

REFERENCE: R-3825B

PROJECT: 34552

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY Johnston  
PROJECT DESCRIPTION NC 42 from SR 1902 (Glen Laurel Rd.) to SR 1003 (Buffalo Rd.)  
SITE DESCRIPTION Bridge No. 75 on NC 42 over the Neuse River at -L- Sta. 64 + 20

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PERSONNEL

Lindsay Pugh

Mid Atlantic Drilling

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INVESTIGATED BY J.L. Stone

DRAWN BY J.L. Stone

CHECKED BY J.L. Pedro

SUBMITTED BY J.L. Stone

DATE June 2017



DocuSigned by:  
Joseph L Stone 7/28/2017

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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

| SOIL DESCRIPTION   |   |   |  |   |  |                   |                   |  |             | GRADATION |              |  |                |                 |   |              |      |             |  | ROCK DESCRIPTION     |  |  |  |  |  |  |  |  |  | TERMS AND DEFINITIONS |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                      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| <p><b>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</b></p>   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | <p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br/><b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.<br/><b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  | <p><b>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</b></p> |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             | <p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.<br/><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.<br/><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.<br/><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.<br/><b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.<br/><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.<br/><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.<br/><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.<br/><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.<br/><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.<br/><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.<br/><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.<br/><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.<br/><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.<br/><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.<br/><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.<br/><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.<br/><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.<br/><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.<br/><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.<br/><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.<br/><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.<br/><b>ROCK QUALITY DESIGNATION (ROD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.<br/><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.<br/><b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.<br/><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.<br/><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.<br/><b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br/><b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.<br/><b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         | 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| <p><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th colspan="5"></th> </tr> </thead> <tbody> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="5"></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX 10 MX</td> <td>51 MN 35 MX 35 MX</td> <td>35 MX 35 MX 35 MX</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td colspan="5"></td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td colspan="5"></td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td colspan="2">-</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>41 MN 11 MN</td> <td>40 MX 10 MX</td> <td>41 MN 11 MN</td> <td>40 MX 11 MN</td> <td>41 MN 11 MN</td> <td colspan="5"></td> <td colspan="5">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="5">HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="2">0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td colspan="5"></td> <td colspan="5"></td> <td colspan="5"></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="2">STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td colspan="3">SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td colspan="3">CLAYEY SOILS</td> <td colspan="5"></td> <td colspan="5"></td> <td colspan="5"></td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="10">EXCELLENT TO GOOD</td> <td colspan="5">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td colspan="5">UNSATURABLE</td> </tr> <tr> <td colspan="40"> <p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</p> </td> </tr> <tr> <td colspan="40"> <p><b>CONSISTENCY OR DENSENESS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESSIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <td>BOULDER (BLDR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COBBLE (COB.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAVEL (GR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COARSE SAND (CS. SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FINE SAND (F SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SILT (SL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLAY (CL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAIN SIZE</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td>MM</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>PLASTICITY</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td></td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td></td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td></td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td></td> <td>HIGH</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> </td> </tr> <tr> <td colspan="40"> <p><b>GRADATION</b></p> <p><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31<br/>MODERATELY COMPRESSIBLE LL = 31 - 50<br/>HIGHLY COMPRESSIBLE LL &gt; 50</p> <p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> <p><b>GROUND WATER</b></p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br/>  STATIC WATER LEVEL AFTER 24 HOURS<br/>  PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br/>  SPRING OR SEEP</p> <p><b>MISCELLANEOUS SYMBOLS</b></p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION<br/>  SOIL SYMBOL<br/>  ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT<br/>  INFERRED SOIL BOUNDARY<br/>  INFERRED ROCK LINE<br/>  ALLUVIAL SOIL BOUNDARY</p> <p> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES<br/>  TEST BORING<br/>  AUGER BORING<br/>  CORE BORING<br/>  MONITORING WELL<br/>  PIEZOMETER INSTALLATION<br/>  SLOPE INDICATOR INSTALLATION<br/>  CONE PENETROMETER TEST<br/>  SOUNDING ROD<br/>  TEST BORING WITH CORE<br/>  SPT N-VALUE</p> <p><b>RECOMMENDATION SYMBOLS</b></p> <p> UNDERCUT<br/>  SHALLOW UNDERCUT<br/>  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p> <p><b>ABBREVIATIONS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL. - CLAY</td> <td>MOD. - MODERATELY</td> <td>U - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>U<sub>G</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE. - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td><b>SAMPLE ABBREVIATIONS</b></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td>S - BULK</td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRIAXIAL REFUSAL</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>HI. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> D-25</td> <td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/> TRICONE <input type="checkbox"/> 2 1/16" STEEL TEETH</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/> TRICONE <input type="checkbox"/> TUNG-CARB.</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>ROCK HARDNESS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>VERY HARD</th> <th>HARD</th> <th>MODERATELY HARD</th> <th>MEDIUM HARD</th> <th>SOFT</th> <th>VERY SOFT</th> </tr> </thead> <tbody> <tr> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> <td>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</td> <td>CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</td> <td>CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</td> <td>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</td> </tr> </tbody> </table> <p><b>FRACTURE SPACING</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>SPACING</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </tbody> </table> <p><b>BEDDING</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </tbody> </table> <p><b>INDURATION</b></p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="40"> <p><b>NOTES:</b></p> <p>BENCH MARK: BM # 4<br/>END BENT ELEVATION DATA COLLECTED USING A SURVEY GRADE GPS<br/>ELEVATION: 141.0 FEET</p> </td> </tr> <tr> <td colspan="40"> <p>DATE: 8-15-14</p> </td> </tr> </tbody> </table> |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | GENERAL CLASS.  | GRANULAR MATERIALS (<= 35% PASSING #200) |  |  |   |   |   |   | SILT-CLAY MATERIALS (> 35% PASSING #200)  |  |   |  |  |   |  | ORGANIC MATERIALS                       |   |              |  |   | GROUP CLASS.       | A-1                      | A-3  | A-2                    | A-4                      | A-5  | A-6                 | A-7                      | A-1, A-2                                     | A-3                         | A-4, A-5                 | A-6, A-7                         |                    |                  |                   |                        |                          | SYMBOL                      |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    | % PASSING #10 #40 #200 | 50 MX 30 MX 15 MX              | 50 MX 25 MX 10 MX | 51 MN 35 MX 35 MX | 35 MX 35 MX 35 MX | 36 MN 36 MN 36 MN | 36 MN 36 MN 36 MN | 36 MN 36 MN 36 MN |  |            |     |    |     | GRANULAR SOILS | SILT-CLAY SOILS | MUCK, PEAT |    |  |  |  |  | MATERIAL PASSING #40 LL PI | - |     | 40 MX 10 MX | 41 MN 10 MX | 41 MN 11 MN  | 40 MX 10 MX | 41 MN 11 MN | 40 MX 11 MN | 41 MN 11 MN |  |  |  |  |  | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER |  |  |  |  | HIGHLY ORGANIC SOILS |  |  |  |  | GROUP INDEX | 0 |  | 0 | 4 MX | 8 MX | 12 MX | 16 MX | NO MX |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS. GRAVEL, AND SAND |  | FINE SAND | SILTY OR CLAYEY GRAVEL AND SAND |  |  | SILTY SOILS | CLAYEY SOILS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | GEN. RATING AS SUBGRADE | EXCELLENT TO GOOD |  |  |  |  |  |  |  |  |  | FAIR TO POOR |  |  |  |  | FAIR TO POOR | POOR | UNSATURABLE |  |  |  |  | <p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</p> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <p><b>CONSISTENCY OR DENSENESS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESSIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </tbody> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50 | N/A | GENERALLY SILT-CLAY MATERIAL (COHESSIVE) | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 | <p><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <td>BOULDER (BLDR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COBBLE (COB.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAVEL (GR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COARSE SAND (CS. SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FINE SAND (F SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SILT (SL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLAY (CL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAIN SIZE</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td>MM</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 |  | 4.75 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 | BOULDER (BLDR.) |  |  |  |  |  |  | COBBLE (COB.) |  |  |  |  |  |  | GRAVEL (GR.) |  |  |  |  |  |  | COARSE SAND (CS. SD.) |  |  |  |  |  |  | FINE SAND (F SD.) |  |  |  |  |  |  | SILT (SL.) |  |  |  |  |  |  | CLAY (CL.) |  |  |  |  |  |  | GRAIN SIZE | 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 | MM |  |  |  |  |  |  | IN. | 12 | 3 |  |  |  |  | <p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL - LIQUID LIMIT | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PL - PLASTIC LIMIT | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM - OPTIMUM MOISTURE SHRINKAGE LIMIT | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | SL - SHRINKAGE LIMIT | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <p><b>PLASTICITY</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td></td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td></td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td></td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td></td> <td>HIGH</td> </tr> </tbody> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | NON PLASTIC | PLASTICITY INDEX (PI) |  | DRY STRENGTH | SLIGHTLY PLASTIC | 0-5 |  | VERY LOW | MODERATELY PLASTIC | 6-15 |  | SLIGHT | HIGHLY PLASTIC | 16-25 |  | MEDIUM |  | 26 OR MORE |  | HIGH | <p><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <p><b>GRADATION</b></p> <p><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31<br/>MODERATELY COMPRESSIBLE LL = 31 - 50<br/>HIGHLY COMPRESSIBLE LL &gt; 50</p> <p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> <p><b>GROUND WATER</b></p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br/>  STATIC WATER LEVEL AFTER 24 HOURS<br/>  PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br/>  SPRING OR SEEP</p> <p><b>MISCELLANEOUS SYMBOLS</b></p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION<br/>  SOIL SYMBOL<br/>  ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT<br/>  INFERRED SOIL BOUNDARY<br/>  INFERRED ROCK LINE<br/>  ALLUVIAL SOIL BOUNDARY</p> <p> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES<br/>  TEST BORING<br/>  AUGER BORING<br/>  CORE BORING<br/>  MONITORING WELL<br/>  PIEZOMETER INSTALLATION<br/>  SLOPE INDICATOR INSTALLATION<br/>  CONE PENETROMETER TEST<br/>  SOUNDING ROD<br/>  TEST BORING WITH CORE<br/>  SPT N-VALUE</p> <p><b>RECOMMENDATION SYMBOLS</b></p> <p> UNDERCUT<br/>  SHALLOW UNDERCUT<br/>  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p> <p><b>ABBREVIATIONS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL. - CLAY</td> <td>MOD. - MODERATELY</td> <td>U - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>U<sub>G</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE. - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td><b>SAMPLE ABBREVIATIONS</b></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td>S - BULK</td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRIAXIAL REFUSAL</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>HI. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </tbody> </table> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | GRANULAR SOILS | SILT - CLAY SOILS | OTHER MATERIAL | TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE 1 - 10% | LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE 10 - 20% | MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME 20 - 35% | HIGHLY ORGANIC | > 10% | > 20% | HIGHLY 35% AND ABOVE | AR - AUGER REFUSAL | MED. - MEDIUM | VST - VANE SHEAR TEST | BT - BORING TERMINATED | MICA - MICACEOUS | WEA. - WEATHERED | CL. - CLAY | MOD. - MODERATELY | U - UNIT WEIGHT | CPT - CONE PENETRATION TEST | NP - NON PLASTIC | U <sub>G</sub> - DRY UNIT WEIGHT | CSE. - COARSE | ORG. - ORGANIC |  | DMT - DILATOMETER TEST | PMT - PRESSUREMETER TEST | <b>SAMPLE ABBREVIATIONS</b> | DPT - DYNAMIC PENETRATION TEST | SAP. - SAPROLITIC | S - BULK | e - VOID RATIO | SD. - SAND, SANDY | SS - SPLIT SPOON | F - FINE | SL. - SILT, SILTY | ST - SHELBY TUBE | FOSS. - FOSSILIFEROUS | SLI. - SLIGHTLY | RS - ROCK | FRAC. - FRACTURED, FRACTURES | TCR - TRIAXIAL REFUSAL | RT - RECOMPACTED TRIAXIAL | FRAGS. - FRAGMENTS | w - MOISTURE CONTENT | CBR - CALIFORNIA BEARING RATIO | HI. - HIGHLY | V - VERY |  | <p><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width:100%; 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| GENERAL CLASS.   | GRANULAR MATERIALS (<= 35% PASSING #200)  |   |  |   |  |                   |                   | SILT-CLAY MATERIALS (> 35% PASSING #200) |             |           |              |  |                |                 | ORGANIC MATERIALS                                       |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     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| GROUP CLASS.   | A-1   | A-3   | A-2  | A-4   | A-5  | A-6               | A-7               | A-1, A-2                                 | A-3         | A-4, A-5  | A-6, A-7     |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |          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      |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  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| SYMBOL   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |       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| % PASSING #10 #40 #200   | 50 MX 30 MX 15 MX   | 50 MX 25 MX 10 MX   | 51 MN 35 MX 35 MX  | 35 MX 35 MX 35 MX   | 36 MN 36 MN 36 MN  | 36 MN 36 MN 36 MN | 36 MN 36 MN 36 MN |  |             |           |              |  | GRANULAR SOILS | SILT-CLAY SOILS | MUCK, PEAT  |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |  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         |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |    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| MATERIAL PASSING #40 LL PI   | -   |   | 40 MX 10 MX  | 41 MN 10 MX   | 41 MN 11 MN  | 40 MX 10 MX       | 41 MN 11 MN       | 40 MX 11 MN                              | 41 MN 11 MN |           |              |  |                |                 | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER |              |      |             |  | HIGHLY ORGANIC SOILS |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |           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|    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |      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          |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GROUP INDEX  | 0   |   | 0  | 4 MX  | 8 MX   | 12 MX             | 16 MX             | NO MX                                    |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |     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| USUAL TYPES OF MAJOR MATERIALS   | STONE FRAGS. GRAVEL, AND SAND   |   | FINE SAND  | SILTY OR CLAYEY GRAVEL AND SAND   |  |                   | SILTY SOILS       | CLAYEY SOILS                             |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |        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| GEN. RATING AS SUBGRADE  | EXCELLENT TO GOOD   |   |  |   |  |                   |                   |  |             |           | FAIR TO POOR |  |                |                 |   | FAIR TO POOR | POOR | UNSATURABLE |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |     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| <p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</p>  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |    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| <p><b>CONSISTENCY OR DENSENESS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE<br/>LOOSE<br/>MEDIUM DENSE<br/>DENSE<br/>VERY DENSE</td> <td>&lt; 4<br/>4 TO 10<br/>10 TO 30<br/>30 TO 50<br/>&gt; 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESSIVE)</td> <td>VERY SOFT<br/>SOFT<br/>MEDIUM STIFF<br/>STIFF<br/>VERY STIFF<br/>HARD</td> <td>&lt; 2<br/>2 TO 4<br/>4 TO 8<br/>8 TO 15<br/>15 TO 30<br/>&gt; 30</td> <td>&lt; 0.25<br/>0.25 TO 0.5<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </tbody> </table>   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | PRIMARY SOIL TYPE   | COMPACTNESS OR CONSISTENCY               | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) | GENERALLY GRANULAR MATERIAL (NON-COHESSIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE                    | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50  | N/A   | GENERALLY SILT-CLAY MATERIAL (COHESSIVE)  | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD   | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30  | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4   |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |           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          |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |  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| PRIMARY SOIL TYPE  | COMPACTNESS OR CONSISTENCY  | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)  | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |           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          |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)  | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE  | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50  | N/A  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                   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  |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |         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| GENERALLY SILT-CLAY MATERIAL (COHESSIVE)   | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD  | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30  | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  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 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> </thead> <tbody> <tr> <td></td> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <td>BOULDER (BLDR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COBBLE (COB.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAVEL (GR.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>COARSE SAND (CS. SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FINE SAND (F SD.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SILT (SL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CLAY (CL.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GRAIN SIZE</td> <td>305</td> <td>75</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td>MM</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>IN.</td> <td>12</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | U.S. STD. SIEVE SIZE OPENING (MM)   | 4  | 10   | 40   | 60  | 200   | 270   |   | 4.75  | 2.00   | 0.42  | 0.25   | 0.075                                    | 0.053   | BOULDER (BLDR.)                                      |   |   |              |  |   |                    | COBBLE (COB.)            |  |                        |                          |  |                     |                          | GRAVEL (GR.)                                 |                             |                          |                                  |                    |                  |                   | COARSE SAND (CS. SD.)  |                          |                             |                                |  |   |   | FINE SAND (F SD.) |  |                     |   |                  |                       |                 | SILT (SL.) |                              |                        |                           |                    |                        |                                | CLAY (CL.)        |                   |                   |                   |                   |                   |  | GRAIN SIZE | 305 | 75 | 2.0 | 0.25           | 0.05            | 0.005      | MM |  |  |  |  |                            |   | IN. | 12          | 3           |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |         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| U.S. STD. SIEVE SIZE OPENING (MM)  | 4   | 10  | 40   | 60  | 200  | 270               |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  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 |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |               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|  | 4.75  | 2.00  | 0.42   | 0.25  | 0.075  | 0.053             |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  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 |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |   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 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |       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| BOULDER (BLDR.)  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        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| COBBLE (COB.)  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        | 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| GRAVEL (GR.)   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        | 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| COARSE SAND (CS. SD.)  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |            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| FINE SAND (F SD.)  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                      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| SILT (SL.)   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |   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| CLAY (CL.)   