

PROJECT: 17BP.3.R.53

REFERENCE: 810148

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STRUCTURE

SUBSURFACE INVESTIGATION

COUNTY SAMPSON

PROJECT DESCRIPTION BRIDGE NO.148 ON -L-

(SR 1434) OVER MILL SWAMP AT STA.18+70.5

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C. | 810148 | 1 | 7 |

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 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.

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 - 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.

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DATE DECEMBER 2016



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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

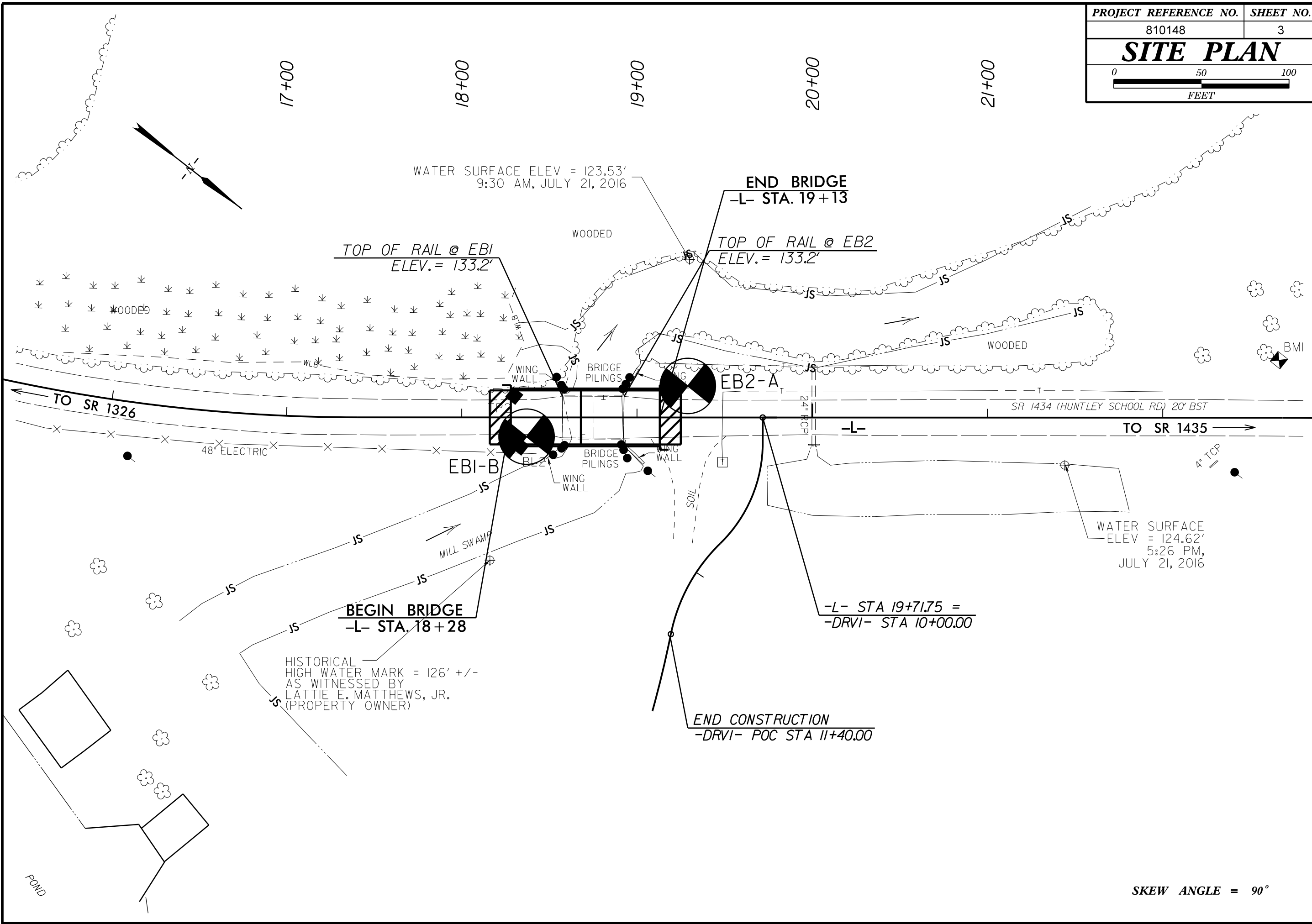
DIVISION OF HIGHWAYS

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SUBSURFACE INVESTIGATION

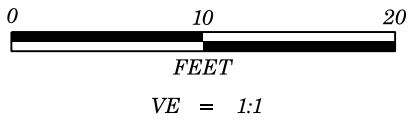
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| SOIL DESCRIPTION | | | | | | | | | | | | GRADATION | | | | | | | | | | | | ROCK DESCRIPTION | | | | | | | | | | | | TERMS AND DEFINITIONS | | | | | | | | | | | |
|---|--|--|--|--|--|---------------------------------|--|--|--|-------------|--|---|--|---|--|--|--|--|--|---|--|----------------------|--|---|--|---|--|--|--|---------------------|--|--|--|---|--|---|--|--------------------------|--|--|--|-----------|--|---|--|--|--|
| 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> | | | | | | | | | | | | 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. | | | | | | | | | | | | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: | | | | | | | | | | | | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. | | | | | | | | | | | |
| SOIL LEGEND AND AASHTO CLASSIFICATION | | | | | | | | | | | | ANGULARITY OF GRAINS | | | | | | | | | | | | WEATHERED ROCK (WR) | | | | | | | | | | | | WEATHERING | | | | | | | | | | | |
| GENERAL CLASS. | | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | ORGANIC MATERIALS | | | | CRYSTALLINE ROCK (CR) | | FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, ONEISS, GABBRO, SCHIST, ETC. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP CLASS. | | A-1-a | | A-1-b | | A-3 | | 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 | | | | | | | | | | | | | | | | | |
| SYMBOL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| % PASSING | | #10 | | #40 | | #200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MATERIAL PASSING #40 | | LL | | PI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP INDEX | | 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 | | | | | | | | | | | | MISCELLANEOUS SYMBOLS | | | | | | | | | | | | ROCK HARDNESS | | | | | | | | | | | | BEDDING | | | | | | | | | | | |
