

REFERENCE: BR-0011

PROJECT: 67011

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0011	1	8

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	CROSS SECTIONS
6-8	BORE LOGS

COUNTY CHEROKEE
PROJECT DESCRIPTION REPLACE BRIDGE #0002
ON NC-141 OVER SLOW CREEK

SITE DESCRIPTION _____

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 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. 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.

PERSONNEL

C.D. JOHNSON

D.O. CHEEK

C.J. COFFEY

INVESTIGATED BY D.M. MULLEN

DRAWN BY DMM

CHECKED BY J.C. KUHNE

SUBMITTED BY JCK

DATE 8/21/2019



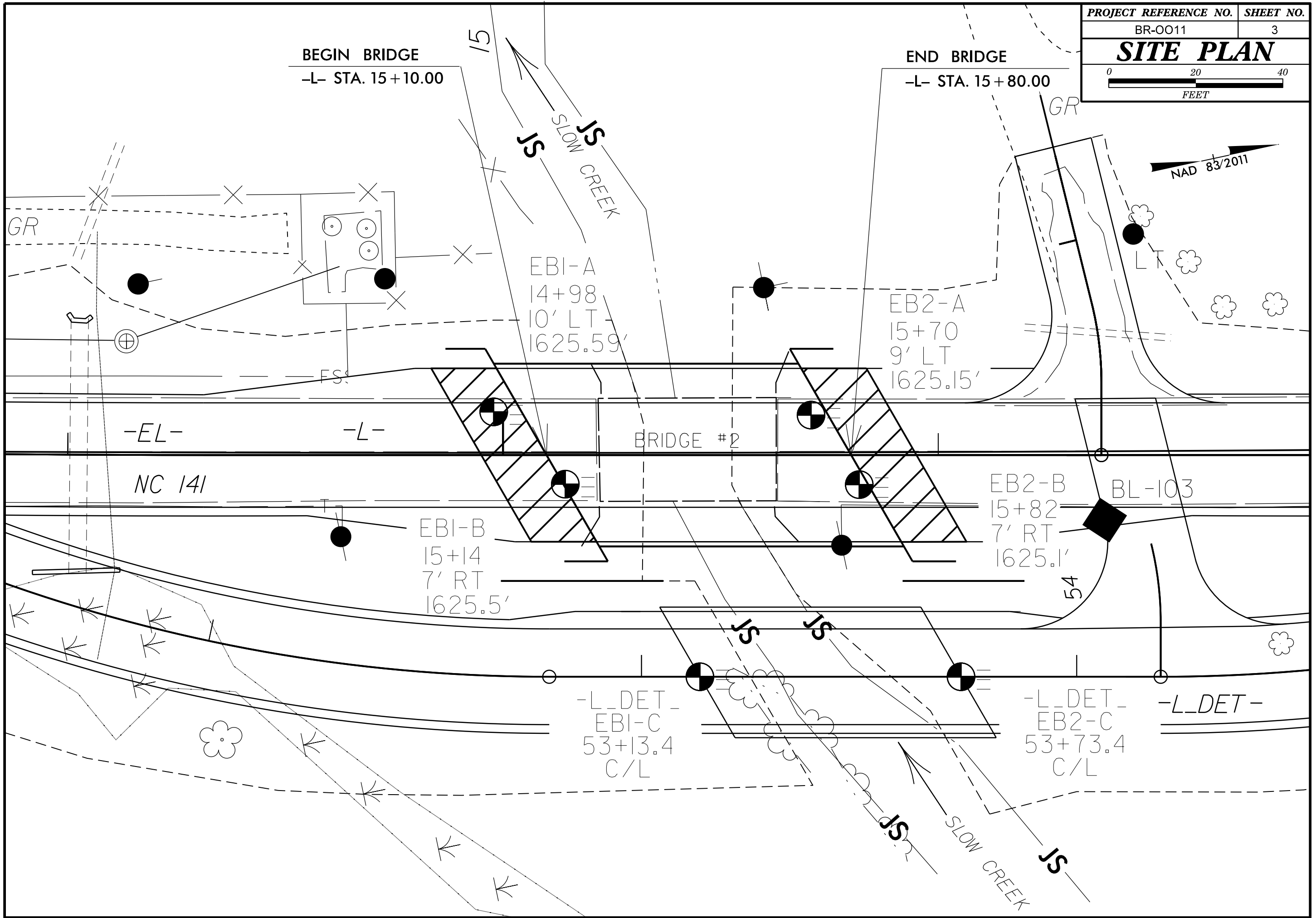
DocuSigned by:
D Matt Mullen 8/21/2019

18909BD3CD440C... SIGNATURE DATE

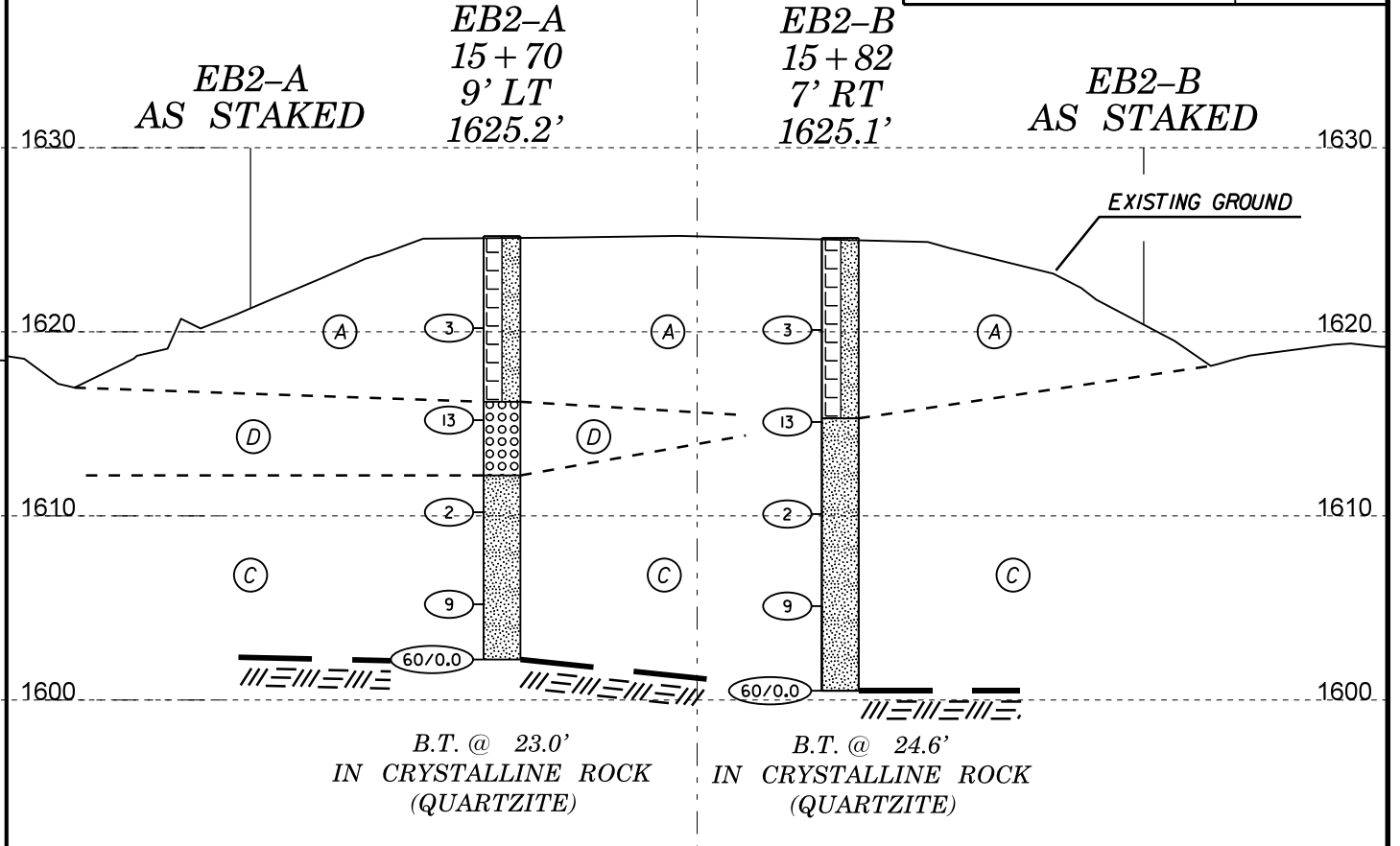
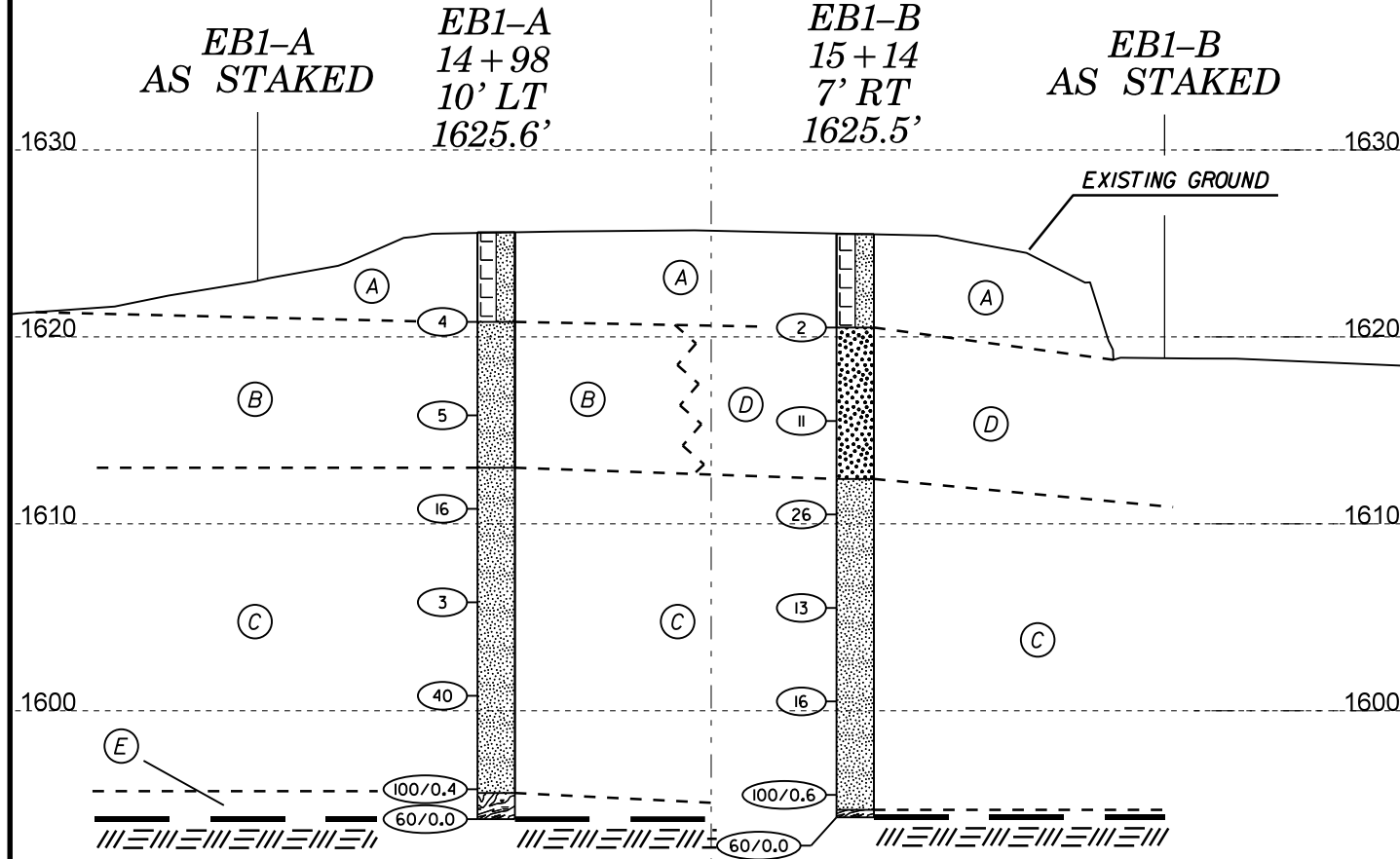
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

