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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

| COUNTY. | FORSYTH | |
|----------|----------------|-----------------------------|
| PROJECT | DESCRIPTION | BRIDGE NO. 243 ON |
| | | ROAD OVER NC 150 |
| (PETER | RS CREEK P. | ARKWAY) |
| SITE DES | SCRIPTION STA | I. <i>16</i> + <i>94.29</i> |
| | | |

STATE PROJECT REFERENCE NO. 13 B-5770

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 (1991) 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 BORCHOLE. 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 INCLORDED TO CLIMATIC CONDITIONS INCLORDED TO CLIMATIC CONDITIONS INCLORDING TO CLIMATIC CONDITIONS INCLORDING 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 SATISTY 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 BY 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.

B. SMITH, PG

M. SHIPMAN, EI A. RULEY, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY <u>B. SMITH, PG</u>

DRAWN BY _B. SMITH, PG

CHECKED BY B. WORLEY, PG

SUBMITTED BY __B. SMITH, PG

DATE __*JUNE*, 2019

Prepared in the Office of:



NC FIRM LICENSE No: P-0339 and C-487 504 Meadowlands Drive Hillsborough, NC 27278 (919) 732-3883 (919) 732-6676 (FAX)



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PROJECT REFERENCE NO. SHEET NO. 2

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 |
|--|--|--|---|
| 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 | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. | 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. | ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. |
| ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION | <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. | 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 | AQUIFER - A WATER BEARING FORMATION OR STRATA. |
| IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH | ANGULARITY OF GRAINS | REPRESENTED BY A ZONE OF WEATHERED ROCK. | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. |
| AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF.GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: | 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. |
| SOIL LEGEND AND AASHTO CLASSIFICATION | ANGULAR, <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> . | WEATHERED VILLY NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. | ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT |
| CENERAL CRANIII AR MATERIALS SILT-CLAY MATERIALS | MINERALOGICAL COMPOSITION | FINE TO COARSE CRAIN IGNEOUS AND METAMORPHIC ROCK THAT | WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS | MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE. | CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. | SURFACE. |
| CROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7 | COMPRESSIBILITY | NON-CRYSTALLINE - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM |
| SYMBOL COCCOCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC | SLIGHTLY COMPRESSIBLE LL < 31 | ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. | OF SLOPE. |
| 5 5 5 5 6 5 5 6 5 5 6 5 5 5 5 5 5 5 5 5 | MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED |
| 7. PASSING *10 50 MX GRANULAR SILT- GRANULAR CLAY MUCK, | PERCENTAGE OF MATERIAL | (CP) SHELL BEDS, ETC. | 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 |
| *40 30 MX 50 MX 51 MN PEAT SOILS PEAT SOILS PEAT SOILS PEAT SOILS | GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL | WEATHERING | ROCKS OR CUTS MASSIVE ROCK. |
| MATERIAL STATE OF THE STATE OF | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE |
| PASSING *40 SOILS WITH | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, | HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE |
| LL — — 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR HIGHLY | HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE | (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. | LINE OF DIP, MEASURED CLOCKWISE FROM NORTH, |
| GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF COLUMN | GROUND WATER | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE |
| USUAL TYPES STONE FRACS. ORGANIC ORGA | ✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING | (SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR | SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. |
| OF MAJOR GRAYEL, AND SAND GRAYEL AND SAND SOILS SOILS | ▼ STATIC WATER LEVEL AFTER 24 HOURS | CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM |
| CEN RATING FAIR TO | | (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS | PARENT MATERIAL. |
| AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE | SPRING OR SEEP | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. |
| PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 | | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE |
| CONSISTENCY OR DENSENESS | MISCELLANEOUS SYMBOLS | SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. | FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. |
| PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH | ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION | IF TESTED, WOULD YIELD SPT REFUSAL | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO |
| CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT ²) | WITH SOIL DESCRIPTION DESCRIPTION DESCRIPTION | SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT | ITS LATERAL EXTENT. |
| GENERALLY VERY LOOSE | SOIL SYMBOL SOIL SYMBOL SUPPLINT TEST BORING SLOPE INDICATOR INSTALLATION | (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. |
| MATERIAL MEDIUM DENSE 10 TO 30 N/A | ARTIFICIAL FILL (AF) OTHER AUGER RODING CONE PENETROMETER | IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. |
| DENSE | THAN ROADWAY EMBANKMENT TEST | VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE |
| VERY SOFT < 2 < 0.25 | — INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD | (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR | OF AN INTERVENING IMPERVIOUS STRATUM. |
| GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 | INFERRED ROCK LINE MAN MONITORING WELL TEST BORING | VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| MATERIAL STIFF 8 TO 15 1 TO 2 | A DIEZOMETED | SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS | 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 |
| (COHESIVE) | TTTT ALLUVIAL SOIL BOUNDARY A INSTALLATION SPT N-VALUE | ALSO AN EXAMPLE. | RUN AND EXPRESSED AS A PERCENTAGE. |
| TEXTURE OR GRAIN SIZE | RECOMMENDATION SYMBOLS | ROCK HARDNESS | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 | UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND |
| OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053 | USED IN THE TOP 2 FEET OF | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED | RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. |
| BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY | SHALLOW UNCLASSIFIED EXCAVATION - SEED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL | TO DETACH HAND SPECIMEN. | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT |
| (BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.) | ABBREVIATIONS | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED | OR SLIP PLANE. |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005 | AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED | BY MODERATE BLOWS. | 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 |
| SIZE IN. 12 3 | BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT | MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE | WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL |
| SOIL MOISTURE - CORRELATION OF TERMS | CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC | POINT OF A GEOLOGIST'S PICK. | TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS. |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) DESCRIPTION | DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS | 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 | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY | DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON | PIECES CAN BE BROKEN BY FINGER PRESSURE. | STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL |
| (SAT.) FROM BELOW THE GROUND WATER TABLE | F - FINE SL SILT, SILTY ST - SHELBY TUBE | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY | TENGTH 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. |
| PLASTIC SEMISOLID; REQUIRES DRYING TO | FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL | FINGERNAIL. | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| RAINCE ATTAIN OPTIMUM MOISTURE | FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING | FRACTURE SPACING BEDDING | BENCH MARK: B5770-2 (STA. 18+66.92, OFF. 22'LT) |
| " PLL + PLASTIC LIMIT - | HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT | TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET | |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: | WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET | ELEVATION: 824.13 FEET |
| SL SHRINKAGE LIMIT | CME-45C CLAY BITS X AUTOMATIC MANUAL | MODERATELY CLOSE | NOTES: |
| - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | 6' CONTINUOUS FLIGHT AUGER | VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET | FIAD = FILLED IMMEDIATELY AFTER DRILLING |
| PLASTICITY | CME-55 | INDURATION (8.000 FEET | |
| PLASTICITY INDEX (PI) DRY STRENGTH | - | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. | |
| NON PLASTIC 0-5 VERY LOW | X TUNGCARBIDE INSERTS | RUBBING WITH FINGER FREES NUMEROUS GRAINS; | |
| SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM | VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS: | GENILE BLUW BY HAMMER DISTRIEGRATES SAMPLE. | |
| HIGHLY PLASTIC 26 OR MORE HIGH | PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | |
| COLOR | TRICONE TUNGCARB. SOUNDING ROD | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). | X CORE BIT VANE SHEAR TEST | DIFFICULT TO BREAK WITH HAMMER. | |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. | DATE: 8-15-1- |
| | | Communication (Control of Control | I DATE, 0 15 P |

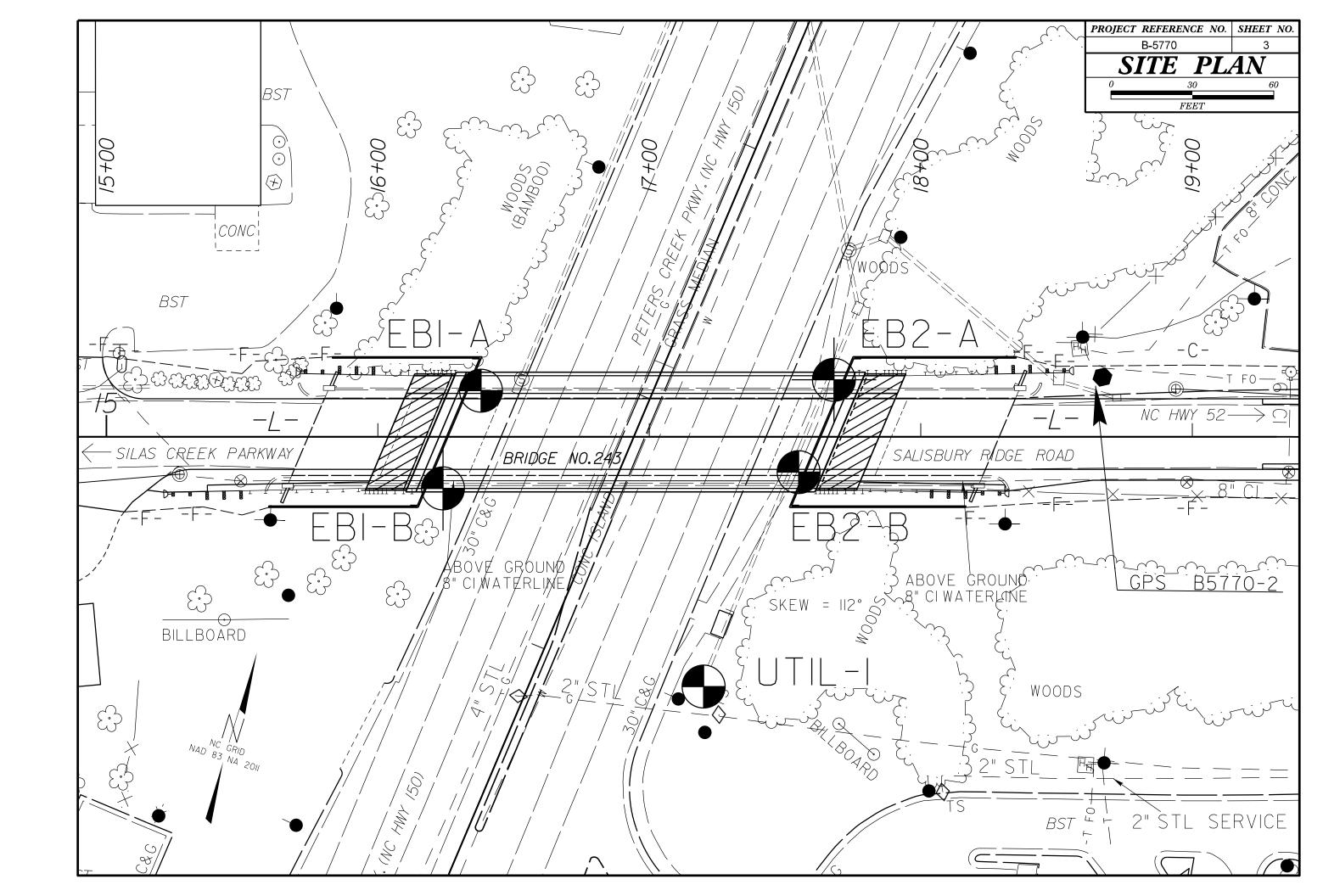
| ROJECT REFERENCE NO. | SHEET NO. |
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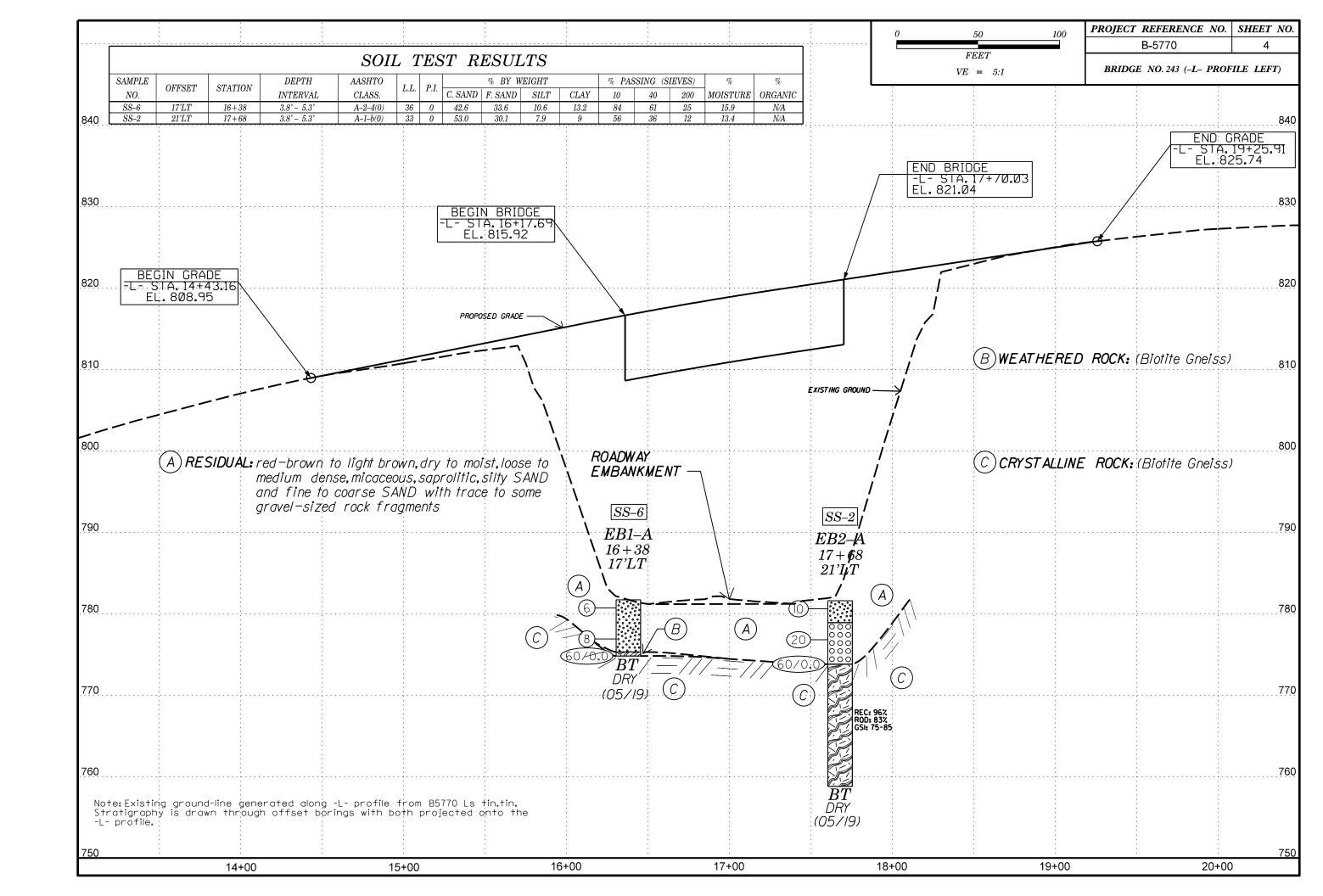
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