| PRIMARY SOIL TYPE | | COMPACTNESS OR CONSISTENCY | | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | | | | RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²) | | | | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION | | 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES | | SLOPE INDICATOR INSTALLATION | | SEVERE (SEV.) | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | | VERY SEVERE (V SEV.) | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | COMPLETE | | ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE. | | | | | | | | | | | | | | | | | | | |
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | | VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE | | < 4 4 TO 10 10 TO 30 30 TO 50 > 50 | | | | N/A | | | | SOIL SYMBOL | | TEST BORING | | CONE PENETROMETER TEST | | | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | | | | VERY SEVERE (V SEV.) | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | INFERRED SOIL BOUNDARY | | CORE BORING | | SOUNDING ROD | | | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | VERY SEVERE (V SEV.) | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | INFERRED ROCK LINE | | MONITORING WELL | | TEST BORING WITH CORE | | | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | VERY SEVERE (V SEV.) | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | ALLUVIAL SOIL BOUNDARY | | PIEZOMETER INSTALLATION | | SPT N-VALUE | | | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | VERY SEVERE (V SEV.) | | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. | | | | | | | | | | | | | | | | | | | | | |
| TEXTURE OR GRAIN SIZE | | | | | | | | | | | | RECOMMENDATION SYMBOLS | | | | | | | | | | | | ROCK HARDNESS | | | | | | | | | | | | BEDDING | | | | | | | | | | | |
| U.S. STD. SIEVE SIZE OPENING (MM) | | 4 | | 10 | | 40 | | 60 | | 200 | | 270 | | UNDERCUT | | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL | | 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. | | SOFT | | CAN BE GROVED 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 FINGERNAIL. | | | |
| BOULDER (BLDR.) | | COBBLE (COB.) | | GRAVEL (GR.) | | COARSE SAND (CSE. SD.) | | FINE SAND (F SD.) | | SILT (SL.) | | CLAY (CL.) | | SHALLOW UNDERCUT | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. | | SOFT | | CAN BE GROVED 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 FINGERNAIL. | | | | | | | | | | | |
