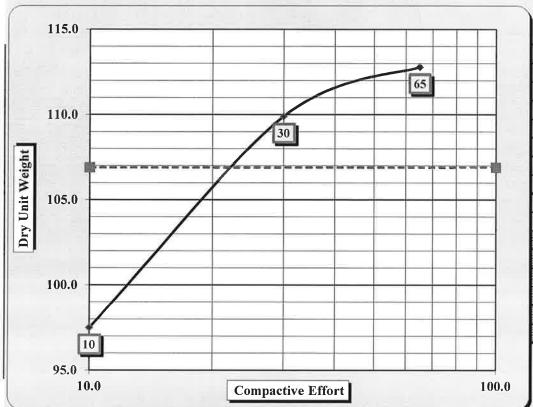
AASHTO T 193

Quality Assurance

| S&ME, Inc. ~ 9751 Southern Pine Boulevard ~ Charlotte, NC 28273 |                  |               |                  |          |  |  |  |
|---|------------------|---------------|------------------|----------|--|--|--|
| Project #:  | 3735-14-001      |               | Report Date:     | 4/9/14   |  |  |  |
| Project Name:   | Ecusta Mill Site |               | Test Date(s)     | 4/3-9/14 |  |  |  |
| Client Name:  | NI               |               |                  |          |  |  |  |
| Client Address:   | NI               |               |                  |          |  |  |  |
| Boring #: Area 3  |                  | Sample #: P-3 | Sample Date: 3/1 | 8-27/14  |  |  |  |
| Location: Or  | n-site           | Offset: NI    | Elevation: NI    |          |  |  |  |

Sample Description: Black Brown Silty Coarse to Fine Sand with Gravel

## Compactive Effort vs. Dry Unit weight



| Series 1          |             |  |  |  |  |
|-------------------|-------------|--|--|--|--|
| Compactive effort | Dry Wt. PCF |  |  |  |  |
| 10                | 97.5        |  |  |  |  |
| 30                | 109.9       |  |  |  |  |
| 65                | 112.8       |  |  |  |  |
|                   |             |  |  |  |  |
|                   |             |  |  |  |  |
|                   |             |  |  |  |  |

| Series 2: MDD |                     |                                      |  |  |  |
|---------------|---------------------|--------------------------------------|--|--|--|
| 10            | 106                 | 9                                    |  |  |  |
| 100           | 106                 | 9                                    |  |  |  |
|               |                     |                                      |  |  |  |
|               |                     |                                      |  |  |  |
|               |                     |                                      |  |  |  |
|               |                     |                                      |  |  |  |
|               | Series<br>10<br>100 | Series 2: MDD<br>10 106.<br>100 106. |  |  |  |

Notes / Deviations / References: NI = No information provided. ND = Not determined.

Technician: Jennifer Olsen Date: 4/9/14

Ron Harris / Ron Rothfuss

Technical Responsibility

This record is for internal use only.

# UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

| Project:     | Ecusta Mill Site | Diameter, in.:    | 1.86  | Date:        | 3/19/2014 |
|--------------|------------------|-------------------|-------|--------------|-----------|
| Project No.: | 3735-14-001      | Length, in.:      | 4.21  | Tested by:   | TJW       |
| Boring Id:   | PSB-14           | Unit Weight, pcf: | 173.2 | Reviewed by: | JBP       |

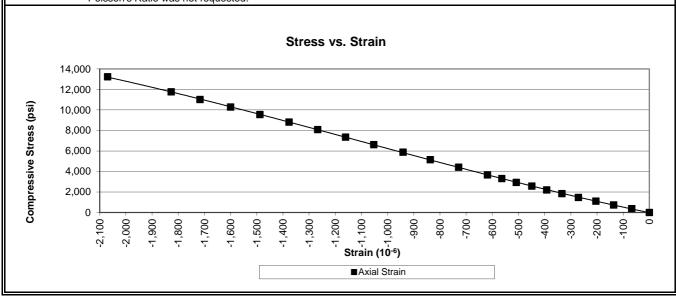
 Sample No:
 7039
 Moisture Content, %:
 0.1

 Depth (ft):
 44.0 - 44.8
 Load Rate, psi/sec:
 56

| Data<br>Point | Strair<br>axial | <u>(10<sup>-6</sup>)</u><br>I radial | Load<br>(lb) | Compressive<br>Stress (psi) | Secant Modulus<br>x 10 <sup>6</sup> (psi) | Poisson's<br>Ratio | Remarks<br>Failure |
|---------------|-----------------|--------------------------------------|--------------|-----------------------------|---|--------------------|--------------------|
| 1             | 0               | radiai                               | 0            | 0                           | 0.00                                      | ratio              | Tanaro             |
| 2             | -67             |                                      | 1,000        | 368                         | 5.49                                      |                    |                    |
| 3             | -136            |                                      | 2,000        | 735                         | 5.41                                      |                    |                    |
| 4             | -204            |                                      | 3,000        | 1,103                       | 5.41                                      |                    |                    |
| 5             | -271            |                                      | 4,000        | 1,471                       | 5.43                                      |                    |                    |
| 6             | -334            |                                      | 5,000        | 1,838                       | 5.50                                      |                    |                    |
| 7             | -392            |                                      | 6,000        | 2,206                       | 5.63                                      |                    |                    |
| 8             | -449            |                                      | 7,000        | 2,574                       | 5.73                                      |                    |                    |
| 9             | -508            |                                      | 8,000        | 2,941                       | 5.79                                      |                    |                    |
| 10            | -564            |                                      | 9,000        | 3,309                       | 5.87                                      |                    |                    |
| 11            | -619            |                                      | 10,000       | 3,677                       | 5.94                                      |                    |                    |
| 12            | -729            |                                      | 12,000       | 4,412                       | 6.05                                      |                    |                    |
| 13            | -837            |                                      | 14,000       | 5,147                       | 6.15                                      |                    |                    |
| 14            | -941            |                                      | 16,000       | 5,882                       | 6.25                                      |                    |                    |
| 15            | -1,053          |                                      | 18,000       | 6,618                       | 6.28                                      |                    |                    |
| 16            | -1,161          |                                      | 20,000       | 7,353                       | 6.33                                      |                    |                    |
| 17            | -1,267          |                                      | 22,000       | 8,088                       | 6.38                                      |                    |                    |
| 18            | -1,377          |                                      | 24,000       | 8,824                       | 6.41                                      |                    |                    |
| 19            | -1,488          |                                      | 26,000       | 9,559                       | 6.42                                      |                    |                    |
| 20            | -1,600          |                                      | 28,000       | 10,294                      | 6.43                                      |                    |                    |
| 21            | -1,717          |                                      | 30,000       | 11,029                      | 6.42                                      |                    |                    |
| 22            | -1,827          |                                      | 32,000       | 11,765                      | 6.44                                      |                    |                    |
| 23            | -2,070          |                                      | 36,000       | 13,235                      | 6.39                                      |                    |                    |
| 24            |                 |                                      | 36,730       | 13,504                      |   |                    | Failure            |

Comments: Loading rate was selected to target reaching failure between 2 and 15 minutes.

Poisson's Ratio was not requested.



Sheet 1 of 1





|   | Specimen ID | Boring PSB-14, Sample 7039, (44.0' – 44.8')   |
|---|-------------|---|
| 1 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen Before Test (ASTM D7012, Method D) |



|   | Specimen ID | Boring PSB-14, Sample 7039, (44.0' – 44.8')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

# UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

| Project:                   | Ecusta Mill Site | Diameter, in.:      | 1.86  | Date:        | 3/19/2014 |
|----------------------------|------------------|---------------------|-------|--------------|-----------|
| Project No.:<br>Boring Id: | 3735-14-001      | Length, in.:        | 4.23  | Tested by:   | TJW       |
| Boring Id:                 | PSB-15           | Unit Weight, pcf:   | 176.2 | Reviewed by: | JBP       |
| Sample No:                 | 7038             | Moisture Content %: | 0.0   |              |           |

 Sample No:
 7038
 Moisture Content, %:
 0.0

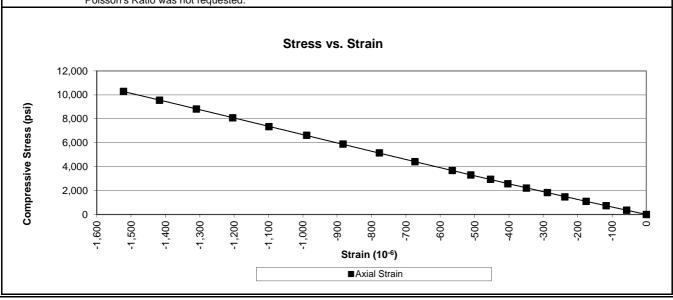
 Depth (ft):
 39.0 - 40.0
 Load Rate, psi/sec:
 48

| Data  | Strain | (10 <sup>-6</sup> ) | Load   | Compressive  | Secant Modulus          | Poisson's | Remarks |
|-------|--------|---------------------|--------|--------------|-------------------------|-----------|---------|
| Point | axial  | radial              | (lb)   | Stress (psi) | x 10 <sup>6</sup> (psi) | Ratio     | Failure |
| 1     | 0      |                     | 0      | 0            | 0.00                    |           |         |
| 2     | -57    |                     | 1,000  | 368          | 6.45                    |           |         |
| 3     | -117   |                     | 2,000  | 735          | 6.28                    |           |         |
| 4     | -175   |                     | 3,000  | 1,103        | 6.30                    |           |         |
| 5     | -237   |                     | 4,000  | 1,471        | 6.21                    |           |         |
| 6     | -288   |                     | 5,000  | 1,838        | 6.38                    |           |         |
| 7     | -349   |                     | 6,000  | 2,206        | 6.32                    |           |         |
| 8     | -403   |                     | 7,000  | 2,574        | 6.39                    |           |         |
| 9     | -454   |                     | 8,000  | 2,941        | 6.48                    |           |         |
| 10    | -511   |                     | 9,000  | 3,309        | 6.48                    |           |         |
| 11    | -565   |                     | 10,000 | 3,677        | 6.51                    |           |         |
| 12    | -674   |                     | 12,000 | 4,412        | 6.55                    |           |         |
| 13    | -777   |                     | 14,000 | 5,147        | 6.62                    |           |         |
| 14    | -883   |                     | 16,000 | 5,882        | 6.66                    |           |         |
| 15    | -989   |                     | 18,000 | 6,618        | 6.69                    |           |         |
| 16    | -1,099 |                     | 20,000 | 7,353        | 6.69                    |           |         |
| 17    | -1,204 |                     | 22,000 | 8,088        | 6.72                    |           |         |
| 18    | -1,310 |                     | 24,000 | 8,824        | 6.74                    |           |         |
| 19    | -1,417 |                     | 26,000 | 9,559        | 6.75                    |           |         |
| 20    | -1,522 |                     | 28,000 | 10,294       | 6.76                    |           |         |
| 21    |        |                     | 28,340 | 10,419       |                         |           | Failure |

Comments: The deviation from straightness of the as-received core was greater than 0.020 inches.

Loading rate was selected to target reaching failure between 2 and 15 minutes.

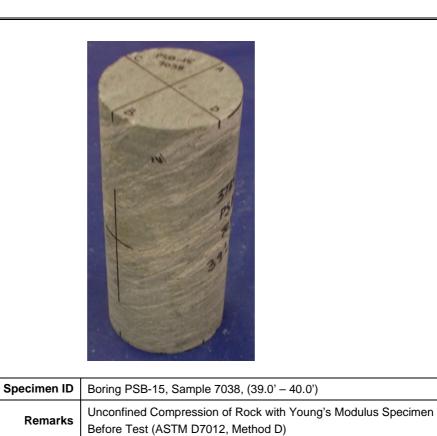
Poisson's Ratio was not requested.



Sheet 1 of 1

1







|   | Specimen ID | Boring PSB-15, Sample 7038, (39.0' – 40.0')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

### UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

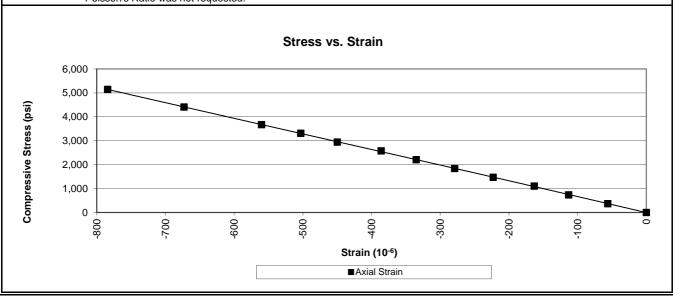
| Project:     | Ecusta Mill Site | Diameter, in.:       | 1.86  | Date:        | 3/19/2014 |
|--------------|------------------|----------------------|-------|--------------|-----------|
| Project No.: | 3735-14-001      | Length, in.:         | 4.07  | Tested by:   | TJW       |
| Boring Id:   | PSB-26           | Unit Weight, pcf:    | 172.7 | Reviewed by: | JBP       |
| Sample No:   | 7050             | Moisture Content, %: | 0.0   |              |           |
| Depth (ft):  | 55.0 - 55.8      | Load Rate, psi/sec:  | 40    |              |           |

| Data  | Strain |        | Load   | Compressive  | Secant Modulus          | Poisson's | Remarks |
|-------|--------|--------|--------|--------------|-------------------------|-----------|---------|
| Point | axial  | radial | (lb)   | Stress (psi) | x 10 <sup>6</sup> (psi) | Ratio     | Failure |
| 1     | 0      |        | 0      | 0            | 0.00                    |           |         |
| 2     | -56    |        | 1,000  | 368          | 6.56                    |           |         |
| 3     | -113   |        | 2,000  | 735          | 6.51                    |           |         |
| 4     | -163   |        | 3,000  | 1,103        | 6.77                    |           |         |
| 5     | -223   |        | 4,000  | 1,471        | 6.59                    |           |         |
| 6     | -279   |        | 5,000  | 1,838        | 6.59                    |           |         |
| 7     | -335   |        | 6,000  | 2,206        | 6.58                    |           |         |
| 8     | -386   |        | 7,000  | 2,574        | 6.67                    |           |         |
| 9     | -450   |        | 8,000  | 2,941        | 6.54                    |           |         |
| 10    | -503   |        | 9,000  | 3,309        | 6.58                    |           |         |
| 11    | -560   |        | 10,000 | 3,677        | 6.57                    |           |         |
| 12    | -673   |        | 12,000 | 4,412        | 6.56                    |           |         |
| 13    | -784   |        | 14,000 | 5,147        | 6.57                    |           |         |
| 14    |        |        | 15,250 | 5,607        |                         |           | Failure |

Comments: The deviation from the as-received core was greater than 0.020 inches.

Loading rate was selected to target reaching failure between 2 and 15 minutes.

Poisson's Ratio was not requested.



Sheet 1 of 1





|   | Specimen ID | Boring PSB-26, Sample 7050, (55.0' – 55.8')   |
|---|-------------|---|
| 1 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen Before Test (ASTM D7012, Method D) |



|   | Specimen ID | Boring PSB-26, Sample 7050, (55.0' – 55.8')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

# UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

| Project:   | Ecusta Mill Site | Diameter, in.:       | 1.84  | Date:        | 3/19/2014 |
|--|------------------|----------------------|-------|--------------|-----------|
| Project No.:   | 3735-14-001      | Length, in.:         | 4.13  | Tested by:   | TJW       |
| Boring Id:   | PSB-27           | Unit Weight, pcf:    | 173.1 | Reviewed by: | JBP       |
| Project:<br>Project No.:<br>Boring Id:<br>Sample No: | 7051             | Moisture Content, %: | 0.0   |              |           |

 Sample No:
 7051
 Moisture Content, %:
 0.0

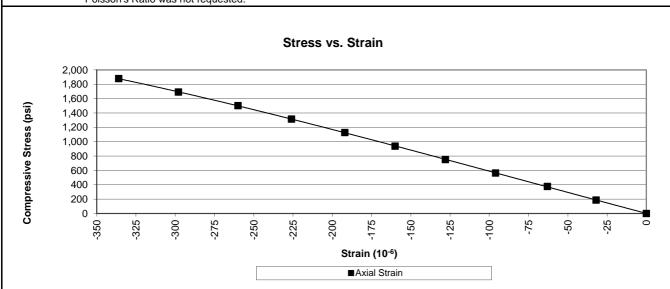
 Depth (ft):
 80.7 - 81.3
 Load Rate, psi/sec:
 37

| Data  | Strain | (10 <sup>-6</sup> ) | Load  | Compressive  | Secant Modulus          | Poisson's | Remarks |
|-------|--------|---------------------|-------|--------------|-------------------------|-----------|---------|
| Point | axial  | radial              | (lb)  | Stress (psi) | x 10 <sup>6</sup> (psi) | Ratio     | Failure |
| 1     | 0      |                     | 0     | 0            | 0.00                    |           |         |
| 2     | -32    |                     | 500   | 188          | 5.88                    |           |         |
| 3     | -63    |                     | 1,000 | 376          | 5.97                    |           |         |
| 4     | -96    |                     | 1,500 | 564          | 5.87                    |           |         |
| 5     | -128   |                     | 2,000 | 752          | 5.87                    |           |         |
| 6     | -160   |                     | 2,500 | 940          | 5.87                    |           |         |
| 7     | -192   |                     | 3,000 | 1,128        | 5.87                    |           |         |
| 8     | -226   |                     | 3,500 | 1,316        | 5.82                    |           |         |
| 9     | -260   |                     | 4,000 | 1,504        | 5.78                    |           |         |
| 10    | -298   |                     | 4,500 | 1,692        | 5.68                    |           |         |
| 11    | -336   |                     | 5,000 | 1,880        | 5.59                    |           |         |
| 12    |        |                     | 5,080 | 1,910        |                         |           | Failure |

Comments: The deviation from straightness of the as-received core was greater than 0.020 inches.

Loading rate was selected to target reaching failure between 2 and 15 minutes. Core reached failure at 52 seconds after loading began due to the low strength of the specimen.

Poisson's Ratio was not requested.