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

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
SOIL LEGEND AND AASHTO CLASSIFICATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>SYMBOL</th> <th>A-1</th> <th>A-1-b</th> <th>A-3</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <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>○</td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td></td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 10 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td></td> <td>- 6 MX</td> <td>- NP</td> <td>40 MX 41 MN 10 MX</td> <td>41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GROUP INDEX</td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td></td> <td>STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</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>GEN. RATING AS SUBGRADE</td> <td></td> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATURABLE</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="4" style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</td> </tr> <tr> <td colspan="4" style="text-align: center;">CONSISTENCY OR DENSENESS</td> </tr> <tr> <td>PRIMARY SOIL TYPE</td> <td>COMPACTNESS OR CONSISTENCY</td> <td>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</td> <td>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</td> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> <tr> <td colspan="4" style="text-align: center;">TEXTURE OR GRAIN SIZE</td> </tr> <tr> <td>U.S. STD. SIEVE SIZE OPENING (MM)</td> <td>4 4.76</td> <td>10 2.00</td> <td>40 0.42</td> <td>60 0.25</td> <td>200 0.075</td> <td>270 0.053</td> </tr> <tr> <td>BOULDER (BLDR.)</td> <td>COBBLE (COB.)</td> <td>GRAVEL (GR.)</td> <td>COARSE SAND (CS, SD.)</td> <td>FINE SAND (F SD.)</td> <td>SILT (SL.)</td> <td>CLAY (CL.)</td> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305 IN. 12</td> <td>75 3</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> <tr> <td colspan="4" style="text-align: center;">SOIL MOISTURE - CORRELATION OF TERMS</td> </tr> <tr> <td>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</td> <td>FIELD MOISTURE DESCRIPTION</td> <td>GUIDE FOR FIELD MOISTURE DESCRIPTION</td> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PLASTIC RANGE (PI)</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td colspan="4" style="text-align: center;">PLASTICITY</td> </tr> <tr> <td>NON PLASTIC</td> <td>PLASTICITY INDEX (PI) 0-5</td> <td>DRY STRENGTH VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> <tr> <td colspan="4" style="text-align: center;">COLOR</td> </tr> <tr> <td colspan="4">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.</td> </tr> <tr> <td colspan="4" style="text-align: center;">GRADATION</td> </tr> <tr> <td colspan="4">WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</td> </tr> <tr> <td colspan="4" style="text-align: center;">ANGULARITY OF GRAINS</td> </tr> <tr> <td colspan="4">THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</td> </tr> <tr> <td colspan="4" style="text-align: center;">MINERALOGICAL COMPOSITION</td> </tr> <tr> <td colspan="4">MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</td> </tr> <tr> <td colspan="4" style="text-align: center;">COMPRESSIBILITY</td> </tr> <tr> <td colspan="4">SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</td> </tr> <tr> <td colspan="4" style="text-align: center;">PERCENTAGE OF MATERIAL</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <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 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">GROUND WATER</td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td colspan="4" style="text-align: center;">MISCELLANEOUS SYMBOLS</td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td colspan="4" style="text-align: center;">RECOMMENDATION SYMBOLS</td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td colspan="4" style="text-align: center;">ABBREVIATIONS</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>UW - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>UW - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td></td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td></td> </tr> <tr> <td>HI. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">EQUIPMENT USED ON SUBJECT PROJECT</td> </tr> <tr> <td colspan="4"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * STEEL TEETH</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * TUNG-CARB.</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> </td> </tr> <tr> <td colspan="4" style="text-align: center;">ROCK HARDNESS</td> </tr> <tr> <td colspan="4">VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> </tr> <tr> <td colspan="4">HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> </tr> <tr> <td colspan="4">MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</td> </tr> <tr> <td colspan="4">MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</td> </tr> <tr> <td colspan="4">SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</td> </tr> <tr> <td colspan="4">VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</td> </tr> <tr> <td colspan="4" style="text-align: center;">ROCK HARDNESS</td> </tr> <tr> <td colspan="2" style="text-align: center;">FRACTURE SPACING</td> <td colspan="2" style="text-align: center;">BEDDING</td> </tr> <tr> <td>TERM</td> <td>SPACING</td> <td>TERM</td> <td>THICKNESS</td> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> <tr> <td colspan="4" style="text-align: center;">INDURATION</td> </tr> <tr> <td colspan="4">FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</td> </tr> <tr> <td colspan="4">FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td colspan="4">MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td colspan="4">INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td colspan="4">EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> <tr> <td colspan="4" style="text-align: center;">NOTES:</td> </tr> <tr> <td colspan="4" style="text-align: center;">BENCH MARK: BL-103</td> </tr> <tr> <td colspan="4" style="text-align: center;">ELEVATION: 1623.65 FEET</td> </tr> <tr> <td colspan="4" style="text-align: right;">DATE: 8-15-14</td> </tr> </table>				GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS			GROUP CLASS.	SYMBOL	A-1	A-1-b	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	% PASSING #10 #40 #200		50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN						MATERIAL PASSING #40 LL PI		- 6 MX	- NP	40 MX 41 MN 10 MX	41 MN 11 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN						GROUP INDEX		0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX								USUAL TYPES OF MAJOR MATERIALS		STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS												GEN. RATING AS SUBGRADE		EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE								PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30				CONSISTENCY OR DENSENESS				PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A	GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4	TEXTURE OR GRAIN SIZE				U.S. STD. SIEVE SIZE OPENING (MM)	4 4.76	10 2.00	40 0.42	60 0.25	200 0.075	270 0.053	BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CS, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)	GRAIN SIZE	MM 305 IN. 12	75 3	2.0	0.25	0.05	0.005	SOIL MOISTURE - CORRELATION OF TERMS				SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	PL - PLASTIC LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	PLASTICITY				NON PLASTIC	PLASTICITY INDEX (PI) 0-5	DRY STRENGTH VERY LOW	SLIGHTLY PLASTIC	6-15	SLIGHT	MODERATELY PLASTIC	16-25	MEDIUM	HIGHLY PLASTIC	26 OR MORE	HIGH	COLOR				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.				GRADATION				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.				ANGULARITY OF GRAINS				THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				MINERALOGICAL COMPOSITION				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.				COMPRESSIBILITY				SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50				PERCENTAGE OF MATERIAL				<table border="1" style="width: 100%; border-collapse: collapse;"> <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 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>				ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE	GROUND WATER								MISCELLANEOUS SYMBOLS								RECOMMENDATION SYMBOLS								ABBREVIATIONS				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>UW - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>UW - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td></td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td></td> </tr> <tr> <td>HI. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </table>				AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST	BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED	CL - CLAY	MOD. - MODERATELY	UW - UNIT WEIGHT	CPT - CONE PENETRATION TEST	NP - NON PLASTIC	UW - DRY UNIT WEIGHT	CSE - COARSE	ORG. - ORGANIC		DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST		DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC		e - VOID RATIO	SD. - SAND, SANDY		F - FINE	SL. - SILT, SILTY		FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY		FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL		FRAGS. - FRAGMENTS	w - MOISTURE CONTENT		HI. - HIGHLY	V - VERY		EQUIPMENT USED ON SUBJECT PROJECT				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * STEEL TEETH</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * TUNG-CARB.</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>				DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input checked="" type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER		<input type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS		<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS		<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS			<input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER			<input type="checkbox"/> TRICONE * STEEL TEETH			<input type="checkbox"/> TRICONE * TUNG-CARB.			<input type="checkbox"/> CORE BIT					ROCK HARDNESS				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.				MODERATELY HARD 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.				MEDIUM HARD 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.				SOFT 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.				VERY SOFT 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.				ROCK HARDNESS				FRACTURE SPACING		BEDDING		TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	INDURATION				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				FRIABLE 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.				NOTES:				BENCH MARK: BL-103				ELEVATION: 1623.65 FEET				DATE: 8-15-14			
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
GROUP CLASS.	SYMBOL	A-1	A-1-b	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
% PASSING #10 #40 #200		50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
MATERIAL PASSING #40 LL PI		- 6 MX	- NP	40 MX 41 MN 10 MX	41 MN 11 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN	40 MX 41 MN 11 MN																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
GROUP INDEX		0	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
USUAL TYPES OF MAJOR MATERIALS		STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
GEN. RATING AS SUBGRADE		EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
CONSISTENCY OR DENSENESS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
GENERALLY GRANULAR MATERIAL (NON-COHESSIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
TEXTURE OR GRAIN SIZE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
U.S. STD. SIEVE SIZE OPENING (MM)	4 4.76	10 2.00	40 0.42	60 0.25	200 0.075	270 0.053																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CS, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
GRAIN SIZE	MM 305 IN. 12	75 3	2.0	0.25	0.05	0.005																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
SOIL MOISTURE - CORRELATION OF TERMS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
PL - PLASTIC LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
PLASTICITY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
NON PLASTIC	PLASTICITY INDEX (PI) 0-5	DRY STRENGTH VERY LOW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
SLIGHTLY PLASTIC	6-15	SLIGHT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
MODERATELY PLASTIC	16-25	MEDIUM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
HIGHLY PLASTIC	26 OR MORE	HIGH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
COLOR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
GRADATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
ANGULARITY OF GRAINS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
MINERALOGICAL COMPOSITION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
COMPRESSIBILITY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
PERCENTAGE OF MATERIAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <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 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>				ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
GROUND WATER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
MISCELLANEOUS SYMBOLS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
RECOMMENDATION SYMBOLS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
ABBREVIATIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICACEOUS</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>UW - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>UW - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td></td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td></td> </tr> <tr> <td>HI. - HIGHLY</td> <td>V - VERY</td> <td></td> </tr> </table>				AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST	BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED	CL - CLAY	MOD. - MODERATELY	UW - UNIT WEIGHT	CPT - CONE PENETRATION TEST	NP - NON PLASTIC	UW - DRY UNIT WEIGHT	CSE - COARSE	ORG. - ORGANIC		DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST		DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC		e - VOID RATIO	SD. - SAND, SANDY		F - FINE	SL. - SILT, SILTY		FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY		FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL		FRAGS. - FRAGMENTS	w - MOISTURE CONTENT		HI. - HIGHLY	V - VERY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
CL - CLAY	MOD. - MODERATELY	UW - UNIT WEIGHT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	UW - DRY UNIT WEIGHT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
CSE - COARSE	ORG. - ORGANIC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
e - VOID RATIO	SD. - SAND, SANDY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
F - FINE	SL. - SILT, SILTY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
HI. - HIGHLY	V - VERY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
EQUIPMENT USED ON SUBJECT PROJECT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-45C</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> CME-55</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> VANE SHEAR TEST</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * STEEL TEETH</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> TRICONE * TUNG-CARB.</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>				DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input checked="" type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER		<input type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS		<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS		<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS			<input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER			<input type="checkbox"/> TRICONE * STEEL TEETH			<input type="checkbox"/> TRICONE * TUNG-CARB.			<input type="checkbox"/> CORE BIT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
<input checked="" type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
<input type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	<input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	<input type="checkbox"/> TRICONE * STEEL TEETH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	<input type="checkbox"/> TRICONE * TUNG-CARB.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	<input type="checkbox"/> CORE BIT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
ROCK HARDNESS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
MODERATELY HARD 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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
MEDIUM HARD 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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
SOFT 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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
VERY SOFT 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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
ROCK HARDNESS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
FRACTURE SPACING		BEDDING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
TERM	SPACING	TERM	THICKNESS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
INDURATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
FRIABLE 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.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
NOTES:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
BENCH MARK: BL-103																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
ELEVATION: 1623.65 FEET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
DATE: 8-15-14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												



