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STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_**HAYWOOD** 

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209 (CRABTREE RD.) TO EAST OF RUSS AVE. SITE DESCRIPTION BRIDGE NO. 430468 ON - L-(US 74/US 23) OVER RICHLAND CREEK BETWEEN US 276 AND NC 209

STATE PROJECT REFERENCE NO. 35 B-3186/B-5898

#### **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 707-6800. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAP AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MEDITARIES DESCRIPTIONS AND ASSOCIATIONS AND ASSOCIATION AND ASSOCIATION ASSOCIATION AND ASSOCIATION 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 WARRAYT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE TO 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.

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

C. SWAFFORD N. YACOBI R. DUGGER GEOTECHNOLOGY, INC

**PERSONNEL** 

INVESTIGATED BY C. SWAFFORD

DRAWN BY \_\_T. LYNN

CHECKED BY K. BUSSEY

SUBMITTED BY \_HDR

DATE AUGUST 2021



kenneth R. Bussey, Jr.

SIGNATURE

DATE

PROJECT REFERENCE NO.

B-3186/B-5898

# 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.  UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - 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.
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, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED VISUAL 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	CRYSTALLINE CRYSTALLINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (\$\leq 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE.
GROUP 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-1-0 A-1-0 A-2-4 A-2-5 A-2-6 A-2-7 A-2-4 A-3-7 A-3 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.
0000q000q3*****************************	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR)  SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 5Ø	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   GRANULAR SILT- MUCK,	HIGHLY COMPRESSIBLE LL > 50  PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
#40 30 MX 50 MX 51 MN SOILS SOILS SOILS PEAT	GRANIII AR STILT - CLAY	- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
15 MA CZ MA UZ MA	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL 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	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL - 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50LLS WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	water level in Bore Hole immediately after Drilling	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.  FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
AS SUBGRADE	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM, FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	ET	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE)  25/025  DIP & DIP DIRECTION  OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE 4.4		SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANII AP LOOSE 4 TO 10	SOIL SYMBOL  SOIL SYMBOL  SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THE TOPIC WHITE EMBHINKINE IN THE TENT OF	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  GENERALLY SOFT 2 TO 4 0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>	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 MONITORING WELL TEST BORING WITH CORE	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.  ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY 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	LICED 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	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
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 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7d - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
HITERDERO EIMITS) DESCRIFTION	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY  (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
LL LIQUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC   SEMISOLID: REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	TERM SPACING TERM THICKNESS	BENCH MARK: N/A
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: 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 MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL _ SHRINKAGE LIMIT REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D)  ATTAIN OPTIMUM MOISTURE	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	BORING ELEVATIONS OBTAINED FROM TRIMBLE RI2 GNSS RECEIVER CERTIFIED WITH FCC PART 15 (CLASS B DEVICE), 24, 32; RCM; PTCRB; BT SIG
PLASTICITY	X CME-55   X 8" HOLLOW AUGERS   CORE SIZE:   -BH	INDURATION	BT SIG
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550 HARD FACED FINGER BITS X-N Q2	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	FIAD - FILLED IMMEDIATELY AFTER DRILLING
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST CASING WY ADVANCER HAND TOOLS:	GENILE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICOUS ADD HAND AUGER	CRAINC ARE DIFFICULT TO CERARATE WITH CTEEL PROPE.	
	X   CME-75	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE:	
TELL TELL GOST TO ELECT, STATE, G. TELLED, E.G. FILE GOSE TO BESCHIEF HIT ENGINEER		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

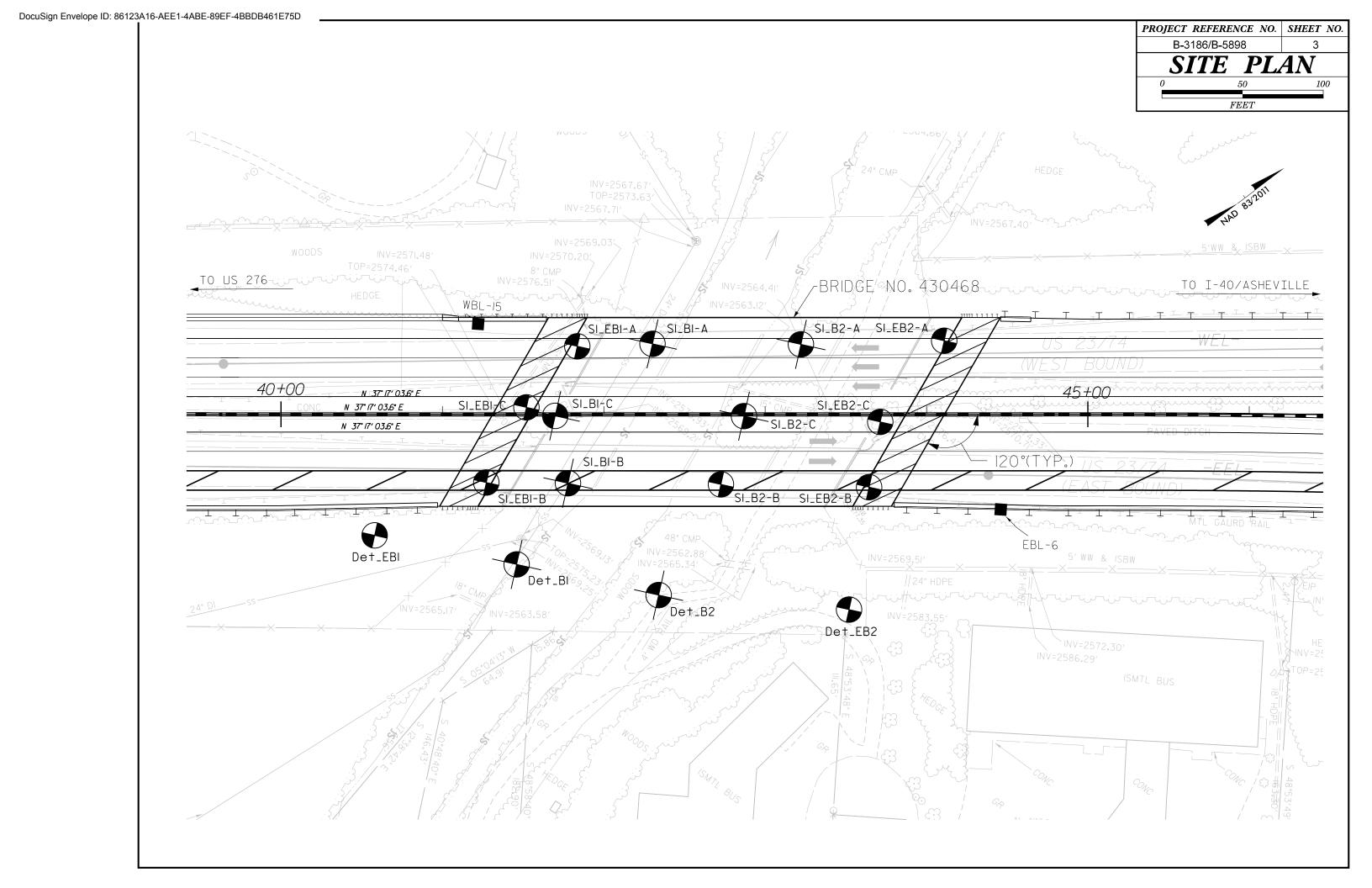
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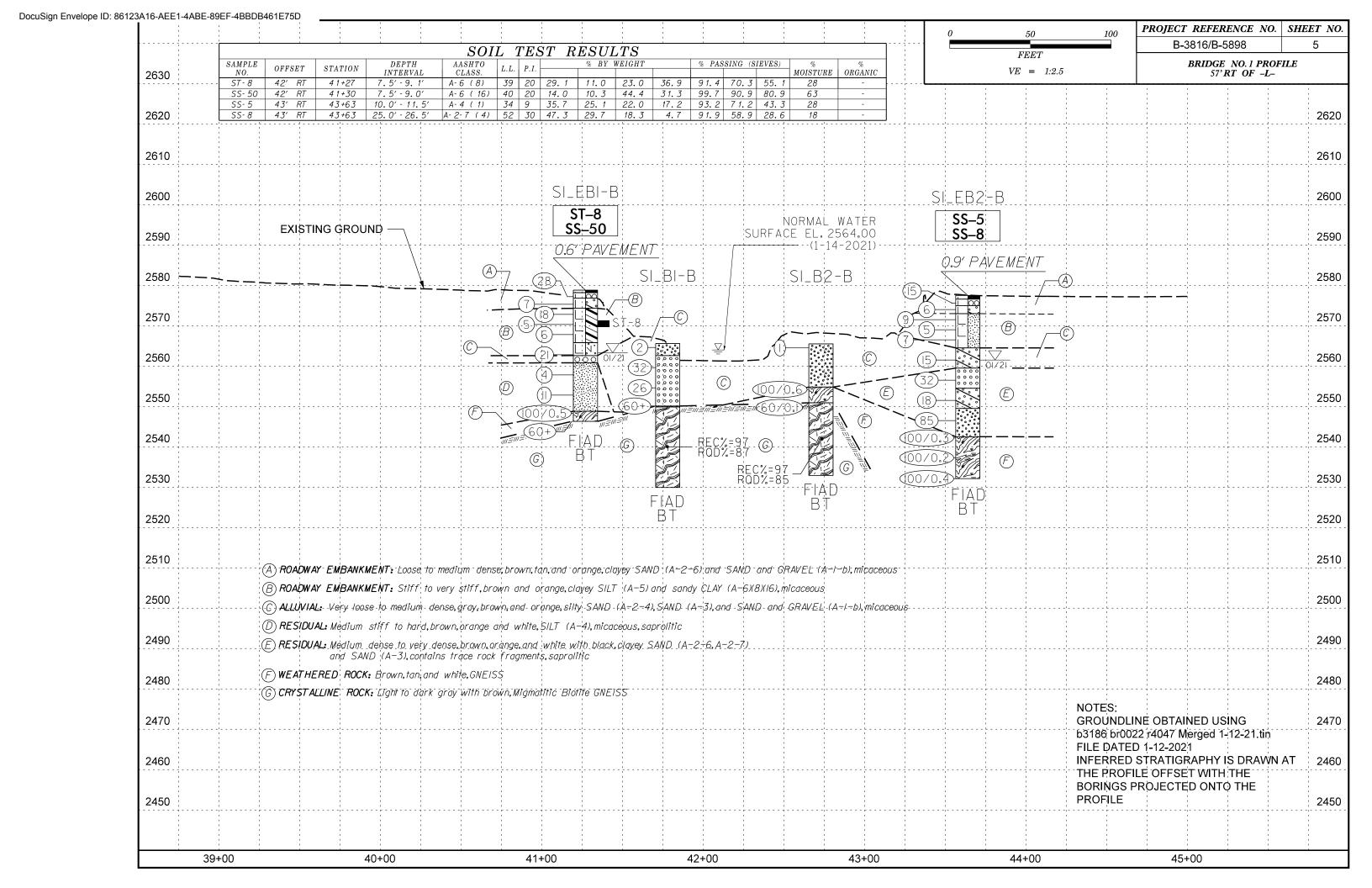
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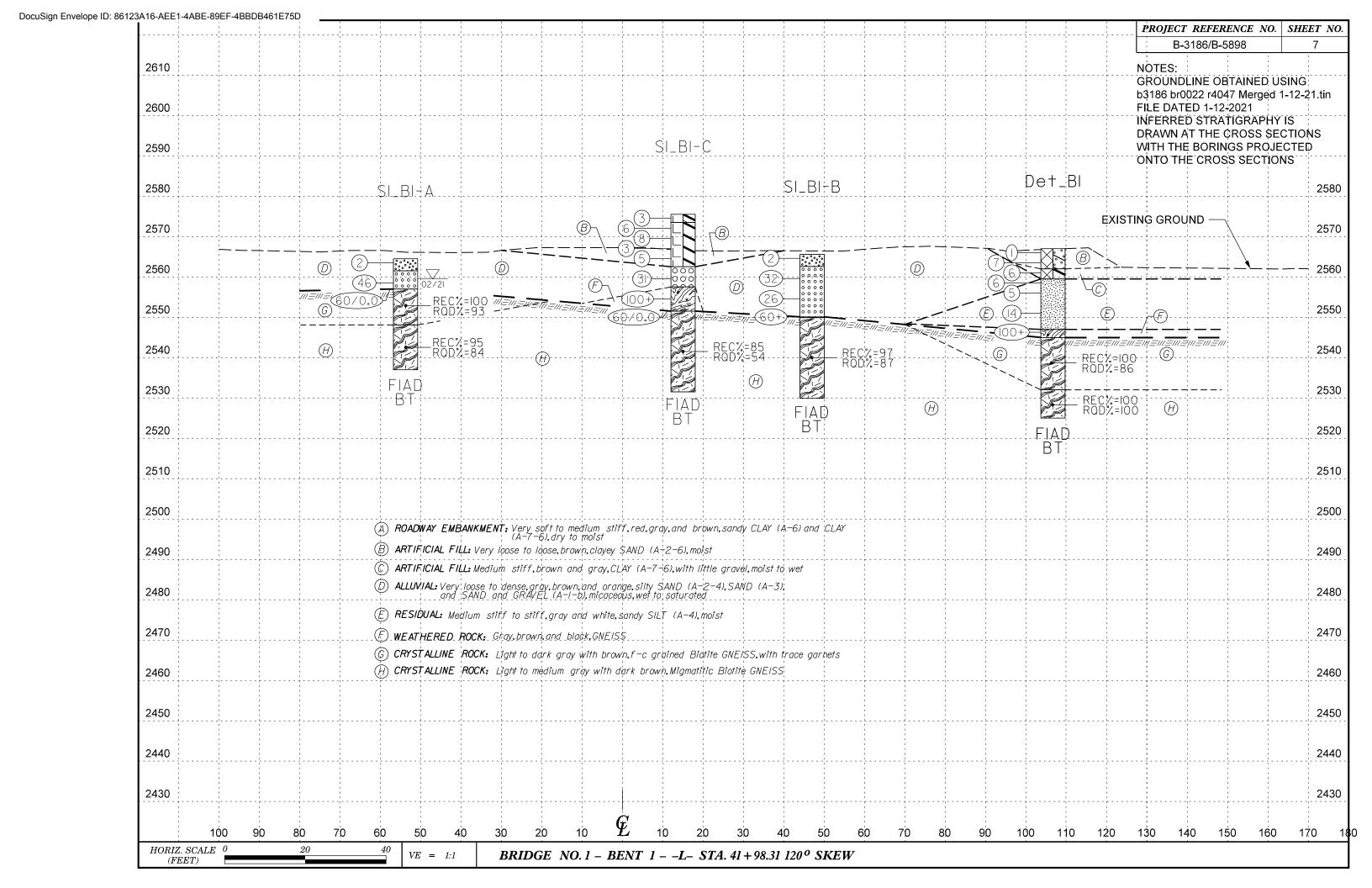
#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

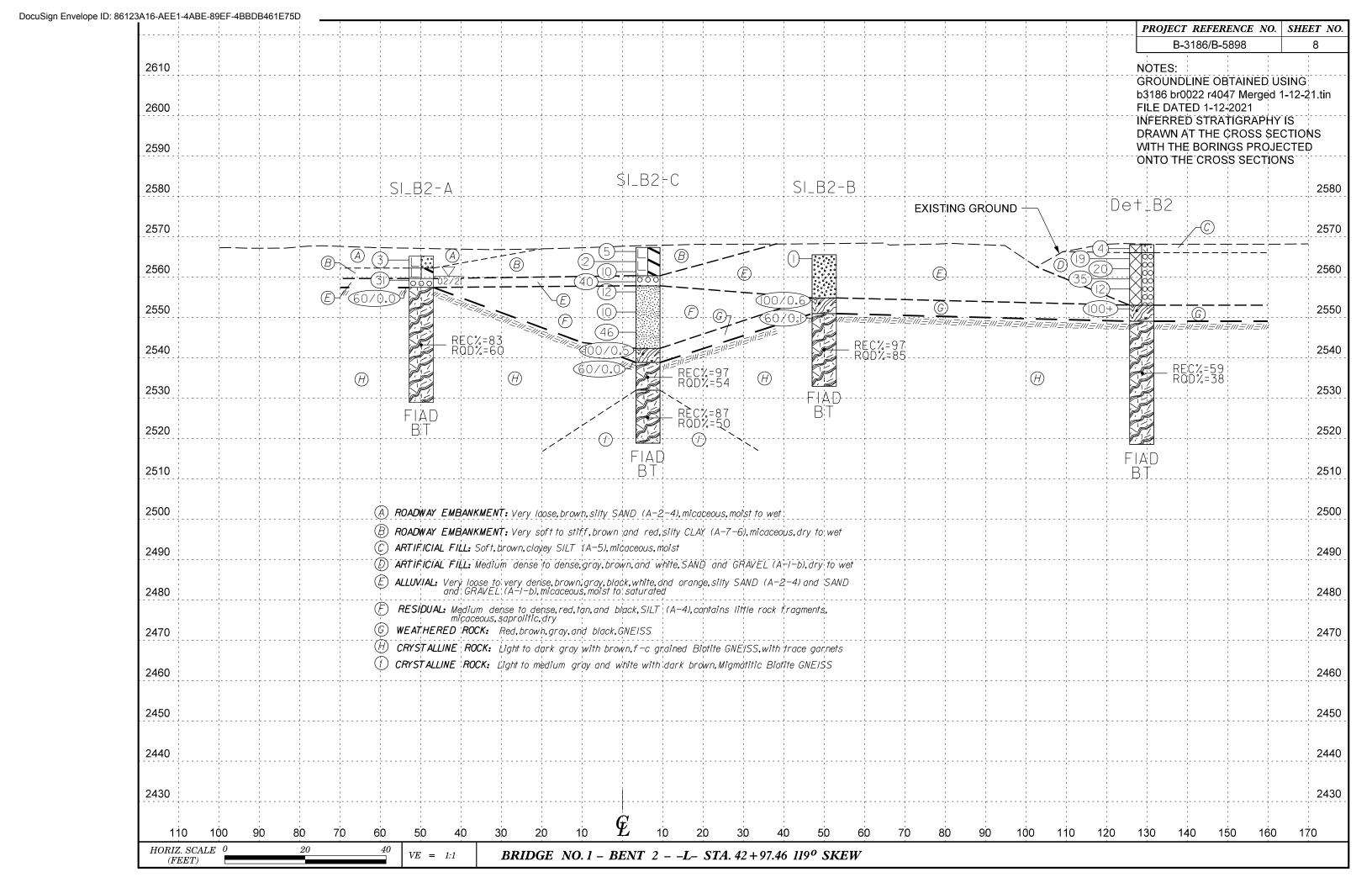
### SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000) AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000) GEOLOGICAL STRENGTH INDEX (GSI) FOR GSI FOR HETEROGENEOUS ROCK MASSES SUCH JOINTED ROCKS (Hoek and Marinos, 2000) AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and ,occasionally es with compact s with angular From the lithology, structure and surface POOR - Very smooth, slicken-l or highly weathered surfaces soft clay coatings or fillings athered sur or fillings conditions of the discontinuities, estimate the average value of GSI. Do not try to surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the planes) be too precise. Quoting a range from 33 to 37 is more realistic than stating that position in the box that corresponds to the condition of the discontinuities and estimate the average value GSI = 35. Note that the table does not of GSI from the contours. Do not attempt to be too apply to structurally controlled failures. Where weak planar structural planes are precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the slightly present in an unfavorable orientation smooth, surface fillings highly coating Hoek-Brown criterion does not apply to structurally with respect to the excavation face, these will dominate the rock mass controlled failures. Where unfavourably oriented behaviour. The shear strength of surfaces continuous weak planar discontinuities are present, in rocks that are prone to deterioration slightly es these will dominate the behaviour of the rock mass. Rough, Slickensided, Fith compact or angular fra as a result of changes in moisture content will be reduced if water is The strength of some rock masses is reduced by the 1 0 GOOD rough, presence of groundwater and this can be allowed for present. When working with rocks in the by a slight shift to the right in the columns for fair, fair to very poor categories, a shift to th, r poor and very poor conditions. Water pressure does the right may be made for wet conditions. GOOD Rough, s surface VERY | sided with s FAIR -weath VERY Slick with VERY Very VERY Water pressure is dealt with by effective FAIR Smooralter not change the value of GSI and it is dealt with by stress analysis. using effective stress analysis. STRUCTURE DECREASING SURFACE QUALITY COMPOSITION AND STRUCTURE INTACT OR MASSIVE - intact A. Thick bedded, very blocky sandstone 90 rock specimens or massive in 7Ó N/A N/A The effect of pelitic coatings on the bedding situ rock with few widely spaced planes is minimized by the confinement of PIECES discontinuities the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally 80 controlled instability. 60 BLOCKY - well interlocked un-70<sup>′</sup> disturbed rock mass consisting of cubical blocks formed by three D. Siltstone B. Sand-stone wi thin inte intersecting discontinuity sets WWW E. Weak 50 C. Sandstone and stone with or silty shale siltstone thin inter siltstone with sandor clayey С shale with layers of an similar stone layers VERY BLOCKY - interlocked. amounts sands tone siltstone 40 partially disturbed mass with 50 multi-faceted angular blocks formed by 4 or more joint sets INTERL  $C_{\bullet}D_{\bullet}E_{\bullet}$  and G - may be more or F. Tectonically deformed, BLOCKY/DISTURBED/SEAMY -30 less folded than illustrated but intensively folded/faulted, folded with angular blocks this does not change the strength. sheared clayey shale or siltstone formed by many intersecting Tectonic deformation, faulting and with broken and deformed CREASING loss of continuity moves these discontinuity sets. Persistence sandstone layers forming an 30 categories to F and H. of bedding planes or schistosity almost chaotic structure 20 DISINTEGRATED - poorly interlocked, heavily broken rock mass 20 H. Tectonically deformed silty with mixture of angular and or clayey shale with or clayey shale forming a 10 rounded rock pieces or without a few very chaotic structure with pockets thin sandstone layers of clay. Thin layers of sandstone are transformed into small rock pieces 10 LAMINATED/SHEARED - Lack of blockiness due to close spacing N/A N/A → Means deformation after tectonic disturbance of weak schistosity or shear planes









SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway)  GROUND WTR (ft)  SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway)  GROUND WTR (ft)			BORE LOG					
CORNAN NO. 51_EB1-A.   STATION 41-94   OPPSET 42.LT   DIR. NO.	<b>WBS</b> 38332.1.FS1			GEOLOGIST R. Dugger	<b>WBS</b> 38332.1.FS1			GEOLOGIST N. Yacobi
COLLAR   LAW and Fract   Collar   Col		<del></del>	· · · · · · · · · · · · · · · · · · ·	<u> </u>			· · · · · · · · · · · · · · · · · · ·	
DRILLER   L. Warnstrath   START DATE (3301/21   COMP DATE 0301/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0301/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0301/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0301/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0301/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0300/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0300/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   COMP DATE 0300/21   SURFACE WATER DEPTH N/A   START DATE (3301/21   SURFACE WATER DEPTH N/A   SU			OFFSET 42 ft LT	ALIGNMENT -L- 0 HR. N/A			OFFSET 4 ft LT	
DRILLER   L. Worstrath			1	1				
ELLY SINGLE CUT 1 3 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	DRILL RIG/HAMMER EFF/DATE G		DRILL METHOD	S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE	GTC9083 CME-550X 80% (11/24/2020)	DRILL METHO	DD H.S. Augers HAMMER TYPE Automatic
				SURFACE WATER DEPTH N/A				SURFACE WATER DEPTH N/A
2572 GROUND SURFACE OU C.F PANEMANNIENT 20 C.F	(ft) ELEV C(ft)		75 400		(ft) ELEV OLF III		400	
2572 256.5 0.7 1 2 13 13 6	2580			 - - 2 577 2 GROUND SURFACE 0.0	2580			
2570 2.560 2.75. 3 4 3		6		- 2,576.5 0.7' DAVEMENT 0.7	2,575.8 0.0			
2,572   5.0   3   4   3   5   5   5   5   5   5   5   5   5	2.574.7 2.5	6 .40		_ Dense, brown, SAND and GRAVEL (A-1-b) /		3 6		ROADWAY EMBANKMENT  2,573.8 Loose, red and brown, clayey SAND (A-2-6)2
2560 2 567 2 10.0 1 2 3 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2,572.2 5.0	3		Medium stiff to stiff, brown and orange, silty CLAY (A-7-6)(21)	4 2	2 3 <b>4</b> 5		Soft to medium stiff, red and brown, sandy
2,567.2 10.0 1 2 3	2570 2 560 7 7 5	<b>∮</b> 7	·   · · · · ·					52(1.5)
2565 2.566.8 1.0.0 1 1 4 6 19  2.567.2 2.0.0 600.1  2.567.2 3.0.0 600.1  2.567.2 6.0.0 600.1  2.567.2 3.0 600.1  2.567.2 3.0 600.1  2.5	1   2	1 1 95 1 1		-	2,568.3 7.5			
2.562.2 15.0 14 16 19  2.567.2 20.0 600.1  2.5	1   2	2	·   · · · ·		2 565 8	• • • • • • • • • • • • • • • • • • •	·   · · · ·         D	2,566.3 9
2.562.2 15.0 14 16 19	2565				2565 1 1	4 5		Medium still, red, sandy CLAY (A-7-6)
2560 2.557.2 20.0 600.1 2557.2 20.0 600.1 2557.2 20.0 600.1 2557.2 20.0 600.1 2557.2 20.0 600.1 2557.2 25.0 17 20 800.4 2557.2 25.0 2.557.2 25.0 17 20 800.1 2557.2 25.0 2.557.2 25.0 17 20 800.1 2557.2 25.0 2.557.2 25.0 17 20 800.1 2557.2 25.0 2.557.2 25.0 17 20 800.1 2557.2 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 2.557.2 25.0 25.0 25.0 2.557.2 25.0 25.0 25.0 2.557.2 25.0 25.0 25.0 2.557.2 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25	2,562.2 15.0	>	.					2,562.8 13
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:		19 •35	M	_	2560 2,560.8 15.0 6 12	1 20	.	Dense, gray and black, SAND and GRAVEL
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:				-	T I			7000L
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:		.		CRYSTALLINE ROCK	7 200			RESIDUAL
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:	2555			Brown, tan, and orange, GNEISS	2555 2,555.6 20.0 14 13		D	
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:	2 552 2 7 25 0			- - 2,552.2 25.0		_   _		F
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:	17   20	80/0.4	100/0 9	WEATHERED ROCK  Brown, tan, and grange, GNEISS	2.551.1 <sup>†</sup> 24.7 2:550.7 <sup>‡</sup> 25.1 100/0.3			
Brown, tan, and orange, GNEISS  Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:	+				60/0.0		60/0.0	Gray, GNEISS
Brown, tan, and orange, GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,547.1 ft in Crystalline Rock (GNEISS) Other Samples:			60/0.1	- 2,547.2 30.0 - 2,547.1/\ CRYSTALLINE ROCK \\ 30.1				Penetration Test Refusal at Elevation
Penetration Test Refusal at Elevation  - 2,547.1 ft in Crystalline Rock (GNEISS)  Other Samples:	+			Brown, tan, and orange, GNEISS				2,550.7 ft on Crystalline Rock (GNEISS)
Other Samples:				Penetration Test Refusal at Elevation				
Cheer Sampress SST-1 (e.S9.6)				2,547.1 ft in Crystalline Rock (GNEISS)				
	±			— <u>Other Samples:</u> - ST-1 (8.5 - 9.6)				
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#### SHEET 11

# GEOTECHNICAL BORING REPORT BORE LOG

	38332 DESCR			23/119			86 / B-5898 noky Mountai	l	Y HAYWO	OD			GEOLOGIST R. Dugger	OUND WTR (ft)
	ING NO.			23/ 00		TATION	-	ii i iigiiwa	OFFSET 4	12 ft RT				HR. 15.5
	AR ELE			ft			<b>EPTH</b> 32.5 f	t .	NORTHING		39		<b>EASTING</b> 818,893 <b>24</b> I	
							X 80% (11/24/2		- NORTHING			DН		YPE Automatic
	LER L.						ATE 01/29/2		COMP. DA				SURFACE WATER DEPTH N/A	
ELEV	DDI) /E	DEPTH	_	W CO				PER FOOT		SAMP.	<b>V</b> /	1 L ]	SORI AGE WATER BEFTII NA	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0		50	75 100	NO.	MOI	O G	SOIL AND ROCK DESCRIP	TION DEPTH (fi
2580		-												<b>0</b> .
ŀ	2,578.2	_	15	18	10						D		0.6' PAVEMENT 2,576.8 <b>ROADWAY EMBANKME</b>	NT2.
2575	2,576.3	2.5	2	3	4	 7_	·				D	_%	Medium dense, brown, tan, and	orange,
	2,573.8-	- 5.0	11	11	7						D		SAND and GRAVEL (A-1- Loose, brown and orange, claye	
	2.571.3	- 7.5					18	: : : :			] "		(A-2-6), micaceous Stiff to medium stiff, brown and	
2570			1	2	3	5		ļ · · · ·		SS-50	63% 28%		sandy CLAY (A-6)(8)(16), mica	aceous
	2,568.8-	- 10.0 -	2	2	4	1					D D		- -	
	-												- _ 2,565.8	13.
2565	_ 2.563.8-	- - 15.0				<del>  ``</del>		+	+				Very stiff, brown, clayey SILT	(A-5)
	2,505.6-	- 15.0	2	7	14	· · · ·		: : : :			$\vdash^{\vee}$		- - 2,562.6	16.
2560	-	_										000	- ALLUVIAL - 2,560.8 Medium dense, brown and gray, S	SAND and <u>18</u> .
2000	_ 2,558.8-	- - 20.0				<u> </u>		1	1				- GRAVEL (A-1-b) RESIDUAL	j
	-		2	2	2	4::					D		Medium stiff to hard, brown, ora	nge and
2555	-	-				<u> </u> '							white, SILT (A-4), micaceous, s	aprolitic
	2,553.8-	25.0	2	5	6						_		<del>-</del> -	
	-		^	5	0	. • •1° • •1°	1:   : : : :				D		<del>-</del> -	
2550		_				نثنا							- <del>-</del>	
	2,548.8-	30.0	100/0.5			· · L	-+	+	100/0.5	,		477	2,548.8 WEATHERED ROCK	30.
	2,546.3	32.5	400/0						100/0.5	,			- <sub>2,546.3</sub> Brown, tan and white, GNE	
	-		100/0.0						00+-				Boring Terminated at Elevation 2,4 Crystalline Rock (GNEIS	
	_	-											Other Samples:	
	_												ST-8 (7.5 - 9.1)	
	_	_											<del>-</del> -	
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2560

2555

2550

2545

2540

2,559.5 5.0

2,557.0 7.5

67

60/0.0

25

#### GEOTECHNICAL BORING REPORT **BORE LOG** TIP B-3186 / B-5898 | COUNTY HAYWOOD **GEOLOGIST** R. Dugger WBS 38332.1.FS1 GROUND WTR (ft) SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway) **STATION** 42+30 ALIGNMENT -L-BORING NO. S1\_B1-A OFFSET 44 ft LT 0 HR. 5.0 COLLAR ELEV. 2,564.5 ft TOTAL DEPTH 27.5 ft **NORTHING** 666,373 **EASTING** 818,887 24 HR. FIAD **DRILL RIG/HAMMER EFF./DATE** GTC9083 CME-550X 80% (11/24/2020) HAMMER TYPE Automatic **DRILL METHOD** SPT Core Boring **DRILLER** L. Wanstrath **START DATE** 02/28/21 COMP. DATE 02/28/21 SURFACE WATER DEPTH N/A SAMP. **BLOWS PER FOOT** SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft MOI G 75 100 NO. ELEV. (ft) DEPTH (ft 2565 **GROUND SURFACE** W ALLUVIAL

60/0.0

. . . .