Sheet 1 of 1





|   | Specimen ID | Boring PSB-27, Sample 7051, (80.7' – 81.3')   |
|---|-------------|---|
| 1 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen Before Test (ASTM D7012, Method D) |



|   | Specimen ID | Boring PSB-27, Sample 7051, (80.7' – 81.3')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

# UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

| Project:     | Ecusta Mill Site | Diameter, in.:      | 1.85  | Date:        | 4/3/2014 |
|--------------|------------------|---------------------|-------|--------------|----------|
| Project No.: | 3735-14-001      | Length, in.:        | 4.19  | Tested by:   | BKP      |
| Boring Id:   | PSB-16           | Unit Weight, pcf:   | 173.4 | Reviewed by: | JBB      |
| Sample No:   | 7040             | Moisture Content %: | 0.0   |              |          |

 Sample No:
 7040
 Moisture Content, %:
 0.0

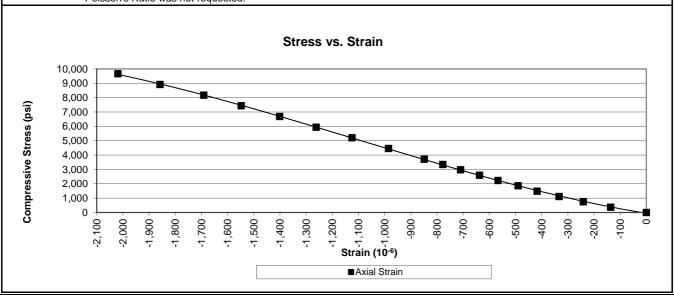
 Depth (ft):
 45.5 - 46.1
 Load Rate, psi/sec:
 47

| Data  | Strain | (10 <sup>-6</sup> ) | Load   | Compressive  | Secant Modulus          | Poisson's | Remarks |
|-------|--------|---------------------|--------|--------------|-------------------------|-----------|---------|
| Point | axial  | radial              | (lb)   | Stress (psi) | x 10 <sup>6</sup> (psi) | Ratio     | Failure |
| 1     | 0      |                     | 0      | 0            | 0.00                    |           |         |
| 2     | -136   |                     | 1,000  | 372          | 2.73                    |           |         |
| 3     | -241   |                     | 2,000  | 744          | 3.09                    |           |         |
| 4     | -333   |                     | 3,000  | 1,115        | 3.35                    |           |         |
| 5     | -417   |                     | 4,000  | 1,487        | 3.57                    |           |         |
| 6     | -490   |                     | 5,000  | 1,859        | 3.79                    |           |         |
| 7     | -567   |                     | 6,000  | 2,231        | 3.93                    |           |         |
| 8     | -638   |                     | 7,000  | 2,602        | 4.08                    |           |         |
| 9     | -710   |                     | 8,000  | 2,974        | 4.19                    |           |         |
| 10    | -778   |                     | 9,000  | 3,346        | 4.30                    |           |         |
| 11    | -849   |                     | 10,000 | 3,718        | 4.38                    |           |         |
| 12    | -985   |                     | 12,000 | 4,461        | 4.53                    |           |         |
| 13    | -1,125 |                     | 14,000 | 5,205        | 4.63                    |           |         |
| 14    | -1,262 |                     | 16,000 | 5,948        | 4.71                    |           |         |
| 15    | -1,401 |                     | 18,000 | 6,691        | 4.78                    |           |         |
| 16    | -1,548 |                     | 20,000 | 7,435        | 4.80                    |           |         |
| 17    | -1,691 |                     | 22,000 | 8,178        | 4.84                    |           |         |
| 18    | -1,858 |                     | 24,000 | 8,922        | 4.80                    |           |         |
| 19    | -2,019 |                     | 26,000 | 9,665        | 4.79                    |           |         |
| 20    |        |                     | 27,570 | 10,249       |                         |           | Failure |

Comments: The deviation from straightness of the as-received core was greater than 0.020 inches.

Loading rate was selected to target reaching failure between 2 and 15 minutes.

Poisson's Ratio was not requested.



Sheet 1 of 1





| _ | Specimen ID | Boring PSB-16, Sample 7040, (44.5' – 46.1')                  |  |
|---|-------------|--|--|
| 1 |             | Unconfined Compression of Rock with Young's Modulus Specimen |  |
|   |             | Before Test (ASTM D7012, Method D)                           |  |



|   | Specimen ID | Boring PSB-16, Sample 7040, (44.5' – 46.1')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

### UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

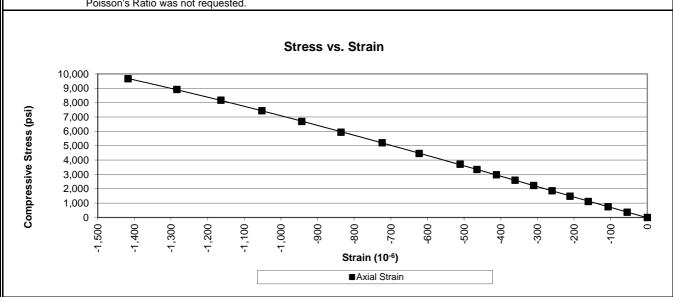
| Project:                         | Ecusta Mill Site | Diameter, in.:      | 1.85  | Date:        | 4/3/2014 |
|----------------------------------|------------------|---------------------|-------|--------------|----------|
| Project: Project No.: Boring Id: | 3735-14-001      | Length, in.:        | 4.17  | Tested by:   | BKP      |
| Boring Id:                       | PSB-17           | Unit Weight, pcf:   | 175.4 | Reviewed by: | JBB      |
| Sample No:                       | 7041             | Maistura Contant 9/ | 0.0   |              |          |

Depth (ft): 65.0 - 65.8 Load Rate, psi/sec: 60

| Data<br>Point | Strain axial | (10 <sup>-6</sup> )<br>radial | Load<br>(lb) | Compressive<br>Stress (psi) | Secant Modulus<br>x 10 <sup>6</sup> (psi) | Poisson's<br>Ratio | Remarks<br>Failure |
|---------------|--------------|-------------------------------|--------------|-----------------------------|---|--------------------|--------------------|
| 1             | 0            | Tadiai                        | 0            | 0<br>0                      | 0.00                                      | Ratio              | ranare             |
| 2             | -55          |                               | 1,000        | 372                         | 6.76                                      |                    |                    |
|               |              |                               |              |                             |   |                    |                    |
| 3             | -107         |                               | 2,000        | 744                         | 6.95                                      |                    |                    |
| 4             | -161         |                               | 3,000        | 1,115                       | 6.93                                      |                    |                    |
| 5             | -211         |                               | 4,000        | 1,487                       | 7.05                                      |                    |                    |
| 6             | -260         |                               | 5,000        | 1,859                       | 7.15                                      |                    |                    |
| 7             | -310         |                               | 6,000        | 2,231                       | 7.20                                      |                    |                    |
| 8             | -361         |                               | 7,000        | 2,602                       | 7.21                                      |                    |                    |
| 9             | -412         |                               | 8,000        | 2,974                       | 7.22                                      |                    |                    |
| 10            | -465         |                               | 9,000        | 3,346                       | 7.20                                      |                    |                    |
| 11            | -511         |                               | 10,000       | 3,718                       | 7.27                                      |                    |                    |
| 12            | -623         |                               | 12,000       | 4,461                       | 7.16                                      |                    |                    |
| 13            | -724         |                               | 14,000       | 5,205                       | 7.19                                      |                    |                    |
| 14            | -836         |                               | 16,000       | 5,948                       | 7.11                                      |                    |                    |
| 15            | -943         |                               | 18,000       | 6,691                       | 7.10                                      |                    |                    |
| 16            | -1,052       |                               | 20,000       | 7,435                       | 7.07                                      |                    |                    |
| 17            | -1,164       |                               | 22,000       | 8,178                       | 7.03                                      |                    |                    |
| 18            | -1,284       |                               | 24,000       | 8,922                       | 6.95                                      |                    |                    |
| 19            | -1,417       |                               | 26,000       | 9,665                       | 6.82                                      |                    |                    |
| 20            |              |                               | 26,520       | 9,859                       |   |                    | Failure            |

Comments: Loading rate was selected to target reaching failure between 2 and 15 minutes.

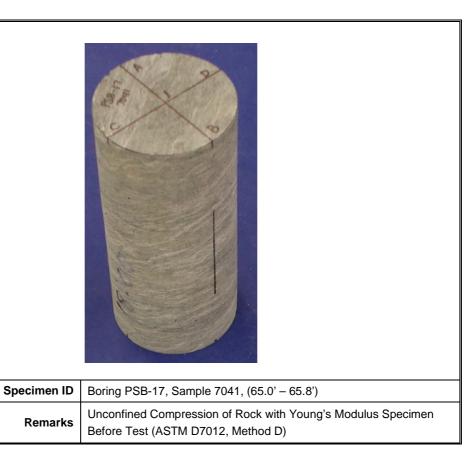
Poisson's Ratio was not requested.



Sheet 1 of 1

1







|   | Specimen ID | Boring PSB-17, Sample 7041, (65.0' - 65.8')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

# UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

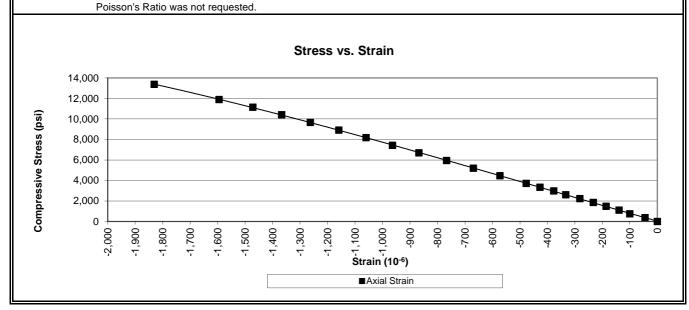
| Project:     | Ecusta Mill Site | Diameter, in.:    | 1.85  | Date:        | 4/17/2014 |
|--------------|------------------|-------------------|-------|--------------|-----------|
| Project No.: | 3735-14-001      | Length, in.:      | 3.92  | Tested by:   | TJW       |
| Boring Id:   | PSB-25           | Unit Weight, pcf: | 174.1 | Reviewed by: | JBB       |

 Sample No:
 7048
 Moisture Content, %:
 0.1

 Depth (ft):
 82.2 - 83.0
 Load Rate, psi/sec:
 52

| Data  | Strain | (10 <sup>-6</sup> ) | Load   | Compressive  | Secant Modulus          | Poisson's | Remarks |
|-------|--------|---------------------|--------|--------------|-------------------------|-----------|---------|
| Point | axial  | radial              | (lb)   | Stress (psi) | x 10 <sup>6</sup> (psi) | Ratio     | Failure |
| 1     | 0      |                     | 0      | 0            | 0.00                    |           |         |
| 2     | -45    |                     | 1,000  | 372          | 8.26                    |           |         |
| 3     | -100   |                     | 2,000  | 744          | 7.44                    |           |         |
| 4     | -139   |                     | 3,000  | 1,115        | 8.02                    |           |         |
| 5     | -186   |                     | 4,000  | 1,487        | 7.99                    |           |         |
| 6     | -233   |                     | 5,000  | 1,859        | 7.98                    |           |         |
| 7     | -282   |                     | 6,000  | 2,231        | 7.91                    |           |         |
| 8     | -333   |                     | 7,000  | 2,602        | 7.81                    |           |         |
| 9     | -377   |                     | 8,000  | 2,974        | 7.89                    |           |         |
| 10    | -427   |                     | 9,000  | 3,346        | 7.84                    |           |         |
| 11    | -477   |                     | 10,000 | 3,718        | 7.79                    |           |         |
| 12    | -573   |                     | 12,000 | 4,461        | 7.79                    |           |         |
| 13    | -670   |                     | 14,000 | 5,205        | 7.77                    |           |         |
| 14    | -767   |                     | 16,000 | 5,948        | 7.75                    |           |         |
| 15    | -868   |                     | 18,000 | 6,691        | 7.71                    |           |         |
| 16    | -964   |                     | 20,000 | 7,435        | 7.71                    |           |         |
| 17    | -1,060 |                     | 22,000 | 8,178        | 7.72                    |           |         |
| 18    | -1,159 |                     | 24,000 | 8,922        | 7.70                    |           |         |
| 19    | -1,263 |                     | 26,000 | 9,665        | 7.65                    |           |         |
| 20    | -1,367 |                     | 28,000 | 10,409       | 7.61                    |           |         |
| 21    | -1,472 |                     | 30,000 | 11,152       | 7.58                    |           |         |
| 22    | -1,595 |                     | 32,000 | 11,896       | 7.46                    |           |         |
| 23    | -1,831 |                     | 36,000 | 13,383       | 7.31                    |           |         |
| 24    |        |                     | 37,980 | 14,119       |                         |           | Failure |

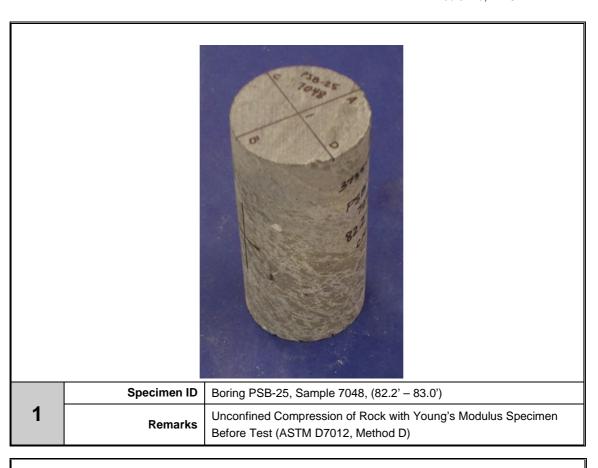
Comments: Loading rate was selected to target reaching failure between 2 and 15 minutes.



Sheet 1 of 1

2







# UNCONFINED COMPRESSION WITH YOUNG'S MODULUS AND POISSON'S RATIO (ASTM D7012 Method C and D)



### 1413 Topside Road, Louisville, TN 37777

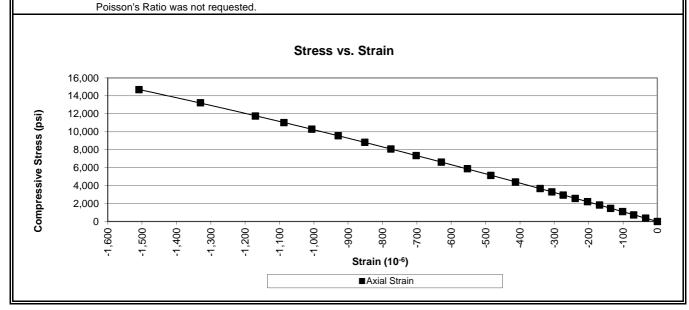
| Project:     | Ecusta Mill Site | Diameter, in.:    | 1.86  | Date:        | 4/17/2014 |
|--------------|------------------|-------------------|-------|--------------|-----------|
| Project No.: | 3735-14-001      | Length, in.:      | 4.05  | Tested by:   | TJW       |
| Boring Id:   | PSB-24           | Unit Weight, pcf: | 170.6 | Reviewed by: | JBB       |

 Sample No:
 7049
 Moisture Content, %:
 0.0

 Depth (ft):
 73.3 - 74.0
 Load Rate, psi/sec:
 66

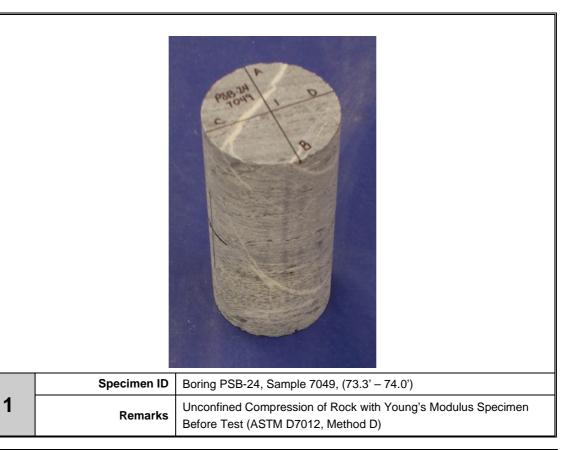
| Data  | Strain | n (10 <sup>-6</sup> ) | Load   | Compressive  | Secant Modulus          | Poisson's | Remarks |
|-------|--------|-----------------------|--------|--------------|-------------------------|-----------|---------|
| Point | axial  | radial                | (lb)   | Stress (psi) | x 10 <sup>6</sup> (psi) | Ratio     | Failure |
| 1     | 0      |                       | 0      | 0            | 0.00                    |           |         |
| 2     | -34    |                       | 1,000  | 368          | 10.81                   |           |         |
| 3     | -69    |                       | 2,000  | 735          | 10.66                   |           |         |
| 4     | -101   |                       | 3,000  | 1,103        | 10.92                   |           |         |
| 5     | -136   |                       | 4,000  | 1,471        | 10.81                   |           |         |
| 6     | -168   |                       | 5,000  | 1,838        | 10.94                   |           |         |
| 7     | -203   |                       | 6,000  | 2,206        | 10.87                   |           |         |
| 8     | -239   |                       | 7,000  | 2,574        | 10.77                   |           |         |
| 9     | -274   |                       | 8,000  | 2,941        | 10.73                   |           |         |
| 10    | -307   |                       | 9,000  | 3,309        | 10.78                   |           |         |
| 11    | -341   |                       | 10,000 | 3,677        | 10.78                   |           |         |
| 12    | -413   |                       | 12,000 | 4,412        | 10.68                   |           |         |
| 13    | -485   |                       | 14,000 | 5,147        | 10.61                   |           |         |
| 14    | -553   |                       | 16,000 | 5,882        | 10.64                   |           |         |
| 15    | -629   |                       | 18,000 | 6,618        | 10.52                   |           |         |
| 16    | -702   |                       | 20,000 | 7,353        | 10.47                   |           |         |
| 17    | -776   |                       | 22,000 | 8,088        | 10.42                   |           |         |
| 18    | -852   |                       | 24,000 | 8,824        | 10.36                   |           |         |
| 19    | -929   |                       | 26,000 | 9,559        | 10.29                   |           |         |
| 20    | -1,006 |                       | 28,000 | 10,294       | 10.23                   |           |         |
| 21    | -1,087 |                       | 30,000 | 11,029       | 10.15                   |           |         |
| 22    | -1,170 |                       | 32,000 | 11,765       | 10.06                   |           |         |
| 23    | -1,330 |                       | 36,000 | 13,235       | 9.95                    |           |         |
| 24    | -1,509 |                       | 40,000 | 14,706       | 9.75                    |           |         |
| 25    |        |                       | 43,910 | 16,143       |                         |           | Failure |

Comments: Loading rate was selected to target reaching failure between 2 and 15 minutes.