NAD 83/2011

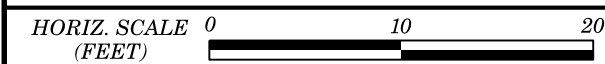


- (A) SLIGHTLY MICACEOUS SANDY SILT ROADWAY EMBANKMENT (A-4)
- (B) SLIGHTLY MICACEOUS, CLAYEY, SANDY SILT ALLUVIUM WITH A FEW PEBBLES AND GRAVELS (A-4)
- (C) SLIGHTLY MICACEOUS, SANDY SILT SAPROLITE WITH A FEW WEATHERED ROCK LAYERS (A-4)
- (D) SLIGHTLY MICACEOUS, CLAYEY, SILTY SAND ALLUVIUM WITH A FEW PEBBLES AND GRAVELS (A-2)
- (E) WEATHERED ROCK (SCHIST)

- (A) SLIGHTLY MICACEOUS SANDY SILT ROADWAY EMBANKMENT (A-4)
- (B) SLIGHTLY MICACEOUS, CLAYEY, SANDY SILT ALLUVIUM WITH A FEW PEBBLES AND GRAVELS (A-4)
- (C) SLIGHTLY MICACEOUS, SANDY SILT SAPROLITE WITH A FEW WEATHERED ROCK LAYERS (A-4)
- (D) SLIGHTLY MICACEOUS, CLAYEY, SILTY SAND ALLUVIUM WITH A FEW PEBBLES AND GRAVELS (A-2)

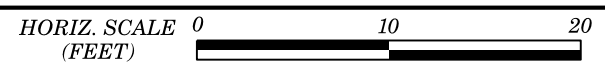
⊥ SKREW = 60 DEG.

⊥ SKREW = 60 DEG.



