

PROJECT: 34518.1.3 ID: R-2915B BR. 4

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | R-2915B 34518.1.3           | 1         | 20           |

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

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**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. R-2915B 34518.1.3 F.A. PROJ. \_\_\_\_\_  
COUNTY ASHE  
PROJECT DESCRIPTION BRIDGE NO. 4 ON US 221 OVER THE SOUTH FORK OF THE NEW RIVER (OVERFLOW)  
  
SITE DESCRIPTION NB BRIDGE, STA. 234+00

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4099. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL  
DC ELLIOTT

CJ COFFEY

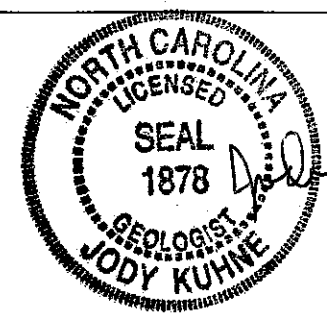
DO CHEEK

INVESTIGATED BY JC KUHNE

CHECKED BY \_\_\_\_\_

SUBMITTED BY JC KUHNE

DATE 9/23/2013



DRAWN BY: JC KUHNE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

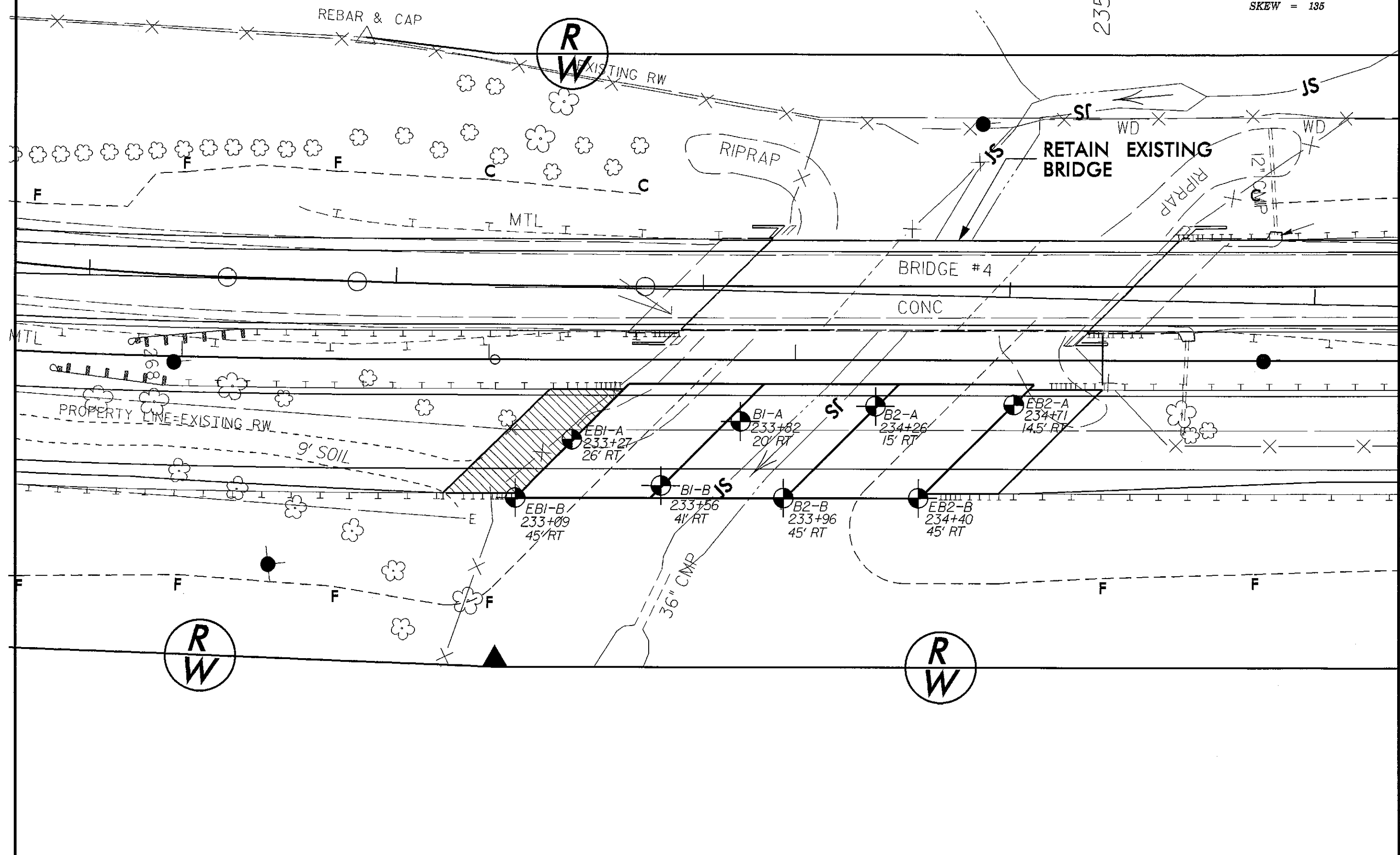
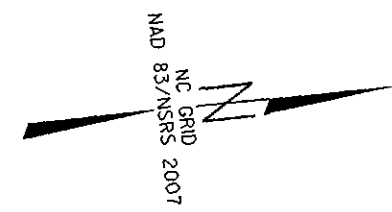
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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GEOTECHNICAL ENGINEERING UNIT

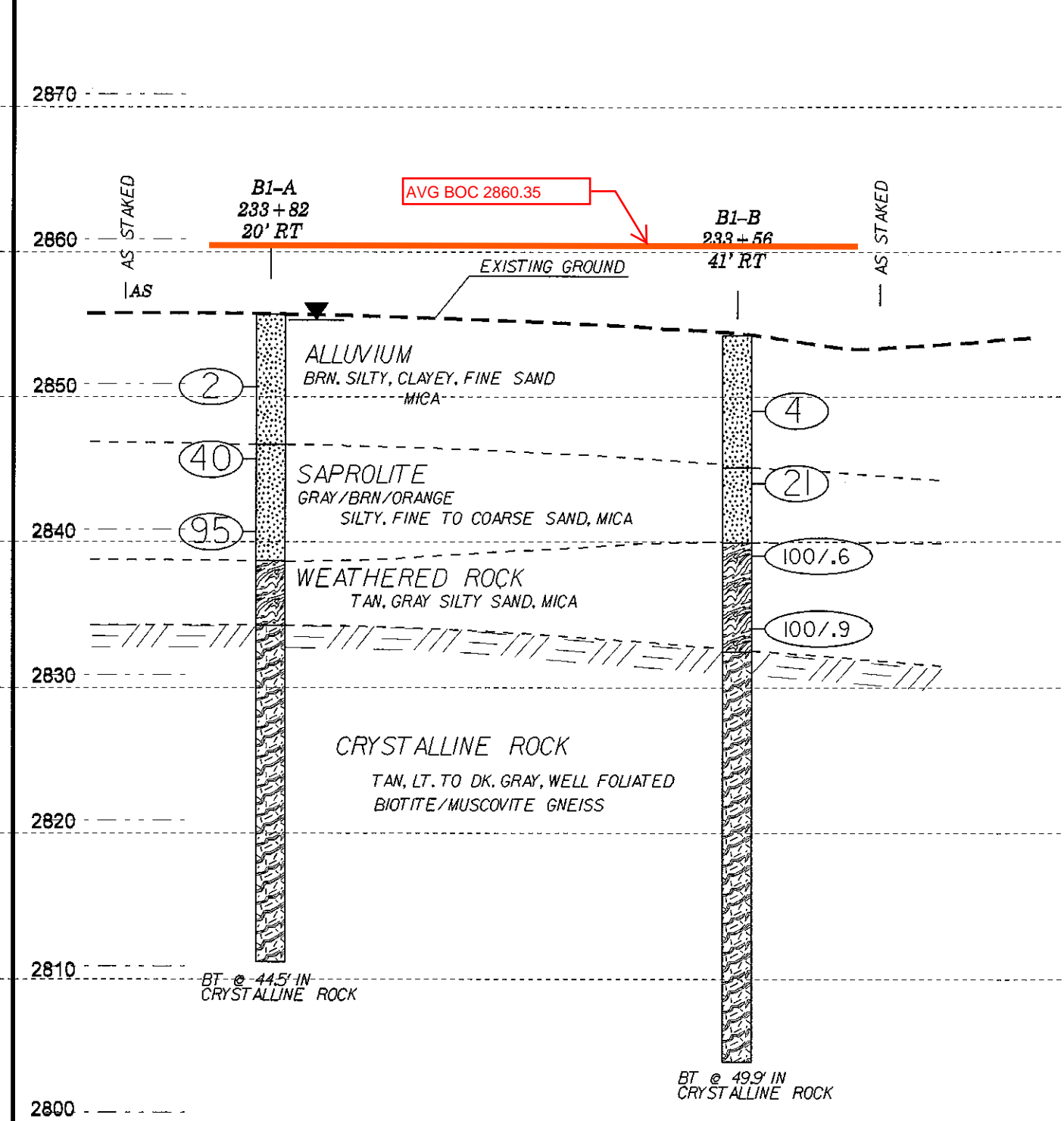
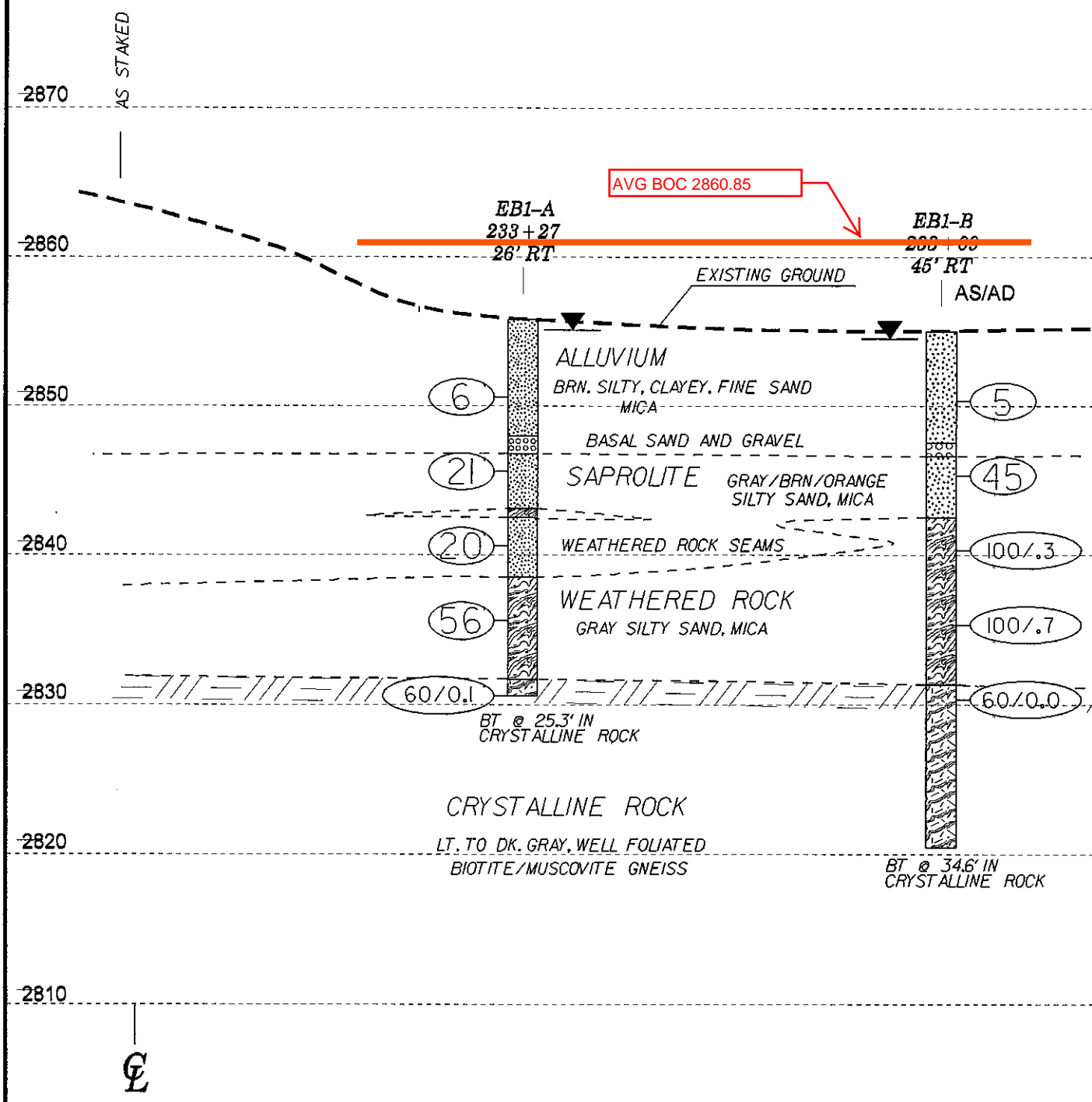
## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