Sheet 1 of 1







|   | Specimen ID | Boring PSB-24, Sample 7049, (73.3' – 74.0')  |
|---|-------------|--|
| 2 | Remarks     | Unconfined Compression of Rock with Young's Modulus Specimen After Test (ASTM D7012, Method D) |

Revision No. 0

### Laboratory Determination of Water Content



| Revision D   | Date: 02/22/08              | Lai             | oor atory  | Determina         | ition or wa         | ter Content                  |                 |                     |             |
|--|-----------------------------|-----------------|--|-------------------|---------------------|------------------------------|-----------------|---------------------|-------------|
|  |                             | A               | STM D 22   | 16                | AASHTO T 2          | 265                          | Qu              | ality Assurance     |             |
|  |                             | 9               | 751 South  | hern Pine Blv     | d., Charlotte       | , NC 28273                   |                 |                     |             |
| Project #  | 373                         | 5-14-001        |  |                   |                     | Report Date:                 |                 | 3/24/14             |             |
| Project Name: Ecusta Mill Site                     |                             |                 |  |                   |                     | Test Date(s):                |                 | 3/21/-24/14         |             |
| Client Na  | me: Shav                    | w Environme     | ntal & Inf   | rastructure, Inc  | о.                  | 40                           |                 |                     |             |
| Client Ad  | ldress: 1150                | 60 Great Oak    | s Way, Su  | ite 500, Alphe    | retta, GA           |                              |                 |                     |             |
| Sample by: Shaw                                    |                             |                 |  |                   |                     | Sample Dat                   |                 | 3/18-20/14          |             |
| Sampling   |                             | NA              |  |                   |                     | Drill Rig:                   |                 | NA                  |             |
| Method   | d: A (1%                    | ) 🗆             | B (0.19  | %) 🗸              | Balance ID.         | 3222                         | Calibration     | Date: 6/18/1        |             |
| Boring<br>No.                                      | Sample<br>No.               | Sample<br>Depth | Tare #   | Tare Weight       | Tare Wt.+<br>Wet Wt | Tare Wt. +<br>Dry Wt         | Water<br>Weight | Percent<br>Moisture | N<br>o<br>t |
|  |                             | ft. or m.       |  | grams             | grams               | grams                        | grams           | %                   | e           |
| PSB-16   | 7040                        | 1-8'            | G-1  | 83.18             | 547.06              | 442.16                       | 104.90          | 29.2%               |             |
| PSB-16   | 7040                        | 8-19'           | S-4  | 81.73             | 623.20              | 526.79                       | 96.41           | 21.7%               |             |
| PSB-16   | 7040                        | 19-38'          | PAUL   | 81.83             | 699.47              | 591.30                       | 108.17          | 21.2%               |             |
| PSB-17   | 7041                        | 1-11'           | G-3  | 81.42             | 619.84              | 437.67                       | 182.17          | 51.1%               |             |
| PSB-17   | 7041                        | 11-18'          | G-10   | 81.70             | 729.85              | 552.84                       | 177.01          | 37.6%               |             |
| PSB-17   | 7041                        | 18-38'          | T-1  | 83.65             | 704.37              | 616.51                       | 87.86           | 16.5%               |             |
| PSB-18   | 7042                        | 1-10'           | S-9  | 83.13             | 763.38              | 660.23                       | 103.15          | 17.9%               | *           |
| PSB-19   | 7043                        | 1-7'            | T-8  | 81.58             | 717.79              | 605.77                       | 112.02          | 21.4%               | *           |
|  |                             |                 |  |                   |                     |                              |                 |                     |             |
|  |                             |                 | 1  |                   |                     |                              |                 |                     |             |
|  |                             |                 |  |                   |                     |                              |                 |                     |             |
|  |                             | av              |  |                   |                     |                              |                 |                     |             |
|  |                             |                 |  |                   |                     |                              |                 |                     |             |
|  |                             |                 |  |                   |                     |                              |                 |                     |             |
| Notes / Dev  | viations / Refere           | nces            |  |                   |                     | 1.                           |                 |                     |             |
|  | Sample contain              |                 | d and meta   |                   |                     |                              |                 |                     |             |
| *PSB-19 S  | Sample contain              | ed wood         |  |                   |                     |                              |                 |                     |             |
| A A GLUTTO   | T 265 I 1                   | . D             | C. C.M.  | ·                 | . C.C 11-           |                              |                 |                     |             |
| AASHTO   | 1 265: Labora               | tory Determina  | ation of Mc  | oisture Content o | of Soils            |                              |                 |                     |             |
| ıl.  | Karen Warı<br>Technician Na |                 | The state of the s | New Yor           | ru _                | Certification Type           | e / No.         | 194/19<br>Date      |             |
| Ron Harris/ Ron Rothfuss  Technical Responsibility |                             |                 | Signature  |                   |                     | Staff Professional 3/25/2014 |                 |                     |             |

Revision No. 0

### **Laboratory Determination of Water Content**



Revision Date: 02/22/08 ASTM D 2216 AASHTO T 265 1 Quality Assurance 9751 Southern Pine Blvd., Charlotte, NC 28273 3/31/14 Project #: 3735-14-001 Report Date: Ecusta Mill Site Test Date(s): 3/30-31/14 Project Name: Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA 3/18-27/14 Sample Date(s): Shaw Sample by: Drill Rig: NA Sampling Method: NA V Balance ID. 3222 Calibration Date: 6/18/13 Method: A (1%) B (0.1%) N Boring Sample Sample Tare Wt.+ Tare Wt. + Water Percent Tare Weight Tare# 0 Moisture No. No. Depth Wet Wt Dry Wt Weight t ft. or m. grams grams grams grams e 1-9' 79.89 7048 T-6 81.46 640.40 560.51 16.7% PSB25 106.72 PSB25 7048 9-21' S-1 81.56 830.38 723.66 16.6% 107.37 PSB25 7048 21-38' G-1 83.24 708.30 600.93 20.7% 7049 1-8' 81.59 573.83 513.61 60.22 13.9% PSB24 T-8 PSB24 7049 8-20' 82.39 860.19 731.31 128.88 19.9% S-5 PSB24 7049 82.32 939.46 773.08 166.38 24.1% 20-37' G-2 PSB23 7047 1-11' G-11 83.30 580.63 506.98 73.65 17.4% PSB20 1-5' T-4 81.90 596.91 537.36 59.55 13.1% 7044 498.91 100.59 PSB21 7045 1-9' T-9 81.79 599.50 24.1% 7046 1-7' 82.00 657.09 563.24 93.85 19.5% PSB22 T-7 Notes / Deviations / References AASHTO T 265: Laboratory Determination of Moisture Content of Soils Karen Warner Technician Name Certification Type / No. Staff Purfussional Ron Harris/Ron Rothfuss Technical Responsibility

Revision No. 0

### **Laboratory Determination of Water Content**



Revision Date: 02/22/08 ASTM D 2216 AASHTO T 265 1 Quality Assurance 9751 Southern Pine Blvd., Charlotte, NC 28273 Report Date: 2/26/14 Project #: 3735-14-001 Project Name: Ecusta Mill Site Test Date(s): 2/25-26/14 Shaw Environmental & Infrastructure, Inc. Client Name: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Client Address: Sample Date(s): 2/19-20/14 Sample by: Shaw Sampling Method: NA Drill Rig NA  $\overline{ }$ Balance ID. 3222 Calibration Date: 6/18/13 Method: A (1%) B (0.1%) N Boring Tare Wt.+ Tare Wt. + Water Percent Sample Sample Tare Weight Tare# 0 Wet Wt Weight Moisture No. No. Depth Dry Wt t % ft. or m. grams grams grams grams e PSB<sub>1</sub> 7025 0-4' O 16.84 663.97 567.70 96.27 17.5% PSB<sub>1</sub> 7025 4-10' KT 16.63 873.07 716.30 156.77 22.4% PSB8 7032 1-9' RR 16.29 937.47 723.51 213.96 30.3% PSB8 7032 **FISH** 105.23 689.61 512.64 176.97 43.4% 9-12' PSB9 16.53 969.30 750.83 218.47 7033 1-5' BE 29.8% PSB9 7033 5-12' K-18 16.41 892.30 694.65 197.65 29.1% 141.89 PSB<sub>10</sub> 7034 4-11' L 16.56 970.06 828.17 17.5% PSB11 7035 1-7' K-10 16.47 952.01 765.80 186.21 24.9% PSB12 7036 1-5' K-22 16.84 878.75 594.09 284,66 49.3% 232.22 PSB12 16.35 1010.65 778.43 7036 5-11' K-23 30.5% Notes / Deviations / References PSB13-7037 (1-7') Not Tested Due to Strong Unknown Odor. AASHTO T 265: Laboratory Determination of Moisture Content of Soils Karen Warner Technician Name Certification Type / No. Ron Harris/ Ron Rothfuss Technical Responsibility



Revision No. 0 **Laboratory Determination of Water Content** Revision Date: 02/22/08 ASTM D 2216 AASHTO T 265 4 Quality Assurance 9751 Southern Pine Blvd., Charlotte, NC 28273 3/4/14 Report Date: Project #: 3735-14-001 Ecusta Mill Site Test Date(s): 3/3-4/14 Project Name: Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Sample Date(s): 2/21-26/14 Shaw Sample by: Drill Rig: NA Sampling Method: NA Calibration Date: 1 Balance ID. 3222 6/18/13 Method: A (1%) B (0.1%) N Tare Wt.+ Tare Wt. + Water Percent Boring Sample Sample Tare Weight Tare # 0 Moisture No. Depth Wet Wt Dry Wt Weight No. grams % ft. or m. grams grams grams e 701.06 604.36 96.70 18.5% PBS15 7038 1-5' G-3 81.30 733.78 580.70 153.08 30.8% PSB15 7038 5-10' G-1 83.14 841.85 727.28 114.57 17.8% PSB14 7039 1-7' G-12 83.49 7039 T-4 81.87 1068.77 901.89 166.88 20.4% PBS14 7-18' 7031 1-11' S-4 81.80 764.38 616.72 147.66 27.6% PSB7 770.99 591.94 179.05 37.4% PSB6 7030 1-11' POT 113.22 173.10 112.06 648.41 32.3% PSB5 7029 1-7' CT 821.51 199.99 PSB5 7029 7-11' 112.10 876.21 676.22 35.5% OX223.92 1-7' P-2 112.72 890.42 666.50 40.4% PSB4 7028 P-1 112.51 766.31 570.15 196.16 42.9% 7028 7-11' PSB4 PSB3 7027 1-7' CAT 104.31 880.13 639.85 240.28 44.9% 111.38 569.20 459.78 109.42 31.4% PSB3 7027 7-11' ANT 112.44 740.17 130.75 20.8% PSB<sub>2</sub> 7026 1-7' 870.92 QQ 41.9% PSB2 7026 7-13' BE16.46 851.37 605.03 246.34 Notes / Deviations / References AASHTO T 265: Laboratory Determination of Moisture Content of Soils Karen Warner Certification Type / No. Technician Name

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Ron Harris/ Ron Rothfuss Technical Responsibility

Revision No. 0

### **Laboratory Determination of Water Content**



Revision Date: 02/22/08 4 ASTM D 2216 AASHTO T 265 **Quality Assurance** 9751 Southern Pine Blvd., Charlotte, NC 28273 3/6/14 Report Date: Project #: 3735-14-001 Test Date(s): 3/4-6/14 Ecusta Mill Site Project Name: Shaw Environmental & Infrastructure, Inc. Client Name: Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Sample Date(s): 2/27-28/14 Sample by: NA NA Drill Rig: Sampling Method:  $\sqrt{}$ Balance ID. 3222 Calibration Date: 6/18/13 Method: A (1%) B (0.1%) Tare Wt. + Tare Wt.+ Water Percent Sample Boring Sample Tare Weight Tare# 0 Depth Wet Wt Dry Wt Weight Moisture No. No. t ft. or m. grams grams grams grams % e 519.97 99.21 22.6% PSB26 7050 1-11' Paul 81.80 619.18 PSB26 7050 11-17' T-4 81.88 814.03 625.54 188.49 34.7% 736.42 617.51 118.91 22.3% PSB27 G-12 83.30 7051 1-12' 209.02 PSB27 855.39 646.37 37.1% 7051 12-20' G-12 83.15 PSB27 7051 20-25' G-3 81.30 1001.04 856.33 144.71 18.7% 109.40 799.82 690.42 18.0% 7051 81.81 PSB27 25-35' S-4 Notes / Deviations / References AASHTO T 265: Laboratory Determination of Moisture Content of Soils Karen Warner Certification Type / No. Technician Name Ron Harris/ Ron Rothfuss Technical Responsibility

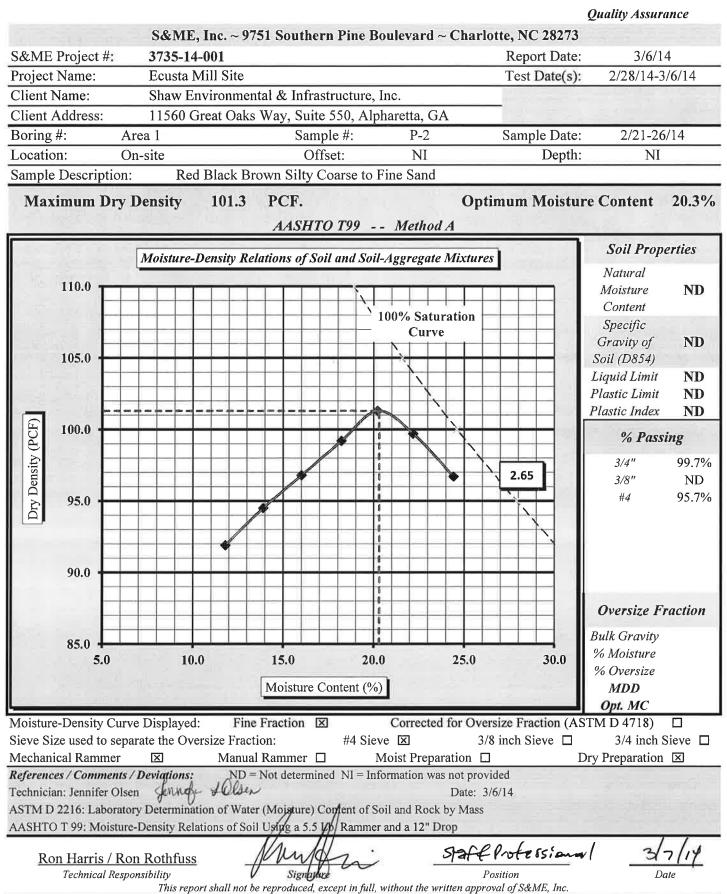
### Form No. TR-D698-2

Revision No.: 0

Revision Date: 11/21/07

### **Moisture - Density Report**





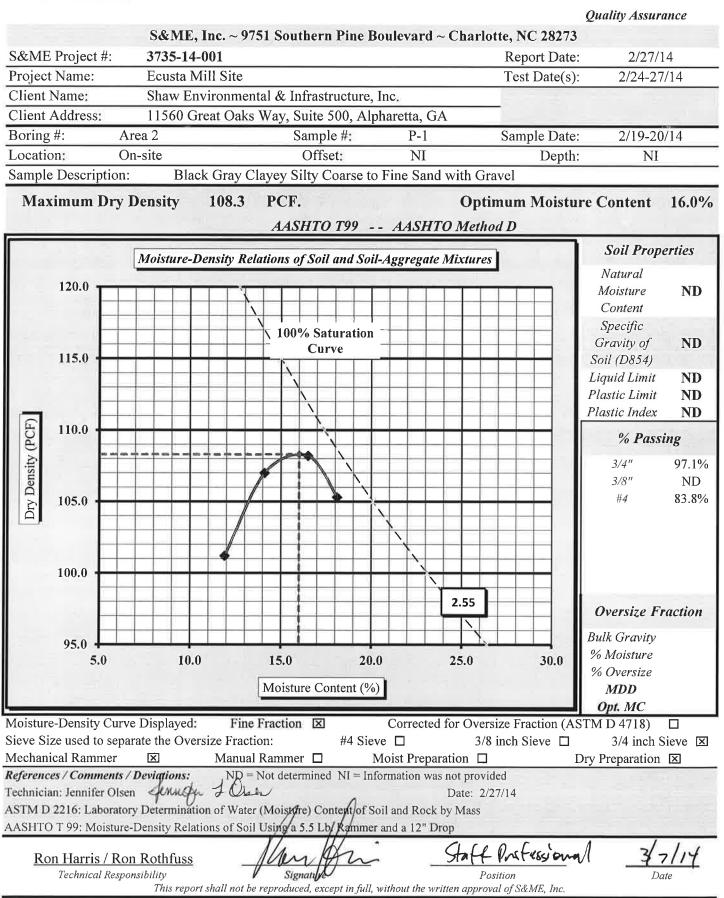
#### Form No. TR-D698-2

Revision No. : 0

Revision Date: 11/21/07

### Moisture - Density Report





#### Form No. TR-D698-2

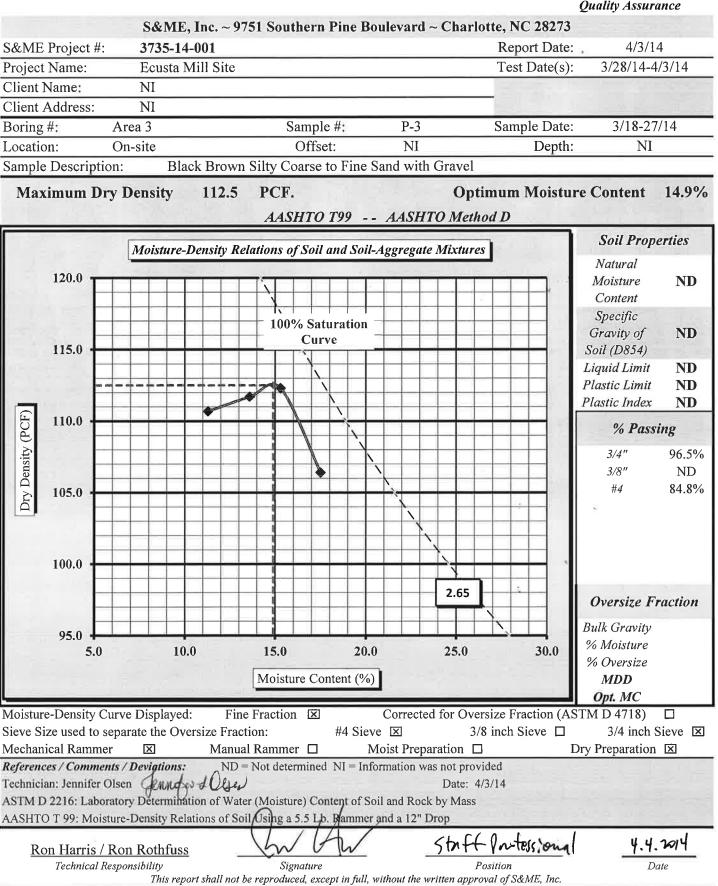
Revision No.: 0

Revision Date: 11/21/07

### Moisture - Density Report



Quality Assurance





AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

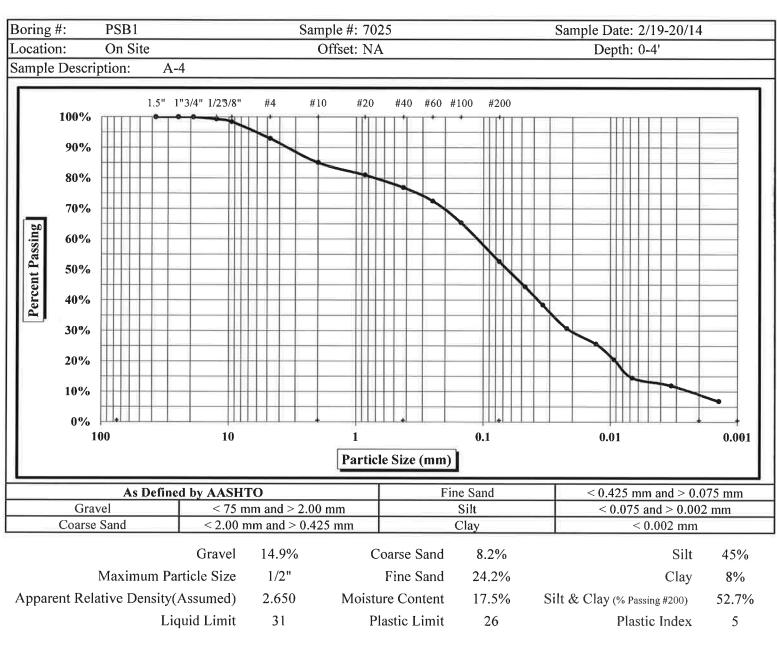
2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA



| Description of     | Sand & Gravel Particl          | es: Rounded $\square$        | Angular ⊠  | Hard & Durable           | ⊠ Soft □           | Weathere             | d & Friable □ |
|--------------------|--------------------------------|------------------------------|------------|--------------------------|--------------------|----------------------|---------------|
| Mechanical Stirrin | g Apparatus (A)                | Length of Dispersion Period: | 1 min.     | Dispersing Agent:        | Sodium Hexar       | netaphosphate:       | 40 g./ Liter  |
| References:        | AASHTO T88: Particle           | Size Analysis of Soils       | AASHTO T87 | Dry Preparation of Distu | rbed Soil and Soi  | l Aggregate Sample   | s for Test    |
| AASHTO T89: De     | etermining the Liquid Limit of | of Soils                     | AASHT      | O T90: Determining the   | Plastic Limit & Pl | asticity Index of So | ils           |

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

## Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07

| <b>♦S&amp;ME</b> |   |
|------------------|---|
|                  | _ |

X Another code ASTM D 4318 AASHTO T 89 AASHTO T 90  $\boxtimes$ Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/7/14 Project Name: Ecusta Mill Site Test Date(s) 2/24-3/7/14 Client Name: Shaw Environmental & Infrastructure, Inc. 11560 Great Oaks Way, Suite 500, Alpheretta, GA Client Address: Sample #: 7025 Boring #: PSB<sub>1</sub> Sample Date: 2/19-20/14 On Site Offset: NA Elevation: 0-4' Location: Sample Description: A-4 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: 6/18/2013 Grooving tool Balance (0.01 g) 3222 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan # Tare #: 40 2 17 7. 23 Tare Weight 13.96 A 15.78 15.75 16.87 14.06 В Wet Soil Weight + A 28.66 29.01 28.31 25.44 23.51 C Dry Soil Weight + A 25.62 25.82 24.77 23.68 21.61 Water Weight (B-C) 3.04 3.19 3.54 1.76 1.90 D 6.81 7.55 E Dry Soil Weight (C-A) 9.84 10.07 10.81 F % Moisture (D/E)\*100 30.9% 31.7% 32.7% 25.8% 25.2% # OF DROPS 27 23 N 18 Moisture Contents determined by AASHTO T 245 LL LL = F \* FACTORAve. Average 25.5% One Point Liquid Limit 40.0 Factor **Factor** 20 0.974 26 1.005 21 0.979 27 1.009 35.0 Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 24 0.995 1.022 30.0 25 1.000 NP, Non-Plastic Liquid Limit 31 % 25.0 Plastic Limit 26 Plastic Index 5 20.0 Group Symbol A-4 100 15 20 25 30 35 40 # of Drops Multipoint Method 1 One-point Method Wet Preparation **Dry Preparation** Air Dried Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: AASHTO 1789: Determining the Liquid Limit of Soils AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