Sat.

RS-6

RS-7

Very loose, brown, silty SAND (A-2-4), micaceous

Dense, brown, SAND (A-3), contains trace

gravel

CRYSTALLINE ROCK

Light to dark gray with brown, m-c grained Biotite GNEISS, with trace garnets

Light to dark gray with brown, Migmatitic Biotite GNEISS

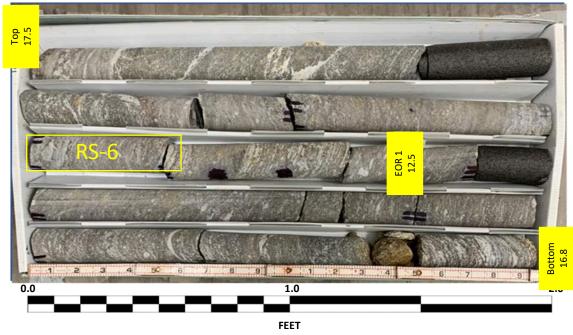
Boring Terminated at Elevation 2,537.0 ft in Crystalline Rock (GNEISS)

#### GEOTECHNICAL BORING REPORT CORE LOG

									C	Ol	RE L	OG							
WBS	38332	.1.FS1			TIP	B-318	36 / B-58	98 <b>C</b>	OUNT	ΥΗ	HAYWOO	DD D		GEOLOG	IST R.D	ugger			
SITE	DESCR	IPTION	I US	23/ US 7	4 (Gre	at Sm	oky Mou	ntain H	lighwa	ay)							GROUI	ND WTR	(ft)
BOR	ING NO.	S1_E	31-A		STA	TION	42+30			OF	FSET 4	4 ft LT		ALIGNME	NT -L-		0 HR.		5.0
COL	LAR ELE	<b>EV.</b> 2,	564.5	ft	TOT	AL DE	<b>PTH</b> 27	.5 ft		NC	RTHING	666,373		EASTING	818,887	7	24 HR.	F	IAD
DRIL	L RIG/HAI	MMER E	FF./DA	TE GTCS	9083 CIV	/E-550X	(80% (11/2	24/2020)	)	•		DRILL ME	THOD SP	Core Boring		HAN	MER TYPE	Automa	atic
DRIL	LER L.	Wans	trath		STAI	RT DA	TE 02/2	28/21		СС	MP. DAT	E 02/28	/21	SURFACE	WATER	DEPTH	N/A		
COR	E SIZE	NQ2			TOTA	AL RU	<b>N</b> 20.01												
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	L O G	ELEV. (ff	:)	D	ESCRIPTION	N AND REM	IARKS		DEP <sup>-</sup>	TH (ft)
2557														Begin Co	ring @ 7.5	5 ft			
2555 2550	2,552.0	-	5.0	1:18 1:58 1:35 1:58 2:00	(5.0) 100% (5.0)	(5.0)	RS-6	(8.9) 100%	(8.3) 93%		2,557.0  - - - -	garr	nets, slight v	CRYSTA with brown, m weathering, ha eathering, mo RS-6	ALLINE RO n-c grained f ard, close to	<b>CK</b> Biotite GNEI o wide fractu rd, very clos	re spacing		7.5
2550	1 -	-		2:05 2:15	100%	100%					- 0.540.4		Slight weat	Qu= hering, hard,	18,520 psi	le fracture s	nacing		40.4
	2,547.0	17.5		2:15 2:10	(4.4)	(0.0)	RS-7	(10.5) 95%	(9.3) 84%		2,548.1	Light to da	ark gray with	brown, Mign	natitic Biotit	e GNEISS,		ering,	16.4
2545	2,542.0	22.5	5.0	1:45 0:15 2:00 2:02 2:10	(4.4) 88%	(3.9) 78%		95%	84%		-  -		na	GSI Qu=	16.8' - 17.5' l= 70 - 80 10,027 psi				
2540		-	5.0	1:33 1:35 1:33 2:10	(5.0) 100%	(4.3) 86%					- - - -	Very se		ering, modera hering, hard,				ng	
	2,537.0	27.5		2:30							2,537.0	Di 7		at Elevation 2	) F07 0 # :	O	DI- (ONE)	20)	27.5

38330.1.FS1 (B-3186/B-5898)

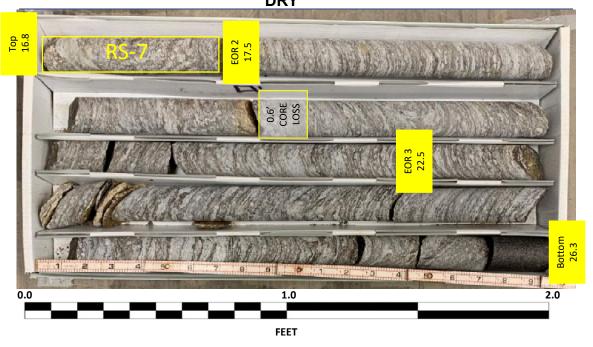
S1\_B1-A Box 1 of 3: 7.5 - 16.8 FEET DRY



S1\_B1-A Box 1 of 3: 7.5 - 16.8 FEET WET



S1\_B1-A Box 2 of 3: 16.8 - 26.3 FEET DRY

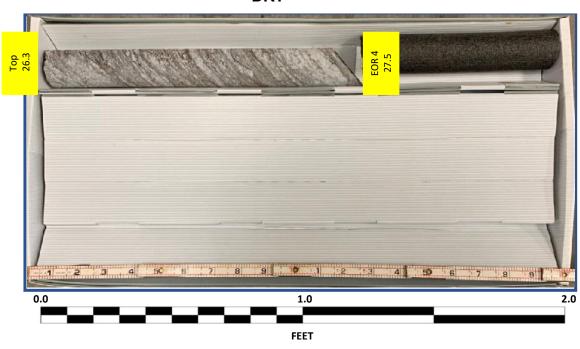


S1\_B1-A Box 2 of 3: 16.8 - 26.3 FEET WET

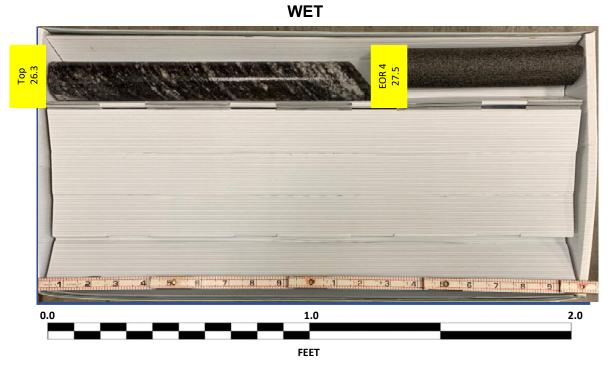


38330.1.FS1 (B-3186/B-5898)

S1\_B1-A Box 3 of 3: 26.3 – 27.5 FEET DRY



S1\_B1-A Box 3 of 3: 26.3 – 27.5 FEET



#### **BORE LOG** TIP B-3186 / B-5898 | COUNTY HAYWOOD WBS 38332.1.FS1 **GEOLOGIST** N. Yacobi SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway) **GROUND WTR (ft) STATION** 41+70 ALIGNMENT -L-BORING NO. S1\_B1-C OFFSET 1 ft RT 13.0 0 HR. COLLAR ELEV. 2,575.5 ft TOTAL DEPTH 44.0 ft **NORTHING** 666,298 **EASTING** 818,886 24 HR. FIAD **DRILL RIG/HAMMER EFF./DATE** GTC3277 CME-75 83% (09/15/2020) HAMMER TYPE Automatic **DRILL METHOD** SPT Core Boring **DRILLER** L. Wanstrath **START DATE** 03/10/21 COMP. DATE 03/10/21 SURFACE WATER DEPTH N/A **BLOWS PER FOOT** SAMP. SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft 75 100 NO. MOI G ELEV. (ft) DEPTH (ft 2580 **GROUND SURFACE** 2.575.5 ROADWAY EMBANKMENT D 2,573.5 Very soft, red and brown, sandy CLAY (A-6) \_\_\_\_\_2.0 2.573.0 Soft to medium stiff, red, gray, and brown, CLAY (A-7-6) D 2.570.5+ 2570 М Μ 2565 2,565.5 10.0 Μ $\nabla$ ALLUVIAL Dense, gray, SAND and GRAVEL (A-1-b) 2,560.5 15.0 2560 16 W . . . . WEATHERED ROCK 2555 2,555.5 20.0 Gray and black, GNEISS 87 50/0.5 100+ 2,551.5 24.0 60/0.0 **.** 60/0.0 CRYSTALLINE ROCK 2550 Gray, black, and white, Migmatitic Biotite GNEISS 2545 . . . . . . . . 2540 2535 RS-9 . . . . Boring Terminated at Elevation 2,531.5 ft in Crystalline Rock (GNEISS)

## GEOTECHNICAL BORING REPORT CORE LOG

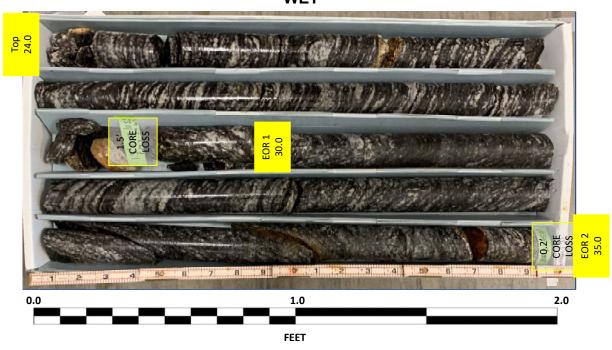
WBS	38332	2.1.FS1			TIP	B-318	6 / B-58	98 <b>C</b>			RE L HAYWOO		GEOLOGIST N. Yao	obi		
				23/ US 7									1		GROUN	ID WTR (ft)
	ING NO.				<del>_ ` _ </del>		41+70		3	<del>í –</del>	FSET 1	ft RT	ALIGNMENT -L-		0 HR.	13.0
	LAR ELI			ft			PTH 44	O ft		-		666,298	<b>EASTING</b> 818,886		24 HR.	FIAD
				TE GTC						1		DRILL METHOD SE	,	HAMIN		Automatic
	LER L				1		<b>TE</b> 03/1			CC	MD DAT	Γ <b>E</b> 03/10/21	SURFACE WATER DI			
	E SIZE		пап		<del>                                     </del>		N 20.0 f			-	MIF. DA	12 03/10/21	SURFACE WATER DI	EFIN IN	//	
	RUN	1		DRILL	RI	JN			ATA	L						
(ft)	ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	Ö G	ELEV. (fi		DESCRIPTION AND REMAR	RKS		DEPTH (fi
551.5	2,551.5-	24.0	6.0	2:18	(4.5)	(2.9)					-		Begin Coring @ 24.0 CRYSTALLINE ROCK			
2550	- -	<u> </u>	0.0	2:09 2:20 2:13	75%	48%					-		white, Migmatitic Biotite GNE ng, hard, close fracture space	EISS mode		nt
2545	2,545.5-	30.0		2:07 2:08				(17.0) 85%	(10.7) 54%		‡		1.5' core loss			
.545	-	<del> </del>  -  -	5.0	2:19 2:13 2:17	(4.8) 96%	(3.5) 70%					<del>-</del> -	Close to mo	oderately close fracture spac	ng; 0.2' co	re loss	
540	2,540.5-	35.0		1:58 2:09	(4.0)	(4.0)						Ma-da4				
	_	£	5.0	1:46 1:48	(4.0) 80%	(1.9) 38%					<u> </u>		ely hard, very close to close f		Ū	
	2 E2F F	40.0		1:53 1:50				]			E	Ciose to modera	tely close fracture spacing, h weathering; 1.0' core los		ate to sligh	ıı
2535	2,535.5-	40.0	4.0	1:59 2:11	(3.7)	(2.4)	RS-9	1			-		RS-9 39.4' - 40.0' GSI= 70 - 80			
	0.504.5	1,,,		1:49 2:21	93%	60%							Qu= 13,205 psi			
	2,531.5-	44.0		2:13							- 2,531.5 -	\	0.3' core loss			44.
	-	Ŧ									F	Boring Terminated	l at Elevation 2,531.5 ft in Cr	ystalline Ro	ock (GNEIS	SS)
	-	‡									Ė.					
		t									Ł					
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38330.1.FS1 (B-3186/B-5898)

S1\_B1-C Box 1 of 2: 24.0 – 35.0 FEET DRY



S1\_B1-C Box 1 of 2: 24.0 - 35.0 FEET WET



S1\_B1-C Box 2 of 2: 35.0 – 44.0 FEET DRY



S1\_B1-C Box 2 of 2: 35.0 – 44.0 FEET WET



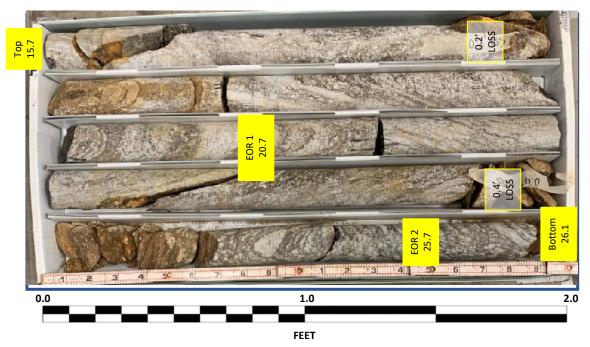
# GEOTECHNICAL BORING REPORT

#### **GEOTECHNICAL BORING REPORT BORE LOG CORE LOG**

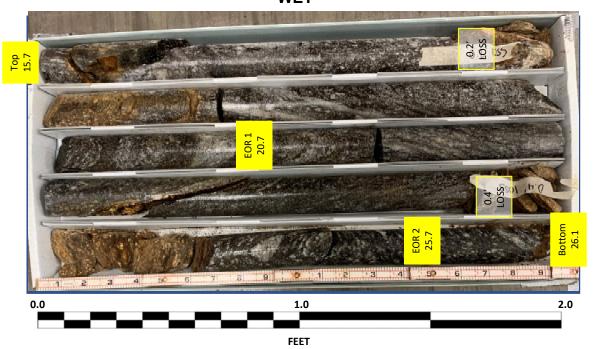
WBS \$38327_F51
BORING NO. S1_B1-B   STATION 41+78   OFFSET 43 ft RT   ALIGNMENT -L-   0 HR.   0.0
COLLAR ELEV. 2,565.6 ft TOTAL DEPTH 35.7 ft NORTHING 666,279 EASTING 818,924 24 HR. FIAD DRILLER L. Wanstrath START DATE GTOX80S XMS-560X 80% (11/24/2020) DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER L. Wanstrath START DATE GY06/21 COMP. DATE 02/16/21 SURFACE WATER DEPTH N/A  DRILLER L. Wanstrath START DATE 02/16/21 SURFACE WATER DEPTH N/A  ELEV DEPTH (8) (1) 0.55 0.55 0.55 0.55 0.55 0.55 0.55 0.5
DRILL RIGHAMMER EFF/DATE   GT02883 CME-550X 89% (11/24/2020)   DRILL METHOD   SPT Core Boring   HAMMER TYPE   Automatic
DRILLER L. Wanstrath   START DATE   02/16/21   COMP. DATE   02/16/21   SURFACE WATER DEPTH   N/A
ELEV   DRIVE   DRIVE   CH   CH   CH   CH   CH   CH   CH   C
Company   Comp
2570
2570
2565 2.566.6 10.0 10 12 14 26 Sat.
2,565.6 0.0 2 1 1 1
255 2.556.0 10.0 10 12 14 255 2.556.0 10.0 1
Sect   Very Cose, brown and orange, silly SAND, micracrous   SAND (N-3),   SAND,   SAND,   SAND (N-3),   SAND,   SAN
250 2.560.6 5.0 15 20 12 2 32 32 32 32 32 32 32 32 32 32 32 32
Sat.    15   20   12   332   333   337   233   337   337   233   337   3
255 2.556.6 10.0 10 12 14 00 256 2.556.6 10.0 10 12 14 00 256 2.556.6 10.0 10 12 14 00 256 2.556.6 10.0 10 12 14 00 256 2.556.6 10.0 10 10 12 14 00 256 2.556.6 10.0 10 10 12 14 00 256 2.556.6 10.0 10 10 12 14 00 256 2.556.6 10.0 10 10 12 14 00 256 2.556.6 10.0 10 12 14 00 256 2.556.6 10 12 14 00 256 2.556
2555 2556 + 10.0   10   12   14   2550   2550 6 + 15.0   10   100   10   12   14   2550   2550 6 + 15.0   15.5   10   100   10   10   10   10   10
250 2550 4 150 1000.0 2550 2550 6 150 1000.0 2550 2550 6 150 1000.0 2550 2550 6 150 1000.0 2550 2550 6 150 1000.0 2550 2550 6 150 1000.0 2550 2550 2550 6 150 1000.0 2550 2550 2550 6 150 1000.0 2550 2550 2550 6 150 1000.0 2550 2550 2550 2550 2550 2550 2550
2550 2550 155 10 100/0.0
100   100
2545  2540  2535  RS-8
2540 2540 2535
2540 2535 2536 2638 2638 2638 2638 2638 2638 2638 26
2540 2535 2536 2637 2638 2638 2638 2638 2638 2638 2638 2638
2535
2535
2535
Boring Terminated at Elevation 2,529.9 ft in Land Crystalline Rock (GNEISS)

38330.1.FS1 (B-3186/B-5898)

S1\_B1-B Box 1 of 2: 15.7 – 26.1 FEET DRY



S1\_B1-B Box 1 of 2: 15.7 – 26.1 FEET WET



S1\_B1-B Box 2 of 2: 26.1 - 35.7 FEET DRY



S1\_B1-B Box 2 of 2: 26.1 - 35.7 FEET WET



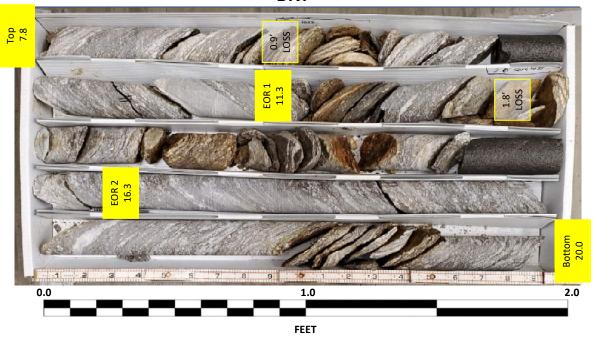
#### TIP B-3186 / B-5898 | COUNTY HAYWOOD **GEOLOGIST** R. Dugger WBS 38332.1.FS1 GROUND WTR (ft) SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway) **STATION** 43+22 ALIGNMENT -L-BORING NO. S1\_B2-A OFFSET 43 ft LT 0 HR. 5.0 COLLAR ELEV. 2,565.2 ft TOTAL DEPTH 36.3 ft **NORTHING** 666,446 **EASTING** 818,943 24 HR. FIAD **DRILL RIG/HAMMER EFF/DATE** GTC9083 CVE-550X 80% (11/24/2020) HAMMER TYPE Automatic **DRILL METHOD** SPT Core Boring **DRILLER** L. Wanstrath **START DATE** 03/01/21 **COMP. DATE** 03/01/21 SURFACE WATER DEPTH N/A SAMP. **BLOWS PER FOOT** SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft MOI G 75 100 NO. ELEV. (ft) DEPTH (ft) 2570 GROUND SURFACE 2,565.2 2565 2,565.2 W ROADWAY EMBANKMENT Very loose, brown, silty SAND (A-2-4), Sat. Stiff, brown, CLAY (A-7-6) 2560 2,560.2 ALLUVIAL Dense, brown and orange, SAND and 2,557.4 7.8 60/0.0 -60/0.0 GRAVEL (A-1-b) CRYSTALLINE ROCK 2555 Light to medium gray with dark brown, Migmatitic Biotite GNEISS 2550 2545 RS-10 2540 2535 . . . . 2530 Boring Terminated at Elevation 2,528.9 ft in Crystalline Rock (GNEISS)

## GEOTECHNICAL BORING REPORT CORE LOG

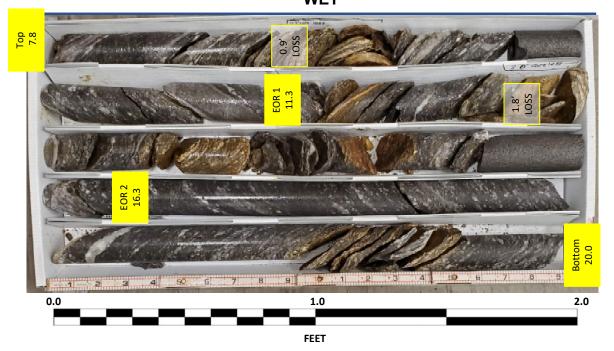
									C	<u>Ul</u>	RE LOG					
	38332.						86 / B-589	_			AYWOOD	GEOLOGI	ST R. Dug	ger		
SITE	DESCRI	PTION	US	23/ US 7	4 (Gre	at Sm	oky Mour	ntain H	lighwa	ıy)					GROUN	ID WTR (ft)
BOR	ING NO.	S1_B	32-A		STA	ΓΙΟΝ	43+22			OF	FSET 43 ft LT	ALIGNME	NT -L-		0 HR.	5.0
	LAR ELE						<b>PTH</b> 36			NO	RTHING 666,446	EASTING	818,943		24 HR.	FIAD
DRILI	_ RIG/HAN	IMER E	FF./DA	TE GTC9	083 CIV	1E-550>	(80% (11/2	24/2020)	)		DRILL METHOD SP	T Core Boring		HAMM	ER TYPE	Automatic
DRIL	LER L.	Wanst	rath		STAI	RT DA	<b>TE</b> 03/0	1/21		CO	<b>MP. DATE</b> 03/01/21	SURFACE	WATER DE	EPTH N/	A	
COR	E SIZE	NQ2					<b>N</b> 28.5 f		A T A							
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	JN RQD (ft) %	SAMP. NO.	REC. (ft)	RQD (ft) %	L O G	ELEV. (ft)	DESCRIPTION	AND REMAR	RKS		DEPTH (ft)
2557.4	2,557.4	7.8	3.5	0.53/0.5	(2.6)	(1.2)		(23.7)	(14.2)		- 2,557.4	Begin Cor	ing @ 7.8 ft			7.8
2555	2,553.9			0:53/0.5 2:00/1.0 1:45/1.0 3:22/1.0	74%	(1.3)		83%	50%		Light to medium gray weathering, mediu	with dark brow	n, Migmatitic I, very close to	Biotite GNE close frac	EISS, mode ture spacir	erate
2550			5.0	1:18/1.0 3:02/1.0 0:47/1.0	(3.2) 64%	(0.0) 0%					With trace epidote	on fractures, n Very severel		hering, mod	derately ha	ırd
2550	2,548.9	16.3	F 0	0:55/1.0 1:25/1.0	(5.0)	(4.0)					Moderate to	ا ۱.۵ slight weatheri		e fracture s	pacing	
	‡		5.0	1:50/1.0 1:33/1.0 1:37/1.0	(5.0) 100%	(4.0) 80%					<del>-</del> -					
2545	2,543.9	21.3		1:54/1.0 2:13/1.0	(0.0)	(4.0)	RS-10				Severe w Moderate to	eathering, soft slight weatheri	, very close fra ng, hard, close 20.0' - 20.8'	acture spac e fracture s	ing pacing	
	‡		5.0	1:18/1.0 1:39/1.0	(3.8) 76%	(1.9) 38%					<del>.</del> -	GSI:	20.0 - 20.6 = 75 - 85 9,796 psi			
2540	2,538.9	26.3		1:31/1.0 1:29/1.0 2:09/1.0							- <del>-</del>	Very close f	racture spacir core loss	ng		
	-		5.0	2:01/1.0 1:47/1.0	(5.0) 100%	(4.5) 90%					With trace garnets,			e to wide fra	acture spac	cing
2535	$oxed{1}$			1:50/1.0 2:23/1.0	100%	3070					• - _					
	2,533.9	31.3	5.0	2:38/1.0 2:15/1.0	(5.0)	(2.5)						ery close to clo	ose fracture sp	pacing		
0500				2:09/1.0 2:14/1.0	100%	50%					<u>.</u>					
2530	2,528.9	36.3		1:16/1.0 2:05/1.0												36.3

38330.1.FS1 (B-3186/B-5898)

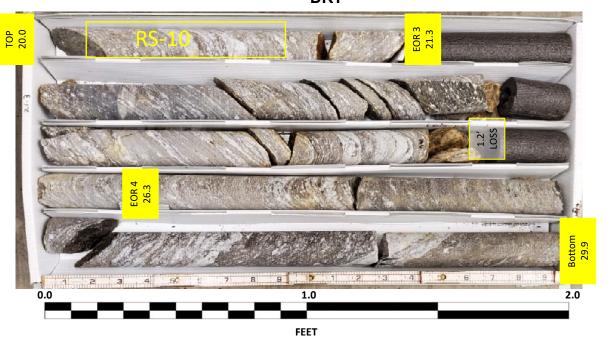
\$1\_B2-A Box 1 of 3: 7.8 - 20.0 FEET DRY



S1\_B2-A Box 1 of 3: 7.8 - 20.0 FEET WET



\$1\_B2-A Box 2 of 3: 20.0-29.9 FEET DRY

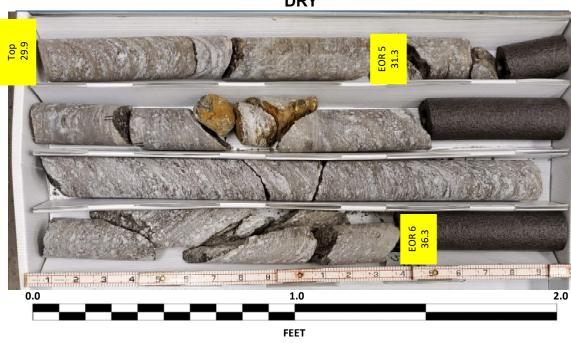


S1\_B2-A Box 2 of 3: 20.0 – 29.9 FEET WET

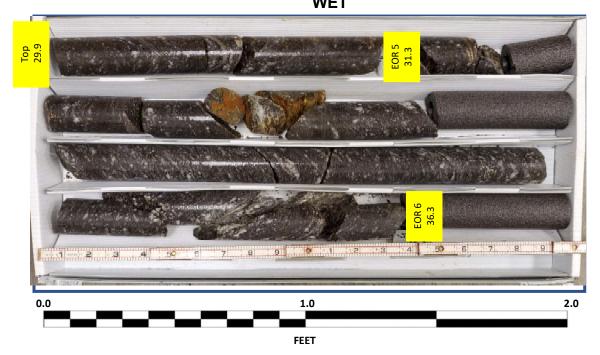


38330.1.FS1 (B-3186/B-5898)

S1\_B2-A Box 3 of 3: 29.9 – 36.3 FEET DRY



S1\_B2-A Box 3 of 3: 29.9 – 36.3 FEET WET



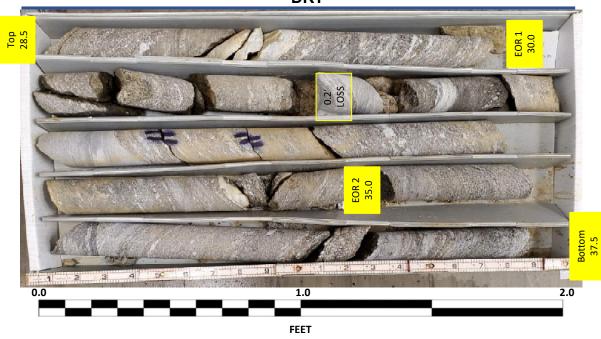
WBS	38332	.1.FS1			Т	I <b>P</b> B-3	186 /	B-5898			DRE HAYW					GEOLOGIST N. Yacobi		
				23/11				/ Mounta								1. 140001	GROUND	WTR (ff
	NG NO.			201 0		TATION			i iigi	-	) OFFSET	. 1	ft RT			ALIGNMENT -L-	0 HR.	4.0
	AR ELE			ft				H 48.5	ft	-+	NORTHI			Q1		EASTING 818,957	24 HR.	FIAD
								% (11/24/2			UKITI				<b>D</b> SI		JERTYPE /	
								03/10/		$\neg$	COMP. I	_						- COLLEGE
	ER L.			ow co		IAKI L	AIE	BLOWS			COIVIP. I	Т	SAMP.	10/21	1 L	SURFACE WATER DEPTH	WA.	
(ft)	ELEV (ft)	DEPTH (ft)	0.5ft	_		0	25		50		75 1	00	NO.	MOI	0	SOIL AND ROCK DES	CRIPTION	DEPTH
2570																_		
	-	-														- - 2,567.3 GROUND SURF	ACE	C
	2,567.3	- 0.0 -	1	2	3	<b>9</b> 5.	: :		1 : :			:		М		ROADWAY EMBAI	IKMENT	
2565	2,564.8	- 2.5	1	1	1	1/			+ : :		<del>                                     </del>	$\exists$				Very soft to medium stiff, re- CLAY (A-7-6), mic		suty
	2,562.3	5.0					$\cdot \cdot  $					:			ļD			
2560	2.559.8	_ _ 75	3	3	7	. •1	10.		<u> </u>		<u> </u>	-		W		- 2,560.3		
	-	-	18	14	26	1 🗔		>40	,			-		w	0000	ALLUVIAL 2,557.8 Medium dense to very der	se, gray, blacl	k,9
+	2,557.3	10.0	4	5	7	::_	112.	· · · ·	: :			:		D		and white, SAND and GF	AVEL (A-1-b)	
2555	_	-					. 14 .		+ : :	• •	ļ · · · ·	4				_ Medium dense to dense, re	d, tan, and bla	
	- 2.552.3	15.0				:			: :	: :		:				SILT (A-4), contains little i micaceous, sap		<b>,</b>
2550	-	-	3	4	6	: •1	io .		: :	: :		:		D		•		
	-	-							1							<del>-</del> -		
-	2,547.3	20.0	8	16	30	::	: :					:		D		•		
545	_	_				::	• •	(	P46	• •				٦ ا		• <del>-</del>		
	0.540.03	- 05 0					: :		: :			:				- - 2,542.3		25
	2,542.3	<u> </u>	100/0.5			::	$: \cdot  $		٦		100/0	.5				WEATHERED R		
2540	_ 2,538.8-	L - 28.5				<del>                                   </del>			+		<del> </del>	$\perp$				Red, brown, and blac 2,538.8	K, GNEISS	28
ľ	_,		60/0.0	1							60/0	1				CRYSTALLINE I Light to dark gray with bro		
2535	-						:									Biotite GNEISS, with tr	ace garnets	<b>-</b>
	-	-							1			-	RS-11			= •		
	-	-							: :				1.0-11			2,531.9 Light to dark gray with br	wn Miamatic	35
2530	_	-					• •		+ : :	• •	ļ · · · ·	4				Biotite GNEIS	S	•
	7	-					::		: :	: :		:				•		
2525	-	-							: :	: :						•		
_020	-	<b>-</b> -							1		1	-				<del>-</del> ·		
	-	-					: :			: :		:				•		
2520		_					• •			• •						<del>-</del>		
+	-	<u>-</u> -			+	<del>                                     </del>			1		l	<u>. l</u>				2,518.8 Boring Terminated at Eleva		in 48
	-	-														Crystalline Rock (G	NEISS)	
	-	<b>-</b> -														<del>-</del> •		
	_	_																
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# GEOTECHNICAL BORING REPORT