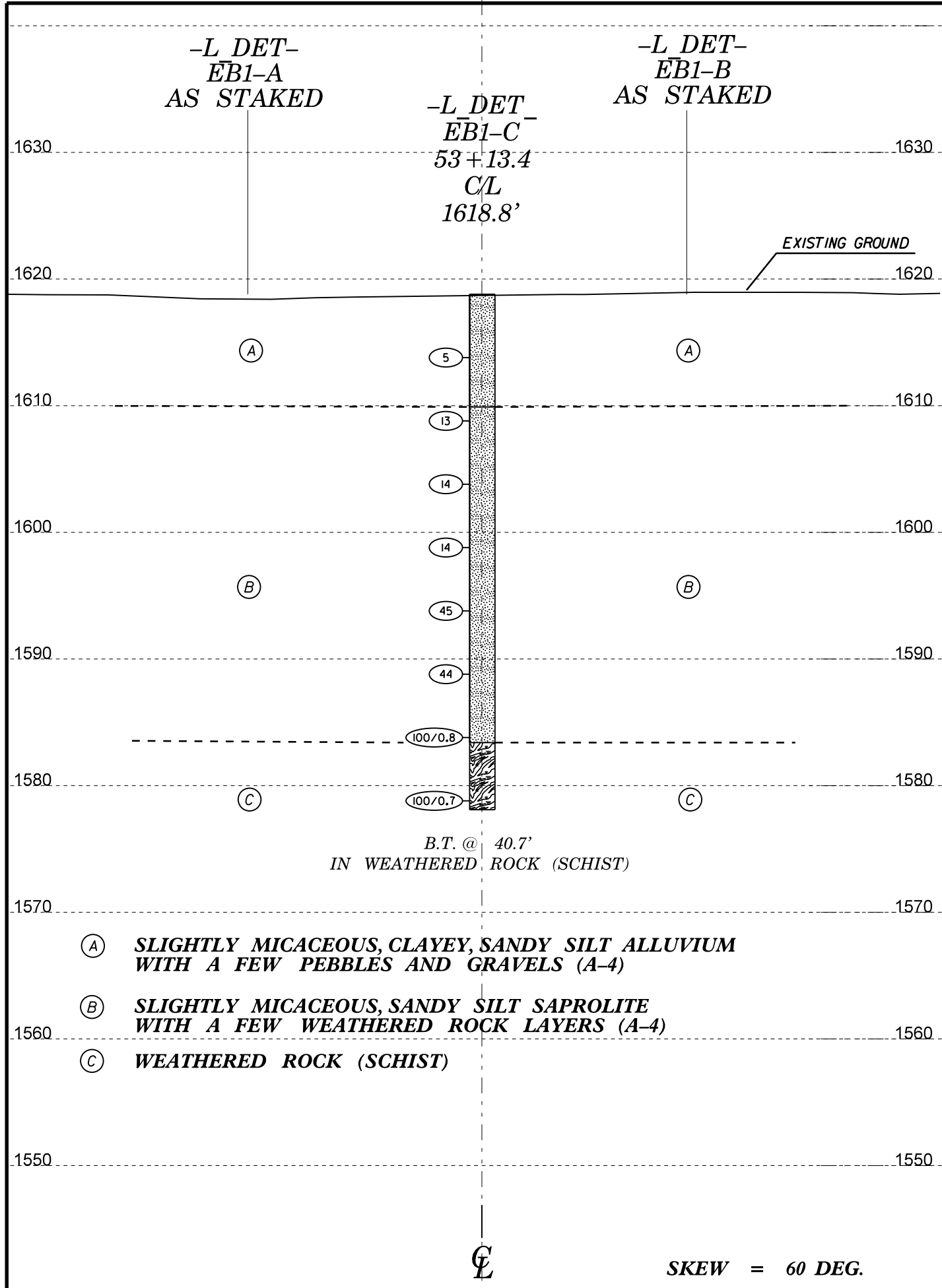
VE = 1H:1V

SECTION ALONG -L- END BENT 1

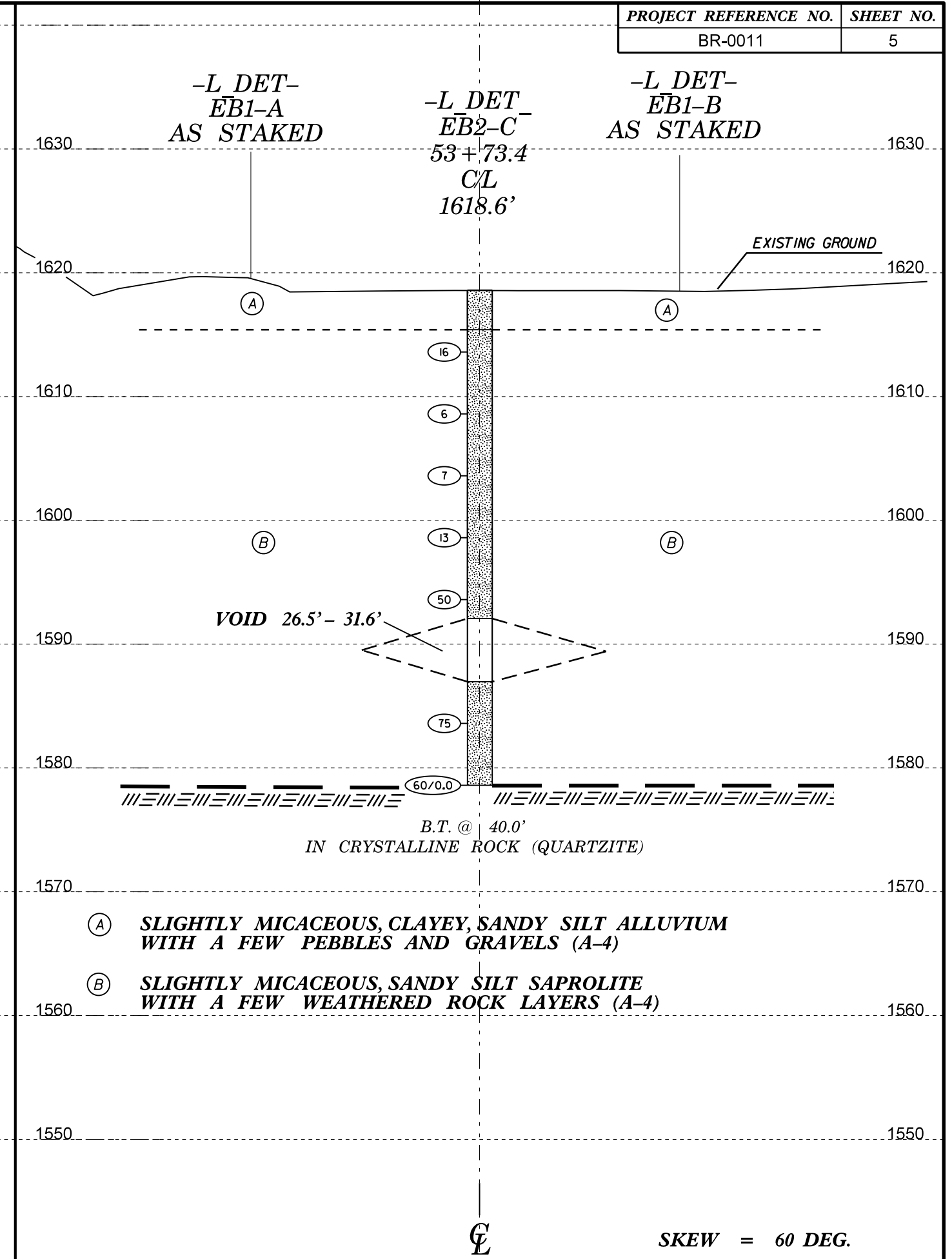


VE = 1H:1V

SECTION ALONG -L- END BENT 2



HORIZ. SCALE 0 10 20 (FEET) VE = 1H:1V SECTION ALONG -L_DET- E.B. 1



HORIZ. SCALE 0 10 20 (FEET) VE = 1H:1V SECTION ALONG -L_DET- E.B. 2

- (A) SLIGHTLY MICACEOUS, CLAYEY, SANDY SILT ALLUVIUM WITH A FEW PEBBLES AND GRAVELS (A-4)
- (B) SLIGHTLY MICACEOUS, SANDY SILT SAPROLITE WITH A FEW WEATHERED ROCK LAYERS (A-4)
- (C) WEATHERED ROCK (SCHIST)

- (A) SLIGHTLY MICACEOUS, CLAYEY, SANDY SILT ALLUVIUM WITH A FEW PEBBLES AND GRAVELS (A-4)
- (B) SLIGHTLY MICACEOUS, SANDY SILT SAPROLITE WITH A FEW WEATHERED ROCK LAYERS (A-4)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67011.1.1		TIP BR-0011		COUNTY CHEROKEE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION REPLACE BRDG #0002 ON NC-141 OVER SLOW CREEK							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 14+98		OFFSET 10 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 1,625.6 ft		TOTAL DEPTH 31.4 ft		NORTHING 526,949		EASTING 521,303									
DRILL RIG/HAMMER EFF./DATE AFC6744 CME - 45C 92% 07/31/2017			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 07/08/19		COMP. DATE 07/08/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1630															
1625														1,625.6	0.0
1620	1,620.8	4.8	1	2	2									1,620.8	4.8
1615	1,615.8	9.8	1	3	2										
1610	1,610.8	14.8	5	8	8									1,613.0	12.6
1605	1,605.8	19.8	1	2	1										
1600	1,600.8	24.8	14	18	22										
1595	1,595.8	29.8	100/0.4											1,595.6	30.0
	1,594.2	31.4	60/0.0											1,594.2	31.4

WBS 67011.1.1		TIP BR-0011		COUNTY CHEROKEE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION REPLACE BRDG #0002 ON NC-141 OVER SLOW CREEK							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 15+14		OFFSET 7 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 1,625.5 ft		TOTAL DEPTH 31.2 ft		NORTHING 526,962		EASTING 521,322									