Walun

ical Remonsibility



AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

PSB1 Sample #: 7025 Sample Date: 2/19-20/14 Boring #: Offset: NA Depth: 4-10' On Site Location: Sample Description: A-4 1.5" 1"3/4" 1/23/8" #4 #10 #20 #40 #60 #100 #200 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 0.001 10 1 0.1 0.01 100 Particle Size (mm) As Defined by AASHTO Fine Sand < 0.425 mm and > 0.075 mm< 75 mm and > 2.00 mmSilt < 0.075 and > 0.002 mmGravel < 2.00 mm and > 0.425 mmClay < 0.002 mmCoarse Sand

| Course Suriu                | · 2.00 I   | illi alia - 0. | 125 (1111) |              | Jiuj  | · 01002 mm                   |       |
|-----------------------------|------------|----------------|------------|--------------|-------|------------------------------|-------|
| -                           | Gravel     | 9.7%           | (          | Coarse Sand  | 7.9%  | Silt                         | 46%   |
| Maximum Par                 | ticle Size | 1/2"           |            | Fine Sand    | 23.5% | Clay                         | 13%   |
| Apparent Relative Density(A | Assumed)   | 2.650          | Moist      | ure Content  | 22.4% | Silt & Clay (% Passing #200) | 58.8% |
| Liqu                        | uid Limit  | 34             | P          | lastic Limit | 27    | Plastic Index                | 7     |

| Mechanical Stirring Apparatus (A)  Length of I | Dispersion Period: 1 min | Dispersing Age | ent: Sodium Hex | ametaphosphate: | 40 g / Liter |
|--|--------------------------|----------------|-----------------|-----------------|--------------|

**References:** AASHTO T88: Particle Size Analysis of Soils AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

Ron Hanis

3/7/14

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07 AASHTO T 89 X AASHTO T 90 X ASTM D 4318 Quality Assurance Another code S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 3/7/14 Project #: 3735-14-001 Report Date: Project Name: Ecusta Mill Site Test Date(s) 2/24-3/7/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA PSB<sub>1</sub> Sample #: 7025 Sample Date: 2/19-20/14 Boring #: Elevation: 4-10' Location: On Site Offset: NA Sample Description: A-4 S&ME ID# S&ME ID # Type and Specification Cal Date: Type and Specification Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 3653 1/21/2014 Grooving tool LL Apparatus Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan# EE 48 27 PP Tare #: 7 Tare Weight 15.70 14.00 16.16 16.86 13.89 A 28.76 22.33 В Wet Soil Weight + A 29.52 29.65 24.46 C Dry Soil Weight + A 26.10 26.39 24.85 20.56 22.72 Water Weight (B-C) 3.42 3.26 3.91 1.77 1.74 D Dry Soil Weight (C-A) 10.40 9.53 10.85 6.67 6.56 E F % Moisture (D/E)\*100 32.9% 34.2% 36.0% 26.5% 26.5% # OF DROPS 28 22 N 16 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL 26.5% Ave. Average One Point Liquid Limit 50.0 Factor Factor 20 0.974 1.005 26 45.0 27 21 0.979 1.009 % Moisture Content 22 0.985 28 1.014 40.0 23 0.99 29 1.018 24 0.995 30 1.022 35.0 1.000 25 NP, Non-Plastic 30.0 Liquid Limit 34 Plastic Limit 27 25.0 7 Plastic Index 20.0 Group Symbol A-4 100 10 15 20 25 30 35 40 # of Drops Multipoint Method 1 One-point Method 1 Air Dried Estimate the % Retained on the #40 Sieve: Wet Preparation **Dry Preparation** Notes / Deviations / References: AASHTQ T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

Technical Responsibility

Technician Name



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/19/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

3/3-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

PSB<sub>2</sub> Sample #: 7026 Sample Date: 2/21-26/14 Boring #: Depth: 1-7' Location: On Site Offset: NA Sample Description: A-4 1.5" 1"3/4" 1/2'3/8" #4 #10 #20 #40 #60 #100 #200 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 100 10 0.1 0.01 0.001 Particle Size (mm)

| As Define   | ed by AASHTO             | Fine Sand         | < 0.425  mm and > 0.075  mm |
|-------------|--------------------------|-------------------|-----------------------------|
| Gravel      | < 75 mm and > 2.00 mm    | Silt              | < 0.075 and > 0.002 mm      |
| Coarse Sand | < 2.00 mm and > 0.425 mm | Clay              | < 0.002 mm                  |
|             | Gravel 17.5%             | Coarse Sand 18.4% | Silt 34%                    |

18.7% Maximum Particle Size 1/2" Fine Sand Clay 11% Apparent Relative Density(Assumed) 2.650 Moisture Content 20.8% Silt & Clay (% Passing #200) 45.4% 10 40 Plastic Limit 30 Plastic Index Liquid Limit

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐ Mechanical Stirring Apparatus (A) Length of Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References: AASHTO T88: Particle Size Analysis of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T89: Determining the Liquid Limit of Soils

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AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

3109 Spring Forest Road, Raleigh, N.C. 27613735-14-001 PSB2 7026 (1-7') Hydro.xls

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

Ron Hawis

3.19.2014

## Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07

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|-------|---|
|       |   |

AASHTO T 89 X AASHTO T 90 ASTM D 4318  $\times$ Quality Assurance Another code S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/19/14 Project Name: **Ecusta Mill Site** Test Date(s) 3/3-19/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA PBS2 Sample #: 7026 Sample Date: 2/21-26/14 Boring #: Elevation: 1-7' On Site Offset: NA Location: A-4 Sample Description: S&ME ID # Type and Specification S&ME ID# Cal Date: Type and Specification Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 Grooving tool LL Apparatus 3653 1/21/2014 Oven 11702 1/21/2014 Grooving tool Plastic Limit Liquid Limit Pan # 39 Tare #: 49 51 41 8 Tare Weight 15.76 13.96 13.94 15.66 15.74 A В Wet Soil Weight + A 26.76 26.33 24.63 20.39 20.91 Dry Soil Weight + A C 23.65 23.25 21.98 18.92 19.30 Water Weight (B-C) 3.11 3.08 2.65 1.47 1.61 D Dry Soil Weight (C-A) 7.99 7.51 6.22 4.96 5.36 E % Moisture (D/E)\*100 38.9% 41.0% 42.6% 29.6% 30.0% F 29 24 18 N # OF DROPS Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. 29.8% Average One Point Liquid Limit 55.0 Factor N Factor 20 0.974 26 1.005 50.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 45.0 1.018 23 0.99 29 24 0.995 30 1.022 40.0 1.000 25 NP, Non-Plastic 35.0 Liquid Limit 40 Plastic Limit 30 30.0 Plastic Index 10 25.0 **Group Symbol** A-4 100 10 15 20 25 30 35 40 # of Drops Multipoint Method 1 One-point Method 1 Estimate the % Retained on the #40 Sieve: Wet Preparation **Dry Preparation** Air Dried Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

Karen Warner Technician Name

Kon Hawir Technical Responsibility 3.19.2014



AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/19/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

3/3-10/14

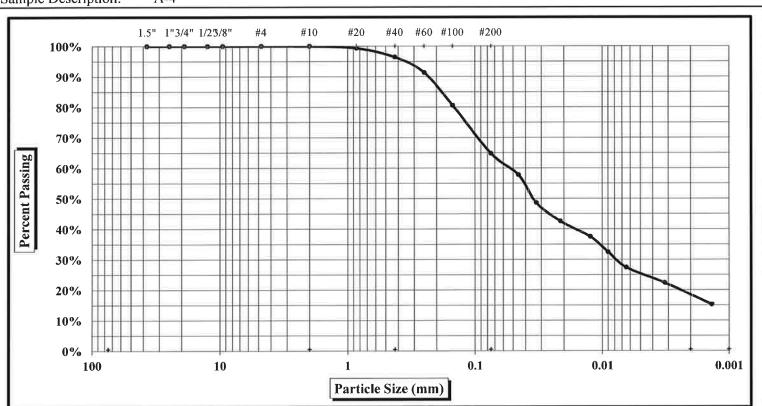
Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA

Sample Date: 2/21-26/14 Boring #: PSB<sub>2</sub> Sample #: 7027 Depth: 7-13' Offset: NA Location: On Site

Sample Description: A-4



| As Define   | ed by AASHTO             | Fine Sand | < 0.425 mm and > 0.075 mm |
|-------------|--------------------------|-----------|---------------------------|
| Gravel      | < 75 mm and > 2.00 mm    | Silt      | < 0.075 and > 0.002 mm    |
| Coarse Sand | < 2.00 mm and > 0.425 mm | Clay      | < 0.002 mm                |

| Gravel                             | 0.0%  | Coarse Sand      | 3.6%  | Silt                         | 46%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | #20   | Fine Sand        | 31.6% | Clay                         | 19%   |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 41.9% | Silt & Clay (% Passing #200) | 64.8% |
| Liquid Limit                       | 38    | Plastic Limit    | 29    | Plastic Index                | 9     |

| Description of Sand & Gravel Partic | les: Rounded □              | Angular 🗵 | Hard & Durable    | e ⊠ Soft □       | Weather   | ed & Friable $\square$ |
|-------------------------------------|-----------------------------|-----------|-------------------|------------------|-----------|------------------------|
| Mechanical Stirring Apparatus (A)   | Length of Dispersion Period | 1 min     | Dispersing Agent: | Sodium Hexametar | hosphate: | 40 g / Liter           |

References: AASHTO T88: Particle Size Analysis of Soils AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

3.19.2014

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07

| A | 437 |  |  |
|---|-----|--|--|
|   |     |  |  |
|   |     |  |  |

ASTM D 4318 AASHTO T 89 X AASHTO T 90 X Another code Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Report Date: 3/19/14 Project #: 3735-14-001 Test Date(s) 3/3-19/14 **Project Name:** Ecusta Mill Site Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Sample Date: 2/21-26/14 Boring #: PSB2 Sample #: 7026 On Site Offset: NA Elevation: 7-13' Location: Sample Description: A-4 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: 7/16/2013 Balance (0.01 g) Grooving tool 20835 3222 6/18/2013 3653 1/21/2014 Grooving tool LL Apparatus 1/21/2014 Oven 11702 Grooving tool Liquid Limit Plastic Limit Pan# XX RR NN KK 6 Tare #: Tare Weight 16.03 15.30 15.28 16.05 14.02 A Wet Soil Weight + A 31.56 27.06 22.39 20.83 В 27.59 C Dry Soil Weight + A 20.99 19.31 27.31 24.19 23.72 4.25 3.40 3.34 1.40 1.52 D Water Weight (B-C) 4.94 5.29 E Dry Soil Weight (C-A) 11.28 8.89 8.44  $\mathbf{F}$ % Moisture (D/E)\*100 37.7% 38.2% 39.6% 28.3% 28.7% # OF DROPS 28 22 15 N Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL 28.5% Ave. Average One Point Liquid Limit 50.0 Factor Factor N 0.974 1.005 20 26 45.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 40.0 24 0.995 1.022 25 1.000 35.0 NP, Non-Plastic **Liquid Limit** 38 30.0 Plastic Limit 29 9 Plastic Index 25.0 Group Symbol A-4 100 10 15 20 35 25 30 40 # of Drops Multipoint Method 1 One-point Method Estimate the % Retained on the #40 Sieve: **Dry Preparation** 1 Wet Preparation Air Dried Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

AASHTO T89: Determining the Liquid Limit of Soils

Karen Warner Technician Name

Ron Hamis Technical Responsibility

3.19.2014

AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/19/14

Project Name: Client Name:

**Ecusta Mill Site** 

Test Date(s):

3/3-10/14

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

Boring #: PSB3 Sample #: 7027 Sample Date: 2/21-26/14 Location: On Site Offset: NA Depth: 1-7' Sample Description: A-4 1.5" 1"3/4" 1/23/8" #4 #10 #20 #40 #60 #100 #200 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 10 0.1 0.01 0.001 100 1 Particle Size (mm)

| As Define   | d by AASHTO              | Fine Sand | < 0.425 mm and > 0.075 mm |
|-------------|--------------------------|-----------|---------------------------|
| Gravel      | < 75 mm and > 2.00 mm    | Silt      | < 0.075 and > 0.002 mm    |
| Coarse Sand | < 2.00 mm and > 0.425 mm | Clay      | < 0.002 mm                |

| Gravel                             | 0.0%  | Coarse Sand      | 2.1%  | Silt                         | 47%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | #10   | Fine Sand        | 26.9% | Clay                         | 24%   |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 44.9% | Silt & Clay (% Passing #200) | 71.0% |
| Liquid Limit                       | 38    | Plastic Limit    | 30    | Plastic Index                | 8     |

| Description of Sand & Gravel Particles: Rounded                         |                               |                                | Angular ⊠        | Hard & Durable              | ⊠ So         | ft 🗆        | Weathere        | d & Friable 🛚   |
|---|-------------------------------|--------------------------------|------------------|-----------------------------|--------------|-------------|-----------------|-----------------|
| Mechanical Stirrin  | g Apparatus (A)               | Length of Dispersion Period:   | 1 min.           | Dispersing Agent:           | Sodium       | Hexameta    | phosphate:      | 40 g./ Liter    |
| References:   | AASHTO T88: Particle          | Size Analysis of Soils         | AASHTO T8        | 7: Dry Preparation of Distu | rbed Soil ar | nd Soil Ag  | gregate Sample  | es for Test     |
| AASHTO T89: Determining the Liquid Limit of Soils AASHTO T90: Determini |                               |                                |                  |                             |              | t & Plastic | ity Index of So | oils            |
| AASHTO M 145:   | The Classification of Soils a | nd Soil Aggregate Mixtures for | Highway Construc | ction Purposes              | 1            | ASTM D 8    | 54: Specific G  | ravity of Soils |

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

Ron Hanis

Another code

## Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07

| ASTM D 4318 | AASHTO T 89 | X | AASHTO T 90 | X | Quality Assurance |
|-------------|-------------|---|-------------|---|-------------------|
|             |             |   |             |   |                   |

S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273

3/19/14 Report Date: Project #: 3735-14-001

3/3-19/14 Ecusta Mill Site Test Date(s) Project Name:

Shaw Environmental & Infrastructure, Inc. Client Name:

Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA

Sample #: 7027 Sample Date: 2/21-26/14 Boring #: PSB3

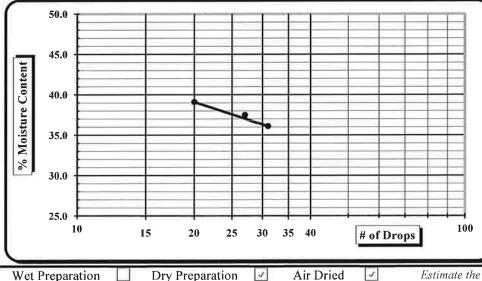
Offset: NA Elevation: 1-7' Location: On Site

Sample Description: A-4

Type and Specification S&ME ID # Type and Specification S&ME ID # Cal Date: Cal Date: 20835 7/16/2013 Balance (0.01 g) 3222 6/18/2013 Grooving tool 1/21/2014 LL Apparatus 3653 Grooving tool

1/21/2014 Grooving tool Oven 11700

| Oven  | 11/02                 | 3            | 1/21/2014 | Groc  | iving tool |  |                              |               |         |  |
|-------|-----------------------|--------------|-----------|-------|------------|--|------------------------------|---------------|---------|--|
| Pan # |                       | Liquid Limit |           |       |            |  |                              | Plastic Limit |         |  |
|       | Tare #;               | 59           | TS        | 52    |            |  | 23                           | 33            |         |  |
| Α     | Tare Weight           | 15.78        | 15.30     | 15.71 |            |  | 14.08                        | 15.89         |         |  |
| В     | Wet Soil Weight + A   | 27.70        | 26.18     | 26.24 |            |  | 21.90                        | 22.27         |         |  |
| С     | Dry Soil Weight + A   | 24.54        | 23.21     | 23.28 |            |  | 20.11                        | 20.82         |         |  |
| D     | Water Weight (B-C)    | 3.16         | 2.97      | 2.96  |            |  | 1.79                         | 1.45          |         |  |
| Е     | Dry Soil Weight (C-A) | 8.76         | 7.91      | 7.57  |            |  | 6.03                         | 4.93          |         |  |
| F     | % Moisture (D/E)*100  | 36.1%        | 37.5%     | 39.1% |            |  | 29.7%                        | 29.4%         |         |  |
| N     | # OF DROPS            | 31           | 27        | 20    |            |  | Moisture Contents determined |               | ermined |  |
| LL    | LL = F * FACTOR       |              |           |       |            |  | by AASHTO T 245              |               |         |  |
| Ave.  | Average               | 29.6%        |           |       |            |  |                              |               |         |  |



|    | One Point Liquid Limit |    |        |  |  |  |  |  |  |  |  |  |
|----|------------------------|----|--------|--|--|--|--|--|--|--|--|--|
| N  | Factor                 | N  | Factor |  |  |  |  |  |  |  |  |  |
| 20 | 0.974                  | 26 | 1.005  |  |  |  |  |  |  |  |  |  |
| 21 | 0.979                  | 27 | 1.009  |  |  |  |  |  |  |  |  |  |
| 22 | 0.985                  | 28 | 1.014  |  |  |  |  |  |  |  |  |  |
| 23 | 0.99                   | 29 | 1.018  |  |  |  |  |  |  |  |  |  |
| 24 | 0.995                  | 30 | 1.022  |  |  |  |  |  |  |  |  |  |
| 25 | 1.000                  |    |        |  |  |  |  |  |  |  |  |  |
|    |                        |    |        |  |  |  |  |  |  |  |  |  |

NP, Non-Plastic Liquid Limit 38 Plastic Limit 30 Plastic Index Group Symbol Multipoint Method

1 One-point Method

Estimate the % Retained on the #40 Sieve!