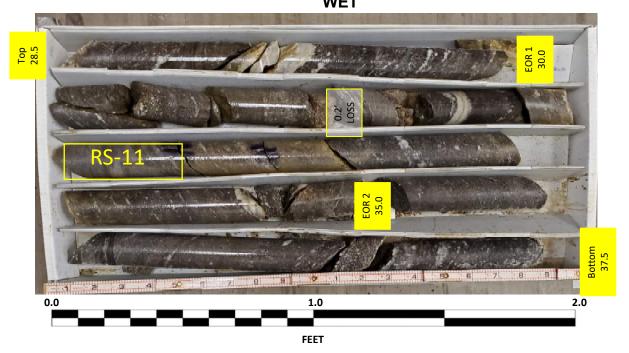
									C	OI	RE L	OG				
WBS 3	38332.1	.FS1			TIP	B-318	36 / B-589	98 <b>C</b>	OUNT	Υŀ	HAYWO	DD	GEOLOGIST N. Yaco	obi		
SITE DE	ESCRIP	TION	US	23/ US 7	4 (Grea	at Sm	oky Mour	ntain H	lighwa	ıy)					GROUN	ID WTR (ft)
BORING	G NO.	S1_B	2-C		STAT	ΓΙΟN	42+87			OF	FSET	ft RT	ALIGNMENT -L-		0 HR.	4.0
COLLA	R ELEV	. 2,5	67.3	ft	TOTA	AL DE	<b>PTH</b> 48.	.5 ft		NC	RTHING	666,391	<b>EASTING</b> 818,957		24 HR.	FIAD
DRILL RI	RIG/HAMIV	MER EF	FF./DA	TE GTC9	083 CIV	<b>1</b> E-550X	(80% (11/2	24/2020)	)			<b>DRILL METHOD</b> SP	T Core Boring	HAMIN	IER TYPE	Automatic
DRILLE	ER L. W	Vanst	rath		STAF	RT DA	<b>TE</b> 03/1	0/21		CC	MP. DA	Γ <b>E</b> 03/10/21	SURFACE WATER DE	PTH N	/A	
CORE S	SIZE N	Q2					<b>N</b> 20.0 f									
CLEV E		EPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	L O G	ELEV. (f		ESCRIPTION AND REMAR	KS		DEPTH (ft)
2538.8	500 0	20.5											Begin Coring @ 28.5 f			
2535	,538.8 + 3 - - - - 532.3 + 3	28.5 30.0 35.0	5.0	N=60/0.0 1:49/0.5 2:09 2:32 1:49 2:31 2:49 2:49 2:37 3:02 2:42	(1.5) (100%) (4.8) 96% (5.0) 100%	(1.3) (87%) (2.4) 48% (4.3) 86%	RS-11 ,	(6.7) 97% (11.4)	(3.7) 54% (6.6) 50%		2,538.8/ - - - - 2,531.9	Light to dark gray with moderately severe to Severe weathering, m	VEATHERED ROCK (contine CRYSTALLINE ROCK brown, f-c grained Biotite G slight weathering, moderate to close fracture spacing edium to moderately hard, v 0.2' core loss athering, moderately hard to	NEISS, wi y hard to ery close	hard, very of	close acing 35.4
2525	,527.3 - 4 ,522.3 - 4		5.0	2:42 2:18 1:59 1:37 1:42 1:57 1:53 1:59	(5.0) 100%	(1.0)		87%	50%		- - - - - - - - - -	Qu= 3	fracture spacing RS-11 33.5' - 34.1' GSI= 60 - 70 3,264 psi (sampled along head prown, Migmatitic Biotite Gomethed hard, very close Core barrel blocked off	aled joint) NEISS, m	oderate to	slight
2520	Ŧ		3.5	1:38 1:41 2:09	(1.6) 46%	(0.4) 11%					}		1.9' core loss			
				1:08/0.5								Boring Terminated	at Elevation 2,518.8 ft in Cry	stalline Ro	ock (GNEIS	S)

38330.1.FS1 (B-3186/B-5898)

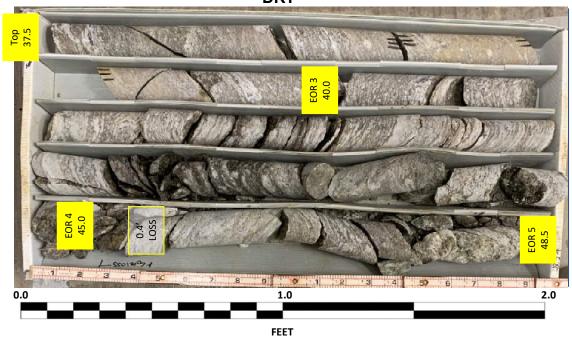
S1\_B2-C Box 1 of 2: 28.5 – 37.5 FEET DRY



S1\_B2-C Box 1 of 2: 28.5 – 37.5 FEET WET



S1\_B2-C Box 2 of 2: 37.5 - 48.5 FEET DRY



S1\_B2-C Box 2 of 2: 37.5 - 48.5 FEET WET



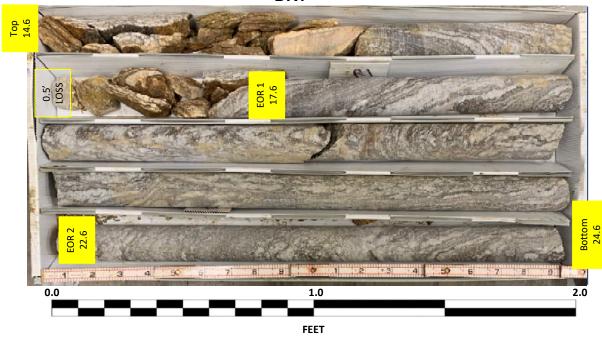
											D	$\bigcup \Gamma$		<u>.OG</u>						
WBS	38332	2.1.FS1			TI	IP B	3186	6 / B	3-5898	C	DUNT	<b>Y</b> H	AYWC	OD				GEOLOGIST N. Yacobi		
SITE	DESCR	IPTION	l US	23/ US	S 74 (0	Great	Smo	ky N	Mounta	ain H	ighwa	y)							GRO	UND WTR (f
BORI	NG NO	. S1_l	32-B		S	TATI	ON 4	42+7	73			OFF	SET	43 ft R	Т			ALIGNMENT -L-	0 HR	. N//
	AR ELI								32.6			NOF	RTHING	<b>3</b> 666				<b>EASTING</b> 818,982	24 HR	
RILL	.RIG/HA	MMER E	FF./DA	TE G	TC3277	CME	-75 83	% (09	9/15/20	20)				DRILL	METH	<del>I</del> OD	H.:	S. Augers HA	MMER TYP	E Automatic
ORIL	LER K	. Boon	е		S	TAR	DAT	ſΕ	02/15	/21		CO	/IP. DA	TE 02		1		SURFACE WATER DEPTH	N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		0		25 	BLOWS	S PER 50	FOOT	75 	100	SAMF NO.	17		L O G	SOIL AND ROCK D	ESCRIPTIC	DEPTH
2570																		2,565.5 GROUND SU	REACE	(
2565	2,565.5	0.0	1	1	0	1						1:			M			- ALLUVIA	\L	
2560	_	+ + + + +															-	Very loose, brown, silt micaceo	JAND (A	Z- <b>4</b> ),
2555	2,554.8	10.7				<u>  i_</u>	· · ·	<u> </u>	· · ·	·   ·	· · ·	<u>.</u>	· · ·					_2,554.8		10
		‡	100/0.5	1		:		:   :		:   :			100/0.5			2		<b>WEATHERED</b> Brown, GN		
2550	2,550.9	14.6	60/0.1	-				:   :		:   :		:	60/0.1				쐵	2,550.9 CRYSTALLINI	BUCK	14
	-	Ŧ	00/0.1			-		Τ.		-   -		1:				18:	4	Light to dark gray with be	rown, Mign	natitic
		Ŧ						:   :	 	:   :		:					3	Dionie Givi		
2545	_	Ē				H		+	· · ·	+		+:	· · ·					<del>-</del>		
		ŧ								:   :										
2540	-	ţ								<u>. L</u>		1:						_		
	-	‡				:		:   :		:   :										
2525		‡				:		:   :		:   :		:								
2535	-	‡				-		+.		+:	<del></del>	+-						2 532 0		00
		<del>                                     </del>				┼		ш.			<u> </u>			4			-	2,532.9  Boring Terminated at Ele Crystalline Rock	vation 2,53	32 2.9 ft in
	_	Ī															F	_		
		Ŧ															F	NOTES Rocking coring times	t not availal	ole
																			not available	

# **GEOTECHNICAL BORING REPORT**

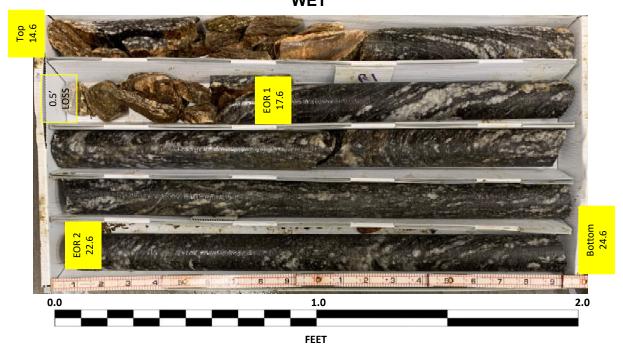
									C	Ol	RE L	OG					
WBS	38332	2.1.FS1			TIP	B-318	86 / B-589	98 <b>C</b>	OUNT	ΥΙ	HAYWO	OD	GEOLOGIST	N. Yacob	i		
SITE	DESCR	IPTION	l US	23/ US 7	4 (Gre	at Sm	oky Mour	ntain H	lighwa	ıy)						GROUN	ID WTR (ft)
BOR	ING NO	. S1_E	32-B		STA	ΓΙΟΝ	42+73			OF	FSET 4	3 ft RT	ALIGNMENT	-L-		0 HR.	N/A
COL	LAR EL	<b>EV.</b> 2,	565.5	ft	тот	AL DE	<b>PTH</b> 32	.6 ft		NC	RTHING	666,354	EASTING 8	18,982		24 HR.	FIAD
DRIL	L RIG/HA	MMER E	FF./DA	TE GTC3	277 CN	<b>1E-75</b> 83	3% (09/15/2	2020)				DRILL METHOD H	S. Augers		HAMM	ER TYPE	Automatic
DRIL	LER K	. Boone	•		STAI	RT DA	<b>TE</b> 02/1	5/21		CC	MP. DA	<b>TE</b> 02/15/21	SURFACE W	ATER DEP	TH N	/A	
COR	E SIZE	NQ2			TOTA	AL RUI	<b>N</b> 18.0 f										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	L O G	ELEV. (f		DESCRIPTION AN	ID REMARKS	3		DEPTH (ft)
2550.9													Begin Coring				
2550	2,550.9 2,547.9 2,542.9	17.6	5.0	N=60/0.1 0:0 0:0 0:0 0:0 0:0 0:0 0:0 0:0	(2.5) 83% (5.0) 100%	(0.5) 17% (5.0) 100% (4.7)		(17.5) 97%	(14.9) 83%		2,550.9 - - - - - - - -	Light to dark gray wi to moderate weather	CRYSTALLII th brown, Migmatiti ing, soft to mdoera spaci 0.4' core ng, hard, moderatel	c Biotite GNE tely hard, ver ng e loss	y close t	to close fra	cture
2540 2535	2,537.9		5.0	0:0 0:0 0:0 0:0 0:0 0:0 0:0 0:0	(5.0) 100%	94%					- - - - - - - - - - -	Clo	se to moderately clo	ose fracture s	pacing		
	2,532.9	32.6		0:0						22	2,532.9	Boring Terminate	d at Elevation 2,532	9 ft in Crysts	alline Ro	ck (GNFIS	32.6 (S)
	_	E									_	3	NOTE			( -	,
													Rocking coring tim				

38330.1.FS1 (B-3186/B-5898)

\$1\_B2-B Box 1 of 2: 14.6 – 24.6 FEET DRY



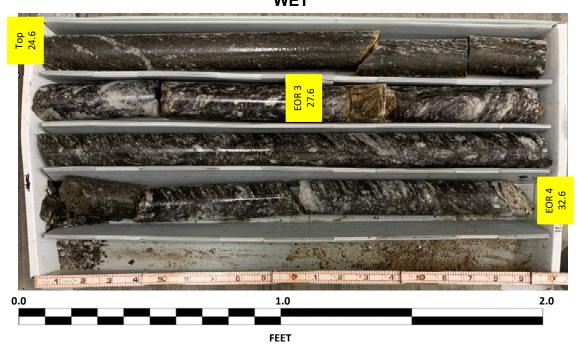
S1\_B2-B Box 1 of 2: 14.6 – 24.6 FEET WET



S1\_B2-B Box 2 of 2: 24.6 – 32.6 FEET DRY



\$1\_B2-B Box 2 of 2: 24.6 – 32.6 FEET WET



BORING NO. S1_EB2-A         STATION 44+11         OFFSET 46 ft LT         ALIGNMENT -L-         0 HR.         11.5         BORING NO. S1_EB2-C         STATION 43+71         OFFSET 5 ft RT         ALIGNMENT -L-         0 HR.           COLLAR ELEV. 2,580.0 ft         TOTAL DEPTH 27.0 ft         NORTHING 666,518         EASTING 818,995         24 HR.         FIAD         COLLAR ELEV. 2,577.1 ft         TOTAL DEPTH 27.5 ft         NORTHING 666,456         EASTING 819,011         24 HR.		<i>E</i>	BORE LOG													
BORNING NO. 51_EB2-A   STATION 44-11   OFFSET 49.RLT   ALIGNMENT 1-L   9 HR, 11.5	<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN	TY HAYWOOD	GEOLOGIST C. Swafford		<b>WBS</b> 3833	2.1.FS1		Т	<b>FIP</b> B-3186	/ B-5898 <b>COUN</b>	TY HAYWO	DOD		GEOLOGIST N. Ya	cobi
COLLAR ELEV.   7.500   COLLAR ELEV.   7.577   TOTAL DEPTH   7.75   TOT	SITE DESCRIPTION US 23/ US	74 (Great Smoky Mountain Highw	ay)		GROUND WTR (ft)	SITE DESCR	RIPTION	US 23/	/ US 74 (	(Great Smok	y Mountain Highw	vay)				GROUND WTR (ft
DRILLER K   BOW    START DATE   07/28/21   COMP. DATE   02/28/21   COMP. DAT	BORING NO. S1_EB2-A	STATION 44+11	OFFSET 46 ft LT	ALIGNMENT -L-	<b>0 HR.</b> 11.5	BORING NO	. S1_E	B2-C	s	STATION 4	3+71	OFFSET	5 ft RT		ALIGNMENT -L-	<b>0 HR.</b> 9.0
DRILLER   Roome	COLLAR ELEV. 2,580.0 ft	TOTAL DEPTH 27.0 ft	<b>NORTHING</b> 666,518	· · · · · · · · · · · · · · · · · · ·								NORTHIN			1	24 HR. FIAD
ELD   DRIVE	DRILL RIG/HAMMER EFF./DATE GTO	C3277 CME-75 83% (09/15/2020)	DRILL METHOD	H.S. Augers HAMIN	MER TYPE Automatic	DRILL RIG/HA	MMER EF	F./DATE	GTC908	3 CME-550X 8	0% (11/24/2020)		DRILL	METHO	DD H.S. Augers	HAMMER TYPE Automatic
Control   Cont		<b>START DATE</b> 02/28/21	<b>COMP. DATE</b> 02/28/21	SURFACE WATER DEPTH N	I/A			ath	S	START DATE	03/10/21	COMP. DA	<b>ATE</b> 03/	10/21	SURFACE WATER D	DEPTH N/A
2.573   0.9   14   19   9   2.571   0.0   M   2.	ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP		400     /   0			/#\·	DEPTH (ft)			0 2				1 /	L O SOIL AND	ROCK DESCRIPTION
2.571.5	2.579.1 0.9	9		2 579 1 0 9' PAVEMEN	VT0.9	2580	  -  -								-  -	
2,571.5		4		Loose to medium dense, brow with some grav	wn, SAND (A-3),	2575	ĮΙ	1 :	2 1	3				D	L. ROADW	AY EMBANKMENT
2570 2566 2565 13.6 2 1 1 1 2 2 566.5 13.6 2 1 1 2 566.5 13.6 2 1 2 2 566.5 13.6 2 1 1 2 566.5 13.6 1 2 566.5 1 2 566.5 1 2 566.5 1 2 566.5 1 2 566.5 1 2 566.5	2.574.2 5.8	3 6	·   · · · ·	<ul> <li>Soft to medium stiff, gray</li> </ul>	/, SILT (A-4),	2,374.0	† 1	3 4	4 3	7 : :			1	D		
2,566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 2 2 566.5 13.5 2 1 3 2 1 3 3 3 566 56 56.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13 2 1 3 3 3 566 56 56.5 13.5 13 2 1 3 3 3 566 56 56.5 13.5 13 2 1 3 3 3 566 56 56.5 13.5 13.5 13 2 1 3 3 3 566 56 56.5 13.5 13 2 1 3 3 3 566 56 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 2 1 3 3 3 566 56.5 13.5 13.5 13 13 13 13 13 13 13 13 13 13 13 13 13	7,	$\frac{1}{1}$ $\begin{bmatrix} \int_{2}^{1} \cdots \cdot \int_{2}^{1} \cdot \cdots \cdot \int_$				2570	ĮΠ	2	1 2	<b>√</b>				D	└ <b>∵</b> - Very loose, gr	ray and green, silty SAND (A-2-4)
2565 2.56.5 23.5 13 21 33	+				12.0	2,509.0	† 1	1	1 2	<b>→</b> 3 : : :		<b>I</b>		$\nabla$	Soft, red, gray a	and tan, CLAY (A-7-6), with
2,561.5 18.5 4 6 12	, , , , ,	2 3		Soft, gray, CLAY (A-7-6), of wood fragments, mid	contains trace caceous	, , , , , , , , , , , , , , , , , , , ,	10.0	1	1 3	· · · · ·     • • • · · · · ·		<b>I</b>		w		
2560				2,563.0	17.0		Ī ,,			1		<b>I</b>			2,564.1	
2,556.5 23.5	'   4   6	12		Very loose, gray, SAND a	and GRAVEL		<del>†</del> 13.0	5 1	10 8		3			W	ooo and (	GRAVEL (A-1-b)
2,553.0 27.0 60/0.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 27.0 60/0.0 English Shelby tube obtained from 6.0'-8.0' Shelby tube obtained from 13,5'-15.5' Shelby tube obtained from 13,5'-15.5' W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.0 W Very dense, brown, orange, and white, silty SAND (A-2-4), saprolitic 2,553.			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			2.557.1	† <sub>20.0</sub>			::::					000- 000- 000-	
2,553.0 27.0 60/0.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,553.0 10/0.5 Penetration Test Refusal at Elevation 2,553.0 10/0.5 Penetration Test Refusal at Elevation 2,553.0 10/0.5 Penetration Test Refusal at Elevation 2,552.1 25.0 Penetration Test Refusal at Elevation 2,549.6 Gray and black, granitic GNEISS Penetration Test Refusal at Elevation 2,549.6 Gray and black, granitic GNEISS Penetration Test Refusal at Elevation Penetration Test Refusal at Elevation Shelby tube obtained from 6.0'-8.0' Shelby tube obtained from 13.5'-15.5'	10 01	1	·   · · · · ·	Very dense, brown, orange,	and white, silty		Į	25   1	15 6	1	21			W	000- 000- 000-	
NOTES  Shelby tube obtained from 6.0'-8.0' Shelby tube obtained from 13.5'-15.5'  Boring Terminated with Standard Follows Foll			_     _   _   _   _   _   _   _   _	Boring Terminated with	n Standard	2,552.1	25.0	00/0.5							000- 000- 000- 2,552.1	25.
NOTES  Shelby tube obtained from 13.5'-15.5'  Boring Terminated with Standard Food 1.5'-15.5'  Boring Terminated with Standard Food 1.5'-15.5'  Shelby tube obtained from 13.5'-15.5'  Boring Terminated with Standard Food 1.5'-15.5'  Penetration Test Refusal at Elevation Test Ref				Penetration Test Refusal 2,553.0 ft on Crystalline Ro	l at Elevation ock (GNEISS)	2550 2 549 6	+ <sub>27 5</sub> [	00/0.5					<b>1</b> 1		WEA Gray and b	
	: B3186_GEO_SPT.GPJ NC_DOT.GDT 8/2/21			Shelby tube obtained from Shelby tube obtained from	m 13.5'-15.5'			60/0.0				60/0.0			Boring Ten	minated with Standard Fest Refusal at Elevation
$lpha$ $\mid$	OOT BORE DOUBLE			  -  -  -  -  -  -		-									-	

		BORE LOG					
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN		GEOLOGIST R. Dugger	<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN		GEOLOGIST R. Dugger
SITE DESCRIPTION US 23/ US	S 74 (Great Smoky Mountain Highw	· ·	GROUND WTR (ft)	SITE DESCRIPTION US 23/ US 7	· · · · · · · · · · · · · · · · · · ·		GROUND WTR (ft)
BORING NO. S1_EB2-B	STATION 43+64	OFFSET 45 ft RT	<b>ALIGNMENT</b> -L- <b>0 HR.</b> 16.0	BORING NO. Det_EB1	STATION 40+58	OFFSET 75 ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 2,577.5 ft	TOTAL DEPTH 45.4 ft	<b>NORTHING</b> 666,426	<b>EASTING</b> 819,039 <b>24 HR.</b> FIAD	COLLAR ELEV. 2,570.8 ft	TOTAL DEPTH 24.0 ft	<b>NORTHING</b> 666,164	<b>EASTING</b> 818,877 <b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF./DATE G	· · · · · · · · · · · · · · · · · · ·	DRILL METHOD	S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF/DATE GTC	08255 CME-55 93% (11/24/2020)	DRILL METH	OD H.S. Augers HAMMER TYPE Automatic
DRILLER L. Wanstrath	<b>START DATE</b> 01/28/21	COMP. DATE 01/28/21	SURFACE WATER DEPTH N/A	DRILLER L. Wansrath	<b>START DATE</b> 03/22/21	COMP. DATE 03/22/21	1 SURFACE WATER DEPTH N/A
ELEV CHIEF C		75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION  ELEV. (ft) DEPTH (ft)	ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP		400	O SOIL AND ROCK DESCRIPTION OI G
2580				2575			
2,576.6 0.9 11 10 2575 2,575.0 2.5	5	D	- 2,576.6 ROADWAY EMBANKMENT 0.9 - 2,575.0 0.9' PAVEMENT 2.5	2,570.8 0.0 1 1	1		2,570.8 GROUND SURFACE 0.  ARTIFICIAL FILL
	4		ROADWAY EMBANKMENT  2,573.0 Medium dense, brown and orange, SAND  4.5	2.568.3 2.5	<u></u>	M	2,568.8 Very soft, brown and orange, silty CLAY2
2,572.5	5	M   M	and GRAVEL (A-1-b) Loose, brown and orange, clayey SAND (A-2-6)	2,565.8 5.0 10 3	2	Sat.	SAND and GRAVEL (A-1-b)
2.567.5	3   65		Medium stiff to stiff, brown and orange, sandy SILT (A-4)(1), micaceous	2,563.3 7.5 3 3	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		2,563.8
2565	4	: ::::     M	-	2,560.8+ 10.0	<sup>4</sup>   .♠7	.       M	2,561.3 (A-7-6) 9 RESIDUAL
			=2,564.5 13.0	2560	0 11	M	Stiff, brown and orange, SILT (A-4), with trace clay, contains little rock fragments
2,562.5 15.0 9 9	6		Medium dense, brown and gray, clayey SAND (A-2-6), with little gravel	2,555.8 - 15.0 6 8	::/::::::::::::::::::::::::::::::::		
2560			- 2,559.5	2555 6 8	7 15		-
2,557.5 + 20.0   6   12	20		Dense, brown and white, SAND (A-3), contains trace rock fragments, saprolitic	2.550.8 + 20.0			-
2555	32		- -2,554.5 23.0	2550 2,550.8 + 20.0 22 15 85	5/0.3		20.5 VEATHERED ROCK
2,552.5 25.0 4 7	11   /	SS-8 18%	Medium dense, brown, orange and white, clayey SAND (A-2-7)(4), contains little rock fragments, micaceous	2.546.8 24.0			WEATHERED ROCK Brown, GNEISS 24.1
2550		55-0   10%	- -2 549 5	60/0.0		60/0.0	Boring Terminated with Standard Penetration Test Refusal at Elevation
2,547.5 30.0	<u>                                     </u>		Very dense, brown and orange with black, silty SAND (A-2-4)				- 2,546.8 ft on Crystalline Rock (GNEISS)
2545	45		-				F
2,542.5 35.0			- - - 2.542.5 35.0				I E
2540 100/0.3		· 100/0.3	WEATHERED ROCK Brown and orange, GNEISS				
T I I			-				-
2,537.5 + 40.0   100/0.2							F
2535			_				<del> </del>
2,532.5 45.0		100/0.4	2,532.1 45.4				
		100/0.4	Boring Terminated at Elevation 2,532.1 ft in Weathered Rock (GNEISS)				
			-				
128/2/			-				
7 10 1			-				l E
9.100							
			-				
TAS   +			- -				
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BB 3186							<u> </u>
			<u>.                                    </u>				
			-				F
							[
			•	†			

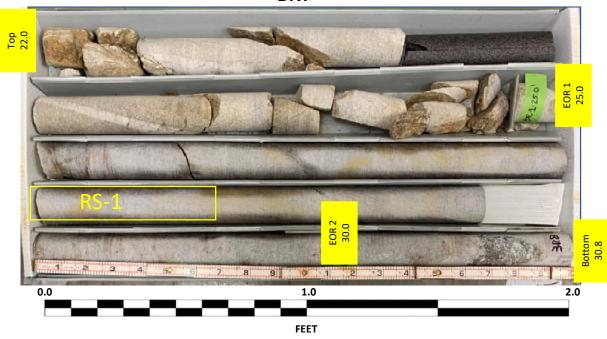
#### TIP B-3186 / B-5898 | COUNTY HAYWOOD WBS 38332.1.FS1 **GEOLOGIST** N. Yacobi SITE DESCRIPTION US 23/ US 74 (Great Smoky Mountain Highway) **GROUND WTR (ft)** STATION 41+46 ALIGNMENT -L-BORING NO. Det\_B1 OFFSET 93 ft RT 0 HR. N/A COLLAR ELEV. 2,567.0 ft TOTAL DEPTH 42.0 ft **NORTHING** 666,223 **EASTING** 818,945 24 HR. FIAD HAMMER TYPE Automatic **DRILL RIG/HAMMER EFF./DATE** GTC8255 CWE-55 93% (11/24/2020) **DRILL METHOD** SPT Core Boring **DRILLER** L. Wansrath **START DATE** 03/17/21 COMP. DATE 03/17/21 SURFACE WATER DEPTH N/A SAMP. **BLOWS PER FOOT** SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft 75 100 NO. MOI G ELEV. (ft) DEPTH (ft) 2570 **GROUND SURFACE** 2,567.0 ARTIFICIAL FILL M 2565 Very loose to loose, brown, clayey SAND 2,564.5 (A-2-6) М 2,562.0 Medium stiff, brown and gray, CLAY (A-7-6), with little gravel W 2560 2,559.5 RESIDUAL М Medium stiff to stiff, gray and white, sandy SILT (A-4) 2,557.0 М 2555 2.552.0 T 15.0 6 М 2550 . . . . 2,547.0 20.0 57 100/0.3 WEATHERED ROCK · · 100+ 2545 Brown and black, GNEISS CRYSTALLINE ROCK Light to medium gray and white with tan, m-c grained GRANITE with trace Bitoite Gneiss 2540 RS-1 RS-2 2535 Light to dark gray with brown, Migmatitic Biotite GNEISS . . . . 2530 RS-3 2525 Boring Terminated at Elevation 2,525.0 ft in Crystalline Rock (GNEISS)

## GEOTECHNICAL BORING REPORT CORE LOG

									C	U	<u>RE L</u>	O	G														
WBS	38332	1.FS1			TIP	B-318	6 / B-589	98 <b>C</b>	OUNT	Υ	HAYWO	OD						GEC	LOG	IST	N.`	Yaco	bi				
SITE	DESCRI	PTION	US	23/ US 7	4 (Gre	at Sm	oky Mour	ntain H	lighwa	ay)															GROUI	ND WTF	R (ft)
BOR	ING NO.	Det_l	B1		STA	ΓΙΟΝ	41+46			OI	FFSET 9	93 ft	RT	_				ALIC	NME	NT	' -L-				0 HR.		N/A
1	LAR ELE						<b>PTH</b> 43			N	DRTHING		-								18,94	15			24 HR.		IAD
				TE GTC	3255 CIV	<b>1E-55</b> 93	3% (11/24/2	2020)				DR	ILL N	MET	HOI	D 8	SPT	Core	Boring	)			HA	MME	RTYPE	Automa	atic
	LER L.		ath				<b>TE</b> 03/1			C	OMP. DAT	TE	03/	/17/	21			SUR	FACI	ΕW	ATEF	R DE	PTH	N/A			
COR	E SIZE	NQ2				AL RUI JN	<b>N</b> 21.0 f		ATA	ļ.,	1																
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	RQD (ft)	SAMP. NO.	REC. (ft)	RQD (ft) %	L O G	ELEV. (fi	ft)					DE	SCR	PTIOI	IA N	ND RE	MAR	KS			DEP	TH (ft)
2545	2,545.0	22.0	3.0	1:17	(3.0)	(1.4)		(13.0)	(11.2)		2,545.0						l	Begi <b>C</b> I	n Coi	ring <b>ALL</b>	@ 22 INE RO	2.0 ft <b>CK</b>					22.0
	2,542.0	25.0		1:13 1:08	100%	47%		100%	(11.2) 86%							zenc	oliths	s, slig	ht to v	ery	slight v	weath	ering, ı	mode	TE with trately ha		
2540	1 1		5.0	1:38 1:59	(5.0) 100%	(4.8) 96%					<u></u>		5	Sligh	ht ot						ose fra close				pacing		
				2:08 2:04			RS-1	1			<u></u>										0' - 27. 5 - 95	7'					
2525	2,537.0	30.0	5.0	2:07	(5.0)	(5.0)	RS-2	1			1										108 ps 3' - 31.						
2535	†	-			100%	100%	KS-2	1											GS	il= 8	5 - 95						
	2,532.0	35.0			(= =)	(= -)					2,532.0										364 ps						35.0
2530		•	5.0	2:25 2:01	(5.0) 100%	(5.0) 100%		(7.0) 100%	(7.0) 100%			I	Light								atitic Bi close to				ght to fre acing	esh	
	. 507.0			2:03 1:56							1																
0505	2,527.0	40.0	3.0	1:56 1:36	(3.0)	(3.0)	RS-3				<u></u>										1 - 40.6	6'					
2525	2,524.0	43.0		1:49 2:36	100%	100%					2,524.0	_									5 - 95 519 ps	i					43.0
											ţ		Borin	ng T	erm	inate	ed at	Elev	ation 2	2,52	4.0 ft ii	n Crys	stalline	Rock	(GNEIS	SS)	
		-									L					Run	time	es for		NOT	<u>'ES</u> 0.0' we	re no	t recor	ded			
											-					rtuii	uni	55 101	COIC	at J	0.0 WC	16 110	recon	ueu			
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38330.1.FS1 (B-3186/B-5898)