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |   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| GRAIN SIZE   | 305   | 75  | 2.0  | 0.25  | 0.05   | 0.005             |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |        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| <p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </tbody> </table>  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | SOIL MOISTURE SCALE (ATTERBERG LIMITS)  | FIELD MOISTURE DESCRIPTION               | GUIDE FOR FIELD MOISTURE DESCRIPTION               | LL - LIQUID LIMIT  | - SATURATED - (SAT.)                        | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE           | PL - PLASTIC LIMIT  | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE   | OM - OPTIMUM MOISTURE SHRINKAGE LIMIT  | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE   | SL - SHRINKAGE LIMIT                     | - DRY - (D)                                     | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                        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| SOIL MOISTURE SCALE (ATTERBERG LIMITS)   | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              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| LL - LIQUID LIMIT  | - SATURATED - (SAT.)  | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                    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| PL - PLASTIC LIMIT   | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                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         |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  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| OM - OPTIMUM MOISTURE SHRINKAGE LIMIT  | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |     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|        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  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| SL - SHRINKAGE LIMIT   | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>PLASTICITY</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td></td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td></td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td></td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td></td> <td>HIGH</td> </tr> </tbody> </table>   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | NON PLASTIC   | PLASTICITY INDEX (PI)                    |  | DRY STRENGTH   | SLIGHTLY PLASTIC                            | 0-5   |   | VERY LOW  | MODERATELY PLASTIC  | 6-15   |   | SLIGHT   | HIGHLY PLASTIC                           | 16-25   |  | MEDIUM                                  |   | 26 OR MORE   |  | HIGH  |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                   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               |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NON PLASTIC  | PLASTICITY INDEX (PI)   |   | DRY STRENGTH   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  | 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                   |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  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               |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SLIGHTLY PLASTIC   | 0-5   |   | VERY LOW   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  | 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    |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MODERATELY PLASTIC   | 6-15  |   | SLIGHT   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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    |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| HIGHLY PLASTIC   | 16-25   |   | MEDIUM   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 26 OR MORE  |   | HIGH   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  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 |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                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| <p><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  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 |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |               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| <p><b>GRADATION</b></p> <p><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31<br/>MODERATELY COMPRESSIBLE LL = 31 - 50<br/>HIGHLY COMPRESSIBLE LL &gt; 50</p> <p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> <p><b>GROUND WATER</b></p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br/>  STATIC WATER LEVEL AFTER 24 HOURS<br/>  PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br/>  SPRING OR SEEP</p> <p><b>MISCELLANEOUS SYMBOLS</b></p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION<br/>  SOIL SYMBOL<br/>  ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT<br/>  INFERRED SOIL BOUNDARY<br/>  INFERRED ROCK LINE<br/>  ALLUVIAL SOIL BOUNDARY</p> <p> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES<br/>  TEST BORING<br/>  AUGER BORING<br/>  CORE BORING<br/>  MONITORING WELL<br/>  PIEZOMETER INSTALLATION<br/>  SLOPE INDICATOR INSTALLATION<br/>  CONE PENETROMETER TEST<br/>  SOUNDING ROD<br/>  TEST BORING WITH CORE<br/>  SPT N-VALUE</p> <p><b>RECOMMENDATION SYMBOLS</b></p> <p> UNDERCUT<br/>  SHALLOW UNDERCUT<br/>  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK<br/>  UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p> <p><b>ABBREVIATIONS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL. - CLAY</td> <td>MOD. - MODERATELY</td> <td>U - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>U<sub>G</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE. - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td><b>SAMPLE ABBREVIATIONS</b></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td>S - BULK</td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRIAXIAL REFUSAL</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>HI. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </tbody> </table>  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   | GRANULAR SOILS                           | SILT - CLAY SOILS                                  | OTHER MATERIAL   | TRACE OF ORGANIC MATTER                     | 2 - 3%  | 3 - 5%  | TRACE 1 - 10%   | LITTLE ORGANIC MATTER   | 3 - 5%   | 5 - 12%   | LITTLE 10 - 20%  | MODERATELY ORGANIC                       | 5 - 10%   | 12 - 20%   | SOME 20 - 35%                           | HIGHLY ORGANIC                                | > 10%        | > 20%                                    | HIGHLY 35% AND ABOVE  | AR - AUGER REFUSAL | MED. - MEDIUM            | VST - VANE SHEAR TEST  | BT - BORING TERMINATED | MICA - MICACEOUS         | WEA. - WEATHERED   | CL. - CLAY          | MOD. - MODERATELY        | U - UNIT WEIGHT                              | CPT - CONE PENETRATION TEST | NP - NON PLASTIC         | U <sub>G</sub> - DRY UNIT WEIGHT | CSE. - COARSE      | ORG. - ORGANIC   |                   | DMT - DILATOMETER TEST | PMT - PRESSUREMETER TEST | <b>SAMPLE ABBREVIATIONS</b> | DPT - DYNAMIC PENETRATION TEST | SAP. - SAPROLITIC  | S - BULK  | e - VOID RATIO  | SD. - SAND, SANDY | SS - SPLIT SPOON   | F - FINE            | SL. - SILT, SILTY   | ST - SHELBY TUBE | FOSS. - FOSSILIFEROUS | SLI. - SLIGHTLY | RS - ROCK  | FRAC. - FRACTURED, FRACTURES | TCR - TRIAXIAL REFUSAL | RT - RECOMPACTED TRIAXIAL | FRAGS. - FRAGMENTS | w - MOISTURE CONTENT   | CBR - CALIFORNIA BEARING RATIO | HI. - HIGHLY      | V - VERY          |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|  | GRANULAR SOILS  | SILT - CLAY SOILS   | OTHER MATERIAL   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                       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| TRACE OF ORGANIC MATTER  | 2 - 3%  | 3 - 5%  | TRACE 1 - 10%  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                     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| LITTLE ORGANIC MATTER  | 3 - 5%  | 5 - 12%   | LITTLE 10 - 20%  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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 |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                  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| MODERATELY ORGANIC   | 5 - 10%   | 12 - 20%  | SOME 20 - 35%  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                     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|  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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                      |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  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                  |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| HIGHLY ORGANIC   | > 10%   | > 20%   | HIGHLY 35% AND ABOVE   |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                     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|  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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                      |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  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                  |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AR - AUGER REFUSAL   | MED. - MEDIUM   | VST - VANE SHEAR TEST   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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    |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  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    |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BT - BORING TERMINATED   | MICA - MICACEOUS  | WEA. - WEATHERED  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             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    |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |               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| CL. - CLAY   | MOD. - MODERATELY   | U - UNIT WEIGHT   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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                   |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  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| CPT - CONE PENETRATION TEST  | NP - NON PLASTIC  | U <sub>G</sub> - DRY UNIT WEIGHT  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |        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|      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  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| CSE. - COARSE  | ORG. - ORGANIC  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |            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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                            |                                      |                   |                      |   |                    |             |   |                                       |               |                                    |                      |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |             |                       |  |              |                  |     |  |          |                    |      |  |        |                |       |  |        |  |            |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                |                   |                |                         |        |        |               |                       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| DMT - DILATOMETER TEST   | PMT - PRESSUREMETER TEST  | <b>SAMPLE ABBREVIATIONS</b>   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |              |      |             |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  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| DPT - DYNAMIC PENETRATION TEST   | SAP. - SAPROLITIC   | S - BULK  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |             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  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                   |                            |  |  |   |  |  |     |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                   |   |    |    |    |     |     |  |      |      |      |      |       |       |                 |  |  |  |  |  |  |               |  |  |  |  |  |  |              |  |  |  |  |  |  |                       |  |  |  |  |  |  |                   |  |  |  |  |  |  |            |  |  |  |  |  |  |            |  |  |  |  |  |  |            |     |    |     |      |      |       |    |  |  |  |  |  |  |     |    |   |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 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| e - VOID RATIO   | SD. - SAND, SANDY   | SS - SPLIT SPOON  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                     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                  |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| F - FINE   | SL. - SILT, SILTY   | ST - SHELBY TUBE  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                           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| FOSS. - FOSSILIFEROUS  | SLI. - SLIGHTLY   | RS - ROCK   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                       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| FRAC. - FRACTURED, FRACTURES   | TCR - TRIAXIAL REFUSAL  | RT - RECOMPACTED TRIAXIAL   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |      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| FRAGS. - FRAGMENTS   | w - MOISTURE CONTENT  | CBR - CALIFORNIA BEARING RATIO  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            | 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| HI. - HIGHLY   | V - VERY  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                  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| <p><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> D-25</td> <td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/> TRICONE <input type="checkbox"/> 2 1/16" STEEL TEETH</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/> TRICONE <input type="checkbox"/> TUNG-CARB.</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> </tbody> </table>  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  | DRILL UNITS:  | ADVANCING TOOLS:                         | HAMMER TYPE:                                       | <input 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type="checkbox"/> | <input checked="" type="checkbox"/> CORE BIT |                             | <input type="checkbox"/> | <input type="checkbox"/>         |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  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| DRILL UNITS:   | ADVANCING TOOLS:  | HAMMER TYPE:  |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                             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             |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  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      |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |         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      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |     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| <input type="checkbox"/> CME-55  | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |      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| <input type="checkbox"/> CME-550   | <input checked="" type="checkbox"/> 8" HOLLOW AUGERS  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |     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|        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  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| <input type="checkbox"/> VANE SHEAR TEST   | <input type="checkbox"/> HARD FACED FINGER BITS   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  | 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   |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    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| <input type="checkbox"/> PORTABLE HOIST  | <input type="checkbox"/> TUNG-CARBIDE INSERTS   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |              |  |  |  |  |     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|        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  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| <input checked="" type="checkbox"/> D-25   | <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER                             |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                 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| <input type="checkbox"/>   | <input checked="" type="checkbox"/> TRICONE <input type="checkbox"/> 2 1/16" STEEL TEETH                    |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |             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| <input type="checkbox"/>   | <input type="checkbox"/> TRICONE <input type="checkbox"/> TUNG-CARB.  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |        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         |        |        |               |                       |        |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                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| <input type="checkbox"/>   | <input checked="" type="checkbox"/> CORE BIT  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            | 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                 |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <input type="checkbox"/>   | <input type="checkbox"/>  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                     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| CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. | CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. | CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. | CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL. |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                    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| TERM   | SPACING   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        | 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| VERY WIDE  | MORE THAN 10 FEET   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |            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| WIDE   | 3 TO 10 FEET  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                      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| MODERATELY CLOSE   | 1 TO 3 FEET   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |          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| CLOSE  | 0.16 TO 1 FOOT  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                    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| VERY CLOSE   | LESS THAN 0.16 FEET   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |        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| TERM   | THICKNESS   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        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| VERY THICKLY BEDDED  | 4 FEET  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |              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| THICKLY BEDDED   | 1.5 - 4 FEET  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |            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| THINLY BEDDED  | 0.16 - 1.5 FEET   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |          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| VERY THINLY BEDDED   | 0.03 - 0.16 FEET  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |    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| THICKLY LAMINATED  | 0.008 - 0.03 FEET   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |    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| THINLY LAMINATED   | < 0.008 FEET  |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |          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                 |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FRIABLE  | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.                      |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |            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| MODERATELY INDURATED   | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.                   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                 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|                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| INDURATED  | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.                          |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                        |                           |                    |                        |                                |                   |                   |                   |                   |                   |                   |  |            |     |    |     |                |                 |            |    |  |  |  |  |                            |   |     |             |             |  |             |             |             |             |  |  |  |  |  |   |  |  |  |  |                      |  |  |  |  |             |   |  |   |      |      |       |       |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                |                               |  |           |                                 |  |  |             |              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                         |                   |  |  |  |  |  |  |  |  |  |  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|              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |             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| EXTREMELY INDURATED  | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.                                   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  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| <p><b>NOTES:</b></p> <p>BENCH MARK: BM # 4<br/>END BENT ELEVATION DATA COLLECTED USING A SURVEY GRADE GPS<br/>ELEVATION: 141.0 FEET</p>  |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |         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                    |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |         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| <p>DATE: 8-15-14</p>   |   |   |  |   |  |                   |                   |  |             |           |              |  |                |                 |   |              |      |             |  |                      |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |   |  |  |  |   |   |   |   |   |  |   |  |  |   |  |   |   |              |  |   |                    |                          |  |                        |                          |  |                     |                          |  |                             |                          |                                  |                    |                  |                   |                        |                          |                             |                                |  |   |   |                   |  |                     |   |                  |                       |                 |            |                              |                  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  |         |                 |                    |         |          |               |                |       |       |                      |                    |               |                       |                        |                  |                  |            |                   |                 |                             |                  |                                  |               |                |  |                        |                          |                             |                                |                   |          |                |                   |                  |          |                   |                  |                       |                 |           |                              |                        |                           |                    |                      |                                |              |          |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |              |                  |              |   |                                    |   |                                 |   |  |                                  |  |  |  |   |  |   |   |  |  |   |  |                          |  |  |                          |  |  |                          |  |  |                          |                          |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |      |                 |             |      |           |   |   |   |  |   |  |      |         |           |                   |      |              |                  |             |       |                |            |                     |      |           |                     |        |                |              |               |                 |                    |                  |                   |                   |                  |              |         |  |                      |   |           |  |                     |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