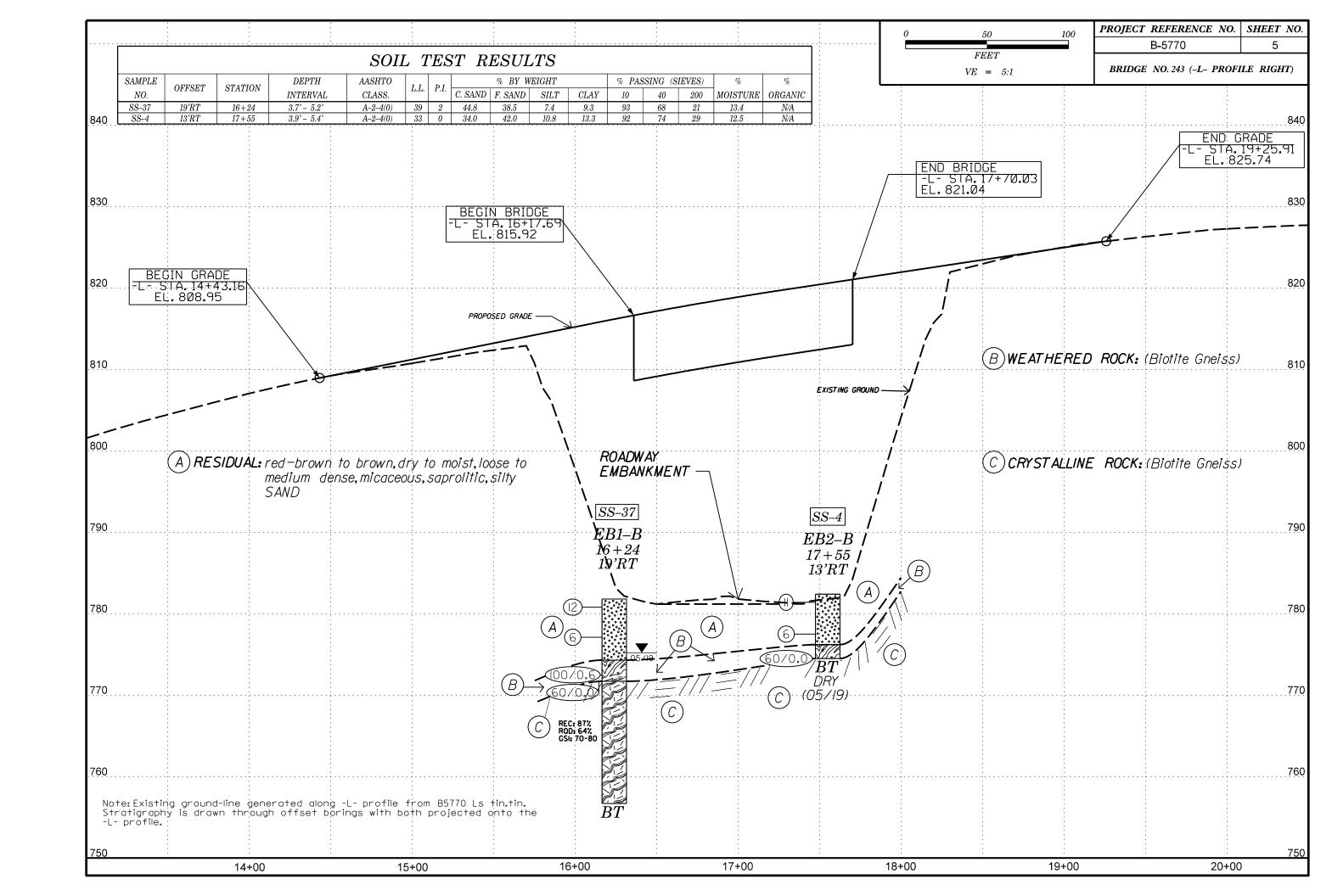
SUBSURFACE INVESTIGATION

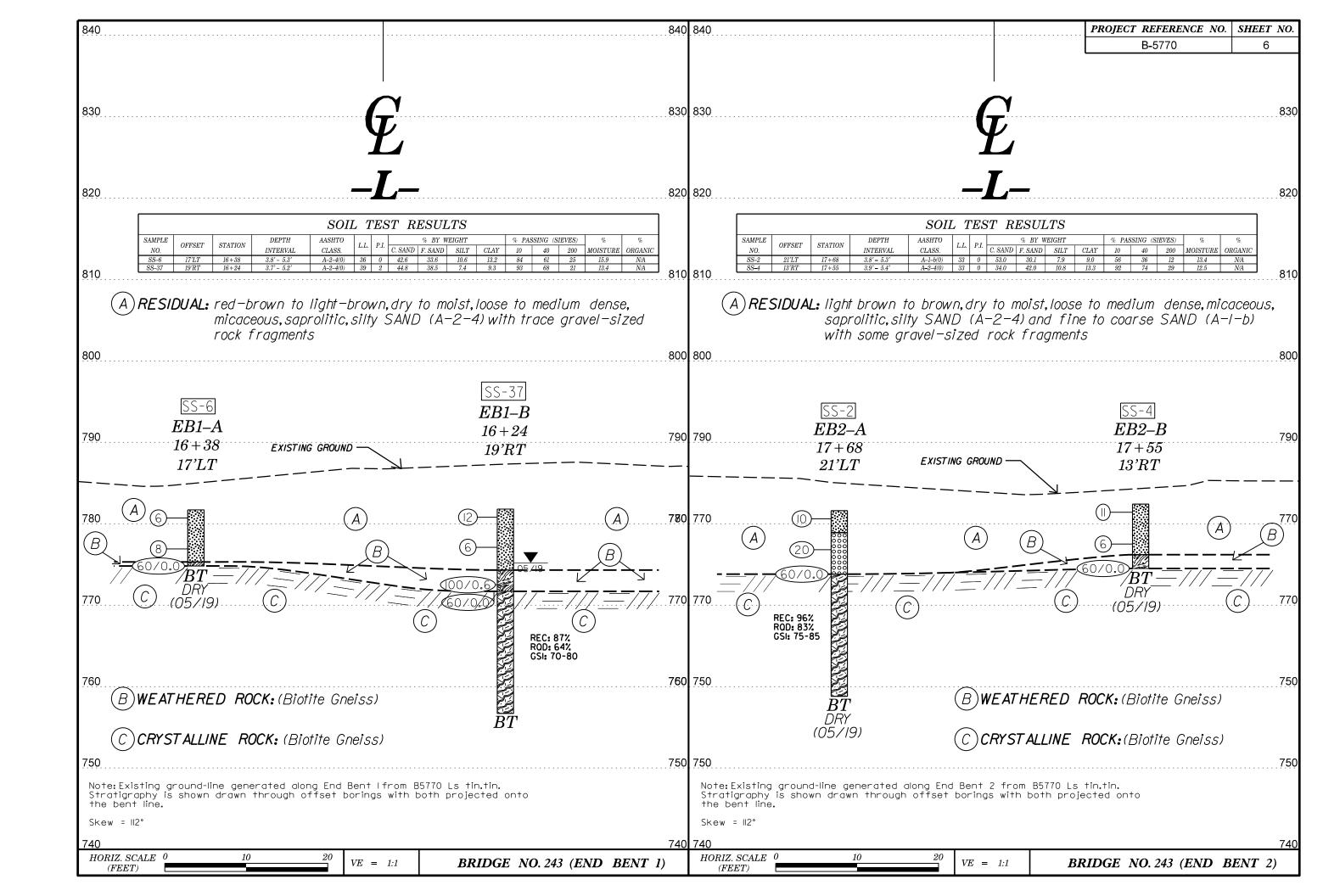
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES

| | | FROM AAS | SHTO LRFD BR | ICAL STRENGTH INDEX (GSI) TABLES IDGE DESIGN SPECIFICATIONS |
|--|--|--|--|---|
| AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Joint GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis. STRUCTURE | VERY GOOD Very rough, fresh unweathered surfaces | Sough, slightly weathered, iron stained surfaces Surfaces Surfaces Surfaces Surfaces Surfaces AM Surfaces Surfaces Surfaces Surfaces | POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments VERY POOR Slickensided, highly weathered surfaces | GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis. COMPOSITION AND STRUCTURE |
| INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities | 90 80 | SING SOM REE GO | N/A N/A | A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. 70 A |
| BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets | 70 CKING OF HOUSE | 60 50 | | 8. Sand- stone with thin inter- layers of siltstone amounts D. Siltstone or silty shale with sand- stone layers stone layers amounts D. Siltstone or clayey shale with sandstone layers 40 B C D E |
| BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity | | 40 | 30 | C. D. E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H. F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure |
| DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces | DECKE ASINO | | 20 | G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces. |
| LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes | N/A | N/A | 10 | Means deformation after tectonic disturbance □ATE: 8-19-1 |









| | | | | | | | | | <u>DU</u> | KE I | <u> </u> | | | | | |
|---------------------|---|---------|---------|---------|---------------|---------|-----------|----------|-----------|-----------|----------------|--------|-------------|---|--|-------------|
| WBS 457 | 26.1.1 | | | TI | P B-57 | 770 | | COU | NTY | FORSY1 | Ή | | | GEOLOGIST Ruley, A. | | |
| SITE DESC | RIPTION | Bridge | e No. 2 | 243 on | Salisbu | ıry Ric | dge Roa | d over I | NC 15 | 0 (Peters | Creek P | arkway | /) | | GROUN | D WTR (ft) |
| BORING N | O . EB1-A | ۹ | | ST | TATION | 16+ | 38 | | О | FFSET | 17 ft LT | | | ALIGNMENT -L- | 0 HR. | Dry |
| COLLAR E | LEV. 78 | 1.7 ft | | т | OTAL D | EPTH | 6.9 ft | | N | ORTHIN | 3 845,8 | 35 | | EASTING 1,628,127 | 24 HR. | Dry |
| DRILL RIG/H | AMMER EF | F./DATE | SUM | 12603 C | ME-550> | < 81% C | 04/23/201 | 19 | | | DRILL | /IETHO | D H.S | . Augers HAMM | RTYPE | Automatic |
| DRILLER | Moseley, | M.G. | | ST | TART D | ATE | 05/09/ | 19 | С | OMP. DA | TE 05/ | 09/19 | | SURFACE WATER DEPTH N// | A | |
| ELEV DRIV ELEV (ft) | E DEBTH | BLOV | N COL | | 0 | | BLOWS | | | | SAMP. | | L O G | SOIL AND ROCK DESC | | DEPTH (f |
| 785 | 7 = 0.0 | 3 | 3 | 3 | la: | | | T | | | | M | - | . 781.7 GROUND SURFA | ACE | 0. |
| 780 | 9 + 3.8 | 5 | 5 | 3 | -1. | | | | | | | | | red-brown to light-brown, saprolitic, silty SAND v gravel-sized rock frag | vith trace | s, |
| 775 774. | 8 6.9 | 60/0.0 | | | . • 8 | | | | | 60/0.0 | SS-6 | 16% | | 775.3 WEATHERED RO | | 6.4 |
| | + | | | | | | | | | | | | - | (Biotite Gneiss CRYSTALLINE R((Biotite Gneiss Boring Terminated with Penetration Test Refusal at I ft on Crystalline Rock (Bio | OCK) Standard Elevation 7 otite Gneis | 774.8 s) |
| | + | | | | | | | | | | | | | - No topsoil object - Harder drilling reported froi interpreted as Weathe - Auger and SPT Refusal a Crystalline Roc | n 6.4 - 6.9 rd Rock. at 6.9 feet | |
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GEOTECHNICAL BORING REPORT BORE LOG

| | | | | | | | | | Un | EL | <u>UU</u> | | | | | |
|--------------|---|----------------------|---------|--------|----------|---------------------------|----------------|------------|-------------------------|----------|--------------|--------|-------------|---|--|-----------|
| WBS | 45726 | .1.1 | | | TI | P B-5770 |) | COUNT | Y FC | RSYTH | 1 | | | GEOLOGIST Ruley, A. | | |
| SITE | DESCR | PTION | Brid | ge No. | 243 on | Salisbury | Ridge Ro | ad over NC | 150 (I | Peters (| Creek Pa | arkway |) | | GROUND | WTR (ft) |
| BORI | NG NO. | EB1-l | В | | ST | TATION ' | 16+24 | | OFF | SET 1 | 9 ft RT | | | ALIGNMENT -L- | 0 HR. | N/A |
| COLI | AR ELE | V . 78 | 31.8 ft | | TO | OTAL DEP | TH 25.1 | ft | NOR | THING | 845,79 | 97 | | EASTING 1,628,125 | 24 HR. | 6.6 |
| DRILL | .RIG/HAIV | MER EF | F./DAT | E SUI | V12603 C | ME-550X 8° | 1%04/23/20 | 19 | | | DRILL N | /IETHO |) H.S | 6. Augers HAMMI | RTYPE / | Automatic |
| DRIL | LER M | oseley, | M.G. | | ST | TART DAT | E 05/13 | /19 | CON | IP. DAT | E 05/ | 13/19 | | SURFACE WATER DEPTH N/A | Α | |
| ELEV (ft) | DDI\/E | DEPTH (ft) | т . | 0.5ft | | 0 | BLOWS 25 | S PER FOO | T 75 | 100 | SAMP. NO. | MOI | L O G | SOIL AND ROCK DESC | CRIPTION | DEPTH (fi |
| 785 | - - 781.8 - | - - - - 0.0 | | | | | | | | | | | - | 781.8 GROUND SURFA | ACE. | 0. |
| 780 | _ | | 8 | 7 | 5 | 12 | | | | | | М | | RESIDUAL red-brown to brown, micace | ous saproli | tic |
| 775 | 778.1 - | 3.7 - | 3 | 3 | 3 | • / • / · · · · • 6 | | | | | SS-37 | 13% | | silty SAND | очо, очр. о | |
| | 773.1 | 8.7 | | | | | ::- | | | | | | 477 | 774.3 WEATHERED RO | OCK | 7. |
| | 1 | - 10.1 | 39 | 61/0.1 | 1 | | | | . : | 100/0.6 | | | | 771.7 (Biotite Gneiss | s) | 10. |
| 770 | _ | _ | 60/0.0 | ' | | | | | <u> </u> | 60/0.0 | | | | - CRYSTALLINE RO - (Biotite Gneiss | ;) | |
| | - | - | | | | | | | - : | : : : | | | | REC: 87% RQD: 64% (| ŚSI: 70-80 | |
| 705 | - | - | | | | | | | - : | : : : | | | | | | |
| 765 | _ | - | | | | | | | | | | | | - | | |
| | - | _ | | | | | | | - - | : : : | | | | | | |
| 760 | - | _ | | | | | | | . . | | | | | | | |
| | - | - | | | | | | | . . | | | | | - | | |
| | | | | | | | | | | | | | | 756.7 Boring Terminated at Eleva | tion 756 7 ft | 25. |
| | _ | - | | | | | | | | | | | | - Crystalline Rock (Biotite | e Gneiss) | in |
| | - - - - - - - - | - | | | | | | | | | | | | - 0.2 feet of topsoil ob - Harder drilling reported interpreted as the top of We - Auger and SPT Refusal a Crystalline Roc - Begin coring at 10. | l at 7.5 feet athered Root t 10.1 feet o k. | ck. n |
| | - - - - - - - - - - - - - - - - - - - | | | | | | | | | | | | | - - - - - - - | | |
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| | - - - - - | - - - - | | | | | | | | | | | | - - - | | |