DRILL RIG/HAMMER EFF./DATE AFC6744 CME - 45C 92% 07/31/2017			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 07/08/19		COMP. DATE 07/08/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1630															
1625														1,625.5	0.0
1620	1,620.5	5.0	1	1	1									1,620.5	5.0
1615	1,615.5	10.0	2	6	5										
1610	1,610.5	15.0	8	13	13									1,612.4	13.1
1605	1,605.5	20.0	13	8	5										
1600	1,600.5	25.0	3	7	9										
1595	1,595.5	30.0	22	50	50/0.1									1,594.7	30.8
	1,594.3	31.2	60/0.0											1,594.3	31.2

NCDOT BORE DOUBLE BR0011_GEO_CHEROKEE_BH.GPJ NC_DOT.GDT 8/19/19

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67011.1.1		TIP BR-0011		COUNTY CHEROKEE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION REPLACE BRDG #0002 ON NC-141 OVER SLOW CREEK							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 15+70		OFFSET 9 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 1,625.2 ft		TOTAL DEPTH 23.0 ft		NORTHING 527,020		EASTING 521,318									
DRILL RIG/HAMMER EFF./DATE AFC6744 CME - 45C 92% 07/31/2017			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 07/08/19		COMP. DATE 07/08/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1630															
1625														1,625.2	0.0
1620	1,620.2	5.0	1	2	1								M	ROADWAY EMBANKMENT DK ORANGE, SL MIC, SLT-CL w/FEW GRVLS, TR MnO	
1615	1,615.2	10.0	4	6	7								M	ALLUVIAL GREY, PEBS/GRVLS W/SND, TR SLT	9.0
1610	1,610.2	15.0	1	1	1								M	SAPROLITE RED-BROWN TO BRN-BLACK, SND-SLT w/FEW PEBS, TR V. PLASTIC CL LAYERS	13.0
1605	1,605.2	20.0	2	3	6								M		
	1,602.2	23.0											M	CRYSTALLINE ROCK CRYSTALLINE ROCK (QUARTZITE) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,602.2 ft ON CRYSTALLINE ROCK (QUARTZITE)	23.0