| GRAIN SIZE | | MM 305 | | 75 | | 2.0 | | 0.25 | | 0.05 | | 0.005 | | | | | | | | | | 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. | | SOFT | | CAN BE GROVED 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 FINGERNAIL. | | | | | | | | | | | |
| SOIL MOISTURE - CORRELATION OF TERMS | | | | | | | | | | | | ABBREVIATIONS | | | | | | | | | | | | ROCK HARDNESS | | | | | | | | | | | | BEDDING | | | | | | | | | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | | FIELD MOISTURE DESCRIPTION | | GUIDE FOR FIELD MOISTURE DESCRIPTION | | | | | | | | AR - AUGER REFUSAL | | MED. - MEDIUM | | VST - VANE SHEAR TEST | | TERM | | SPACING | | TERM | | THICKNESS | | VERY WIDE | | MORE THAN 10 FEET | | VERY THICKLY BEDDED | | 4 FEET | | BENCH MARK: BM #1, RR SPIKE IN BASE OF 24" PINE TREE. | | | | | | | | | | | | | |
| CL. - CLAY | | | | | | | | | | | | CL. - CLAY | | MICA - MICACEOUS | | WEA. - WEATHERED | | WIDE | | 3 TO 10 FEET | | THICKLY BEDDED | | 1.5 - 4 FEET | | MODERATELY CLOSE | | 1 TO 3 FEET | | THINLY BEDDED | | 0.16 - 1.5 FEET | | -L- STA. 22+66, 32.9' LT | | | | | | | | | | | | | |
| CPT - CONE PENETRATION TEST | | | | | | | | | | | | CSE. - COARSE | | NP - NON PLASTIC | | W - WEATHERED | | CLOSE | | 0.16 TO 1 FOOT | | VERY THINLY BEDDED | | 0.03 - 0.16 FEET | | VERY CLOSE | | LESS THAN 0.16 FEET | | VERY THINLY BEDDED | | 0.008 - 0.03 FEET | | ELEVATION: 129.01 FEET | | | | | | | | | | | | | |
| DMT - DILATOMETER TEST | | | | | | | | | | | | DMT - DILATOMETER TEST | | ORG. - ORGANIC | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DPT - DYNAMIC PENETRATION TEST | | | | | | | | | | | | DPT - DYNAMIC PENETRATION TEST | | SAP. - SAPROLITIC | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e - VOID RATIO | | | | | | | | | | | | e - VOID RATIO | | SD. - SAND, SANDY | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F - FINE | | | | | | | | | | | | F - FINE | | SL. - SILT, SILTY | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FOSS. - FOSSILIFEROUS | | | | | | | | | | | | FOSS. - FOSSILIFEROUS | | SLR. - SLIGHTLY | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FRAC. - FRACTURED, FRACTURES | | | | | | | | | | | | FRAC. - FRACTURED, FRACTURES | | SLR. - SLIGHTLY | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FRAGS. - FRAGMENTS | | | | | | | | | | | | FRAGS. - FRAGMENTS | | SLR. - SLIGHTLY | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HL. - HIGHLY | | | | | | | | | | | | HL. - HIGHLY | | SLR. - SLIGHTLY | | W - WEATHERED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EQUIPMENT USED ON SUBJECT PROJECT | | | | | | | | | | | | ROCK HARDNESS | | | | | | | | | | | | BEDDING | | | | | | | | | | | | | | | | | | | | | | | |