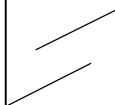
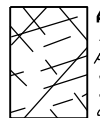
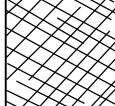
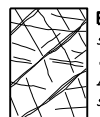





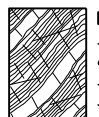


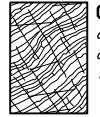

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

| GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)   |  | SURFACE CONDITIONS           |      |      |      |           | GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)   |   | SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes) |      |      |      |           |  |
|--|--|------------------------------|------|------|------|-----------|---|---|--|------|------|------|-----------|--|
| From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis. |  | VERY GOOD                    | GOOD | FAIR | POOR | VERY POOR | From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis. |   | VERY GOOD  | GOOD | FAIR | POOR | VERY POOR |  |
| STRUCTURE  |  | DECREASING SURFACE QUALITY → |      |      |      |           | COMPOSITION AND STRUCTURE   |   |  |      |      |      |           |  |
|   | INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities   | 90                           |      |      | N/A  | N/A       |    | A. Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. | 70   |      |      |      |           |  |
|   | BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets                     | 80                           |      |      |      |           |    | B. Sandstone with thin inter-layers of siltstone  | 60   |      |      |      |           |  |
|   | VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets                             |                              | 70   |      |      |           |    | C. Sandstone and siltstone in similar amounts   | 50   |      |      |      |           |  |
|   | BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity |                              | 60   |      |      |           |    | D. Siltstone or silty shale with sandstone layers   | 40   |      |      |      |           |  |
|   | DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces                                     |                              | 50   |      |      |           |    | E. Weak siltstone or clayey shale with sandstone layers   | 30   |      |      |      |           |  |
|   | LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes  |                              | 40   |      |      |           |    | F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure   | 20   |      |      |      |           |  |
|  |  |                              | 30   |      |      |           |    | G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers   | 10   |      |      |      |           |  |
|  |  |                              | 20   |      |      |           |    | H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.   |  |      |      |      |           |  |
|  |  |                              | 10   |      |      |           |   |   |  |      |      |      |           |  |
|  |  |                              | N/A  |      |      |           |   |   |  |      |      |      |           |  |
|  |  |                              | N/A  |      |      |           |   |   |  |      |      |      |           |  |

→ Means deformation after tectonic disturbance



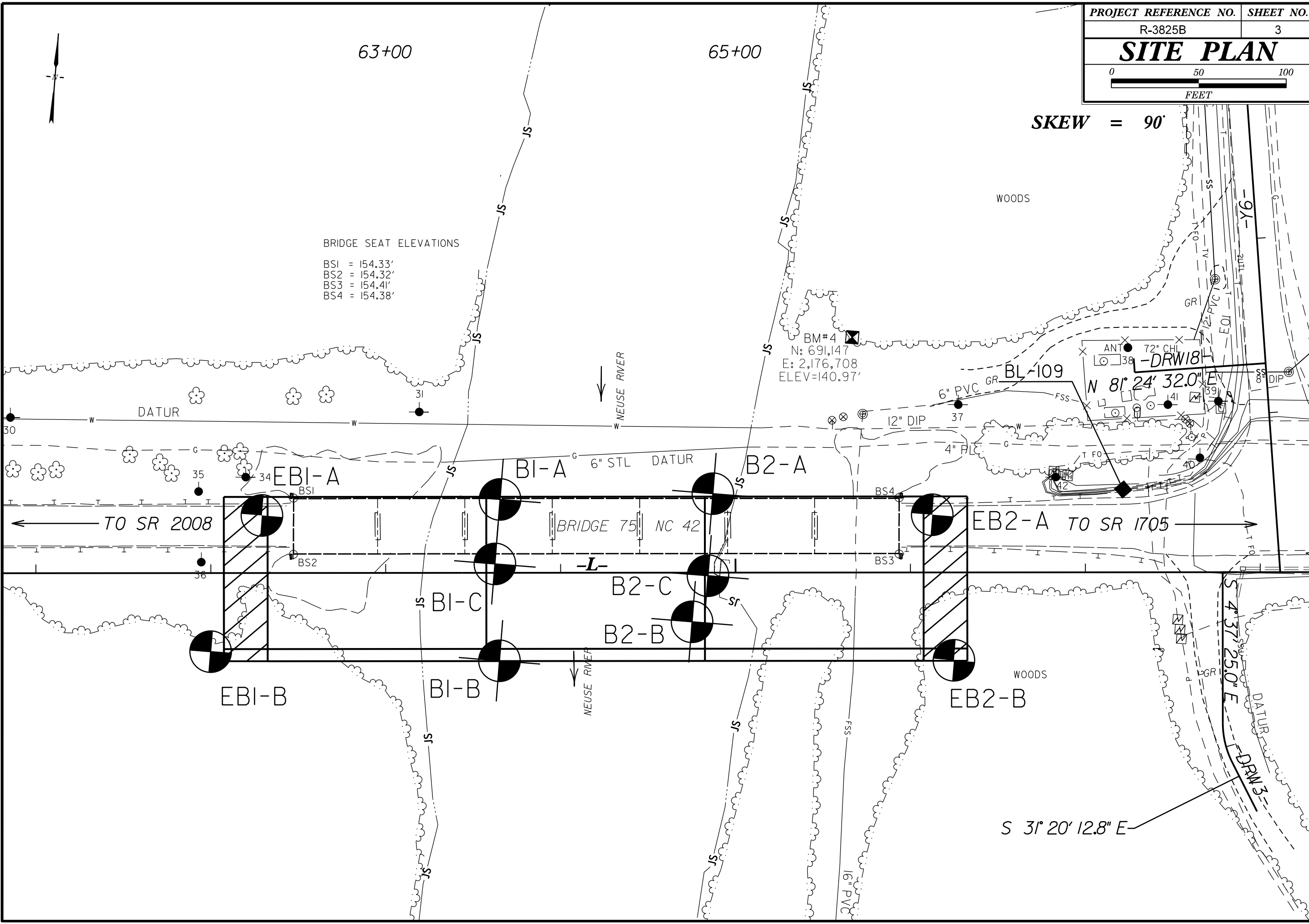
63+00

65+00

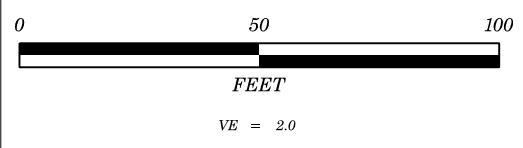
**SKEW = 90'**

BRIDGE SEAT ELEVATIONS

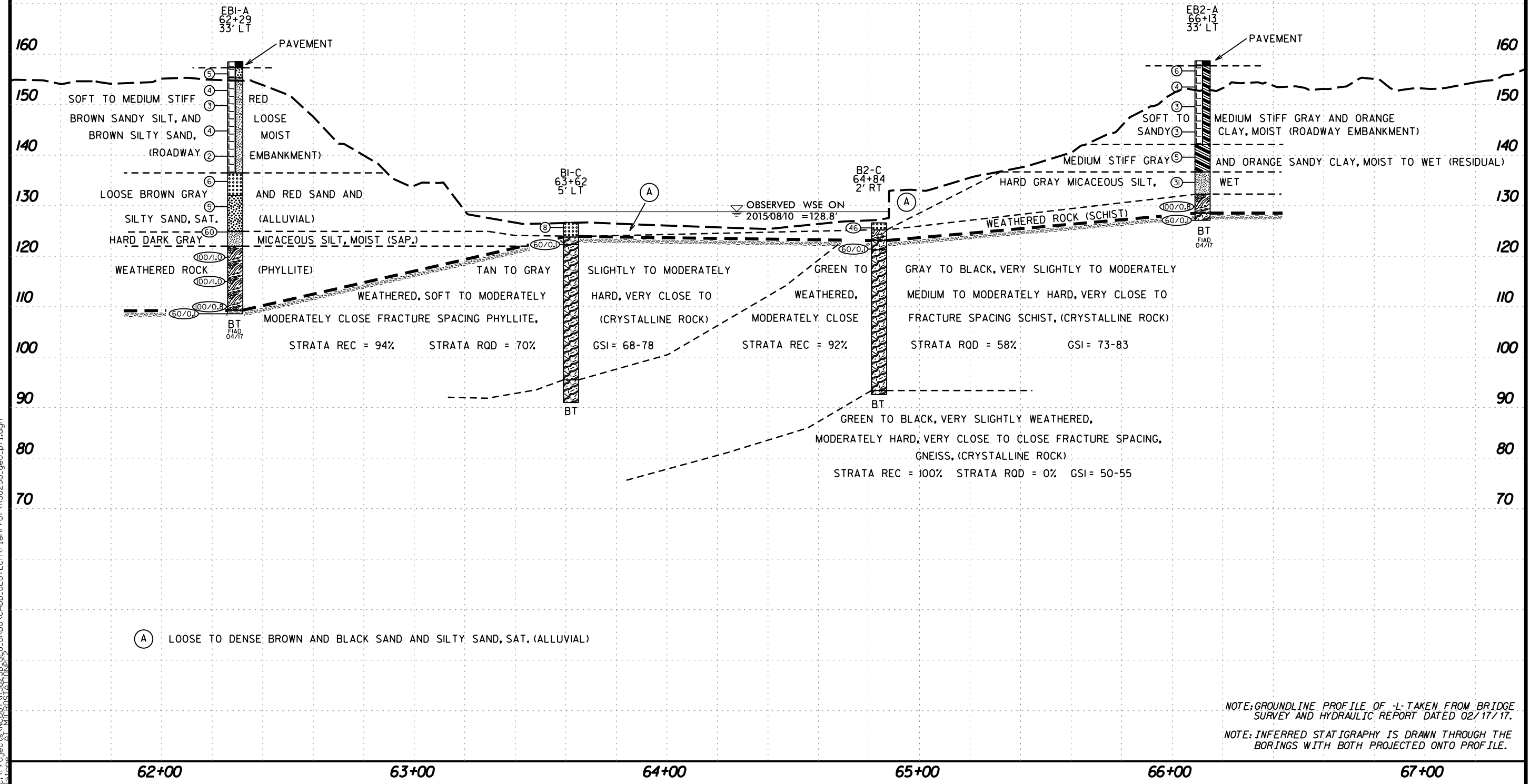
- BS1 = 154.33'
- BS2 = 154.32'
- BS3 = 154.41'
- BS4 = 154.38'



# PROFILE THROUGH BORINGS PROJECTED ALONG -L-



5/14/99  
08-JUN-2017 08:12  
C:\p\c\ec\es\N\001\FR3825B.GEO\_BROG\CADD.GEOTECH\Plan\Profile\FR3825B-geo-pl1.dgn



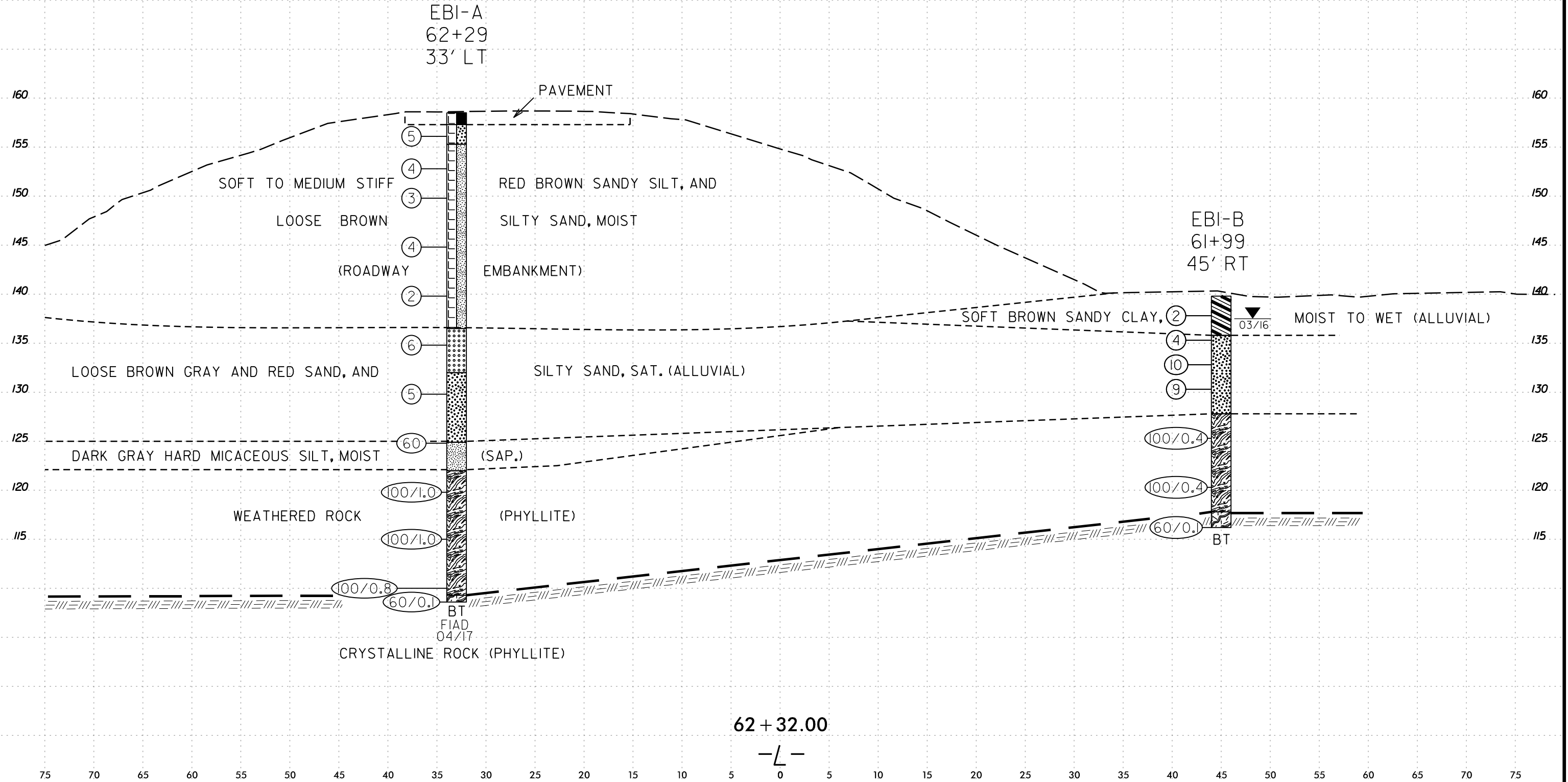
NOTE: GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC REPORT DATED 02/17/17.  
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