| SITE DESCRIPTION Bridge No. 243 on Salisbury Ridge Road over NC 150 (Peters Creek Parkway) GROUND WTR (ft) | | 4==00 | | | | | | | | | | AL LOG | | | | |
|--|--------|----------|-------------|---------|----------------------|-----------|-----------|------------------|-----------|-----------|------------|---|--|-------------------|-----------------------------|----------------|
| BORING NO. EB1-B STATION 16+24 OFFSET 19 ft RT ALIGNMENT -L- 0 HR. N/A | | | | | | | | | _ | | | | GEOLOGIST Ruley, A. | | | |
| COLLAR ELEV. 781.8 ft TOTAL DEPTH 25.1 ft NORTHING 845,797 EASTING 1,628,125 24 HR. 6.6 | | | | | ge No. 243 | _ | | | oad ov | er NC | | | T | | 1 | |
| DRILL RIGHAWMER EFF/DATE SUM2603 CME-550X 81% 04/23/2019 DRILL METHOD H.S. Augers HAWMER TYPE Automatic | | | | | | _ | | | | | _ | | | | 0 HR. | N/A |
| DRILLER Moseley, M.G. START DATE 05/13/19 COMP. DATE 05/13/19 SURFACE WATER DEPTH N/A | | | | | | | | | | | NO | | | _ | | 6.6 |
| CORE SIZE NQ2 | DRILL | .RIG/HAN | IMER EF | F./DATI | E SUM26 | 03 CME | -550X 8 | 31%04/23/2 | 2019 | | | DRILL METHOD H.S. | Augers | HAMME | ERTYPE | Automatic |
| RUN (ft) Chi (ft) Chi (ft) RATE (ft) (ft) RATE (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) | DRIL | LER M | oseley, | M.G. | | STAI | RT DA | TE 05/1 | 3/19 | | СО | MP. DATE 05/13/19 | SURFACE WATER DEP | TH N/A | ٩ | |
| File Pile Run Rate Rate Rith Rith Rate Rith Rate Rith Rith Rith Rith Rith Rate Rith R | CORI | SIZE | NQ2 | | | | | N 15.0 ft | | | <u>L</u> , | | | | | |
| Company Comp | ELEV | | | | | REC. | RQD | | REC. | RQD | L | D | ESCRIPTION AND REMARK | S | | |
| 771.7 | (π) | | (π) | (π) | | (ft) % | (ft) % | NO. | (ft) % | (ft) % | | | | | | DEPTH (ft) |
| 765 765 768.7 | 771.71 | 771 7 | 10.1 | 0.0 | N 60/0 0 | (0.0) | (0.0) | | (40.0) | (0,0) | (C) | | | | | |
| 765 765 768.7 | 770 | _ | L | 3.0 | 0:57/1.0 2:27/1.0 | 77% | 77% | | | 64% | | light to dark gray, bl | ack, and white, generally sligh | | | ing |
| 765 | | 768.7 - | - 13.1 | 5.0 | 3:09/1.0 2:46/1.0 | I (T.U) | | | | | | with one moderately s hard, close fracture s | evere weathered zone (17.0 - pacing, BIOTITE GNEISS, po | 17.4 feessibly in | et), hard to iterlayered | very I with |
| 763.7 | 705 | - | | | 2:37/1.0 2:33/1.0 | 92% | 74% | | | | | amphibolite. Eviden | ce of chemical weathering (di | ssolutior | n) observe | d in |
| 760 758.7 23.1 | 765 | 763.7 | _ - 18.1 | | 1 2.29/1 0 | | | | | | | _ - | | | | |
| 758.7 23.1 3:12/1.0 3:24/1.0 758.7 23.1 2.0 2:39/1.0 (1.9) (0.4) 756.7 25.1 2.0 2:19/1.0 95% 20% Boring Terminated at Elevation 756.7 ft in Crystalline Rock (Biotite Gneiss) - 0.2 feet of topsoil observed Harder drilling reported at 7.5 feet interpreted as the top of Weathered Rock Auger and SPT Refusal at 10.1 feet on Crystalline Rock. | | - | | 5.0 | 2:23/1.0 | (4.2) | (3.2) | | | | | - | GSI. 70-60 | | | |
| 758.7 23.1 3.32/1.0 (1.9) (0.4) 756.7 25.1 2.0 2:39/1.0 (1.9) 95% 20% Boring Terminated at Elevation 756.7 ft in Crystalline Rock (Biotite Gneiss) - 0.2 feet of topsoil observed Harder drilling reported at 7.5 feet interpreted as the top of Weathered Rock Auger and SPT Refusal at 10.1 feet on Crystalline Rock. | 760 | - | Ŀ | | 3:12/1.0 | "" | 0,70 | | | | | - | | | | |
| 756.7 | | 758.7 | 23.1 | 20 | 3:32/1.0 | (4.0) | (0.4) | | | | | - | | | | |
| Gneiss) 0.2 feet of topsoil observed Harder drilling reported at 7.5 feet interpreted as the top of Weathered Rock Auger and SPT Refusal at 10.1 feet on Crystalline Rock. | | 756.7 | 25.1 | 2.0 | | | | | | | | | | = | | 25.1 |
| - Harder drilling reported at 7.5 feet interpreted as the top of Weathered Rock Auger and SPT Refusal at 10.1 feet on Crystalline Rock. | | _ | - | | | | | | | | | - Boring Ferminate | | talline R | ock (Biotit | e |
| + Rock. Rock Auger and SPT Refusal at 10.1 feet on Crystalline Rock. | | - | - | | | | | | | | | - - | - 0.2 feet of topsoil observed | | | |
| - Auger and SPT Refusal at 10.1 feet on Crystalline Rock. | | - | | | | | | | | | | Harder drilling repo | | the top | of Weathe | ered |
| | | - | - | | | | | | | | | - Auger and S | SPT Refusal at 10.1 feet on Ci | rystalline | Rock. | |
| | | - | _ | | | | | | | | | - - | - begin coming at 10.1 leet. | | | |
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GEOTECHNICAL BORING REPORT BORE LOG

| WBS | | | | | | | | | | | | | <u>UG</u> | | | |
|--------------|-----------|---------------|---------|--------|----------|----------------|--------|----------|-------------|---------|--------|----------|----------------|--------|-------------|---|
| | 45726. | 1.1 | | | T | IP B-57 | 70 | | С | OUNT | Y FO | RSYTH | 1 | | | GEOLOGIST Ruley, A. |
| SITE | DESCRI | PTION | Bridg | je No. | 243 or | n Salisbu | ıry Ri | dge Ro | ad ov | er NC | 150 (F | Peters (| Creek P | arkway | /) | GROUND WTR (|
| BORII | NG NO. | EB2-A | A | | S | TATION | 17- | +68 | | | OFF | SET 2 | 21 ft LT | | | ALIGNMENT -L- 0 HR. N |
| COLL | AR ELE | V . 78 | 1.6 ft | | T | OTAL DI | EPTH | 1 22.8 | ß ft | | NOR | THING | 845,8 | 77 | | EASTING 1,628,251 24 HR. D |
| DRILL | .RIG/HAMI | WER EF | F./DATI | E SU | V12603 (| DME-550X | (81% | 04/23/20 |)19 | | | | DRILL | METHO | D H. | S. Augers HAMMER TYPE Automatic |
| DRILL | LER Mo | seley, | M.G. | | S | TART D | ATE | 05/08 | /19 | | CON | IP. DA | Γ E 05/ | 09/19 | | SURFACE WATER DEPTH N/A |
| ELEV (ft) | DD1) /E | DEPTH (ft) | | W CO | | 0 | 25 | BLOW | S PEF 50 | R F00 | 75 | 100 | SAMP. | MO | L O G | SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH |
| 785 | - | - | | | | | | | | | | | | | | |
| 700 | 781.6 | 0.0 | 4 | 5 | 5 | 10 | | | - | | | | | М | | 781.6 GROUND SURFACE RESIDUAL |
| 780 | | | | | | \ | | | | | +- | | | " | | brown, silty SAND |
| 775 | 777.8 | 3.8 | 5 | 9 | 11 | | 20 | | - | | | | SS-2 | 13% | 000 | brown, fine to coarse SAND with some gravel-sized rock fragments |
| ŀ | 773.8 | 7.8 | 60/0.0 | | | : : : | · | <u></u> | -:- - | | - -:- | 60/0.0 | | | | 2 773.8 CRYSTALLINE ROCK |
| 770 | Ī | · · · | 00,010 | | | | | · · · | : | | | | | | | (Biotite Gneiss) - REC: 96% RQD: 83% GSI: 75-85 |
| | + | • | | | | | · - | | - | · · · · | | | | | | |
| 765 | 1 | • • | | | | | | | - | | | | | | | |
| | ‡ | | | | | ::: | | : : : | - | | | | | | | |
| 760 | ‡ | | | | | | | | - | | | | | | | 758.8 |
| | | | | | | | | | | | | | | | | - No topsoil observed Auger and SPT Refusal at 7.8 feet on Crystalline Rock Begin coring at 7.8 feet. |

| | | | | | | | | | | <u>UI</u> | RE LUG | | |
|-------|--------------|---------------|---------|--|---------------|--------------|------------------|---------------|---------------|------------|-------------------------------------|--|--------------------|
| WBS | 45726 | 3.1.1 | | | TIP | B-577 | 0 | С | OUNT | Y F | ORSYTH | GEOLOGIST Ruley, A. | |
| SITE | DESCR | IPTION | Brido | ge No. 243 | 3 on Sa | alisbur | y Ridge R | oad ov | er NC | 150 | (Peters Creek Parkway) | | GROUND WTR (ft) |
| BORI | NG NO. | EB2-/ | A | | STA | TION | 17+68 | | | OF | FSET 21 ft LT | ALIGNMENT -L- | 0 HR . N/A |
| COLL | AR EL | EV. 78 | 31.6 ft | | тот | AL DE | PTH 22. | 8 ft | | NO | RTHING 845,877 | EASTING 1,628,251 | 24 HR . Dry |
| DRILL | RIG/HAI | /IMER EF | F./DATI | E SUM26 | 03 CME | -550X 8 | 31%04/23/2 | 2019 | | | DRILL METHOD H.S. | Augers HAMMI | ERTYPE Automatic |
| DRILI | LER N | loseley, | M.G. | | STAI | RT DA | TE 05/0 | 8/19 | | СО | MP. DATE 05/09/19 | SURFACE WATER DEPTH N// | Α |
| | SIZE | | | | TOTA | AL RUI | N 15.0 ft | t | | | | | |
| ELEV | RUN | DEPTH | RUN | DRILL | | JN RQD | SAMP. | | ATA | L | | | |
| (ft) | ELEV (ft) | (ft) | (ft) | RATE (Min/ft) | (ft) % | (ft) | NO. | (ft) % | (ft) | O G | DI ELEV. (ft) | ESCRIPTION AND REMARKS | DEPTH (fi |
| 73.77 | | | | | | | | | | | | Begin Coring @ 7.8 ft | |
| | 773.8 | 7.8 | 5.0 | N=60/0.0 5:47/1.0 6:13/1.0 | (5.0) 100% | (3.3) 66% | | (14.4) 96% | (12.5) 83% | | - 773.8 light to dark gray, blac | CRYSTALLINE ROCK ck, and white, slight to fresh weathering | 7.8 |
| 770 | | Ŧ | | 6:13/1.0 7:24/1.0 6:54/1.0 7:18/1.0 | 10070 | 0070 | | 0070 | 0070 | | - hard, close fracture s | pacing, BIOTITE GNEISS, possibly in amphibolite. GSI: 75-85 | terlayered with |
| | 768.8 | 12.8 | 5.0 | 7:18/1.0 4:23/1.0 | (4.4) | (4.4) | | | | | - | amphibolite. Gol. 73-63 | |
| | | Ŧ | 0.0 | 1:40/1.0 2:24/1.0 | 88% | 88% | | | | | - - | | |
| 765 | 763.8 | 17.8 | | 2:47/1.0 2:38/1.0 | | | | | | | - - | | |
| | 100.0 | 17.0 | 5.0 | 2:07/1.0 | (5.0) | (4.8) | | | | | - - | | |
| 760 | | ‡ | | 2:26/1.0 2:34/1.0 | 100% | 96% | | | | | - - | | |
| | 758.8 | 22.8 | | 2:56/1.0 2:55/1.0 | | | | | | | _ 758.8 | | 22. |
| | | ‡ | | | | | | | | | Boring Terminate | d at Elevation 758.8 ft in Crystalline R Gneiss) | оск (Biotite |
| | - | ‡ | | | | | | | | | - - | - No topsoil observed. | |
| | | ‡ | | | | | | | | | - Auger and S | SPT Refusal at 7.8 feet on Crystalline - Begin coring at 7.8 feet. | Rock. |
| | | ‡ | | | | | | | | | - - | gg | |
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GEOTECHNICAL BORING REPORT BORE LOG