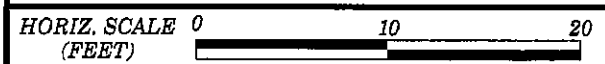
| SOIL DESCRIPTION  | GRADATION   | ROCK DESCRIPTION   | TERMS AND DEFINITIONS  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
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| <p>SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY-SILT CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>   | <p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br/><b>UNIFORM</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)<br/><b>POORLY GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <b>ANGULAR</b>, <b>SUBANGULAR</b>, <b>SUBROUNDED</b>, OR <b>ROUNDED</b>.</p>                                       | <p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, 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:</p> <p><b>WEATHERED ROCK (WR)</b>  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p> <p><b>CRYSTALLINE ROCK (CR)</b>  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b>  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</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, 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 (RQD)</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 INTRUDING 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 149 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 (SCREC)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br/><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</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> |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">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="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th><th>A-2</th><th>A-3</th><th>A-4</th><th>A-5</th><th>A-6</th><th>A-7</th> <th>A-1</th><th>A-2</th><th>A-3</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-1, A-5</th><th>A-6, A-7</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td><td>A-1-b</td><td>A-2-1</td><td>A-2-2</td><td>A-2-3</td><td>A-2-4</td><td>A-2-5</td> <td>A-3-1</td><td>A-3-2</td><td>A-3-3</td><td>A-3-4</td><td>A-3-5</td><td>A-3-6</td><td>A-3-7</td> <td>A-4-1</td><td>A-4-2</td><td>A-4-3</td> </tr> <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></td><td></td><td></td> <td></td><td></td><td></td> </tr> <tr> <td>% PASSING</td> <td>50</td><td>30</td><td>50</td><td>50</td><td>50</td><td>50</td><td>50</td> <td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td> <td>10</td><td>10</td><td>10</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>5</td><td>5</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td> <td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td><td>10</td> <td>10</td><td>10</td><td>10</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td>0</td><td>0</td><td>0</td> </tr> </table> <p>PI OF A-7-6 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt;&gt; LL - 30</p> | GENERAL CLASS.  | GRANULAR MATERIALS (<= 35% PASSING #200)   |  |  |  |   |  |   | SILT-CLAY MATERIALS (> 35% PASSING #200) |  |  |   |   |  |   | ORGANIC MATERIALS   |   |                        | A-1               | A-2        | A-3        | A-4              | A-5                   | A-6                         | A-7               | A-1              | A-2           | A-3              | A-4              | A-5                    | A-6            | A-7                              | A-1, A-2                       | A-1, A-5                 | A-6, A-7 | GROUP CLASS.  | A-1-a   | A-1-b   | A-2-1   | A-2-2  | A-2-3 | A-2-4                 | A-2-5             | A-3-1             | A-3-2                        | A-3-3          | A-3-4            | A-3-5              | A-3-6                 | A-3-7          | A-4-1      | A-4-2               | A-4-3 | SYMBOL    |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           | % PASSING  | 50                  | 30  | 50 | 50 | 50 | 50 | 50 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | LIQUID LIMIT | 5 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | GROUP INDEX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | <p style="text-align: center;"><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;"><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE<br/>MODERATELY COMPRESSIBLE<br/>HIGHLY COMPRESSIBLE</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt;10%</td> <td>&gt;20%</td> <td>HIGHLY</td> </tr> </table> <p style="text-align: center;"><b>GROUND WATER</b></p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> | ORGANIC MATERIAL | GRANULAR SOILS | SILT - CLAY SOILS | OTHER MATERIAL | TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE | MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | HIGHLY ORGANIC | >10% | >20% | HIGHLY | <p style="text-align: center;"><b>WEATHERING</b></p> <p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V SL.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p><b>SLIGHT (SL.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS, SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p><b>MODERATE (MOD.)</b> - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p><b>MODERATELY SEVERE (MOD. SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p><b>SEVERE (SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i></p> <p><b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i></p> <p><b>COMPLETE</b> - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p> <p style="text-align: center;"><b>ROCK HARDNESS</b></p> <p><b>VERY HARD</b> - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p><b>HARD</b> - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p><b>MODERATELY HARD</b> - 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.</p> <p><b>MEDIUM HARD</b> - 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.</p> <p><b>SOFT</b> - 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.</p> <p><b>VERY SOFT</b> - 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.</p> |
| GENERAL CLASS.  |   | GRANULAR MATERIALS (<= 35% PASSING #200)   |  |  |  |   |  |   | SILT-CLAY MATERIALS (> 35% PASSING #200) |  |  |   |   |  |   | ORGANIC MATERIALS   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | A-1   | A-2  | A-3  | A-4  | A-5  | A-6   | A-7  | A-1   | A-2                                      | A-3  | A-4  | A-5   | A-6   | A-7  | A-1, A-2  | A-1, A-5  | A-6, A-7  |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| GROUP CLASS.  | A-1-a   | A-1-b  | A-2-1  | A-2-2  | A-2-3                                      | A-2-4   | A-2-5  | A-3-1   | A-3-2                                    | A-3-3  | A-3-4  | A-3-5   | A-3-6   | A-3-7  | A-4-1   | A-4-2   | A-4-3   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| SYMBOL  |   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| % PASSING   | 50  | 30   | 50   | 50   | 50   | 50  | 50   | 10  | 10                                       | 10   | 10   | 10  | 10  | 10   | 10  | 10  | 10  |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| LIQUID LIMIT  | 5   | 5  | 10   | 10   | 10   | 10  | 10   | 10  | 10                                       | 10   | 10   | 10  | 10  | 10   | 10  | 10  | 10  |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| GROUP INDEX   | 0   | 0  | 0  | 0  | 0  | 0   | 0  | 0   | 0  | 0  | 0  | 0   | 0   | 0  | 0   | 0   | 0   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| ORGANIC MATERIAL  | GRANULAR SOILS  | SILT - CLAY SOILS  | OTHER MATERIAL   |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| TRACE OF ORGANIC MATTER   | 2 - 3%  | 3 - 5%   | TRACE  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| LITTLE ORGANIC MATTER   | 3 - 5%  | 5 - 12%  | LITTLE   |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| MODERATELY ORGANIC  | 5 - 10%   | 12 - 20%   | SOME   |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| HIGHLY ORGANIC  | >10%  | >20%   | HIGHLY   |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>CONSISTENCY OR DENSENESS</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <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> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</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 (COHESIVE)</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 0.50<br/>0.5 TO 1.0<br/>1 TO 2<br/>2 TO 4<br/>&gt; 4</td> </tr> </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-COHESIVE) | 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 (COHESIVE)  | 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 0.50<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 | <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p> SOIL SYMBOL</p> <p> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p> INFERRED SOIL BOUNDARY</p> <p> INFERRED ROCK LINE</p> <p> ALLUVIAL SOIL BOUNDARY</p> <p> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p> SOUNDING ROD</p> <p> SPT TEST BORING</p> <p> AUGER BORING</p> <p> CORE BORING</p> <p> MONITORING WELL</p> <p> PIEZOMETER INSTALLATION</p> <p> SLOPE INDICATOR INSTALLATION</p> <p> SPT N-VALUE</p> <p> SPT REFUSAL</p> | <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>AR - AUGER REFUSAL</td> <td>HI - HIGHLY</td> <td>W - MOISTURE CONTENT</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MED. - MEDIUM</td> <td>V - VERY</td> </tr> <tr> <td>CL - CLAY</td> <td>MICA - MICACEOUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>MOD. - MODERATELY</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CSE. - COARSE</td> <td>NP - NON PLASTIC</td> <td>W% - UNIT WEIGHT</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>ORG. - ORGANIC</td> <td>W<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>o - VOID RATIO</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SD. - SAND, SANDY</td> <td></td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SL. - SILT, SILTY</td> <td></td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>SL. - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> </table> | AR - AUGER REFUSAL  | HI - HIGHLY   | W - MOISTURE CONTENT  | BT - BORING TERMINATED | MED. - MEDIUM     | V - VERY   | CL - CLAY  | MICA - MICACEOUS | VST - VANE SHEAR TEST | CPT - CONE PENETRATION TEST | MOD. - MODERATELY | WEA. - WEATHERED | CSE. - COARSE | NP - NON PLASTIC | W% - UNIT WEIGHT | DMT - DILATOMETER TEST | ORG. - ORGANIC | W <sub>d</sub> - DRY UNIT WEIGHT | DPT - DYNAMIC PENETRATION TEST | PMT - PRESSUREMETER TEST |          | o - VOID RATIO  | SAP. - SAPROLITIC   |   | F - FINE  | SD. - SAND, SANDY  |       | FOSS. - FOSSILIFEROUS | SL. - SILT, SILTY |                   | FRAC. - FRACTURED, FRACTURES | SL. - SLIGHTLY |                  | FRAGS. - FRAGMENTS | TCR - TRICONE REFUSAL |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| 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-COHESIVE)  | 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 (COHESIVE)   | 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 0.50<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| AR - AUGER REFUSAL  | HI - HIGHLY   | W - MOISTURE CONTENT   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| BT - BORING TERMINATED  | MED. - MEDIUM   | V - VERY   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| CL - CLAY   | MICA - MICACEOUS  | VST - VANE SHEAR TEST  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| CPT - CONE PENETRATION TEST   | MOD. - MODERATELY   | WEA. - WEATHERED   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| CSE. - COARSE   | NP - NON PLASTIC  | W% - UNIT WEIGHT   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| DMT - DILATOMETER TEST  | ORG. - ORGANIC  | W <sub>d</sub> - DRY UNIT WEIGHT   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| DPT - DYNAMIC PENETRATION TEST  | PMT - PRESSUREMETER TEST  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| o - VOID RATIO  | SAP. - SAPROLITIC   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| F - FINE  | SD. - SAND, SANDY   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| FOSS. - FOSSILIFEROUS   | SL. - SILT, SILTY   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| FRAC. - FRACTURED, FRACTURES  | SL. - SLIGHTLY  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| FRAGS. - FRAGMENTS  | TCR - TRICONE REFUSAL   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <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> <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> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>BOULDER (BLDR.)</th><th>COBBLE (COB.)</th><th>GRAVEL (GR.)</th><th>COARSE SAND (CSE. SD.)</th><th>FINE SAND (F SD.)</th><th>SILT (SL.)</th><th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE MM</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>IN.</td><td>12</td><td>3</td><td></td><td></td><td></td><td></td> </tr> </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 (CSE. SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | GRAIN SIZE MM    | 305                   | 75                          | 2.0               | 0.25             | 0.05          | 0.005            | IN.              | 12                     | 3              |                                  |                                |                          |          | <p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> <p>DRILL UNITS:</p> <p><input type="checkbox"/> MOBILE B-</p> <p><input type="checkbox"/> BK-51</p> <p><input type="checkbox"/> CME-45C</p> <p><input checked="" type="checkbox"/> CME-550</p> <p><input type="checkbox"/> PORTABLE HOIST</p> </td> <td> <p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER</p> <p><input checked="" type="checkbox"/> 8' HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input checked="" type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE * TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> </td> <td> <p>HAMMER TYPE:</p> <p><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> B</p> <p><input checked="" type="checkbox"/> N XWL</p> <p><input type="checkbox"/> H</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> </td> </tr> </table> | <p>DRILL UNITS:</p> <p><input type="checkbox"/> MOBILE B-</p> <p><input type="checkbox"/> BK-51</p> <p><input type="checkbox"/> CME-45C</p> <p><input checked="" type="checkbox"/> CME-550</p> <p><input type="checkbox"/> PORTABLE HOIST</p>   | <p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER</p> <p><input checked="" type="checkbox"/> 8' HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input checked="" type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE * TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> | <p>HAMMER TYPE:</p> <p><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> B</p> <p><input checked="" type="checkbox"/> N XWL</p> <p><input type="checkbox"/> H</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> | <p style="text-align: center;"><b>FRACTURE SPACING</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>TERM</th><th>SPACING</th> </tr> <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 FEET</td> </tr> <tr> <td>VERY CLOSE</td><td>LESS THAN 0.16 FEET</td> </tr> </table> <p style="text-align: center;"><b>BEDDING</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>TERM</th><th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td><td>&gt; 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> </table> <p style="text-align: center;"><b>INDURATION</b></p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>FRIBLE</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> </table> | TERM  | SPACING               | VERY WIDE         | MORE THAN 10 FEET | WIDE                         | 3 TO 10 FEET   | MODERATELY CLOSE | 1 TO 3 FEET        | CLOSE                 | 0.16 TO 1 FEET | VERY CLOSE | LESS THAN 0.16 FEET | TERM  | THICKNESS | VERY THICKLY BEDDED | > 4 FEET | THICKLY BEDDED | 1.5 - 4 FEET | THINLY BEDDED | 0.16 - 1.5 FEET | VERY THINLY BEDDED | 0.03 - 0.16 FEET | THICKLY LAMINATED | 0.008 - 0.03 FEET | THINLY LAMINATED | < 0.008 FEET | FRIBLE | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | MODERATELY INDURATED | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | INDURATED | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. | EXTREMELY INDURATED | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| 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 (CSE. SD.)   | FINE SAND (F SD.)  | SILT (SL.)                                 | CLAY (CL.)  |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| GRAIN SIZE MM   | 305   | 75   | 2.0  | 0.25   | 0.05                                       | 0.005   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| IN.   | 12  | 3  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
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| TERM  | SPACING   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| VERY WIDE   | MORE THAN 10 FEET   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| WIDE  | 3 TO 10 FEET  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| MODERATELY CLOSE  | 1 TO 3 FEET   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| CLOSE   | 0.16 TO 1 FEET  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| VERY CLOSE  | LESS THAN 0.16 FEET   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| TERM  | THICKNESS   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| VERY THICKLY BEDDED   | > 4 FEET  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| THICKLY BEDDED  | 1.5 - 4 FEET  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| THINLY BEDDED   | 0.16 - 1.5 FEET   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| VERY THINLY BEDDED  | 0.03 - 0.16 FEET  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| THICKLY LAMINATED   | 0.008 - 0.03 FEET   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| THINLY LAMINATED  | < 0.008 FEET  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| FRIBLE  | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| MODERATELY INDURATED  | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| INDURATED   | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.  |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| EXTREMELY INDURATED   | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.   |  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>PLASTICITY</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>NONPLASTIC</th><th>PLASTICITY INDEX (PI)</th><th>DRY STRENGTH</th> </tr> <tr> <td>LOW PLASTICITY</td><td>0-5</td><td>VERY LOW</td> </tr> <tr> <td>MED. PLASTICITY</td><td>6-15</td><td>SLIGHT</td> </tr> <tr> <td>HIGH PLASTICITY</td><td>16-25</td><td>MEDIUM</td> </tr> <tr> <td></td><td>26 OR MORE</td><td>HIGH</td> </tr> </table> <p style="text-align: center;"><b>COLOR</b></p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>  | NONPLASTIC  | PLASTICITY INDEX (PI)  | DRY STRENGTH   | LOW PLASTICITY   | 0-5  | VERY LOW  | MED. PLASTICITY                                | 6-15  | SLIGHT                                   | HIGH PLASTICITY  | 16-25  | MEDIUM  |   | 26 OR MORE   | HIGH  | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| NONPLASTIC  | PLASTICITY INDEX (PI)   | DRY STRENGTH   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| LOW PLASTICITY  | 0-5   | VERY LOW   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| MED. PLASTICITY   | 6-15  | SLIGHT   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| HIGH PLASTICITY   | 16-25   | MEDIUM   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | 26 OR MORE  | HIGH   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td rowspan="3">LL - LIQUID LIMIT<br/>PL - PLASTIC LIMIT<br/>OM - OPTIMUM MOISTURE<br/>SL - SHRINKAGE LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>   | SOIL MOISTURE SCALE (ATTERBERG LIMITS)  | FIELD MOISTURE DESCRIPTION   | GUIDE FOR FIELD MOISTURE DESCRIPTION   | LL - LIQUID LIMIT<br>PL - PLASTIC LIMIT<br>OM - OPTIMUM MOISTURE<br>SL - SHRINKAGE LIMIT | - SATURATED - (SAT.)                       | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | - WET - (W)                                    | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | - MOIST - (M)                            | SOLID; AT OR NEAR OPTIMUM MOISTURE                               |  | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p>  | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS)  | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| LL - LIQUID LIMIT<br>PL - PLASTIC LIMIT<br>OM - OPTIMUM MOISTURE<br>SL - SHRINKAGE LIMIT  | - SATURATED - (SAT.)  | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>TEXTURE OR GRAIN SIZE</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <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> <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> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>BOULDER (BLDR.)</th><th>COBBLE (COB.)</th><th>GRAVEL (GR.)</th><th>COARSE SAND (CSE. SD.)</th><th>FINE SAND (F SD.)</th><th>SILT (SL.)</th><th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE MM</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>IN.</td><td>12</td><td>3</td><td></td><td></td><td></td><td></td> </tr> </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 (CSE. SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) | GRAIN SIZE MM    | 305                   | 75                          | 2.0               | 0.25             | 0.05          | 0.005            | IN.              | 12                     | 3              |                                  |                                |                          |          | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p>   | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| 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 (CSE. SD.)   | FINE SAND (F SD.)  | SILT (SL.)                                 | CLAY (CL.)  |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| GRAIN SIZE MM   | 305   | 75   | 2.0  | 0.25   | 0.05                                       | 0.005   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| IN.   | 12  | 3  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| <p style="text-align: center;"><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td rowspan="3">LL - LIQUID LIMIT<br/>PL - PLASTIC LIMIT<br/>OM - OPTIMUM MOISTURE<br/>SL - SHRINKAGE LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td></td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>   | SOIL MOISTURE SCALE (ATTERBERG LIMITS)  | FIELD MOISTURE DESCRIPTION   | GUIDE FOR FIELD MOISTURE DESCRIPTION   | LL - LIQUID LIMIT<br>PL - PLASTIC LIMIT<br>OM - OPTIMUM MOISTURE<br>SL - SHRINKAGE LIMIT | - SATURATED - (SAT.)                       | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | - WET - (W)                                    | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | - MOIST - (M)                            | SOLID; AT OR NEAR OPTIMUM MOISTURE                               |  | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>INDURATION</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p>  | <p style="text-align: center;"><b>FRAC. SPACING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST</p> <p style="text-align: center;"><b>BEDDING</b></p> <p>DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME</p>   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS)  | FIELD MOISTURE DESCRIPTION  | GUIDE FOR FIELD MOISTURE DESCRIPTION   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
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|   | - WET - (W)   | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | - MOIST - (M)   | SOLID; AT OR NEAR OPTIMUM MOISTURE   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |
|   | - DRY - (D)   | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE   |  |  |  |   |  |   |  |  |  |   |   |  |   |   |   |                        |                   |            |            |                  |                       |                             |                   |                  |               |                  |                  |                        |                |                                  |                                |                          |          |   |   |   |   |  |       |                       |                   |                   |                              |                |                  |                    |                       |                |            |                     |       |           |                     |          |                |              |               |                 |                    |                  |                   |                   |                  |              |        |  |                      |   |           |  |                     |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |              |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |                |                   |                |                         |        |        |       |                       |        |         |        |                    |         |          |      |                |      |      |        |  |



235+00



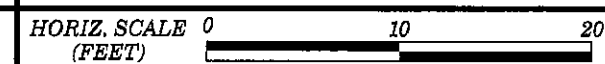
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VE = 1:1