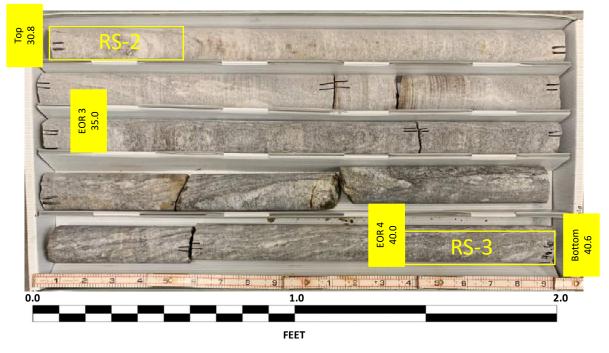
DET-B1
Box 1 of 3: 22.0 – 30.8 FEET
DRY



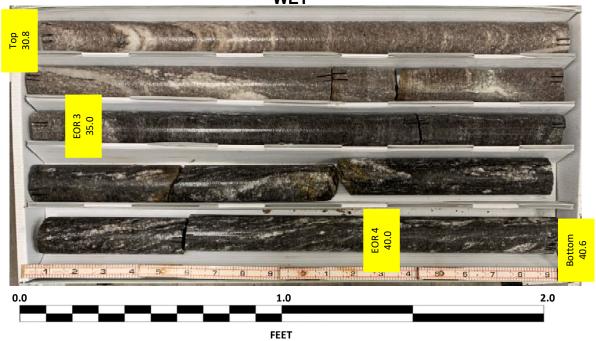
DET-B1 Box 1 of 3: 22.0 – 30.8 FEET



DET-B1
Box 2 of 3: 30.8 – 40.6 FEET
DRY

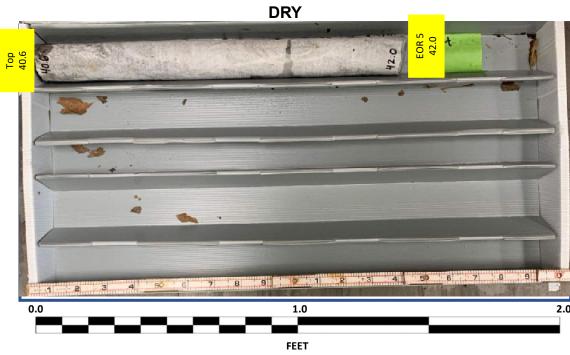


DET-B1 Box 2 of 3: 30.8 – 40.6 FEET WET



38330.1.FS1 (B-3186/B-5898)

DET-B1
Box 3 of 3: 40.6 – FEET



DET-B1
Box 3 of 3: 40.6 – 42.0 FEET
WET



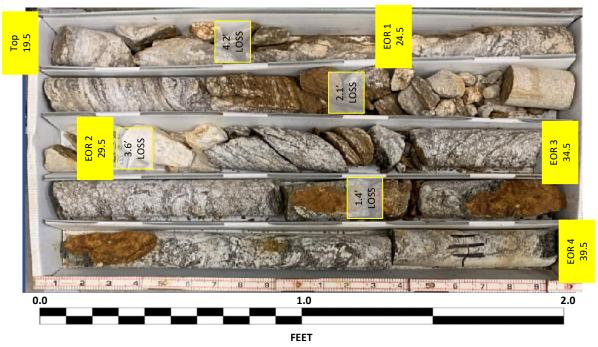
							BORE L	<u>OG</u>			
	38332						NTY HAYWO	DD		GEOLOGIST N. Yacobi	
				23/ U		Great Smoky Mountain Hig				1	GROUND WTR (ft)
	NG NO.					<b>TATION</b> 42+34	OFFSET			ALIGNMENT -L-	<b>0 HR</b> . N/A
	AR ELE					OTAL DEPTH 49.5 ft	NORTHING	-		<b>EASTING</b> 819,014	24 HR. FIAD
				TE G		6 CME-55 93% (11/24/2020)				PT Core Boring HAW	IMER TYPE Automatic
DRILL	LER L.	. Wans				TART DATE 03/11/21	COMP. DA	_	<del></del>	SURFACE WATER DEPTH	N/A
(ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		BLOWS PER F0	OT 75 100	SAMP. NO.	MOI G	SOIL AND ROCK DE	SCRIPTION  DEPTH (ft)
	2,568.0 - 2,565.5	-	2	2	2	4			M N		FILL A-5), micaceous2.0
2560	2,563.0 - 2,560.5	5.0 7.5	5 6 33	10 8 15	9 12 20	20			□	— Medium dense to dense, of white, SAND and GRA	gray, brown, and NVEL (A-1-b)
2555	2,558.0 - - - 2,553.0		53	6 58	6	12	· ·   · · · · · · · · · · · · · · · · ·		W	- - - - 2,553.0 WEATHERED I	15.0
2550	-	<u> </u>			. 00, 0.0						SS 19.0
2545	- - -	† - -								Light to dark gray, whit Migmatitic Biotite GNEISS weathered rock sean concentrations of felsic dike	e, and brown, interlayered with ns and high
540	- - - -	<del> </del>  -  -  -								- - - -	
2535	- - - -									- - - - - -	
2530	- - - -							RS-4		- - - - -	
2525	- - - - -	<del> </del>  -  -  -								- - - -	
								RS-5 /		- 2,518.5  Boring Terminated at Elevic Crystalline Rock (for some state of the control of the co	GNEISS)

#### **GEOTECHNICAL BORING REPORT** CORFIGG

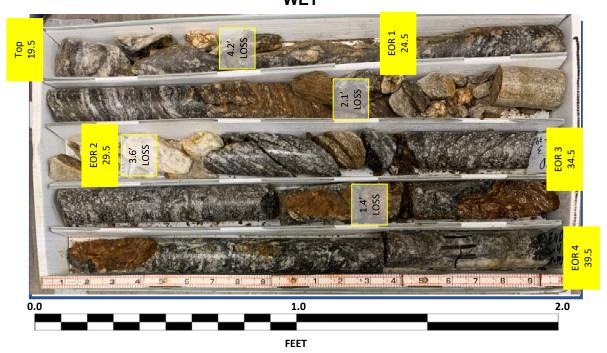
									<u></u>	<u>Ol</u>	RE L	<u>.O</u>	<u>G</u>											
WBS	38332	2.1.FS1			TIP	B-318	6 / B-589	98 <b>C</b>	OUNT	Υŀ	HAYWOO	OD				GE	OLOG	IST	N. Y	acobi				
SITE	DESCF	RIPTION	ı US	23/ US 7	4 (Gre	at Sm	oky Mour	ntain H	lighwa	ıy)												GROU	ND W	TR (ft)
BOR	ING NO	. Det_	B2		STA	TION	42+34			OF	FSET 1	113	ft RT	-		ALI	GNME	ENT	-L-			0 HR.		N/A
	LAR EL						<b>PTH</b> 49			NO	RTHING								19,014			24 HR.		FIAD
DRILI	L RIG/HA	MMER E	FF./DA	TE GTC	255 CN	/IE-55 93	3% (11/24/2	2020)				DR	ILL M	ETHO	D SP	Γ Core	Boring	9			HAMIV	IER TYPE	Auto	matic
DRIL	LER L	. Wans	rath		STAI	RT DA	<b>TE</b> 03/1	1/21		CO	MP. DAT	TE	03/1	1/21		SUF	RFACE	ΕW	ATER	DEP1	TH N	/A		
COR	E SIZE	NQ2					<b>N</b> 30.5 f																	
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	REC. (ft)	RQD (ft) %	L O G	ELEV. (fl	ft)			D	ESCF	RIPTION	IA N	ND REM	ARKS			D	EPTH (ft)
2549	2,549.0	19.0		10.5	(4.0)	(0.0)		(47.0)	(44.5)	2	0.540.0								@ 19.					10.0
2545	2,543.5	24.5	5.5	-/0.5 1:38 1:18 1:01 0:58 1:00 0:38 0:12 0:20 0:12 0:31	(1.3) 24% (2.9) 58%	(0.6) 11% (0.5) 10%		(17.9) 59%	(11.5) 38%		_ 2,549.0 - - - - - - - -	Lig \	with w	eathe	red rock	te, an seam	d brown is and I ely severery close 4.2'	n, M high vere ose to ' cor	concen	c Biotit tration rate w	s of fels	ISS interla sic dikes, ng, mode ng	with	19.0
		‡	5.0	0:57 0:48	(1.4) 28%	(0.4) 8%					-						3.6'	' cor	e loss					
2535	2,533.5	34.5	5.0	0:49 0:53 1:00 1:11 1:15	(3.6) 72%	(2.8) 56%					- - - -	М	odera	te to s			g, with t	few	ery close healed f			ly close fr	acture	
2530	-	‡		1:10 1:23							_		<1	cm no	ormal-se	nse di				aled su	bvertic:	al fracture		
	2,528.5	+ 39.5 +	5.0	1:27 1:29	(4.4)	(2.9) 58%	RS-4				-			OIII IIC	ina oc	1100 0	0.6'	' cor	e loss			ai iraotare		
2525		Ŧ		1:25 1:32	88%	58%	R3-4	1			-								2' - 41.0'' 5 - 75					
	2,523.5	44.5		1:49 1:45		(1.2)					-						Qu=	= 8,8	366 psi					
		Ŧ	5.0	1:49 1:47	(4.3) 86%	(4.3) 86%					-													
2520	_	Ŧ ", "		1:48 1:19			D0 5				F								e loss					40.5
	2,518.5	49.5		1:26			RS-5				- 2,518.5 -	7					GS	SI= 6	5' - 49.0' 5 - 75					49.5
		Ŧ									-	Ч,	Boring	7 Term	ninated a	at Elev			8,369 8.5 ft in	Crysta	Illine Ro	ock (GNE	SS)	
	-														Split s	spoon	at 10.0	NOT	ES sulted in	low re	covery			
	-	+             									- - - - - - - - - - - - - - - - - - -													

38330.1.FS1 (B-3186/B-5898)

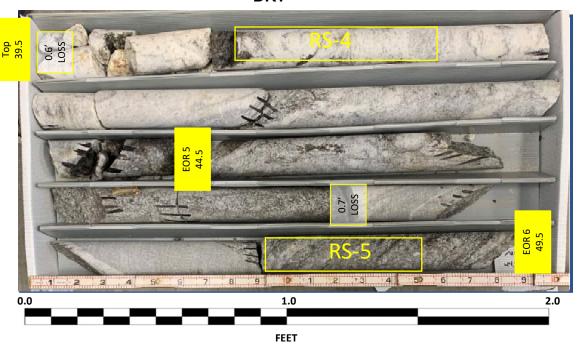
DET-B2 Box 1 of 2: 19.5 – 39.5 FEET DRY



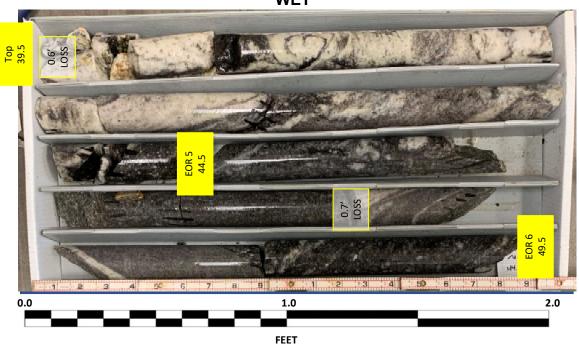
DET-B2 Box 1 of 2: 19.5 – 39.5 FEET WET



DET-B2 Box 2 of 2: 39.5 – 49.5 FEET DRY



DET-B2 Box 2 of 2: 39.5 – 49.5 FEET WET



						BURE LUG	
WBS	38332	.1.FS1			TI	P B-3186 / B-5898 COUNTY HAYWOOD GEOLOGIST N. Yacobi	
SITE	DESCR	IPTION	l US	23/ U	S 74 (0	reat Smoky Mountain Highway)	GROUND WTR (ff
BOR	ING NO.	Det_	EB2		S	TATION 43+52 OFFSET 121 ft RT ALIGNMENT -L-	0 HR. N//
COLI	LAR ELE	<b>EV.</b> 2.	584.5	ft		OTAL DEPTH 43.3 ft NORTHING 666,370 EASTING 819,092	24 HR. FIAI
							J <b>AMMER TYPE</b> Automatic
	LER L.						
	DRIVE	ı	T 51.4	014/ 00			N/A
LEV (ft)	ELEV	DEPTH (ft)	<b>'</b>	OW CO		O SOIL AND ROCK I	
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0 25 50 75 100 NO. MOI G ELEV. (ft)	DEPTH
585	2,584.5	- 0.0					JRFACE
		Ė .	3	2	2	ARTIFICIA  2,582.5 Soft, red and brown, s	
	2,582.0_	2.5	1	1	2		ous j
580	2,579.5	5.0			<u> </u>	Very loose to loose, red	
	-		2	3	4	•   ↑ · · · · · · · · · · · · · · ·   D   ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	•
	2,577.0	7.5	4	3	3	1	d gray, silty SAND
575	2,574.5	10.0	2	2	2		aceous
	-	F	-	2	-	• • • • • • • • • • • • • • • • • • •	
70	-	<u> </u>					(A-5) micaceous
70	2,569.5	15.0	1	1	2		(, t o),cacccac
	_	-	'	'	-	•3 · · ·   · · · ·   · · · ·   · · · ·     M   N	
65	_	-					CLAY (A-7-6)
103	2,564.5	20.0	1 1	1	3		,
	-	-	'	'		M M	,
60	-	F					and tan, SAND and
	2,559.5	25.0	14	86	24/0.5	GRAVEL (	A-1-b)
	_	_					
555	-	<b>-</b>				· · ·     - · · · · · · · · · · · · ·	
	2,554.5	30.0	15	9	11	Very stiff to hard, white,	gray, tan and brown, eous, saprolitic
	_	_					,
550	-					· · · ·   · · · ·   · · · ·	
	2,549.5	35.0	8	15	16	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
	-	<u> </u>					
545	- 2.544.5	L 400					
	2,544.5	40.0	6	7	25		
	2.541.3	432				2,541.3	4
	2,071.0	-70.2	60/0.1	1		60/0.1 2,541.2 CRYSTALLIN	NE ROCK
	-	-				Gray, white, and b	
	-	-				Penetration Test Ref	usal at Elevation
	_	<u> </u>					,
	-	Ė				NOTE Offset and augered dow	<u>:<b>S</b></u> n to 18.0' for shelbv
	-	-				tube sar	
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REPORT ON SAMPLES OF: Rock For Quality

 PROJECT:
 B-3186 / B-5898
 COUNTY:
 Haywood

 DATE SAMPLED:
 05/11/2021
 RECEIVED:
 5/11/2021

 SAMPLED FROM:
 Test Borings
 REPORTED:
 5/12/2021

SUBMITTED BY: BY / CERT NO: Kevin E. Walker

BORING NO	SAMPLE	DEPTH (FT)	ROCK TYPE	LENGTH (IN)	DIAMETER (IN)	UNIT WEIGHT (PCF)	UNCONFINED COMPRESSIVE STRENGTH (PSI)
S1_B1-A	RS-6	11.0-11.5	Biotite Gneiss	4.16	1.86	175.8	18,520
S1_B1-A	RS-7	16.8-17.5	Migmatitic Biotite Gneiss	3.49	1.86	173.40	10,027
S1_B1-B	RS-8	32.1-32.5	Migmatitic Biotite Gneiss	4.17	1.87	172.90	10,268
S1_B1-C	RS-9	39.4-40.0	Migmatitic Biotite Gneiss	4.14	1.87	171.40	13,205
S1_B2-A	RS-10	20.0-20.8	Migmatitic Biotite Gneiss	4.15	1.87	171.50	9,796
S1_B2-C	RS-11	33.5-34.1	Biotite Gneiss	4.16	1.86	173.10	3,264
DET_B1	RS-1	27.0-27.7	Granite	4.17	1.86	165.5	22,108
DET_B1	RS-2	30.8-31.3	Granite	4.19	1.86	165.1	20,364
DET_B1	RS-3	40.1-40.6	Migmatitic Biotite Gneiss	4.11	1.86	170.4	16,519
DET_B2	RS-4	40.2-41.0	Migmatitic Biotite Gneiss	4.25	1.87	170.3	8,866
DET_B2	RS-5	48.5-49.0	Migmatitic Biotite Gneiss	4.24	1.87	169.5	8,389

DocuSign Envelope ID: 86123A16-AEE1-4ABE-89EF-4BBDB461E75D

**CONTENTS** 

**DESCRIPTION** 

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

PROFILE BORE LOGS

SHEET NO.

5898 186B ~ Ö REFERENCE

STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_**HAYWOOD** 

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209(CRABTREE RD.) TO EAST OF RUSS AVE. SITE DESCRIPTION RETAINING WALL #1 FROM -L LT- STA. 48+60.08 TO 49+09.03

STATE PROJECT REFERENCE NO. TOTAL SHEETS 5 B-3186/B-5898

#### **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 (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 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 FOOD THE PROJECT. 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.

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	C. SWAFFORD
	GEOTECHNOLOGY, IN
INVESTIGATED	BY C. SWAFFORD
DRAWN BY	T. LYNN
CHECKED BY _	K. BUSSEY
SUBMITTED BY	HDR
DATE NOV	EMBER 2021

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kenneth R. Bussey, Jr. SIGNATURE

9/6/2023

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**UNLESS ALL SIGNATURES COMPLETED** 

PROJECT REFERENCE NO.

B-3186/B-5898

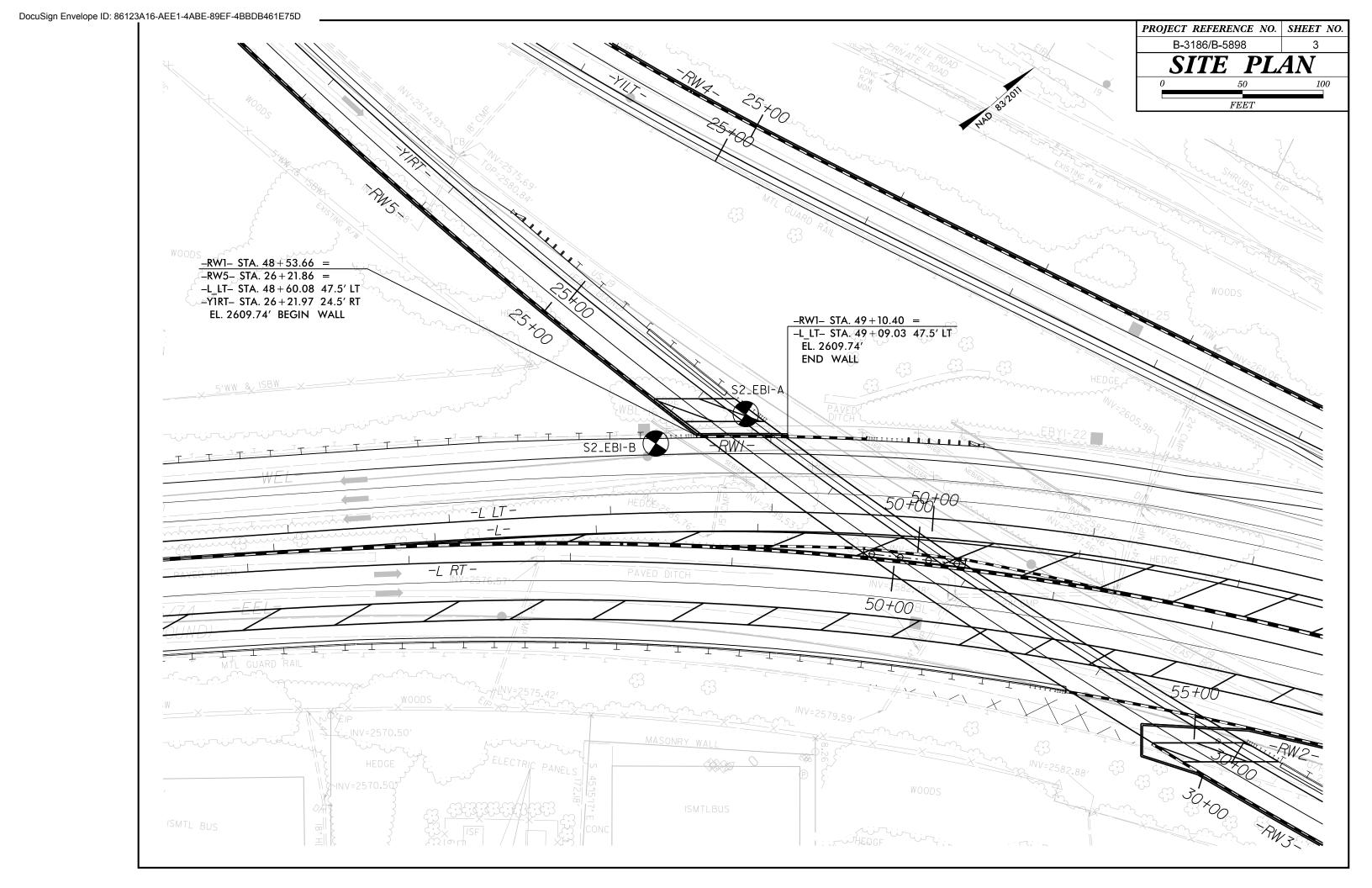
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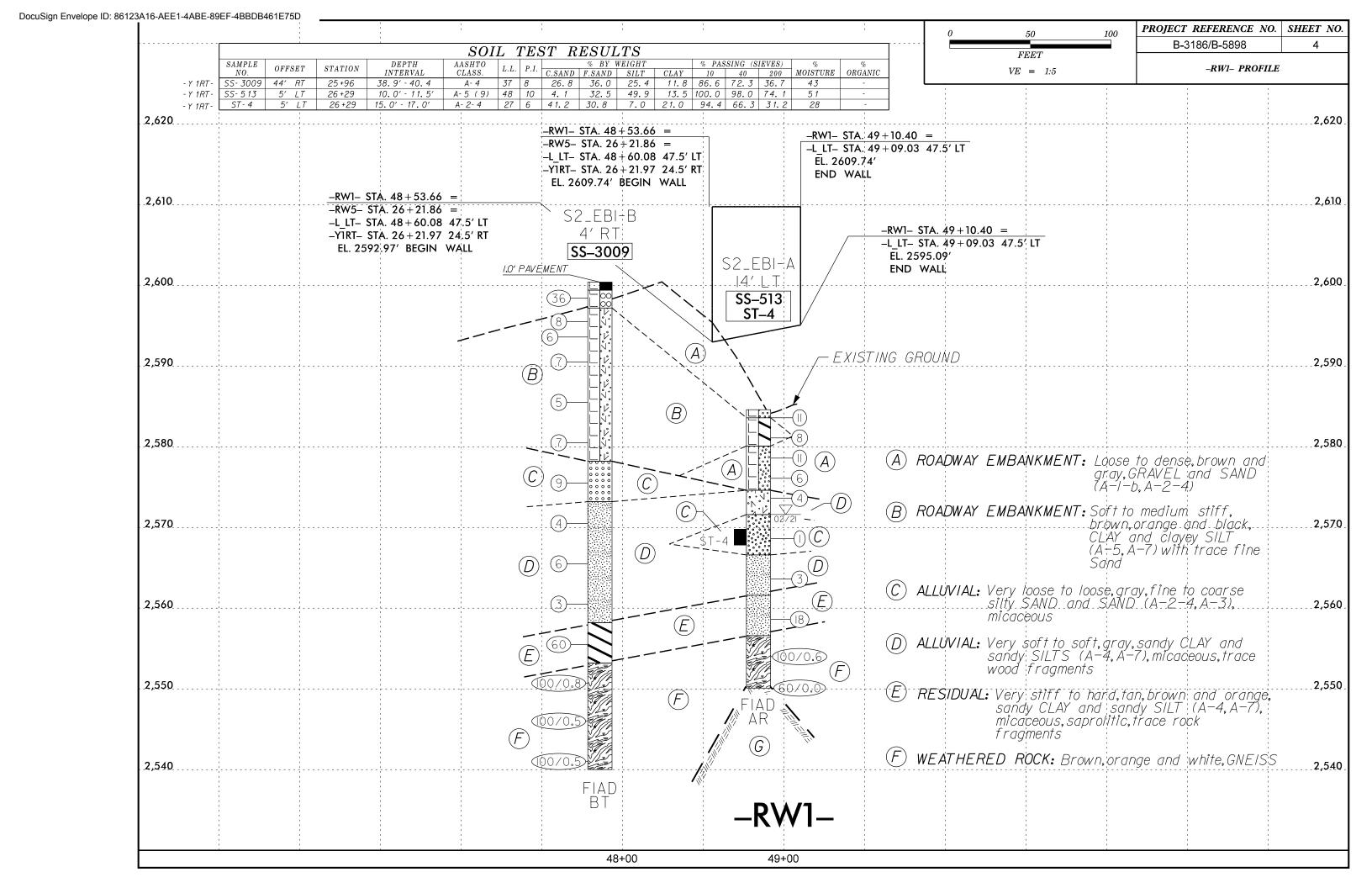
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

### SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

The content of the				
Part				TERMS AND DEFINITIONS
The content of the			ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	
## ACCUPATION OF THE PROPERTY				
Column   C	CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	l ———
Column   C			NI//8I//A	
The control of the	SOIL LEGEND AND AASHTO CLASSIFICATION			
April			URISTALLINE WILLIAM VIELD OFF DEFLICAL TE TECTED POOK TYPE INCLUDES CRANITE	
Column   C			GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
The content of the			NON-CRISTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	
The control of the	SYMBOL 000000000000000000000000000000000000		ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
Second Column   Col				BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
The content of the part of t	840 20 MV E0 MV E1 MN COLIC CLAY DEAT			
Control   Cont	#200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL		
1				
Control	LL 40 MX 41 MN LITTLE OR PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MNEPATE HIGHLY		(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	
Part   Column   Col	GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF UNCANIL			
Section   Sect	OF MAIOR GRAVELAND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER			FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
Column   C				
## 15 PARTICLE SECTION OF CONSISTENCY   STORY   STORY		PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA		
CONSTRUCTION   CONS		SPRING OR SEEP		
### 200 PC   PC   MY   CASE   1   1   2   2   2   2   2   2   2   2	· · · · · · · · · · · · · · · · · · ·	MISCELLANEOUS SYMBOLS		
Control   Cont		[] 25/025 ptp 4 ptp 1/25/025		
Company   Figure	PRIMARY SUIL TYPE CONSISTENCY PENEIRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT <sup>2</sup> )	III HONDWAY EMBARKATERY (NE) I DI & DI DIRECTION		
## ## ## ## ## ## ## ## ## ## ## ## ##				LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
100   100	GRANULAR LUUSE 4 10 10	APTICION EIL (AE) OTHER CONE PENETPOMETER		
## PARTIES OF THE PAR	(NON-COHESIVE) DENSE 30 IU 50			
Second   S		— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	
MEET, 10 1 10 2	GENERALLY SOFT 2 TO 4 0.25 TO 0.5	TEST BORING		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
Texture OF GRANN SIZE	MATERIAL STIFF 8 TO 15 1 TO 2	= INFERRED ROCK LINE		
EXTURE OF CHAIN STATE   FACE TO A STATE OF THE CONTROL OF THE CO		TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY SPT N-VALUE		
A	TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS		
SOLICE   COMPAN   CLUS   SOLIC   COMPAN   CLUS	U.S. STD. SIEVE SIZE 4 10 40 60 200 270			
## CORD   GOAD   CORNES   STATE   CAP   CORNES   STATE   CAP   CORNES   STATE   CAP   CORNES   STATE		SHALLOW STEET OF STEET OF		
## ABBREVIATIONS   MISTURE   CORRECTION OF TERMS   AF AUGUSTUS   ABBREVIATION STORY   VIET SHEED   ASSOCIATION OF A CELLOSISTS PICK. HIMP SECURITY OF A CELLOSIST PICK. HIMP SECURITY OF A CELLOSIST PICK. HIMP SECURITY OF A CELLOSIST PICK. HIMP SEC	BOULDER COBBLE GRAVEL SAND SAND SILT CLAY			
SOIL MOISTURE CORRELATION OF TERMS  SOIL MOISTURE CORRELATION OF THE ARMS OF TERMS OF THE ORDING OF THE ARMS OF THE ORDING OF THE ORDING OF THE ARMS OF THE ORDING OF THE ARMS OF THE ORDING OF THE OR	(CSE. SD.) (F SD.) (SE.)		HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	
SOIL MOISTURE - CORRELATION OF TERMS  SOIL MOISTURE CORRELATION OF TERMS  SOIL MOISTURE CORRELATION OF TERMS  SOIL MOISTURE - CORRELATION OF TERMS  SOIL MOISTURE - CORRELATION OF TERMS  SOIL MOISTURE CORRELATION  SOIL MOISTUR				
SOIL MOISTURE SCALE   FIELD MOISTURE DESCRIPTION OUTCE FOR FIELD MOISTURE DESCRIPTION OF CORRECT MANAGEMENT OF		CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
ORTERIERS LIMITS DESCRIPTION  OBSCRIPTION  O	SOU MOISTURE SCALE FIELD MOISTURE	CSE COARSE ORG ORGANIC		
Seminate - Usually Visually West Visually Visual		DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
FOR BELOW WATER TIGHT		e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON		LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
PLASTIC LIMIT  - WET - (W)  SEMSOLUP, REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  - WET - (W)  SEMSOLUP, REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  - PLASTIC LIMIT  - MOIST - IM)  - MOIST - IM)  - PLASTIC LIMIT  - OPTIMUM MOISTURE  - OPTIMUM MOI			SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	
PLASTIC LIMIT  PROBLE PLASTIC LIMIT  PORTABLE HOIST  PORTABLE PROBE, HANDA DICER  SOUNDING FIGURE SCHOOL CORD OR COLOR COMBINATION STAN, RED, YELLOW-BRONN, BLUE-CRAY).  PORTABLE HOIST  PHAND ADDRESS  PORTABLE HOIST  PHAND ADDRESS  PORTABLE H	PLASTIC   SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL		
OF THIMM MOISTURE  OPTIMUM MOISTURE  OPTIMUM MOISTURE  OPTIMUM MOISTURE  OPTIMUM MOISTURE  SHRINAGE LIMIT  OPTIMUM MOISTURE  SHRINAGE LIMIT  OPTIMUM MOISTURE  OPTIMUM MOISTURE  SHRINAGE LIMIT  OPTIMUM MOISTURE  OPTIMUM MOISTURE  SHRINAGE LIMIT  OPTIMUM MOISTURE  OPTIMUM MOISTURE  OPTIMUM MOISTURE  SHRINAGE LIMIT  OPTIMUM MOISTURE  OR ALTIMUM TEROLO  OR ALTIMUM TEROLO  OPTIMUM MOISTURE  OR ALTIMUM TEROLO  OR ALTIMUM THE MANUM THE MOISTURE  THICKLY LAMINATED  OR ALOS 48. ALB FEET  THICKLY LAMINATED  OR ALOS 48. ALB FEET  THICKLY LAMINATED  O	ATTAIN OPTIMUM MUISTURE			BENCH MARK: N/A
ONL OPTIMUM MOISTURE SLEST HAND STREAM BLOWN FOR THINLY BEDDED ALSO LOSE SHRINKAGE LIMIT  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRE ADDITIONAL WATER TO A LIGHT OF THINLY SECURE AND A LIGHT OF THINLY SECURE ADDITION OPT THINLY SECURE ADDITION OPT THINLY SECURE ADDITION OPT THINLY SECURE ADDITION OF THINLY SECURE ADDITION OPT THINL	- MOIST - (M) COLID-AT OR NEAR ORTIMIN MOISTIRE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: FEET
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  - DRY - (D) REAL WATER OPTIMUM MOISTURE  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (D) REAL WATER TO THICK WATER OPTIMUM ADDED  - DRY - (	OM _ OPTIMUM MOISTURE		MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTEC.
ATTAIN OPTIMUM MOISTURE  PLASTICITY  PLASTICITY   NOEX (P)    DRY STRENGTH   SLIGHT V PLASTIC   GENTAL BY CARREIN   SHOLLOW AUGERS   SHOLLOW A	PEGUIDEC ADDITIONAL MATER TO			
PLASTICITY  PLASTICITY INDEX (PI)  PLASTIC INTERCSURE, TC.  FIABLE  FOR SEDIMENTARY ROCKS, INDURATION IS THE MEDIAN IN IS THE MEDIAN IN IS THE MEDIAN IN IS THE MEDIAN IN ISTANCES, INDEX (PI)  PLASTIC INTERCSURE, TC.  PLASTIC INTERCS NUMBROUS GRAINS;  PLASTIC INTERCS NUMBROUS GRA		CME-55	THINLY LAMINATED < 0.008 FEET	T CERTIFIED WITH FCC PART 15 (CLASS B DEVICE), 24, 32; RCM; PTCRB;
PLASTICITY INDEX (PI)  NON PLASTIC  O-5  VERY LOW SLIGHTLY PLASTIC  G-15  SLIGHTLY PLASTIC  MODERATELY PLASTIC  16-25  MEDIUM HIGHLY PLASTIC  CASING W/ ADVANCER HIGHLY PLASTIC  COLOR  DESCRIPTIONS MAY INCLUDE COLOR OR COURD COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIPE APPEARANCE.  WARE SHEAR TEST  TUNG,-CARBIDE INSERTS  TUNG,-CARBIDE INSERTS  TUNG,-CARBIDE INSERTS  TUNG,-CARBIDE INSERTS  TUNG,-CARBIDE INSERTS  TUNG,-CARBIDE INSERTS  HAND TOOLS:  HAND TOOLS:  POST HOLE DIGGER HAND AUGER  SOUNDING ROD  TRICONE  TRICONE  VANE SHEAR TEST  SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	PLASTICITY	X 8* HOLLOW AUGERS		FIAD - FILLED IMMEDIATELY AFTER DRILLING
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH PORTABLE HOIST TRICONE 'STEEL TEETH HAND TOOLS:    DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).    DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).    MODERATELY INDURATED SAMPLE WITH STEEL PROBE: SOUNDING ROD DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.    SOUNDING ROD DIFFICULT TO BREAK WITH HAMMER. SHERAK EST VANE SHERAK ES			DURRING WITH FINCED EDEES NUMEDOUS CRAINS.	THAD THELED INVINIEDIATELT AFTER DRIELING
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH PORTABLE HOIST TRICONE 'STEEL TEETH HAND AUGER  COLOR  DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE.  CASING W/ ADVANCER POST HOLE DIGGER HAND AUGER SOUNDING ROD INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.  OUR BIT  VANE SHEAR TEST  SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;		VANE SHEAR TEST TUNGCARBIDE INSERTS HAND TOOLS:		
COLOR  DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE.  WAND BOTTARY  WAND BOTTARY  WAND BOTTARY  WELL TEETH HAND AUGER  SOUNDING ROD  INDURATED  BREAKS EASILY WHEN HIT WITH HAMMER.  BREAKS EASILY WHEN HIT WITH HAMMER.  BREAKS EASILY WHEN HIT WITH HAMMER.  GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:  DIFFICULT TO BREAK WITH HAMMER.  WAND SHEAR TEST  WAND BOTTARY  WAND BOTTARY  WAND BOTTARY  WAND BOTTARY  SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	MODERATELY PLASTIC 16-25 MEDIUM	CASING W/ ADVANCER POST HOLE DIGGER		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, FTC, ARE USED TO DESCRIBE APPEARANCE.  SOUNDING ROD  INDURATED  DIFFICULT TO BREAK WITH HAMMER.  VANE SHEAR TEST  SOUNDING ROD  SOUNDING ROD  INDURATED  DIFFICULT TO BREAK WITH HAMMER.		-   -   HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COUR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). CORE BIT VANE SHEAR TEST  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE.  FYTERMELY INDUBATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;		1   Y   CME - 75		
DATE: 8-15-14		CORE BIT VANE SHEAR TEST		
	TOOK TEND SOON NO ETONY DANING STREEMED, ETO, AND SOED TO DESCRIBE ALL EMPHROES	LJ   [X] MUD ROTARY   LJ	SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14