| DRILL UNITS: | | ADVANCING TOOLS: | | HAMMER TYPE: | | | | | | | | CME-45C | | CLAY BITS | | AUTOMATIC | | MANUAL | | TERM | | SPACING | | TERM | | THICKNESS | | VERY WIDE | | MORE THAN 10 FEET | | VERY THICKLY BEDDED | | 4 FEET | | BENCH MARK: BM #1, RR SPIKE IN BASE OF 24" PINE TREE. | | | | | | | | | | | |
| CME-55 | | 6" CONTINUOUS FLIGHT AUGER | | | | | | | | | | CME-55 | | 8" HOLLOW AUGERS | | CORE SIZE: | | -B | | -H | | WIDE | | 3 TO 10 FEET | | THICKLY BEDDED | | 1.5 - 4 FEET | | MODERATELY CLOSE | | 1 TO 3 FEET | | THINLY BEDDED | | 0.16 - 1.5 FEET | | -L- STA. 22+66, 32.9' LT | | | | | | | | | |
| CME-550 | | HARD FACED FINGER BITS | | | | | | | | | | CME-550 | | TUNG.-CARBIDE INSERTS | | CORE SIZE: | | -B | | -H | | CLOSE | | 0.16 TO 1 FOOT | | VERY THINLY BEDDED | | 0.03 - 0.16 FEET | | VERY CLOSE | | LESS THAN 0.16 FEET | | VERY THINLY BEDDED | | 0.008 - 0.03 FEET | | ELEVATION: 129.01 FEET | | | | | | | | | |
| VANE SHEAR TEST | | CASING | | | | | | | | | | VANE SHEAR TEST | | TRICONE | | CORE SIZE: | | -B | | -H | | CLOSE | | 0.16 TO 1 FOOT | | VERY THINLY BEDDED | | 0.03 - 0.16 FEET | | VERY CLOSE | | LESS THAN 0.16 FEET | | VERY THINLY BEDDED | | 0.008 - 0.03 FEET | | | | | | | | | | | |
| PORTABLE HOIST | | TRICONE | | | | | | | | | | PORTABLE HOIST | | TRICONE | | CORE SIZE: | | -B | | -H | | CLOSE | | 0.16 TO 1 FOOT | | VERY THINLY BEDDED | | 0.03 - 0.16 FEET | | VERY CLOSE | | LESS THAN 0.16 FEET | | VERY THINLY BEDDED | | 0.008 - 0.03 FEET | | | | | | | | | | | |
| | | TRICONE | | | | | | | | | | | | TRICONE | | CORE SIZE: | | -B | | -H | | CLOSE | | 0.16 TO 1 FOOT | | VERY THINLY BEDDED | | 0.03 - 0.16 FEET | | VERY CLOSE | | LESS THAN 0.16 FEET | | VERY THINLY BEDDED | | 0.008 - 0.03 FEET | | | | | | | | | | | |
| | | CORE BIT | | | | | | | | | | | | CORE BIT | | CORE SIZE: | | -B | | -H | | CLOSE | | 0.16 TO 1 FOOT | | VERY THINLY BEDDED | | 0.03 - 0.16 FEET | | VERY CLOSE | | LESS THAN 0.16 FEET | | VERY THINLY BEDDED | | 0.008 - 0.03 FEET | | | | | | | | | | | |
| COLOR | | | | | | | | | | | | INDURATION | | | | | | | | | | | | BEDDING | | | | | | | | | | | | | | | | | | | | | | | |
| DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPREACE. | | | | | | | | | | | | 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. | | | | | | | | | | | |