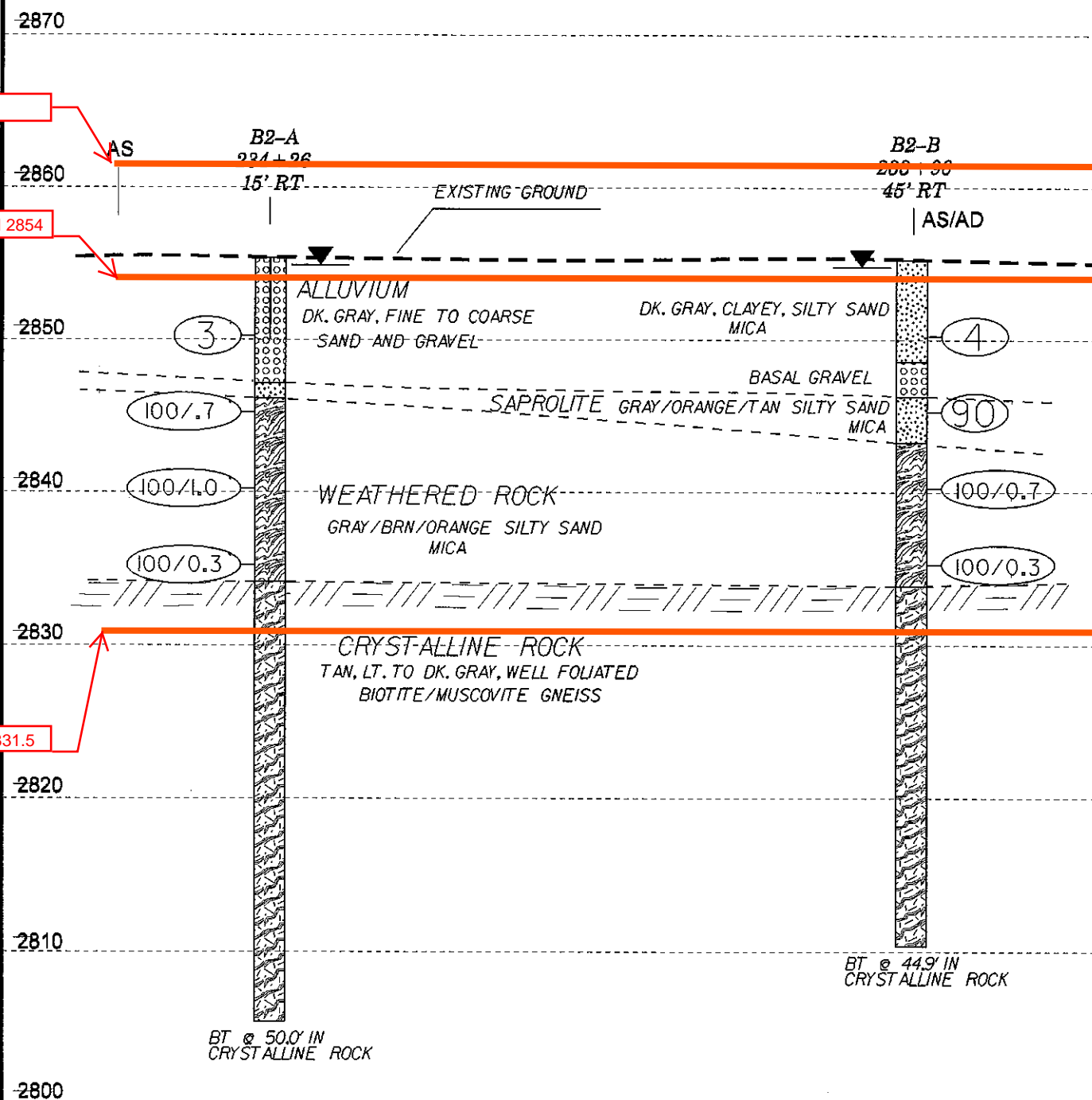
SECTION ALONG EB-1

SKEW = 135



VE = 1:1

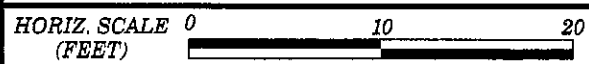
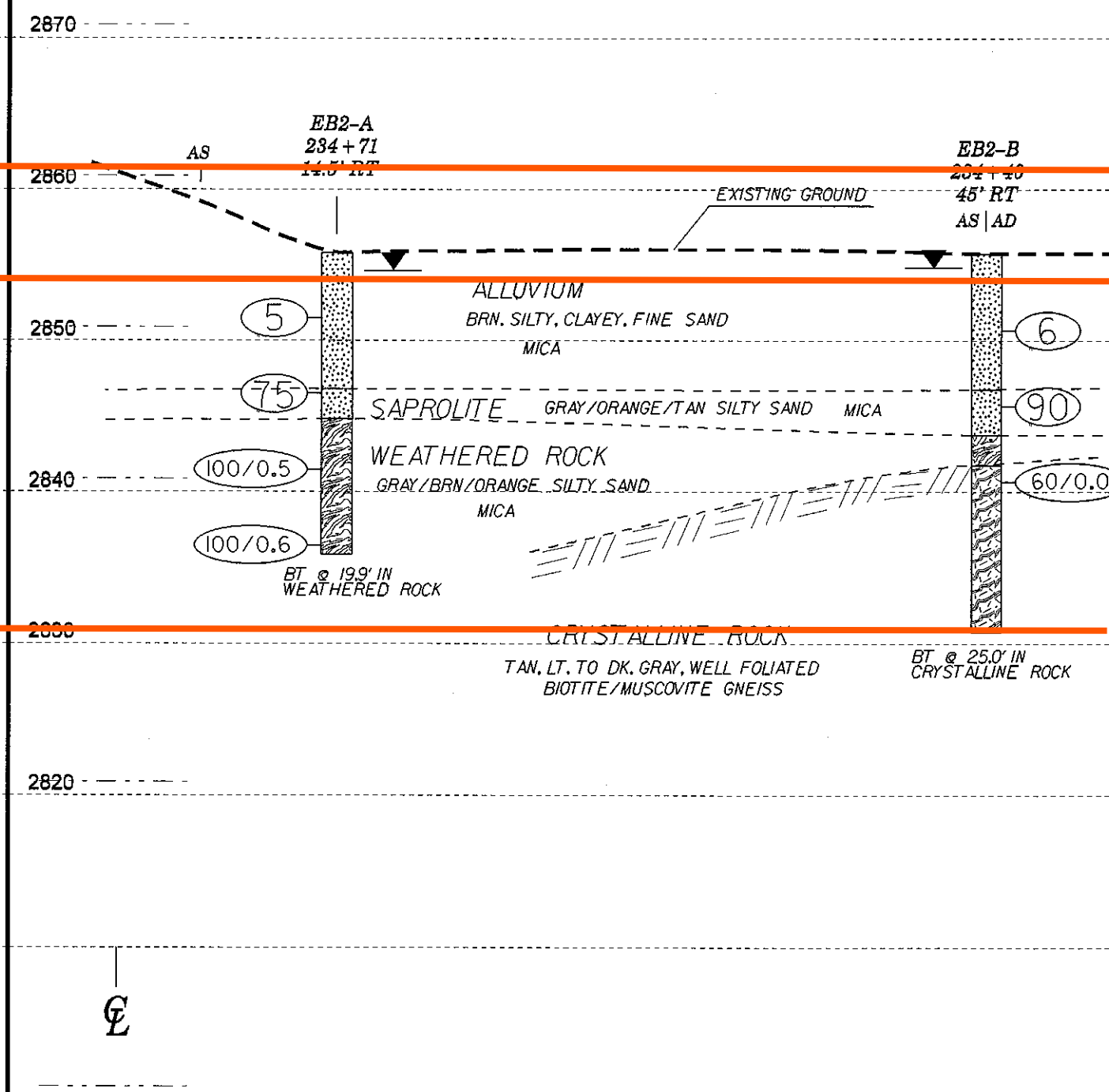
SECTION ALONG B-1



AVG BOC 2862.25

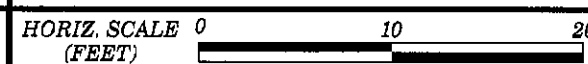
BOTTOM OF COLUMN 2854

PRELIMINARY POF 2831.5



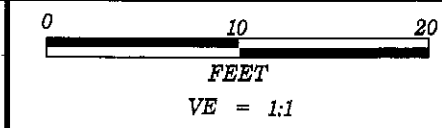
VE = 1:1

SECTION ALONG B-2

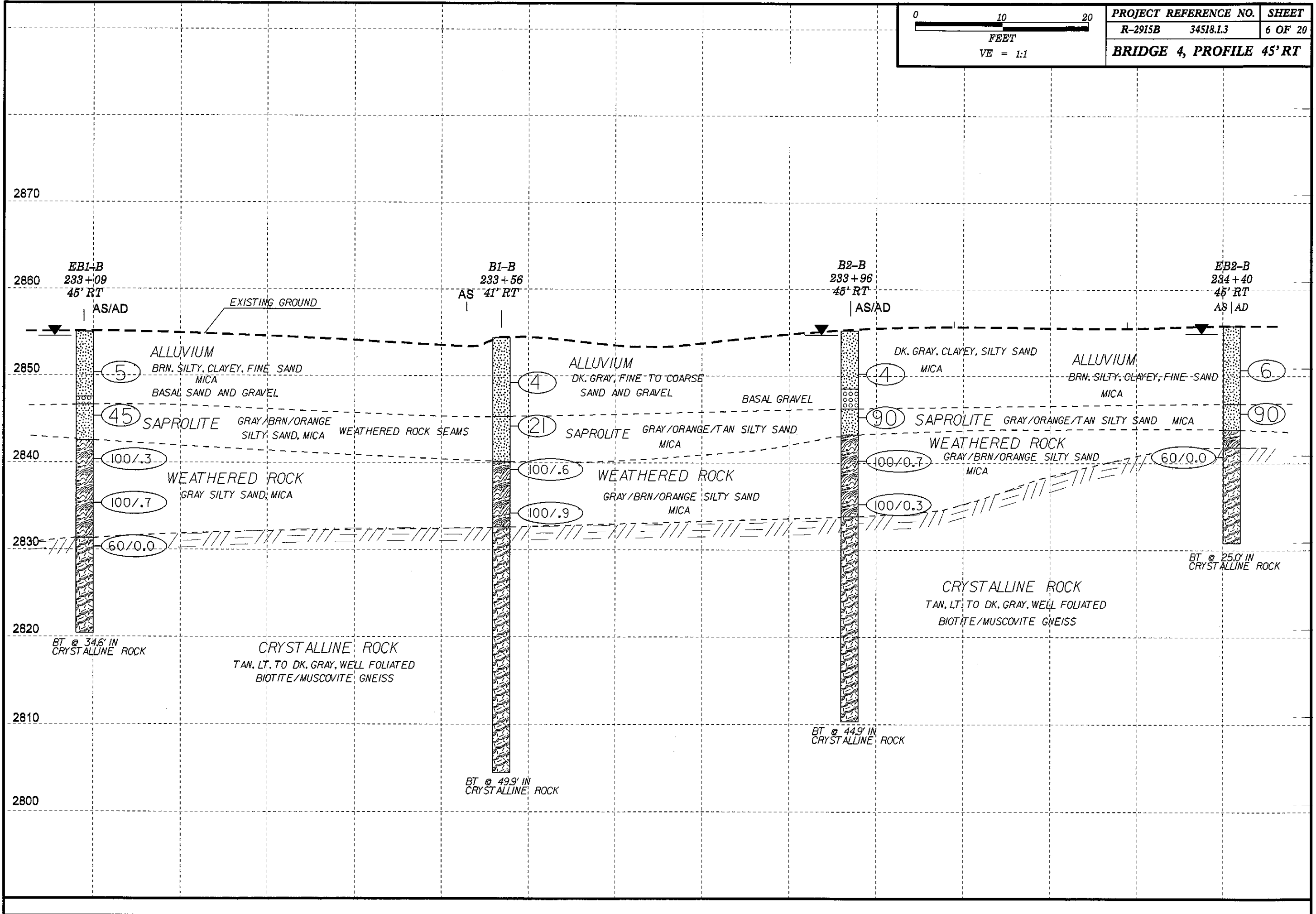


VE = 1:1

SECTION ALONG EB-2



| PROJECT REFERENCE NO.    |           | SHEET   |
|--------------------------|-----------|---------|
| R-2915B                  | 34518.1.3 | 6 OF 20 |
| BRIDGE 4, PROFILE 45' RT |           |         |



2870

EB1-B  
233+09  
45' RT  
AS/AD

2850

2840

2830

2820

2810

2800

B1-B  
233+56  
41' RT  
AS

(4)

(21)

(100/.6)

(100/.9)

BT @ 49.9' IN  
CRYSTALLINE ROCK

B2-B  
233+96  
45' RT  
AS/AD

(4)

(90)

(100/.7)

(100/.3)

BT @ 44.9' IN  
CRYSTALLINE ROCK

EB2-B  
234+40  
45' RT  
AS/AD

(6)

(90)

(60/0.0)

BT @ 25.0' IN  
CRYSTALLINE ROCK

ALLUVIUM

BRN. SILTY, CLAYEY, FINE SAND  
MICA  
BASAL SAND AND GRAVEL

SAPROLITE

GRAY/BRN/ORANGE  
SILTY SAND, MICA

WEATHERED ROCK

GRAY SILTY SAND, MICA

CRYSTALLINE ROCK

TAN, LT. TO DK. GRAY, WELL FOLIATED  
BIOTITE/MUSCOVITE GNEISS

ALLUVIUM

DK. GRAY, FINE TO COARSE  
SAND AND GRAVEL

SAPROLITE

GRAY/ORANGE/TAN SILTY SAND  
MICA

WEATHERED ROCK

GRAY/BRN/ORANGE SILTY SAND  
MICA

DK. GRAY, CLAYEY, SILTY SAND  
MICA

ALLUVIUM

BRN. SILTY, CLAYEY, FINE SAND  
MICA

SAPROLITE

GRAY/ORANGE/TAN SILTY SAND  
MICA

WEATHERED ROCK

GRAY/BRN/ORANGE SILTY SAND  
MICA

CRYSTALLINE ROCK

TAN, LT. TO DK. GRAY, WELL FOLIATED  
BIOTITE/MUSCOVITE GNEISS

EXISTING GROUND

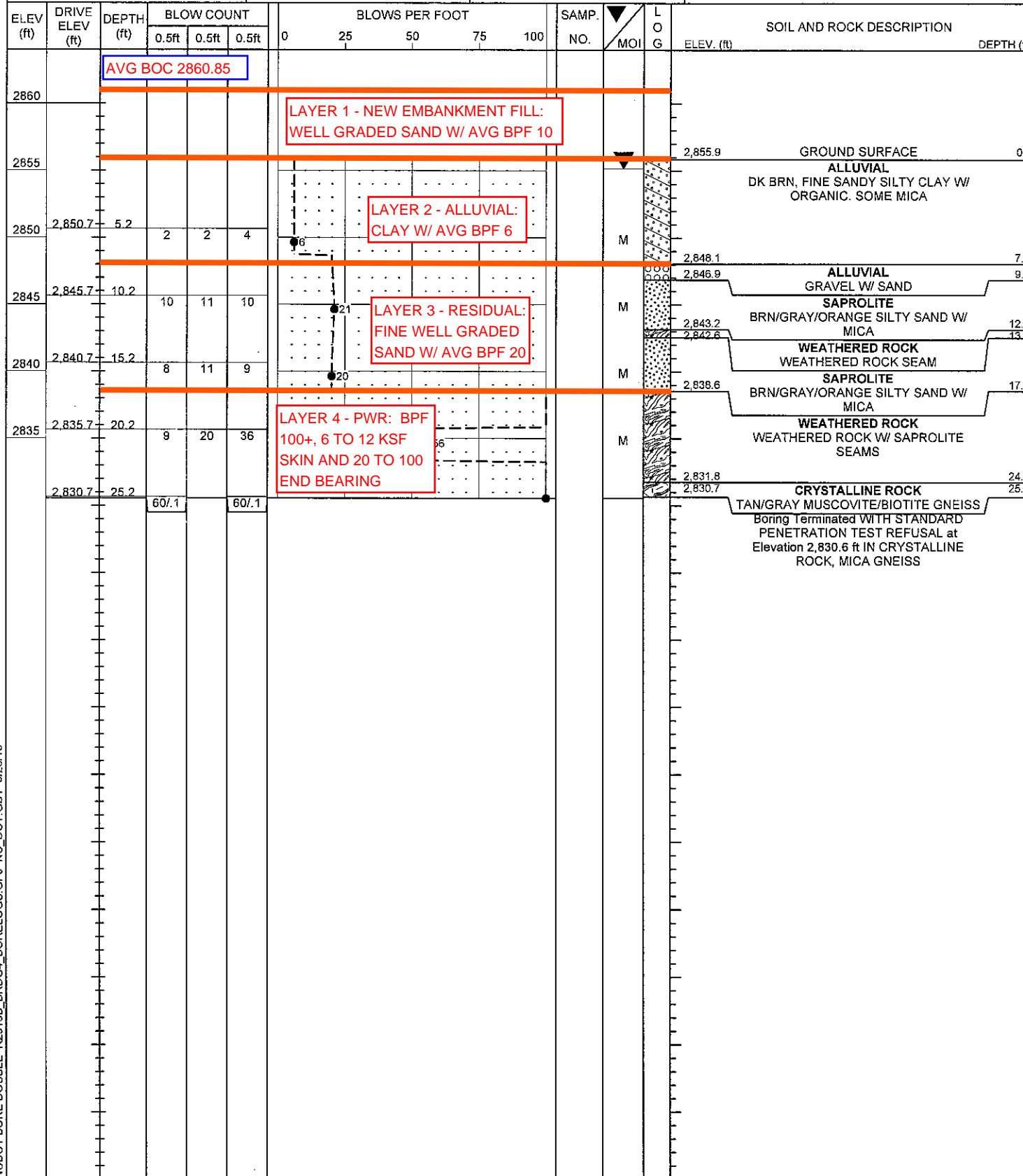
WEATHERED ROCK SEAMS

BASAL GRAVEL

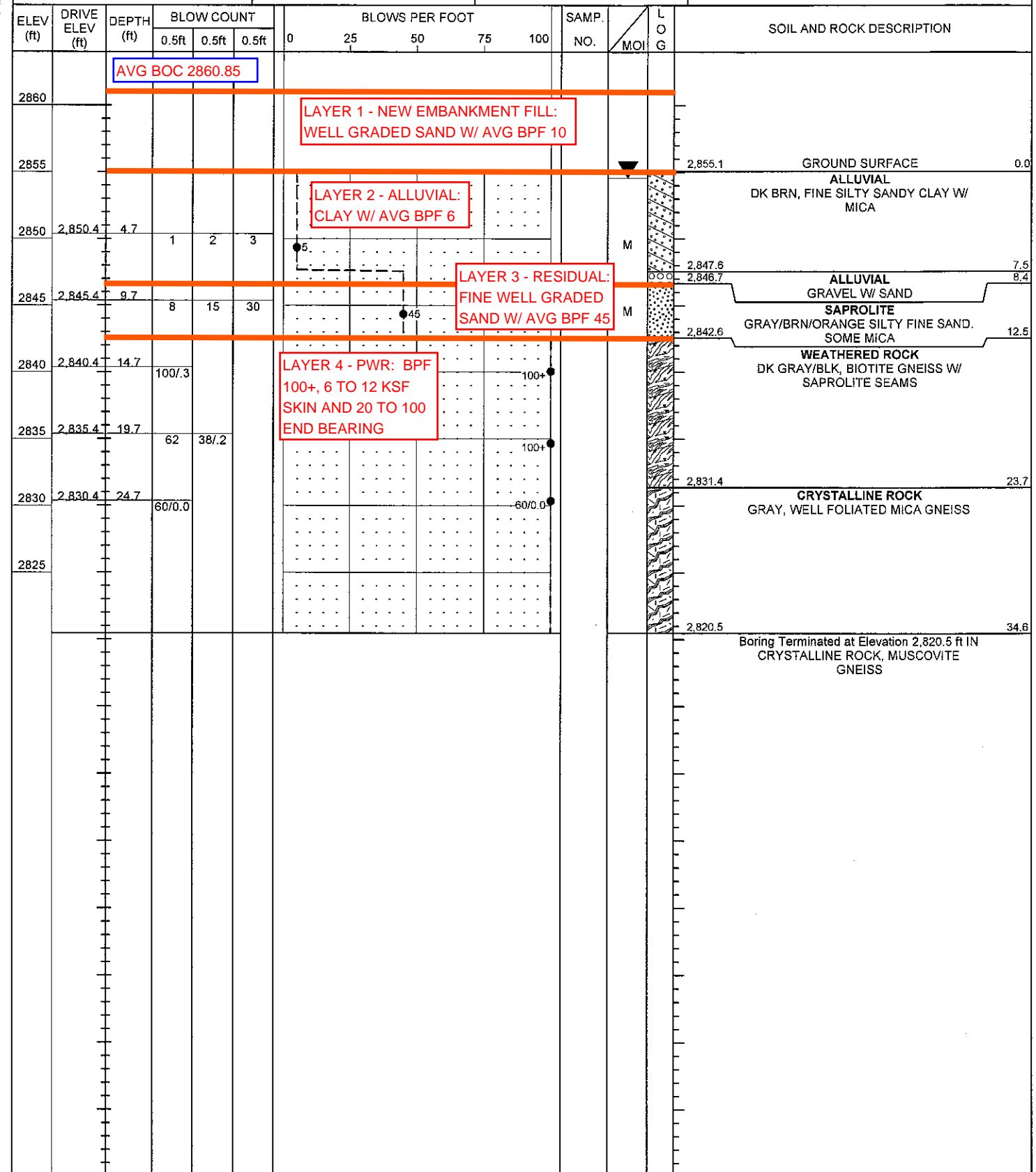
BT @ 34.6' IN  
CRYSTALLINE ROCK



|   |                     |                               |                          |                       |
|---|---------------------|-------------------------------|--------------------------|-----------------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                   | GEOLOGIST Elliott, D. C. |                       |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                               |                          | GROUND WTR (ft)       |
| BOHRING NO. EB1-A   | STATION 233+27      | OFFSET 26 ft RT               | ALIGNMENT -L-            | 0 HR. N/A             |
| COLLAR ELEV. 2,855.9 ft   | TOTAL DEPTH 25.3 ft | NORTHING 934,177              | EASTING 1,263,751        | 24 HR. 0.7            |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing w/ SPT |                          | HAMMER TYPE Automatic |
| DRILLER Cheek, D. O.  | START DATE 08/26/13 | COMP. DATE 08/26/13           | SURFACE WATER DEPTH N/A  |                       |