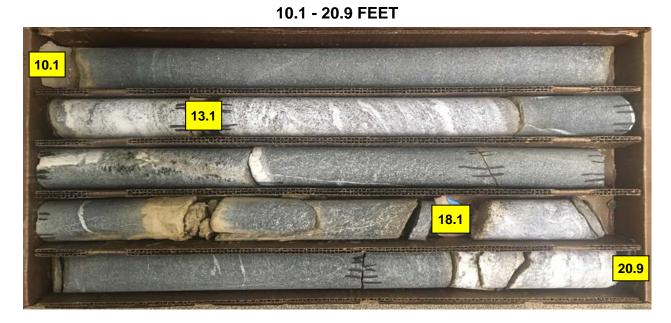
| 14 | VPC | 45700 | 1 1 | | | T-1 | D D = 770 | ١ | | | | <u> </u> | | | GEOLOGIST Ruley, A. | | |
|--|------|-------------------------|-----------------|--------|---------|-------|------------------|--------------------------------|----------------|--------|--------|-------------------|---------|---|--|---|------------|
| - | | 45726 | | Drida | o No | | P B-5770 | Ridge Road | COUNT | | | | arku.c. | Λ | GEOLOGIST Ruley, A. | GROUND WT | R (ft) |
| \vdash | | | | | je ivo. | | | | d over NC | | | | arkway | <u>') </u> | ALICAMENT I | - | ` ′ [|
| \vdash | | NG NO. | | | | | TATION | | | _ | | 13 ft RT 845,8 | 44 | | ALIGNMENT -L- EASTING 1,628,248 | 0 HR. | Dry |
| - 1 | | AR ELE | | | = 9111 | - 1 | | TH 7.9 ft 1% 04/23/2019 | Ω | NORI | HING | , | | 1 HS | <u> </u> | 24 HR. ERTYPE Automa | Dry |
| \vdash | | | | | _ 301 | | | | | 0014 | | | | J 11.0 | | | auc |
| \vdash | | DRIVE | | | W COI | | ARI DAI | E 05/09/1 | | | P. DA | SAMP. | 09/19 | 1 [| SURFACE WATER DEPTH N// | A | |
| | (ft) | DRIVE ELEV (ft) | DEPTH (ft) | 0.5ft | W COL | 0.5ft | 0 | | PER FOOT 50 | 75 | 100 | NO. | MOI | 0 | SOIL AND ROCK DESC | | PTH (ft) |
| 7 | 785 | - 782.4 ⁻ | - - - 0.0 | | | | | | | | | | | - | - 782.4 GROUND SURFA | ACE | 0.0 |
| 7 | 780 | - - 778.5 - | - - - 3.9 | 8 | 6 | 5 | 111 | | | | | | M | | RESIDUAL light brown to brown, micace silty SAND | eous, saprolitic, | |
| 7 | 75 | - - 774.5 | - - - 7.9 | 7 | 3 | 3 | 6 | | | | | SS-4 | 13% | | 776.2 WEATHERED RC | | 6.2 7.9 |
| NCDOT BORE SINGLE B5770_GEO_BRDG0243_GINT_SUMMIT.GPJ NC_DOT.GDT 6/7/19 | | | - / 9 | 60/0.0 | | | | | | | 60/0.0 | | | | (Biotite Gneiss CRYSTALLINE RI (Biotite Gneiss Boring Terminated with Penetration Test Refusal at I ft on Crystalline Rock (Biotite - No topsoil obser - Harder drilling reported fro interpreted as Weather - Auger and SPT Refusal at Crystalline Rock - | OCK s) a Standard Elevation 774.5 bitite Gneiss) ved. m 6.2 - 7.9 feet red Rock. at 7.9 feet on | 7.9 |

| | | | | | | | | | | | UG | | | 1 | | |
|--------------|---|----------|--------|----------|----------------|---------------|---------|--------|--------|---------|---------------|---------|-------------|--|--|-------------|
| | 45726.1.1 | | | | P B-577 | | | TNUO | | | | | | GEOLOGIST Ruley, A. | | |
| SITE | DESCRIPTION | l Bridg | ge No. | 243 on | Salisbur | y Ridge F | Road ov | ver NC | 150 (P | eters (| Creek Pa | arkway | ′) | | GROUN | ID WTR (ft) |
| BOR | ING NO. UTIL | -1 | | ST | TATION | 17+20 | | | OFFS | ET 9 | 92 ft RT | | | ALIGNMENT -L- | 0 HR. | Dry |
| COL | LAR ELEV. 78 | 30.5 ft | | TC | OTAL DE | PTH 10 |).0 ft | | NORT | THING | 845,7 | 55 | | EASTING 1,628,238 | 24 HR. | Dry |
| DRILL | L RIG/HAMMER EI | FF./DATI | E SUN | V12603 C | ME-550X 8 | 31%04/23 | /2019 | | | | DRILL N | VIETHOL |) H.S | . Augers HAMME | RTYPE | Automatic |
| DRIL | LER Moseley, | M.G. | | S1 | TART DA | TE 05/ | 10/19 | | COMI | P. DA | FE 05/ | 10/19 | | SURFACE WATER DEPTH N/A | Α | |
| ELEV (ft) | DDIVE I | 1 | 0.5ft | UNT | 0 | | | R FOOT | | 100 | SAMP. | | L O G | SOIL AND ROCK DESC | | DEPTH (ft) |
| <u>785</u> | 780.5 + 0.0 | | | | | | | | | | | | | 780.5 GROUND SURFA | ACF. | 0.0 |
| 780 | 780.5 + 0.0 - - - - - - - - - - - - - - - - - - | 5 | 5 | 6 | . •11 | | | | | | | М | - | brown and orange, micaced clayey, silty SAND and s | us, sapro | litic, |
| 775 | 774.5 6.0 | 9 | 23 | 79/0.4 | | | | | | 00/0.9 | | М | | -774.0 WEATHERED RO | | 6.5 |
| | 772.0 8.5 | 14 | 49 | 37 | | | | | · 1 | | | М | | 772.0 (Biotite Gneiss |) | 8.5 |
| | | | 45 | 5 | | | | | · • | 86 - | | M | | brown and gray, micaceous, SAND with trace gravel-fragments Boring Terminated at Elevat Residual (silty SA - No topsoil obserrent Harder drilling reported from interpeted as Weathern interpeted as Weathern interpeted as Weathern interpeted as Weathern interpeted | tion 770.5 ND) ved. n 6.5 - 8.5 | ft in |



CORE PHOTOGRAPHS

EB1-B



EB1-B 20.9 - 25.1 FEET



EB2-A 7.8 - 17.1 FEET



EB2-A



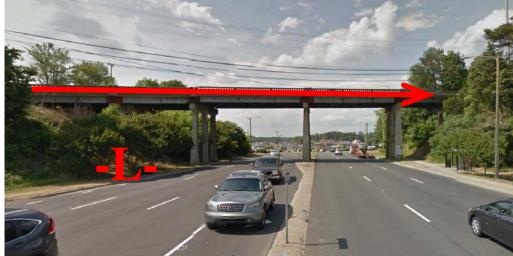
FEET

SITE PHOTOGRAPHS

Bridge No. 243 on Salisbury Ridge Road over NC 150 (Peters Creek Parkway)



Standing at End Bent 2 looking west toward End Bent 1



Standing on NC 150 (Peters Creek Parkway) looking North toward bridge



Standing at End Bent 1 Looking East toward End Bent 2

Note: Images are courtesy Google Earth street view.

S Ò REFERENCE

CONTENTS

DESCRIPTION

LEGEND (SOIL & ROCK)

SOIL TEST RESULTS CORE PHOTOGRAPH(S)

SUPPLEMENTAL LEGEND (GSI)

BORE LOG(S) & CORE REPORT(S)

TITLE SHEET

SITE PLAN

PROFILE(S)

SHEET NO.

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4-5

6-10

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

| COUNTY | FORSYTH | |
|----------|----------------|-------------------|
| | | BRIDGE NO. 243 ON |
| | | ROAD OVER NC 150 |
| _(PETEI | RS CREEK PA | 4RKWAY) |
| SITE DES | SCRIPTION MS | E ABUTMENT WALLS |
| | | |

STATE PROJECT REFERENCE NO. 13 B-5770

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 1991 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED 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 SATISTY 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 BY 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.

B. SMITH, PG

M. SHIPMAN, EI

A. RULEY, GIT

M.G. MOSELEY

J. MOSELEY

INVESTIGATED BY <u>B. SMITH, PG</u>

DRAWN BY _B. SMITH, PG

CHECKED BY B. WORLEY, PG

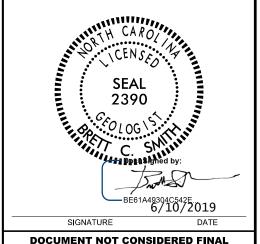
SUBMITTED BY __B. SMITH, PG

DATE __*JUNE*, 2019

Prepared in the Office of:



NC FIRM LICENSE No: P-0339 and C-487 504 Meadowlands Drive Hillsborough, NC 27278 (919) 732-3883 (919) 732-6676 (FAX)



UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO. 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

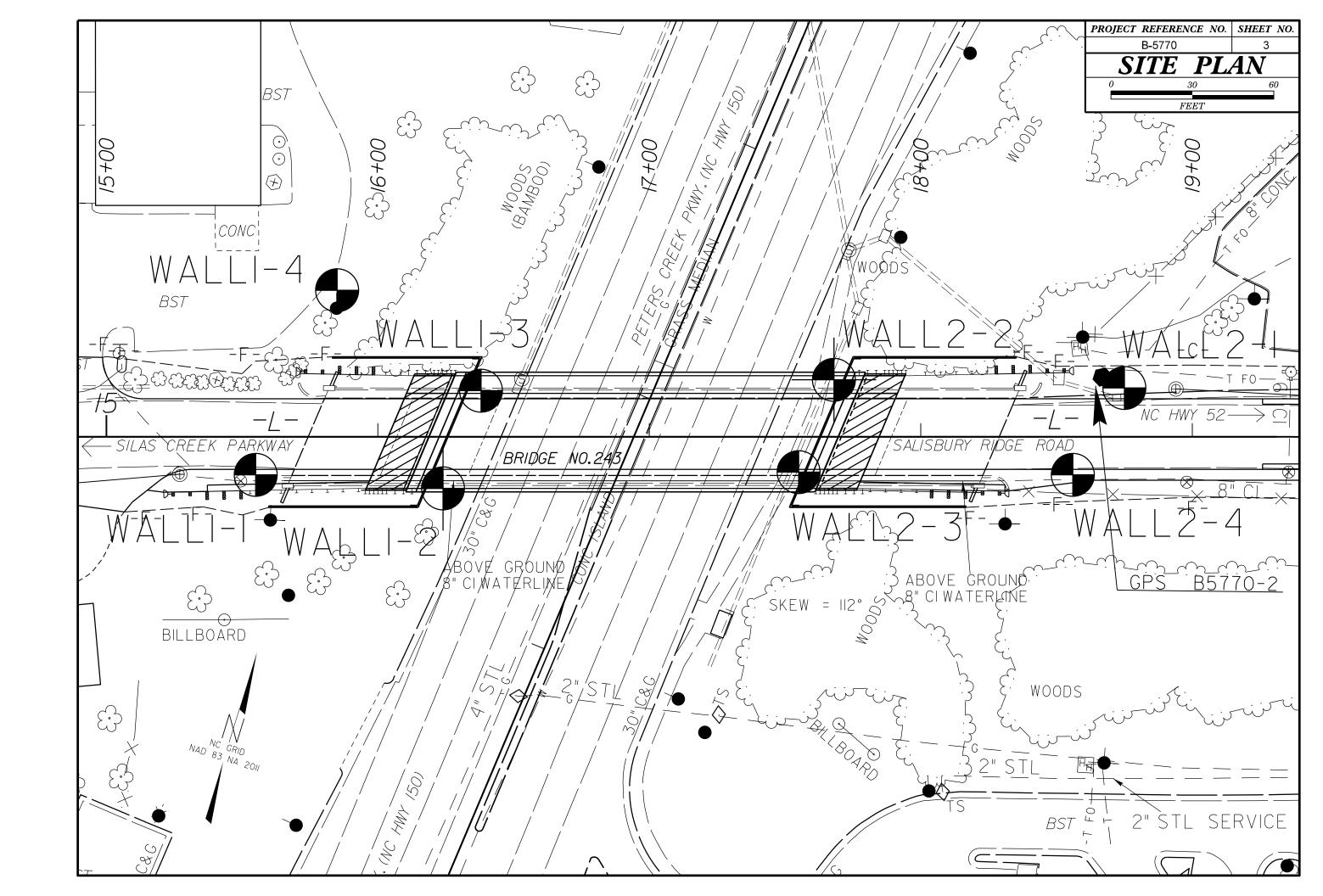
| SOIL DESCRIPTION | GRADATION | ROCK DESCRIPTION | TERMS AND DEFINITIONS |
|--|--|--|---|
| SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. | 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. | ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. |
| ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION | <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. | 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 | AQUIFER - A WATER BEARING FORMATION OR STRATA. |
| IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH | ANGULARITY OF GRAINS | REPRESENTED BY A ZONE OF WEATHERED ROCK. | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. |
| AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF.GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: | 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. |
| SOIL LEGEND AND AASHTO CLASSIFICATION | ANGULAR, <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> . | WEATHERED VILLY NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. | ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT |
| CENERAL CRANIII AR MATERIALS SILT-CLAY MATERIALS | MINERALOGICAL COMPOSITION | FINE TO COARSE CRAIN IGNEOUS AND METAMORPHIC ROCK THAT | WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS | MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE. | CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. | SURFACE. |
| CROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7 | COMPRESSIBILITY | NON-CRYSTALLINE - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM |
| SYMBOL COCCOCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC | SLIGHTLY COMPRESSIBLE LL < 31 | ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. | OF SLOPE. |
| 5 5 5 5 6 5 5 6 5 5 6 5 5 5 5 5 5 5 5 5 | MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED |
| 7. PASSING *10 50 MX GRANULAR SILT- GRANULAR CLAY MUCK, | PERCENTAGE OF MATERIAL | (CP) SHELL BEDS, ETC. | 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 |
| *40 30 MX 50 MX 51 MN PEAT SOILS PEAT SOILS PEAT SOILS PEAT SOILS | GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL | WEATHERING | ROCKS OR CUTS MASSIVE ROCK. |
| MATERIAL STATE OF THE STATE OF | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE |
| PASSING *40 SOILS WITH | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, | HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE |
| LL — — 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR HIGHLY | HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE | (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. | LINE OF DIP, MEASURED CLOCKWISE FROM NORTH, |
| GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF COLUMN | GROUND WATER | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE |
| USUAL TYPES STONE FRACS. ORGANIC ORGA | ✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING | (SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR | SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. |
| OF MAJOR GRAYEL, AND SAND GRAYEL AND SAND SOILS SOILS | ▼ STATIC WATER LEVEL AFTER 24 HOURS | CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM |
| CEN RATING FAIR TO | | (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS | PARENT MATERIAL. |
| AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE | SPRING OR SEEP | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. |
| PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 | | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE |
| CONSISTENCY OR DENSENESS | MISCELLANEOUS SYMBOLS | SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. | FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. |
| PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH | ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION | IF TESTED, WOULD YIELD SPT REFUSAL | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO |
| CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT ²) | WITH SOIL DESCRIPTION DESCRIPTION DESCRIPTION | SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT | ITS LATERAL EXTENT. |
| GENERALLY VERY LOOSE | SOIL SYMBOL SOIL SYMBOL SUPPLINT TEST BORING SLOPE INDICATOR INSTALLATION | (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. |
| MATERIAL MEDIUM DENSE 10 TO 30 N/A | ARTIFICIAL FILL (AF) OTHER AUGER RODING CONE PENETROMETER | IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. |
| DENSE | THAN ROADWAY EMBANKMENT TEST | VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE |
| VERY SOFT < 2 < 0.25 | — INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD | (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR | OF AN INTERVENING IMPERVIOUS STRATUM. |
| GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 | INFERRED ROCK LINE MAN MONITORING WELL TEST BORING | VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| MATERIAL STIFF 8 TO 15 1 TO 2 | A DIEZOMETED | SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS | 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 |
| (COHESIVE) | TTTT ALLUVIAL SOIL BOUNDARY A INSTALLATION SPT N-VALUE | ALSO AN EXAMPLE. | RUN AND EXPRESSED AS A PERCENTAGE. |
| TEXTURE OR GRAIN SIZE | RECOMMENDATION SYMBOLS | ROCK HARDNESS | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 | UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND |
| OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053 | USED IN THE TOP 2 FEET OF | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED | RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. |
| BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY | SHALLOW UNCLASSIFIED EXCAVATION - SEED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL | TO DETACH HAND SPECIMEN. | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT |
| (BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.) | ABBREVIATIONS | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED | OR SLIP PLANE. |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005 | AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED | BY MODERATE BLOWS. | 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 |
| SIZE IN. 12 3 | BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT | MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE | WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL |
| SOIL MOISTURE - CORRELATION OF TERMS | CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC | POINT OF A GEOLOGIST'S PICK. | TO OR LESS THAN Ø.1 FOOT PER 6Ø BLOWS. |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) DESCRIPTION | DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS | 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 | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY | DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON | PIECES CAN BE BROKEN BY FINGER PRESSURE. | STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL |
| (SAT.) FROM BELOW THE GROUND WATER TABLE | F - FINE SL SILT, SILTY ST - SHELBY TUBE | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY | TENGTH 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. |
| PLASTIC SEMISOLID; REQUIRES DRYING TO | FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL | FINGERNAIL. | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| RAINCE ATTAIN OPTIMUM MOISTURE | FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING | FRACTURE SPACING BEDDING | BENCH MARK: B5770-2 (STA. 18+66.92, OFF. 22'LT) |
| " PLL + PLASTIC LIMIT - | HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT | TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET | |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: | WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET | ELEVATION: 824.13 FEET |
| SL SHRINKAGE LIMIT | CME-45C CLAY BITS X AUTOMATIC MANUAL | MODERATELY CLOSE | NOTES: |
| - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | 6' CONTINUOUS FLIGHT AUGER | VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET | FIAD = FILLED IMMEDIATELY AFTER DRILLING |
| PLASTICITY | CME-55 | INDURATION (8.000 FEET | |
| PLASTICITY INDEX (PI) DRY STRENGTH | - | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. | |
| NON PLASTIC 0-5 VERY LOW | X TUNGCARBIDE INSERTS | RUBBING WITH FINGER FREES NUMEROUS GRAINS; | |
| SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM | VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS: | GENILE BLUW BY HAMMER DISTRIEGRATES SAMPLE. | |
| HIGHLY PLASTIC 26 OR MORE HIGH | PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | |
| COLOR | TRICONE TUNGCARB. SOUNDING ROD | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). | X CORE BIT VANE SHEAR TEST | DIFFICULT TO BREAK WITH HAMMER. | |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. | DATE: 8-15-1- |
| | | Communication (Control of Control | I DATE, 0 15 P |