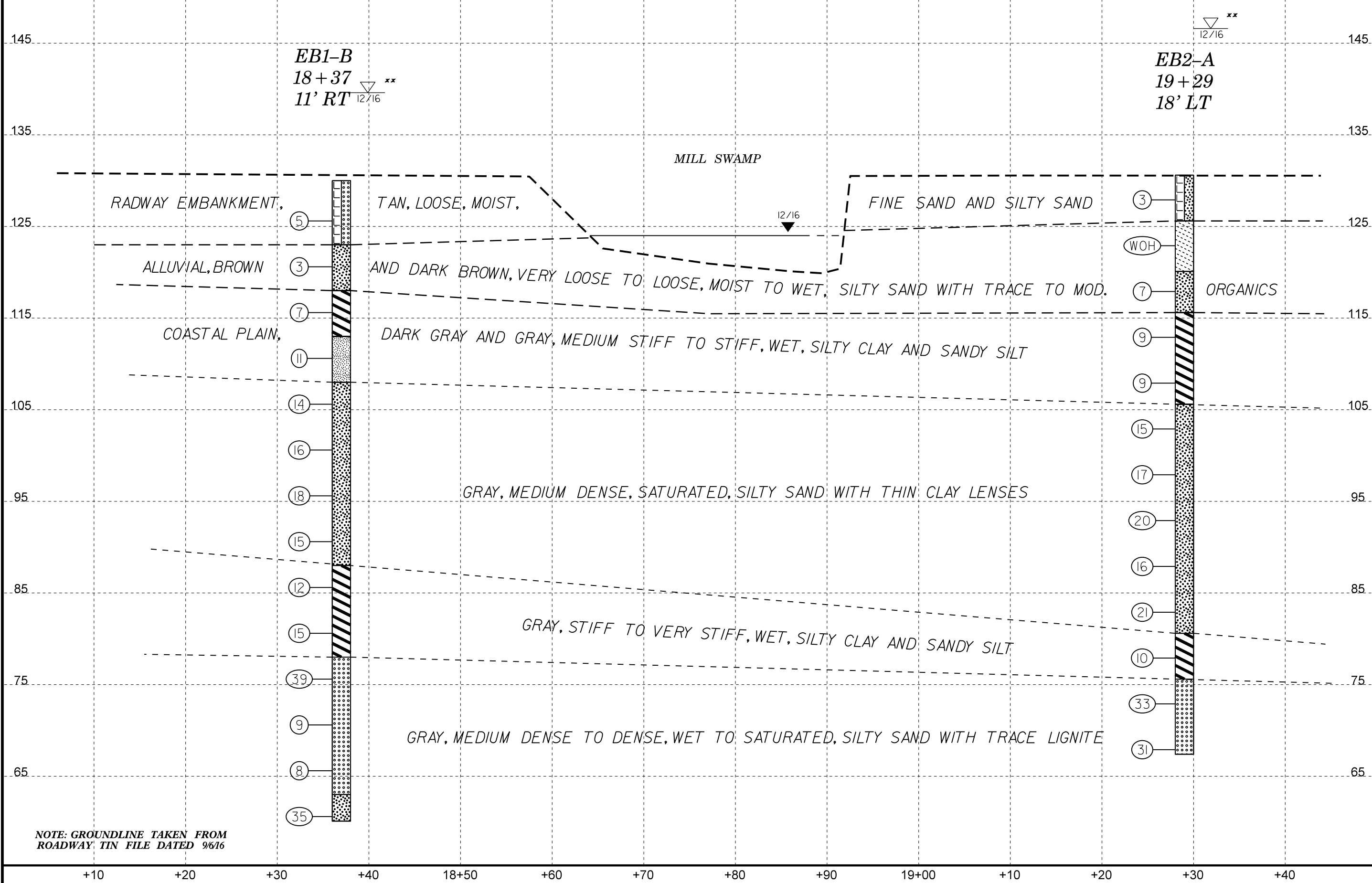


SKIEW ANGLE = 90°

ARTESIAN



| PROJECT REFERENCE NO. | SHEET NO. |
|--|-----------|
| 810148 | 4 |
| FENCE DIAGRAM OF BORINGS PROJECTED ALONG CENTERLINE OF -L- PROFILE | |