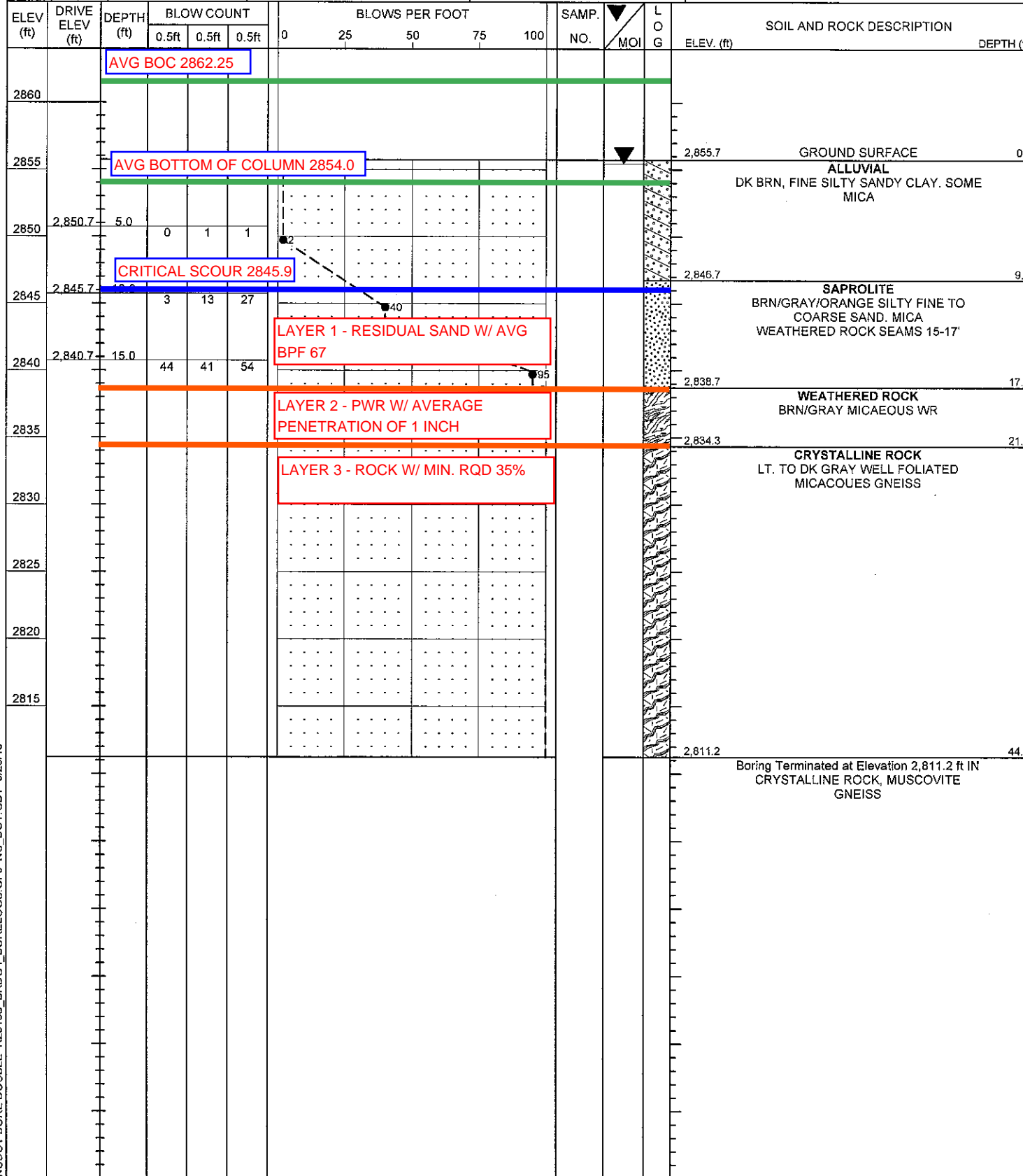


|   |                     |                                     |                          |                       |
|---|---------------------|-------------------------------------|--------------------------|-----------------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |                       |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     |                          | GROUND WTR (ft)       |
| BOHRING NO. EB1-B   | STATION 233+09      | OFFSET 45 ft RT                     | ALIGNMENT -L-            | 0 HR. N/A             |
| COLLAR ELEV. 2,855.1 ft   | TOTAL DEPTH 34.6 ft | NORTHING 934,156                    | EASTING 1,263,768        | 24 HR. 0.5            |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core |                          | HAMMER TYPE Automatic |
| DRILLER Coffey, Jr., C.   | START DATE 08/26/13 | COMP. DATE 08/26/13                 | SURFACE WATER DEPTH N/A  |                       |

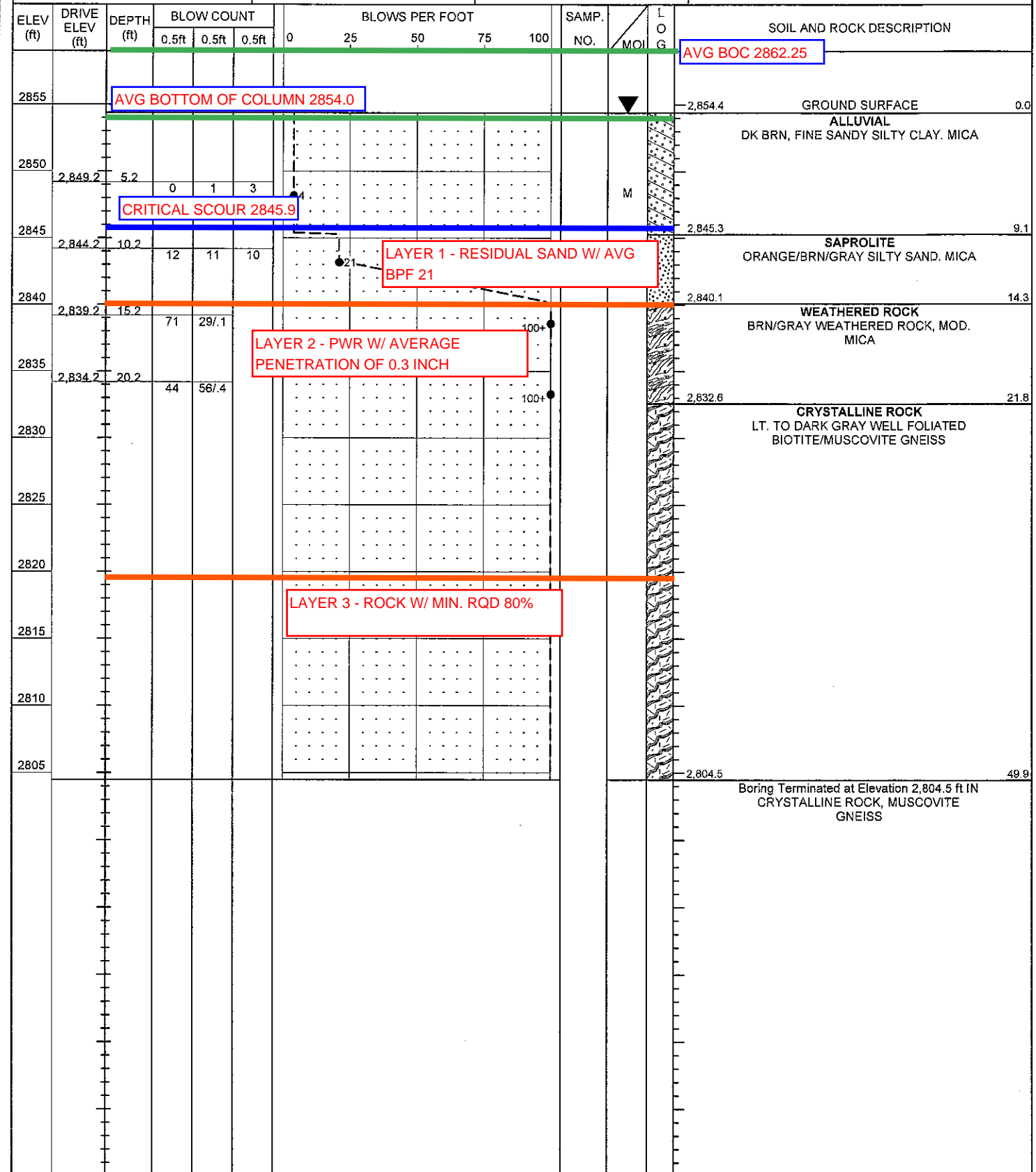


NCDOT BORE DOUBLE R2915B\_BRD4\_BORELOGS.GPJ NC\_DOT\_GDT\_9/23/13

|   |                     |                                     |                          |                 |
|---|---------------------|-------------------------------------|--------------------------|-----------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |                 |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     |                          | GROUND WTR (ft) |
| BORING NO. B1-A   | STATION 233+82      | OFFSET 20 ft RT                     | ALIGNMENT -L-            | 0 HR. N/A       |
| COLLAR ELEV. 2,855.7 ft   | TOTAL DEPTH 44.5 ft | NORTHING 934,232                    | EASTING 1,263,751        | 24 HR. 0.3      |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |                 |
| DRILLER Coffey, Jr., C.   | START DATE 08/28/13 | COMP. DATE 08/28/13                 | SURFACE WATER DEPTH N/A  |                 |



|   |                     |                                     |                          |                 |
|---|---------------------|-------------------------------------|--------------------------|-----------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |                 |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     |                          | GROUND WTR (ft) |
| BORING NO. B1-B   | STATION 233+56      | OFFSET 41 ft RT                     | ALIGNMENT -L-            | 0 HR. N/A       |
| COLLAR ELEV. 2,854.4 ft   | TOTAL DEPTH 49.9 ft | NORTHING 934,204                    | EASTING 1,263,769        | 24 HR. 0.0      |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |                 |
| DRILLER Coffey, Jr., C.   | START DATE 08/28/13 | COMP. DATE 08/28/13                 | SURFACE WATER DEPTH N/A  |                 |



NCDOT BORE DOUBLE R2915B\_BRDG4\_BORELOGS.GPJ NC\_DOT\_GDT 9/23/13

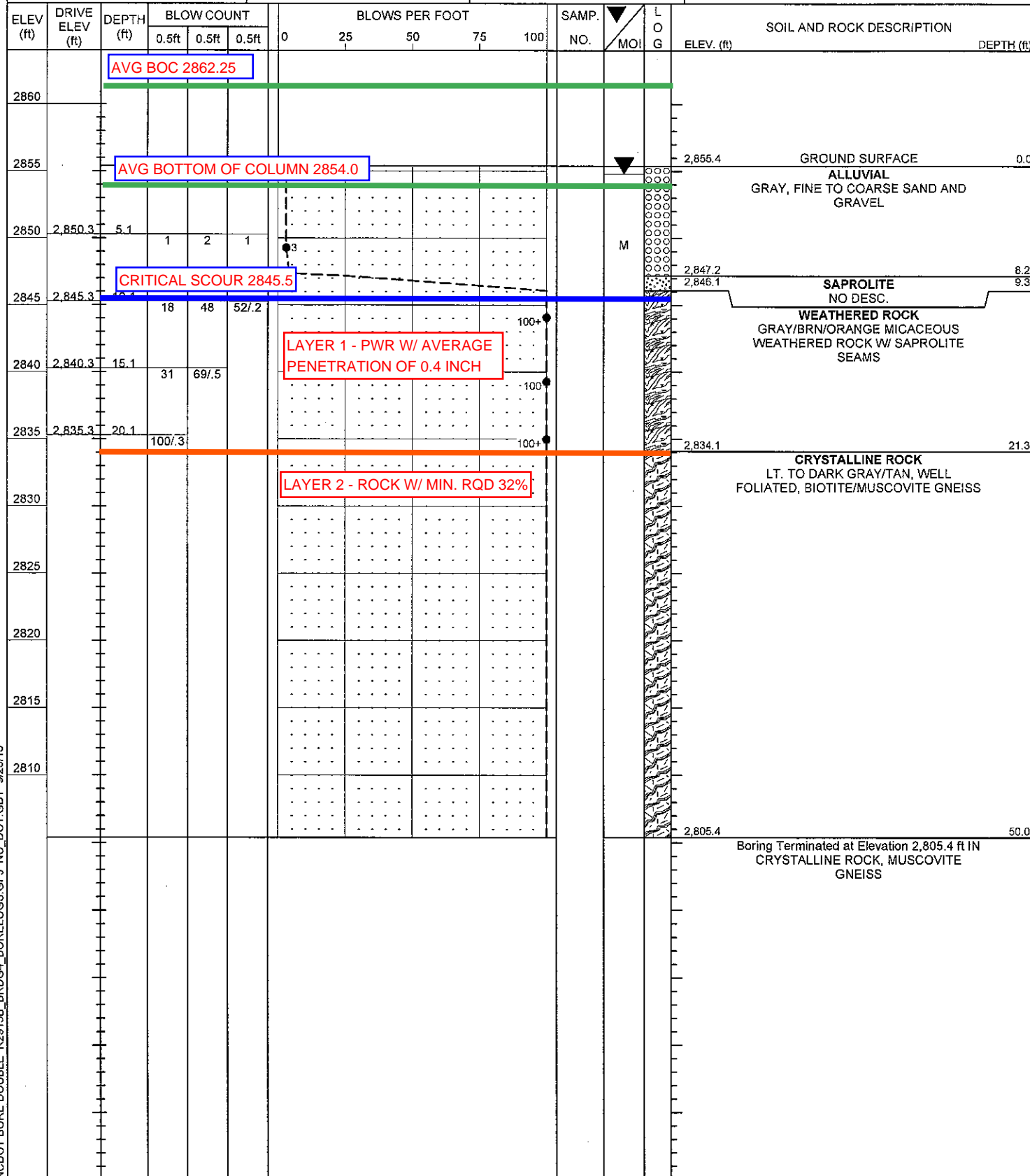




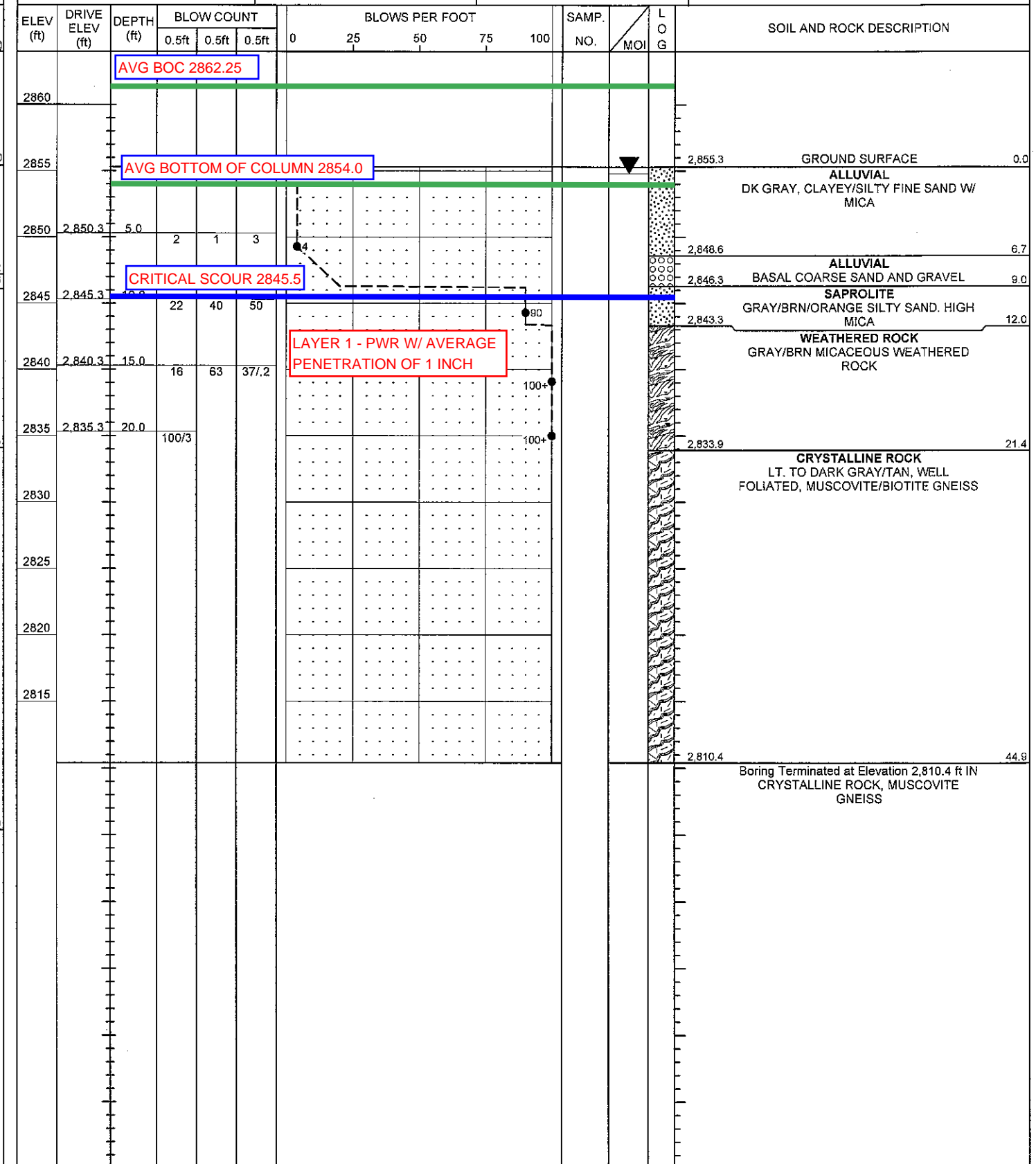
# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

|   |                     |                                     |                          |
|---|---------------------|-------------------------------------|--------------------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     | GROUND WTR (ft)          |
| BORING NO. B2-A   | STATION 234+26      | OFFSET 15 ft RT                     | ALIGNMENT -L-            |
| COLLAR ELEV. 2,855.4 ft   | TOTAL DEPTH 50.0 ft | NORTHING 934,276                    | EASTING 1,263,751        |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |
| DRILLER Coffey, Jr., C.   | START DATE 08/27/13 | COMP. DATE 08/27/13                 | SURFACE WATER DEPTH N/A  |