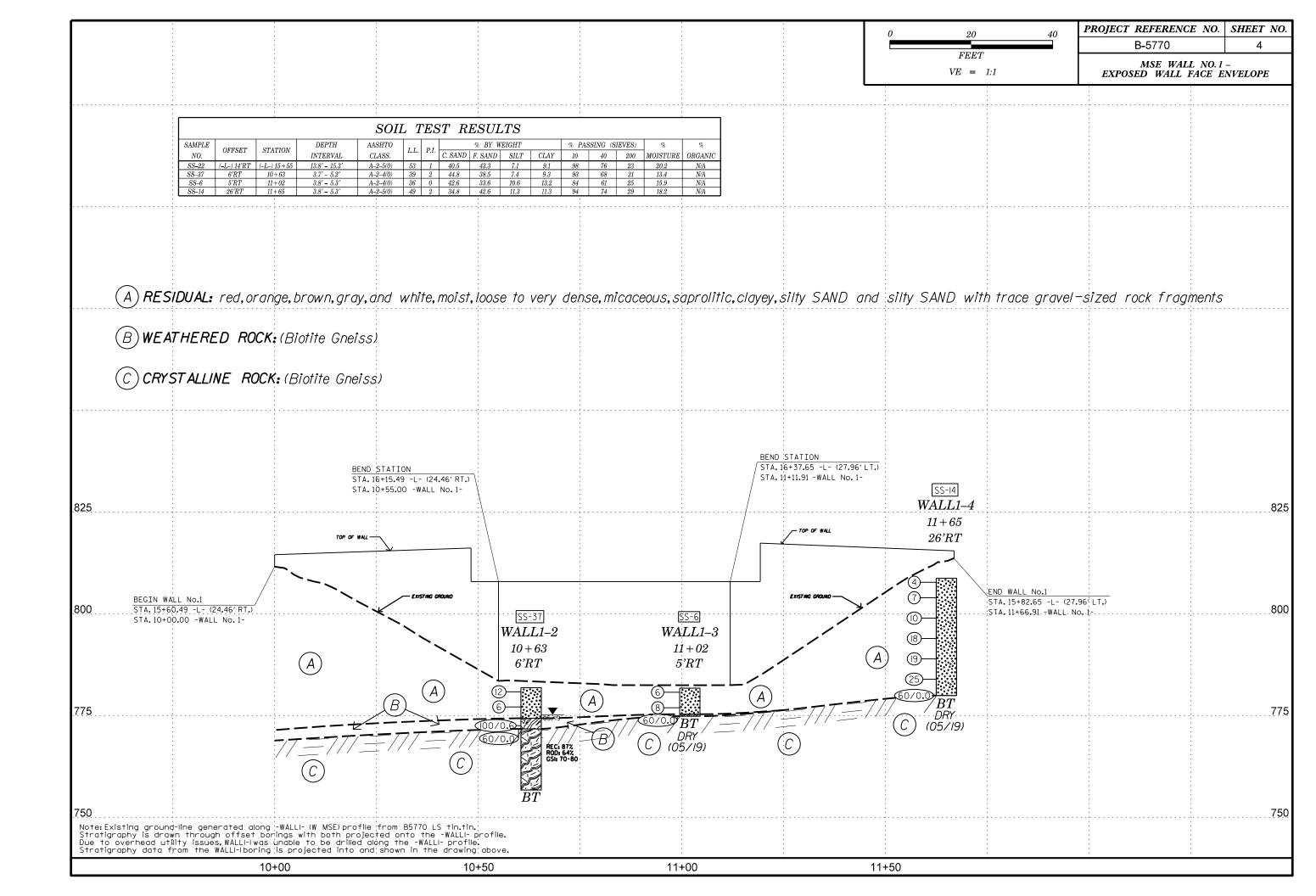
| ROJECT REFERENCE NO. | SHEET NO. |
|----------------------|-----------|
| B-5770 | 2A |

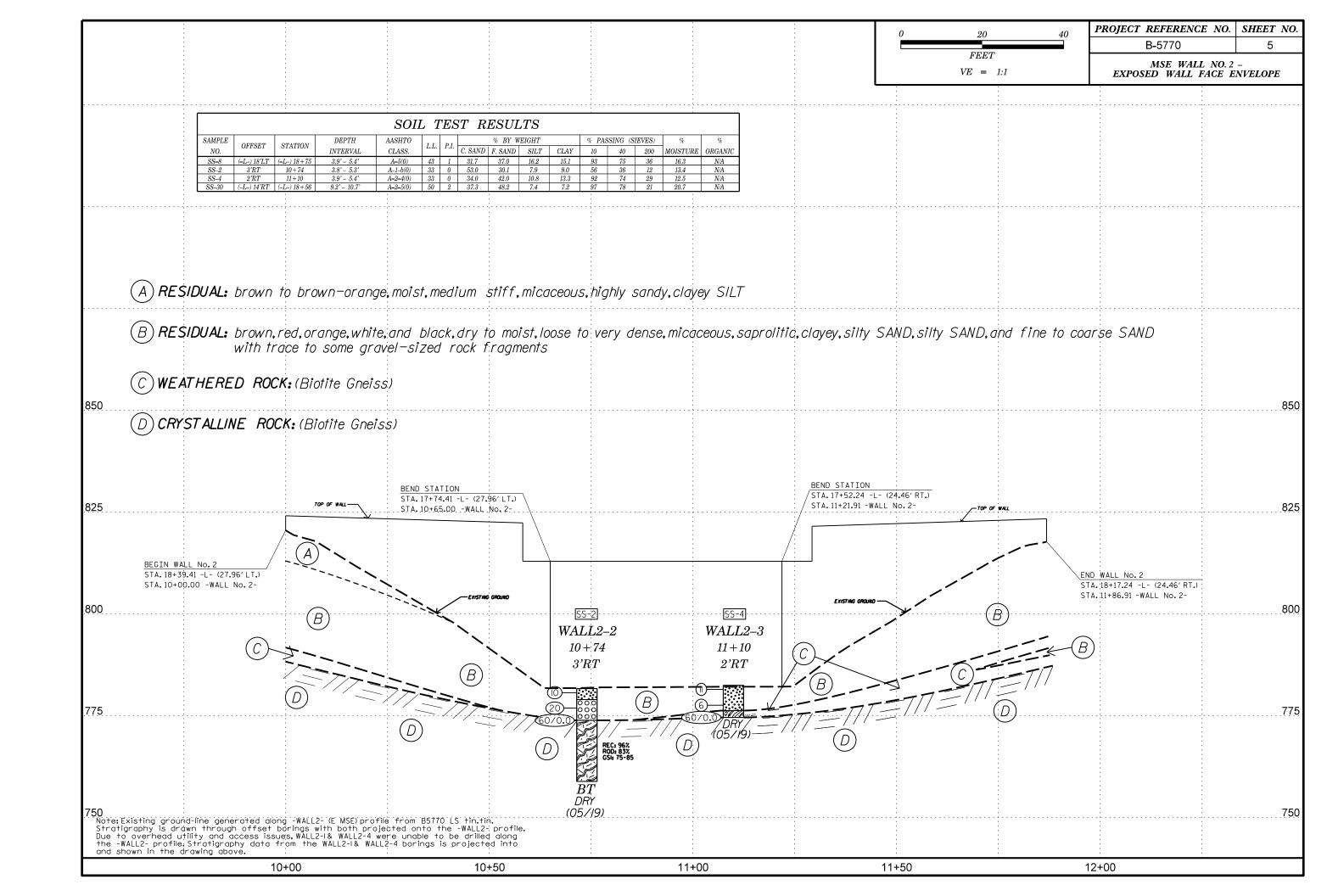
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

| | S | SUPPLEMENTAL L FROM AAS | EGEND, G SHTO LRI | EOLOGIO FD BRID | CAL STRENGTH INDEX (GSI) TABLES OGE DESIGN SPECIFICATIONS | |
|--|--|--|--|---|---|--|
| AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Join | ted Rock Mass (Mar | inos and Hoek, 2000) | | | AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos | and Hoek, 2000) |
| GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) | s e O | D 0 | aces | aces | GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) | |
| From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis. | SURFACE CONDITIONS VERY GOOD Very rough, fresh unweathered surfa | GOOD Rough, slightly weathered, iron stained surfaces FAIR Smooth, moderately weathered and altered surfaces | POOR Slickensided, highly weathered surf with compact coatings or fillings or angular fragments | VERY POOR Slickensided, highly weathered surf with soft clay coatings or fillings | realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis. | slickensided surfaces with compact coatings or fillings with angular fragments VERY POOR - Very smooth, slickensided or highly weathered surfaces |
| STRUCTURE | DE | CREASING SURFACE QU | | | COMPOSITION AND STRUCTURE | |
| INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities BLOCKY - well interlocked un- | PIECES 06 | | N/A | N/A | A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. A. Thick bedded, very blocky sandstone To A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. | |
| disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets | OF ROCK | 70 60 | | | B. Sand- stone with stone and siltstone with sand- with sand- with sand- B. Weak siltstone or silty shale with sand- with sand- with sand- | E |
| VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets | LOCKING | 50 | | | thin inter-layers of layers of layers of siltstone amounts and stone layers of layers of layers shale with sandstone layers | |
| BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity | ASING INTERL | 40 | 30 | | C.D.E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H. | F 20 |
| DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces | DECREK | | 20 | | G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers The fectonically deformed silty or clayey shale forming a chaotic structure with packets of clay. Thin layers of sandstone are transformed | 10 H/ |
| LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes | ♡ N/A | N/A | | 10 | Into small rock pieces. → Means deformation after tectonic disturbance | DATE: 8 |