NOTE: GROUNDLINE TAKEN FROM
ROADWAY TIN FILE DATED 9/6/16

GEOTECHNICAL BORING REPORT

BORE LOG

| | | | | | | | | | | | | | | | |
|--|-----------------|---------------------|------------|-------------------------|-------|-------------------------|----|---------------------------|----|-----|-----------|-----|-------|---------------------------|---|
| WBS 17BP.3.R.53 | | | | TIP 810148 | | COUNTY SAMPSON | | GEOLOGIST Swartley, J. R. | | | | | | | |
| SITE DESCRIPTION Bridge No. 148 on -L- (SR 1434) over Mill Swamp | | | | | | | | GROUND WTR (ft) | | | | | | | |
| BORING NO. EB1-B | | STATION 18+37 | | OFFSET 11 ft RT | | ALIGNMENT -L- | | 0 HR. -9.6 | | | | | | | |
| COLLAR ELEV. 130.0 ft | | TOTAL DEPTH 69.9 ft | | NORTHING 477,434 | | EASTING 2,146,986 | | 24 HR. ARTESIAN | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 90% 07/12/2016 | | | | DRILL METHOD Mud Rotary | | HAMMER TYPE Automatic | | | | | | | | | |
| DRILLER Pinter, D. G. | | START DATE 12/13/16 | | COMP. DATE 12/14/16 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | MOI | L O G | SOIL AND ROCK DESCRIPTION | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | ELEV. (ft) | DEPTH (ft) |
| 140 | | | | | | | | | | | | | | | |
| 135 | | | | | | | | | | | | | | | |
| 130 | | | | | | | | | | | | | | | |
| 125 | 126.6 | 3.4 | 3 | 2 | 3 | | | | | | | | | 130.0 | GROUND SURFACE |
| 120 | 121.6 | 8.4 | 1 | 1 | 2 | | | | | | | | | 123.0 | ROADWAY EMBANKMENT TAN, FINE SAND |
| 115 | 116.6 | 13.4 | 3 | 3 | 4 | | | | | | | | | 118.0 | ALLUVIAL BROWN, SILTY SAND WITH TRACE ORGANICS |
| 110 | 111.6 | 18.4 | 4 | 5 | 6 | | | | | | | | | 113.0 | COASTAL PLAIN DARK GRAY, SILTY CLAY (BLACK CREEK FORMATION) |
| 105 | 106.6 | 23.4 | 4 | 6 | 8 | | | | | | | | | 108.0 | GRAY, SANDY SILT WITH TRACE CLAY LENSES |
| 100 | 101.6 | 28.4 | 6 | 7 | 9 | | | | | | | | | | |
| 95 | 96.6 | 33.4 | 6 | 8 | 10 | | | | | | | | | | |
| 90 | 91.6 | 38.4 | 7 | 6 | 9 | | | | | | | | | | |
| 85 | 86.6 | 43.4 | 3 | 5 | 7 | | | | | | | | | 88.0 | GRAY, SILTY SAND |
| 80 | 81.6 | 48.4 | 5 | 7 | 8 | | | | | | | | | | |
| 75 | 76.6 | 53.4 | 10 | 16 | 23 | | | | | | | | | | |
| 70 | 71.6 | 58.4 | 6 | 4 | 5 | | | | | | | | | | |
| 65 | 66.6 | 63.4 | WOR | WOR | 8 | | | | | | | | | | |
| | 61.6 | 68.4 | 2 | 12 | 23 | | | | | | | | | 63.0 | GRAY, SILTY SAND |
| | | | | | | | | | | | | | | 60.1 | |

[illegible]

NC DOT BORE DOUBLE 810148 GEO BH.GPJ NC_DOT.GDT 12/21/16

GEOTECHNICAL BORING REPORT

BORE LOG

[illegible][illegible]

NCDOT BORE DOUBLE 810148 GEO_BH.GPJ NC_DOT.GDT 12/21/16

SITE PHOTOGRAPH

Bridge No. 148 on -L- (SR 1434) over Mill Swamp



Looking West towards End Bent 2