6/23/16

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

VE = 1:1  
SKEW = 90°

# CROSS SECTION THROUGH END BENT 1



05-JUN-2017 10:06  
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 Isotone AT MICROSTATION PC2

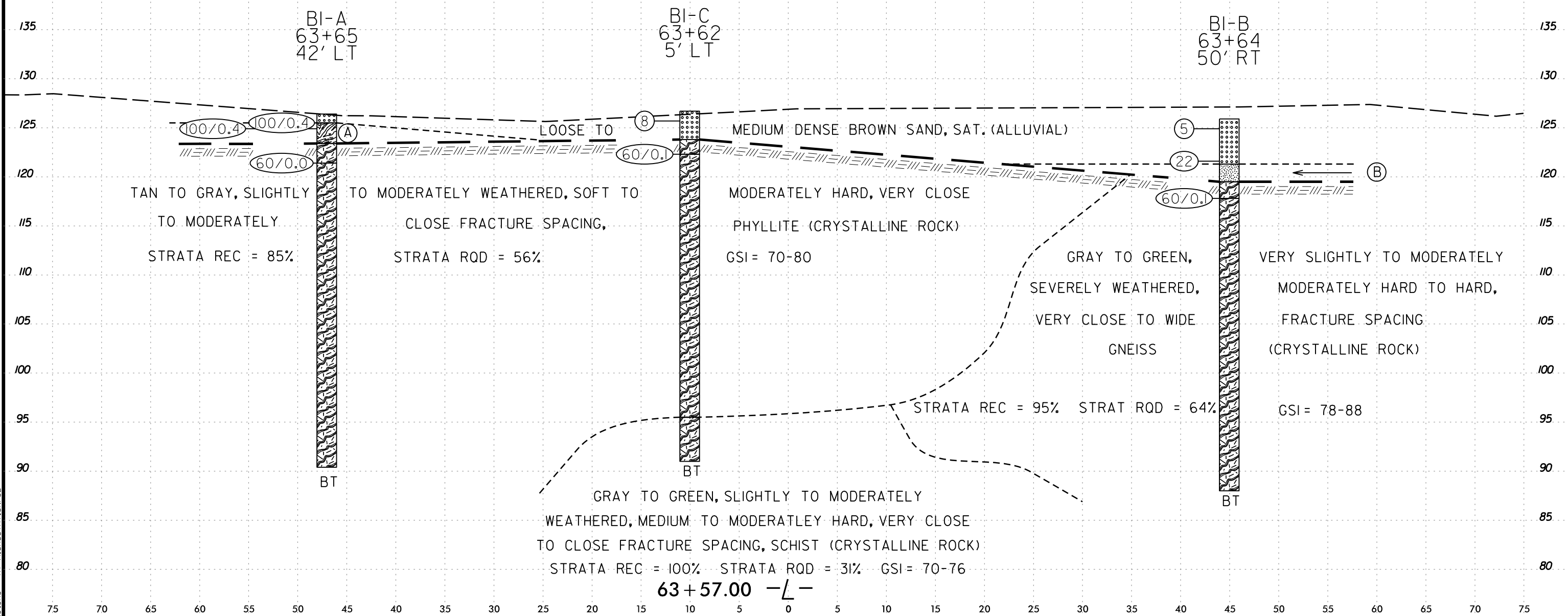
6/23/16  
05-JUN-2017 10:07  
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L:\stone

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

VE = 1:1  
SKEW = 90°

# CROSS SECTION THROUGH BENT 1

- (A) WEATHERED ROCK (PHYLLITE)
- (B) HARD DARK GREEN MICACEOUS SILT, WET (RESIDUAL)

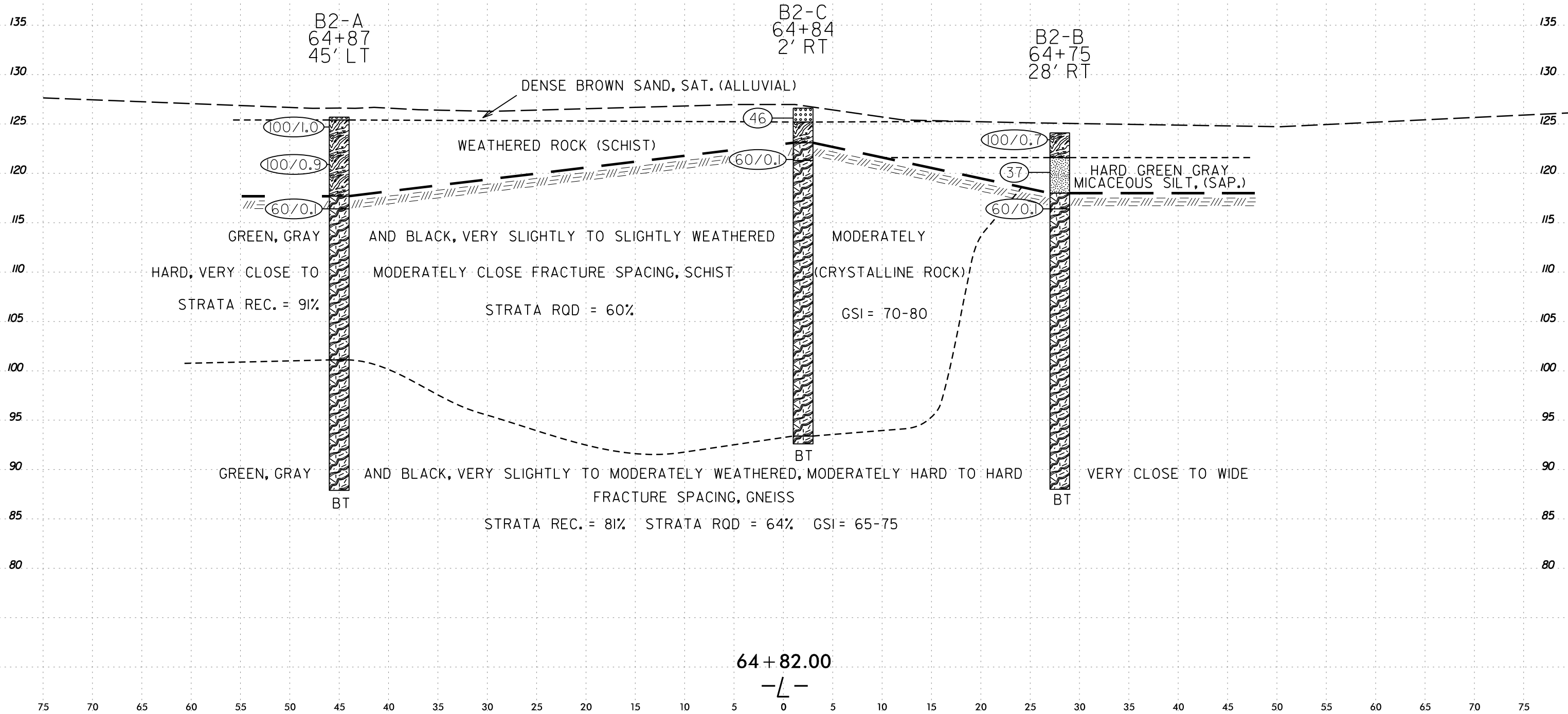


6/23/16

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

VE = 1:1  
SKEW = 90°

# CROSS SECTION THROUGH BENT 2



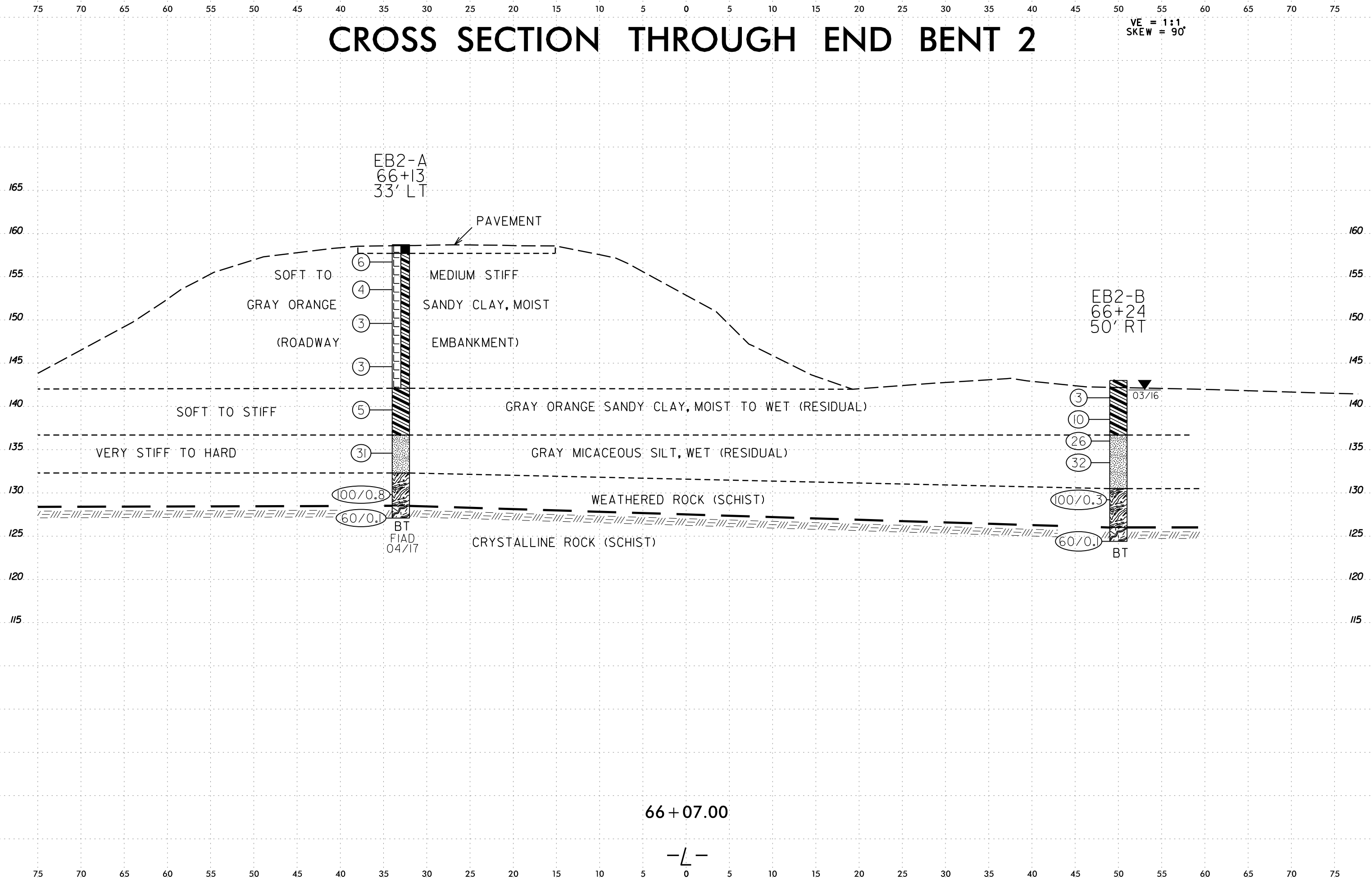
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LSTONE AT MICROSTATIONPC2



6/23/16

# CROSS SECTION THROUGH END BENT 2

VE = 1:1  
SKEW = 90°



05-JUN-2017 10:07  
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LSTONE AT MICROSTATION