								SORE			-																			
	<b>S</b> 3833				<b>IP</b> B-3186			TY HAYWO	DOD		GEOL	OGIST C. Swafford	T		WBS 3833					IP B-318			JNTY HAYV	/OOD				GEOLOGIST C. Swafford	T	
				— È		/ Mountain	Highway)				1		GROUND W	`	SITE DESC			23/ US	— È		•	in Highw	<del>''</del>						GROUND WT	
		. S2_E			TATION :			OFFSET				IMENT -Y1RT-	0 HR.	22.0	BORING NO				-	TATION			_	5 ft LT				ALIGNMENT -Y1RT-		13.0
		. <b>EV</b> . 2,6				<b>PTH</b> 60.41		NORTHIN			l l	NG 819,251	24 HR.	FIAD	COLLAR EI					OTAL DE			NORTH	<b>NG</b> 666				<b>EASTING</b> 819,274		FIAD
						(09/15/2020)			DRILL	METHOD	Mud Rotary	HAMI	MER TYPE Auto	omatic	DRILL RIG/HA	MMER E	FF/DAT	E GTO									H.S. A	Augers HA	MIMER TYPE Autom	natic
DR		K. Boone			TART DAT	E 02/27/2		COMP. D			SURF	ACE WATER DEPTH N	I/A		DRILLER					TART DA				DATE 0		/21	!	SURFACE WATER DEPTH	N/A	
ELE (ft)	/ DRIVE ELEV (ft)	DEPTH (ft)	BLOW C 0.5ft 0.5f		0		PER FOO	OT 75 10		MOI	O G ELEV. (ft	SOIL AND ROCK DES		DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTI (ft)	0.5ft	0.5ft	0.5ft	0	BLOV 25	/S PER F		00 NO		MOI	O G	SOIL AND ROCK D	ESCRIPTION	
260	5	<u> </u>									-				2585 -2,584.	<del> </del> 0.0	5	7	4	11	.			-		м	2, <b>::</b> - 2,	2,584.6 GROUND SU 2,583.6 <b>ROADWAY EMB</b>		(
260		‡									- - 2,600.4	GROUND SURF		0.0	2,582	Ŧ	3	4	4	.   .   .   .   .   .   .   .   .				11		M L		Medium dense, brown, f trace gra	vel `	4
	2,599.4	1.0	11 20	16	-	36			1	М	2,599.4	ROADWAY EMBAN 1.0' PAVEME		1.0	2,579.	<del>3+</del> 5.0 +	6	5	6	. 11						М		Loose to medium dense (A-2-4	e, gray, f-c SAND	
	2,596.5	3.9			] :::;						2,596.9	ROADWAY EMBAN Dense, brown, GRAV	NKMENT /FL (A-1-b)	3.5	2,577.	1 7.5	3	3	3	:/: :				-		Sat.	-  -	(11-2-4)	,	
259	2,594.6	5.8	6 4							M		Medium stiff, orange and b clayey SILT (A-5), with	rown with black,	_	2575 2,574.	10.0	1			🕶						L		2,574.6		10
		Ŧ	6 3	3	6					M		Clayey SILT (A-5), WIII	i liace saliu			Ŧ	3	2	2	<b>∮</b> .4				.	_	51%		ALLUVIA Soft, gray, SILT (A-5)	<b>AL</b> (9), micaceous	40
259	,	5 <del>+</del> 8.9	4 3	4	1 1					М					2570	Ŧ				/: : :				11		<u> </u>	N = 2	Very loose, gray, f silty	/ SAND (A-2-4),	13
200		‡			1 1										2,569	<del>3+</del> 15.0 +	1	WOH	1	1				1 1		w	-	micaceo	us	
	2,586.5	† 5 13.9			]											‡				[[:::				.	2	28%	2	.,566.6	. <del> </del>	18
258	5	‡	3 2	3	<b>\$</b> 5					M					2565 2,564.	20.0	<u> </u>									2000		Soft, gray, f sandy SILT	(A-4), micaceous	
		‡														‡	1	1	2	3 : :				1 1		W				
258	,	5 <u>† 18.9</u> †	3 3	4	- 1 - 1 1					M					2560	‡				÷÷5							2 <u>.</u>	2,561.6 RESIDU		23
230	<u>'</u>	‡			1 1				1		2,578.4			22.0	2,559.	3+ 25.0	4	7	11	1	18					w		Very stiff, brown and ora (A-4), micaceous		
	2.576.5	+ 5+ 23.9			- - :					0	000	ALLUVIAL Very loose to loose, gray				‡										0000		, ,,		
257	,	Ī	4 4	5	9					W	000	micaceous			2555	+ 3+ 30.0							· ·   · · ·	·		80000		2,554.6		30
		<u> </u>			<i>:j</i> ::::					0	2,568.4					Ŧ	90	10/0.1					100/	0.6		\$2 \$		WEATHERED Brown, orange, and v	ROCK	
	,	28.9	3 3	1		.				W	0 0 0 _ 0 0 0 _ 0 0 0 _					<u>†</u>								: []		K< 43	//=		Willo, CIVEICO	
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	0.500.5	+ 5+ 33.9				.					1818F	Soft to medium stiff, gray, s	sandy SILT (A-4)	, 32.0		İ											E	Penetration Test Refu 2,550.1 ft on Crystalline		
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**CONTENTS** 

**DESCRIPTION** 

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

BORE LOGS

PROFILE

SHEET NO.

5-6

5898 186/B ~ Ö REFERENCE

STATE OF NORTH CAROLINA

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

### **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_ **HAYWOOD** 

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209 (CRABTREE RD) TO EAST OF RUSS AVE. SITE DESCRIPTION RETAINING WALL #2 FROM -L RT- STA. 51+62.74 TO 53+56.35

STATE PROJECT REFERENCE NO. B-3186/B-5898 6

#### **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 (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 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 WARRAYT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE TO 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 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.

N. YACOBI
R. DUGGER
GEOTECHNOLOGY, INC.

INVESTIGATED BY \_\_C. SWAFFORD

DRAWN BY \_\_T. LYNN

CHECKED BY K. BUSSEY

SUBMITTED BY \_\_HDR

DATE NOVEMBER 2021



HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116



kenneth R. Bussey, Ir. SIGNATURE

9/6/2023

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

PROJECT REFERENCE NO.

B-3186/B-5898

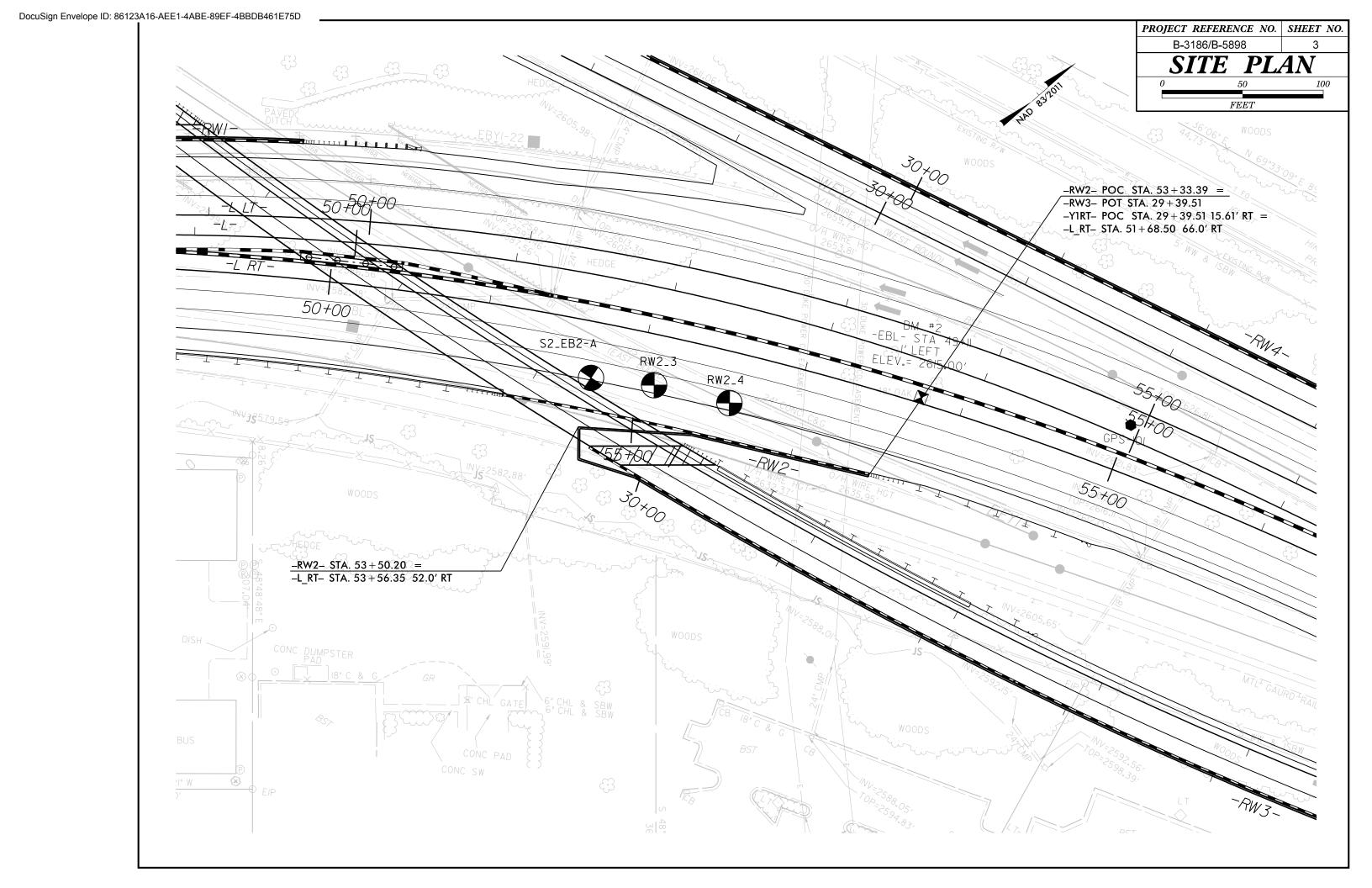
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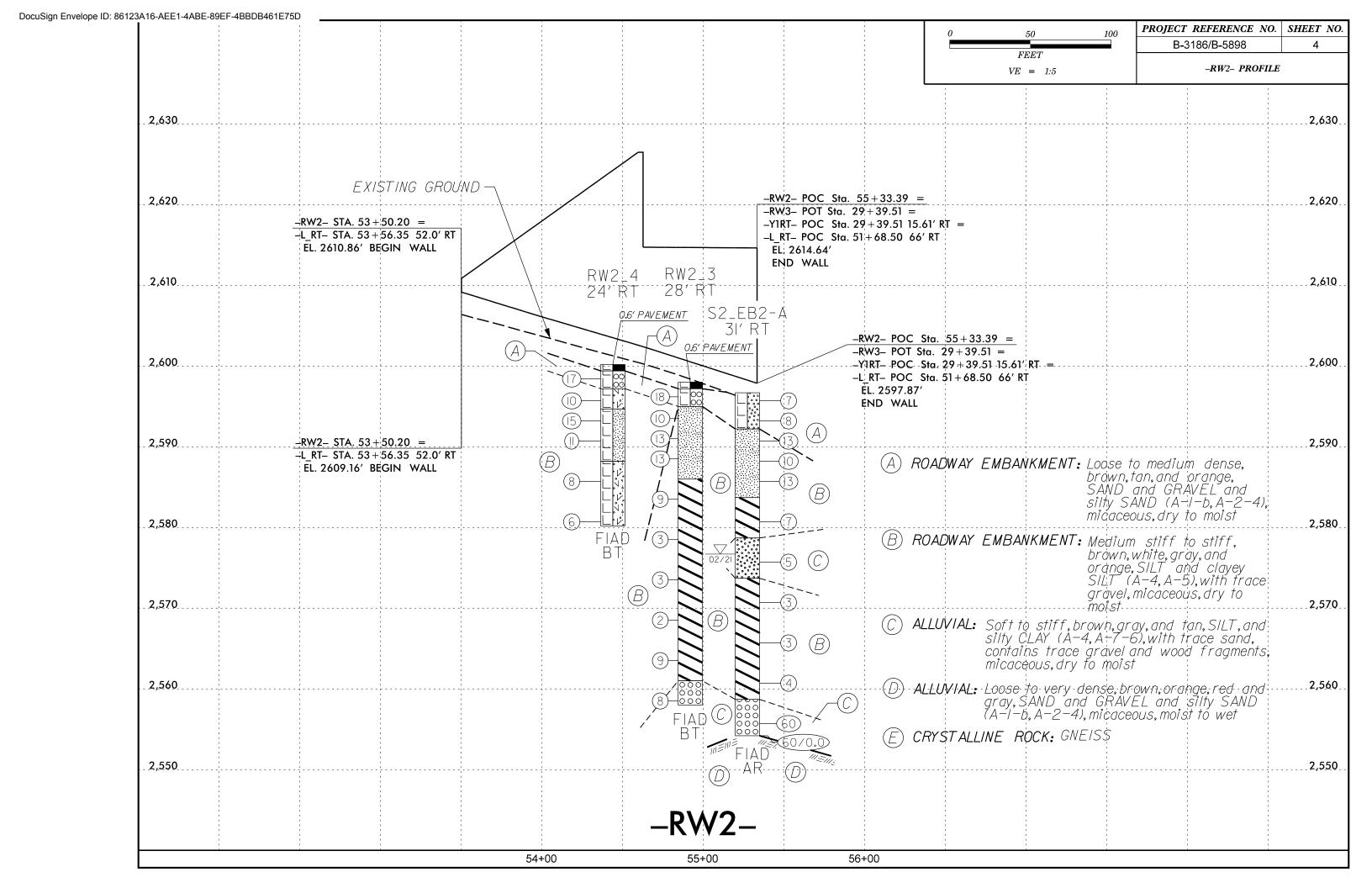
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

### 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.  UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	GAP-GRADED - 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, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
ULASS. (≤ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP 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-2-6 A-2-7 A-3-6 A-7 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK (NCR)  ROCK THEN WOLLD TELES OF THE TOTAL TELES.  ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR SILT- MUCK, *40 30 MX 50 MX 51 MN SOILS CALY PEAT	PERCENTAGE OF MATERIAL	CCP) SHELL BEDS, ETC.  WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
#2000 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY  ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING ALG	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
PASSING *40 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR	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, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE DECANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE  GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W W 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL AND SAND SAND SOILS SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN, RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	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	SPRING OR SEEP	WITH FRESH ROCK.  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	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,  IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.   LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	₩ITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL  SOIL SYMBOL  SOIL SYMBOL  SEPT DMT 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.	<u>LENS</u> - 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 AUGED POPING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
DENSE   30 TO 50	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 VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY   SOFT   2 TO 4   0.25 TO 0.5	INFERRED ROCK LINE MW MONITORING WELL TEST BORING	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 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TITES ALLUVIAL SOIL BOUNDARY A PIEZOMETER SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	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
HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	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 - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAV	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	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND (SL) (CL)		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(USE, SU.) (F SU.)	ABBRE VIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY  MOD MODERATELY  7 - UNIT WEIGHT  CPT - CONE PENETRATION TEST  NP - NON PLASTIC  7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION SOIDE FOR THEED HOLDSTONE BESCHIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS  DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
LL LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC   SEMISOLID: REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: N/A
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FEET
OM _ OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CL CONTINUOUS EL IGUT AUGED	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	BORING ELEVATIONS OBTAINED USING b3186_br0022_r4047_Merged_I-12-21.+in
ATTAIN OPTIMUM MOISTURE	CME-55   ==   COME 512E1	THINLY LAMINATED < 0.008 FEET  INDURATION	
PLASTICITY		INDURTHION  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	SITE 2 BORING ELEVATIONS OBTAINED FROM TRIMBLE RI2 GNSS RECEIVER CERTIFIED WITH FCC PART 15 (CLASS B DEVICE), 24, 32; RCM; PTCRB; BT SIG
PLASTICITY INDEX (PI) DRY STRENGTH  NON PLASTIC 0-5 VERY LOW	X CME-550X	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST CASING WY ADVANCER HAND TOOLS:	GENILE BLUW BY HAMMER DISINIEGRATES SAMPLE.	FIAD - FILLED IMMEDIATELY AFTER DRILLING
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG-CARB.	CRAINC ARE DISEIGNET TO SERARATE WITH STEEL PROPE.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CME-75 CORE BIT SOUNDING ROD VANE SHEAR TEST	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X MUD ROTARY	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
I		SHITTLE BREHKS ACKUSS GRAINS.	DATE: 8-15-14





		BORE LOG	T												T	
WBS 38332.1.FS1	TIP B-3186 / B-5898 COUN		GEOLOGIST N. Yacobi		WBS 3833						COUNTY HAY	WOOD	)		GEOLOGIST N. Yacobi	
	Wall No. 2 from -L_RT- STA 51+63 to		ALIONIMENT DIAG	GROUND WTR (ft)	SITE DESCR							<b></b>	" DT		ALIONMENT DIVIG	GROUND WTR (ft)
BORING NO. RW2_4	<b>STATION</b> 54+44	OFFSET 24 ft RT	ALIGNMENT -RW2-	0 HR. Dry	BORING NO				TATION 5		OFFSE				ALIGNMENT -RW2-	0 HR. Dry
COLLAR ELEV. 2,600.2 ft  DRILL RIG/HAMMER EFF/DATE GT	TOTAL DEPTH 20.0 ft	NORTHING 667,055  DRILL METHOD H.	EASTING 819,630	24 HR. FIAD  WERTYPE Automatic	COLLAR EL DRILL RIG/HA					<b>FH</b> 40.0 ft	NORII		667,028	שמב ב	EASTING 819,591  H.S. Augers HA	24 HR. FIAD MIMER TYPE Automatic
	START DATE 02/10/21						DAIL			E 02/10/21	COMP					
DRILLER K. Boone		COMP. DATE 02/11/21  OT SAMP. ▼ / L	SURFACE WATER DEPTH N	//A	DRILLER K		BLOW C			BLOWS PE			02/10/ SAMP.	21 // L	SURFACE WATER DEPTH	N/A
ELEV (ft) DEPTH BLOW CC (ft) 0.5ft 0.5ft		400     /   0	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV CHICKET	(ft)		ift 0.5ft	0	25 50		11	Ι.	MOI G		DESCRIPTION
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2600			- - 2,600.2	FACE 0.0	2505	Į l	9 12	2 6	1 فحر	8		11		D 🗔	ROADWAY EMB	BANKMENT
2,599.4 0.8 15 11	6	-      D □	0.8' PAVEME		2,594.5	3.5	5 5	5	10					D 💮	02 <u>.595.0</u> Medium dense, brown, S (A-1-b), mic	aceous
2,596.7 3.5 6 5	5 . 1		2,597.2 Medium dense, brown and GRAVEL (A-1	tan. SAND and .— 3.0	2,592.0	6.0	5 6	7						D	ALLUVI. Stiff, brown and tan, SIL	.T (A-4), with trace
2595	5	M []	2,594.7 Stiff, brown and white, cla	yey SILT (A-5)5.5	2590 2,589.5	T 1	7 6		13						sand and gravel,	micaceous
2.591.7+ 8.5	8   •15	.       D   C	Stiff to very stiff, brown a (A-4), with trace gravel	, micaceous		<u> </u>	′   °	'						D	_	
2590 4 5	6 . •11	D L	_		2585	13.5			:   : :			11			2,586.0 Soft to stiff, gray, silty C	CLAY (A-7-6), with12
	:;::: :::: :::		2,588.2 Modium stiff to stiff gray	12.0	2,004.0	+ 10.0	4 4	5	]					м	trace sand, mi	icaceous
2,586.7 + 13.5 2 4	4	-   · · · · ·         M	Medium stiff to stiff, gray orange, clayey SILT (A-5), v micaceous	with trace gravel,	2580	‡			/::::			11			<b>‡</b>	
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WBS	38332	.1.FS1			ТІ	IP B-3186 /	B-5898	COUNT	<b>r</b> HAYWOO	DD D			GEOLOGIST R. Dugger		
SITE	DESCRI	IPTION	US 2	23/ US	74 (Gr	reat Smoky I	Mountain I	Highway)						GROUNI	D WTR (ft)
BORI	NG NO.	S2_E	B2-A		s	TATION 29	9+30		OFFSET	14 ft LT			ALIGNMENT -Y1RT-	0 HR.	20.0
COLL	AR ELE	<b>V</b> . 2,	596.7	ft	Т	OTAL DEPT	<b>H</b> 42.5 f	t	NORTHING	667,0	01		<b>EASTING</b> 819,562	24 HR.	FIAD
DRILL	.RIG/HAM	IMER EF	F/DAT	E GTO	C9083 C	ME-550X 80%	6(11/24/202	20)		DRILL N	<b>IETHO</b>	D H.S	S. Augers HAMIN	MER TYPE	Automatic
DRIL	LER L.	Wanst	rath		S	TART DATE	02/10/2	21	COMP. DA	TE 02/	10/21		SURFACE WATER DEPTH N	/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		0 2		PER FOOT 50	75 100	SAMP.	MO	0 I G	SOIL AND ROCK DES	CRIPTION	DEPTH (f
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2590	2,591.7- -	- 5.0 -	3	6	7	13					D		ALLUVIAL Stiff, brown and orange		
	2,589.2	7.5	4	4	6	<del>  . j</del>			1		D		micaceous		
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	0.570.7	[											Loose, brown and gray, f	-c silty SAN	<u>D</u> — <u>''</u>
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	- 2.571.7-	- 25.0				<u> </u> :::::							Soft to medium stiff, gray, contains trace wood fragme	-CLAY (A-7 ents, micace	6), eous
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	0.550.7	[ ,,					\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.					000	Very dense, gray, SAND (A-1-b)	and GRAVE	:L =
555	2,556.7-	40.0	9	25	35			•60			w	000	- (A-1-b)		
333	2,554.2	42.5	60/0.0			<u> </u>		<u> </u>	60/0.0	H		888	2,554.2	h Standard	42
	-	- - - -	60/0.0						00/0.0				Boring Terminated wit Penetration Test Refusa 2,554.2 ft on Crystalline R A.R. at a depth of	l at Elevation ock (GNEIS	
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**CONTENTS** 

**DESCRIPTION** 

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

BORE LOGS

PROFILE

SHEET NO.

5-15

5898 186/B ~ Ò REFERENCE

STATE OF NORTH CAROLINA

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

### **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_ **HAYWOOD** 

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209 (CRABTREE RD.) TO EAST OF RUSS AVE. SITE DESCRIPTION RETAINING WALL #3 FROM -Y1RT-STA.29+34.68 TO 40+54.00

STATE PROJECT REFERENCE NO. TOTAL SHEETS 15 B-3186/B-5898

#### **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 (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 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 WARRAYT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE TO 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 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.

R. DUGGER
N. YACOBI
GEOTECHNOLOGY, INC

INVESTIGATED BY \_\_C. SWAFFORD

DRAWN BY \_\_T. LYNN

CHECKED BY K. BUSSEY

SUBMITTED BY \_HDR

DATE NOVEMBER 2021



HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116



kenneth R. Bussey, Jr. SIGNATURE

9/6/2023

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

PROJECT REFERENCE NO.

B-3186/B-5898

2

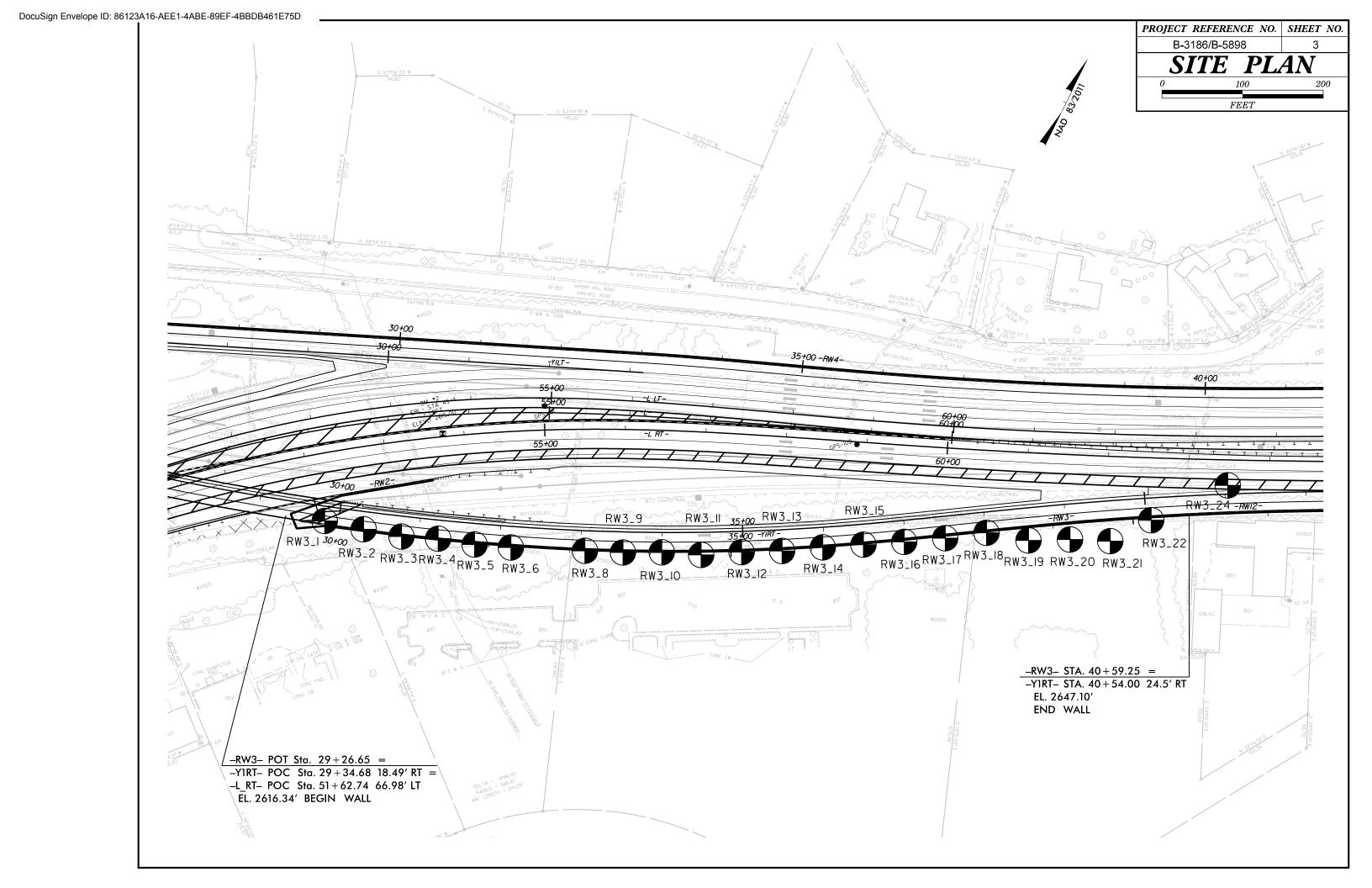
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