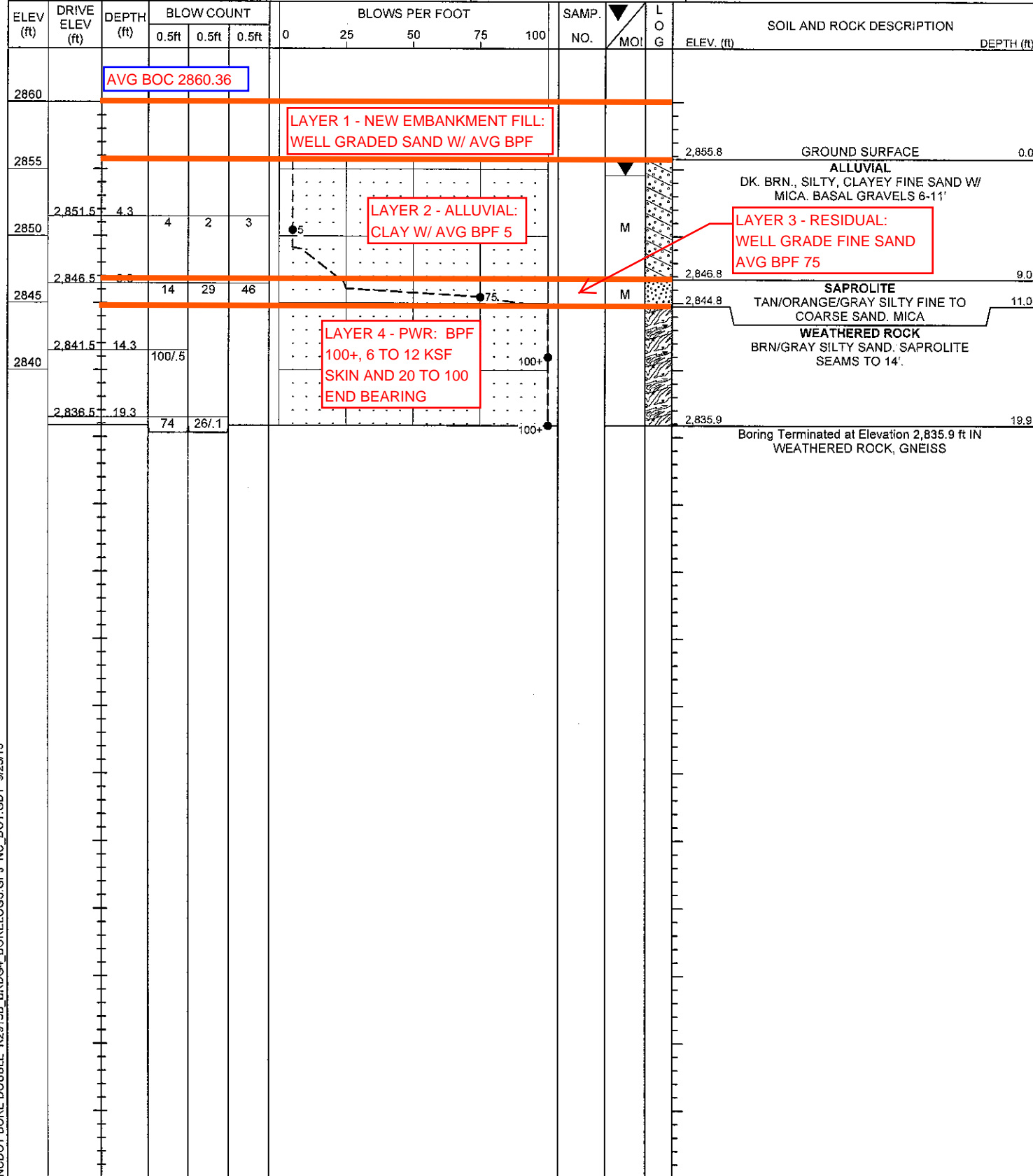


|   |                     |                                     |                          |
|---|---------------------|-------------------------------------|--------------------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     | GROUND WTR (ft)          |
| BORING NO. B2-B   | STATION 233+96      | OFFSET 45 ft RT                     | ALIGNMENT -L-            |
| COLLAR ELEV. 2,855.3 ft   | TOTAL DEPTH 44.9 ft | NORTHING 934,244                    | EASTING 1,263,777        |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |
| DRILLER Coffey, Jr., C.   | START DATE 08/27/13 | COMP. DATE 08/27/13                 | SURFACE WATER DEPTH N/A  |

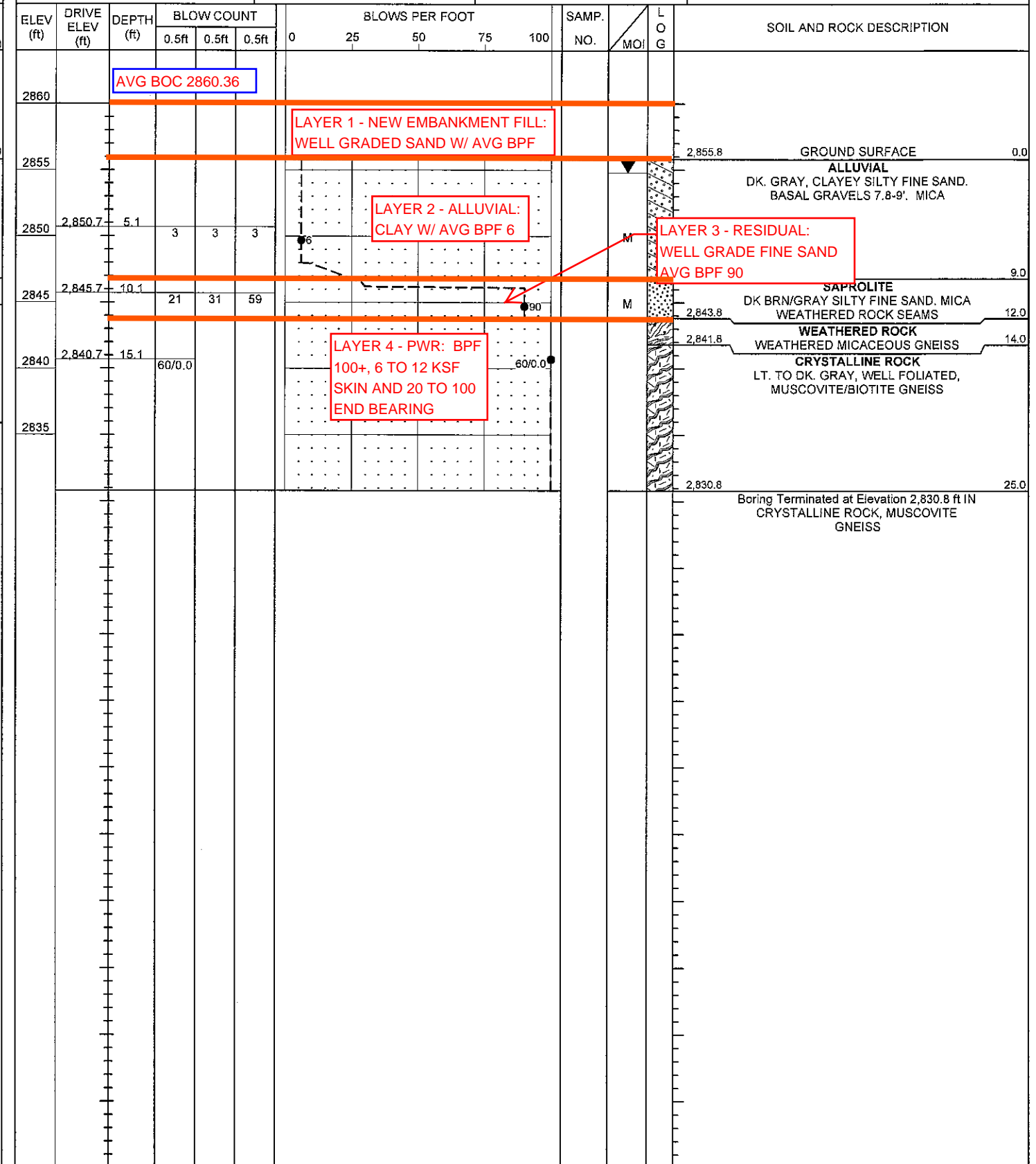


NCDOT BORE DOUBLE R2915B\_BRD04\_BORELOGS.GPJ NC\_DOT.GDT 9/23/13

|   |                     |                               |                          |                 |
|---|---------------------|-------------------------------|--------------------------|-----------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                   | GEOLOGIST Elliott, D. C. |                 |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                               |                          | GROUND WTR (ft) |
| BOREING NO. EB2-A   | STATION 234+71      | OFFSET 15 ft RT               | ALIGNMENT -L-            | 0 HR. N/A       |
| COLLAR ELEV. 2,855.8 ft   | TOTAL DEPTH 19.9 ft | NORTHING 934,321              | EASTING 1,263,755        | 24 HR. 1.2      |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing w/ SPT | HAMMER TYPE Automatic    |                 |
| DRILLER Coffey, Jr., C.   | START DATE 08/26/13 | COMP. DATE 08/26/13           | SURFACE WATER DEPTH N/A  |                 |



|   |                     |                                     |                          |                 |
|---|---------------------|-------------------------------------|--------------------------|-----------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |                 |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     |                          | GROUND WTR (ft) |
| BOREING NO. EB2-B   | STATION 234+40      | OFFSET 45 ft RT                     | ALIGNMENT -L-            | 0 HR. N/A       |
| COLLAR ELEV. 2,855.8 ft   | TOTAL DEPTH 25.0 ft | NORTHING 934,287                    | EASTING 1,263,782        | 24 HR. 1.0      |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |                 |
| DRILLER Coffey, Jr., C.   | START DATE 08/27/13 | COMP. DATE 08/27/13                 | SURFACE WATER DEPTH N/A  |                 |



NCDOT BORE DOUBLE R2915B\_BRD64\_BORELOGS.GPJ NC\_DOT\_GDT 9/23/13



**NCDOT GEOTECHNICAL ENGINEERING UNIT  
CORE BORING REPORT**

|   |                     |                                     |                          |
|---|---------------------|-------------------------------------|--------------------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     | GROUND WTR (ft)          |
| BORING NO. B1-A   | STATION 233+82      | OFFSET 20 ft RT                     | ALIGNMENT -L-            |
| COLLAR ELEV. 2,855.7 ft   | TOTAL DEPTH 44.5 ft | NORTHING 934,232                    | EASTING 1,263,751        |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |
| DRILLER Coffey, Jr., C.   | START DATE 08/28/13 | COMP. DATE 08/28/13                 | SURFACE WATER DEPTH N/A  |

|                |                     |                         |
|----------------|---------------------|-------------------------|
| CORE SIZE NXWL |                     | TOTAL RUN 23.1 ft       |
| ELEV (ft)      | RUN ELEV (ft)       | DEPTH (ft)              |
| RUN (ft)       | DRILL RATE (Min/ft) | REC. (ft) %             |
| RQD (ft) %     | SAMP. NO.           | STRATA REC. (ft) %      |
| RQD (ft) %     | LOG                 | DESCRIPTION AND REMARKS |

|         |         |      |     |  |               |              |  |  |  |  |         |      |  |
|---------|---------|------|-----|--|---------------|--------------|--|--|--|--|---------|------|--|
| 2834.33 | 2,834.3 | 21.4 | 3.1 | 0:32/1.0<br>0:41/1.0<br>0:39/1.1                         | (2.8)<br>90%  | (1.1)<br>35% |  |  |  |  | 2,834.3 | 21.4 | Begin Coring @ 21.4 ft<br>CRYSTALLINE ROCK   |
| 2830    | 2,831.2 | 24.5 | 5.0 | 0:40/1.0<br>0:39/1.0<br>0:44/1.0<br>0:42/1.0<br>0:49/1.0 | (4.7)<br>94%  | (2.7)<br>54% |  |  |  |  |         |      |  |
| 2825    | 2,826.2 | 29.5 | 5.0 | 0:32/1.0<br>0:50/1.0<br>0:52/1.0<br>0:50/1.0<br>0:39/1.0 | (4.8)<br>96%  | (3.0)<br>60% |  |  |  |  |         |      |  |
| 2820    | 2,821.2 | 34.5 | 5.0 | 0:47/1.0<br>0:42/1.0<br>0:38/1.0<br>0:41/1.0<br>0:44/1.0 | (4.9)<br>98%  | (2.4)<br>48% |  |  |  |  |         |      |  |
| 2815    | 2,816.2 | 39.5 | 5.0 | 0:57/1.0<br>1:04/1.0<br>1:12/1.0<br>0:59/1.0<br>1:01/1.0 | (5.0)<br>100% | (4.2)<br>84% |  |  |  |  |         |      |  |
|         | 2,811.2 | 44.5 |     |  |               |              |  |  |  |  | 2,811.2 | 44.5 | Boring Terminated at Elevation 2,811.2 ft IN CRYSTALLINE ROCK,<br>MUSCOVITE GNEISS |

|   |                     |                                     |                          |
|---|---------------------|-------------------------------------|--------------------------|
| WBS 34518.1.3   | TIP R-2915B         | COUNTY ASHE                         | GEOLOGIST Elliott, D. C. |
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |                     |                                     | GROUND WTR (ft)          |
| BORING NO. B1-B   | STATION 233+56      | OFFSET 41 ft RT                     | ALIGNMENT -L-            |
| COLLAR ELEV. 2,854.4 ft   | TOTAL DEPTH 49.9 ft | NORTHING 934,204                    | EASTING 1,263,769        |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |                     | DRILL METHOD NW Casing W/SPT & Core | HAMMER TYPE Automatic    |
| DRILLER Coffey, Jr., C.   | START DATE 08/28/13 | COMP. DATE 08/28/13                 | SURFACE WATER DEPTH N/A  |

|                |                     |                         |
|----------------|---------------------|-------------------------|
| CORE SIZE NXWL |                     | TOTAL RUN 28.1 ft       |
| ELEV (ft)      | RUN ELEV (ft)       | DEPTH (ft)              |
| RUN (ft)       | DRILL RATE (Min/ft) | REC. (ft) %             |
| RQD (ft) %     | SAMP. NO.           | STRATA REC. (ft) %      |
| RQD (ft) %     | LOG                 | DESCRIPTION AND REMARKS |

|         |         |      |     |  |               |              |  |  |  |  |         |      |  |
|---------|---------|------|-----|--|---------------|--------------|--|--|--|--|---------|------|--|
| 2832.58 | 2,832.6 | 21.8 | 3.1 | 0:31/1.1<br>0:25/1.0<br>0:27/1.0                         | (2.1)<br>68%  | (0.4)<br>13% |  |  |  |  | 2,832.6 | 21.8 | Begin Coring @ 21.8 ft<br>CRYSTALLINE ROCK   |
| 2830    | 2,829.5 | 24.9 | 5.0 | 0:11/1.0<br>0:17/1.0<br>0:27/1.0<br>0:10/1.0<br>0:12/1.0 | (0.5)<br>10%  | (0.0)<br>0%  |  |  |  |  |         |      |  |
| 2825    | 2,824.5 | 29.9 | 5.0 | 0:27/1.0<br>0:31/1.0<br>0:26/1.0<br>0:40/1.0<br>0:51/1.0 | (2.0)<br>40%  | (0.4)<br>8%  |  |  |  |  |         |      |  |
| 2820    | 2,819.5 | 34.9 | 5.0 | 1:00/1.0<br>1:03/1.0<br>0:58/1.0<br>1:04/1.0<br>1:12/1.0 | (4.8)<br>96%  | (3.9)<br>78% |  |  |  |  |         |      |  |
| 2815    | 2,814.5 | 39.9 | 5.0 | 1:21/1.0<br>1:11/1.0<br>1:20/1.0<br>1:15/1.0<br>1:09/1.0 | (5.0)<br>100% | (4.4)<br>88% |  |  |  |  |         |      |  |
| 2810    | 2,809.5 | 44.9 | 5.0 | 0:58/1.0<br>1:10/1.0<br>1:13/1.0<br>1:01/1.0             | (4.6)<br>92%  | (4.0)<br>80% |  |  |  |  |         |      |  |
| 2805    | 2,804.5 | 49.9 |     | 0:52/1.0   |               |              |  |  |  |  | 2,804.5 | 49.9 | Boring Terminated at Elevation 2,804.5 ft IN CRYSTALLINE ROCK,<br>MUSCOVITE GNEISS |