WBS 67011.1.1		TIP BR-0011		COUNTY CHEROKEE		GEOLOGIST Johnson, C. D.									
SITE DESCRIPTION REPLACE BRDG #0002 ON NC-141 OVER SLOW CREEK							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 15+82		OFFSET 7 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 1,625.1 ft		TOTAL DEPTH 24.6 ft		NORTHING 527,028		EASTING 521,336									
DRILL RIG/HAMMER EFF./DATE AFC6744 CME - 45C 92% 07/31/2017			DRILL METHOD NW Casing w/ SPT			HAMMER TYPE Automatic									
DRILLER Cheek, D. O.		START DATE 07/08/19		COMP. DATE 07/08/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1630															
1625														1,625.1	0.0
1620	1,620.1	5.0	1	2	1								M	ROADWAY EMBANKMENT ASPHALT/BASE MATERIAL, RED-BRN, SL MIC, SND-SLT, w/TR CL, FEW PEBS	
1615	1,615.1	10.0	WOH	4	5								M	SAPROLITE BROWN-BLACK, SL MIC, SND-SLT	9.8
1610	1,610.1	15.0		4	5								M		
1605	1,605.1	20.0	6	5	5								M		
	1,600.5	24.6											M	CRYSTALLINE ROCK CRYSTALLINE ROCK (QUARTZITE) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,600.5 ft ON CRYSTALLINE ROCK (QUARTZITE)	24.6

NCDOT BORE DOUBLE BR0011_GEO_CHEROKEE_BH.GPJ NC_DOT.GDT 8/19/19

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67011.1.1		TIP BR-0011		COUNTY CHEROKEE		GEOLOGIST Johnson, C. D.											
SITE DESCRIPTION REPLACE BRDG #0002 ON NC-141 OVER SLOW CREEK							GROUND WTR (ft)										
BORING NO. -LDET- EB1-C		STATION 53+13.4		OFFSET C/L		ALIGNMENT -L_DET-											
0 HR.		3.0		24 HR.		FIAD											
COLLAR ELEV. 1,618.8 ft		TOTAL DEPTH 40.7 ft		NORTHING 526,983		EASTING 521,372											
DRILL RIG/HAMMER EFF./DATE AFC6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Cheek, D. O.		START DATE 07/09/19		COMP. DATE 07/09/19		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
1620															1,618.8	0.0	GROUND SURFACE
1615	1,613.8	5.0	5	2	3								M				ALLUVIAL BROWN, SL MIC, SND-SLT, SOME PEBS
1610	1,608.8	10.0	5	5	8								M		1,609.9	8.9	SAPROLITE BROWN-BLK, SL MIC, SND-SLT, w/TR CL THROUGHOUT
1605	1,603.8	15.0	6	6	8								M				
1600	1,598.8	20.0	3	6	8								M				
1595	1,593.8	25.0	8	18	27								M				
1590	1,591.8	27.0	12	20	24								M				
1585	1,588.8	30.0	NO DRIVE										M				
1580	1,583.8	35.0	48	52/0.3									M		1,583.4	35.4	WEATHERED ROCK BLACK-GREY WEA SCHIST
	1,578.8	40.0	51	49/0.2											1,578.1	40.7	Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,578.1 ft IN WEATHERED ROCK (GREY SCHIST)

WBS 67011.1.1		TIP BR-0011		COUNTY CHEROKEE		GEOLOGIST Johnson, C. D.												
SITE DESCRIPTION REPLACE BRDG #0002 ON NC-141 OVER SLOW CREEK							GROUND WTR (ft)											
BORING NO. -L_DET- EB2-C		STATION 53+73.4		OFFSET C/L		ALIGNMENT -L_DET-												
0 HR.		2.3		24 HR.		FIAD												
COLLAR ELEV. 1,618.6 ft		TOTAL DEPTH 40.0 ft		NORTHING 527,042		EASTING 521,384												
DRILL RIG/HAMMER EFF./DATE AFC6744 CME - 45C 92% 07/31/2017				DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic												
DRILLER Cheek, D. O.		START DATE 07/09/19		COMP. DATE 07/09/19		SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100								
1620															1,618.6	0.0	GROUND SURFACE	
1615	1,613.6	5.0	4	8	8								M		1,615.4	3.2	ALLUVIAL BROWN, SND-SLT w/GRVLS, CBLS	
1610	1,608.6	10.0	3	3	3								M				SAPROLITE BROWN-BLK, SL MIC, SND-SLT w/TR MnO	
1605	1,603.6	15.0	3	3	4								M					
1600	1,598.6	20.0	3	6	7								M					
1595	1,593.6	25.0	8	28	22								M					
1590	1,588.6	30.0	NO DRIVE										M				IN/OUT V. SOFT MATERIAL/VOID 26.5'-31.6'	
1585	1,584.8	33.8	16	38	37								M		1,587.0	31.6		
1580	1,578.6	40.0	NO DRIVE															CRYSTALLINE ROCK CRYSTALLINE ROCK (SCHIST) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,578.6 ft ON CRYSTALLINE ROCK (QUARTZITE)

NCDOT BORE DOUBLE BR0011_GEO_CHEROKEE_BH.GPJ_NC_DOT.GDT 8/19/19