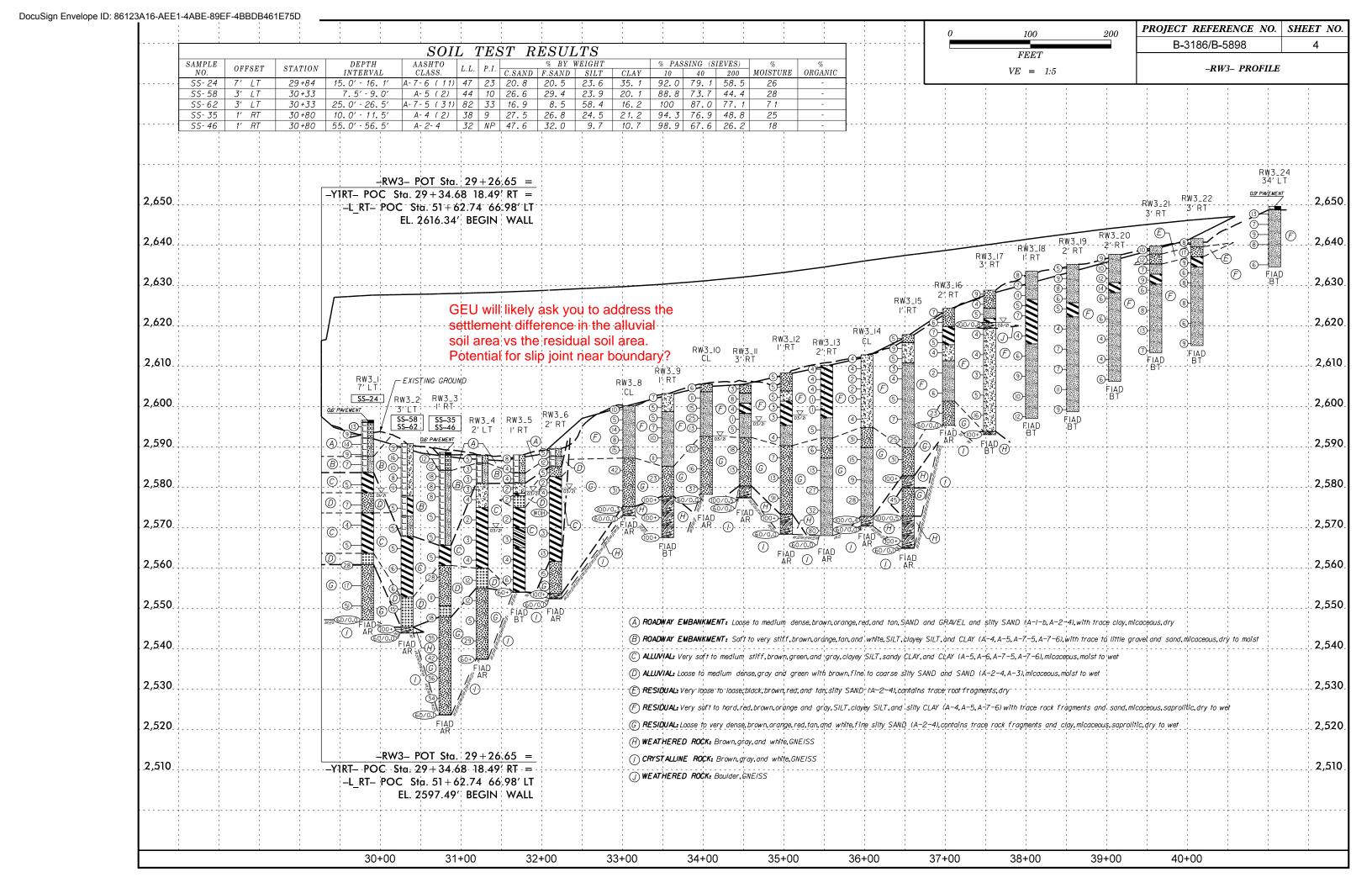
GEOTECHNICAL ENGINEERING UNIT

### 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. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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 IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - 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.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	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:	WEATHERED WOON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	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, SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC.	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS.     (≤ 35% PASSING *200)     (> 35% PASSING *200)       GROUP     A-1     A-3     A-2     A-4     A-5     A-6     A-7     A-1, A-2     A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 0000 d0000  d0000  d0000  d0000 d0000 d0000 d0000 d0000 d0000 d0000 d0000 d0000 d000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK (NCR) ROCK THEN WOLLD FELLO STATE TO THE TESTED.  ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR SILT- MUCK, *40 30 MX 50 MX 51 MN SOILS CALY PEAT	PERCENTAGE OF MATERIAL	CCP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
#200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40	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, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	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 SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAIOR CRAVEL AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	lacktright static water level after $24$ hours	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBGRADE   EACELLERY TO 50000   FHIN TO FOOK   POOR   FOOK   ORSOTHABLE	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM, FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OF RANGE OF STANDARD RANGE OF UNCONFINED	ETT 25 / 425	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONFIDENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE)  25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL  SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SPIT MI TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	N 1	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE 2 20		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0   MATERIAL   STIFF   8 TO 15   1 TO 2	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
HARD > 30 > 4		ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
COARSE FINE	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER   COBBLE   GRAVEL   SAND   SAND   SILT   CLAY		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	ABBREVIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY  MOD MODERATELY  7 - UNIT WEIGHT  CPT - CONE PENETRATION TEST  NP - NON PLASTIC  7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION SOIDE FOR THEED HOLDSTONE BESCHIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS  DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
LL LIQUID LIMIT	F - FINE SL SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC   SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRACS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: N/A
- MOICT - (M) COLID. AT OR NEAR ORTIMIN MOICTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FEET
OM _ OPTIMUM MOISTURE SULLS HI OK NEHA OPTIMUM MOISTURE SL _ SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES:
REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	X CME-55 CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	BORING ELEVATIONS OBTAINED USING b3l86_br0022_r4047_Merged_I-i2-21.tin
PLASTICITY	X 8* HOLLOW AUGERS	INDURATION	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550X HARD FACED FINGER BITS -N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNGCARBIDE INSERTS HAND TOOLS:	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	X CME-I7 TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:  DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	CHARP HAMMER BLOWS REQUIRED TO RREAK SAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14





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2585	2.583.6	50	"   "	'	12-	1						2,58	34.1 and GRAVEL (A	\-1-b) 4.5		I		1	2	1	<b>4</b> 3					D		Soft, brown a	and tan, SIL	T (A-4)
	+	7	7 9	9	1 : : :>1	8							Medium stiff to very stiff, borange, f-c sandy SILT (A-	4)(2), with trace		2,582.9	5.0	1	2	1	3					D				
2580	2,581.1	7.5	3 3	5	/	1		-				<b>上</b>	gravel and some clay,	micaceous	2580 2	2,580.4	7.5	1	1	_	<u> </u>					М	2,580.	AL	LÜVÏAL	
	2,578.6	10.0	4 4	4	-					SS-35	25%				2	2,577.9	10.0				•3 · · ·					IVI	1 1	Soft, dark gray mi	/, clayey SIL caceous	_T (A-5),
	l ±				J		-			33-33	23/0					· ±		1	2	2	•4					М				
2575	2.573.6	15.0			+	+						<u> </u>			2575	$\pm$					<del> </del>		<del>                                     </del>	<del></del>			2,574.	9Very soft to medi	um stiff. dar	<u> 13</u> rk grav. siltv
	2,5/3.6	15.0	2 2	3	<b>•</b> 5			.							2	2,572.9	15.0	1	1	1	<u> </u>					М		CLA	Y (A-7-6)	3 ,, ,
2570	<del> </del>					1	-   - :					<u>-</u>			2570	Ŧ				Ηľ	1									
	2,568.6	20.0	3 2	3	1							F				Z.567.9	20 0				Ţ					ľ				
		'	3   2		<b>•</b> 5	: : :		.				- F	NF 0	20.0		2,507.9= 7	20.0	2	1	2	3			.		w				
2565	<b>∤</b> ‡				H	ļ : : :						2,56	ALLUVIAL		2565	‡					¦····		1							
	2,563.6+	25.0	3 2	3	5			.			М	3	Medium stiff, gray, silty ( micaceous		2	2,562.9	25.0	1	2	_	ļ : : : :					l				
2560	‡						-					- 2,56	60.6		2560	‡		'	_	_	4:::					W	3	0		01
2300	2.558.6	30.0			;							-	Medium dense, brown, fi (A-2-4), micace	ne silty SAND		‡				11	-\						2,559.	Medium dense, g	ray, coarse	SAND (A-3)
	1	3	3 3	25		€28					W		, ,,			2,557.9		4	6	6	. 12.					w	0000			
2555	1 1				,	<u> </u>	-	-							2555	1					T:						2,554.	9		33
	2,553.6	35.0	4 4	7	/ .			.								2.552.9	35.0							.				RE Loose to mediur	SIDUAL n dense. tai	n. red. and
	+		.   .		- 11 -		-	.					50.6	20.0		+		3	5	7	· •12·			.		D	-	brown, silty SAN	D (A-2-4), r aprolitic	nicaceous,
2550	1 —	40.0				1					0 0	2,53	Medium dense, gray, coar	se SAND (A-3)	2550	Ŧ													аргонио	
	2,548.6	40.0	11 8	10	1	8	-	.			W	2,54	17.8 RESIDUAL	40.8	1	2,547.9	10.0	2	2	3	<i></i>			.		M				
2545					: : : :							ii.	Medium dense to dense. It	brown, tan, and	2545	Ŧ				· []	5			I		IVI				
20.0	2,543.6	45.0				1							orange, fine to coarse SAN little silt and clay, with trace	rock fragments,		a 540 a T	45.0				/									
	‡	2	20   15	20		35	-	-			M		micaceous, sap	rolitic		2,542.9	15.0	6	12	17		<b>●</b> 29				D				
2540						1/.									2540	‡						ļi : : :								
	2,538.6	50.0	14 18	24				.			D				1	2,537.9 2,537.3	50.0	40 40	0/0.4					.			2,537.	4		50
2535	‡					:: i					-	<b>::</b> ‡				<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>	60	0/0.0	0/0.1					100+ 60/0.0	•		± 2,537.	3∕\ WEATH	IERED ROC	CK 50
	2.533.6	55.0				<del> /.</del>				L		<b>::</b>				‡											-	Boring Termin	nated with S	
T.GDT	<u> </u>	1	11 17	19		<b>∮</b> 36				SS-46	18%					‡												Penetration Tes 2,537.3 ft on Crys	talline Rock	k (GNEISS).
2530	±					:   :	1					<u></u>				<u></u>											<u> </u>	A.R. at a	depth of 50	).6'.
N 2330	2,528.6	60.0	6 18	16		.   .	1				D					1														
T.GPJ	l ±	`				<b>●</b> 34	-	-								$\pm$											<u> </u>			
2525	2.523.6	65.0										2,52	23.6	65.0		Ŧ											<del>[</del> -			
GEO	2,523.6	65.0 60/	/0.1	$\dagger$	1	<u> </u>			60/0.1	+	<del>                                     </del>	2,52	23.5/\ CRYSTALLINE F	ROCK \(\_65.1\)		Ŧ											F			
B3186	‡											F	Gray, GNEIS  Boring Terminated wit	th Standard		Ŧ											F			
E B	‡											F	Penetration Test Refusa 2,523.5 ft in Crystalline Re	ock (GNEISS).		Ŧ											l F			
DOUBI	‡											F	A.R. at a depth of	f 65.Ò'.		‡														
RE D	‡											Ė				‡											-			
T BO	‡											Ė				‡														
CDO	‡											ļ.				‡														
z				1																						1	1 L			

		ORE LOG	1							
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUNT		GEOLOGIST N. Yacobi		<b>WBS</b> 38332.1.F			ITY HAYWOOD	GEOLOGIST N. Yacobi	
SITE DESCRIPTION Retaining Wa	1		1	GROUND WTR (ft)			Vall No. 3 from -Y1RT- STA 29+35 t			GROUND WTR (ft)
BORING NO. RW3_5	STATION 31+72	OFFSET 1 ft RT	ALIGNMENT -RW3-	<b>0 HR.</b> 9.0	BORING NO. R		STATION 32+17	OFFSET 2 ft RT	ALIGNMENT -RW3-	<b>0 HR.</b> 10.0
COLLAR ELEV. 2,588.0 ft	TOTAL DEPTH 34.1 ft	NORTHING 667,041	<b>EASTING</b> 819,802	24 HR. FIAD	COLLAR ELEV.	,	TOTAL DEPTH 37.3 ft	NORTHING 667,058	<b>EASTING</b> 819,844	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE GTC82	·	DRILL METHOD H.S	i. Augers HAMM	MERTYPE Automatic			08255 CME-55 93%(11/24/2020)	DRILL METHOD	H.S. Augers HAMI	MER TYPE Automatic
DRILLER L. Wanstrath	<b>START DATE</b> 03/02/21	COMP. DATE 03/12/21	SURFACE WATER DEPTH N/	/A	DRILLER L. Wa		START DATE 03/12/21	COMP. DATE 03/12/21	SURFACE WATER DEPTH N	I/A
ELEV (ft) DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft 0		75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION  DEPTH (ft)	ELEV DRIVE ELEV (ft) (ft)	PTH BLOW COU ft) 0.5ft 0.5ft		OT   SAMP.   75 100   NO.   MOI (	SOIL AND ROCK DES	SCRIPTION
2580  2,588.0  2,588.0  2,588.5  2,583.0  2,583.0  2,580.5  2,578.0  1  2,578.0  2,588.0	2	M M	2,588.0 GROUND SURF  ROADWAY EMBAN  Loose, brown and tan, silty with trace clay, mice 2,583.5  Soft to medium stiff, brow 2,581.0  Soft, gray and green, clays micaceous  Very loose, gray and green with a layer of clay 10.  Soft, gray, fine sandy Company to red-ora (A-7-6), micaceous	WMENT / SAND (A-2-4), caceous  vn, SILT (A-4)  rey SILT (A-5), n, SAND (A-3), 0.0 to 10.1'  CLAY (A-6)	2,579.6 10	2.5 10 7 5.0 3 2 7.5 1 1 0.0 1 2 5.0 1 WOH	WOH 0	M L D L M M M M M M M M Sat.	2,589.6 GROUND SUR  ROADWAY EMBAI Loose, red and brown, silt Stiff, brown and white, S 2,585.1 trace sand ALLUVIAL Very soft to stiff, gray, silt with trace sand, mi	23.6    SAND (A-2-4)
2555 2,558.0 30.0 5 1 2555 2,554.0 34.0 100/0.1	5	60+ W	2,554.0  2,553.9  CRYSTALLINE R Gray, GNEISS Boring Terminated with Penetration Test Refusal 2,553.9 ft in Crystalline Ro A.R. at a depth of NOTES Split spoons at 15.0' and 3- no recovery	h Standard all at Elevation lock (GNEISS).	2555 2,559 6 36 2,559 6 36 2,552 4 3	5.0		D D	Medium dense, brown and SAND (A-2-4), sa	ROCK SS ROCK SS Hostandard al at Elevation ock (GNEISS). f 37.2' resulted in
			-							

		ORE LOG					<u>,                                      </u>			
<b>WBS</b> 38332.1.FS1	<b>TIP</b> B-3186 / B-5898 <b>COUNT</b>		GEOLOGIST N. Yacobi		<b>WBS</b> 38332.1.FS			TY HAYWOOD	GEOLOGIST N. Yacobi	
SITE DESCRIPTION Retaining Wa				GROUND WTR (ft)		<u> </u>	III No. 3 from -Y1RT- STA 29+35 to			GROUND WTR (ft)
BORING NO. RW3_8	STATION 33+08	OFFSET CL	ALIGNMENT -RW3-	<b>0 HR.</b> Dry	BORING NO. RW:	<u></u> 9	STATION 33+56	OFFSET 1 ft RT	ALIGNMENT -RW3-	<b>0 HR.</b> Dry
COLLAR ELEV. 2,600.2 ft	TOTAL DEPTH 27.3 ft	NORTHING 667,094	<b>EASTING</b> 819,928	24 HR. FIAD	COLLAR ELEV. 2	·	TOTAL DEPTH 35.7 ft	<b>NORTHING</b> 667,113	<b>EASTING</b> 819,971	24 HR. FIAD
DRILL RIG/HAMMER EFF/DATE GTC82		DRILL METHOD H.S	S. Augers HAMM	MER TYPE Automatic	DRILL RIG/HAMMER E	FI/DATE GTC82	255 CME-55 93% (11/24/2020)	DRILL METHOD	H.S. Augers HAMI	MER TYPE Automatic
DRILLER L. Wansrath	<b>START DATE</b> 03/12/21	COMP. DATE 03/12/21	SURFACE WATER DEPTH N/	/A	DRILLER L. Wans		START DATE 03/12/21	COMP. DATE 03/12/21	SURFACE WATER DEPTH N	/A
ELEV (ft) DEPTH BLOW COUN (ft) 0.5ft 0.5ft 0		75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft) DEPT (ft)	BLOW COUN 0.5ft 0.5ft 0		75 100 NO. MOI	L O SOIL AND ROCK DES	SCRIPTION
2600 2,600.2 0.0 12 6 2,597.7 2.5 2 2	4 . 10	D D	2,600.2 GROUND SURF  RESIDUAL  Medium stiff to very stiff, red and gray, SILT (A-4), wit	d, brown, orange	2605 2,603.2 0.0 2,600.7 2.5 2,598.2 5.0	5 3 2 3 3 2	4	.         м 🔯	2,603.2 GROUND SURI RESIDUAL  Medium stiff, red and oran  (A-5), with trace sand  2,598.7  Medium stiff to stiff, brow sandy SILT (A	ge, clayey SILT , saprolitic 4.
2595 2,595.2 5.0 4 7 2,592.7 7.5	7	D D	fragments and sand, micac  2,587.2 Dense, brown, red, and w	ceous, saprolitic	2,595.7- 7.5 2,593.2 10.0 2590 2,588.2 15.0	3   5	3 5 	M M	Salidy SiL1 (A	-4)
2585 2,585.2 15.0 10 18 2580 2,580.2 20.0 10 11			SAND (A-2-4), with trace SAND (received the same of th	clay, contains	2585 2,583.2 20.0 2580 2,578.2 25.0	5 8	15	M	2.585.2 Medium dense, brown a SAND (A-2-4), sa	nd white, silty prolitic
2575 2,575.2 25.0 50 100/0.3 2,572.9 27.3 60/0.0	1		2,575.2  2,572.9  Boring Terminated with Penetration Test Refusal 2,572.9 ft on Crystalline Ro A.R, at a depth of	S 27.3 h Standard ıl at Elevation ock (GNEISS).	2575 2,573.2 30.0 2570 2,568.2 35.0	42   80 100	0/0.4		2,577.7 WEATHERED F White and gray, migma	OCK
						50 100/0.4		100+	2,567.5  Boring Terminated at Eleva Weathered Rock (0	35. tion 2,567.5 ft in GNEISS)

BORE LOG					
WBS         38332.1.FS1         TIP         B-3186 / B-5898         COUNTY         HAYWOOD	GEOLOGIST N. Yacobi	<b>WBS</b> 38332.1.FS1	<b>TIP</b> B-3186 / B-5898 <b>COUNT</b>	Y HAYWOOD	GEOLOGIST N. Yacobi
SITE DESCRIPTION Retaining Wall No. 3 from -Y1RT- STA 29+35 to 40+54	GROUND WTR (ft)	SITE DESCRIPTION Retaining V	Wall No. 3 from -Y1RT- STA 29+35 to		GROUND WTR (ft)
BORING NO. RW3_10 STATION 34+04 OFFSET CL	<b>ALIGNMENT</b> -RW3- <b>0 HR.</b> 13.0	BORING NO. RW3_11	STATION 34+52	OFFSET 3 ft RT	<b>ALIGNMENT</b> -RW3- <b>0 HR.</b> 9.0
COLLAR ELEV.         2,605.6 ft         TOTAL DEPTH         27.4 ft         NORTHING         667,135	<b>EASTING</b> 820,014 <b>24 HR.</b> FIAD	COLLAR ELEV. 2,605.3 ft	TOTAL DEPTH 28.0 ft	<b>NORTHING</b> 667,153	<b>EASTING</b> 820,060 <b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF/DATE GTC8255 CIVE-55 93%(11/24/2020)  DRILL METHOD H.S	S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF/DATE GTO	08255 CME-55 93% (11/24/2020)	DRILL METHOD	H.S. Augers HAMMER TYPE Automatic
DRILLER   L. Wanstrath   START DATE   03/13/21   COMP. DATE   03/13/21	SURFACE WATER DEPTH N/A	DRILLER L. Wanstrath	<b>START DATE</b> 03/13/21	<b>COMP. DATE</b> 03/13/21	SURFACE WATER DEPTH N/A
ELEV (ft)   DRIVE   ELEV (ft)   O.5ft   SOIL AND ROCK DESCRIPTION	ELEV DRIVE DEPTH BLOW COU		T SAMP. L O NO. MOI G		
(ii) (ft) (ii) 0.5tt 0.5tt 0.5tt 0 25 50 75 100 NO. MOI G	ELEV. (ft) DEPTH (ft)	2610		, wor	_
2605 2,605.6 0.0 2 3 3 D	. 2,605.6 GROUND SURFACE 0.0 <b>RESIDUAL</b>	2605 2,605.3 0.0			2,605.3 GROUND SURFACE 0.0
2,603.1 2.5	- 2,603.6 Loose, red and brown, silty SAND (A-2-4) 2.0	II   2.602.8 <b>∔</b> 2.5 I I I	3	D	RESIDUAL 2.603.3 Loose, red, silty SAND (A-2-4), contains2.0
3 5 6 1 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Stiff to very stiff, gray, brown, and orange, SILT (A-4), with trace sand, micaceous,		5	.       D	trace roots/
1 6 6 9 1 15 1 D	saprolitic	2600 2,600.3 5.0 2 2	2 4	<del>                                      </del>	brown, SILT (A-4)
2,598.1 7.5	:	2,597.8 7.5 1 0	1   <u>                                  </u>		2,598.3 Soft to medium stiff, orange and brown, silty CLAY (A-7-6)  Very soft to medium stiff, orange and white,
2595 2,595.6 10.0 10 5 8 D		2595 2,595.3 10.0 2 2	3		Very soft to medium stiff, orange and white, SILT (A-4)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	- - 2,592.6 13.0		5		2 502 2
	Medium dense to dense, brown, tan, and white, fine silty SAND (A-2-4), micaceous,				2,592.3 13.0 Medium dense, orange, brown, and white,
2590 2,590.6 15.0 5 8 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	saprolitic	2590 2,590.3 15.0 5 11	7 • 18	- <del> </del>      w 🔯	fine silty SAND (Ă-2-4), saprolitic
				1 1 1 1 12:00	
2585 2,585.6 20.0 4 6 10	_	2585 2,585.3 20.0		.	<u></u>
4 6 10 1 M		3 4	9 • 13	W	2,580.3
			i		<del>-</del>
2580 2,580.6+ 25.0 15 17 20 037 MM	- -	2580 2,580.3 25.0 100/0.5	<u> </u>		
2.578.2 27.4 60/0.0 60/0.0	27.4 Boring Terminated with Standard			.   ]   🦸	Black, gray, and orange, GNEISS 27.9
	Penetration Test Refusal at Elevation	60/0.1		60/0.1	CRYSTALLINE ROCK GNEISS
	2,578.2 ft on Crystalline Rock (GNEISS). A.R. at a depth of 27.4'.				Boring Terminated with Standard
					Penetration Test Refusal at Elevation 2,577.3 ft in Crystalline Rock (GNEISS). A.R. at a depth of 27.9'.
	_				A.R. at a depth of 27.9'.
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		BORE LOG														
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN		GEOLOGIST N. Yacobi		WBS 38332						OUNTY HAY	VOOD			GEOLOGIST N. Yacobi	
	ng Wall No. 3 from -Y1RT- STA 29+35 t			GROUND WTR (ft)	SITE DESCR											GROUND WTR (ft
BORING NO. RW3_12	STATION 35+03	OFFSET 1 ft RT	1	<b>0 HR.</b> 10.5	BORING NO.				TATION 3			<b>T</b> 2 ft RT			ALIGNMENT -RW3-	<b>0 HR.</b> Dry
COLLAR ELEV. 2,608.3 ft	TOTAL DEPTH 40.0 ft	<b>NORTHING</b> 667,178	1	24 HR. FIAD	COLLAR EL				OTAL DEP		NORTH	IING 667			<b>EASTING</b> 820,147	24 HR. FIAD
DRILL RIG/HAMMER EFF/DATE	GTC8255 CME-55 93% (11/24/2020)	DRILL METHOD H.	S. Augers HAMMEI	RTYPE Automatic	DRILL RIG/HAI										S. Augers HA	MIMER TYPE Automatic
DRILLER L. Wanstrath	<b>START DATE</b> 03/13/21	COMP. DATE 03/13/21	SURFACE WATER DEPTH N/A	١	DRILLER L				TART DATI	E 03/13/21		DATE 0		!1	SURFACE WATER DEPTH	N/A
ELEV CRIP DEPTH BLOW (ft) 0.5ft (	COUNT BLOWS PER FO  .5ft 0.5ft 0 25 50	OT   SAMP.   L O NO.   MOI G	SOIL AND ROCK DESCI	RIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTH_ (ft)	0.5ft 0.	COUNT 5ft 0.5ft	0	BLOWS PE 25 50		100 NO	/	O 101 G	SOIL AND ROCK D	ESCRIPTION
2,608.3 0.0 2	2 3 45	D 838	- 2,608.3 GROUND SURFA(		2615										-	
2,605.8 2.5 3	3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Loose, red and brown, silty S	SAND (A-2-4)	2610 2.610.2	‡ ,,									F 2,610.2 GROUND SU	RFACE 0
2,603.3 5.0	3 2 5	D		4.5		ĪΙ	1 2	2 2	4			1 1	М		RESIDU.  Very soft to medium stiff	AL
	2 3 5	: :   : : : :     M   N   N   N   N   N   N   N   N	Medium stiff, red and orange	7.0	2,607.7	<del>+</del> 2.5 +	2	1 3				11	М	, []	brown, silty CLAY (A-7-6	s), with trace sand,
2600 2,600.8 7.5	1 2	·· ···	Soft, orange and brown, silty	CLAY (A-7-6)	2605 2,605.2	5.0	2 2	2 2	Ț. · · ·		· · · ·   · · ·		١,,	. [3	micaceo	us
2,598.3 10.0	1 2   1				2.602.7	† <sub>7.5</sub>			]   • 4				M		<b>-</b> -	
	$\begin{bmatrix} 1 \\ 1 \end{bmatrix} \begin{bmatrix} \mathbf{q} \\ \mathbf{q} \end{bmatrix} \begin{bmatrix} $		_ - 2,595.3	12.0	,	+ [	1 (	0 1	]   1			11	M		-	
2595	<del>                              </del>	<del>    </del>           <b> </b>	Soft to medium stiff, orange		2600 2,600.2	10.0	1 (	0 1	1	<del>  : : : :  </del>			М		_	
2,593.3 15.0	2 2 4	:: ::::     M	brown, SILT (A-4), with tra micaceous, saproli	race sand, litic		<u>†</u>						.			2,597.2	13
2590			2,590.3 Loose to very dense, black.	18.0	2595 2,595.2	15.0			1 1 1 1 1 1 1						Medium stiff, brown, or SILT (A-4), with trace s	
2,588.3 20.0	1		brown, silty SAND (A-2-4), saprolitic	micaceous,		Ŧ	1   3	3 2	<b>♦</b> 5			1 1	M	1	-	
7 2	3 4 7	M	saprolitic			Ŧ						-			2,592.2 Loose, gray and white	, fine silty SAND
2585			<u></u>		2590 2,590.2	20.0	2 3	3 3	1				l D	,	(A-2-4), sap	rolitic
2,583.3 7 25.0 5	5 8					‡			.\( \).						2,587.2	23
2580			<del>-</del> <del>-</del>		2585 2,585.2	‡ 25.0			:\:::			11			Stiff to hard, brown, rec (A-4), with trace sand ar	I, and white, SILT
2,578.3 30.0			<del>-</del> -		2303 2,303.2	<del>†</del> 23.0 †	3 !	5 8	13.				D	)	micaceo	
2,378.3 30.0 24	38 53		_			‡			: : <u>`</u> ``;						-	
2575					2580 2,580.2	30.0	44	14							_	
2,573.3 35.0	70 400/0 5		2,573.3	35.0		<u>†</u>	14 1	14 13	: : : :	27		11	D	)	_	
	72 100/0.5	· ·   · · 100+	WEATHERED ROO Dark brown with white, (			Ŧ				<del> </del>		-				
2570		M M	_		2575 2,575.2	35.0	6 6	6 26	1	32			l D	, 🎆	-	
2,568.3  40.0  60/0.0		60/0.0	Boring Terminated with			Ŧ				> _ ]		-				
			Penetration Test Refusal a 2,568.3 ft on Crystalline Roc	at Elevation	2570 2,570.2	‡400					S.(.:	11			-	
			A.R. at a depth of 40	0.0'.	2.568.0	I I	30 3	30 50	1				D	)	2.568.0	42
			<u>-</u>		2,568.0	1 422 6	0/0.0			<u> </u>	60	/0.0◆		\$0000	Boring Terminated	with Standard
NCDOI BORE DOUBLE BS186_GEO_SP1.GPJ NC_DOI.GDJ 8/11/21							0/0.0					0.0 -			Boring I erminated Penetration Test Refu- 2,568.0 ft on Crystalline A.R. at a depth	sal at Elevation Rock (GNEISS).