NCDOT CORE DOUBLE R2915B\_BRDG4\_BORELOGS.GPJ NC\_DOT\_GDT 9/23/13



| WBS 34518.1.3   |               | TIP R-2915B         |          | COUNTY ASHE                                  |              | GEOLOGIST Elliott, D. C. |   |
|---|---------------|---------------------|----------|--|--------------|--------------------------|---|
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |               |                     |          |  |              |                          | GROUND WTR (ft)   |
| BORING NO. EB1-B  |               | STATION 233+09      |          | OFFSET 45 ft RT                              |              | ALIGNMENT -L-            |   |
| COLLAR ELEV. 2,855.1 ft   |               | TOTAL DEPTH 34.6 ft |          | NORTHING 934,156                             |              | EASTING 1,263,768        |   |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |               |                     |          | DRILL METHOD NW Casing W/SPT & Core          |              | HAMMER TYPE Automatic    |   |
| DRILLER Coffey, Jr., C.   |               | START DATE 08/26/13 |          | COMP. DATE 08/26/13                          |              | SURFACE WATER DEPTH N/A  |   |
| CORE SIZE NXWL  |               |                     |          | TOTAL RUN 8.1 ft                             |              |                          |   |
| ELEV (ft)   | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft) | DRILL RATE (Min/ft)                          | RUN REC. (%) | RQD (%)                  | DESCRIPTION AND REMARKS   |
| 2828.56   | 2,828.6       | 26.5                | 3.1      | 0:40/1.0                                     | (2.4) 77%    | (1.0) 32%                | <p>Begin Coring @ 26.5 ft<br/>CRYSTALLINE ROCK (continued)</p>                  |
| 2825  | 2,825.5       | 29.6                |          | 1:03/1.1                                     |              |                          |   |
|   |               |                     | 5.0      | 1:17/1.0                                     | (4.6) 92%    | @ 28.5' SEAM             |   |
|   | 2,820.5       | 34.6                |          | 1:04/1.0<br>1:09/1.0<br>0:53/1.0<br>0:45/1.0 | (2.1) 42%    |                          |   |
|   |               |                     |          |  |              |                          | Boring Terminated at Elevation 2,820.5 ft IN CRYSTALLINE ROCK, MUSCOVITE GNEISS |

| WBS 34518.1.3   |               | TIP R-2915B         |          | COUNTY ASHE                                  |              | GEOLOGIST Elliott, D. C. |   |
|---|---------------|---------------------|----------|--|--------------|--------------------------|---|
| SITE DESCRIPTION BRIDGE #4 ON US 221 OVER S. FORK OF NEW RIVER (OVERFLOW) |               |                     |          |  |              |                          | GROUND WTR (ft)   |
| BORING NO. EB2-B  |               | STATION 234+40      |          | OFFSET 45 ft RT                              |              | ALIGNMENT -L-            |   |
| COLLAR ELEV. 2,855.8 ft   |               | TOTAL DEPTH 25.0 ft |          | NORTHING 934,287                             |              | EASTING 1,263,782        |   |
| DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009                |               |                     |          | DRILL METHOD NW Casing W/SPT & Core          |              | HAMMER TYPE Automatic    |   |
| DRILLER Coffey, Jr., C.   |               | START DATE 08/27/13 |          | COMP. DATE 08/27/13                          |              | SURFACE WATER DEPTH N/A  |   |
| CORE SIZE NXWL  |               |                     |          | TOTAL RUN 8.9 ft                             |              |                          |   |
| ELEV (ft)   | RUN ELEV (ft) | DEPTH (ft)          | RUN (ft) | DRILL RATE (Min/ft)                          | RUN REC. (%) | RQD (%)                  | DESCRIPTION AND REMARKS   |
| 2839.7  | 2,839.7       | 16.1                | 3.9      | 0:20/0.9                                     | (1.0) 26%    | (0.0) 0%                 | <p>Begin Coring @ 16.1 ft<br/>CRYSTALLINE ROCK (continued)</p>                  |
| 2835  | 2,835.8       | 20.0                |          | 0:17/1.0<br>0:31/1.0<br>0:21/1.0             |              |                          |   |
|   |               |                     | 5.0      | 0:23/1.0                                     | (3.6) 72%    | (1.1) 22%                |   |
|   | 2,830.8       | 25.0                |          | 0:29/1.0<br>0:41/1.0<br>0:32/1.0<br>0:46/1.0 |              |                          |   |
|   |               |                     |          |  |              |                          | Boring Terminated at Elevation 2,830.8 ft IN CRYSTALLINE ROCK, MUSCOVITE GNEISS |

NCDOT CORE DOUBLE R2915B\_BRD64\_BORELOGS.GPJ NC\_DOT\_GDT 9/23/13

R-2915B, 34518.1.3

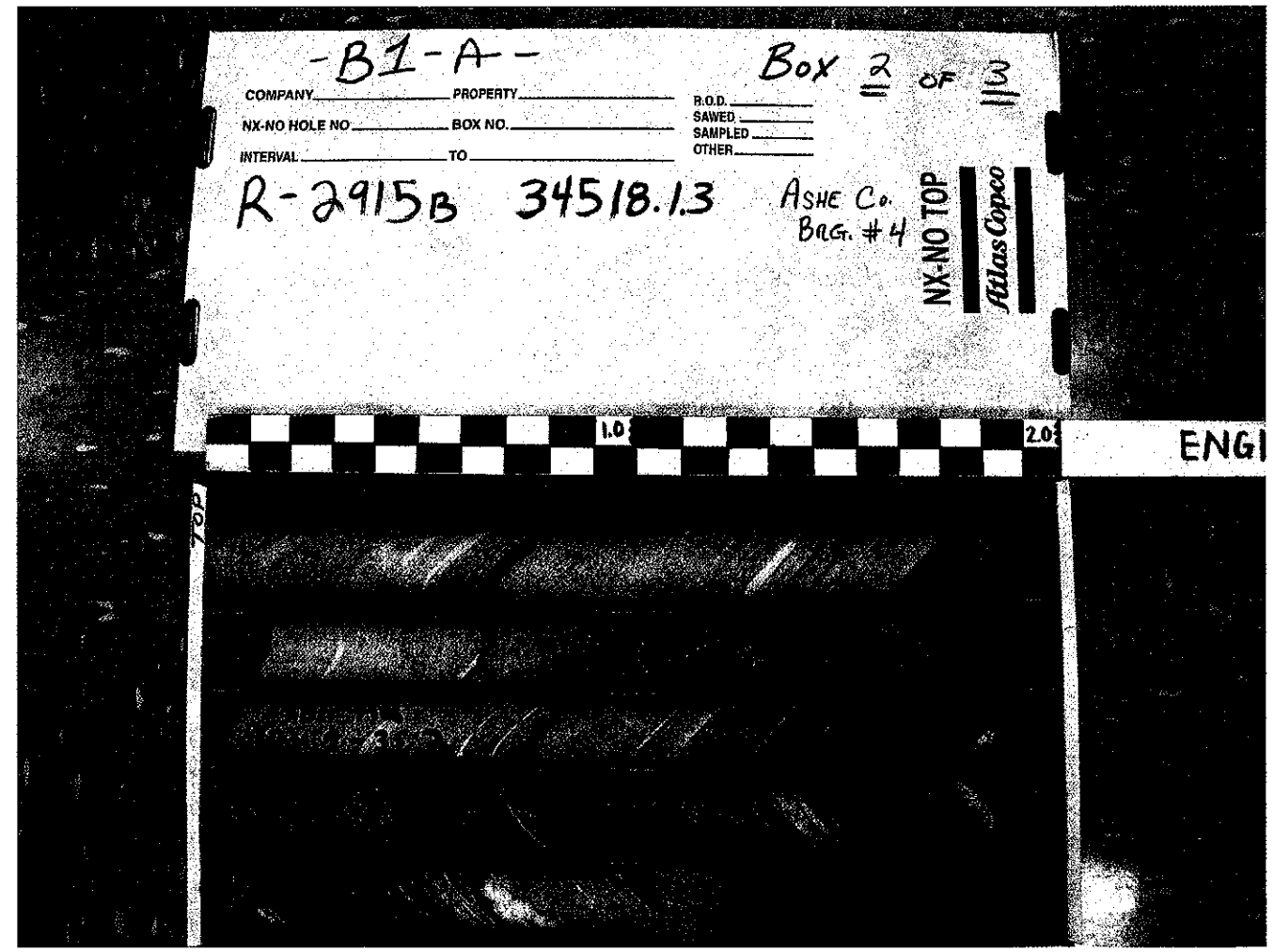
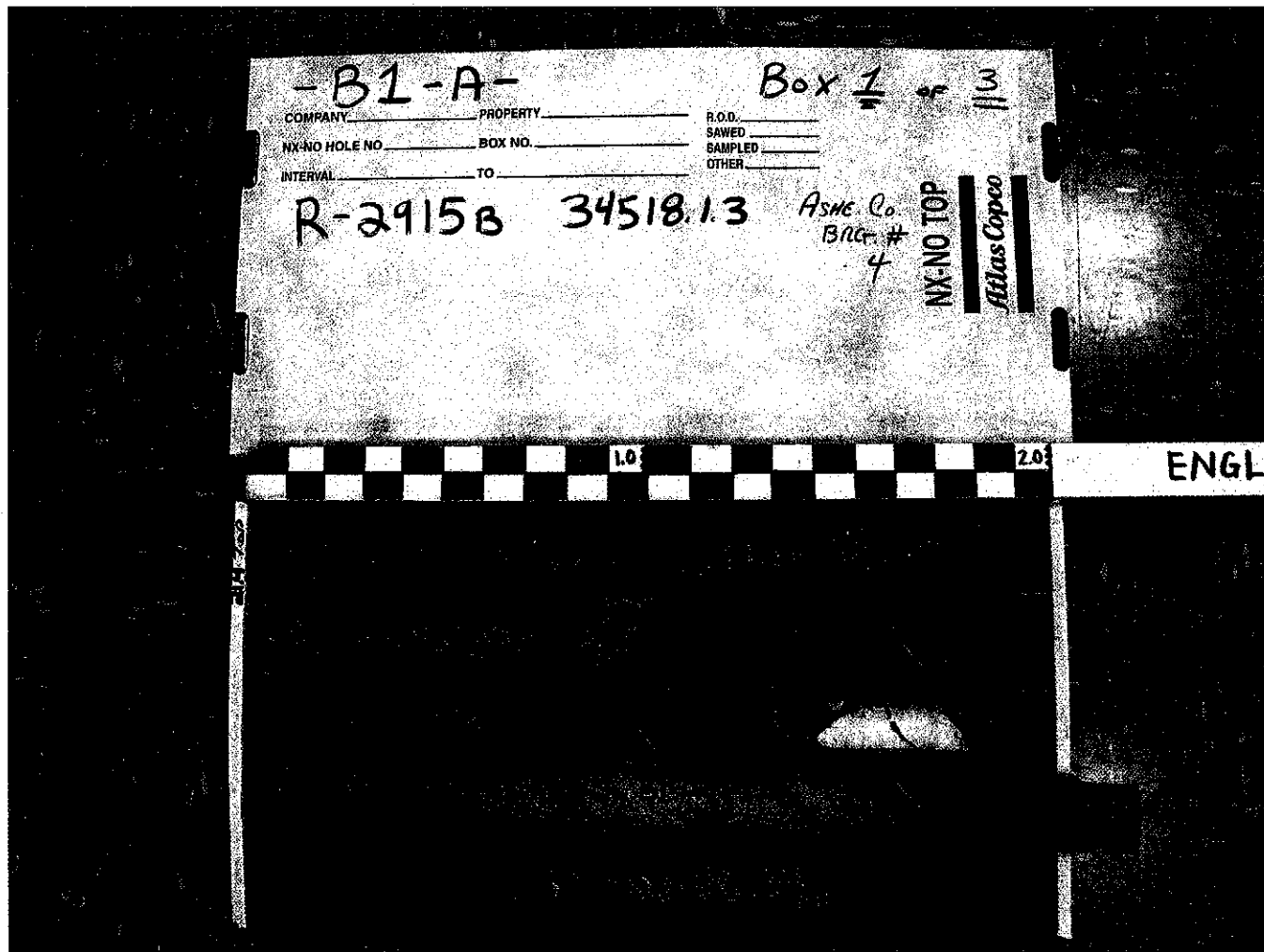
BORING B1-A  
BOX 1 OF 3

DEPTH: 21.4' - 30.0'

R-2915B, 34518.1.3

BORING B1-A  
BOX 2 OF 3

DEPTH: 30.0' - 39.5'





R-2915B, 34518.13

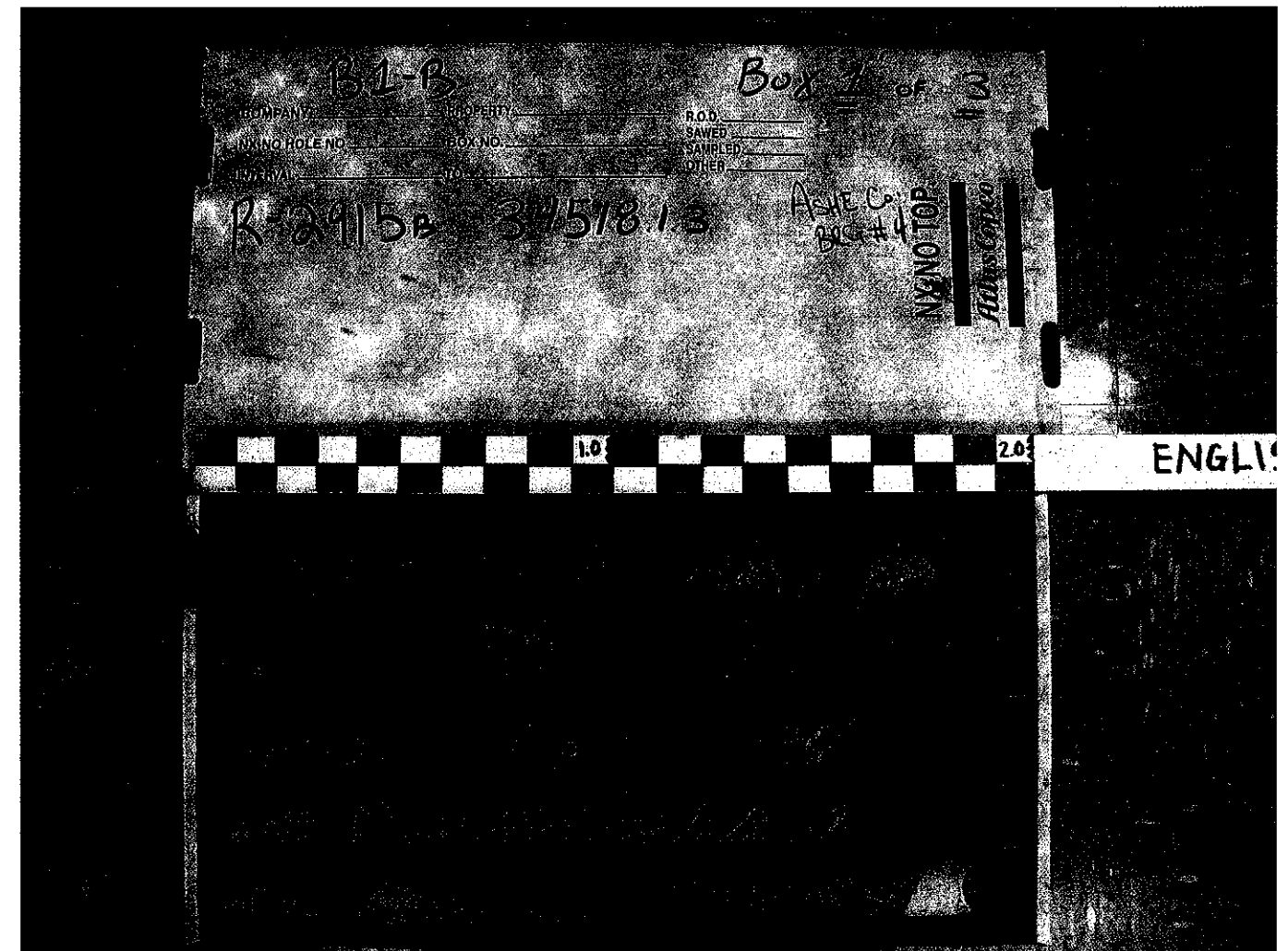
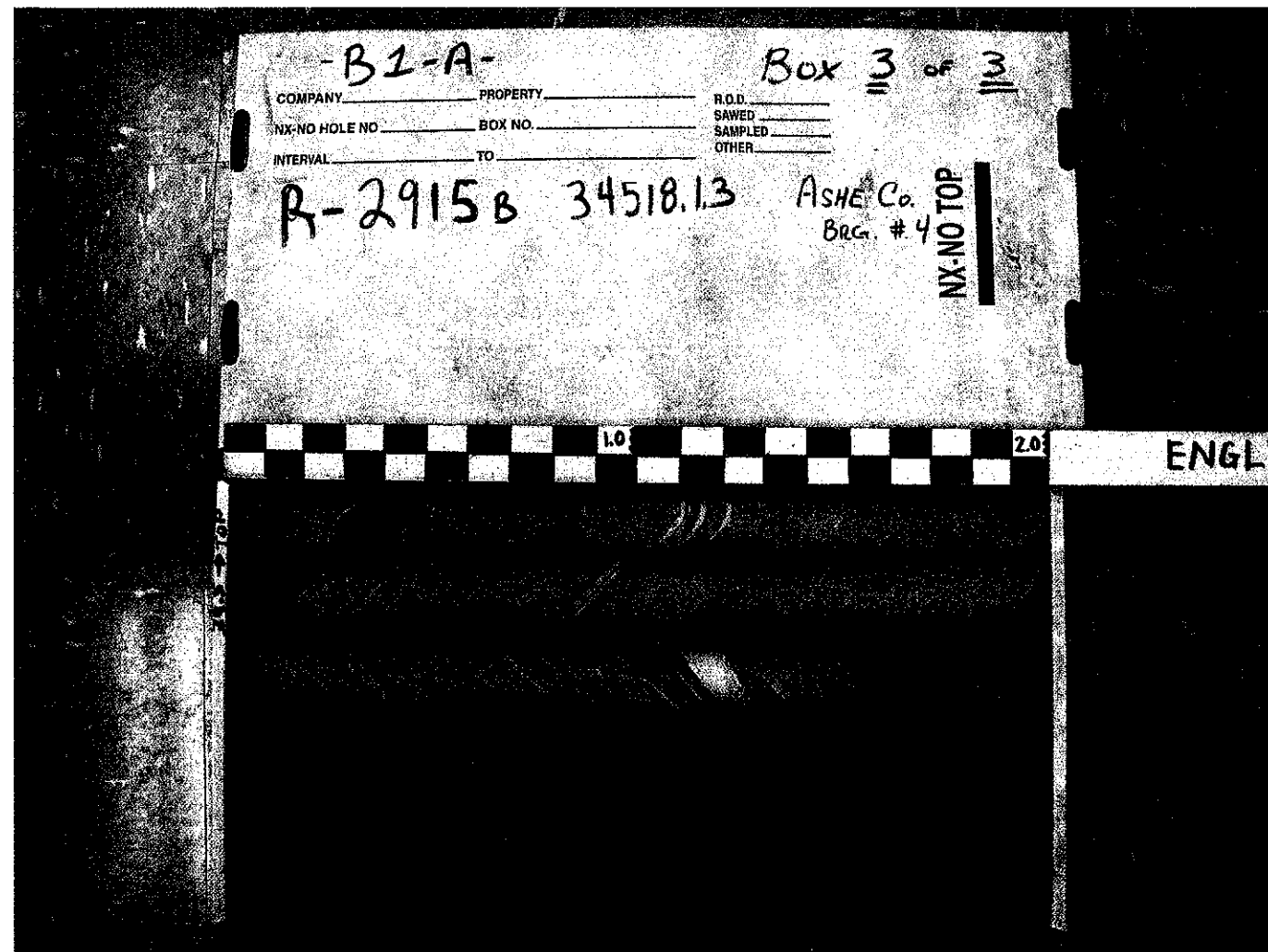
BORING B1-A  
BOX 3 OF 3