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

AASHTO T89: Determining the Liquid Limit of Soils

Karen Warner Technician Name

Ron Harris Technical Responsibility

Date



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/19/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

3/3-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

| Boring #: PSB3 Sample        |          |           |                 | #: 70      | 27      |        |         | Sample     | Sample Date: 2/21-26/14 |     |          |        |       |  |  |  |
|------------------------------|----------|-----------|-----------------|------------|---------|--------|---------|------------|-------------------------|-----|----------|--------|-------|--|--|--|
| ocation                      | n:       | On Site   |                 | Offset: NA |         |        |         |            | Depth: 7-11'            |     |          |        |       |  |  |  |
| ample                        | Descrip  | otion: A  | <b>\-4</b>      |            |         |        |         |            |                         |     |          |        |       |  |  |  |
|                              | 100%     | 1.5"      | 1"3/4" 1/2'3/8" | #4         | #10     | #20    | #40     | #60 #100   | #200                    |     |          |        | 1     |  |  |  |
|                              | 90%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
|                              | 80%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
|                              | 70%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
| Percent Passing              | 60%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
| ent P                        | 50%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
| Perc                         | 40%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
|                              | 30%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
|                              | 20%      |           |                 |            |         |        |         |            |                         |     |          | `~     |       |  |  |  |
|                              | 10%      |           |                 |            |         |        |         |            |                         |     |          |        |       |  |  |  |
|                              | 0%<br>10 | 00        | 10              |            |         | 1      | .1+1    |            | 0.1                     | -11 | 0.01     | l   +  | 0.001 |  |  |  |
|                              |          |           |                 |            |         | Partic | le Size | (mm)       |                         |     |          |        |       |  |  |  |
|                              |          | As Defi   | ned by AASHT    |            |         |        |         | Fine S     |                         |     | 0.425 mm |        |       |  |  |  |
| Gravel < 75 mm and > 2.00 mm |          |           |                 |            | Silt    |        |         | < 0.075 an |                         | mm  |          |        |       |  |  |  |
|                              | Coarse   | Sand      | < 2.00 m        | nm and >   | 0.425 m | ım     |         | Clay       | у                       |     | < 0.0    | 002 mm |       |  |  |  |
|                              |          |           | Gravel          | 0.0%       | •       | C      | oarse ! |            | 1.5%                    |     |          | Silt   | 46%   |  |  |  |
|                              |          | Maximum l | Particle Size   | #10        |         |        | Fine S  | Sand 3     | 36.4%                   |     |          | Clay   | 16%   |  |  |  |

| 0.0%  | Coarse Sand      | 1.5%                                 | Siit  | 46%  |
|-------|------------------|--------------------------------------|---|--|
| #10   | Fine Sand        | 36.4%                                | Clay  | 16%  |
| 2.650 | Moisture Content | 31.4%                                | Silt & Clay (% Passing #200)                        | 62.1%  |
| 36    | Plastic Limit    | 29                                   | Plastic Index                                       | 7  |
|       | #10<br>2.650     | #10 Fine Sand 2.650 Moisture Content | #10 Fine Sand 36.4%<br>2.650 Moisture Content 31.4% | #10 Fine Sand 36.4% Clay 2.650 Moisture Content 31.4% Silt & Clay (% Passing #200) |

Description of Sand & Gravel Particles: Rounded Angular ⊠ Hard & Durable ⊠ Soft  $\square$ Weathered & Friable Mechanical Stirring Apparatus (A) Sodium Hexametaphosphate: 40 g<sub>i</sub>/Liter Length of Dispersion Period: 1 min Dispersing Agent: References: AASHTO T88: Particle Size Analysis of Soils AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

3.19.2014



Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

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|----|------------------|
|    |                  |
|    |                  |

ASTM D 4318 AASHTO T 89  $\boxtimes$ AASHTO T 90 X Another code Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Report Date: 3/19/14 Project #: 3735-14-001 3/3-19/14 Project Name: Ecusta Mill Site Test Date(s) Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Boring #: PSB3 Sample #: 7027 Sample Date: 2/21-26/14 On Site Offset: NA Elevation: 7-11' Location: Sample Description: A-4 Type and Specification S&ME ID# Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) Grooving tool 7/16/2013 3222 6/18/2013 20835 3653 1/21/2014 Grooving tool LL Apparatus Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan # Tare #: Z 30 34 MM Jordi Tare Weight 15.93 15.89 13.98 16.87 16.56 A 24.48 23.39  $\mathbf{B}$ Wet Soil Weight + A 28.36 29.40 25.19 C Dry Soil Weight + A 22.77 25.11 25.72 22.09 21.85 3.25 D Water Weight (B-C) 3.68 3.10 1.71 1.54 E Dry Soil Weight (C-A) 9.18 9.83 8.11 5.90 5.29 F % Moisture (D/E)\*100 35.4% 37.4% 38.2% 29.0% 29.1% # OF DROPS 28 23 16 N Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL 29.1% Ave. Average One Point Liquid Limit 50.0 Factor Factor 20 0.974 26 1.005 45.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 1.018 29 40.0 24 0.995 1.022 1.000 25 35.0 NP, Non-Plastic Liquid Limit 36 30.0 Plastic Limit 29 7 Plastic Index 25.0 Group Symbol A-4 100 10 15 20 30 40 25 35 # of Drops Multipoint Method 1 One-point Method 1 Estimate the % Retained on the #40 Sieve: Wet Preparation Dry Preparation Air Dried Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

AASHTO T89: Determining the Liquid Limit of Soils

Karen Warner Technician Name

Kon Hanis Technical Responsibility 2.19.2014



**AASHTO T88** 

S&ME Project #:

3735-14-001

Report Date:

3/19/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

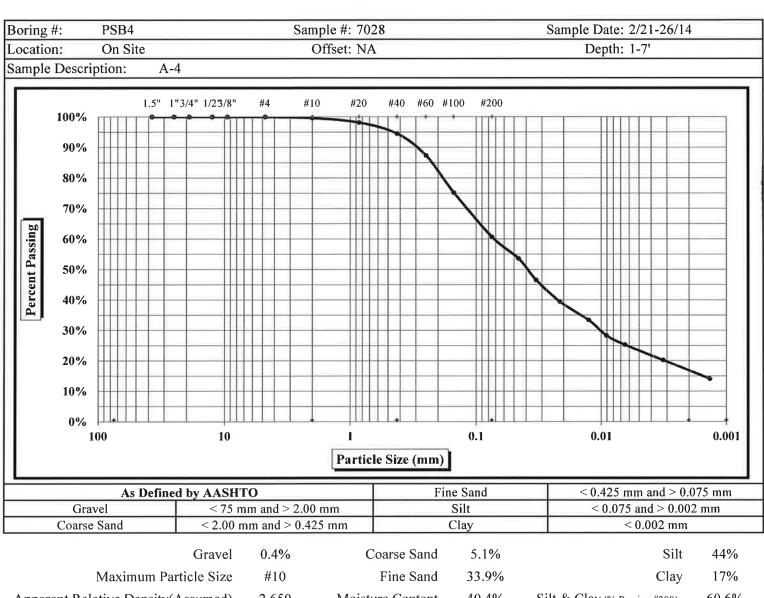
3/3-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA



| 0.4%  | Coarse Sand      | 5.1%                                 | Silt  | 44%  |
|-------|------------------|--------------------------------------|---|--|
| #10   | Fine Sand        | 33.9%                                | Clay  | 17%  |
| 2.650 | Moisture Content | 40.4%                                | Silt & Clay (% Passing #200)                        | 60.6%  |
| 32    | Plastic Limit    | 26                                   | Plastic Index                                       | 6  |
|       | #10<br>2.650     | #10 Fine Sand 2.650 Moisture Content | #10 Fine Sand 33.9%<br>2.650 Moisture Content 40.4% | #10 Fine Sand 33.9% Clay 2.650 Moisture Content 40.4% Silt & Clay (% Passing #200) |

Weathered & Friable Description of Sand & Gravel Particles: Rounded Angular ⊠ Hard & Durable ⊠ Soft □ Mechanical Stirring Apparatus (A) 40 g./ Liter Length of Dispersion Period: Dispersing Agent: Sodium Hexametaphosphate: 1 min References: AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test AASHTO T88: Particle Size Analysis of Soils

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:



Revision No. 0 Liquid Limit, Plastic Limit, and Plastic Index Revision Date: 11/20/07 Another code ASTM D 4318 AASHTO T 89 X AASHTO T 90 X Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 3/19/14 Project #: 3735-14-001 Report Date: 3/3-19/14 Ecusta Mill Site Test Date(s) **Project Name:** Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Sample Date: 2/21-26/14 Boring #: PSB4 Sample #: 7028 Location: On Site Offset: NA Elevation: 1-7' Sample Description: A-4 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID# Cal Date: Balance (0.01 g) 3222 Grooving tool 20835 7/16/2013 6/18/2013 LL Apparatus 3653 1/21/2014 Grooving tool 11702 1/21/2014 Grooving tool Oven Pan# Liquid Limit Plastic Limit w Tare #: 12 38 5 60 Tare Weight 14.16 15.79 15.68 15.99 13.85 Α В Wet Soil Weight + A 26.15 30.03 29.45 24.20 20.28 Dry Soil Weight + A 22.47 C 23.33 26.51 25.92 18.98 D Water Weight (B-C) 2.82 3.52 3.53 1.73 1.30 Dry Soil Weight (C-A) 6.48 5.13 E 9.17 10.72 10.24 F % Moisture (D/E)\*100 30.8% 32.8% 34.5% 26.7% 25.3% 25 17 N # OF DROPS 31 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL 26.0% Average Ave.One Point Liquid Limit 45.0 Factor Factor N 0.974 1.005 20 26 40.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 35.0 24 0.995 1.022 25 1.000 30.0 NP, Non-Plastic **Liquid Limit** 32 25.0 Plastic Limit 26 Plastic Index 6

Estimate the % Retained on the #40 Sieve: **Dry Preparation** Air Dried Wet Preparation Notes / Deviations / References:

# of Drops

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

20

25

30

35 40

15

AASHTO T89: Determining the Liquid Limit of Soils

Group Symbol

Multipoint Method

One-point Method

Karen Warner Technician Name

Ron Hamir Technical Responsibility

100

A-4

1

Date

20.0

10



AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/19/14

Project Name:

Ecusta Mill Site

Test Date(s):

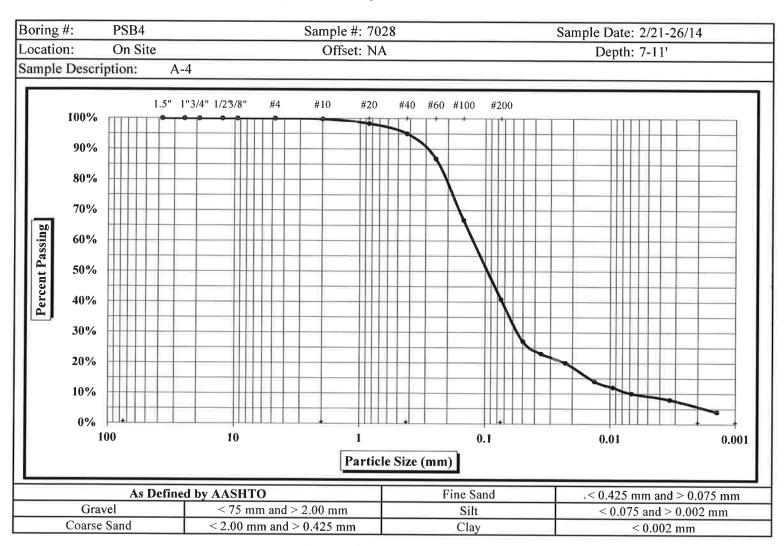
3/3-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA



| Gravel                             | 0.2%  | Coarse Sand      | 4.8%  | Silt                         | 35%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | #10   | Fine Sand        | 54.2% | Clay                         | 6%    |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 42.9% | Silt & Clay (% Passing #200) | 40.8% |
| Liquid Limit                       | 0     | Plastic Limit    | 0     | Plastic Index                | 0     |

| Description of    | Sand & Gravel Part        | Angular ⊠                    | Hard & Durable  | X                          | Soft □   | Weather      | ed & Friable 🛚 |              |
|-------------------|---------------------------|------------------------------|---|----------------------------|----------|--------------|----------------|--------------|
| Mechanical Stirri | ng Apparatus (A)          | Length of Dispersion Period: | 1 min   | Dispersing Agent:          | Sodi     | um Hexam     | etaphosphate:  | 40 g./ Liter |
| References:       | AASHTO T88: Parti         | cle Size Analysis of Soils   | AASHTO T87  | : Dry Preparation of Distu | irbed So | il and Soil. | Aggregate Samp | les for Test |
| AASHTO T89: D     | etermining the Liquid Lir | nit of Soils                 | AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils |                            |          |              |                |              |
|                   |                           |                              |   |                            |          |              |                |              |

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

Lan Havis

M AV
Signature

3.19.2014



| Revision                                  | NO. U                        |                | Liani      | id Lin  | ait Pla   | etic T   | imit a     | and P   | Plastic I    | nday        | V            |                        |          |
|---|------------------------------|----------------|------------|---------|-----------|----------|------------|---------|--------------|-------------|--------------|------------------------|----------|
| Revision                                  | Date: 11/20                  | 0/07           | Liqui      | iu Liii | 111, 1 14 | asuc L   | 111111t, 2 | anu 1   | iastic ii    | nuex        | 4            |                        |          |
| Another o                                 | code                         | ASTM D         | 4318       |         | AASH      | TO T 89  | X          | AAS     | SHTO T 90    | X           | Qua          | ility Assur            | rance    |
|   |                              | S&MI           | E, Inc.    | ~9751   | Southe    | rn Pin   | e Boule    | vard,0  | Charlotte    | e, NC 28    | 273          |                        |          |
| Project                                   | #:                           | 3735-14-001    |            |         |           |          |            |         |              | Report      | Date:        | 3/19/                  | 14       |
| Project 1                                 | Name:                        | Ecusta Mill S  | Site       |         |           |          |            |         |              | Test Da     | ate(s)       | 3/3-19                 | /14      |
| Client N                                  | ame:                         | Shaw Enviro    | nmenta     | al & In | frastruc  | ture, In | 0          |         |              |             |              |                        |          |
| Client A                                  | ddress:                      | 11560 Great    | Oaks V     | Way, Sı | uite 500  | , Alphe  | retta, G   | iΑ      |              |             |              |                        |          |
| Boring #                                  | t: PBS                       | 4              |            | Samp    | ole #: 7  | 028      |            |         | Sam          | ple Date    | : 2/21-26/   | 14                     |          |
| Location                                  | n: On S                      | Site           |            | O       | ffset: N  | Α        |            |         | Е            | levation    | : 7-11'      |                        |          |
| Sample                                    | Description                  | n: A-4         |            |         |           |          |            |         |              |             |              |                        |          |
|   | Specificati                  | on S&          | ME ID      | #       | Cal Da    |          | Type an    | d Speci | ification    | S&          | ME ID#       | Cal                    | Date:    |
| Balance                                   |                              |                | 3222       |         | 6/18/20   |          | Groovin    |         |              |             | 20835        | 7/16                   | /2013    |
| LL Apparatus 3653 1/21/2014 Grooving tool |                              |                |            |         |           |          |            |         |              |             |              |                        |          |
| Oven Pan #                                | 1                            |                | 11702      | _       | 1/21/20   |          | Groovin    |         |              |             |              |                        |          |
| 1 an H                                    |                              | Tar            | e #·       |         |           |          | Liquid Lin | nit     |              |             |              | Plastic Limi           | t I      |
| A   | Т                            | are Weight     | <i>- 1</i> |         |           |          | _          | _       |              |             | 1            |                        |          |
| В   |                              | oil Weight + A |            |         |           | _        | -          |         |              |             | <b>-</b>     |                        |          |
| C   |                              | oil Weight + A |            |         | -         | _        | -          |         |              |             | <b>-</b>     |                        |          |
| D   |                              | · Weight (B-C) | _          |         | -         | -        |            |         |              |             | <b> </b>     |                        |          |
| E   |                              | il Weight (C-A |            |         | -         | _        | _          |         |              |             | -            |                        |          |
| F   |                              | sture (D/E)*10 |            |         | ļ         | _        | -          |         |              |             | -            |                        |          |
| N   |                              | OF DROPS       |            |         |           | +        | $\dashv$   |         |              |             | <b>-</b>     | _                      |          |
| LL  |                              | F * FACTOR     |            |         |           |          |            |         |              |             | -8           | Contents d<br>AASHTO T |          |
| Ave.                                      | 1                            | Average        |            |         |           |          |            |         |              |             |              |                        |          |
|   | 0.0 т                        |                |            |         |           |          |            |         |              |             | One Point I  | iquid Limit            |          |
|   | 0.0                          |                |            |         |           |          |            |         |              | N           | Factor       | N                      | Factor   |
|   | 5.0                          |                |            |         |           |          |            |         |              | 20          | 0.974        | 26                     | 1.005    |
| ntent                                     | 5.0                          |                |            |         |           |          |            |         |              | 21          | 0.979        | 27                     | 1.009    |
| g   |                              |                |            |         |           |          |            |         |              | 22          | 0.985        | 28                     | 1.014    |
|   | 0.0                          |                |            |         |           |          |            |         |              | 24          | 0.995        | 30                     | 1.022    |
| % Moisture Co                             |                              |                |            |         |           |          |            |         |              | 25          | 1.000        |                        |          |
| Š   3                                     | 5.0                          |                |            |         |           |          |            |         |              | N]          | P, Non-Pla   | astic                  | X        |
| %   |                              |                |            |         |           |          |            |         |              |             | Liquid L     | imit                   |          |
| 30  | 0.0                          |                |            |         |           |          |            |         |              |             | Plastic L    | imit                   |          |
|   |                              |                |            |         |           |          |            |         |              |             | Plastic Ir   | ndex                   |          |
| 25  | 5.0 +                        | 15 0           |            |         |           |          |            |         | 100          |             | Group Syn    | nbol A                 | -4       |
| l   |                              | 15 2           | 0 25       | 5 30    | 35 40     | #        | of Drop    | os      |              |             | Multipoint N |                        | <u> </u> |
| Wet D                                     |                              | D 20           |            | 777     |           | , , ,    |            |         |              |             | One-point N  |                        |          |
| Wet Pre                                   | paration  <br>viations / Rej | Dry Pre        | paration   | 1 🛂     | Air I     | ried     | <b>V</b>   | Estin   | rate the % I | Retained or | n the #40 Si | eve:                   |          |
| mes / De                                  | viuuons / Kej                | rerences;      |            |         |           |          |            |         |              |             |              |                        |          |

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

AASHTO T89: Determining the Liquid Limit of Soils

Karen Warner
Technician Name









AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/18/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

3/3-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

Boring #: PSB5 Sample #: 7029 Sample Date: 2/21-26/14 Location: On Site Offset: NA Depth: 1-7' Sample Description: A-4 1.5" 1"3/4" 1/23/8" #4 #10 #20 #40 #60 #100 #200 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 10 1 0.001 100 0.1 0.01 Particle Size (mm) As Defined by AASHTO Fine Sand < 0.425 mm and > 0.075 mm Gravel < 75 mm and > 2.00 mm Silt < 0.075 and > 0.002 mmCoarse Sand < 2.00 mm and > 0.425 mmClay < 0.002 mm

| Gravel                             | 1.2%  | Coarse Sand      | 4.0%  | Silt                         | 43%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | #4    | Fine Sand        | 37.0% | Clay                         | 15%   |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 32.3% | Silt & Clay (% Passing #200) | 57.8% |
| Liquid Limit                       | 33    | Plastic Limit    | 27    | Plastic Index                | 6     |

| Description of Sand & Gravel Particl | es: Rounded $\square$        | Angular ⊠ | Hard & Durable    | ⊠ Soft □         | Weathere  | d & Friable  |
|--------------------------------------|------------------------------|-----------|-------------------|------------------|-----------|--------------|
| Mechanical Stirring Apparatus (A)    | Length of Dispersion Period: | 1 min     | Dispersing Agent: | Sodium Hexametap | hosphate: | 40 g / Liter |

References: AASHTO T88: Particle Size Analysis of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

Rou Hanis In Ofer

Revision Date: 11/20/07

# Liquid Limit, Plastic Limit, and Plastic Index



Another code ASTM D 4318 AASHTO T 89 X AASHTO T 90 X Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/18/14 Ecusta Mill Site 3/3-18/14 Project Name: Test Date(s) Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Sample Date: 2/21-26/14 Boring #: PSB5 Sample #: Location: On Site Offset: 7029 Elevation: 1-7' Sample Description: A-4 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool 11702 1/21/2014 Oven Grooving tool Pan # Liquid Limit Plastic Limit Tare #: 60 TS MM 54 W Tare Weight A 13.87 15.30 16.56 14.07 16.03 В Wet Soil Weight + A 25.46 29.47 29.80 20.73 23.12  $\mathbf{C}$ Dry Soil Weight + A 22.71 25.92 26.39 19.34 21.58 Water Weight (B-C) D 2.75 3.55 3.41 1.39 1.54 E Dry Soil Weight (C-A) 8.84 9.83 10.62 5.27 5.55 F % Moisture (D/E)\*100 31.1% 33.4% 34.7% 26.4% 27.7% N # OF DROPS 30 24 19 Moisture Contents determined by AASHTO T 245 LL LL = F \* FACTORAve. 27.1% Average One Point Liquid Limit 45.0 Factor Factor N N 20 0.974 26 1.005 40.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 35.0 24 0.995 1.022 25 1.000 30.0 NP, Non-Plastic Liquid Limit 33 25.0 Plastic Limit 27 Plastic Index 6 20.0 Group Symbol A-4 10 100 15 20 25 30 35 40 # of Drops 1 Multipoint Method One-point Method Wet Preparation Dry Preparation Air Dried Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: AASHTO T90. Determining the Plastic Limit & Plastic Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