		BORE LOG													
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUNT		GEOLOGIST N. Yacobi		<b>WBS</b> 38332				B-5898 <b>COUN</b>		DD	GI	EOLOGIST N. Yao		
SITE DESCRIPTION Retaining Wa				GROUND WTR (ft)	SITE DESCR	IPTION F	Retaining Wall	No. 3 from -Y1F	RT- STA 29+35 to					GROUNI	D WTR (ft)
BORING NO. RW3_14	STATION 36+03	OFFSET CL	ALIGNMENT -RW3-	<b>0 HR.</b> Dry	BORING NO.	RW3_15	5	STATION 36-	+54	OFFSET	1 ft RT	Al	LIGNMENT -RW3-	0 HR.	Dry
COLLAR ELEV. 2,612.8 ft	TOTAL DEPTH 42.5 ft	<b>NORTHING</b> 667,228	<b>EASTING</b> 820,191	24 HR. FIAD	COLLAR ELE			TOTAL DEPTH		NORTHING		I .	<b>ASTING</b> 820,235	24 HR.	FIAD
DRILL RIG/HAMMER EFF/DATE GTC8	3255 CME-55 93% (11/24/2020)	DRILL METHOD H.S	S. Augers HAMM	MER TYPE Automatic	DRILL RIG/HAM	MER EFF./I	DATE GTC8255	5 CME-55 93% (11	1/24/2020)		DRILL METI-	HOD H.S. Aug	gers	HAMMER TYPE	Automatic
DRILLER L. Wanstrath	<b>START DATE</b> 03/13/21	<b>COMP. DATE</b> 03/13/21	SURFACE WATER DEPTH N/	/A	DRILLER L.	Wanstrati	h	START DATE	03/14/21	COMP. DA	<b>TE</b> 03/14/2	:1 SU	JRFACE WATER D	EPTH N/A	
ELEV (ft) DEPTH BLOW COULD (ft) 0.5ft 0.5ft 0		75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTH 0	BLOW COUNT .5ft 0.5ft 0.5		BLOWS PER FOO	OT 75 100	SAMP.	L   O   IOI   G	SOIL AND I	ROCK DESCRIPTION	
2615  2,612.8 0.0  2 2  2610  2,610.3 2.5  5 2  2,607.8 5.0  2 1  2605  2,605.3 7.5  1 1	2 4	M N N N N N N N N N N N N N N N N N N N	- 2,612.8 GROUND SURF RESIDUAL Very soft to medium stiff, b clayey SILT (A-5), mi	brown and red,	2620 2,617.8- 2615 2,615.3 2,612.8- 2610 2,610.3	2.5	2 2 3 2 4 5 2 2 3 2 1 2	,5°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°°				) N L 2.61	5.8 Loose, broven Stiff to medium and to very stiff to very stife.	UND SURFACE RESIDUAL wn, silty SAND (A-2-4) stiff, brown and red, cla SILT (A-5)	ayey
2,602.8 10.0 2 1 2600 2 1 2,597.8 15.0 1 2 2595 2,592.8 20.0 3 11 2590 2,587.8 25.0 4 5	2	M	Dense, red, brown, and wh (A-2-4), micaceous, s  2,589.8 Stiff to very stiff, red, brown SILT (A-4), with trace	saprolitic	2,607.8- 2605 2,602.8- 2600 2,597.8- 2595	15.0	2 2 2 2 2 3 2 3 4	\$\\ \frac{\psi_3}{4} \cdots \c			N N		SILT (A-4), WIT	h trace sand, micaceou saprolitic	us,
2585 2,582.8 30.0 2 3 2580 2,577.8 35.0 6 11	6	M M	-		2590 2,587.8- 2585 2,582.8-	35.0	22 10 21		931	100+	N	2,58	i2.8 <b>WEA</b> Gray, black an	White, silty SAND (A-2 saprolitic  THERED ROCK d red, GNEISS with SIL (A-4)	35.0
2,572 8 40.0 100/0.4 2,570.3 42.5 60/0.0		60/0.0	Black and white, migmat  Boring Terminated with Penetration Test Refusal 2,570.3 ft on Crystalline Ro A.R. at a depth of	titic GNEISS 42.5 h Standard il at Elevation ock (GNEISS).	2,577.8- 2,572.8- 2,572.8- 2,567.8-	45.0	20 20 25		45			<b>:</b> ::::↓	Dense, gray and	RESIDUAL I white, silty SAND (A-2 saprolitic  THERED ROCK red, GNEISS, with silt (	45.
NCDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 8/11/2					2565 2,564.9	1 1		J.4		400.		2,56	White a Boring Terr Penetration T 2,564.8 ft in Cr	TALLINE ROCK nd black, GNEISS minated with Standard est Refusal at Elevatio ystalline Rock (GNEISS a depth of 52.9'.	n

WEST SERVICE   The STANES AND   CONTINUE   WEST SERVICE   THE STANES AND   CONTINUE   WEST SERVICE   THE STANES AND   CONTINUE   WEST SERVICE   WEST SERV	BORE LOG			_					
DORLING NO. NY3_16	WBS         38332.1.FS1         TIP         B-3186 / B-5898         COUNTY         HAYWOOD	GEOLOGIST N. Yacobi		<b>-</b>				GEOLOGIST N. Yacobi	
COLLAR PLANE   SUPPLANE   SUPPL	SITE DESCRIPTION Retaining Wall No. 3 from -Y1RT- STA 29+35 to 40+54		GROUND WTR (ft)	SITE DESCRIPTION	ON Retaining Wall	No. 3 from -Y1RT- STA 29+35 to	0 40+54	GI	ROUND WTR (ft)
DRILLER   L. Vanshush	BORING NO. RW3_16 STATION 37+04 OFFSET 2 ft RT	ALIGNMENT -RW3-	<b>0 HR.</b> Dry	BORING NO. R	V3_17	STATION 37+55	OFFSET 3 ft RT	ALIGNMENT -RW3- 0	<b>HR.</b> 8.0
START DATE   03/14/21   COMP. DATE   03/14/21   COMP	·	· · · · · · · · · · · · · · · · · · ·					<b>NORTHING</b> 667,305	<b>EASTING</b> 820,322 <b>24</b>	HR. FIAD
ELEV   ONCE   PRINT   BLOWN SPER FOOT   BLOWN SP	DRILL RIG/HAMMER EFF/DATE GTC8255 CME-55 93% (11/24/2020)  DRILL	HOD H.S. Augers HAM	MINIER TYPE Automatic	DRILL RIG/HAMMER	REFF/DATE GTC825	5 CIVIE-55 93% (11/24/2020)	DRILL METHO	DD H.S. Augers HAMINIER T	YPE Automatic
W   (i)   W   0.8f		SURFACE WATER DEPTH	N/A				COMP. DATE 03/14/21	SURFACE WATER DEPTH N/A	
2003 T. 0.0 1 2 3 3 4 9	ELEV (ft)   DRIVE   BLOW COUNT   BLOWS PER FOOT   SAMI   S	/   O   SOIL AND ROCK DE			OTH BLOW COUNT 0.5ft 0.5ft 0.5		/		PTION
Residual   Loses from and true, sity SAND (A-24)   Lose from and true, sity SAND (A-24)   Lose from and true, sity SAND (A-24)   Lose from and true, sity SAND (A-24)   Lose from and true, sity SAND (A-24)	2,624.3 0.0			7					
2819 2 5 0 3 3 3 3 4 2 2 2 3 4 3 4 4 4 4 4 4 4 4 4	+				2 5 4	1 1 👿 9 1 1 1	· · · · · D	RESIDUAL	
2.619.3 5.0 4 3 4 4 7	$\begin{vmatrix} 2620 \end{vmatrix}$ $\begin{vmatrix} 3 \end{vmatrix}$ $\begin{vmatrix} 3 \end{vmatrix}$ $\begin{vmatrix} 3 \end{vmatrix}$ $\begin{vmatrix} 46 \end{vmatrix}$ $\begin{vmatrix} 1 \end{vmatrix}$ $\begin{vmatrix} 46 \end{vmatrix}$ $\begin{vmatrix} 1 \end{vmatrix}$ $\begin{vmatrix} 1 \end{vmatrix}$	2 6 1 9 8	4 5	1 10005	5 3 2 2		.       D		(112-4)
2615 2.618.5 7.5 2 3 9	2,619.3 5.0 4 3 4	Medium stiff, brown and or	orange, silty CLAY		0 2 3 2			Medium stiff, brown and tan, S	<u>ILT (A-4),</u> —— — <sup>4</sup> .
Ref   S   2614.37   10.0	2,616.8+ 7.5   1	. 🔀		2,621.3 7.	5	Ψ <sup>5</sup>		829222 <b>L</b> 2,021.0	7. (A-7-6) 8.
2810 2.609.3 15.0 2 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 1 2 2 1	2.614.3 10.0	Medium stiff, light gray, c	clayey SILT (A-4) —— 9.0	2620	1 1 1	).3	100/0.8	2.619.3 contains few rock fragments, m	nicaceous 9
2610 2.609.3 15.0 2 1 1 1				+	2 2 2	•		Gray, BOULDER	
2605 2,604.3 20.0 2 2 4 4 250	2610 +	Soft to medium stiff, red, b	brown, and black,					RESIDUAL Soft to very stiff, gray, orange, a	and black,
2605 2,604.3 20.0 2 2 4			and, micaceous	2,613.8 15	.0 1 2 2			clayey SILT (Ā-5), with trace micaceous, saprolitic	e sand,
2605 2,604.3 20.0 2 2 4 66	$ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot \cdot$	F					.	7.7.	
2600 2.599.\$\frac{5}{2.593.\$\frac{1}{2}}\$ 2.593.\$\frac{6}{3}\$ 2.593.\$\frac{1}{2}\$ 2.593.\$\frac{1}{2}\$ 3.593.\$\frac{1}{2}\$ 3.59	2.604.3 20.0	F		I <del>-</del>			<del>-    </del>		
2600 2.599.3 25.0 6 9 14 23 Medium dense, red, brown, and tan, silty SAND (A-2-4), micaceous, saprolitic  2595.3 29.0 60/0.0		1000T		+	2 1 2		·   · · · ·     W		
2.595.3	2600	Medium dense, red, brow	wn, and tan, silty						
2,595.3 29.0 60/0.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,595.3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 29.0. 2595. 3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 29.0. 3 5 11 2,593.8 435.0 58 100/0.3 5.593.8 435.0 58 100/0.3 5.593.8 435.0 58 100/0.3 5.593.8 435.0 58 100/0.3 5.593.8 435.0 58 100/0.3 5.593.8 435.0 58 100/0.3 5.593.8 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58 100/0.3 5.0 58	2,599.3 25.0 6 9 14		ous, saprolitic		.0 1 2 3				
2,595.3 29.0 60/0.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,595.3 ft on Crystalline Rock (GNEISS).  A.R. at a depth of 29.0'.  2,598.8 30.0 3 5 11						5		7.7.	
2,595.3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 29.0'.  2595  2,593.8—35.0  2595  2,593.8—35.0  3	2,595.31 29.0	Boring Terminated w	rith Standard	1 2000		1			
2595 2,593.8 35.0 58 100/0.3 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100		Penetration Test Refus 2,595.3 ft on Crystalline F	sal at Elevation Rock (GNEISS). of 29.0'	2,330.04 30	3 5 11	1 16	·   · · · ·         W		
		A.ix. at a deptific	01 29.0 .			-			
Brown and orange, GNEISS / Boring Terminated at Elevation 2,592.5 ft in				2,593.8+ 35	.0 58 100/0.3		· · · · · · · · · · · · · · · · · · ·	WEATHERED ROCK	35.
Weathered Roox (GMEISS)							100+\$	Brown and orange, GNE Boring Terminated at Elevation 2	ISS 2,592.5 ft in
		<u> </u>						<u> </u>	
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	SORE LOG Y HAYWOOD	GEOLOGIST R. Dugger		WBS	<b>3</b> 38332.1	FS1		TIP	P B-3186 / B-5898 COU	NTY HAYWO	OD		GEOL	OGIST R. Dugg	er	
SITE DESCRIPTION Retaining Wall No. 3 from -Y1RT- STA 29+35 to 4	40+54		GROUND WTR (ft)	SITE	DESCRIP	ΓΙΟΝ Re	etaining V	Wall No.	3 from -Y1RT- STA 29+35	to 40+54						UND WTR
BORING NO. RW3_18 STATION 38+07	OFFSET 1 ft RT	ALIGNMENT -RW3-	<b>0 HR.</b> 23.0	BOR	RING NO.	RW3_19		STA	<b>ATION</b> 38+58	OFFSET	2 ft RT		ALIG	NMENT -RW3-	0 HF	₹.
COLLAR ELEV. 2,633.5 ft TOTAL DEPTH 36.5 ft	<b>NORTHING</b> 667,333	<b>EASTING</b> 820,365	24 HR. FIAD	COL	LAR ELEV	2,635.	2 ft	то	TAL DEPTH 36.5 ft	NORTHING	<b>3</b> 667,35	59	EAST	ING 820,409	24 HF	<b>R.</b> F
DRILL RIG/HAMMER EFF/DATE GTC8255 CME-55 93% (11/24/2020)	DRILL METHOD H.S	S. Augers HAMM	/IER TYPE Automatic	DRIL	L RIG/HAMM	ER EFF/D/	ATE GTO	08255 OV	/E-55 93% (11/24/2020)	· ·	DRILL M	ETHO	D H.S. Augers		HAMMER TYP	E Automat
DRILLER L. Wansrath START DATE 03/24/21	COMP. DATE 03/24/21	SURFACE WATER DEPTH N/	/A	DRIL	LER L. W	/ansrath		STA	<b>ART DATE</b> 03/23/21	COMP. DA	TE 03/2	23/21	SURF	ACE WATER DE	PTH N/A	
DRIVE   CHAPTER   DEPTH   BLOW COUNT   BLOWS PER FOOT	T SAMP. V L O NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV (ft)	DRIVE DI	EPTH B (ft) 0.5	LOW CO	0.5ft	BLOWS PER F0	OOT 75 100	SAMP. NO.	MOI	0 1 G	SOIL AND RO	OCK DESCRIPTION	ON
2635	M M M M M M M M M M M M M M M M M M M	2,633.5 GROUND SURF RESIDUAL Medium stiff to stiff, brown, trace rock fragments, r  2,626.5  Medium stiff, brown and gr (A-7-6), with trace rock fr sand, micaceo  2,615.5  Medium stiff to stiff, brown, or SILT (A-4), micaceo  2,597.0  Boring Terminated at Elevat SILT	SILT (A-4), with micaceous	2635 2630 2625 2620 2615 2610	2,635.2 2,630.2 2,630.2 2,627.7 2,625.2 2,610.2 2,600.2	2.5 3 5.0 3 7.5 2 10.0 2 15.0 2 20.0 2 25.0 3	3 3 2 2 3 3 4	4	◆5			M M M M M M M M M M M M M M M M M M M		Medium stiff, bro  Medium stiff, bro  (A-7-6  Medium stiff to stiff  SILT (A-	vn and gray, silty , micaceous brown, tan, and 4), micaceous	CLAY  orange,

<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN	TY HAYWOOD	GEOLOGIST R. Dugger	<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN	JTY HAYWOOD	GEOLOGIST R. Dugger
	Wall No. 3 from -Y1RT- STA 29+35 to		GROUND WTR (ft)	SITE DESCRIPTION Retaining W			GROUND WTR (f
BORING NO. RW3 20	<b>STATION</b> 39+10	OFFSET 2 ft RT	ALIGNMENT -RW3- 0 HR. Dry	BORING NO. RW3 21	<b>STATION</b> 39+61	OFFSET 3 ft RT	ALIGNMENT -RW3- 0 HR. D
COLLAR ELEV. 2,637.7 ft	TOTAL DEPTH 31.5 ft	NORTHING 667,387	<b>EASTING</b> 820,453 <b>24 HR.</b> FIAD	COLLAR ELEV. 2,639.8 ft	TOTAL DEPTH 26.5 ft	NORTHING 667,412	<b>EASTING</b> 820,497 <b>24 HR</b> . FIA
DRILL RIG/HAMMER EFF/DATE GT		DRILL METHOD H	1, 1, 1	DRILL RIG/HAMMER EFF/DATE GTO		DRILL METHOD H	
DRILLER L. Wansrath	<b>START DATE</b> 03/24/21	COMP. DATE 03/24/21	SURFACE WATER DEPTH N/A	DRILLER L. Wansrath	START DATE 03/24/21	COMP. DATE 03/24/21	SURFACE WATER DEPTH N/A
ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP	DUNT BLOWS PER FOO	OT SAMP.	SOIL AND ROCK DESCRIPTION  ELEV. (ft) DEPTH (ft)	ELEV (ft) DRIVE ELEV (ft) DEPTH BLOW COU	JNT BLOWS PER FO		SOIL AND ROCK DESCRIPTION
2640			_	2640 0.0 3 5	5	M (30)	2,639.8 GROUND SURFACE RESIDUAL
2,637.7 + 0.0 2 3	6	-       M	_ 2,637.7	2,637.3 2.5 3 5	7		2.637.8 Stiff, brown and orange, SILT (A-4), with trace rock fragments and sand, micaceous
2635 2,635.2 2.5 5 4	6		Stiff, brown, tan, and orange, SILT (A-4), with trace sand and rock fragments,	2635 2,634.8 5.0	• • • • • • • • • • • • • • • • • • •		2,635.3 Medium dense, brown and orange, silty SAND (A-2-4)
2.632.7+ 5.0	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -		micaceous	2,632.37 7.5	4   •7 · ·   · · · ·   · · · ·	"" 🗨	2,632.8 Medium stiff, brown and orange, fine sandy SILT (A-4), with trace clay, micaceous
2630 2,630.2 7.5	4	·   · · · · ·     M		2630 2,629.8 10.0	5 . • 9	[: ::::   M	Stiff, brown and black, silty CLAY (A-7-6), micaceous
2.627.7+ 10.0	11 14		- <sub>2.628.2</sub> with trace sand, micaceous <sub>9.5</sub>	2,629.6 10.0 2 2	4	- ·   · · · ·     M	Medium stiff to stiff, brown and tan, SILT
2   3		-       м	Medium stiff, orange, brown, and tan, SILT (A-4), with trace rock fragments,				(A-4), with trace rock fragments, micaceous
2625			micaceous, saprolitic	2625 2,624.8 15.0 2 4	4		
2,622.7 15.0 2 3	3	.           M					- - -
2620	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			2620 2,619.8 20.0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		- -
2,617.7+ 20.0		.			9	· ·   · · · ·           M	
2615 2 1	3   64	·   · · · ·     M		2615	:#:: :::: :::		- -
T I I				2615 2,614.8 25.0 3 3	4		- - 2,613.3
2,612.7+ 25.0 2 1	1 4 1	-       м					Boring Terminated at Elevation 2,613.3 ft in SILT
2610							<u>-</u>
2,607.7 30.0		-					ļ.
2 2	4     •6	·   · · · ·     M	2,606.2 31.5  Boring Terminated at Elevation 2,606.2 ft in				-
			SILT				-
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WBS 393321FS1   TP B-3186 FB-5986   COUNTY   HAVMOOD   GEOLOGIST N. Dugger   STEEDESCRIPTION Rearing Wall No. 12 from 1715. TSA405-61-64-62-62-62-63-64-63-63-63-63-63-63-63-63-63-63-63-63-63-	
BORING NO. RW3_22   STATION 40-12   OFFSET 3   RTT   ALIGNMENT -RW3-   OFFSET 3   RTT   ALIGNMENT -RW3-   OFFSET 3   RTT   ALIGNMENT -RW3-   OFFSET 3   RTT   ALIGNMENT -RW12-   OFFSET 3   RTT   OFFS	
COLLAR ELEV. 2,641.6 ft	
DRILL RICHARD   FLATE   CITEZET O.N.E-76-89%(1912/2020)   DRILL METHOD   FLATE   COMP. DATE   O27/2721   OXMP. DATE	N/A
DRILLER   L Warstrath   START DATE   G3/24/21   SURFACE WATER DEPTH   N/A	FIAI
ELEV   CHIVE   DEPTH   BLOW COUNT   O.S.   O	
## Company   Com	
2645	
2641.6 GROUND SURFACE 0.0 2641.6 GROUND AND AND AND AND AND AND AND AND AND A	
26416 GROUND SURFACE 0.0 RESIDUAL PRESIDUAL 2.641.6 GROUND SURFACE 0.0 RESIDUAL 2.641.6 GROUND SURFACE 0.0 RESIDUAL 2.641.6 GROUND surface rock fragments and surface	C
2,641.6 ± 0.0 ± 0.	
2,633,1 2,5 7 8 9	ıd
2636	
2636   2634.1   7.5   2   3   3   3   4   4   6   5   5   5   6   5   5   6   5   5	
2630 2.631.6 10.0 3 4 4	
2630	
2625 2.626.6 15.0 3 3 5	15
2,626.6-15.0 3 3 5	ft in
2620 2 2 4 6 1.0	
2620 2 2 4 6 · · · · · · · · · · · · · · · · · ·	
2,616.6 - 25.0	
2,616.6 25.0	
1   2   3   6   1   6   1   6   1   7   1   1   1   1   1   1   1   1	
Boring Terminated at Elevation 2,615.1 ft in	

DocuSign Envelope ID: 86123A16-AEE1-4ABE-89EF-4BBDB461E75D

**CONTENTS** 

**DESCRIPTION** 

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLANS

**PROFILES** 

BORE LOGS

SHEET NO.

3-4

7-18

5898 186B ~ Ò REFERENCE

STATE OF NORTH CAROLINA

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

### **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_ **HAYWOOD** 

PROJECT DESCRIPTION US 23/US 74/US 19 (GREAT SMOKY MOUNTAIN HWY) FROM WEST OF NC 209 (BRABTREE RD.) TO EAST OF RUSS AVE. SITE DESCRIPTION RETAINING WALL #5 FROM -Y1RT- STA. 15 + 25.00 TO 26 + 12.97

STATE PROJECT REFERENCE NO. TOTAL SHEETS 18 B-3186/B-5898

#### **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 (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 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.

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

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

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DATE NOVEMBER 2021



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SIGNATURE

9/6/2023

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

PROJECT REFERENCE NO.

B-3186/B-5898

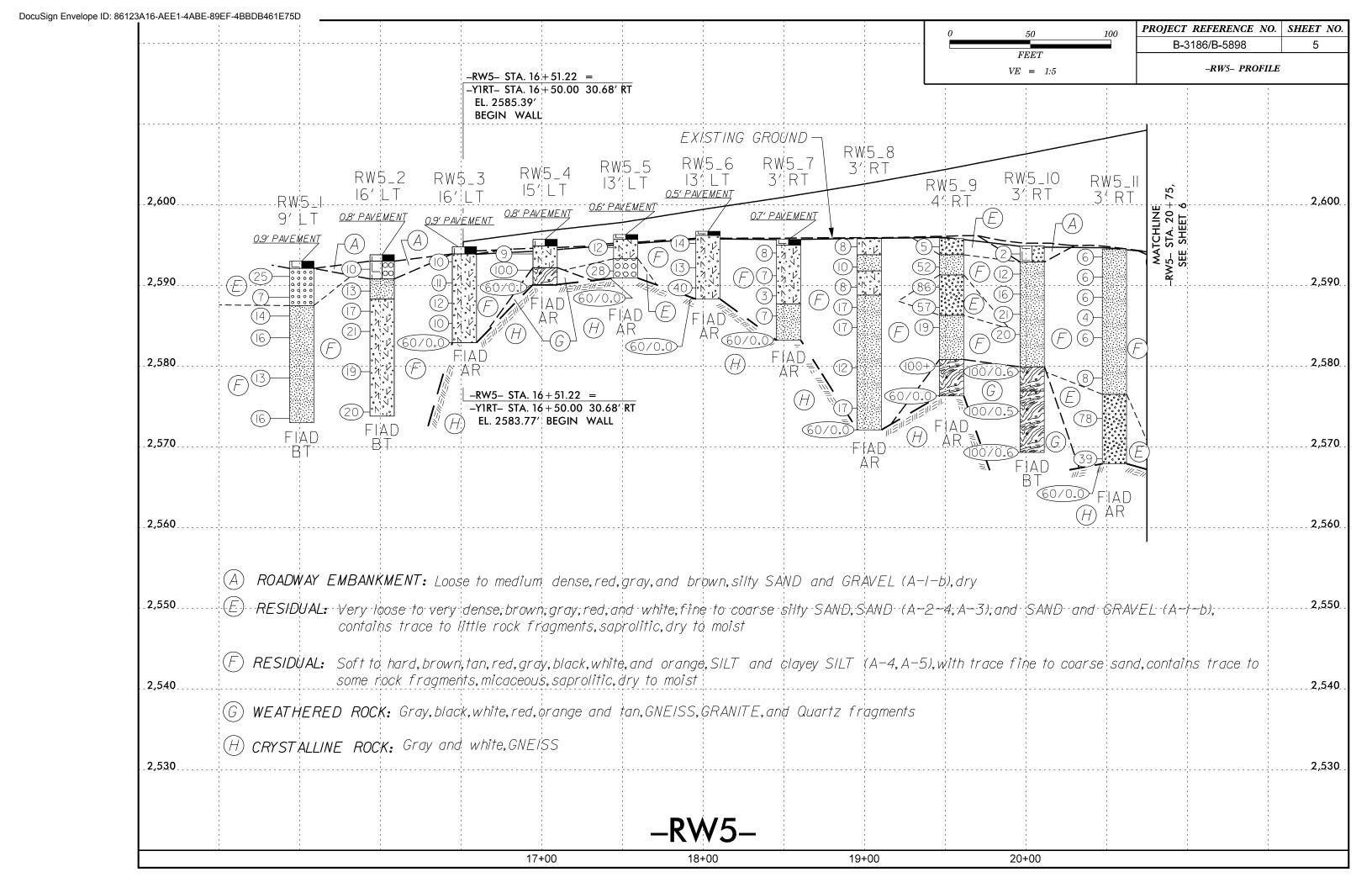
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# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

### 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.  UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	GAP-GRADED - 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, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
ULASS. (≤ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP 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-2-6 A-2-7 A-3-6 A-7 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK (NCR)  ROCK THEN WOLLD TELES OF THE TOTAL TELES.  ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR SILT- MUCK, *40 30 MX 50 MX 51 MN SOILS CALY PEAT	PERCENTAGE OF MATERIAL	CCP) SHELL BEDS, ETC.  WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
#2000 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY  ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING ALG	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
PASSING *40 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR	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, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE DECANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE  GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W W 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL AND SAND SAND SOILS SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN, RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	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	SPRING OR SEEP	WITH FRESH ROCK.  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	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,  IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.   LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	₩ITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL  SOIL SYMBOL  SOIL SYMBOL  SEPT DMT 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.	<u>LENS</u> - 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 AUGED POPING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
DENSE   30 TO 50	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 VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY   SOFT   2 TO 4   0.25 TO 0.5	INFERRED ROCK LINE MW MONITORING WELL TEST BORING	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 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TITES ALLUVIAL SOIL BOUNDARY A PIEZOMETER SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	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
HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	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 - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAV	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	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND (SL) (CL)		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(USE, SU.) (F SU.)	ABBRE VIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY  MOD MODERATELY  7 - UNIT WEIGHT  CPT - CONE PENETRATION TEST  NP - NON PLASTIC  7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION SOIDE FOR THEED HOLDSTONE BESCHIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS  DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
LL LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC   SEMISOLID: REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: N/A
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FEET
OM _ OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CL CONTINUOUS EL IGUT AUGED	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	BORING ELEVATIONS OBTAINED USING b3186_br0022_r4047_Merged_I-12-21.+in
ATTAIN OPTIMUM MOISTURE	CME-55   ==   COME 512E1	THINLY LAMINATED < 0.008 FEET  INDURATION	
PLASTICITY		INDURTHION  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	SITE 2 BORING ELEVATIONS OBTAINED FROM TRIMBLE RI2 GNSS RECEIVER CERTIFIED WITH FCC PART 15 (CLASS B DEVICE), 24, 32; RCM; PTCRB; BT SIG
PLASTICITY INDEX (PI) DRY STRENGTH  NON PLASTIC 0-5 VERY LOW	X CME-550X	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST CASING WY ADVANCER HAND TOOLS:	GENILE BLUW BY HAMMER DISINIEGRATES SAMPLE.	FIAD - FILLED IMMEDIATELY AFTER DRILLING
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG-CARB.	CRAINC ARE DISEIGNET TO SERARATE WITH STEEL PROPE.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CME-75 CORE BIT SOUNDING ROD VANE SHEAR TEST	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X MUD ROTARY	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
I		SHITTLE BREHKS ACKUSS GRAINS.	DATE: 8-15-14



23+00

24+00

25+00

26+00

21+00

22+00

	BORE LOG		1			
WBS 38332.1.FS1 TIP B-3186 / B-5898 C		GEOLOGIST C. Swafford	<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN		GEOLOGIST N. Yacobi
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA		GROUND WTR (ft)	SITE DESCRIPTION Retaining			GROUND WTR (ft)
<b>BORING NO.</b> RW5_1 <b>STATION</b> 15+52	OFFSET 9 ft LT	ALIGNMENT -RW5- 0 HR. Dry	BORING NO. RW5_2	STATION 16+54	OFFSET 16 ft LT	ALIGNMENT -RW5- 0 HR. Dry
COLLAR ELEV. 2,583.0 ft TOTAL DEPTH 20.0 ft	<b>NORTHING</b> 666,845	<b>EASTING</b> 818,199 <b>24 HR.</b> FIAD	COLLAR ELEV. 2,583.8 ft	TOTAL DEPTH 20.0 ft	NORTHING 666,847	<b>EASTING</b> 818,249 <b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF/DATE GTC CME 75 183277	DRILL METHOD	H.S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF/DATE GT	TC CME 75 183277	DRILL METHOD	H.S. Augers HAMMER TYPE Automatic
DRILLER K. Boone START DATE 02/25/21	COMP. DATE 02/25/21	SURFACE WATER DEPTH N/A	DRILLER K. Boone	START DATE 02/13/21	COMP. DATE 02/13/21	SURFACE WATER DEPTH N/A
ELEV (ft)	400     7   0	SOIL AND ROCK DESCRIPTION  ELEV. (ft)  DEPTH (ft)	ELEV (ft) DRIVE (ELEV (ft) (ft) 0.5ft 0.5ft		OT SAMP.  75 100 NO. MOI	C SOIL AND ROCK DESCRIPTION  G
2,582.1 0.9 8 16 9		2,583.0 GROUND SURFACE 0.0 2,582.1 0.9' PAVEMENT 0.9	11 + 1 - 1 ' 1	6 . •10		2,583.8 GROUND SURFACE 0.0 2,583.0 0.8' Pavement 0.8 POPUR ROADWAY EMBANKMENT
2580 2,579.5 3.5 6 4 3	M   0   0   0   0   0   0   0   0   0	RESIDUAL Loose to medium dense, brown, f-c SAND (A-3), contains trace rock fragments - 2,577.5	2580 2,580.3 3.5 5 6 2,577.8 6.0 4 7	713		ROADWAY EMBANKMENT  2.580.8 Loose to medium dense, red and brown, silty , 3.0  GRAVEL (A-1-b)  2.578.3 RESIDUAL  Stiff, red and brown, SILT (A-4), micaceous
2575 2.574.5+ 8.5	M M	Stiff to very stiff, brown, tan, and orange, SILT (A-4), micaceous	2575 2,575.3 8.5 3 8	13	D 1	Very stiff, gray, clayey SILT (A-5), micaceous, saprolitic
2570 2,569.5 13.5 3 5 8		- - - -	2570 2,570.3 13.5 3 8	11 • 19	M	7 \$ <del>1</del> 2 <del>1</del> 3 <del>1</del> 4 <del>1</del> 4 <del>1</del>
2565 2,564.5 18.5 4 7 9		- - - - - 2,563.0 20.0	2565 2,565.3 18.5 4 8	12 20		20.0 Boring Terminated at Elevation 2,563.8 ft in
VCDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 7/8/21		Boring Terminated at Elevation 2,563.0 ft in SILT				SILT

<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN	BORE LOG	GEOLOGIST N. Yacobi	<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COU	INTY HAYWOOD	GEOLOGIST N. Yacobi
	Wall No. 5 from -Y1RT- STA 15+2		GROUND WTR (ft)		Wall No. 5 from -Y1RT- STA 15+		GROUND WTR (#
BORING NO. RW5_3	<b>STATION</b> 16+52	OFFSET 16 ft LT	ALIGNMENT -RW5- 0 HR. Dry	BORING NO. RW5_4	<b>STATION</b> 17+02	OFFSET 15 ft LT	ALIGNMENT -RW5- 0 HR. Dr
COLLAR ELEV. 2,584.8 ft	TOTAL DEPTH 11.9 ft	<b>NORTHING</b> 666,842	<b>EASTING</b> 818,299 <b>24 HR.</b> FIAD	COLLAR ELEV. 2,585.7 ft	TOTAL DEPTH 5.7 ft	NORTHING 666,837	<b>EASTING</b> 818,349 <b>24 HR.</b> FIAI
DRILL RIG/HAMMER EFF/DATE G	TC CME 75 183277	DRILL METHOD	S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF/DATE G	TC CME 75 183277	DRILL METHOD	H.S. Augers HAMMER TYPE Automatic
DRILLER K. Boone	<b>START DATE</b> 02/13/21	COMP. DATE 02/13/21	SURFACE WATER DEPTH N/A	DRILLER K. Boone	<b>START DATE</b> 02/13/21	COMP. DATE 02/13/21	SURFACE WATER DEPTH N/A
BORING NO. RW5_3  COLLAR ELEV. 2,584.8 ft  DRILL RIG/HAMMER EFF/DATE G	STATION 16+52   TOTAL DEPTH 11.9 ft   TC CME 75 183277   START DATE 02/13/21   BLOWS PER FOO	OFFSET 16 ft LT  NORTHING 666,842    DRILL METHOD	ALIGNMENT -RW5- 0 HR. Dry EASTING 818,299 24 HR. FIAD S. Augers HAMMER TYPE Automatic SURFACE WATER DEPTH N/A SOIL AND ROCK DESCRIPTION	BORING NO. RW5_4  COLLAR ELEV. 2,585.7 ft  DRILL RIG/HAMMER EFF/DATE G	STATION 17+02   TOTAL DEPTH 5.7 ft    START DATE 02/13/21    UNT   BLOWS PER FO     0.5ft   0   25   50	OFFSET 15 ft LT  NORTHING 666,837    DRILL METHOD	ALIGNMENT -RW5-  EASTING 818,349  H.S. Augers  HAMMER TYPE Automatic  SURFACE WATER DEPTH N/A  SOIL AND ROCK DESCRIPTION  SOIL AND ROCK DESCRIPTION  2,585.7  GROUND SURFACE  2,584.9  0.8' Pavement  RESIDUAL  1 2,582.2  Stiff, red and gray, clayey SILT (A-5),