DEPTH: 39.5' - 44.5'

R-2915B, 34518.13

BORING B1-B  
BOX 1 OF 3

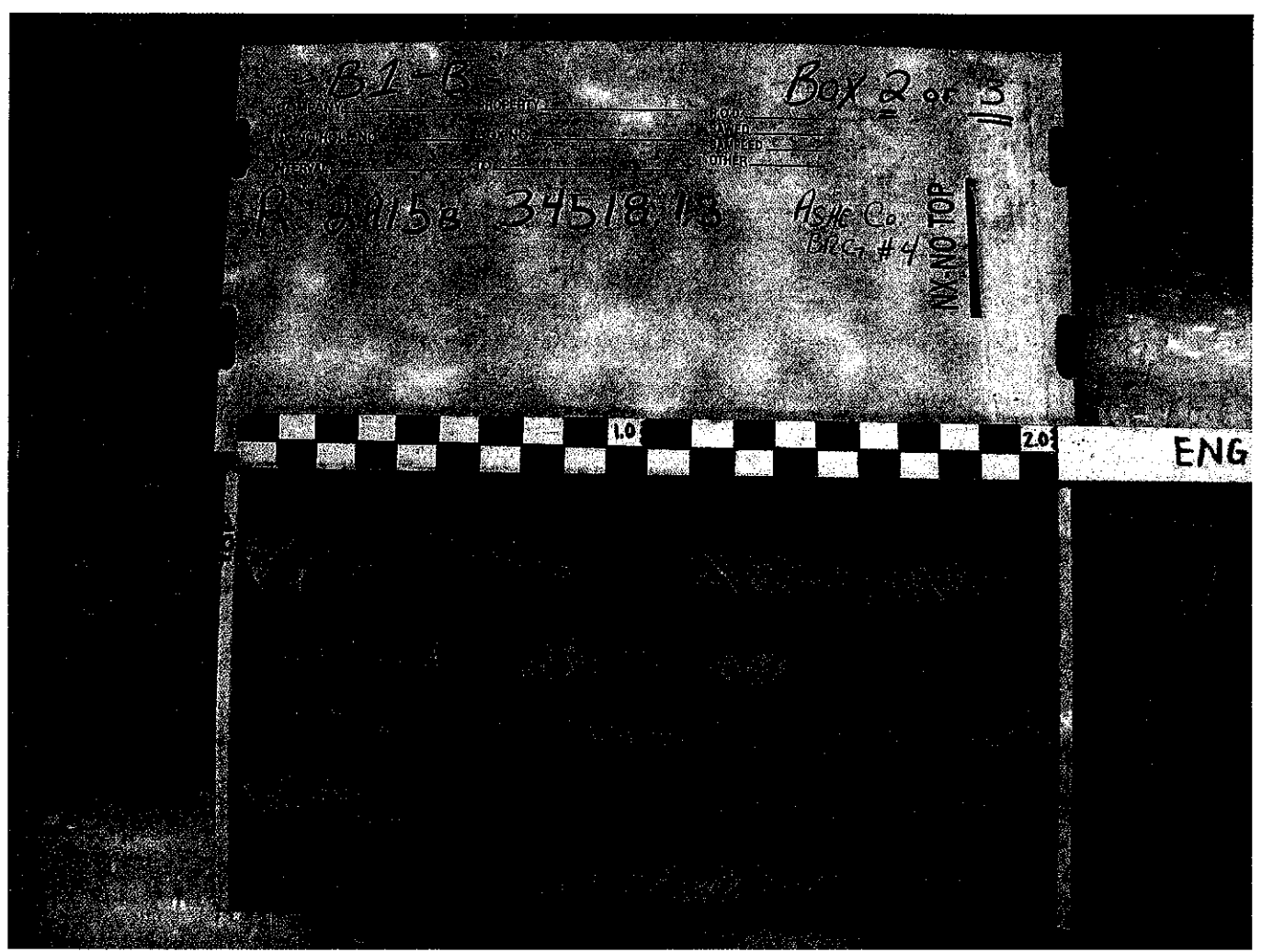
DEPTH: 21.8' - 38.9'



R-2915B, 34518.1.3

BORING B1-B  
BOX 2 OF 3

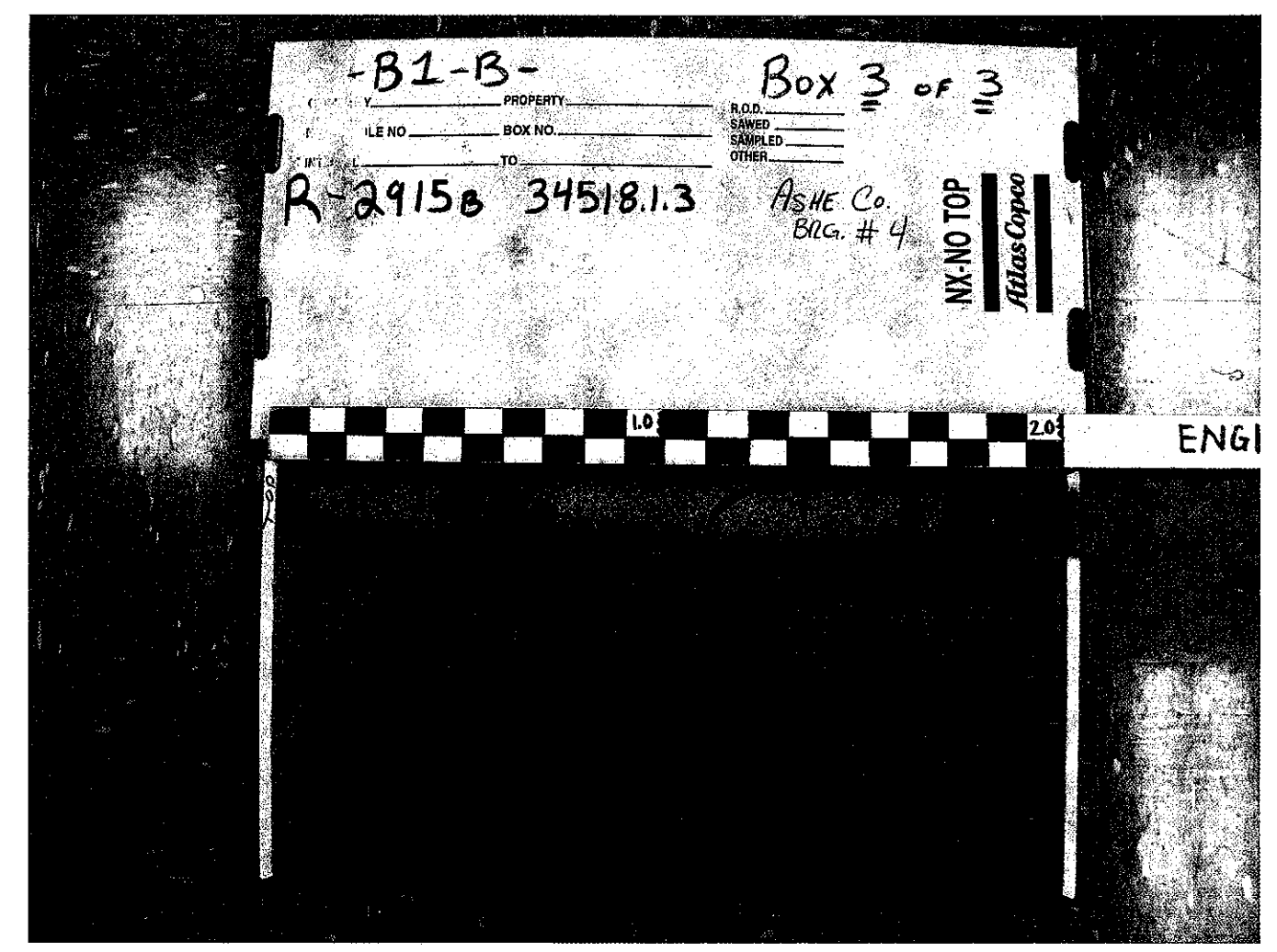
DEPTH: 38.9' - 47.9'



34518.1.3

BORING B1-B  
BOX 3 OF 3

DEPTH: 47.9' - 49.9'



R-2915B, 34518.1.3

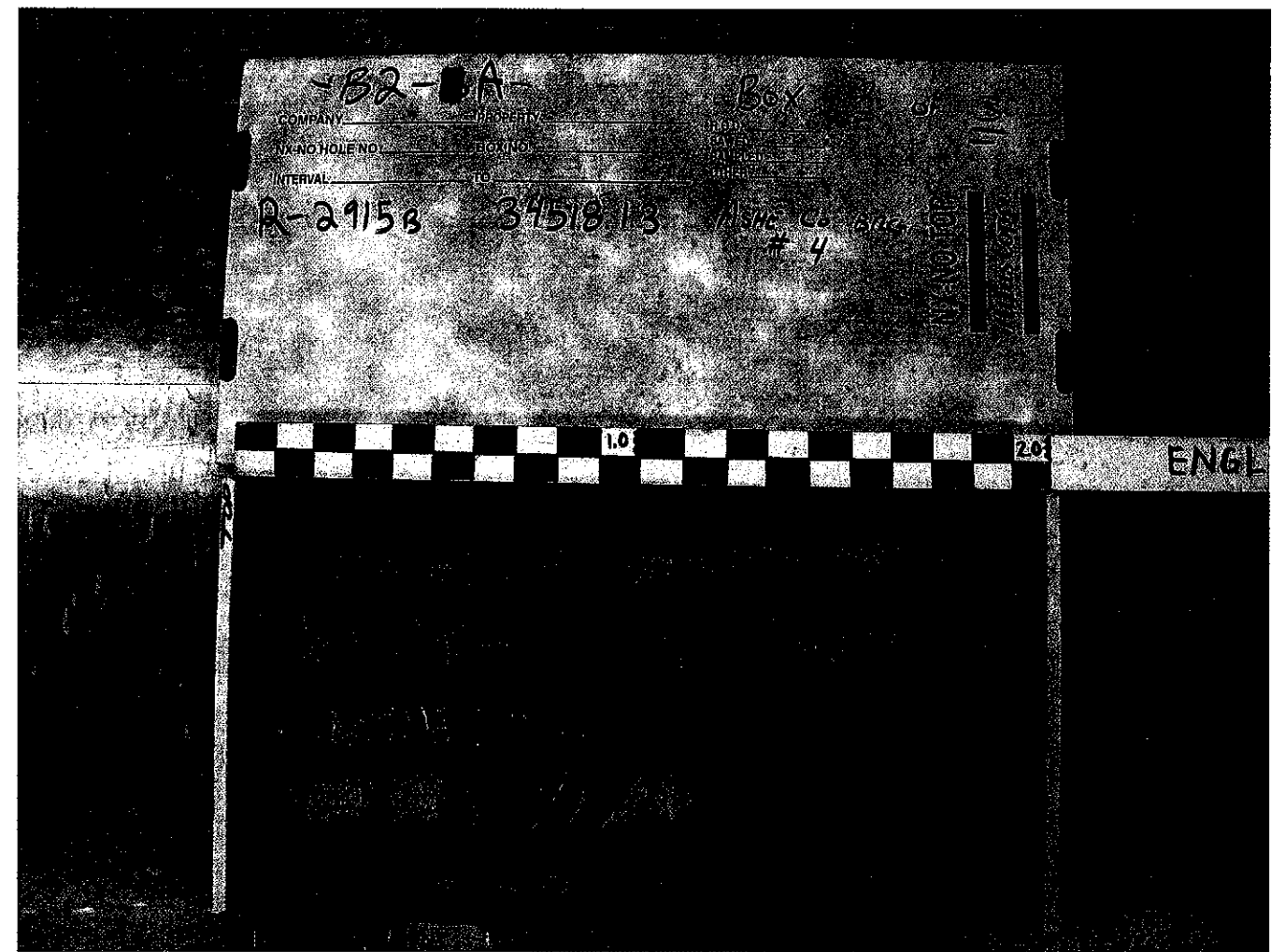
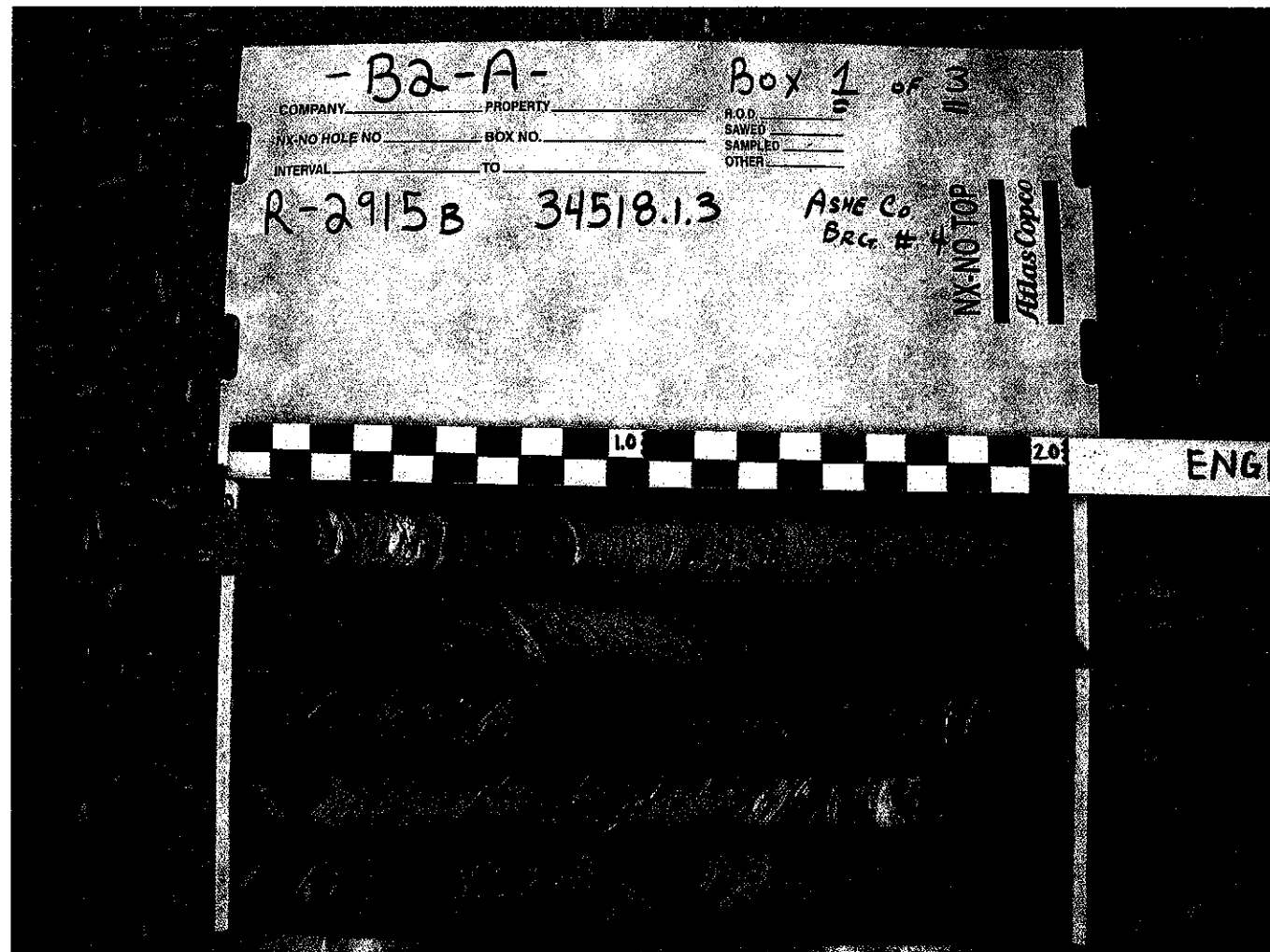
BORING B2-A  
BOX 1 OF 3