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Karen Warner Technician Name



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/18/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

3/5-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA

Boring #: PSB5 Sample #: 7029 Sample Date: 2/21-26/14 On Site Location: Offset: NA Depth: 7-11' Sample Description: A-4 1.5" 1"3/4" 1/23/8" #4 #10 #60 #100 #200 #40 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 10 0.1 0.001 100 0.01 Particle Size (mm) As Defined by AASHTO Fine Sand < 0.425 mm and > 0.075 mm

| ш  | As Define   | d by AASIII |                   |             | nie Dana | * 0.425 mm and * 0.075 mm |
|----|-------------|-------------|-------------------|-------------|----------|---------------------------|
| Е  | Gravel      | < 75 m      | m and > 2.00 mm   |             | Silt     | < 0.075 and > 0.002 mm    |
|    | Coarse Sand | < 2.00 m    | ım and > 0.425 mı | m           | Clay     | < 0.002 mm                |
| w= |             | Gravel      | 0.5%              | Coarse Sand | 7.3%     | Silt 39%                  |

| Gravel                             | 0.5%  | Coarse Sand      | 7.3%  | Silt                         | 39%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | #4    | Fine Sand        | 41.6% | Clay                         | 12%   |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 35.5% | Silt & Clay (% Passing #200) | 50.6% |
| Liquid Limit                       | 28    | Plastic Limit    | 26    | Plastic Index                | 2     |

| Description of Sand & Gravel Part | icles: Rounded $\square$     | Angular ⊠ | Hard & Durable    | e ⊠ Soft □       | Weathere  | ed & Friable $\square$ |
|-----------------------------------|------------------------------|-----------|-------------------|------------------|-----------|------------------------|
| Mechanical Stirring Apparatus (A) | Length of Dispersion Period: | 1 min.    | Dispersing Agent: | Sodium Hexametar | hosphate: | 40 g./ Liter           |

References: AASHTO T88: Particle Size Analysis of Soils AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:



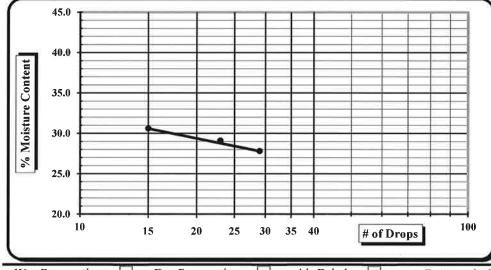
| Revision No. 0                   | Liani                   | id Lin  | nit, Plastic Li   | mit. a  | nd Plastic I | ndex         | POCIVIE           |
|----------------------------------|-------------------------|---------|-------------------|---------|--------------|--------------|-------------------|
| Revision Date: 11/. Another code | 220/07 2314 ASTM D 4318 |         | AASHTO T 89       | × ×     | AASHTO T 90  | X X          | Quality Assurance |
| momer code                       |                         |         | Southern Pine     |         |              |              | Quality Assurance |
| Project #:                       | 3735-14-001             |         |                   |         |              | Report Date: | 3/18/14           |
| Project Name:                    | Ecusta Mill Site        |         |                   |         |              | Test Date(s) | 3/5-18/14         |
| Client Name:                     | Shaw Environment        | al & In | frastructure, Inc |         |              |              |                   |
| Client Address:                  | 11560 Great Oaks V      | Way, S  | uite 500, Alpher  | etta, G | A            |              |                   |

Boring #: PSB5 Sample #: 7029 Sample Date: 2/21-26/14

Location: On Site Offset: NA Elevation: 7-11'

| Sample Description:    | A-4       |           |                        |           |           |
|------------------------|-----------|-----------|------------------------|-----------|-----------|
| Type and Specification | S&ME ID # | Cal Date: | Type and Specification | S&ME ID # | Cal Date: |
| Balance (0.01 g)       | 3222      | 6/18/2013 | Grooving tool          | 20835     | 7/16/2013 |
| LL Apparatus           | 3653      | 1/21/2014 | Grooving tool          |           |           |
| Oven                   | 11702     | 1/21/2014 | Grooving tool          |           |           |

| Pan # |                       | Liquid Limit |       |       |  |  |  |          | Plastic Limit |           |  |
|-------|-----------------------|--------------|-------|-------|--|--|--|----------|---------------|-----------|--|
|       | Tare #:               | 38           | 33    | 41    |  |  |  | Jordi    | 52            |           |  |
| A     | Tare Weight           | 15.81        | 15.89 | 15.77 |  |  |  | 15.94    | 15.71         |           |  |
| В     | Wet Soil Weight + A   | 29.11        | 30.83 | 28.76 |  |  |  | 23.89    | 22.90         |           |  |
| С     | Dry Soil Weight + A   | 26.22        | 27.46 | 25.72 |  |  |  | 22.29    | 21.39         |           |  |
| D     | Water Weight (B-C)    | 2.89         | 3.37  | 3.04  |  |  |  | 1.60     | 1.51          |           |  |
| Е     | Dry Soil Weight (C-A) | 10.41        | 11.57 | 9.95  |  |  |  | 6.35     | 5.68          |           |  |
| F     | % Moisture (D/E)*100  | 27.8%        | 29.1% | 30.6% |  |  |  | 25.2%    | 26.6%         |           |  |
| N     | # OF DROPS            | 29           | 23    | 15    |  |  |  | Moisture | Contents de   | etermined |  |
| LL    | LL LL = F * FACTOR    |              |       |       |  |  |  | by A     | 245           |           |  |
| Ave.  | Average               |              |       |       |  |  |  |          | 25.9%         |           |  |



|    | One Point I | iquid Limit |        |
|----|-------------|-------------|--------|
| N  | Factor      | N           | Factor |
| 20 | 0.974       | 26          | 1.005  |
| 21 | 0.979       | 27          | 1.009  |
| 22 | 0.985       | 28          | 1.014  |
| 23 | 0.99        | 29          | 1.018  |
| 24 | 0.995       | 30          | 1.022  |
| 25 | 1,000       |             |        |

NP, Non-Plastic Liquid Limit 28 Plastic Limit 26 Plastic Index 2 **Group Symbol** A-4 Multipoint Method One-point Method

Dry Preparation Wet Preparation Air Dried Estimate the % Retained on the #40 Sieve:

Notes / Deviations / References:

AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils

AASHTO 789: Determining the Liquid Limit of Soils

Karen Warner Technician Name

Technical Responsibility Kou Hamic

3/18/20/4



AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/18/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

3/3-10/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

| Boring #:       | PSB6               |                               | Sample #: 703 |                  | 1  | Sample Date: 2/21-2   | 26/14        |
|-----------------|--------------------|-------------------------------|---------------|------------------|----|-----------------------|--------------|
| ocation:        | On Site            |                               | Offset: NA    |                  |    | Depth: 1-11'          |              |
| ample Desc      | cription: A        | -6                            |               |                  |    |                       |              |
| 100%            |                    | 1"3/4" 1/2'3/8" #4            | #10 #20       | #40 #60 #100 #20 | 00 |                       |              |
| 90%             | 6                  |                               |               |                  |    |                       |              |
| 80%             | 6                  |                               |               |                  |    |                       |              |
| 70%             | 6                  |                               |               |                  |    |                       |              |
| Percent Passing | 6                  |                               |               |                  |    |                       |              |
| 50%             | <b>6</b>           |                               |               |                  |    |                       |              |
| Jerce 40%       | <b>6</b>           |                               |               |                  |    |                       |              |
| 30%             | 6                  |                               |               |                  |    |                       |              |
| 20%             | 6                  |                               |               |                  |    |                       | •            |
| 10%             | 6                  |                               |               |                  |    |                       |              |
| 0%              | 6     <del> </del> | 10                            | 1             | 0.1              |    | 0.01                  | 0.001        |
|                 |                    |                               | Particl       | e Size (mm)      |    |                       | 3,004        |
|                 | As Defin           | ed by AASHTO                  |               | Fine Sand        |    | < 0.425 mm and        | d > 0.075 mm |
|                 | ravel              | < 75 mm and > < 2.00 mm and > |               | Silt<br>Clay     |    | < 0.075 and > < 0.002 |              |
| Coar            | se Sand            | < 2.00 mm and >               | 0.425 mm      | Clay             |    | < 0.002               | 4 HHH        |

| Course Sund                  |          |       |                  | - 100 | 0,000                        |       |
|------------------------------|----------|-------|------------------|-------|------------------------------|-------|
|                              | Gravel   | 1.1%  | Coarse Sand      | 6.1%  | Silt                         | 36%   |
| Maximum Parti                | cle Size | 3/8"  | Fine Sand        | 37.1% | Clay                         | 20%   |
| Apparent Relative Density(As | ssumed)  | 2.650 | Moisture Content | 37.4% | Silt & Clay (% Passing #200) | 55.7% |
| Liqu                         | id Limit | 35    | Plastic Limit    | 24    | Plastic Index                | 11    |

| Description of Sand & Gravel Pa   | rticles: Rounded $\square$   | Angular ⊠ | Hard & Durable    | ⊠ Soft □        | Weathered  | d & Friable □ |
|-----------------------------------|------------------------------|-----------|-------------------|-----------------|------------|---------------|
| Mechanical Stirring Apparatus (A) | Length of Dispersion Period: | 1 min,    | Dispersing Agent: | Sodium Hexameta | phosphate: | 40 g./ Liter  |

**References:** AASHTO T88: Particle Size Analysis of Soils AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

RonHarris

Signature Signature

118 2014

Revision Date: 11/20/07

# Liquid Limit, Plastic Limit, and Plastic Index



ASTM D 4318 AASHTO T 89 X AASHTO T 90 Another code Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/18/14 **Project Name: Ecusta Mill Site** Test Date(s) 3/3-18/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Sample Date: 2/21-26/14 Boring #: PSB6 Sample #: 7030 On Site Offset: NA Elevation: 1-11' Location: Sample Description: A-6 Type and Specification S&ME ID# Type and Specification Cal Date: S&ME ID # Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool Oven 11702 1/21/2014 Grooving tool Liquid Limit Pan # Plastic Limit Tare #: 12 34 KK Z 59 Tare Weight 14.17 13.98 16.05 A 16.87 15.78 Wet Soil Weight + A 24.25 В 28.18 26.48 23.77 21.97  $\mathbf{C}$ Dry Soil Weight + A 24.56 21.52 23.65 22.41 20.78 D Water Weight (B-C) 3.62 2.73 2.83 1.36 1.19 E Dry Soil Weight (C-A) 10.39 7.54 7.60 5.54 5.00 % Moisture (D/E)\*100 F 34.8% 36.2% 37.2% 24.5% 23.8% # OF DROPS 29 16 N 21 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. 24.2% Average One Point Liquid Limit 50.0 Factor N N Factor 20 0.974 26 1.005 45.0 0.979 21 27 1.009 % Moisture Content 22 1.014 0.985 28 23 0.99 29 1.018 40.0 24 0.995 1.022 1.000 25 35.0 NP, Non-Plastic Liquid Limit 35 30.0 Plastic Limit 24 Plastic Index 11 25.0 **Group Symbol** A-6 10 100 15 20 25 30 35 # of Drops Multipoint Method 1 One-point Method **Dry Preparation** Wet Preparation Air Dried Estimate the % Retained on the #40 Sieve: 1 Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

Karen Warner Technician Name

Technical Responsibility Kin Haw



**AASHTO T 88** 

 S&ME Project #:
 3735-14-001
 Report Date:
 3/18/14

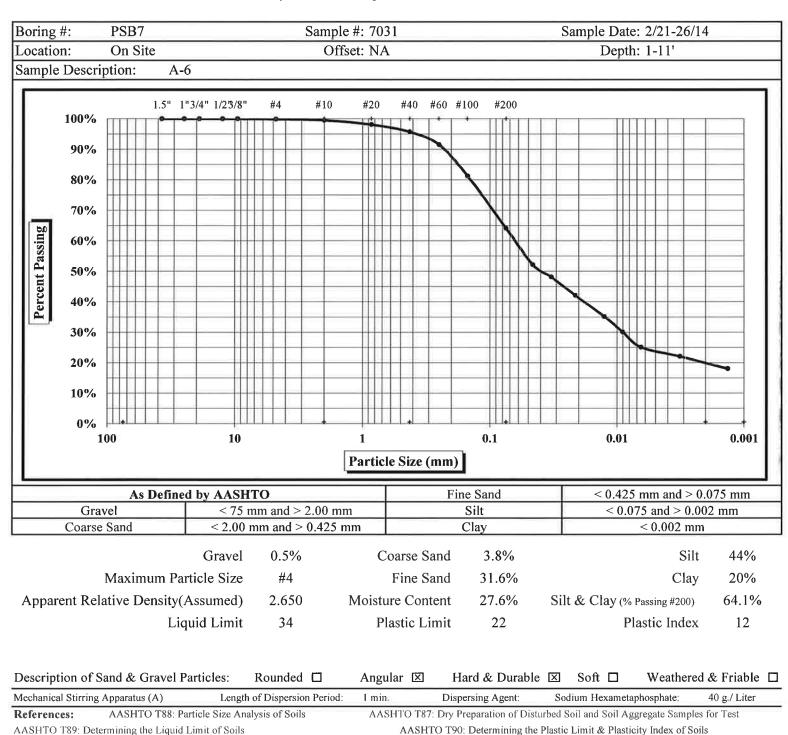
 Project Name:
 Ecusta Mill Site
 Test Date(s):
 3/3-10/14

Client Name: Shaw Environmental & Infrastructure, Inc.

Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

AASHTO T265: Laboratory Determination of Moisture Content of Soils



Technical Responsibility:

ASTM D 854: Specific Gravity of Soils

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07 ASTM D 4318 AASHTO T 89 X AASHTO T 90 Another code X **Quality Assurance** S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/18/14 Project Name: Ecusta Mill Site Test Date(s) 3/3-18/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Boring #: PSB7 Sample #: 7031 Sample Date: 2/21-26/14 Elevation: 1-11' Location: On Site Offset: NA Sample Description: A-6 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) Grooving tool 3222 6/18/2013 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan# Tare #: 4 NN RR 8 30 Tare Weight 15.24 15.67 15.25 15.74 15.89 A B Wet Soil Weight + A 25.82 24.95 24.88 22.12 22.47 C Dry Soil Weight + A 23.27 22.46 22.38 20.96 21.31 D Water Weight (B-C) 2.55 2.49 2.50 1.16 1.16 E Dry Soil Weight (C-A) 7.60 7.21 7.14 5.22 5.42 F % Moisture (D/E)\*100 33.6% 34.5% 35.0% 22.2% 21.4% # OF DROPS 27 N 23 16 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. Average 21.8% One Point Liquid Limit 50.0 N Factor Factor 20 0.974 26 1.005 45.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 40.0 0.995 24 30 1.022 25 1.000 35.0 NP, Non-Plastic Liquid Limit 34 30.0 Plastic Limit 22 Plastic Index 12 25.0 Group Symbol A-6 10 100 15 20 25 30 35 40 # of Drops Multipoint Method  $\overline{}$ One-point Method 1 Dry Preparation Air Dried Estimate the % Retained on the #40 Sieve: Wet Preparation Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASHTO 789: Determining the Liquid Limit of Soils

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Karen Warner

Technician Name

Technical Responsibility Kon Herris



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

| oring #         | <i>‡</i> : | PSB8   |          |              |            | Sample  | #: 70       | Sample Date: 2/19-20/14 |        |         |   |            |            |       |
|-----------------|------------|--------|----------|--------------|------------|---------|-------------|-------------------------|--------|---------|---|------------|------------|-------|
| ocation         | <b>า</b> : | On Si  | te       |              | Offset: NA |         |             |                         |        |         |   | Depth: 1-9 | 9'         |       |
| mple            | Descri     | ption: | A-4      |              |            |         |             |                         |        |         |   |            |            |       |
|                 | 100%       |        | 1.5" 1"3 | 3/4" 1/23/8" | #4         | #10     | #20         | #40                     | #60 #1 | 00 #200 | T |            |            | 1     |
|                 | 90%        |        |          |              |            |         |             | *                       |        |         |   |            |            |       |
|                 | 80%        |        |          |              |            |         | -           |                         |        |         |   |            |            |       |
|                 | 70%        |        |          |              |            |         |             |                         |        |         |   |            |            |       |
| Percent Passing | 60%        |        |          |              |            |         |             |                         |        |         |   |            |            |       |
| ent Pa          | 50%        |        |          |              |            |         |             |                         |        |         |   |            |            |       |
| Perce           | 40%        |        |          |              |            |         |             |                         |        |         |   |            |            |       |
|                 | 30%        |        |          |              |            |         |             |                         |        |         |   |            |            |       |
|                 | 20%        |        |          |              |            |         |             |                         |        |         |   |            |            | `     |
|                 | 10%        |        |          |              |            |         |             |                         |        |         |   |            |            |       |
|                 | 0%         | +      |          | 10           |            |         |             |                         |        |         |   | 0.01       |            | 0.001 |
|                 |            | 00     |          | 10           |            | Î       | 1<br>Partic | le Size                 | (mm)   | 0.1     |   | 0.01       |            | 0.001 |
|                 |            | Ac     | Defined  | by AASHT     | 70         |         |             |                         |        | e Sand  |   | < 0.425 mm | and > 0.0' | 75 mm |
|                 | Gra        |        |          | < 75 m       | m and >    | 2.00 mn | n           |                         |        | Silt    |   |            | nd > 0.002 |       |
|                 | Coarse     | Sand   |          | < 2.00 n     | nm and >   | 0.425 n | nm          |                         | (      | Clay    |   | < 0        | .002 mm    |       |
|                 |            |        |          | Gravel       | 3.6%       |         | (           | Coarse S                | Sand   | 3.7%    |   |            | Silt       | 35%   |
|                 |            | Maxim  | ium Part | icle Size    | #4         |         |             | Fine S                  | Sand   | 34.4%   |   |            | Clay       | 23%   |

| Maximum Particle Size              | #4    | Fine Sand        | 34.4% | Clay                         | 23%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 30.3% | Silt & Clay (% Passing #200) | 58.3% |
| Liquid Limit                       | 32    | Plastic Limit    | 22    | Plastic Index                | 10    |

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

tavis Partoni

3/7/14 Signifiance

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07 Another code ASTM D 4318 AASHTO T 89 X AASHTO T 90 X Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 3/7/14 Report Date: Project Name: Ecusta Mill Site 2/24-3/7/14 Test Date(s) Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Boring #: PSB8 Sample #: 7032 Sample Date: 2/19-20/14 Location: On Site Offset: NA Elevation: 1-9' Sample Description: A-4 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool Oven 11702 1/21/2014 Grooving tool Pan # Liquid Limit Plastic Limit Tare #: 54 51 FE 29 MM Tare Weight 14.09 15.73 16.83 14.11 A 16.55 В Wet Soil Weight + A 25.34 27.72 29.97 25.01 22.38 Dry Soil Weight + A C 22.76 24.80 26.62 23.51 20.93 D Water Weight (B-C) 2.58 2.92 3.35 1.50 1.45 Dry Soil Weight (C-A) E 8.67 9.07 9.79 6.96 6.82 F % Moisture (D/E)\*100 29.8% 32.2% 34.2% 21.6% 21.3% N # OF DROPS 34 24 16 Moisture Contents determined LL = F \* FACTORby AASHTO T 245 LL Ave. 21.5% Average One Point Liquid Limit 45.0 Factor N Factor 20 0.974 1.005 26 40.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 35.0 24 0.995 30 1.022 25 1.000 30.0 NP, Non-Plastic Liquid Limit 32 25.0 **Plastic Limit** 22 Plastic Index 10 20.0 **Group Symbol** A-4 10 100 15 20 25 30 35 40 # of Drops Multipoint Method 1 One-point Method **Dry Preparation** 1 Wet Preparation Air Dried Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: AASHTO #789: Determining the Liquid Limit of Soils