| | | | | | | | | 1 | UKE L | | | | | | | | |
|------|--------------------|----------|---------------|--------|--------|---------------------------|--------------|--------------|-----------------|---------------|------------|--------------|------------|---|------------------------------|-----------------------------|-----------|
| WBS | 45726 | 5.1.1 | | | TI | IP B-5770 | | COUNT | f FORSYT | H | | | GEOLOGI | ST Ruley, A | ٩. | | |
| SITE | DESCR | IPTION | I Brid | dge No | . 243 | on Salisbur | y Ridge R | oad over l | NC 150 (Pet | ers Cree | ek Par | kway) | | | | GROUN | D WTR (fi |
| BOR | NG NO. | . WAL | L1-1 | | S | TATION 1 | 5+55 | | OFFSET 1 | 14 ft RT | | | ALIGNME | NT -L- | | 0 HR. | Dr |
| | AR ELI | | | | - 1 | OTAL DEP | | | NORTHING | | | | | 1,628,057 | | 24 HR. | FIAD |
| RILL | . RIG/HA | MMER E | FF./DA | TE S | UM2603 | 3 CME-550X 8 | 1% 04/23/20 |)19 | | DRILL N | /IETHO | D H.S | S. Augers | | HAMM | ER TYPE | Automatic |
| RIL | LER M | loseley | , M.G. | | S | TART DATI | E 05/10/1 | 9 | COMP. DAT | ΓE 05/ | 10/19 | | SURFACE | WATER DE | PTH N/ | A | |
| LEV | DRIVE ELEV | DEPTH | BLC | ow co | UNT | | BLOWS | PER FOOT | | SAMP. | lacksquare | L | | SOIL AND RO | OCK DESC | RIPTION | |
| (ft) | (ft) | (ft) | 0.5ft | 0.5ft | 0.5ft | 0 | 25 ; | 50 | 75 100 | NO. | МОІ | Ğ | ELEV. (ft) | COLLYNDIA | | 71011 | DEPTH |
| | | | | | | | | | | | | | | | | | |
| 15 | | 1 | | | | | | | | | | | | | | | |
| | 812.4 ⁻ | 1 | | | | | | | | | | | 812.4 | GROUN | ND SURFA | CE | |
| | 812.4 | 0.0 | 5 | 3 | 3 | 6 | | | | | М | | | RE | SIDUAL | | |
| 10 | 808.6 | 3.8 | | | | `\ | | | | | | | sapı | , orange, brown olitic, clayey, s | ilty SAND | and silty SA | AND |
| | 000.0 | 3.0 | 4 | 4 | 5 | 9 | | | | | М | - | V | vith trace grave | el-sized roc | k fragment | S |
| 05 | | Ŧ | | | | :j: : : | | | | | | F | | | | | |
| | 803.6 | 8.8 | 3 | | 2 | 1 7 | | | | | | - | - | | | | |
| | | Ŧ | 3 | 2 | 3 | • 5 | | | | | М | - | | | | | |
| 00 | _ | ‡ | | | | 1 -1 | | | | | | <u> </u> | | | | | |
| | 798.6 | 13.8 | 3 | 4 | 5 | - 1 - 1 - 1 | | | | SS-22 | 20% | | | | | | |
| 95 | | ‡ | | | | : ĭ;:: | | | | | | - | | | | | |
| 55 | 793.6 | 18.8 | | | |]\. | | | | | | | - | | | | |
| | | - | 8 | 7 | 7 | 14 | | | | | М | - | | | | | |
| 90 | _ | ‡ | | | | <u> · · · j· ·</u> | | | | | | | | | | | |
| | 788.6 | 23.8 | 4 | 6 | 7 | | | | | | М | | | | | | |
| | | <u> </u> | | | | • 13. | | | | | IVI | _ | | | | | |
| 35 | 783.6 - | 28.8 | | | | \ | | | | | | L | | | | | |
| | 705.0 | 20.0 | 10 | 11 | 11 | 1 : : : } | 122 | | | | М | _ | | | | | |
| 30 | - | ł | | | | | `\ | | | | | _ | _ | | | | |
| | 778.6 | 33.8 | 6 | 15 | 36 | | | | | | l | F | | | | | |
| | - | Ŧ | " | 13 | 30 | | : : : : , | 51 | | | М | I I | | | | | |
| 75 | | Ŧ | | | | | , | | | | | <u> </u> | - | | | | |
| | 773.6 | 38.8 | 6 | 23 | 14 | | → 37 | | | | М | - | | | | | |
| 70 | | ļ | | | | | : :Ľ: | | + | | | | 771.1 | WFATH | IERED RO | CK | 4 |
| | 768.6 | 43.8 | | | | | | | | | | | 768.6 | (Biot | ite Gneiss |) | 4 |
| | | ‡ | 60/0.0 | ' | | | | | 60/0.0 | | | - | | | ALLINE RO | | |
| | _ | ‡ | | | | | | | | | | | - Per | Boring Terminetration Test R | | | 38.6 |
| | | ‡ | | | | | | | | | | | f | t on Crystalline | Rock (Bio | tite Gneiss |) |
| | - | ‡ | | | | | | | | | | | | | soil obser | | |
| | - | ‡ | | | | | | | | | | - | inte | Harder drilling erpreted as the | top of We | athered Ro | ck. |
| | | ‡ | | | | | | | | | | - | | | alline Rocl | Κ. | |
| | _ | ţ | | | | | | | | | | l Ŀ | . (W | Boring does n MSE) Profile a | ot fall on th and therefo | ne -WALL1 ore it's locat | - tion |
| | - | ‡ | | | | | | | | | | <u> </u> | | must be sh | own relativ | e to -L- | |
| | | <u> </u> | | | | | | | | | | <u> </u> | | | | | |
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GEOTECHNICAL BORING REPORT BORE LOG

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|-------------|--------------------------------------|---|--------------|--------|---------------|-------------|--------|--------|--------|--------|------|----------|------------------|---------------|--------|-------------|--|
| WBS | 45726 | 5.1.1 | | | TI | P B- | 5770 | | | COU | NTY | FO | RSYT | Н | | | GEOLOGIST Ruley, A. |
| SITE | DESCR | IPTION | l Bric | lge No | 243 (| on Sal | isbury | / Ridg | je Ro | ad ov | er N | C 15 | 0 (Pet | ers Cree | ek Par | kway | GROUND WTR (ft) |
| | ING NO. | | | | $\overline{}$ | ΓΑΤΙΟ | | | | | _ | | | ft RT | | | ALIGNMENT -WALL1- 0 HR. N/A |
| | | | | | _ | | | | = 1 ft | | _ | | | 845,7 | 07 | | |
| | LAR ELE | | | TE O | | DTAL | | | | | | NOR | I HING | , | | | 1 ' ' |
| JKILL | _RIG/HAI | VIIVIERE | :FF./DA | IIE SU | JIVI26U3 | GUVIE-5 | 9 XUC | 1% 04/ | 23/20 | 19 | | | | DRILLIN | /IETHU | υ H. | S. Augers HAMMER TYPE Automatic |
| DRIL | LER M | oseley | , M.G. | | S | TART | DATE | 05/ | 13/19 | 9 | | COM | P. DA | FE 05/ | 13/19 | | SURFACE WATER DEPTH N/A |
| LEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | 0.5ft | 0.5ft | JNT 0.5ft | 0 | 2 | BLC | | PER FC | | '5 | 100 | SAMP. NO. | MOI | L O G | SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft |
| 785 | - - - - - - - - | 0.0 | 8 | 7 | 5 | - 1 | 12 . | | | | | | | | М | | 781.8 GROUND SURFACE 0. RESIDUAL red brown to brown pieces up apprelitie |
| 00 | 778.1 | 3.7 | 3 | 3 | 3 | · /. | | | | | | | | SS-37 | 13% | | red-brown to brown, micaceous, saprolitic, silty SAND |
| 775 | 770.4 | | | | | | | - ::- | | | | | | | • | 477 | 774.3 VEATHERED ROCK |
| 770 | 773.1 771.7 - | 8.7 - 10.1 | 39 60/0.0 | 61/0.1 | | | · · | | · · | | : : | . 1 | 00/0.6 60/0.0 | | | | 771.7 (Biotite Gneiss) 10. CRYSTALLINE ROCK |
| 70 | - | - | | | | | | | | | : : | | | | | | - (Biotite Gneiss) REC: 87% RQD: 64% GSI: 70-80 |
| 765 | | | | | | | : : | | | | | | | | | | - |
| 00 | - - | | | | | | | | | | | | | | | | |
| 760 | - - | | | | | | : : | | | | : : | | | | | | - |
| | - | | | | | | | | | | | | • • • | | | | 756.7 25. Boring Terminated at Elevation 756.7 ft in Crystalline Rock (Biotite Gneiss) |
| | | - - - - - - - - - - - - - - - - - - - | | | | | | | | | | | | | | | - 0.2 feet of topsoil observed Harder drilling reported at 7.5 feet interpreted as the top of Weathered Rock Auger and SPT Refusal at 10.1 feet on Crystalline Rock Begin coring at 10.1 feet Equivalent boring to EB1-B from the Bridge Inventory Report. |
| | | - | | | | | | | | | | | | | | | - |
| | | | | | | | | | | | | | | | | | - |
| | - - - - - | - - - - - | | | | | | | | | | | | | | | - |

| | 45700 | | | | | | | | | | AL LUG | | |
|-------|-------------|---------|--------|--|--------------|--------------|-----------------|-----------|--------------|----|---|---|---------------------|
| | 45726 | | | | | B-577 | | | | | ORSYTH | GEOLOGIST Ruley, A. | |
| | | | | ige No. 2 | | | | Road | over | _ | 50 (Peters Creek Parkway) | | GROUND WTR (ft) |
| | NG NO. | | | | _ | | 10+63 | | | + | FSET 6 ft RT | ALIGNMENT -WALL1- | 0 HR. N/A |
| | AR ELI | | | | 1 | | PTH 25 | | | NO | RTHING 845,797 | EASTING 1,628,125 | 24 HR. 6.6 |
| DRILL | . RIG/HA | MMER E | FF./DA | TE SUM | | | | | | | DRILL METHOD H.S | 5. Augers HAI | MMER TYPE Automatic |
| DRIL | LER M | loseley | , M.G. | | STAI | RT DA | TE 05/1 | 3/19 | | co | MP. DATE 05/13/19 | SURFACE WATER DEPTH | N/A |
| COR | E SIZE | NQ2 | | | | | N 15.0 f | | | Ш, | | | |
| ELEV | RUN ELEV | DEPTH | | DRILL RATE | REC. | JN RQD | SAMP. | REC. | RATA | L | D | ESCRIPTION AND REMARKS | |
| (ft) | (ft) | (ft) | (ft) | (Min/ft) | (ft) % | (ft) % | NO. | (ft) % | (ft) % | G | ELEV. (ft) | | DEPTH (f |
| 71.71 | 771.7 | 10.1 | 3.0 | N=60/0.0 | (2.3) | (2.2) | | (13.0) | (0.6) | | - 771.7 | Begin Coring @ 10.1 ft CRYSTALLINE ROCK | 10. |
| 770 | 768.7 | 1 | 3.0 | N=60/0.0 0:57/1.0 2:27/1.0 3:09/1.0 | 77% | (2.3) 77% | | 87% | (9.6) 64% | | light to dark gray, blace | ck, and white, generally slight to free | h weathering with |
| | - 100.1 | 10.1 | 5.0 | 3:09/1.0 2:46/1.0 | I (T.U) | (3.7) | | | | | close fracture space | e weathered zone (17.0 - 17.4 feet) cing, BIOTITE GNEISS, possibly in | erlayered with |
| 765 | - | ŧ | | 2:46/1.0 2:37/1.0 2:33/1.0 | 92% | 74% | | | | | - amphibolite. Eviden - | ce of chemical weathering (dissolut several areas of the core. | ion) observed in |
| | 763.7 | 18.1 | | 2:29/1.0 2:50/1.0 | | (2.2) | | | | | - - | GSI: 70-80 | |
| | | ‡ | 5.0 | 2:23/1.0 3:13/1.0 | (4.2) 84% | (3.2) 64% | | | | | . • | | |
| 760 | | ‡ | | 3:12/1.0 3:24/1.0 | | | | | | | - | | |
| - | 758.7 . | 23.1 | 2.0 | 3:32/1.0 2:39/1.0 | (1.9) | (0.4) | | | | | - - | | |
| + | 756.7 - | 25.1 | | 2:19/1.0 | 95% | 20% | | | | | - 756.7 - Boring Terminated at | Elevation 756.7 ft in Crystalline Roo | ck (Biotite Gneiss) |
| | - | ‡ | | | | | | | | | _ | - 0.2 feet of topsoil observed. | , |
| | - | ţ | | | | | | | | | - Harder drilling repo | orted at 7.5 feet interpreted as the to Rock. | op of Weathered |
| | - | ŧ | | | | | | | | | - Auger and S | SPT Refusal at 10.1 feet on Crystall | ine Rock. |
| | | ł | | | | | | | | | - Equivalent bor | Begin coring at 10.1 feet. ring to EB1-B from the Bridge Invention | tory Report. |
| | | Ŧ | | | | | | | | | - | | |
| | _ | Ŧ | | | | | | | | | - | | |
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GEOTECHNICAL BORING REPORT BORE LOG

| WB | 3S 4572 | 6.1.1 | | | Т | IP B-57 | 770 | | | COUNT | TY F | ORSYT | Н | | | GEOLOGIST Ruley, A. |
|------|----------------|-----------------|---------------|---------|-------|---------------------------------------|------|-------|-------|--------|----------|----------------|---------------|-------------------|------|---|
| SIT | E DESC | RIPTION | I Bric | lge No | . 243 | on Salis | bury | Ridge | Roa | d over | NC 1 | 50 (Pet | ers Cre | ek Par | rkwa | y) GROUND WTR (ft) |
| во | RING NO |). WAL | L1-3 | | S | TATION | 11 | +02 | | | OFF | SET | ft RT | | | ALIGNMENT -WALL1- 0 HR. Dry |
| СО | LLAR EI | .EV . 78 | 31.7 ft | | _ | OTAL D | | | ft | | + | | 845,8 | 35 | | EASTING 1,628,127 24 HR . Dry |
| DRI | LL RIG/H | AMMER E | FF./DA | TE S | | | | | |) | 1 | | DRILL N | /IETHO | D H | I.S. Augers HAMMER TYPE Automatic |
| DR | ILLER | Moselev | . M.G. | | s | TART D | ATE | 05/09 | 9/19 | | col | MP. DA | TE 05/ | 09/19 | | SURFACE WATER DEPTH N/A |
| ELE, | V DRIVE | DEPTH | BLC | ow co | UNT | | | BLOW | /S PE | R F00 | Т | | SAMP. | V / | L | SOIL AND ROCK DESCRIPTION |
| | 781.7 777.9 | DEPTH (ft) | | 0.5ft 3 | UNT | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 200 | BLOW | /S PE | R F00 | 75 75 | 100 100 | SAMP. NO. | 09/19 MOI M | L | SURFACE WATER DEPTH N/A SOIL AND ROCK DESCRIPTION ELEV. (ft) RESIDUAL red-brown to light-brown, micaceous, saprolitic, sity SAND with trace gravel-sized rock fragments 775.3 6.4 774.8 WEATHERED ROCK (Biotite Gneiss) CRYSTALINE ROCK (Biotite Gneiss) Boring Terminated with Standard Penetration Test Refusal at Elevation 774.8 ft on Crystalline Rock (Biotite Gneiss) - No topsoil observed Harder drilling reported from 6.4 - 6.9 feet interpreted as Weatherd Rock Auger and SPT Refusal at 6.9 feet on Crystalline Rock Equivalent boring to EB1-A from the Bridge Inventory Report. |