## GEOTECHNICAL BORING REPORT BORE LOG

|   |  |                            |  |                                |  |                                |                        |
|---|--|----------------------------|--|--------------------------------|--|--------------------------------|------------------------|
| <b>WBS</b> 34552.1.FR3  |  | <b>TIP</b> R-3825B         |  | <b>COUNTY</b> JOHNSTON         |  | <b>GEOLOGIST</b> Lindsay Pugh  |                        |
| <b>SITE DESCRIPTION</b> BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |  |                            |  |                                |  |                                | <b>GROUND WTR (ft)</b> |
| <b>BORING NO.</b> EB1-A   |  | <b>STATION</b> 62+29       |  | <b>OFFSET</b> 33 ft LT         |  | <b>ALIGNMENT</b> -L-           |                        |
| <b>COLLAR ELEV.</b> 158.5 ft  |  | <b>TOTAL DEPTH</b> 49.9 ft |  | <b>NORTHING</b> 691,018        |  | <b>EASTING</b> 2,176,380       |                        |
| <b>DRILL RIG/HAMMER EFF./DATE</b> MID5464 CME-45C 84% 08/09/2016          |  |                            |  | <b>DRILL METHOD</b> Mud Rotary |  | <b>HAMMER TYPE</b> Automatic   |                        |
| <b>DRILLER</b> M. COOGAN  |  | <b>START DATE</b> 04/22/17 |  | <b>COMP. DATE</b> 04/22/17     |  | <b>SURFACE WATER DEPTH</b> N/A |                        |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT |        |       | BLOWS PER FOOT |    |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |
|-----------|-----------------|------------|------------|--------|-------|----------------|----|----|----|-----|-----------|-----|---------------------------|------------|--|
|           |                 |            | 0.5ft      | 0.5ft  | 0.5ft | 0              | 25 | 50 | 75 | 100 |           |     |                           |            |  |
| 160       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 157.3           | 1.2        | 7          | 3      | 2     |                |    |    |    |     |           |     |                           |            |  |
| 155       | 153.8           | 4.7        | 1          | 2      | 2     |                |    |    |    |     |           |     |                           |            |  |
|           | 150.8           | 7.7        | 2          | 2      | 1     |                |    |    |    |     |           |     |                           |            |  |
| 150       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 145.8           | 12.7       | 2          | 2      | 2     |                |    |    |    |     |           |     |                           |            |  |
| 145       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 140.8           | 17.7       | 2          | 1      | 1     |                |    |    |    |     |           |     |                           |            |  |
| 140       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 135.8           | 22.7       | 3          | 3      | 3     |                |    |    |    |     |           |     |                           |            |  |
| 135       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 130.8           | 27.7       | 2          | 2      | 3     |                |    |    |    |     |           |     |                           |            |  |
| 130       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 125.8           | 32.7       | 5          | 15     | 45    |                |    |    |    |     |           |     |                           |            |  |
| 125       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 120.8           | 37.7       | 29         | 71/0.5 |       |                |    |    |    |     |           |     |                           |            |  |
| 120       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 116.0           | 42.5       | 21         | 25     | 75    |                |    |    |    |     |           |     |                           |            |  |
| 115       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 110.8           | 47.7       | 50         | 50/0.3 |       |                |    |    |    |     |           |     |                           |            |  |
| 110       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |
|           | 108.7           | 49.8       | 60/0.1     |        |       |                |    |    |    |     |           |     |                           |            |  |
|           |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |

|   |  |                            |  |                                 |  |                                     |                        |
|---|--|----------------------------|--|---------------------------------|--|-------------------------------------|------------------------|
| <b>WBS</b> 34552.1.FR3  |  | <b>TIP</b> R-3825B         |  | <b>COUNTY</b> JOHNSTON          |  | <b>GEOLOGIST</b> Contract Geologist |                        |
| <b>SITE DESCRIPTION</b> BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |  |                            |  |                                 |  |                                     | <b>GROUND WTR (ft)</b> |
| <b>BORING NO.</b> EB1-B   |  | <b>STATION</b> 61+99       |  | <b>OFFSET</b> 45 ft RT          |  | <b>ALIGNMENT</b> -L-                |                        |
| <b>COLLAR ELEV.</b> 139.8 ft  |  | <b>TOTAL DEPTH</b> 23.6 ft |  | <b>NORTHING</b> 690,938         |  | <b>EASTING</b> 2,176,357            |                        |
| <b>DRILL RIG/HAMMER EFF./DATE</b> BRI2974 CME-45C 79% 06/03/2015          |  |                            |  | <b>DRILL METHOD</b> H.S. Augers |  | <b>HAMMER TYPE</b> Automatic        |                        |
| <b>DRILLER</b> Contract Driller   |  | <b>START DATE</b> 03/07/16 |  | <b>COMP. DATE</b> 03/07/16      |  | <b>SURFACE WATER DEPTH</b> N/A      |                        |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT |       |       | BLOWS PER FOOT |    |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|-----|---------------------------|------------|--|
|           |                 |            | 0.5ft      | 0.5ft | 0.5ft | 0              | 25 | 50 | 75 | 100 |           |     |                           |            |  |
| 140       |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |
|           | 138.8           | 1.0        | 1          | 1     | 1     |                |    |    |    |     |           |     |                           |            |  |
| 135       |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |
|           | 136.3           | 3.5        | 2          | 2     | 2     |                |    |    |    |     |           |     |                           |            |  |
|           | 133.8           | 6.0        | 3          | 4     | 6     |                |    |    |    |     |           |     |                           |            |  |
| 130       |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |
|           | 131.3           | 8.5        | 3          | 4     | 5     |                |    |    |    |     |           |     |                           |            |  |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |
|           | 126.3           | 13.5       | 100/0.4    |       |       |                |    |    |    |     |           |     |                           |            |  |
| 125       |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |
|           | 121.3           | 18.5       | 100/0.4    |       |       |                |    |    |    |     |           |     |                           |            |  |
| 120       |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |
|           | 116.3           | 23.5       | 60/0.1     |       |       |                |    |    |    |     |           |     |                           |            |  |

NCDOT BORE DOUBLE R3825B GEO\_BRDG\_BORINGS.GPJ NC\_DOT.GDT 6/5/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

# GEOTECHNICAL BORING REPORT

## CORE LOG

| WBS 34552.1.FR3  |                 | TIP R-3825B         |                                    | COUNTY JOHNSTON     |       | GEOLOGIST Lindsay Pugh    |                 |    |    |     |           |     |                           |            |  |
|--|-----------------|---------------------|------------------------------------|---------------------|-------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|--|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                 |                     |                                    |                     |       |                           | GROUND WTR (ft) |    |    |     |           |     |                           |            |  |
| BORING NO. B1-A  |                 | STATION 63+65       |                                    | OFFSET 42 ft LT     |       | ALIGNMENT -L-             |                 |    |    |     |           |     |                           |            |  |
| COLLAR ELEV. 126.4 ft  |                 | TOTAL DEPTH 36.0 ft |                                    | NORTHING 691,038    |       | EASTING 2,176,515         |                 |    |    |     |           |     |                           |            |  |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |                 |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     |       | HAMMER TYPE Automatic     |                 |    |    |     |           |     |                           |            |  |
| DRILLER B. Fowler  |                 | START DATE 05/01/17 |                                    | COMP. DATE 05/02/17 |       | SURFACE WATER DEPTH 5.9ft |                 |    |    |     |           |     |                           |            |  |
| ELEV (ft)  | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT                         |                     |       | BLOWS PER FOOT            |                 |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |
|  |                 |                     | 0.5ft                              | 0.5ft               | 0.5ft | 0                         | 25              | 50 | 75 | 100 |           |     |                           |            |  |
| 130  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 125  | 126.4           | 0.0                 | 3                                  | 100/0.4             |       |                           |                 |    |    |     |           |     |                           |            |  |
|  | 125.3           | 1.1                 | 100/0.4                            |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 120  | 121.4           | 5.0                 | 60/0.0                             |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 115  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 110  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 105  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 100  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 95   |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |

| WBS 34552.1.FR3  |               | TIP R-3825B         |                                    | COUNTY JOHNSTON  |               | GEOLOGIST Lindsay Pugh    |                 |               |               |     |                         |            |
|--|---------------|---------------------|------------------------------------|--|---------------|---------------------------|-----------------|---------------|---------------|-----|-------------------------|------------|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |               |                     |                                    |  |               |                           | GROUND WTR (ft) |               |               |     |                         |            |
| BORING NO. B1-A  |               | STATION 63+65       |                                    | OFFSET 42 ft LT  |               | ALIGNMENT -L-             |                 |               |               |     |                         |            |
| COLLAR ELEV. 126.4 ft  |               | TOTAL DEPTH 36.0 ft |                                    | NORTHING 691,038   |               | EASTING 2,176,515         |                 |               |               |     |                         |            |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |               |                     | DRILL METHOD NQ2 Casing W/SPT&Core |  |               | HAMMER TYPE Automatic     |                 |               |               |     |                         |            |
| DRILLER B. Fowler  |               | START DATE 05/01/17 |                                    | COMP. DATE 05/02/17                                      |               | SURFACE WATER DEPTH 5.9ft |                 |               |               |     |                         |            |
| ELEV (ft)  | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft)                           | DRILL RATE (Min/ft)                                      | RUN           |                           | SAMP. NO.       | STRATA        |               | LOG | DESCRIPTION AND REMARKS | DEPTH (ft) |
|  |               |                     |                                    |  | REC. (ft) %   | RQD (ft) %                |                 | REC. (ft) %   | RQD (ft) %    |     |                         |            |
| 121.4  |               |                     |                                    |  |               |                           |                 |               |               |     |                         |            |
| 120  | 121.4         | 5.0                 | 2.4                                | N=60/0.0<br>4:30/1.0<br>3:53/1.0<br>3:08/0.4             | (2.3)<br>96%  | (2.2)<br>92%              |                 | (23.9)<br>77% | (13.8)<br>45% |     |                         |            |
|  | 119.0         | 7.4                 | 5.0                                | 3:24/1.0<br>4:51/1.0<br>4:20/1.0<br>3:28/1.0<br>4:08/1.0 | (3.7)<br>74%  | (3.1)<br>62%              |                 |               |               |     |                         |            |
| 115  | 114.0         | 12.4                | 4.7                                | 3:10/1.0<br>4:23/1.0<br>4:44/1.0<br>4:36/1.0<br>6:04/0.7 | (4.7)<br>100% | (1.8)<br>38%              |                 |               |               |     |                         |            |
| 110  | 109.3         | 17.1                | 3.9                                | 12:40/1.0<br>10:04/1.0<br>8:40/1.0<br>10:54/0.9          | (3.3)<br>85%  | (1.4)<br>36%              |                 |               |               |     |                         |            |
| 105  | 105.4         | 21.0                | 5.0                                | 4:14/1.0<br>6:34/1.0<br>4:25/1.0<br>0:39/1.0<br>4:43/1.0 | (2.9)<br>58%  | (0.9)<br>18%              |                 |               |               |     |                         |            |
| 100  | 100.4         | 26.0                | 5.0                                | 4:18/1.0<br>5:27/1.0<br>5:55/1.0<br>5:26/1.0<br>8:16/1.0 | (4.2)<br>84%  | (3.1)<br>62%              | RS-1            |               |               |     |                         |            |
| 95   | 95.4          | 31.0                | 5.0                                | 5:18/1.0<br>5:46/1.0<br>6:14/1.0<br>1:57/1.0<br>2:50/1.0 | (2.8)<br>56%  | (1.3)<br>26%              |                 |               |               |     |                         |            |
|  | 90.4          | 36.0                |                                    |  |               |                           |                 |               |               |     |                         |            |
|  |               |                     |                                    |  |               |                           |                 |               |               |     |                         |            |

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

| WBS 34552.1.FR3  |                 | TIP R-3825B         |                                    | COUNTY JOHNSTON     |       | GEOLOGIST Lindsay Pugh    |                 |    |    |     |           |     |                           |            |  |
|--|-----------------|---------------------|------------------------------------|---------------------|-------|---------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|------------|--|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                 |                     |                                    |                     |       |                           | GROUND WTR (ft) |    |    |     |           |     |                           |            |  |
| BORING NO. B1-C  |                 | STATION 63+62       |                                    | OFFSET 5 ft LT      |       | ALIGNMENT -L-             |                 |    |    |     |           |     |                           |            |  |
| COLLAR ELEV. 126.7 ft  |                 | TOTAL DEPTH 35.7 ft |                                    | NORTHING 691,001    |       | EASTING 2,176,515         |                 |    |    |     |           |     |                           |            |  |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |                 |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     |       | HAMMER TYPE Automatic     |                 |    |    |     |           |     |                           |            |  |
| DRILLER B. Fowler  |                 | START DATE 04/20/17 |                                    | COMP. DATE 04/21/17 |       | SURFACE WATER DEPTH 2.2ft |                 |    |    |     |           |     |                           |            |  |
| ELEV (ft)  | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT                         |                     |       | BLOWS PER FOOT            |                 |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |
|  |                 |                     | 0.5ft                              | 0.5ft               | 0.5ft | 0                         | 25              | 50 | 75 | 100 |           |     |                           |            |  |
| 130  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  | 126.7           | 0.0                 |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     | WOH                                | 1                   | 7     |                           |                 |    |    |     |           |     |                           |            |  |
| 125  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  | 122.4           | 4.3                 |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 120  |                 |                     | 60/0.1                             |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 115  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 110  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 105  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 100  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
| 95   |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |     |                           |            |  |

| WBS 34552.1.FR3  |               | TIP R-3825B         |                                    | COUNTY JOHNSTON  |               | GEOLOGIST Lindsay Pugh    |                 |               |     |                         |            |
|--|---------------|---------------------|------------------------------------|--|---------------|---------------------------|-----------------|---------------|-----|-------------------------|------------|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |               |                     |                                    |  |               |                           | GROUND WTR (ft) |               |     |                         |            |
| BORING NO. B1-C  |               | STATION 63+62       |                                    | OFFSET 5 ft LT   |               | ALIGNMENT -L-             |                 |               |     |                         |            |
| COLLAR ELEV. 126.7 ft  |               | TOTAL DEPTH 35.7 ft |                                    | NORTHING 691,001   |               | EASTING 2,176,515         |                 |               |     |                         |            |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |               |                     | DRILL METHOD NQ2 Casing W/SPT&Core |  |               | HAMMER TYPE Automatic     |                 |               |     |                         |            |
| DRILLER B. Fowler  |               | START DATE 04/20/17 |                                    | COMP. DATE 04/21/17                                      |               | SURFACE WATER DEPTH 2.2ft |                 |               |     |                         |            |
| CORE SIZE NQ2  |               |                     |                                    | TOTAL RUN 31.3 ft  |               |                           |                 |               |     |                         |            |
| ELEV (ft)  | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft)                           | DRILL RATE (Min/ft)                                      | RUN           |                           | STRATA          |               | LOG | DESCRIPTION AND REMARKS | DEPTH (ft) |
|  |               |                     |                                    |  | REC. (%)      | RQD (%)                   | REC. (%)        | RQD (%)       |     |                         |            |
| 122.3  | 122.3         | 4.4                 | 5.0                                | 3:13/1.0<br>3:44/1.0<br>5:00/1.0<br>3:11/1.0<br>4:50/1.0 | (4.6)<br>92%  | (3.6)<br>72%              | (25.3)<br>94%   | (18.7)<br>70% |     |                         |            |
|  |               |                     |                                    |  |               |                           |                 |               |     |                         |            |
|  | 117.3         | 9.4                 | 1.8                                | 2:36/1.0<br>4:50/0.8                                     | (1.6)<br>89%  | (1.1)<br>61%              |                 |               |     |                         |            |
| 115  | 115.5         | 11.2                | 4.6                                | 3:32/1.0<br>4:40/1.0<br>4:19/1.0<br>5:17/1.0<br>5:30/0.6 | (4.6)<br>100% | (4.3)<br>93%              |                 |               |     |                         |            |
|  |               |                     |                                    |  |               |                           |                 |               |     |                         |            |
|  | 110.9         | 15.8                | 5.4                                | 3:55/1.4<br>3:45/1.0<br>4:03/1.0<br>3:51/1.0<br>5:17/1.0 | (5.0)<br>93%  | (3.1)<br>57%              |                 |               |     |                         |            |
| 110  |               |                     |                                    |  |               |                           |                 |               |     |                         |            |
|  | 105.5         | 21.2                | 5.0                                | 4:12/1.0<br>4:39/1.0<br>4:36/1.0<br>5:43/1.0<br>7:00/1.0 | (5.0)<br>100% | (5.0)<br>100%             |                 |               |     |                         |            |
| 105  |               |                     |                                    |  |               |                           |                 |               |     |                         |            |
|  | 100.5         | 26.2                | 5.0                                | 3:39/1.0<br>4:01/1.0<br>4:10/1.0<br>6:57/1.0<br>8:25/1.0 | (4.5)<br>90%  | (1.6)<br>32%              |                 |               |     |                         |            |
| 100  |               |                     |                                    |  |               |                           |                 |               |     |                         |            |
|  | 95.5          | 31.2                | 4.5                                | 4:34/1.0<br>4:47/1.0<br>4:20/1.0<br>5:13/1.0<br>4:16/0.5 | (4.5)<br>100% | (1.4)<br>31%              | (4.5)<br>100%   | (1.4)<br>31%  |     |                         |            |
| 95   |               |                     |                                    |  |               |                           |                 |               |     |                         |            |
|  | 91.0          | 35.7                |                                    |  |               |                           |                 |               |     |                         |            |