AASHTO T903 Determining the Plastic Limit & Plastic Index of Soils

u Wallen mician Name

Technical Responsibility



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

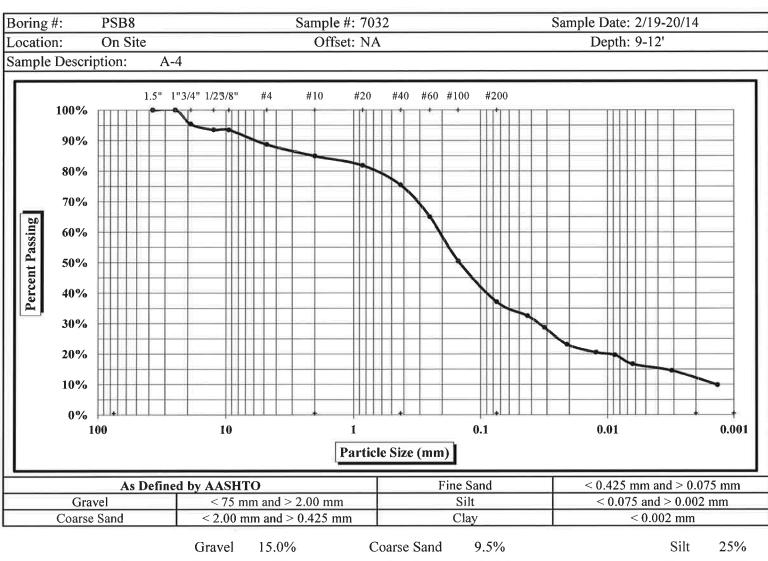
2/24-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA



| Gravel                             | 15.0% | Coarse Sand      | 9.5%  | Silt                         | 25%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | 3/4"  | Fine Sand        | 38.3% | Clay                         | 13%   |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 43.4% | Silt & Clay (% Passing #200) | 37.1% |
| Liquid Limit                       | 32    | Plastic Limit    | 23    | Plastic Index                | 9     |
|                                    |       |                  |       |                              |       |

Description of Sand & Gravel Particles: Rounded Hard & Durable ⊠ Soft □ Weathered & Friable Angular ⊠ Length of Dispersion Period: Sodium Hexametaphosphate: 40 g / Liter Mechanical Stirring Apparatus (A) 1 min. Dispersing Agent:

AASHTO T88: Particle Size Analysis of Soils References:

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07 ASTM D 4318 AASHTO T 89 X AASHTO T 90 X Another code Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 3/7/14 Report Date: Project Name: Ecusta Mill Site Test Date(s) 2/24-3/7/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Boring #: PSB8 Sample #: 7032 Sample Date: 2/19-20/14 On Site Offset: NA Elevation: 9-12' Location: Sample Description: A-4 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan # Tare #: 34 36 XX 10 QQ Tare Weight 13.97 15.66 16.02 13.98 16.85 A В Wet Soil Weight + A 26.69 29.31 29.98 22.74 25.79 C Dry Soil Weight + A 23.63 25.99 26.51 21.10 24.14 Water Weight (B-C) D 3.06 3.32 3.47 1.64 1.65 7.29 E Dry Soil Weight (C-A) 9.66 7.12 10.33 10.49 F % Moisture (D/E)\*100 31.7% 32.1% 33.1% 23.0% 22.6% # OF DROPS N 28 22 17 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. Average 22.8% One Point Liquid Limit 45.0 N Factor Factor 20 0.974 26 1.005 40.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 1.018 23 0.99 29 35.0 0.995 24 30 1.022 1.000 25 30.0 NP, Non-Plastic Liquid Limit 32 25.0 Plastic Limit 23 Plastic Index 0 20.0 Group Symbol A-4 10 100 15 20 25 30 35 40 # of Drops Multipoint Method 1 One-point Method Wet Preparation **Dry Preparation** Air Dried Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASHTO (189: Determining the Liquid Limit of Soils alulalen Technical Responsibility

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Technician Name



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/24-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

| oring           | #:     | PSB9   | )         |               |          | Sample    | #: 70                       | 33            |              |        |      | Sample | Date:   | 2/19-20/14     |        |
|-----------------|--------|--------|-----------|---------------|----------|-----------|-----------------------------|---------------|--------------|--------|------|--------|---------|----------------|--------|
| ocatio          | n:     | On S   | ite       |               |          | Offs      | set: Na                     | 1             |              |        |      | Γ      | epth:   | 1-5'           |        |
| ample           | Descri | ption: | A-6       |               |          |           |                             |               |              |        |      |        |         |                |        |
|                 |        |        |           |               |          |           |                             |               |              |        |      |        |         |                |        |
|                 |        |        | 1.5" 1"   | 3/4" 1/2'3/8" | #4       | #10       | #20                         | #40           | #60 #1       | 00 #20 | 0    |        |         |                |        |
|                 | 100%   | TITI   | IN.       | 1 1           | 11'1     |           |                             | TT            |              |        |      |        |         |                |        |
|                 | 90%    |        |           | ~             |          |           |                             |               |              |        |      |        |         |                |        |
|                 | 90 70  |        |           |               |          |           |                             |               |              |        |      |        | Ш       |                |        |
|                 | 80%    |        |           |               |          | -         |                             |               |              | -      |      |        |         |                |        |
|                 |        |        |           |               |          |           |                             | $\rightarrow$ | $\leftarrow$ |        | +++- |        | +++     |                |        |
|                 | 70%    |        |           |               |          |           |                             | +++           |              | -HH    |      |        |         |                |        |
| <b>p</b> 0      |        |        | ++++      |               |          |           | $\dashv \vdash$             |               |              | -      |      |        |         |                |        |
| Ssir            | 60%    |        |           |               |          |           | -11                         |               | 1 1 7        |        |      |        |         |                |        |
| Percent Passing | 50%    |        |           |               |          |           |                             |               |              |        |      |        |         |                |        |
| Ħ               | 50%    |        |           |               |          |           |                             |               |              |        |      |        |         |                |        |
| 2               | 40%    |        |           |               |          |           | $\perp \parallel \parallel$ |               |              | _Ш     |      |        |         |                |        |
| ا ي             |        |        |           |               |          |           |                             |               |              |        |      |        |         |                |        |
|                 | 30%    | +++    |           |               |          |           |                             |               | -            |        |      |        |         |                |        |
|                 |        | -      |           |               |          |           | -H                          | +++           |              |        |      |        | 1       |                |        |
|                 | 20%    |        |           |               |          |           |                             | ++++          |              |        |      |        |         |                |        |
|                 | 100/   |        |           |               |          |           | -111                        |               |              |        |      |        |         |                |        |
|                 | 10%    |        |           |               |          |           |                             |               |              |        |      |        |         |                |        |
|                 | 0%     |        |           |               |          |           | -11                         | 1             |              |        |      |        | Щ       |                |        |
|                 |        | 00     |           | 10            |          |           | 1                           |               |              | 0.1    |      |        | 0.01    |                | 0.001  |
|                 |        |        |           |               |          | Ī         | Partic                      | le Size       | (mm)         |        |      |        |         |                |        |
|                 |        |        |           |               |          | Į.        | 1 41 (1)                    | IV DIZ        | (11111)      |        |      |        |         |                |        |
|                 |        | A      | s Defined | by AASHT      | О        |           |                             |               | Fine         | Sand   |      | <      | 0.425 n | nm and > 0.0   | )75 mm |
|                 | Gra    |        |           |               |          | 2.00 mm   | n                           |               |              | Silt   |      |        | < 0.075 | 5  and > 0.002 | 2 mm   |
|                 | Coarse | Sand   |           | < 2.00 n      | nm and > | - 0.425 n | ım                          |               | (            | lay    |      |        | <       | < 0.002 mm     |        |
|                 |        |        |           |               | 19.4%    |           | (                           |               |              | 4.6%   |      |        |         | Silt           | 29%    |

| 19.4% | Coarse Sand      | 4.6%                                | Silt  | 29%   |
|-------|------------------|-------------------------------------|---|---|
| 1"    | Fine Sand        | 28.9%                               | Clay  | 19%   |
| 2.650 | Moisture Content | 29.8%                               | Silt & Clay (% Passing #200)  | 47.0%   |
| 33    | Plastic Limit    | 22                                  | Plastic Index   | 11  |
|       | 1"<br>2.650      | 1" Fine Sand 2.650 Moisture Content | 1"         Fine Sand         28.9%           2.650         Moisture Content         29.8% | 1" Fine Sand 28.9% Clay 2.650 Moisture Content 29.8% Silt & Clay (% Passing #200) |

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒ Hard & Durable ☒ Soft ☐ Weathered & Friable ☐ Mechanical Stirring Apparatus (A)

Length of Dispersion Period: 1 min. Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T88: Particle Size Analysis of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility:

References:

Ron Hamis Rong

ASTM D 854: Specific Gravity of Soils

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07

AASHTO T 89 X AASHTO T 90 X ASTM D 4318 Quality Assurance Another code S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 3/7/14 Project #: 3735-14-001 Report Date: 2/24-3/7/14 Project Name: Ecusta Mill Site Test Date(s) Client Name: Shaw Environmental & Infrastructure, Inc. 11560 Great Oaks Way, Suite 500, Alpheretta, GA Client Address: PSB9 Sample #: 7033 Sample Date: 2/19-20/14 Boring #: Elevation: 1-5' On Site Offset: NA Location: Sample Description: A-6 S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Type and Specification 7/16/2013 Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 3653 1/21/2014 Grooving tool LL Apparatus Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan# KK 38 Tare #: 5 LL 56 Tare Weight 15.68 16.04 15.79 15.70 16.92 Α 30.22 В Wet Soil Weight + A 27.76 29.39 24.05 24.57 C Dry Soil Weight + A 24.89 26.28 26.47 22.60 22.97 Water Weight (B-C) 2.87 3.11 3.75 1.45 1.60 D Dry Soil Weight (C-A) 9.19 9.36 10.79 6.56 7.18 E % Moisture (D/E)\*100 31.2% 33.2% 34.8% 22.1% 22.3% F # OF DROPS 18 N 35 26 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL 22.2% Ave. Average One Point Liquid Limit 45.0 Factor N Factor 20 0.974 26 1.005 0.979 27 1.009 40.0 21 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 35.0 24 0.995 30 1.022 25 1.000 30.0 NP, Non-Plastic Liquid Limit 33 25.0 Plastic Limit 22 Plastic Index 11 20.0 Group Symbol A-6 100 10 15 20 25 30 35 40 # of Drops Multipoint Method 4 One-point Method 1 Estimate the % Retained on the #40 Sieve: Wet Preparation Dry Preparation Air Dried Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASHTO 189: Determining the Liquid Limit of Soils en Wahun



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

| Boring #:           | PSB9             |                           | Sample #: 70 |              |              | Sample Date: 2/19-2       | 20/14      |
|---------------------|------------------|---------------------------|--------------|--------------|--------------|---------------------------|------------|
| ocation:            | On Site          |                           | Offset: NA   |              |              | Depth: 5-12'              |            |
| ample Desc          | cription: A-     | 2-4                       |              |              |              |                           |            |
| 100%                |                  | "3/4" 1/2'3/8" #4         | #10 #20      | #40 #60 #3   | 100 #200     |                           |            |
| 90%                 | <b>6</b>         |                           |              |              |              |                           |            |
| 80%                 | 6                |                           |              |              |              |                           |            |
| 70%                 | 6                |                           |              |              |              |                           |            |
| Percent Passing 40% | 6                |                           |              |              |              |                           |            |
| 50%                 | 6                |                           |              |              |              |                           |            |
| 40%                 | <b>6</b>         |                           |              |              |              |                           |            |
| 30%                 | 6                |                           |              |              |              |                           |            |
| 20%                 |                  |                           |              |              |              |                           |            |
| 10%                 |                  |                           |              |              |              |                           |            |
| 0%                  | 100              | 10                        | 1            | +            | 0.1          | 0.01                      | 0.001      |
|                     |                  |                           | Partic       | le Size (mm) |              |                           |            |
|                     |                  | d by AASHTO               |              |              | ne Sand      | < 0.425 mm and            |            |
|                     | ravel<br>se Sand | < 75 mm and < 2.00 mm and |              |              | Silt<br>Clay | < 0.075 and > < 0.002     |            |
|                     |                  | Gravel 6.2°               | %            | Coarse Sand  | 16.4%        |                           | Silt 26%   |
|                     | Maximum Pa       | rticle Size 1/2           | tt.          | Fine Sand    | 43.7%        | (                         | Clay 8%    |
| Apparent R          | elative Density( | Assumed) 2.69             | 50 Moist     | ire Content  | 29.1%        | Silt & Clay (% Passing #2 | 200) 33.89 |

| Gravel                             | 6.2%  | Coarse Sand      | 16.4% | Silt                         | 26%   |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Maximum Particle Size              | 1/2"  | Fine Sand        | 43.7% | Clay                         | 8%    |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 29.1% | Silt & Clay (% Passing #200) | 33.8% |
| Liquid Limit                       | 28    | Plastic Limit    | 24    | Plastic Index                | 4     |
|                                    |       |                  |       |                              |       |

| Description of  | Sand & Gravel Part | icles: Rounded $\square$     | Angular 🗵  | Hard & Durable             | ⊠ Soft □              | Weather      | ed & Friable 🛚 |
|---|--------------------|------------------------------|------------|----------------------------|-----------------------|--------------|----------------|
| Mechanical Stirrin                                      | g Apparatus (A)    | Length of Dispersion Period: | 1 min      | Dispersing Agent:          | Sodium Hexameta       | iphosphate:  | 40 g./ Liter   |
| References: AASHTO T88: Particle Size Analysis of Soils |                    |                              | AASHTO T87 | : Dry Preparation of Distu | rbed Soil and Soil Ag | gregate Samp | les for Test   |

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

ASTM D 854: Specific Gravity of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

3109 Spring Forest Road, Raleigh, N.C. 27637635-14-001 PSB9 7033 (5-12') Hydro.xls

#### Revision Date: 11/20/07

# Liquid Limit, Plastic Limit, and Plastic Index



ASTM D 4318 AASHTO T 89 X AASHTO T 90 X Quality Assurance Another code S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 3/7/14 Project #: 3735-14-001 Report Date: Project Name: Ecusta Mill Site Test Date(s) 2/24-3/7/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA PSB9 Sample #: 7033 Sample Date: 2/19-20/14 Boring #: Elevation: 5-12' Location: On Site Offset: NA Sample Description: A-2-4 S&ME ID # Type and Specification S&ME ID # Cal Date: Type and Specification Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 3653 1/21/2014 Grooving tool LL Apparatus Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan # P3 TT P12 P-16 Tare #: Aa Tare Weight 12.59 15.19 12.60 15.92 12.76 A В Wet Soil Weight + A 30.17 27.14 30.79 21.58 21.00  $\mathbf{C}$ Dry Soil Weight + A 26.93 23.94 27.49 19.88 19.39 Water Weight (B-C) 3.24 3.20 3.30 1.70 1.61 D Е Dry Soil Weight (C-A) 11.74 11.34 11.57 7.12 6.80 F % Moisture (D/E)\*100 27.6% 28.2% 28.5% 23.9% 23.7% # OF DROPS 27 N 21 16 Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. Average 23.8% One Point Liquid Limit 35.0 Factor Factor 20 0.974 1.005 26 27 1.009 21 0.979 Moisture Content 22 0.985 28 1.014 30.0 23 29 0.99 1.018 24 0.995 30 1.022 25 1.000 NP. Non-Plastic 25.0 Liquid Limit 28 % Plastic Limit 24 Plastic Index 4 20.0 Group Symbol A-2-4 100 10 15 20 25 **30** 35 40 # of Drops Multipoint Method 1 One-point Method 1 Estimate the % Retained on the #40 Sieve: Wet Preparation **Dry Preparation** Air Dried Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASH T89: Determining the Liquid Limit of Soils

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technician Name

Date



AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

PSB10 Sample Date: 2/19-20/14 Boring #: Sample #: 7034 On Site Offset: NA Depth: 4-11' Location: Sample Description: A-2-4 1.5" 1"3/4" 1/2'3/8" #10 #20 #40 #60 #100 #200 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 10 0.1 0.01 0.001 100 Particle Size (mm)

| As Define   | ed by AASHTO             | Fine Sand         | < 0.425  mm and > 0.075  mm |  |  |
|-------------|--------------------------|-------------------|-----------------------------|--|--|
| Gravel      | < 75 mm and > 2.00 mm    | Silt              | < 0.075 and > 0.002 mm      |  |  |
| Coarse Sand | < 2.00 mm and > 0.425 mm | Clay              | < 0.002 mm                  |  |  |
| <del></del> | Gravel 38.2%             | Coarse Sand 16.1% | Silt 23%                    |  |  |

| Maximum Particle Size              | 1"    | Fine Sand        | 18.6% | Clay                         | 4%    |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 17.5% | Silt & Clay (% Passing #200) | 27.1% |
| Liquid Limit                       | 29    | Plastic Limit    | 24    | Plastic Index                | 5     |

Description of Sand & Gravel Particles: Rounded Angular ⊠ Hard & Durable 区 Soft □ Weathered & Friable □ Mechanical Stirring Apparatus (A) Length of Dispersion Period: Dispersing Agent: Sodium Hexametaphosphate:

AASHTO T88: Particle Size Analysis of Soils References:

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:



Revision No. 0 Liquid Limit, Plastic Limit, and Plastic Index Revision Date: 11/20/07 AASHTO T 89 X AASHTO T 90 ASTM D 4318 X Another code **Quality Assurance** S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/7/14 Project Name: Ecusta Mill Site Test Date(s) 2/24-3/7/14 Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Boring #: PSB10 Sample #: 7034 Sample Date: 2/19-20/14 Offset: NA Elevation: 4-11" Location: On Site Sample Description: A-2-4 Type and Specification S&ME ID # S&ME ID # Cal Date: Type and Specification Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 LL Apparatus 3653 1/21/2014 Grooving tool Oven 11702 1/21/2014 Grooving tool Plastic Limit Liquid Limit Pan # Tare #: 12 Jordi I 00 37 Tare Weight 13.84 14.17 15.92 16.29 15.87 A 30.25 В Wet Soil Weight + A 28.46 30.65 25.25 24.69 C Dry Soil Weight + A 25.28 27.28 26.41 23.53 23.00 D Water Weight (B-C) 3.18 3.37 3.84 1.72 1.69 E Dry Soil Weight (C-A) 11.11 11.36 12.57 7.24 7.13 F % Moisture (D/E)\*100 28.6% 29.7% 30.5% 23.8% 23.7% # OF DROPS 29 22 17 N Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. Average 23.8% One Point Liquid Limit 45.0 N Factor Factor 0.974 20 26 1.005 40.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 29 23 0.99 1.018 35.0 24 0.995 30 1.022 25 1.000 30.0 NP, Non-Plastic Liquid Limit 29 25.0 **Plastic Limit** 24 Plastic Index 5 20.0 **Group Symbol** A-2-4 10 100 15 20 25 **30** 35 40 # of Drops Multipoint Method 1 One-point Method Dry Preparation Air Dried 1 Wet Preparation Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils 9: Determining the Liquid Limit of Soils