DEPTH: 21.3' - 31.6'

R-2915B, 34518.1.3

BORING B2-A  
BOX 2 OF 3

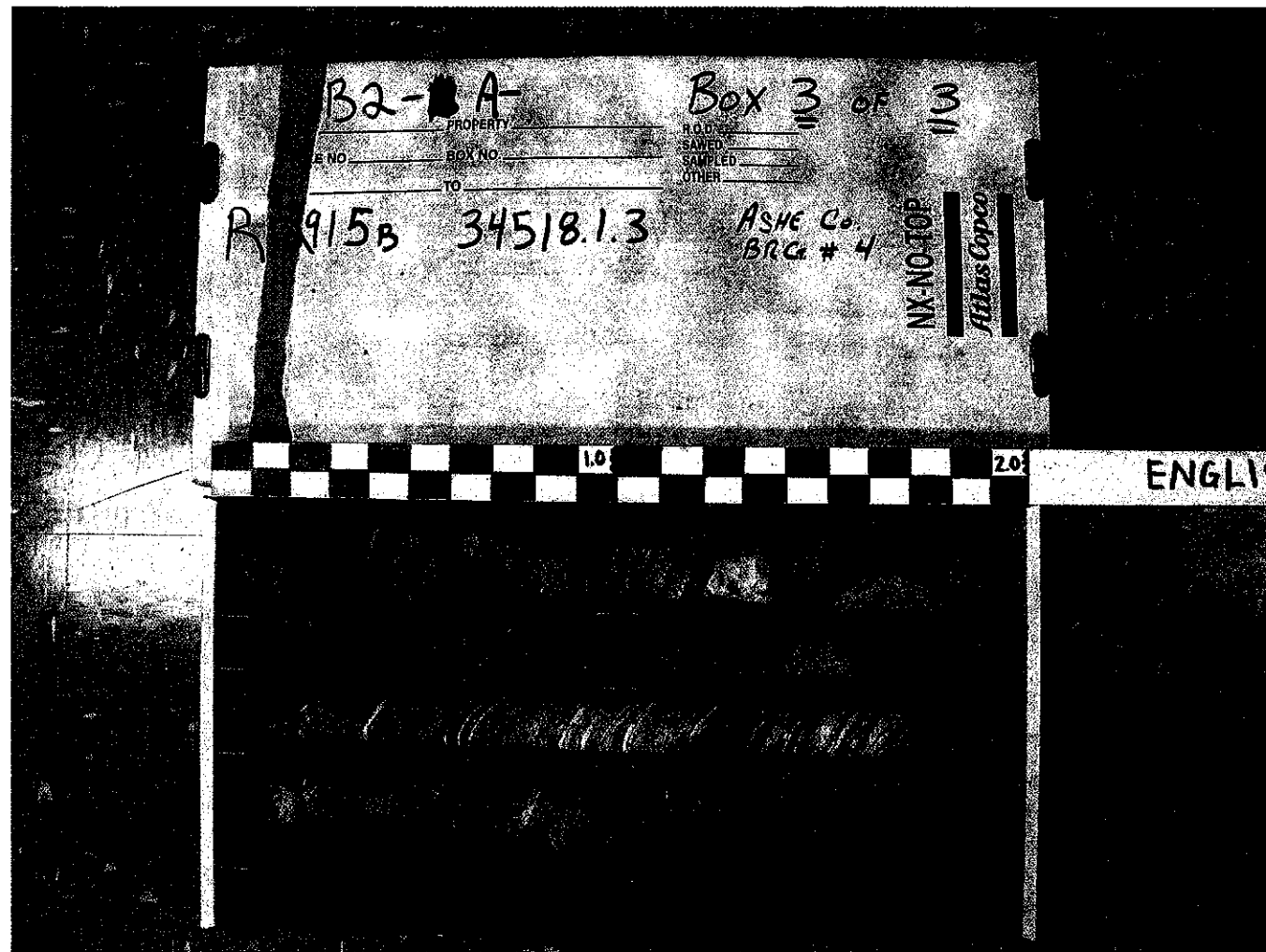
DEPTH: 31.6' - 42.0'



R-2915B, 34518.1.3

BORING B2-A  
BOX 3 OF 3

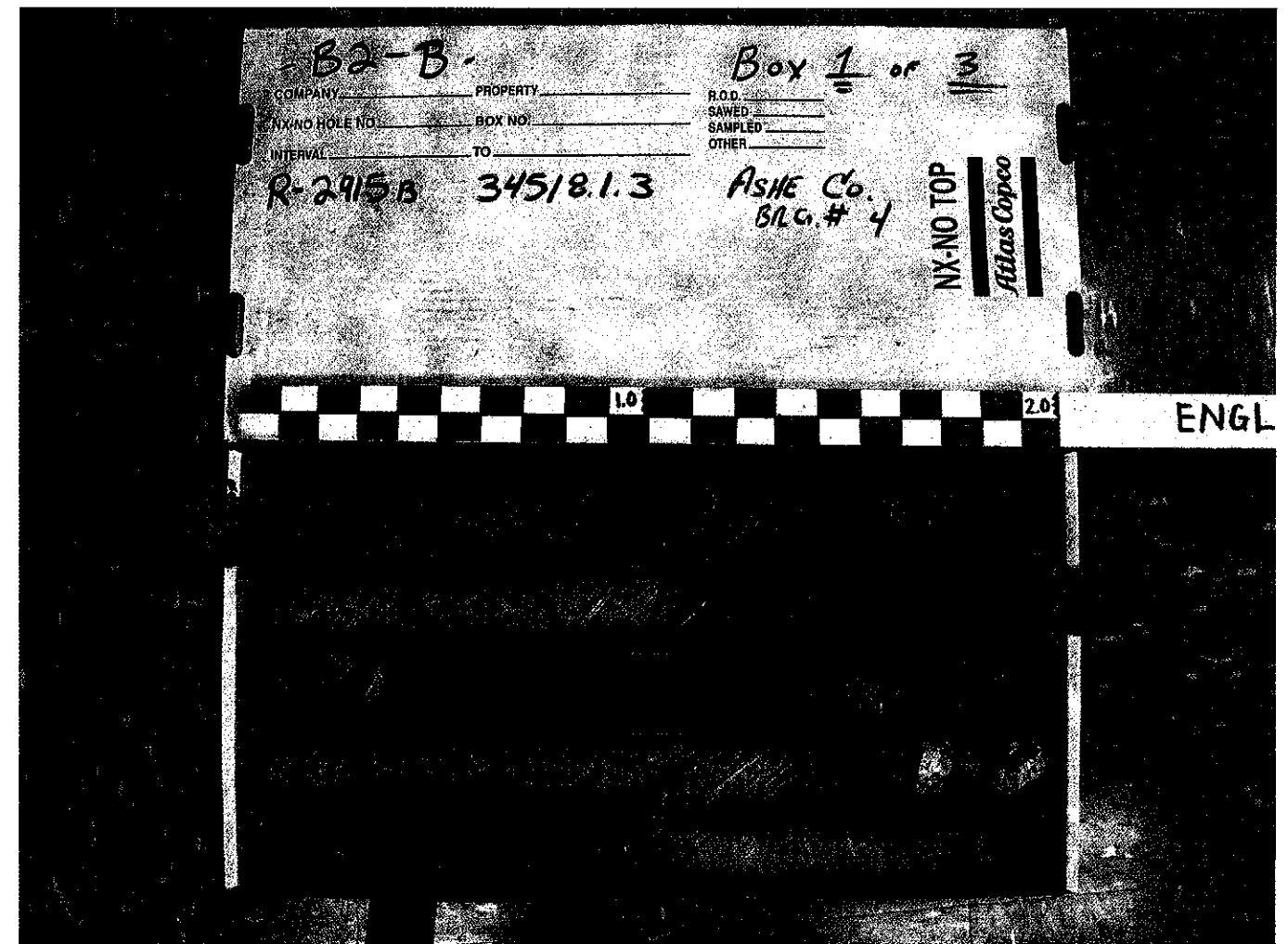
DEPTH: 42.0' - 50.0'



R-2915B, 34518.1.3

BORING B2-B  
BOX 1 OF 3

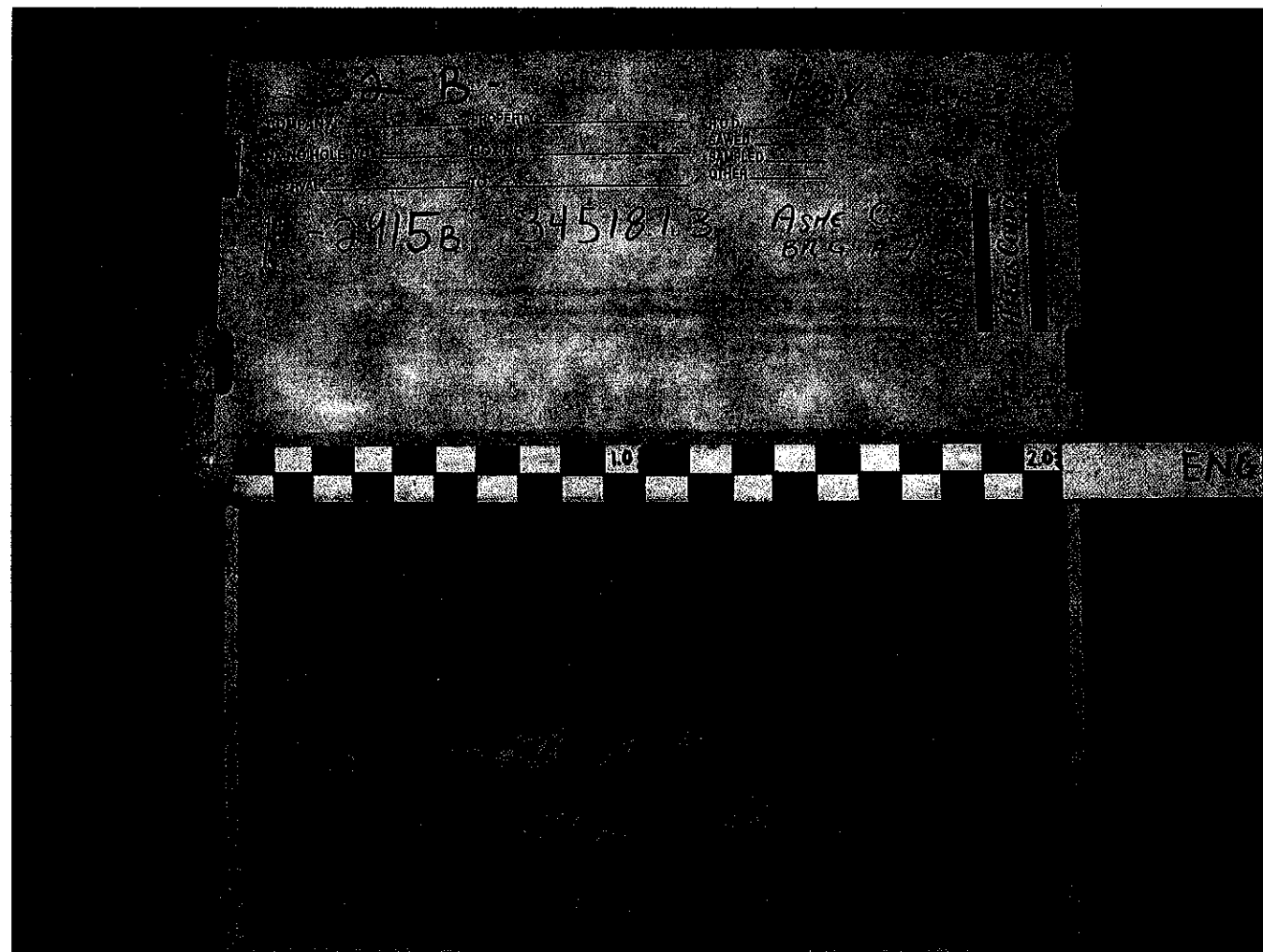
DEPTH: 21.4' - 31.7'



R-2915B, 34518.1.3

BORING B2-B  
BOX 2 OF 3

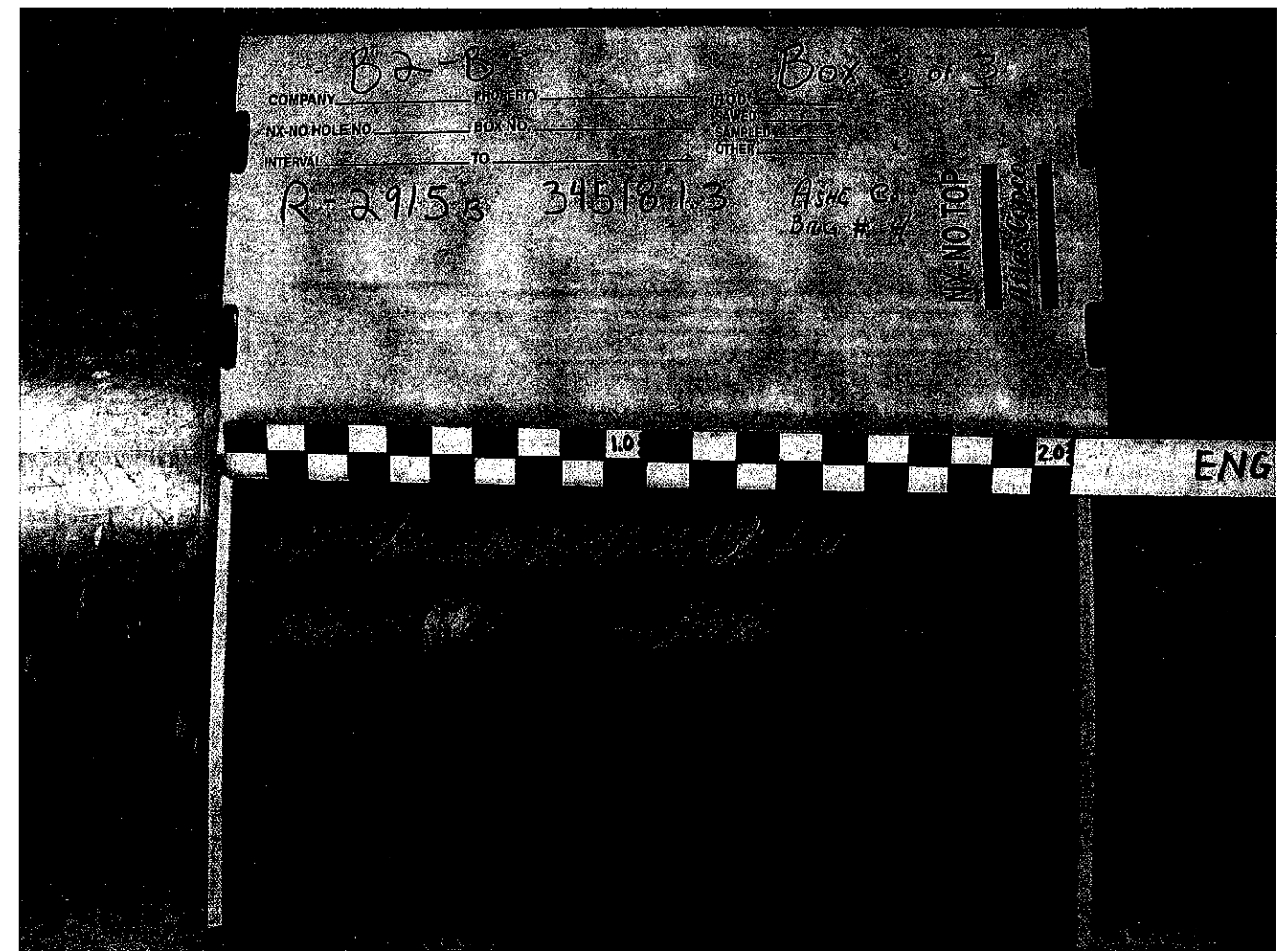
DEPTH: 31.7' - 41.9'



R-2915B, 34518.1.3

BORING B2-B  
BOX 3 OF 3

DEPTH: 41.9' - 44.9'





R-2915B, 34518.1.3

BORING EB1-B  
BOX 1 OF 1

DEPTH: 26.5' - 34.6'

R-2915B, 34518.1.3

BORING EB2-B  
BOX 1 OF 1

DEPTH: 16.1' - 25.0'