NCDOT BORE DOUBLE R3825B\_GEO\_BRDG\_BORINGS.GPJ NC\_DOT.GDT 6/5/17

## GEOTECHNICAL BORING REPORT BORE LOG

## GEOTECHNICAL BORING REPORT CORE LOG

|  |                 |                     |                                    |                     |       |   |                 |
|--|-----------------|---------------------|------------------------------------|---------------------|-------|---|-----------------|
| WBS 34552.1.FR3  |                 | TIP R-3825B         |                                    | COUNTY JOHNSTON     |       | GEOLOGIST Lindsay Pugh  |                 |
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                 |                     |                                    |                     |       |   | GROUND WTR (ft) |
| BORING NO. B1-B  |                 | STATION 63+64       |                                    | OFFSET 50 ft RT     |       | ALIGNMENT -L-   |                 |
| COLLAR ELEV. 125.9 ft  |                 | TOTAL DEPTH 37.9 ft |                                    | NORTHING 690,946    |       | EASTING 2,176,522   |                 |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |                 |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     |       | HAMMER TYPE Automatic   |                 |
| DRILLER B. Fowler  |                 | START DATE 05/03/17 |                                    | COMP. DATE 05/04/17 |       | SURFACE WATER DEPTH 8.8ft   |                 |
| ELEV (ft)  | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT                         |                     |       | SAMP. NO.   | LOG             |
|  |                 |                     | 0.5ft                              | 0.5ft               | 0.5ft |   |                 |
|  |                 |                     | BLOWS PER FOOT                     |                     |       | SOIL AND ROCK DESCRIPTION   |                 |
|  |                 |                     | 0                                  | 25                  | 50    | 75  | 100             |
|  |                 |                     |                                    |                     |       | ELEV. (ft) DEPTH (ft)   |                 |
| 135  |                 |                     |                                    |                     |       | WATER SURFACE (05/03/17)  |                 |
| 125  | 125.9           | 0.0                 | 10                                 | 2                   | 3     | 125.9 RIVER BED   |                 |
| 120  | 122.6           | 3.3                 | 10                                 | 12                  | 10    | ALLUVIAL BROWN SAND   |                 |
| 115  | 117.9           | 8.0                 | 60/0.1                             |                     |       | RESIDUAL DARK GREEN MICACEOUS SILT  |                 |
| 110  |                 |                     |                                    |                     |       | CRYSTALLINE ROCK GNEISS   |                 |
| 105  |                 |                     |                                    |                     |       | GRAY TO GREEN, MODERATLEY SEVERE TO VERY SLIGHTLY WEATHERED, MODERATLEY HARD TO HARD, VERY CLOSE TO WIDE FRACTURE SPACING, GNEISS |                 |
| 100  |                 |                     |                                    |                     |       | REC. = 95% RQD = 64% GSI = 78-88  |                 |
| 95   |                 |                     |                                    |                     |       | RS-2  |                 |
| 90   |                 |                     |                                    |                     |       | 88.0 Boring Terminated at Elevation 88.0 ft IN CRYSTALLINE ROCK (GNEISS) 37.9   |                 |

|  |               |                     |                                    |                     |            |                           |   |  |
|--|---------------|---------------------|------------------------------------|---------------------|------------|---------------------------|---|--|
| WBS 34552.1.FR3  |               | TIP R-3825B         |                                    | COUNTY JOHNSTON     |            | GEOLOGIST Lindsay Pugh    |   |  |
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |               |                     |                                    |                     |            |                           | GROUND WTR (ft)   |  |
| BORING NO. B1-B  |               | STATION 63+64       |                                    | OFFSET 50 ft RT     |            | ALIGNMENT -L-             |   |  |
| COLLAR ELEV. 125.9 ft  |               | TOTAL DEPTH 37.9 ft |                                    | NORTHING 690,946    |            | EASTING 2,176,522         |   |  |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |               |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     |            | HAMMER TYPE Automatic     |   |  |
| DRILLER B. Fowler  |               | START DATE 05/03/17 |                                    | COMP. DATE 05/04/17 |            | SURFACE WATER DEPTH 8.8ft |   |  |
| CORE SIZE NQ2  |               | TOTAL RUN 29.8 ft   |                                    |                     |            |                           |   |  |
| ELEV (ft)  | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft)                           | DRILL RATE (Min/ft) | RUN        |                           | SAMP. NO.   |  |
|  |               |                     |                                    |                     | REC (ft) % | RQD (ft) %                |   |  |
|  |               |                     |                                    | STRATA              |            | LOG                       | DESCRIPTION AND REMARKS   |  |
|  |               |                     |                                    | REC (ft) %          | RQD (ft) % |                           |   |  |
|  |               |                     |                                    |                     |            | ELEV. (ft) DEPTH (ft)     |   |  |
| 117.8  | 117.8         | 8.1                 | 1.4                                | 7:02/1.0            | (1.1)      | (0.4)                     | Begin Coring @ 8.1 ft   |  |
| 115  | 116.4         | 8.5                 | 4.5                                | 4:44/0.4            | 79%        | 29%                       | 117.8 GRAY TO GREEN, VERY SLIGHTLY TO MODERATLEY SEVERELY WEATHERED, MODERATLEY HARD TO HARD, VERY CLOSE TO WIDE FRACTURE SPACING, GNEISS |  |
| 110  | 111.9         | 14.0                | 5.0                                | 2:45/1.0            | (4.1)      | (1.5)                     | GSI = 78-88   |  |
| 105  | 106.9         | 19.0                | 4.8                                | 7:19/1.0            | 91%        | 33%                       |   |  |
| 100  | 102.1         | 23.8                | 5.1                                | 7:52/1.0            | (4.9)      | (3.2)                     |   |  |
| 95   | 97.0          | 28.9                | 4.2                                | 6:22/1.0            | 98%        | 64%                       |   |  |
| 90   | 92.8          | 33.1                | 4.8                                | 6:18/1.0            | (4.7)      | (1.7)                     |   |  |
|  | 88.0          | 37.9                | 88.0                               | 4:21/1.0            | 98%        | 35%                       | Boring Terminated at Elevation 88.0 ft IN CRYSTALLINE ROCK (GNEISS) 37.9  |  |

NCDOT BORE DOUBLE\_R3825B\_GEO\_BRDG\_BORINGS.GPJ\_NC\_DOT.GDT 6/5/17

**GEOTECHNICAL BORING REPORT  
BORE LOG**

**GEOTECHNICAL BORING REPORT  
CORE LOG**

| WBS 34552.1.FR3  |                 | TIP R-3825B         |                                    | COUNTY JOHNSTON     |                       | GEOLOGIST Lindsay Pugh    |    |    |    |           |     |   |
|--|-----------------|---------------------|------------------------------------|---------------------|-----------------------|---------------------------|----|----|----|-----------|-----|---|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                 |                     |                                    |                     |                       | GROUND WTR (ft)           |    |    |    |           |     |   |
| BORING NO. B2-A  |                 | STATION 64+87       |                                    | OFFSET 45 ft LT     |                       | ALIGNMENT -L-             |    |    |    |           |     |   |
| COLLAR ELEV. 125.7 ft  |                 | TOTAL DEPTH 37.8 ft |                                    | NORTHING 691,051    |                       | EASTING 2,176,636         |    |    |    |           |     |   |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |                 |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     | HAMMER TYPE Automatic |                           |    |    |    |           |     |   |
| DRILLER Contract Driller   |                 | START DATE 05/02/17 |                                    | COMP. DATE 05/03/17 |                       | SURFACE WATER DEPTH 7.8ft |    |    |    |           |     |   |
| ELEV (ft)  | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT                         |                     |                       | BLOWS PER FOOT            |    |    |    | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION   |
|  |                 |                     | 0.5ft                              | 0.5ft               | 0.5ft                 | 0                         | 25 | 50 | 75 |           |     |   |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | WATER SURFACE (05/02/17)  |
| 130  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     |   |
| 125  | 125.7           | 0.0                 | 2                                  | 98/0.5              |                       |                           |    |    |    |           |     | 125.7 RIVER BED   |
| 120  | 121.8           | 3.9                 | 43                                 | 57/0.4              |                       |                           |    |    |    |           |     | ALLUVIAL BROWN SAND   |
| 115  | 116.5           | 9.2                 | 60                                 | 0/0.1               |                       |                           |    |    |    |           |     | WEATHERED ROCK SCHIST   |
| 110  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | CRYSTALLINE ROCK SCHIST   |
| 105  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | GRAY, VERY SLIGHTLY TO SLIGHTLY WEATHERED, MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, SCHIST              |
| 100  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | REC. = 92% RQD = 56% GSI = 65-75  |
| 95   |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | 101.1   |
| 90   |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | GRAY, VERY SLIGHTLY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, GNEISS |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | REC. = 92% RQD = 87% GSI = 79-90  |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | 101.1   |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | 24.6  |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | RS-3  |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | 87.9  |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | 37.8  |
|  |                 |                     |                                    |                     |                       |                           |    |    |    |           |     | Boring Terminated at Elevation 87.9 ft IN CRYSTALLINE ROCK (GNEISS)   |

| WBS 34552.1.FR3  |               | TIP R-3825B         |                                    | COUNTY JOHNSTON     |                       | GEOLOGIST Lindsay Pugh    |           |             |            |     |                         |   |
|--|---------------|---------------------|------------------------------------|---------------------|-----------------------|---------------------------|-----------|-------------|------------|-----|-------------------------|---|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |               |                     |                                    |                     |                       | GROUND WTR (ft)           |           |             |            |     |                         |   |
| BORING NO. B2-A  |               | STATION 64+87       |                                    | OFFSET 45 ft LT     |                       | ALIGNMENT -L-             |           |             |            |     |                         |   |
| COLLAR ELEV. 125.7 ft  |               | TOTAL DEPTH 37.8 ft |                                    | NORTHING 691,051    |                       | EASTING 2,176,636         |           |             |            |     |                         |   |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |               |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     | HAMMER TYPE Automatic |                           |           |             |            |     |                         |   |
| DRILLER Contract Driller   |               | START DATE 05/02/17 |                                    | COMP. DATE 05/03/17 |                       | SURFACE WATER DEPTH 7.8ft |           |             |            |     |                         |   |
| CORE SIZE NQ2  |               |                     |                                    | TOTAL RUN 28.5 ft   |                       |                           |           |             |            |     |                         |   |
| ELEV (ft)  | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft)                           | DRILL RATE (Min/ft) | RUN                   |                           | SAMP. NO. | STRATA      |            | LOG | DESCRIPTION AND REMARKS |   |
|  |               |                     |                                    |                     | REC. (ft) %           | RQD (ft) %                |           | REC. (ft) % | RQD (ft) % |     |                         | ELEV. (ft)  |
|  |               |                     |                                    |                     |                       |                           |           |             |            |     |                         | Begin Coring @ 9.3 ft   |
| 116.4  | 116.4         | 9.3                 | 1.2                                | 4:54/1.0            | (1.2)                 | (0.7)                     |           | (14.1)      | (8.5)      |     | 116.4                   | GRAY, VERY SLIGHTLY TO SLIGHTLY WEATHERED, MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, SCHIST              |
| 115  | 115.2         | 10.5                | 4.6                                | 5:02/0.2            | 100%                  | 58%                       |           | 92%         | 56%        |     |                         | GSI = 65 - 75   |
|  |               |                     |                                    | 5:36/1.0            | (4.2)                 | (2.5)                     |           |             |            |     |                         |   |
|  |               |                     |                                    | 5:33/1.0            | 91%                   | 54%                       |           |             |            |     |                         |   |
|  |               |                     |                                    | 5:16/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 5:58/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 7:11/0.6            |                       |                           |           |             |            |     |                         |   |
| 110  | 110.6         | 15.1                | 5.1                                | 6:49/1.0            | (4.3)                 | (2.2)                     |           |             |            |     |                         |   |
|  |               |                     |                                    | 6:04/1.0            | 84%                   | 43%                       |           |             |            |     |                         |   |
|  |               |                     |                                    | 4:49/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 4:55/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 3:38/1.1            |                       |                           |           |             |            |     |                         |   |
| 105  | 105.5         | 20.2                | 4.4                                | 5:31/1.0            | (4.4)                 | (3.1)                     |           |             |            |     |                         |   |
|  |               |                     |                                    | 7:38/1.0            | 100%                  | 70%                       |           |             |            |     |                         |   |
|  |               |                     |                                    | 8:44/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 7:57/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 7:54/0.4            |                       |                           |           |             |            |     |                         |   |
| 100  | 101.1         | 24.6                | 4.8                                | 8:45/1.0            | (4.6)                 | (4.6)                     | RS-3      | (12.1)      | (11.5)     |     | 101.1                   | GRAY, VERY SLIGHTLY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, GNEISS |
|  |               |                     |                                    | 12:05/1.0           | 96%                   | 96%                       |           | 92%         | 87%        |     |                         | GSI = 79 TO 90  |
|  |               |                     |                                    | 12:57/1.0           |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 5:58/0.1            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 14:11/1.0           |                       |                           |           |             |            |     |                         |   |
| 95   | 96.3          | 29.4                | 4.8                                | 16:43/0.7           | (3.9)                 | (3.3)                     |           |             |            |     |                         |   |
|  |               |                     |                                    | 5:01/1.0            | 81%                   | 69%                       |           |             |            |     |                         |   |
|  |               |                     |                                    | 10:29/1.0           |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 8:22/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 9:18/1.0            |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 10:32/0.8           |                       |                           |           |             |            |     |                         |   |
| 90   | 91.5          | 34.2                | 3.6                                | 6:15/1.0            | (3.6)                 | (3.6)                     |           |             |            |     |                         |   |
|  |               |                     |                                    | 10:02/1.0           | 100%                  | 100%                      |           |             |            |     |                         |   |
|  |               |                     |                                    | 11:45/1.0           |                       |                           |           |             |            |     |                         |   |
|  |               |                     |                                    | 14:37/0.6           |                       |                           |           |             |            |     |                         |   |
|  | 87.9          | 37.8                |                                    |                     |                       |                           |           |             |            |     | 87.9                    | Boring Terminated at Elevation 87.9 ft IN CRYSTALLINE ROCK (GNEISS)   |