| | | | | | | | | | | | D | JN | <u> </u> | <u>UG</u> | | | | | |
|-------|---------------|------------|---------------|--------|--------|--|------------------|---|----------|----------|--------|--------------|----------|---------------|------------|----------|---|------------|-----------|
| NBS | 45726 | 5.1.1 | | | Т | I P B | -5770 |) | | CO | UNTY | ' FO | RSYT | Н | | | GEOLOGIST Ruley, A. | | |
| SITE | DESCR | IPTION | I Brid | dge No | 243 | on Sa | lisbu | ry Ri | dge R | oad o | over N | IC 15 | 0 (Pet | ers Cree | ek Par | kway | 1 | GROUN | D WTR (ft |
| 30RI | NG NO. | WAL | L1-4 | | s | TATIO | DN 1 | 11+6 | 5 | | | OFFS | SET 2 | 26 ft RT | | | ALIGNMENT -WALL1- | 0 HR. | Dry |
| | AR ELE | | | | - 1 | | | | 28.8 f | | | NOR' | THING | 845,8 | 55 | | EASTING 1,628,066 | 24 HR. | Dry |
| DRILL | .RIG/HAI | MMER E | FF./DA | TE S | UM2603 | 3 CME | 550X 8 | 81% C | 14/23/20 | 019 | | | | DRILL I | /IETHC | D H. | S. Augers HAMM | ER TYPE | Automatic |
| RIL | LER M | loseley | , M.G. | | S | TART | DAT | E 0 | 5/09/1 | 19 | | COM | P. DA | FE 05/ | 09/19 | | SURFACE WATER DEPTH N/ | A | |
| _EV | DRIVE ELEV | DEPTH | BLO | ow co | UNT | | | BL | OWS | PER F | OOT | | | SAMP. | lacksquare | L | SOIL AND ROCK DESC | RIPTION | |
| ft) | (ft) | (ft) | 0.5ft | 0.5ft | 0.5ft | 0 | | 25 | | 50 | | 75 | 100 | NO. | /MOI | | ELEV. (ft) | 7411 11014 | DEPTH (|
| | | | | | | | | | | | | | | | | | | | |
| 10 | | _ | | | | | | | | | | | | | | | - | | |
| | 808.7 - | 0.0 | 2 | 2 | 2 | 1 | | Τ. | | Τ. | | T | | + | М | - | 808.7 GROUND SURFA RESIDUAL | CE | 0 |
| | - | <u> </u> | | | | T | | : | | | | : : | : : | | | | brown, gray, and white, r saprolitic, clayey, silty SAND | | |
| 5 | 804.9 | 3.8 | 4 | 3 | 4 | H | 7 | +: | | +: | | | | SS-14 | 18% | Ŀ | - with trace gravel-sized roo | | |
| | - | - | | | | T. | | . | | | | | | 00 11 | 1070 | - | | | |
| 0 | 799.9 | [L 8.8 | | | | : ; | | : | | : | | : : | :: | | | F | | | |
| | - | - 0.0 | 4 | 5 | 5 | 1 🗔 | 10 - | Ţ. | | - | | ļ | | | М | F | • | | |
| | - | ļ | | | | : | :\.'. : | : | | | | : : | : : | | | - | | | |
| 5 | 794.9 | 13.8 | 10 | 9 | 9 | <u> </u> | . / . | <u> </u> : | | <u> </u> | | : : | | | | | - | | |
| | - | <u> </u> | 10 | " | 9 | : | · ·•1 | 18 | | | | : : | : : | | М | | | | |
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| 7 | 789.9 | 18.8 | 11 | 10 | 9 | 1 | | 19 • | | +: | | . | | | М | | - | | |
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| 5 | - 784.9 | 23.8 | | | | <u> </u> | | <u>\ · </u> | | | | <u> </u> | | | | _ | _ | | |
| | - | <u> </u> | 10 | 10 | 15 | : | | 25 | | : | | : : | :: | | М | Ŀ | | | |
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| 0 | 779.9 | 28.8 | 60/0.0 | | | H | | <u> </u> | | 1 | | | 60/0.0 | + | | | 779.9 CRYSTALLINE RO | OCK | 28 |
| | _ | Ī | | | | | | | | | | | | | | F | (Biotite Gneiss |) | |
| | - | F | | | | | | | | | | | | | | F | Boring Terminated with Penetration Test Refusal at E | levation 7 | 79.9 |
| | - | Ŧ | | | | | | | | | | | | | | F | ft on Crystalline Rock (Bio | | s) |
| | - | ļ | | | | | | | | | | | | | | | - No topsoil obser | /ed. | |
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GEOTECHNICAL BORING REPORT BORE LOG

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|-------|-------------------------|----------|------------|-------|--------|-----------------|--------|----------|---------|------------------|---------|----------------|------------|------------|---|-------------------------------|---------|
| WBS | 45726.1.1 | | | | TI | P B-5770 |) | | COUNT | Y F | ORSYT | Н | | | GEOLOGIST Ruley, A. | | |
| SITE | DESCRIPTION | ON E | Bridge | e No. | 243 | on Salisbu | ry Rid | ge Ro | ad over | NC 1 | 50 (Pet | ers Cree | ek Par | rkway) | | GROUND V | VTR (fi |
| BOR | ING NO. W | ALL2- | -1 | | S | TATION | 18+75 | | | OFF | SET | 18 ft LT | | | ALIGNMENT -L- | 0 HR. | Dr |
| COLI | AR ELEV. | 824.8 | 3 ft | | т | OTAL DEP | TH 3 | 30.0 ft | | NOF | RTHING | 845,9 | 06 | | EASTING 1,628,354 | 24 HR. | Dr |
| DRILL | RIG/HAMMER | R EFF. | /DATE | : SU | JM2603 | CME-550X | 81% 04 | 1/23/201 | 9 | | | DRILL N | /IETHC | D H.S | S. Augers HAMME | RTYPE Aut | tomatic |
| DRIL | LER Mosele | ey, M | .G. | | S | TART DAT | E 05 | 5/09/19 |) | COI | MP. DA | TE 05/0 | 09/19 | | SURFACE WATER DEPTH N/A | | |
| LEV | DRIVE DEP | тн | BLOW | / COL | JNT | | BL | OWS PI | ER FOO | Т | | SAMP. | V / | | OOII AND DOOK DECOM | DIDTION | |
| ft) | ELEV (ft) | . — | 5ft C | 0.5ft | 0.5ft | 0 | 25 | 50 |) | 75 | 100 | NO. | /MOI | 0 G | SOIL AND ROCK DESCR | | DEPTH |
| | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | .824.8 GROUND SURFAC | Œ | |
| | 824.8 0.0 | , | 4 | 3 | 2 | 6 5· · · | | | | | | | М | | RESIDUAL brown to brown-orange, micad | | |
| | 820.9 I 3.9 | , | | | | | | | | : : | | | | ľ. F | sandy, clayey SIL | | |
| 20 | + 0.0 | <u> </u> | 4 | 3 | 3 | 6 | - | | | | | SS-8 | 16% | * - | - | | |
| | 1 | | | | | :\;: : : | | | | | | | | 1.1. | 817.6 | | |
| 15 | 815.9 8.9 |) | 5 | 6 | 6 | :';:: | | | | : : | | | | | brown, orange, white, and blac saprolitic, clayey, silty SAND at | k, micaceous nd silty SAND | ,) |
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| 0 | 810.9 - 13.9 | 9 | 7 | 8 | 8 | 10 | 3 | | | - - | | | М | | | | |
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| _ | 805.9 18.9 | 9 | | | | | \ : | | | : : | | | | | | | |
| 5_ | † | 1 | 0 | 13 | 16 | | 29 | | | | | | М | | | | |
| | 1 | | | | | | | | | : : | | | | li t | | | |
| 0 | 800.9 23.9 | 9 (| 6 | 10 | 55 | | | | 1 | | | | М | E | | | |
| | Ŧ | | | | | | | | | - + - | | | IVI | <i>777</i> | 799.3 WEATHERED ROO | K | 2 |
| | 795.9 - 28.9 | ۵ | | | | | | | | . . | | | | | (Biotite Gneiss) | | |
| 5 | 794.8 - 30.0 | ი 100 | 0.0 0.0 | | | | | | | | 100/0.2 | | | STA. | .794.8 CRYSTALLINE RO | CK. | 3 |
| | ‡ | 00/ | 0.0 | | | | | | | | 00/0.0 | | | | (Biotite Gneiss) | | |
| | ‡ | | | | | | | | | | | | | - | Boring Terminated with S Penetration Test Refusal at Ele | | ; |
| | ‡ | | | | | | | | | | | | | - | ft on Crystalline Rock (Bioti | te Gneiss) | |
| | ‡ | | | | | | | | | | | | | | - No topsoil observe - Harder drilling reported at | | |
| | # | | | | | | | | | | | | | <u> </u> | interpreted as the top of Wear | thered Rock. | |
| | <u> </u> | | | | | | | | | | | | | | - Auger and SPT Refusal at Crystalline Rock. | | |
| | l İ | | | | | | | | | | | | | E | Boring does not fall on the (E_MSE) Profile and therefore | | |
| | + | | | | | | | | | | | | | <u> </u> | must be shown relative | to -L- | |
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| WBS | 45726.1.1 | | | TI | P B-5770 | | COL | JNTY | FORS | /TH | 1 | | | GEOLOGIST Ruley, A. |
| SITE | DESCRIPTION | Brid | ge No | . 243 (| on Salisbui | y Ridge | Road o | ver N | C 150 (F | ete | ers Cree | k Par | kway | |
| BOR | ING NO. WAL | L2-2 | | S | TATION 1 | 0+74 | | - 0 | OFFSET | 3 | ft RT | | | ALIGNMENT -WALL2- 0 HR. N |
| | LAR ELEV. 78 | | | | OTAL DEP | | | l l | NORTHI | ١G | 845,8 | 77 | | EASTING 1,628,251 24 HR. D |
| DRILL | RIG/HAMMER E | FF./DA | TE SI | JM2603 | CME-550X 8 | 31% 04/23 | 3/2019 | | | | DRILL N | /IETHO | D H. | .S. Augers HAMMER TYPE Automation |
| DRIL | LER Moseley, | M.G. | | S | TART DAT | E 05/08 | 3/19 | (| COMP. D | ΑT | E 05/0 | 09/19 | | SURFACE WATER DEPTH N/A |
| ELEV (ft) | DRIVE DEPTH (ft) | BLO 0.5ft | 0.5ft | UNT 0.5ft | 0 | BLOW 25 | S PER F | ООТ 7 | 5 10 | 0 | SAMP. NO. | MOI | L O G | SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH |
| 785 | | | | | | | | | | | | | | |
| 780 | 781.6 + 0.0 | 4 | 5 | 5 | · •10 · | | | | | + | | М | | - RESIDUAL |
| 100 | ‡ | | | | 1 1 . | | | | | | | | | brown, silty SAND |
| | 777.8 + 3.8 | 5 | 9 | 11 | | | | | | | SS-2 | 13% | | brown, fine to coarse SAND with some gravel-sized rock fragments |
| 775 | <u> </u> | | | | • • • ĭ | | | | | | 002 | 1070 | 000 | - |
| | 773.8 7.8 | 60/0.0 | | | | 1 | | | 60/0 | ٠ | | | 000 | - 773.8 CDVCTALLINE DOCK |
| | ‡ | 60/0.0 | | | | | | | | | | | | - CRYSTALLINE ROCK - (Biotite Gneiss) |
| 770 | | | | | | | | | | | | | | - REC: 96% RQD: 83% GSI: 75-85 |
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| 760 | ‡ | | | | | 1 : : : | | | | 4 | | | | - - 758.8 2 |
| | *** | | | | | | | | | | | | | Boring Terminated at Elevation 758.8 ft in Crystalline Rock (Biotite Gneiss) - No topsoil observed Auger and SPT Refusal at 7.8 feet on Crystalline Rock Begin coring at 7.8 feet Equivalent boring to EB2-A from the Bridge Inventory Report. |