> XUU WAYUN echnician Name This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

Technical Responsibility

Date



AASHTO T 88

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

| oring           |         | PSB11          |                 |                                      | le #: 70                            |              |           |   | Sample Date: 2/19-2      | 20/14      |
|-----------------|---------|----------------|-----------------|--------------------------------------|-------------------------------------|--------------|-----------|---|--------------------------|------------|
| ocatio          |         | On Site        |                 | Of                                   | ffset: NA                           | \            |           |   | Depth: 1-7'              |            |
| ample           | Descri  | ption: A-      | -1-b            |                                      |                                     |              |           |   |                          |            |
|                 | 100%    | 1.5"           | 1"3/4" 1/2'3/8" | #4 #10                               | #20                                 | #40 #60      | #100 #200 |   |                          |            |
|                 | 90%     |                |                 |                                      |                                     |              |           |   |                          |            |
|                 | 80%     |                |                 |                                      |                                     |              |           |   |                          |            |
|                 | 70%     |                |                 |                                      |                                     |              |           |   |                          |            |
| sing            | 60%     |                |                 |                                      |                                     |              |           |   |                          |            |
| Percent Passing | 50%     |                |                 |                                      | $\rightarrow \downarrow \downarrow$ |              |           |   |                          |            |
| erce            | 40%     |                |                 |                                      |                                     |              |           |   |                          |            |
|                 | 30%     |                |                 |                                      |                                     |              |           |   |                          |            |
|                 | 20%     |                |                 |                                      |                                     |              |           |   |                          |            |
|                 | 10%     |                |                 |                                      |                                     |              |           | * |                          |            |
|                 | 0%      |                |                 |                                      |                                     | +            |           |   |                          | <b>□</b>   |
|                 | 1       | .00            | 10              |                                      | 1                                   |              | 0.1       |   | 0.01                     | 0.00       |
|                 |         |                |                 |                                      | Partic                              | le Size (mm  | )         |   |                          |            |
|                 |         | As Define      | ed by AASHT     |                                      |                                     | F            | ine Sand  |   | < 0.425 mm and           |            |
|                 | Gra     |                |                 | $\frac{1}{1}$ and $\frac{2.00}{1}$ m |                                     |              | Silt      |   | < 0.075 and >            |            |
|                 | Coarse  | Sand           | < 2.00 n        | nm and > 0.425                       | mm                                  |              | Clay      | _ | < 0.002                  | mm         |
|                 |         |                | Gravel          | 44.8%                                | C                                   | oarse Sand   | 10.2%     |   |                          | Silt 12%   |
|                 |         | Maximum Pa     | article Size    | 1"                                   |                                     | Fine Sand    | 30.3%     |   | C                        | Clay 3%    |
| Appar           | ent Rel | ative Density( | (Assumed)       | 2.650                                | Moist                               | ire Content  | 24.9%     | S | ilt & Clay (% Passing #2 | 200) 14.79 |
|                 |         | Li             | quid Limit      | 0                                    | P                                   | lastic Limit | 0         |   | Plastic Inc              | dex 0      |

| Description of     | Sand & Gravel Partic          | les: Rounded                    | Angular 🗵   | Hard & Durable              | ⊠ Soft □              | Weathere        | d & Friable 🛚   |
|--------------------|-------------------------------|---------------------------------|---|-----------------------------|-----------------------|-----------------|-----------------|
| Mechanical Stirrir | ng Apparatus (A)              | Length of Dispersion Period:    | 1 min   | Dispersing Agent:           | Sodium Hexameta       | phosphate:      | 40 g./ Liter    |
| References:        | AASHTO T88: Particle          | Size Analysis of Soils          | AASHTO T87  | 7: Dry Preparation of Distu | rbed Soil and Soil Ag | gregate Sample  | es for Test     |
| AASHTO T89: D      | etermining the Liquid Limit   | of Soils                        | AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils |                             |                       |                 |                 |
| AASHTO M 145:      | The Classification of Soils a | and Soil Aggregate Mixtures for | Highway Construc  | tion Purposes               | ASTM D                | 854: Specific G | ravity of Soils |

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Technical Responsibility:

Rou Hawis furthi

3/7/14

#### Form No. TR-D4318-T89-90

Revision No. 0

Revision Date: 11/20/07

# Liquid Limit, Plastic Limit, and Plastic Index



AASHTO T 89 X AASHTO T 90 X ASTM D 4318 Quality Assurance Another code S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Report Date: 3/7/14 Project #: 3735-14-001 Ecusta Mill Site Test Date(s) 2/24-3/7/14 Project Name: Client Name: Shaw Environmental & Infrastructure, Inc. 11560 Great Oaks Way, Suite 500, Alpheretta, GA Client Address: Sample #: 7035 Sample Date: 2/19-20/14 Boring #: PSB11 On Site Offset: NA Elevation: 1-7' Location: A-1-b Sample Description: Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 3653 1/21/2014 Grooving tool LL Apparatus Oven 11702 1/21/2014 Grooving tool Liquid Limit Plastic Limit Pan # Tare #: Tare Weight A В Wet Soil Weight + A Dry Soil Weight + A C Water Weight (B-C) D Dry Soil Weight (C-A) E % Moisture (D/E)\*100 F # OF DROPS N Moisture Contents determined by AASHTO T 245 LL LL = F \* FACTORAve. Average One Point Liquid Limit 65.0 Factor Factor 60.0 20 0.974 26 1.005 0.979 27 1.009 21 55.0 Moisture Content 22 0.985 28 1,014 50.0 23 0.99 29 1.018 45.0 24 0.995 30 1.022 25 1.000 40.0 NP, Non-Plastic  $\times$ 35.0 Liquid Limit % 30.0 Plastic Limit 25.0 Plastic Index 20.0 Group Symbol A-1-b 10 100 15 20 25 30 35 40 # of Drops Multipoint Method 4 One-point Method Wet Preparation **Dry Preparation** Air Dried Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: AASHTO T90 Determining the Plastic Limit & Plastic Index of Soils AASHTO 189: Determining the Liquid Limit of Soils Technician Name Date bechnical Responsibility Date



**AASHTO T 88** 

S&ME Project #:

3735-14-001

Report Date:

3/7/14

Project Name:

**Ecusta Mill Site** 

Test Date(s):

2/25-3/7/14

Client Name:

Shaw Environmental & Infrastructure, Inc.

Client Address:

11560 Great Oaks Way, Suite 500, Alpheretta, GA

PSB12 Boring #: Sample #: 7036 Sample Date: 2/19-20/14 On Site Offset: NA Location: Depth: 1-5' Sample Description: A-5 1.5" 1"3/4" 1/2'3/8" #10 #4 #20 #40 #60 #100 #200 100% 90% 80% 70% Percent Passing 60% 50% 40% 30% 20% 10% 0% 100 10 1 0.1 0.01 0.001 Particle Size (mm) As Defined by AASHTO Fine Sand < 0.425 mm and > 0.075 mm< 75 mm and > 2.00 mm Gravel Silt < 0.075 and > 0.002 mm< 2.00 mm and > 0.425 mmCoarse Sand Clay < 0.002 mm

| <del></del>                        |       |                  |       |                              |       |
|------------------------------------|-------|------------------|-------|------------------------------|-------|
| Gravel                             | 18.4% | Coarse Sand      | 12.1% | Silt                         | 27%   |
| Maximum Particle Size              | 1"    | Fine Sand        | 28.4% | Clay                         | 14%   |
| Apparent Relative Density(Assumed) | 2.650 | Moisture Content | 49.3% | Silt & Clay (% Passing #200) | 41.1% |
| Liquid Limit                       | 43    | Plastic Limit    | 35    | Plastic Index                | 8     |

| Description of Sand & Gravel Particles: Ro |                        | es: Rounded $\square$        | Angular ⊠   | Hard & Durable    | ⊠ Soft □             | Weather | ed & Friable |  |  |  |
|--|------------------------|------------------------------|---|-------------------|----------------------|---------|--------------|--|--|--|
| Mechanical Stirring Apparatus (A) Lengt    |                        | Length of Dispersion Period: | 1 min.  | Dispersing Agent: | gent: Sodium Hexamet |         | 40 g./ Liter |  |  |  |
| References:                                | AASHTO T88: Particle S | Size Analysis of Soils       | AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test |                   |                      |         |              |  |  |  |

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

ASTM D 854: Specific Gravity of Soils

Technical Responsibility:

#### Revision Date: 11/20/07

# Liquid Limit, Plastic Limit, and Plastic Index



AASHTO T 89 X Another code ASTM D 4318 AASHTO T 90 X Quality Assurance S&ME, Inc. ~9751 Southern Pine Boulevard, Charlotte, NC 28273 Project #: 3735-14-001 Report Date: 3/7/14 Ecusta Mill Site 2/24-3/7/14 Project Name: Test Date(s) Client Name: Shaw Environmental & Infrastructure, Inc. Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA Boring #: PSB12 Sample #: 7036 Sample Date: 2/19-20/14 Location: On Site Offset: NA Elevation: 1-5' Sample Description: A-5 Type and Specification S&ME ID # Cal Date: Type and Specification S&ME ID # Cal Date: Balance (0.01 g) 3222 6/18/2013 Grooving tool 20835 7/16/2013 Grooving tool LL Apparatus 3653 1/21/2014 Oven 11702 1/21/2014 Grooving tool Pan # Liquid Limit Plastic Limit Tare #: **SMS** P-18 P-6 Tux U Tare Weight 15.16 12.68 12.54 15.70 15.47 Α В Wet Soil Weight + A 28.47 26.15 26.72 23.90 24.38 C Dry Soil Weight + A 24.46 22.07 22.34 21.76 22.10 Water Weight (B-C) 4.01 4.38 D 4.08 2.14 2.28 9.39 E Dry Soil Weight (C-A) 9.30 9.80 6.06 6.63 % Moisture (D/E)\*100 43.1% 43.5% 44.7% F 35.3% 34.4% 29 19 15 N # OF DROPS Moisture Contents determined by AASHTO T 245 LL = F \* FACTORLL Ave. Average 34.9% One Point Liquid Limit 55.0 N Factor Factor 20 0.974 26 1.005 50.0 21 0.979 27 1.009 % Moisture Content 22 0.985 28 1.014 23 0.99 29 1.018 45.0 24 0.995 1.022 1.000 40.0 NP, Non-Plastic Liquid Limit 43 35.0 Plastic Limit 35 Plastic Index 8 30.0 **Group Symbol** A-5 10 100 15 20 25 30 35 40 # of Drops Multipoint Method 1 One-point Method Wet Preparation **Dry Preparation** Air Dried 1 Estimate the % Retained on the #40 Sieve: Notes / Deviations / References: Sample swelled after hydration. AASHTO T90: Determining the Plastic Limit & Plastic Index of Soils AASHTO 189: Determining the Liquid Limit of Soils aren Walner Technical Responsibility Date



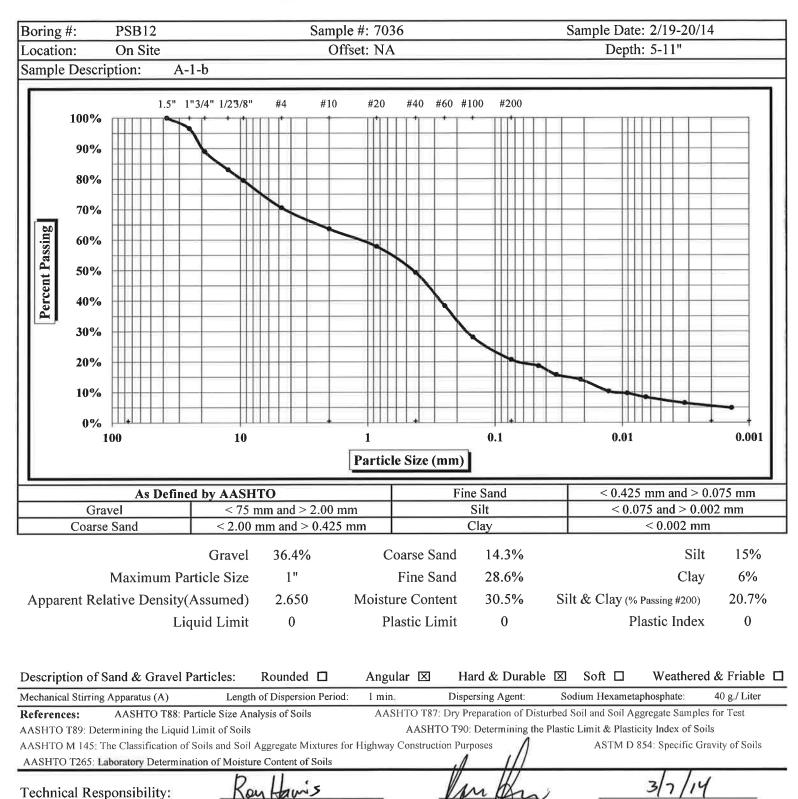
**AASHTO T 88** 

 S&ME Project #:
 3735-14-001
 Report Date:
 3/7/14

 Project Name:
 Ecusta Mill Site
 Test Date(s):
 2/25-3/7/14

Client Name: Shaw Environmental & Infrastructure, Inc.

Client Address: 11560 Great Oaks Way, Suite 500, Alpheretta, GA



### Form No. TR-D4318-T89-90

Revision No. 0

# Liquid Limit, Plastic Limit, and Plastic Index



Revision Date: 11/20/07

| Another o   | code                        | ASTI        | M D 4318 | Г            |          | AASHTO     | ) T 89      | X                       | AA    | SHTO T 90     | X  | Qua          | lity Assur   | ance        |
|-------------|-----------------------------|-------------|----------|--------------|----------|------------|-------------|-------------------------|-------|---------------|--|--------------|--------------|-------------|
|             |                             | S&          | ME, In   | c. ~97       | 751 S    | Southern   | n Pine      | Boule                   | vard, | Charlott      | e, NC 282  | 273          |              |             |
| Project     | #: 3                        | 735-14-0    | )01      |              |          |            |             |                         |       |               | Report 1   | Date:        | 3/7/1        | .4          |
| Project l   |                             |             |          |              |          |            |             | Test Date(s) 2/24-3/7/1 |       |               | 7/14   |              |              |             |
| Client N    | ame: S                      | Shaw Env    | ironme   | ntal &       | z Infr   | astructu   | re, Inc     | le:                     |       |               |  |              | 8 1          | 17 11 45    |
| Client A    | ddress: 1                   | 1560 Gr     | eat Oaks | s Way        | , Su     | ite 500,   | Alphe       | retta, C                | ìΑ    |               |  |              |              |             |
|             |                             |             |          |              |          |            | ple Date:   | 2/19-20/                | 14    |               |  |              |              |             |
| Location    | n: On S                     | ite         |          |              | Of       | fset: NA   |             |                         |       | ]             | Elevation:                                       | 5-11'        |              |             |
| Sample      | Description                 | 1: 4        | A-1-b    |              |          |            |             |                         |       |               |  |              |              |             |
| Type and    | Specification               | n           | S&ME I   | D# Cal Date: |          |            | (           | Type and Specification  |       |               | S&ME ID #  |              | Cal Date:    |             |
| Balance     |                             |             | 3222     |              |          | 6/18/201   | _           | Groovi                  |       |               |  | 20835        | 7/16         | 5/2013      |
| LL Appa     | ratus                       |             | 3653     |              |          | 1/21/201   |             | Groovi                  |       |               |  |              |              |             |
| Oven        |                             |             | 1170     | 2            |          | 1/21/201   |             | Groovi                  |       |               |  | _            | Plastic Lim  | ;a          |
| Pan ‡       |                             |             | Tare #:  |              | -        |            | Ť           | Liquid Li               | mit   | 1             | T -  |              | Flastic Lim  | T T         |
| A           | Т                           | re Weight   |          | 1            | _        |            |             |                         |       |               |  |              |              |             |
| B           |                             | oil Weight  |          | $\vdash$     |          |            | +           |                         |       |               | _  |              |              | +           |
| <u>Б</u>    |                             | oil Weight  |          | 1            |          |            | -           |                         |       |               |  |              |              | 1           |
|             |                             | Weight (I   |          | ┼─           |          |            | _           |                         |       |               |  |              |              | -           |
| <u>Б</u>    |                             | il Weight ( | <u> </u> | ├─           |          |            | -           |                         |       |               | <del>                                     </del> |              |              | -           |
| F           |                             | ture (D/E)  |          | ╁            |          |            | +           |                         |       |               | -  |              |              |             |
|             |                             |             |          | ╁            |          |            | +           |                         |       | -             | 1  | 10.11        | C            | 1           |
| N           | # OF DROPS  LL = F * FACTOR |             |          |              |          |            |             |                         |       |               | Moisture Contents of by AASHTO T                 |              |              |             |
| LL          |                             |             | OK       | -            | _        |            | <del></del> |                         |       |               |  | 97.          |              |             |
| Ave.        |                             | lverage     |          |              | _        |            |             |                         |       | $\overline{}$ | T  | One Point 1  | Liquid Limit | t           |
| ſ           | 55.0                        |             |          | ==           |          |            | Ŧ           | -                       |       | <b>Ⅲ</b> 1    | N  | Factor       | N            | Factor      |
| (           | 50.0                        |             |          |              |          |            |             |                         |       |               | 20   | 0.974        | 26           | 1.005       |
| ाचा ∜       | 55.0                        |             |          | #            | =        |            |             |                         |       |               | 21   | 0.979        | 27           | 1.009       |
| Content     | 50.0                        |             |          |              |          |            |             |                         |       |               | 22   | 0.985        | 28           | 1.014       |
| ے ای        | 15.0                        |             |          |              |          |            |             |                         |       |               | 24   | 0.995        | 30           | 1.018       |
|             | 10.0                        |             |          |              |          |            |             |                         |       |               | 25   | 1.000        |              |             |
| ië          | 35.0                        |             |          |              |          |            |             |                         |       |               | N  | P, Non-Pl    | astic        | X           |
|             |                             |             |          |              |          |            |             |                         |       |               |  | Liquid I     | /imit        |             |
|             | 30.0                        |             |          |              | =        |            |             |                         |       |               |  | Plastic L    | <i>i</i> mit |             |
| 2           | 25.0                        |             |          |              |          |            |             |                         |       |               |  | Plastic I    | ndex         |             |
| 2           | 20.0                        | _           |          | =            | +        | -          | -           | _                       | _     | 100           |  | Group Syn    | nbol A       | -1-b        |
|             | 10                          | 15          | 20       | 25           | 30       | 35 40      | Ļ           | # of Dro                | ps    | 100           | l  | Multipoint I |              | N.          |
| <u></u>     |                             |             |          |              |          |            |             |                         |       |               |  | One-point N  |              |             |
|             | eparation                   |             | Prepara  | tion         | <b>V</b> | Air Dı     | ried        | 1                       | Esti  | imate the %   | Retained o                                       | n the #40 Si | eve:         |             |
| Notes / De  | eviations / Re              | ferences:   |          |              |          |            |             |                         |       |               |  |              |              |             |
|             |                             |             |          |              |          |            |             |                         |       |               | 7.0  |              |              |             |
| 4 4 S H T O | T90 Deter                   | mining the  | Plastic  | Limit        | & Pl     | astic Indo | r of S      | oils                    |       | 1 AASHI       | 0 189 De   | termining th | e Liquid I.  | imit of Soi |
| TASHI U     |                             |             |          | Limit        | oc I II  | one mue    | n 0) 50     | ,,,,                    | 7     | 1             | 1/ -   | o. mining in | - Ligara Di  | / 1         |
| (           | Kalen                       | War         | un       |              | 0        | 3/7/19     | 4           |                         | N     | an A          | In   |              | 3            | 17/14       |
|             | Technicia                   |             |          |              |          | Date       | ,           |                         | Tech  | nical Respon  | sibility   |              | Ι            | Date        |

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