NCDOT BORE DOUBLE R3825B\_GEO\_BRDG\_BORINGS.GPJ NC\_DOT.GDT 6/5/17

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

| WBS 34552.1.FR3  |                 | TIP R-3825B         |                                    | COUNTY JOHNSTON     |       | GEOLOGIST Lindsay Pugh    |                 |    |    |     |           |         |       |                           |            |  |
|--|-----------------|---------------------|------------------------------------|---------------------|-------|---------------------------|-----------------|----|----|-----|-----------|---------|-------|---------------------------|------------|--|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                 |                     |                                    |                     |       |                           | GROUND WTR (ft) |    |    |     |           |         |       |                           |            |  |
| BORING NO. B2-C  |                 | STATION 64+84       |                                    | OFFSET 2 ft RT      |       | ALIGNMENT -L-             |                 |    |    |     |           |         |       |                           |            |  |
| COLLAR ELEV. 126.6 ft  |                 | TOTAL DEPTH 34.0 ft |                                    | NORTHING 691,004    |       | EASTING 2,176,637         |                 |    |    |     |           |         |       |                           |            |  |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |                 |                     | DRILL METHOD NQ2 Casing W/SPT&Core |                     |       | HAMMER TYPE Automatic     |                 |    |    |     |           |         |       |                           |            |  |
| DRILLER B. Fowler  |                 | START DATE 04/18/17 |                                    | COMP. DATE 04/19/17 |       | SURFACE WATER DEPTH 2.5ft |                 |    |    |     |           |         |       |                           |            |  |
| ELEV (ft)  | DRIVE ELEV (ft) | DEPTH (ft)          | BLOW COUNT                         |                     |       | BLOWS PER FOOT            |                 |    |    |     | SAMP. NO. | LOG MOI | L O G | SOIL AND ROCK DESCRIPTION |            |  |
|  |                 |                     | 0.5ft                              | 0.5ft               | 0.5ft | 0                         | 25              | 50 | 75 | 100 |           |         |       | ELEV. (ft)                | DEPTH (ft) |  |
| 130  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            |  |
|  | 126.6           | 0.0                 | 3                                  | 8                   | 38    |                           |                 |    |    |     |           |         |       |                           |            | WATER SURFACE (04/18/17)   |
| 125  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | RIVER BED  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | ALLUVIAL BLACK SILTY SAND  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | WEATHERED ROCK SCHIST  |
| 120  | 121.5           | 5.1                 | 60/0.1                             |                     |       |                           |                 |    |    |     |           |         |       |                           |            | CRYSTALLINE ROCK SCHIST  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | GREEN TO GRAY TO BLACK VERY SLIGHTLY TO SLIGHTLY WEATHERED, MODERATELY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, SCHIST |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | REC. = 91% RQD = 62% GSI = 75-85   |
| 115  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            |  |
| 110  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            |  |
| 105  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            |  |
| 100  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            |  |
| 95   |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            |  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | GREEN TO BLACK VERY SLIGHTLY WEATHERED, MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GNEISS                                |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | REC. = 50% RQD = 0% GSI = 50-55  |
|  |                 |                     |                                    |                     |       |                           |                 |    |    |     |           |         |       |                           |            | Boring Terminated at Elevation 92.6 ft IN CRYSTALLINE ROCK (GNEISS)  |

| WBS 34552.1.FR3  |               | TIP R-3825B         |                                    | COUNTY JOHNSTON  |               | GEOLOGIST Lindsay Pugh    |                 |               |       |                         |  |      |
|--|---------------|---------------------|------------------------------------|--|---------------|---------------------------|-----------------|---------------|-------|-------------------------|--|------|
| SITE DESCRIPTION BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |               |                     |                                    |  |               |                           | GROUND WTR (ft) |               |       |                         |  |      |
| BORING NO. B2-C  |               | STATION 64+84       |                                    | OFFSET 2 ft RT   |               | ALIGNMENT -L-             |                 |               |       |                         |  |      |
| COLLAR ELEV. 126.6 ft  |               | TOTAL DEPTH 34.0 ft |                                    | NORTHING 691,004   |               | EASTING 2,176,637         |                 |               |       |                         |  |      |
| DRILL RIG/HAMMER EFF./DATE MID0314 D-25 86% 08/04/2016             |               |                     | DRILL METHOD NQ2 Casing W/SPT&Core |  |               | HAMMER TYPE Automatic     |                 |               |       |                         |  |      |
| DRILLER B. Fowler  |               | START DATE 04/18/17 |                                    | COMP. DATE 04/19/17  |               | SURFACE WATER DEPTH 2.5ft |                 |               |       |                         |  |      |
| CORE SIZE NQ2  |               |                     |                                    | TOTAL RUN 28.7 ft  |               |                           |                 |               |       |                         |  |      |
| ELEV (ft)  | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft)                           | DRILL RATE (Min/ft)  | RUN           |                           | STRATA          |               | L O G | DESCRIPTION AND REMARKS | DEPTH (ft)   |      |
|  |               |                     |                                    |  | REC. (ft) %   | RQD (ft) %                | REC. (ft) %     | RQD (ft) %    |       |                         |  |      |
| 121.3  |               |                     |                                    |  |               |                           |                 |               |       |                         |  |      |
| 120  | 121.3         | 5.3                 | 5.0                                | 4:44/1.0<br>4:05/1.0<br>4:35/1.0<br>4:02/1.0<br>5:34/1.0<br>3:54/1.0 | (4.2)<br>84%  | (4.0)<br>80%              | (24.2)<br>91%   | (16.5)<br>62% |       | 121.3                   | Begin Coring @ 5.3 ft<br>GREEN TO GRAY TO BLACK VERY SLIGHTLY TO SLIGHTLY WEATHERED, MODERATELY HARD, MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING, SCHIST<br>GSI = 75-85 | 5.3  |
| 115  | 116.3         | 10.3                | 5.0                                | 8:03/1.0<br>7:21/1.0<br>5:34/1.0<br>6:56/1.0<br>6:12/1.0             | (5.0)<br>100% | (4.4)<br>88%              |                 |               |       |                         |  |      |
| 110  | 111.3         | 15.3                | 3.5                                | 7:15/1.0<br>7:17/1.0<br>7:52/1.0<br>6:34/0.5                         | (3.5)<br>100% | (1.1)<br>31%              |                 |               |       |                         |  |      |
| 105  | 107.8         | 18.8                | 3.8                                | 5:31/1.0<br>6:20/1.0<br>6:23/1.0<br>6:03/0.8                         | (3.8)<br>100% | (3.3)<br>87%              |                 |               |       |                         |  |      |
| 100  | 104.0         | 22.6                | 4.9                                | 2:41/1.0<br>3:39/1.0<br>4:04/1.0<br>4:58/1.0<br>3:38/0.9             | (3.6)<br>73%  | (1.9)<br>39%              |                 |               |       |                         |  |      |
| 95   | 99.1          | 27.5                | 4.5                                | 2:39/1.0<br>3:48/1.0<br>4:13/1.0<br>3:24/1.0<br>4:47/0.5             | (4.1)<br>91%  | (2.8)<br>62%              |                 |               |       |                         |  |      |
|  | 94.6          | 32.0                |                                    | 3:12/1.0<br>5:25/1.0   | (1.0)<br>50%  | (0.0)<br>0%               | (1.0)<br>50%    | (0.0)<br>0%   |       | 94.6                    | GREEN TO BLACK VERY SLIGHTLY WEATHERED, MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GNEISS<br>GSI = 50-55   | 32.0 |
|  | 92.6          | 34.0                | 2.0                                |  |               |                           |                 |               |       | 92.6                    | Boring Terminated at Elevation 92.6 ft IN CRYSTALLINE ROCK (GNEISS)  | 34.0 |

NCDOT BORE DOUBLE R3825B\_GEO\_BRDG\_BORINGS.GPJ NC\_DOT.GDT 6/5/17

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

| <b>WBS</b> 34552.1.FR3  |                 | <b>TIP</b> R-3825B         |            | <b>COUNTY</b> JOHNSTON                    |       | <b>GEOLOGIST</b> Lindsay Pugh    |                        |    |         |     |           |      |  |  |      |
|---|-----------------|----------------------------|------------|---|-------|----------------------------------|------------------------|----|---------|-----|-----------|------|--|--|------|
| <b>SITE DESCRIPTION</b> BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                 |                            |            |   |       |                                  | <b>GROUND WTR</b> (ft) |    |         |     |           |      |  |  |      |
| <b>BORING NO.</b> B2-B  |                 | <b>STATION</b> 64+75       |            | <b>OFFSET</b> 28 ft RT                    |       | <b>ALIGNMENT</b> -L-             |                        |    |         |     |           |      |  |  |      |
| <b>COLLAR ELEV.</b> 124.1 ft  |                 | <b>TOTAL DEPTH</b> 36.1 ft |            | <b>NORTHING</b> 690,977                   |       | <b>EASTING</b> 2,176,630         |                        |    |         |     |           |      |  |  |      |
| <b>DRILL RIG/HAMMER EFF./DATE</b> MID0314 D-25 86% 08/04/2016             |                 |                            |            | <b>DRILL METHOD</b> NQ2 Casing W/SPT&Core |       | <b>HAMMER TYPE</b> Automatic     |                        |    |         |     |           |      |  |  |      |
| <b>DRILLER</b> B. Fowler  |                 | <b>START DATE</b> 04/19/17 |            | <b>COMP. DATE</b> 04/20/17                |       | <b>SURFACE WATER DEPTH</b> 5.4ft |                        |    |         |     |           |      |  |  |      |
| ELEV (ft)   | DRIVE ELEV (ft) | DEPTH (ft)                 | BLOW COUNT |   |       | BLOWS PER FOOT                   |                        |    |         |     | SAMP. NO. | LOG  | SOIL AND ROCK DESCRIPTION  | DEPTH (ft)   |      |
|   |                 |                            | 0.5ft      | 0.5ft                                     | 0.5ft | 0                                | 25                     | 50 | 75      | 100 |           |      |  |  |      |
| 130   |                 |                            |            |   |       |                                  |                        |    |         |     |           | ▼    |  | WATER SURFACE (04/19/17)   |      |
| 125   | 124.1           | 0.0                        |            |   |       |                                  |                        |    |         |     |           |      |  | 124.1 RIVER BED  | 0.0  |
| 120   | 121.1           | 3.0                        | 49         | 51/0.2                                    |       |                                  |                        |    | 100/0.7 |     |           | W    | 121.6 WEATHERED ROCK SCHIST  | 2.9  |      |
| 115   | 116.5           | 7.6                        | 38         | 25  | 12    |                                  |                        |    |         |     |           |      | 118.0 SAPROLITE<br>GREEN GRAY MICACEOUS SILT   | 6.1  |      |
| 110   |                 |                            | 60/0.1     |   |       |                                  |                        |    |         |     |           |      | 116.4 CRYSTALLINE ROCK<br>GREEN TO GRAY TO BLACK VERY SLIGHTLY TO MODERATELY WEATHERED, MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GNEISS WITH A 1.4' SAND FILLED FRACTURE AT 10.9' AND A QUARTZ VEIN AT 31.9'<br>REC. = 75% RQD = 55% GSI = 65-75 | 7.7  |      |
| 90  |                 |                            |            |   |       |                                  |                        |    |         |     |           | RS-4 |  | 88.0 Boring Terminated at Elevation 88.0 ft IN CRYSTALLINE ROCK (GNEISS) | 36.1 |