GEOTECHNICAL BORING REPORT CORE LOG

| WDS | 45706 | 1 1 | | | TID | B-577 | 70 | | | | OBSYTH | GEOLOGIST Ruley, A. | |
|--------------|---------------|---------------|-------------|--|--------------|------------------|-----------------|--------------|------------------|--------|---|--|--------------------------------|
| | 45726 | | I Brid | lao No. 2 | | | | _ | | | ORSYTH 150 (Peters Creek Parkway) | | GROUND WTR (ft) |
| | | | | ige No. 2 | 1 | | | Noac | ovei | _ | • | ı | |
| | ING NO. | | | | | | 10+74 | 0.4 | | _ | FSET 3 ft RT | ALIGNMENT -WALL2- | 0 HR. N/A |
| I | LAR ELE | | | TE SUM | 1 | | PTH 22 | | | NO | RTHING 845,877 DRILL METHOD H.S | EASTING 1,628,251 | 24 HR. Dry MMER TYPE Automatic |
| | | | | | | | | | | | | | |
| | LER M | | , M.G. | | | | TE 05/0 | | | CO | MP. DATE 05/09/19 | SURFACE WATER DEPTH | N/A |
| | E SIZE RUN | | 1 | DRILL | | JN | N 15.0 f | | ATA | L | | | |
| ELEV (ft) | ELEV (ft) | DEPTH (ft) | RUN (ft) | RATE (Min/ft) | REC. (ft) | RQD (ft) % | SAMP. NO. | REC. (ft) | RQD (ft) % | O G | | ESCRIPTION AND REMARKS | DEDTIL (0 |
| 770 77 | | | | (IVIIII/IL) | % | 96 | | % | % | - | ELEV. (ft) | Domin Coning @ 7.0 ft | DEPTH (ft |
| 773.77 | 773.8 | 7.8 | 5.0 | N=60/0.0 | (5.0) | (3.3) | | (14.4) | (12.5) | | - 773.8 | Begin Coring @ 7.8 ft CRYSTALLINE ROCK | 7.8 |
| 770 | - | - | | N=60/0.0 5:47/1.0 6:13/1.0 7:24/1.0 6:54/1.0 7:18/1.0 | 100% | 66% | | 96% | 83% | | | ck, and white, slight to fresh weather spacing, BIOTITE GNEISS, possibly | |
| 110 | 768.8 | 12.8 | 5.0 | 6:54/1.0 7:18/1.0 | (4.4) | (4.4) | | | | | - - | amphibolite. GSI: 75-85 | |
| | - | - | 5.0 | 4:23/1.0 1:40/1.0 | (4.4) 88% | (4.4) 88% | | | | | - - | | |
| 765 | | 4 | | 2:24/1.0 2:47/1.0 | | | | | | | - - | | |
| | 763.8 | 17.8 | 5.0 | 2:38/1.0 2:07/1.0 | (5.0) | (4.8) | | | | | - | | |
| 760 | : | ‡ | | 2:26/1.0 2:34/1.0 | 100% | 96% | | | | | - | | |
| 100 | 758.8 | 22.8 | | 2:56/1.0 2:55/1.0 | | | | | | | 758.8 | | 22.8 |
| | | | | | | | | | | | Boring Terminated at | Elevation 758.8 ft in Crystalline Roo | x (Biotite Gneiss) |
| | _ | | | | | | | | | | - Auger and | No topsoil observed. SPT Refusal at 7.8 feet on Crystalli | ne Rock. |
| | - | _ | | | | | | | | | - | Begin coring at 7.8 feet. ring to EB2-A from the Bridge Inven | |
| | - | ŀ | | | | | | | | | | g to EBE / thom the Bridge invol | tory respons |
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| | - | - | | | | | | | | | _ | | |
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| | - | E | | | | | | | | | _ | | |
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| VBS 45726.1.1 | | | | ORE LUG | | | |
|---------------------------------|------------|-----------------|-------------------------|---------------------------------------|---------------|--|--|
| 45720.1.1 | | TIP B-57 | 70 COUNT | Y FORSYTH | | GEOLOGIST Ruley, A. | |
| | | | oury Ridge Road over | NC 150 (Peters Cr | eek Parkway | ′) | GROUND WTR (ff |
| BORING NO. W | ALL2-3 | STATION | 11+10 | OFFSET 2 ft RT | | ALIGNMENT -WALL2- | 0 HR. Dry |
| OLLAR ELEV. | | I | EPTH 7.9 ft | NORTHING 845 | ,841 | EASTING 1,628,248 | 24 HR. Dry |
| RILL RIG/HAMMER | REFF./DATE | SUM2603 CME-550 |)X 81% 04/23/2019 | DRILI | METHOD H | S. Augers HAMN | MER TYPE Automatic |
| ORILLER Mosel | ey, M.G. | START DA | ATE 05/09/19 | COMP. DATE 0 | 5/09/19 | SURFACE WATER DEPTH N | /A |
| LEV DRIVE ELEV (ft) DEP | | | BLOWS PER FOOT 25 50 | 75 100 NO | MOI G | SOIL AND ROCK DES | CRIPTION DEPTH |
| 782.4 — 0.0 80 — 778.5 — 3.9 | 8 6 | 3 | | · · · · · · · · · · · · · · · · · · · | ⊣ ಟ ುಟ | - 782.4 GROUND SURF RESIDUAL Ight brown to brown, micaco silty SAND | eous, saprolitic, |
| 774.5 7.9 | | | | 60/0.0 | | 776.2 -774.5 (Biotite Gneis CRYSTALLINE R (Biotite Gneis Boring Terminated with Penetration Test Refusal at ft on Crystalline Rock (Biotite Gneis Boring Terminated with Penetration Test Refusal at ft on Crystalline Rock (Biotite Gneis Gnei | OCK s) ROCK rs) n Standard Elevation 774.5 otite Gneiss) rved. rved. m 6.2 - 7.9 feet ered Rock. at 7.9 feet on ck. it from the Bridge |

GEOTECHNICAL BORING REPORT BORE LOG

| | | | | | | D' | URE L | <u>UG</u> | | | | |
|--------------|------------------|---------------|--|--------|------------------|--|--------------|-----------|---------------------|----------|--|------------------------------|
| WBS | 45726.1.1 | | | TI | IP B-5770 | COUNT | Y FORSYTI | Н | | | GEOLOGIST Ruley, A. | |
| SITE | DESCRIPTION | l Brid | dge No | . 243 | on Salisbury R | idge Road over l | NC 150 (Pete | ers Cree | ek Parkw | ay) | | GROUND WTR (|
| BOR | ING NO. WAL | L2-4 | | S | TATION 18+5 | 6 | OFFSET 1 | 4 ft RT | | | ALIGNMENT -L- | 0 HR. D |
| COLI | AR ELEV. 82 | 23.2 ft | | T | OTAL DEPTH | 27.5 ft | NORTHING | 845,8 | 70 | | EASTING 1,628,345 | 24 HR . FIA |
| DRILL | . RIG/HAMMER E | FF./DA | ATE SI | JM2603 | 3 CME-550X 81% | 04/23/2019 | | DRILL N | /IETHOD | H.S. | . Augers HAMME | ERTYPE Automatic |
| DRIL | LER Moseley | , M.G. | | S. | TART DATE |)5/10/19 | COMP. DAT | E 05/ | 10/19 | | SURFACE WATER DEPTH N// | A |
| LEV | DRIVE DEPTH | BLO | OW CO | UNT | В | LOWS PER FOOT | | SAMP. | V / L | | OOU AND DOOK DEGO | PURTION |
| (ft) | ELEV (ft) | 0.5ft | 0.5ft | 0.5ft | 0 25 | 50 | 75 100 | NO. | MOI G | | SOIL AND ROCK DESC ELEV. (ft) | RIPTION DEPTH |
| | | | | | | | | | | | | |
| 325 | | | | | | | | | | | | |
|) <u>Z</u> U | 823.2 0.0 | | | | | | | | | F, | 823.2 GROUND SURFA | CE |
| | 1 | 12 | 7 | 4 | . •11 . | | | | М | | RESIDUAL | |
| 20 | | | | | - - - | | | | | Ł | brown, red, orange, and whit saprolitic, clayey, silty SAND a | and silty SAND |
| | 819.0 4.2 | 5 | 6 | 3 | - . . | | | | м | ÷ | | |
| | - | | | | . . | | | | | - | | |
| 15 | 814.0 T 9.2 | | | | 1 -1 | | + | | | - | | |
| | 19.2 | 2 | 3 | 3 | 6 | | | SS-30 | 21% | ‡ | | |
| | ‡ | | | | :\:: : | | | | | 1 | | |
| 10 | 809.0 \pm 14.2 | | | | | | + | | | + | | |
| | Ŧ | 7 | 8 | 11 | • 19 | | | | М | F | 806.7 | 1 |
|)5 | ‡ | | | | : : : -: | | + | | 7 | * | WEATHERED RO | CK |
| | 804.0 19.2 | 56 | 44/0.3 | | | | | | | | (Biotite Gneiss) |) |
| | ‡ | 30 | 44/0.3 | | | | 100/0.8 | | | 計 | | |
| 00 | ± | | | | | | | | | 計 | 801.1 RESIDUAL | 2 |
| | 799.0 24.2 | 11 | 9 | 25 | | | 1 | | м | - | brown, micaceous, saprolition | - |
| | - | | | | | • 34 · · · · · · · · · · · · · · · · · · | | | ''' '' | 77 | 797.2 WEATHERED RO | OCK 2 |
| | 795.8 + 27.4 | 60/0.1 | | | | | 60/0.1 | | 2/2 | - | (Biotite Gneiss) |) |
| | ‡ | | | | | | | | | ţ | CRYSTALLINE RO (Biotite Gneiss) | |
| | ± | | | | | | | | | Ł | Boring Terminated with Penetration Test Refusal at E | |
| | + | | | | | | | | | \vdash | ft on Crystalline Rock (Bio | |
| | Ŧ | | | | | | | | | F | - No topsoil observ | ved. |
| | ‡ | | | | | | | | | F | Harder drilling reported a interpreted as top of Weather | at 16.5 feet ed Rock seam |
| | † | | | | | | | | | F | Harder drilling reported aga | in at 26.0 feet |
| | 1 | | | | | | | | | E | interpreted as top of Weath - Auger and SPT Refusal on C | |
| | Ŧ | | | | | | | | | F | at 27.4 feet Boring does not fall on the | ne -WALL2- |
| | Ŧ | | | | | | | | | F | (E_MSE) Profile and therefore | re it's location |
| | ‡ | | | | | | | | | Ė | must be shown relativ | e to -L- |
| | | | | | | | | | | E | | |
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M & T Form 503 M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

| T. I. P. No. | B-5770 | - | | | | |
|---------------|---------------------|--|---------|----|----------|------------------------|
| | REPORT ON SAMI | Replace Bridge No. 243 on Salisbury Ridge Rd | | | | |
| Project | 45726.1.1 | County | Forsyth | | Owner | Geotech |
| Date: Sampled | 5/1/19 | Received | 5/14/19 | | Reported | 5/30/19 |
| Sampled from | MSE Wall Investigat | ion | | By | Geotech | |
| Submitted by | B Smith | | | | 2008 | Standard Specification |

5/30/19

TEST RESULTS

| Proj. Sample No. | SS-8 | SS-30 | SS-22 | SS-14 | |
|----------------------|---------|---------|---------|---------|--|
| Boring No. | WALL2-1 | WALL2-4 | WALL1-1 | WALL1-4 | |
| Retained #4 Sieve % | 3 | 0 | 0 | 3 | |
| Passing #10 Sieve % | 93 | 97 | 98 | 94 | |
| Passing #40 Sieve % | 75 | 78 | 76 | 74 | |
| Passing #200 Sieve % | 36 | 21 | 23 | 29 | |

MINUS NO. 10 FRACTION

| SOIL MORTAR - 100% | | | | | | |
|-----------------------|---|------|------|------|------|--|
| Coarse Sand Ret - #60 | % | 31.7 | 37.3 | 40.5 | 34.8 | |
| Fine Sand Ret - #270 | % | 37.0 | 48.2 | 43.3 | 42.6 | |
| Silt 0.05 - 0.005 mm | % | 16.2 | 7.4 | 7.1 | 11.3 | |
| Clay < 0.005 mm | % | 15.1 | 7.2 | 9.1 | 11.3 | |
| Passing #40 Sieve | % | 80.7 | 80.7 | 77.4 | 78.8 | |
| Passing #200 Sieve | % | 39.2 | 22.0 | 23.7 | 31.0 | |

| L. L. | 43 | 50 | 53 | 49 | |
|-----------------------|---------------|--------|--------|---------|--|
| P. I. | 1 | 2 | 1 | 2 | |
| AASHTO Classification | A-5 | A-2-5 | A-2-5 | A-2-5 | |
| Group Index | 0 | 0 | 0 | 0 | |
| рН | N/A | N/A | N/A | N/A | |
| Station | 18+75 | 18+56 | 15+55 | 11+65 | |
| OFFSET | 18' LT | 14' RT | 14' RT | 26'RT | |
| ALIGNMENT | -L- | -L- | -L- | -WALL1- | |
| Depth (Ft) | 3.9 | 9.2 | 13.8 | 3.8 | |
| t | to 5.4 | 10.7 | 15.3 | 5.3 | |
| Natural Moisture % | 16.3 | 20.7 | 20.2 | 18.2 | |

SHEET 11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

| T. I. P. No. | B-5770 | _ | | | | | |
|-----------------|----------------------|---------|-----------|-------------|--------------|------------------|---------|
| | REPORT ON SAMI | PLES OF | Replace B | ridge No. 2 | 243 on Salis | sbury Ridge Rd | 1 |
| Project | 45726.1.1 | County | Forsyth | | Owner | Geotech | |
| Date: Sampled | 5/1/19 | - | 5/14/19 | | Reported | 5/30/19 | |
| _ | Bridge Investigation | • | - | By | Geotech | | |
| Submitted by | Brett Smith | | | | 2008 | Standard Specifi | cations |
| - | | | | • | | • | |
| | | | | | | | |
| 5/30/19 | | TE | ST RESUI | LTS | | | |
| Proj. Sample N | [o. | SS-6 | SS-37 | SS-2 | SS-4 | | |
| Boring No. | ,= : | | WALL1-2 | | | | |
| Retained #4 S | ieve % | 5 | 3 | 38 | 3 | | |
| Passing #10 S | | 84 | 93 | 56 | 92 | | |
| Passing #40 S | | 61 | 68 | 36 | 74 | | |
| Passing #200 S | Sieve % | 25 | 21 | 12 | 29 | | |
| | | MINUS | NO. 10 FR | ACTION | | | |
| SOIL MORTA | R - 100% | | | | | | |
| Coarse Sand | | 42.6 | 44.8 | 53.0 | 34.0 | | |
| Fine Sand Re | et - #270 % | 33.6 | 38.5 | 30.1 | 42.0 | | |
| Silt 0.05 - 0.0 | 005 mm % | 10.6 | 7.4 | 7.9 | 10.8 | | |
| Clay < 0.005 | 5 mm % | 13.2 | 9.3 | 9.0 | 13.3 | | |
| Passing #40 S | ieve % | 72.9 | 73.6 | 64.8 | 81.0 | | |
| Passing #200 S | Sieve % | 29.3 | 22.6 | 21.3 | 31.4 | | |
| | | | | | | | |
| L. L. | | 36 | 39 | 33 | 33 | | |
| P. I. | | 0 | 2 | 0 | 0 | | |
| AASHTO Class | sification | A-2-4 | A-2-4 | A-1-b | A-2-4 | | |
| Group Index | | 0 | 0 | 0 | 0 | | |
| рН | | N/A | N/A | N/A | N/A | | |
| Station | | 11+02 | 10+63 | 10+74 | 11+10 | | |
| OFFSET | | 5'RT | 6' RT | 3' RT | 2' RT | | |
| ALIGNMENT | | -WALL1- | -WALL1- | -WALL2- | -WALL2- | | |
| Depth (Ft) | | 3.8 | 3.7 | 3.8 | 3.9 | | |
| 1 | | | | | 1 | | |

5.3

15.9

to

Natural Moisture %

5.2

13.4

5.3

13.4

5.4

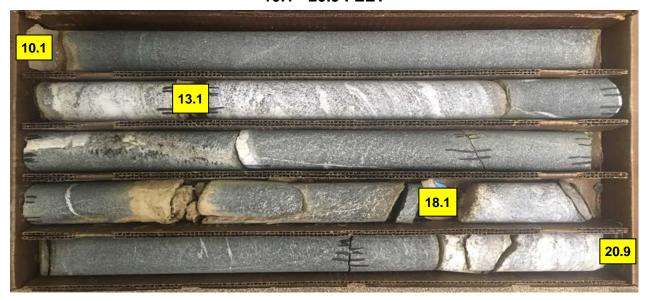
12.5

SUMMIT DESIGN AND ENGINEERING SERVICES

CORE PHOTOGRAPHS

WALL1-2

10.1 - 20.9 FEET



WALL1-2



FEET

WALL2-2

7.8 - 17.1 FEET



WALL2-2

17.1 - 22.8 FEET



FEET