| <b>WBS</b> 34552.1.FR3  |               | <b>TIP</b> R-3825B         |          | <b>COUNTY</b> JOHNSTON  |              | <b>GEOLOGIST</b> Lindsay Pugh    |                        |               |               |     |   |            |
|---|---------------|----------------------------|----------|---|--------------|----------------------------------|------------------------|---------------|---------------|-----|---|------------|
| <b>SITE DESCRIPTION</b> BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |               |                            |          |   |              |                                  | <b>GROUND WTR</b> (ft) |               |               |     |   |            |
| <b>BORING NO.</b> B2-B  |               | <b>STATION</b> 64+75       |          | <b>OFFSET</b> 28 ft RT  |              | <b>ALIGNMENT</b> -L-             |                        |               |               |     |   |            |
| <b>COLLAR ELEV.</b> 124.1 ft  |               | <b>TOTAL DEPTH</b> 36.1 ft |          | <b>NORTHING</b> 690,977   |              | <b>EASTING</b> 2,176,630         |                        |               |               |     |   |            |
| <b>DRILL RIG/HAMMER EFF./DATE</b> MID0314 D-25 86% 08/04/2016             |               |                            |          | <b>DRILL METHOD</b> NQ2 Casing W/SPT&Core                               |              | <b>HAMMER TYPE</b> Automatic     |                        |               |               |     |   |            |
| <b>DRILLER</b> B. Fowler  |               | <b>START DATE</b> 04/19/17 |          | <b>COMP. DATE</b> 04/20/17  |              | <b>SURFACE WATER DEPTH</b> 5.4ft |                        |               |               |     |   |            |
| <b>CORE SIZE</b> NQ2  |               |                            |          | <b>TOTAL RUN</b> 28.4 ft  |              |                                  |                        |               |               |     |   |            |
| ELEV (ft)   | RUN ELEV (ft) | DEPTH (ft)                 | RUN (ft) | DRILL RATE (Min/ft)   | RUN          |                                  | SAMP. NO.              | STRATA        |               | LOG | DESCRIPTION AND REMARKS   | DEPTH (ft) |
|   |               |                            |          |   | REC. (%)     | RQD (%)                          |                        | REC. (%)      | RQD (%)       |     |   |            |
| 116.4   |               |                            |          |   |              |                                  |                        |               |               |     | Begin Coring @ 7.7 ft   |            |
| 115   | 116.4         | 7.7                        | 4.6      | 11:05/1.0<br>8:31/1.0<br>17:57/1.0<br>19:31/0.2<br>2:55/0.8<br>6:42/0.8 | (2.5)<br>54% | (1.2)<br>26%                     |                        | (21.3)<br>75% | (15.5)<br>55% |     | GREEN TO GRAY TO BLACK VERY SLIGHTLY TO MODERATELY WEATHERED, MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GNEISS WITH A 1.4' SAND FILLED FRACTURE AT 10.9' AND A QUARTZ VEIN AT 31.9'<br>GSI = 65-75 | 7.7        |
| 110   | 111.8         | 12.3                       | 4.9      | 4:19/1.0<br>5:25/1.0<br>5:39/1.0<br>5:40/1.0<br>6:09/1.0                | (4.5)<br>92% | (3.3)<br>67%                     |                        |               |               |     |   |            |
| 105   | 106.9         | 17.2                       | 5.1      | 6:25/1.0<br>5:53/1.0<br>5:39/1.0<br>7:29/1.0<br>5:37/1.1                | (4.7)<br>92% | (3.5)<br>69%                     |                        |               |               |     |   |            |
| 100   | 101.8         | 22.3                       | 4.9      | 4:37/1.0<br>5:08/1.0<br>5:04/1.0<br>5:23/1.0<br>6:26/0.9                | (4.5)<br>92% | (3.8)<br>78%                     |                        |               |               |     |   |            |
| 95  | 96.9          | 27.2                       | 5.0      | 4:25/1.0<br>5:35/1.0<br>5:11/1.0<br>4:01/1.0<br>5:22/1.0                | (2.7)<br>54% | (2.3)<br>46%                     |                        |               |               |     |   |            |
| 90  | 91.9          | 32.2                       | 3.9      | 4:40/1.0<br>5:04/1.0<br>11:05/0.5<br>2:29/0.5<br>5:35/0.9               | (2.4)<br>62% | (1.4)<br>36%                     |                        |               |               |     |   |            |
|   | 88.0          | 36.1                       |          |   |              |                                  | RS-4                   |               |               |     | 88.0 Boring Terminated at Elevation 88.0 ft IN CRYSTALLINE ROCK (GNEISS)  | 36.1       |

NCDOT BORE DOUBLE\_R3825B\_GEO\_BRDG\_BORINGS.GPJ\_NC\_DOT.GDT 6/5/17



# GEOTECHNICAL BORING REPORT

## BORE LOG

|   |                            |                                |                                |
|---|----------------------------|--------------------------------|--------------------------------|
| <b>WBS</b> 34552.1.FR3  | <b>TIP</b> R-3825B         | <b>COUNTY</b> JOHNSTON         | <b>GEOLOGIST</b> Lindsay Pugh  |
| <b>SITE DESCRIPTION</b> BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                            |                                | <b>GROUND WTR (ft)</b>         |
| <b>BORING NO.</b> EB2-A   | <b>STATION</b> 66+13       | <b>OFFSET</b> 33 ft LT         | <b>ALIGNMENT</b> -L-           |
| <b>COLLAR ELEV.</b> 158.7 ft  | <b>TOTAL DEPTH</b> 31.6 ft | <b>NORTHING</b> 691,049        | <b>EASTING</b> 2,176,762       |
| <b>DRILL RIG/HAMMER EFF./DATE</b> MID5464 CME-45C 84% 08/09/2016          |                            | <b>DRILL METHOD</b> Mud Rotary | <b>HAMMER TYPE</b> Automatic   |
| <b>DRILLER</b> M. COOGAN  | <b>START DATE</b> 04/22/17 | <b>COMP. DATE</b> 04/22/17     | <b>SURFACE WATER DEPTH</b> N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT |        |       | BLOWS PER FOOT |    |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |  |
|-----------|-----------------|------------|------------|--------|-------|----------------|----|----|----|-----|-----------|-----|---------------------------|------------|--|--|
|           |                 |            | 0.5ft      | 0.5ft  | 0.5ft | 0              | 25 | 50 | 75 | 100 |           |     |                           |            |  |  |
| 160       |                 |            |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 157.7           | 1.0        |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 157.7           |            | 3          | 3      | 3     |                |    |    |    |     |           |     |                           |            |  |  |
| 155       | 154.5           | 4.2        |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 154.5           |            | 2          | 2      | 2     |                |    |    |    |     |           |     |                           |            |  |  |
| 150       | 150.6           | 8.1        |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 150.6           |            | 1          | 1      | 2     |                |    |    |    |     |           |     |                           |            |  |  |
| 145       | 145.6           | 13.1       |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 145.6           |            | 1          | 2      | 1     |                |    |    |    |     |           |     |                           |            |  |  |
| 140       | 140.6           | 18.1       |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 140.6           |            | 1          | 2      | 3     |                |    |    |    |     |           |     |                           |            |  |  |
| 135       | 135.6           | 23.1       |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 135.6           |            | 5          | 9      | 22    |                |    |    |    |     |           |     |                           |            |  |  |
| 130       | 130.6           | 28.1       |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 130.6           |            | 36         | 64/0.3 |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 127.2           | 31.5       |            |        |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 127.2           |            | 60/0.1     |        |       |                |    |    |    |     |           |     |                           |            |  |  |

|   |                            |                                 |                                     |
|---|----------------------------|---------------------------------|-------------------------------------|
| <b>WBS</b> 34552.1.FR3  | <b>TIP</b> R-3825B         | <b>COUNTY</b> JOHNSTON          | <b>GEOLOGIST</b> Contract Geologist |
| <b>SITE DESCRIPTION</b> BRIDGE NO. 75 ON -L- (NC 42) OVER THE NEUSE RIVER |                            |                                 | <b>GROUND WTR (ft)</b>              |
| <b>BORING NO.</b> EB2-B   | <b>STATION</b> 66+24       | <b>OFFSET</b> 50 ft RT          | <b>ALIGNMENT</b> -L-                |
| <b>COLLAR ELEV.</b> 143.0 ft  | <b>TOTAL DEPTH</b> 18.6 ft | <b>NORTHING</b> 690,967         | <b>EASTING</b> 2,176,781            |
| <b>DRILL RIG/HAMMER EFF./DATE</b> BRI2974 CME-45C 79% 06/03/2015          |                            | <b>DRILL METHOD</b> H.S. Augers | <b>HAMMER TYPE</b> Automatic        |
| <b>DRILLER</b> Contract Driller   | <b>START DATE</b> 03/08/16 | <b>COMP. DATE</b> 03/08/16      | <b>SURFACE WATER DEPTH</b> N/A      |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT |       |       | BLOWS PER FOOT |    |    |    |     | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) |  |  |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|-----|---------------------------|------------|--|--|
|           |                 |            | 0.5ft      | 0.5ft | 0.5ft | 0              | 25 | 50 | 75 | 100 |           |     |                           |            |  |  |
| 145       |                 |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 143.0           |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 143.0           |            |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
| 140       | 142.0           | 1.0        |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 142.0           |            | 1          | 1     | 2     |                |    |    |    |     |           |     |                           |            |  |  |
| 135       | 137.0           | 6.0        |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 137.0           |            | 3          | 5     | 5     |                |    |    |    |     |           |     |                           |            |  |  |
| 130       | 129.5           | 13.5       |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 129.5           |            | 7          | 12    | 14    |                |    |    |    |     |           |     |                           |            |  |  |
| 125       | 124.5           | 18.5       |            |       |       |                |    |    |    |     |           |     |                           |            |  |  |
|           | 124.5           |            | 4          | 7     | 25    |                |    |    |    |     |           |     |                           |            |  |  |
|           | 124.5           |            | 60/0.1     |       |       |                |    |    |    |     |           |     |                           |            |  |  |

NCDOT BORE DOUBLE R3825B\_GEO\_BRDG\_BORINGS.GPJ NC\_DOT.GDT 6/5/17

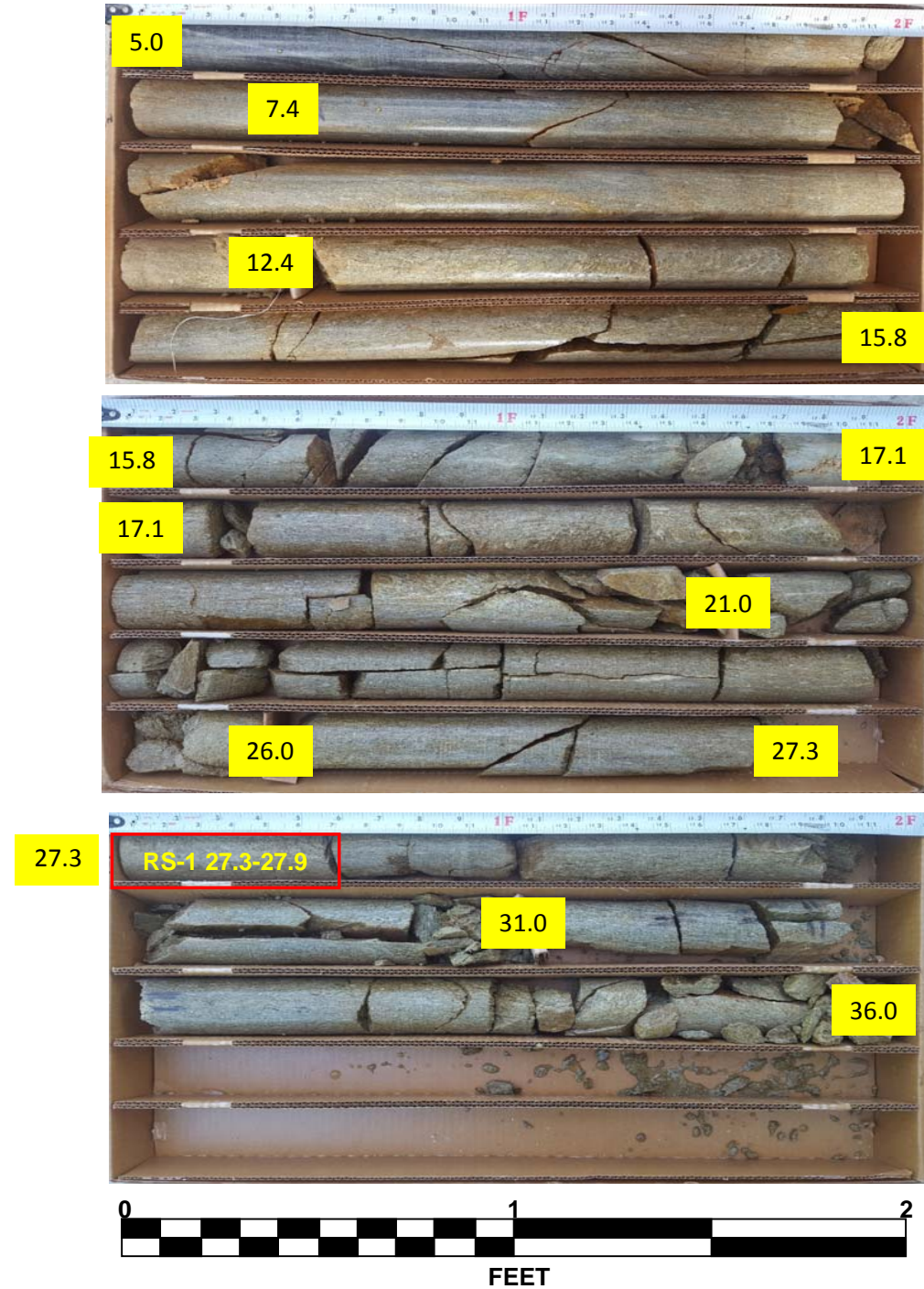
## *ROCK TEST RESULTS*

| <i>SAMPLE NO.</i> | <i>OFFSET</i> | <i>STATION</i> | <i>DEPTH INTERVAL</i> | <i>ROCK TYPE</i> | <i>UNIT WT. (lb/ft<sup>3</sup>)</i> | <i>UNIAXIAL COMPRESSIVE STRENGTH, (psi)</i> |
|-------------------|---------------|----------------|-----------------------|------------------|-------------------------------------|---|
| <i>RS-1</i>       | <i>42' LT</i> | <i>63+65</i>   | <i>27.3' - 27.9'</i>  | <i>PHYLLITE</i>  | <i>165.1</i>                        | <i>1,570</i>                                |
| <i>RS-2</i>       | <i>50' RT</i> | <i>63+64</i>   | <i>30.5' - 32.5'</i>  | <i>GNEISS</i>    | <i>179.3</i>                        | <i>4,630</i>                                |
| <i>RS-3</i>       | <i>45' LT</i> | <i>64+87</i>   | <i>25.3' - 27.2'</i>  | <i>GNEISS</i>    | <i>174.2</i>                        | <i>7,700</i>                                |
| <i>RS-4</i>       | <i>28' RT</i> | <i>64+75</i>   | <i>35.4' - 36.1'</i>  | <i>GNEISS</i>    | <i>171.4</i>                        | <i>14,580</i>                               |

# CORE PHOTOGRAPHS

## B1-A

BOXES 1,2 AND 3: 5.0 TO 36.0 FEET



# CORE PHOTOGRAPHS

## B1-C

BOXES 1,2,3 and 4: 4.4 TO 35.7 FEET



# CORE PHOTOGRAPHS

## B1-B

BOXES 1,2,3 AND 4: 8.1 TO 37.9 FEET



# CORE PHOTOGRAPHS

## B2-A

BOXES 1,2, and 3: 9.3 TO 37.8 FEET



# CORE PHOTOGRAPHS

## B2-C

BOXES 1,2, and 3: 5.3 TO 34.0 FEET



# CORE PHOTOGRAPHS

## B2-B

BOXES 1,2 , and 3: 7.7 TO 36.1 FEET



***SITE PHOTOGRAPH***  
***Bridge No. 75 on NC 42 over the Neuse River***



***Looking west toward End Bent 1***