	E	BORE LOG												
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN	TY HAYWOOD	GEOLOGIST N. Yacobi		<b>WBS</b> 3833	2.1.FS1		TIF	P B-3186 / B-5898 COUN	TY HAYWO	OD	GE	OLOGIST N. Yacobi	
SITE DESCRIPTION Retaining V	Vall No. 5 from -Y1RT- STA 15+25 to	26+13		GROUND WTR (ft)	SITE DESCR	RIPTION Re	taining W	Vall No.	. 5 from -Y1RT- STA 15+25 to	26+13				GROUND WTR (ft)
BORING NO. RW5_5	STATION 17+52	OFFSET 14 ft LT	ALIGNMENT -RW5-	<b>0 HR</b> . Dry	BORING NO	. RW5_6		ST	<b>ATION</b> 18+03	OFFSET	14 ft LT	ALI	GNMENT -RW5-	<b>0 HR</b> . Dry
<b>COLLAR ELEV.</b> 2,586.3 ft	TOTAL DEPTH 5.4 ft	<b>NORTHING</b> 666,834	<b>EASTING</b> 818,399	24 HR. FIAD	COLLAR EL	<b>EV.</b> 2,586.	7 ft	то	OTAL DEPTH 8.4 ft	NORTHING	<b>3</b> 666,831	EAS	<b>STING</b> 818,450	24 HR. FIAD
DRILL RIG/HAMMER EFF/DATE GTO	3277 CME-75 83%(09/15/2020)	DRILL METHOD H.S	S. Augers HAMN	MER TYPE Automatic	DRILL RIG/HA	VIMER EFF./DA	ATE GTC:	3277 ON	VE-75 83% (09/15/2020)	•	DRILL METI-	HOD H.S. Auge	rs HAN	MIMER TYPE Automatic
DRILLER K. Boone	<b>START DATE</b> 02/13/21	COMP. DATE 02/14/21	SURFACE WATER DEPTH N	/A	DRILLER 14				ART DATE 02/14/21	COMP. DA	TE 02/14/2	21 <b>SUF</b>	RFACE WATER DEPTH	N/A
ELEV CRIPTION OF COLUMN (ft) CRIPTION OF COLUMN (ft) CRIPTION OF COLUMN (ft) CRIPTION OF C		75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTH BI (ft) 0.5	t 0.5ft	JNT 0.5ft	BLOWS PER FOO 0 25 50	OT 75 100	SAMP. NO.	L O MOI G	SOIL AND ROCK DI	ESCRIPTION
2590   2590   2590   2585   7   5   2582.8   3.5   5   11   2580   9   5.4   60/0.0   1   1   1   1   2   1   1   1   1   1	7 12 17 28	D	2,586.3 GROUND SURF  2,583.3 Stiff, red and brown, clayey trace gravel (question of the control	FACE 0.0 NT 0.6 SILT (A-5), with	2590 2585 2,586.2	0.5 5 3.5 5 6.0 4	4 4 11	10				MOI G	O.5' PAVEM  RESIDUA  Stiff to hard, red, brown, SILT (A-5), with trace f- fragments (quartz), mica	MENT AL , and gray, clayey -c sand and rock aceous, saprolitic  8.4 with Standard

<b>WBS</b> 38332.1.FS1		TY HAYWOOD	GEOLOGIST N. Yacobi	WBS 38332.1.FS1 TIP B-3186 / B-5898 COUNT	TY HAYWOOD	GEOLOGIST N. Yacobi
	Wall No. 5 from -Y1RT- STA 15+25 t		GROUND WTR (ft)	SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to		GROUND WTR (fi
BORING NO. RW5 7	STATION 18+53	OFFSET 2 ft RT	ALIGNMENT -RW5- 0 HR. Dry	BORING NO. RW5 8 STATION 19+03	1	ALIGNMENT -RW5- 0 HR. Dr
COLLAR ELEV. 2,585.7 ft	TOTAL DEPTH 12.5 ft	<b>NORTHING</b> 666,814	<b>EASTING</b> 818,499 <b>24 HR.</b> FIAD	COLLAR ELEV. 2,585.8 ft TOTAL DEPTH 23.7 ft	+	<b>EASTING</b> 818,550 <b>24 HR.</b> FIAI
DRILL RIG/HAMMER EFF/DATE	TC3277 CME-75 83% (09/15/2020)	DRILL METHOD H.S	S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE GTC3277 CVE-75 83%(09/15/2020)	DRILL METHOD H.S. A	Augers HAMMER TYPE Automatic
DRILLER K. Boone	<b>START DATE</b> 02/14/21	COMP. DATE 02/14/21	SURFACE WATER DEPTH N/A	DRILLER K. Boone START DATE 02/15/21	COMP. DATE 02/15/21	SURFACE WATER DEPTH N/A
ELEV (ft) DEPTH BLOW C	OUNT BLOWS PER FO t 0.5ft 0 25 50	OT SAMP. V L O NO. MOI G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	DRIVE   DEPTH   BLOW COUNT   BLOWS PER FOOT	75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION
2590				2590		2,585.8 GROUND SURFACE
2585 2,585.0 0.7 2 4	4		2,585.0 0.7' PAVEMENT 0.7  RESIDUAL	7 5 3 48	M N 2 2	RESIDUAL 2,583.8 Stiff, brown, clayey SILT (A-5), micaceous2
2,582.2 3.5 3 4			Soft to stiff, red and brown, clayey SILT (A-5), with trace gravel (quartz)	2,583.3	.	Medium stiff to stiff, brown and black, SILT (A-4)
2580 2.579.7 6.0	7	<del></del>	- -	2580 2,580.8 + 5.0 5 3 5	M N N 2	Stiff, red and brown, clayey SILT (A-5)
2.577.2			No recovery  2,577.7  Medium stiff, red and brown with white,	2,578.3 7.5 7 7 10	·   · · · ·	Stiff, red, brown, and tan, SILT (A-4),
2575 4 4	3	[	Medium stiff, red and brown with white, SILT (A-4), with few gravel (well-rounded quartz)	2,575.8 10.0 5 8 9		micaceous, saprolitic
2.573.2 12.5		60/0.0	2,573.2	†   0   0   1   1   1   1   1   1   1   1		
60/0.0		00/0.0	Boring Terminated with Standard Penetration Test Refusal at Elevation	2,570 2,570.8 15.0		
			2,573.2 ft on Crystalline Rock (GNEISS). A.R. at a depth of 12.5'.	2570 3 5 7	D	
			_	2,565 2,565.8 20.0 5 7 10		
				2,562 1 23 7		2,562.1 23
						Boring Terminated with Standard Penetration Test Refusal at Elevation 2,562.1 ft on Crystalline Rock (GNEISS). A.R. at a depth of 23.7'.

		BORE LOG										
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN		GEOLOGIST N. Yacobi		<b>WBS</b> 38332			<b>TIP</b> B-3186 / B-5898 <b>COUN</b>		D	GEOLOGIST N. Yacobi	
	Vall No. 5 from -Y1RT- STA 15+25 t			GROUND WTR (ft)				No. 5 from -Y1RT- STA 15+25 to				GROUND WTR (ft
BORING NO. RW5_9	STATION 19+54	OFFSET 3 ft RT	ALIGNMENT -RW5-	<b>0 HR.</b> Dry	BORING NO.	RW5_10		STATION 20+04	OFFSET 2	ft RT	ALIGNMENT -RW5-	0 HR. Dry
COLLAR ELEV. 2,585.8 ft	TOTAL DEPTH 19.5 ft	<b>NORTHING</b> 666,813	<b>EASTING</b> 818,600	24 HR. FIAD	COLLAR ELI			TOTAL DEPTH 25.6 ft	NORTHING		<b>EASTING</b> 818,651	<b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF/DATE GTO	08255 CME-55 93% (11/24/2020)	DRILL METHOD H.	S. Augers HAMN	MERTYPE Automatic	DRILL RIG/HAN	MER EFF/DA	ATE GTC825	5 CME-55 93% (11/24/2020)		DRILL METHO	OD H.S. Augers HA	MIMIER TYPE Automatic
DRILLER L. Wansrath	<b>START DATE</b> 03/14/21	<b>COMP. DATE</b> 03/14/21	SURFACE WATER DEPTH N	/A	DRILLER L	Wansrath		<b>START DATE</b> 03/16/21	COMP. DAT	TE 03/16/21	SURFACE WATER DEPTH	N/A
ELEV COLUMN (ft) DRIVE (ft) DEPTH BLOW COLUMN (ft) 0.5ft 0.5ft	UNT BLOWS PER FO  0.5ft 0 25 50	75 400     7   0	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTH BI	t 0.5ft 0.5		OT 75 100	SAMP. NO. MC	L O SOIL AND ROCK D	DESCRIPTION
2585 2,585.8 0.0 5 2 2,583.3 2.5 4 23 2,580.8 5.0 33 44 2,578.3 7.5 28 28 2,575.8 10.0 16 10	29	D D D D D D D D D D D D D D D D D D D	2,585.8 GROUND SURF RESIDUAL 2,583.8 Loose, brown, silty SAND some grave 2,581.3 Very stiff, brown and rec contains some rock f Very dense, brown and te SAND (A-2-4), contains fragments, sapr Very stiff, brown, SILT (A- sand	O (A-2-4), with	2,577.4	2.5 4 5.0 8 7.5 8 10.0 11	5 7 8 8 9 12	2 12 22 22 22 22	100/0.6	D D D D	Stiff to very stiff, brown, si  (A-4), with trace f-c s saproli	BANKMENT ty SAND (A-2-4) 2  AL black and red, SILT and, micaceous, tic  DROCK ANITE and quartz
2,570 8 15.0 62 90 2,566.3 19.5 60/0.0		-	2,570.8  WEATHERED R White and tan, GRANIT fragments 2,566.3  Boring Terminated wit	E and quartz  19.5 th Standard	2565 2,564.9 2560 2,559.9	25.0			- 100/0.5		2,566.9 WEATHERE Light tan and white, GF fragmer Dark brown, black, a	nts <u> 18</u> .
NCDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 11/5/21			Penetration Test Refusa 2,566.3 ft on Crystalline R A.R. at a depth of	lock (GNEISS).		- 69	31/0.1		100/0.6		Boring Terminated at Eli Weathered Roci	evation 2,559.3 ft in

								ORE																							
WB	<b>S</b> 38332.1.FS	S1		TIP	B-3186 /	B-5898	COUNT	Y HAYV	VOOD				GEOLOGIST N. Ya	cobi	_		WBS	38332	2.1.FS1			TIP	B-3186 / B-5898 <b>COUN</b>	TY HAYWO	OD		GEOLO	GIST N. Yao	cobi		
SIT	E DESCRIPTIO	N Reta	aining W				15+25 to	26+13							GROUND WT	R (ft)	SITE	DESCR	IPTION	Retain			5 from -Y1RT- STA 15+25 to							GROUND	WTR (ft)
во	ring no. Rw	/5_11		STA	ATION 20	)+55		OFFSE	<b>T</b> 2 ft	RT			ALIGNMENT -RW5	<i>,</i>	0 HR.	Dry	BOR	NG NO.	RW5_	12		STA	<b>ATION</b> 21+05	OFFSET	CL		ALIGNM	ENT -RW5-	-	0 HR.	18.0
	LLAR ELEV. 2				TAL DEPT			NORTH					<b>EASTING</b> 818,701		24 HR.	FIAD	COL	AR EL	<b>EV</b> . 2,5	83.9 ft		TOT	TAL DEPTH 28.0 ft	NORTHIN				<b>3</b> 818,751		24 HR.	FIAD
DRI	⊥ RIG/HAMMER I	EFF./DAT	E GTC	8255 CIV	<b>E</b> -55 93%(1	1/24/2020)			D	RILL ME	THOD	H.S. A	Augers	HAMIM	/IER TYPE Auton	ratic	DRILL	.RIG/HAN	/IMER EF	-/DATE	GTC8255	5 CME	E-55 93% (11/24/2020)		DRILL	METHOD	H.S. Augers		HAMIV	ERTYPE AL	utomatic
DR	<b>LLER</b> L. Wan	ısrath		STA	ART DATE	03/16/2	21	COMP.	DATE	03/16	/21		SURFACE WATER D	JEPTH N/	/A		DRIL	LER L					ART DATE 03/15/21	COMP. DA	ATE 03/	/16/21	SURFAC	E WATER D	EPTH N	A	
ELE (ft)			0.5ft		0 2		PER FOC			NO.	7 I	L O G E	SOIL AND	ROCK DES		PTH (ft)	ELEV (ft)	DRIVE ELEV (ft)			7 COUNT 0.5ft 0.5		BLOWS PER FOO 0 25 50	OT 75 100	SAMP NO.	MOI G		SOIL AND I	ROCK DES	CRIPTION	
258	5 2,584.5 0.0	4	2	4	4	l	1	-	-		D	-2		OUND SURF		0.0	2585	2.583.9	0.0								2,583.9		UND SURF		0.0
258	2,582.0 2.5 2,579.5 5.0	5	3	3	<b>1</b> 6						D M	ŧ	Medium stiff to SILT (A-4), with	stiff, red, bro	rown, and gray, sand and clay,		2580	2,581.4 2,578.9	İ	3	2 4		6			D L	2,581.9 N	Loose, gray a (A-2-6) ledium stiff, bro	AY EMBAN and brown, on the trace own, SILT ( ay, micaceon	clayey SAND gravel A-4), with trac	
257	2,577.0 7.5 2,574.5 10.0	2	2	2	•6, • • • • • • • • • • • • • • • •				·		D						2575	2,576.4 2,573.9	7.5	2	3 2	2	\$5			M L M L	2,574.4		ALLUVIAL	· <b>— — —</b> — -	9.
257	2,569.5 15.0	0		4	•6,				: : :		D						2570	2.568.9	_	2	1 2		<b>4</b> 3 · · · · · · · · · · · · · · · · · · ·			M	2,570.9 S	Soft, tan and light (A-5), confidery soft, dark of	ght grayish tains trace i <u>mottled</u> gray and bro	oot fragments	s, <u>13.0</u>
256	2,564.5 20.0	n	35		.•8				:		D D	2	Very dense, gra	ay and brown (A-2-4)	n, f silty SAND	18.0	2565	2.563.9	20.0	1	1 2		•3 · · · · · · · · · · · · · · · · · · ·		_	M		(A-7-6), conta	ins trace ro mottled	ot fragments,	
256	2,559.5 25.0	0 10	14			• • • • • • • • • • • • • • • • • • • •		78	-		D	-					2560	2,558.9		1	1 1				-	W	2.558.4	/ery dense, bro	own and wh	ite, SAND and b)	<u>23.0</u>
	2,557.9 26.6	60/0.0						<del>- L</del> 60	/o.o			- - - - -	Penetration 7 2,557.9 ft on C	minated with Test Refusal Crystalline Ro at a depth of	l at Elevation ock (GNEISS).	26.6		2,555.9 -	28.0	60/0.0	50 50/0	- 11		60/0.0	11		2,555.9		est Refusa	NEISS Standard at Elevation	28.0
XDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 11/5/21																												A.R. af	t a depth of	28.0'.	•

	BORE LOG TY HAYWOOD GEO	OLOGIST R. Dugger	WBS 38332.1.FS1 TIP B-3186 / B-5898 COUNT	Y HAYWOOD	GEOLOGIST R. Dugger
SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 t		GROUND WTR (ft)	SITE DESCRIPTION Retaining Wall No. 5 from -Y1RT- STA 15+25 to		GROUND WTR (fit
<b>BORING NO.</b> RW5 13 <b>STATION</b> 21+55		IGNMENT -RW5- 0 HR. Dry	<b>BORING NO.</b> RW5 14 <b>STATION</b> 22+06	OFFSET 13 ft LT	ALIGNMENT -RW5- 0 HR. Dr
COLLAR ELEV. 2,582.6 ft TOTAL DEPTH 34.0 ft		STING 818,802 24 HR. FIAD	COLLAR ELEV. 2,584.3 ft TOTAL DEPTH 23.0 ft	NORTHING 666,840	<b>EASTING</b> 818,851 <b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF./DATE GTC9083 CWE-550X 80%(11/24/2020)	DRILL METHOD H.S. Auge		DRILL RIG/HAMMER EFF/DATE GTC9083 CME-550X 80%(11/24/2020)	DRILL METHOD H.S	S. Augers HAMMER TYPE Automatic
DRILLER L. Wanstrath START DATE 02/13/21	COMP. DATE 02/13/21 SUF	RFACE WATER DEPTH N/A	DRILLER L. Wanstrath START DATE 02/13/21	COMP. DATE 02/13/21	SURFACE WATER DEPTH N/A
ELEV   DRIVE   DEPTH   BLOW COUNT   BLOWS PER FO	OT SAMP. V L O NO. MOI G ELEV.	SOIL AND ROCK DESCRIPTION  /. (ft) DEPTH (ft)	ELEV (ft)   DRIVE   DEPTH   BLOW COUNT   BLOWS PER FOOT	T SAMP. L O NO. MOI G	SOIL AND ROCK DESCRIPTION
2585		2.6 GROUND SURFACE 0.0	2585 2,584.3 0.0 5 3 5 4 6 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	.	-2,584.3 GROUND SURFACE (
2,582.6+ 0.0 2 4 4	M	ROADWAY EMBANKMENT Medium stiff to stiff, brown and orange, SILT (A-4), with some f-c sand and trace	2,581.8 2.5 8 10 17 2580 2,579.3 5.0 27		Loose to medium dense, brown, orange, and tan, SAND and GRAVEL (A-1-b)  2,579.8  RESIDUAL
2,577.6 + 5.0	D 2,575.	gravel (quartz), micaceous  5.6  Medium stiff, brown and orange, clayey  3.6  SILT (A-5), contains little rock fragments  (quartz), micaceous  ALLUVIAL  Medium stiff, brown, black, and gray, CLAY	2,576.8 7.5 8 13 20 333 2575 2,574.3 10.0 40 27 22 49	D D	Hard, brown, tan, orange, and white, SILT (A-4), with trace f sand and clay, saprolitic
2,567.6- 15.0		(A-7-6), with trace rock fragments, contains little organic matter  No recovery	2,569.3 15.0 13 29 71/0.3	100/0.8	2,568.8 UEATHERED ROCK Brown, tan and orange, GNEISS
2,562.6= 20.0	2,564.	4.6	2,564.3 20.0	100/0.4	WEATHERED ROCK Brown, tan and orange, GNEISS  2,561.3
2550 2550 2,557.6 - 25.0 2,552.6 - 30.0 2,552.6 - 34.0	2,557.	Medium dense, brown and tan, f-c silty SAND (A-2-4), contains little rock fragments, saprolitic  WEATHERED ROCK Brown and tan, GNEISS  34.0	2,561.3 23.0 00/0.0	60/0.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,561.3 ft on Crystalline Rock (GNEISS). A.R. at a depth of 23.0'.
2,548.6+ 34.0   60/0.0	60/0.0	Boring Terminated by Auger Refusal at Elevation 2,548.6 ft in Crystalline Rock (GNEISS). A.R. at a depth of 34.0'.  NOTES Split spoons at 15.0' and 30.0' resulted in no recovery			

		BORE LOG													
<b>WBS</b> 38332.1.FS1	<b>TIP</b> B-3186 / B-5898 <b>COUN</b>		GEOLOGIST R. Dugger		<b>WBS</b> 38332				ii	OUNTY HAYW	OOD			GEOLOGIST R. Dugger	
-	Wall No. 5 from -Y1RT- STA 15+25 to			GROUND WTR (ft)			etaining W		n -Y1RT- STA 15						GROUND WTR (ft
BORING NO. RW5_15	STATION 22+56	OFFSET 15 ft LT	ALIGNMENT -RW5-	<b>0 HR.</b> Dry	BORING NO.			STATION	23+07	OFFSET	15 ft LT	Т		ALIGNMENT -RW5-	0 HR. Dry
COLLAR ELEV. 2,583.4 ft	TOTAL DEPTH 30.4 ft	<b>NORTHING</b> 666,846	1	24 HR. FIAD	COLLAR ELI				<b>DEPTH</b> 20.7 ft	NORTHI				<b>EASTING</b> 818,951	<b>24 HR</b> . FIAD
DRILL RIG/HAMMER EFF/DATE GTO	C9083 CME-550X 80% (11/24/2020)	DRILL METHOD H	S. Augers HAMMER	RTYPE Automatic	DRILL RIG/HAN	MER EFF./DA	ATE GTO		X 80% (11/24/2020)				OD H.S. A	ugers HAN	MINIER TYPE Automatic
DRILLER L. Wanstrath	<b>START DATE</b> 02/13/21	COMP. DATE 02/13/21	SURFACE WATER DEPTH N/A	١	DRILLER L.				OATE 02/13/21	COMP. D			1 :	SURFACE WATER DEPTH	N/A
ELEV CRIP CHARACTER STATE OF THE SECOND CO. CRIP CHARACTE	0.5ft 0 25 50		SOIL AND ROCK DESCR	RIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTH BI	LOW COL		BLOWS PE 25 50		SAMF 00 NO.	-   /	0 0 0 G	SOIL AND ROCK DE	ESCRIPTION
2585 2,583.4 0.0 4 6 2,580.9 2.5	4 . 10	D	- 2,583.4 GROUND SURFACE - ROADWAY EMBANKI - 2,581.4 Loose to medium dense, brow	MENT wn, black, and 2.0	2585	4	6	6	112 1 1	:::: :::	:	D	LRS-	.582.6 GROUND SUF ROADWAY EMBA .580.6 Medium dense, brown, bl	NKMENT
2580 2,578.4 5.0 2 2 2,578.4 5.0 12 12 2,575.9 7.5	14 8 26	D D	orange, SAND and GRAVI RESIDUAL Medium dense to very dens white, f-c silty SAND (A-2-4		2580 2,580.1 2,577.6	5		5	10		.	39 25°	% <b>\</b>	SAND and GRAVI  RESIDUA  Stiff, brown and orange, f (A-7-6)(5), highly micac	EL (A-1-b) / L sandy, silty CLAY
2575 2,573.4 10.0 29 33	45	D D	- - - -		2575 2,575.1 2,572.6	11		52/0.3		100/0	· 1		2	.575.1 (gneiss)  WEATHERED  Brown and orange, GNI quartz fragm	ROCK EISS with some
2565	17 • 31	D	- - - -		2570 2,569.6 2565	13.0	37	63/0.5		100/1			2		
2,563.4 20.0 100/0.3 2560 2,558.4 25.0 100/0.3		100/0.3	- 2,563.4 - WEATHERED ROC - Tan and white, QUA - 2,560.4 - Gray and white with brown, Al	ARTZ	2,562.6	20.0 53	3 47/0.2			100/0	· []		2	.561.9  Boring Terminated at Elev Weathered Rock	20 vation 2,561.9 ft in (GNEISS)
2,553.4 30.0 100/0.4		100/0.5	- - - 2,553.0 Boring Terminated at Elevatio	30.4	-	-									
			Weathered Rock (AMPHI	IIBOLITE)											
			-  - -												
			<del>-</del>  - -												
12			- - - -												
1.GDT 8/12/			- - - -												
D D D D D D D D D D D D D D D D D D D			- - - -			<del> </del>									
G GEO SPI			- - - -												
NUBLE B318:			<del>-</del>  - -												
OT BORE DO			- - - -												
]			-		] ] -	+							-		

	BORE LOG										
	B-3186 / B-5898 <b>COUNTY</b> HAYWOOD	GEOLOGIST R. Dugger		<b>WBS</b> 383			TIP B-3186 / B-5898 COUN		G	GEOLOGIST N. Yacobi	
SITE DESCRIPTION Retaining Wall No. 8			-l `´l ŀ				/all No. 5 from -Y1RT- STA 15+2				GROUND WTR (ft)
_		ALIGNMENT -RW5-	-l '   1	BORING N				_		ALIGNMENT -RW5-	<b>0 HR.</b> Dry
	L DEPTH 15.2 ft NORTHING 666,8			COLLAR E			TOTAL DEPTH 9.1 ft	NORTHING 666		<b>EASTING</b> 819,051	24 HR. FIAD
DRILL RIG/HAMMER EFF/DATE GTC CME550)			IER TYPE Automatic	DRILL RIG/H	IAMMER EF	F./DATE GTO	COME 550X 9083	DRILL	METHOD H.S. A	Augers H/	AMMER TYPE Automatic
			/A	DRILLER			<b>START DATE</b> 02/15/21	COMP. DATE 02	<del>, , , , , , , , , , , , , , , , , , , </del>	SURFACE WATER DEPTH	N/A
BORING NO. RW5_17   STAT	OFFSET 19 ft LT	ALIGNMENT -RW5-  1 EASTING 819,000  THOD H.S. Augers HAMM  5/21 SURFACE WATER DEPTH N/	O HR. Dry  24 HR. FIAD  IER TYPE Automatic  /A  CRIPTION  DEPTH (ft)  ACE 0.0  KMENT  orange, SAND 2.0  1-b) 2.5  brown, tan and with trace clay, 7.5  OCK  GNEISS  15.2  ion 2,567.3 ft in	BORING N COLLAR E DRILLER ELEV C(ft)  2585  2580  2,578. 2,576.	O. RW5_ LEV. 2,5  AMMER EF  K. Boone  E DEPTH (ft)  1 0.0  6 2.5  1 5.0  6 7.5  0 9.1	BLOW COUN  0.5ft 0.5ft 0	STATION 24+07   TOTAL DEPTH 9.1 ft	OFFSET 10 ft LT  NORTHING 666  COMP. DATE 02  T75 100 NO.	METHOD H.S. A  /15/21 S  /15/21 S  // MOI G	EASTING 819,051  Augers HV  SURFACE WATER DEPTH  SOIL AND ROCK I  RESIDL  Stiff, brown, classy Siltrace from taking trace from the surface of	24 HR. FIAD  AMMER TYPE Automatic  N/A  DESCRIPTION  DESCRIPTION  DIRACE  (A-5), micaceous, ck fragments  (A-4), saprolitic  7.5  D ROCK  JEISS  JEIS
NCDOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.G											

		ORE LOG						
<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUNT	TY HAYWOOD	GEOLOGIST N. Yacobi	_	<b>WBS</b> 38332.1.FS1	TIP B-3186 / B-5898 COUN	TY HAYWOOD	GEOLOGIST N. Yacobi
SITE DESCRIPTION Retaining	Wall No. 5 from -Y1RT- STA 15+25	1		GROUND WTR (ft)	SITE DESCRIPTION Retaining	Wall No. 5 from -Y1RT- STA 15+2	1	GROUND WTR
BORING NO. RW5_19	STATION 24+58	OFFSET 10 ft LT	ALIGNMENT -RW5-	<b>0 HR.</b> Dry	BORING NO. RW5_20	STATION 25+08	OFFSET 15 ft LT	ALIGNMENT -RW5- 0 HR.
COLLAR ELEV. 2,580.8 ft	TOTAL DEPTH 16.2 ft	<b>NORTHING</b> 666,866	<b>EASTING</b> 819,101	<b>24 HR.</b> FIAD	<b>COLLAR ELEV.</b> 2,581.6 ft	TOTAL DEPTH 18.8 ft	<b>NORTHING</b> 666,879	<b>EASTING</b> 819,149 <b>24 HR.</b> FI.
DRILL RIG/HAMMER EFF./DATE G	FTC CME 550X 9083	DRILL METHOD H	S. Augers HAMIN	MER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE GT	TC CME 550X 9083	DRILL METHOD	D H.S. Augers HAMMER TYPE Automat
DRILLER K. Boone	<b>START DATE</b> 02/15/21	COMP. DATE 02/15/21	SURFACE WATER DEPTH N	I/A	DRILLER K. Boone	<b>START DATE</b> 02/14/21	COMP. DATE 02/14/21	SURFACE WATER DEPTH N/A
ELEV DRIVE ELEV (ft) DEPTH BLOW COID (ft) 0.5ft 0.5ft		75 100 NO. MOI G	SOIL AND ROCK DES	CCRIPTION DEPTH (ft)	ELEV Cft DEPTH ELEV (ft) DEPTH (ft) BLOW COU		75 100 NO. MOI	C SOIL AND ROCK DESCRIPTION
2585 2580 2,580.8= 0.0 2,578.3	3 5 	M N N N N N N N N N N N N N N N N N N N		tan, and white, ins trace rock	2585 2,581.6 - 0.0 2,579.1 2.5 4 3 2,576.6 - 5.0	3 5 		2,581.6 GROUND SURFACE  RESIDUAL  Medium stiff to stiff, brown, tan, and orange, clayey SILT (A-5), micaceous
2575 2,575.8 5.0 3 4 2,573.3 7.5 2 5 2570 1 3 2565 2,565.8 15.0 1 9	6 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	M 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	- - - - - - - - - - - - - - - - - - -	16.0	2575 2,574.1 7.5 4 6 2,571.6 10.0 5 7 2,566.6 15.0 7 13	7	M M	Very stiff to hard, tan, white, and brown, silty CLAY (A-7-6), highly micaceous, saprolitic
	60/0.2	100+	2,564.6/\ WEATHERED R	OCK \(\sum_{16.2}\)			-+    1	- 2.563.5 - 2.562.8 WEATHERED ROCK
NODOT BORE DOUBLE B3186_GEO_SPT.GPJ NC_DOT.GDT 7/8/21			Boring Terminated with Penetration Test Refusal 2,564.6 ft in Weathered R	l at Elevation	60/0.0		100/0.7	Brown, white, and tan, GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,562.8 ft on Crystalline Rock (GNEISS). A.R. at a depth of 18.8'.

								D	<u>ORE L</u>	<u>UG</u>							
WBS 3	38332	.1.FS1			ТІ	<b>IP</b> B-3186 /	B-5898	COUNT	r HAYWO	DC			GEOLOGI	ST N. Yaco	bi		
SITE DE	ESCR	IPTION	Ret	aining	Wall 1	No. 5 from -Y	1RT-ST	A 15+25	to 26+13							GROUNI	O WTR (ft)
BORING	G NO.	RW5	_21		S.	TATION 25	+58		OFFSET 5	ft LT			ALIGNME	NT -RW5-		0 HR.	14.5
COLLA	R ELE	<b>V.</b> 2,	582.4	ft	T	OTAL DEPTI	<b>1</b> 32.5 ft		NORTHING	666,8	77		EASTING	819,201		24 HR.	FIAD
DRILL R	IG/HAI	/IMER E	FF./DA	TE G	TC CME	E 550X 9083				DRILL N	/IETHO	D H.	S. Augers		HAMME	R TYPE	Automatic
DRILLE	ER K.	Boone	<del></del>		S.	TART DATE	02/14/2	1	COMP. DA	TE 02/	14/21		SURFACE	WATER DE	PTH N//	Α	
CLE V   E	ORIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft		0 25	BLOWS P		75 100	SAMP. NO.	MOI	L O G	ELEV. (ft)	SOIL AND RO	OCK DESC	RIPTION	DEPTH (f
2585	- ,582.4	- - - 0.0										-	2,582.4		ID SURFA	CE	0.
2580	-	-	3	2	4	6	· · · · ·				М	2.72	-	lium stiff, brow	<b>LUVIAL</b> n, clayey S nd, micace	ILT (A-5), v	
2,	,577.4	5.0	3	2	3						М			Medium stiff, gr			6.3
2575 2,	,574.9 - .572.4	-	2	1	2	<b>4</b> 3 · · · ·					м		2,57 <u>5</u> .4 Soft	Loose, gray, to stiff, gray, C nd lenses, cont	LAY (A-7-	6), with few	
2570	- -	- - -	2	3	2	5		· · · · ·			M		-				
2, 2565	,567.4 - -	15.0 -	7	6	6						Sat.		-2,564.4				18.0
'	- 562.4-	20.0	3	5	15						Sat.	2.2.2.2		ry stiff to hard, red, clayey S	SIDUAL gray, brow ILT (A-5),	m, white, and saprolitic	
2560	_ - 557.4_	- - 25.0	14	18	43							X	-				
2555	- - -552.4	20.0						. ¶61 . . I . I				X	_				
`	.549.9		18	35	65/0.5	1		·	100/1.0	,			2,551.9 _2,549.9 Bi	WEATH	IERED RO		30.9 S 32.9
			60/0.0											Boring Terming Penetration Test 549.9 ft on Cryst A.R. at a	t Refusal a	at Elevation k (GNEISS	

MPC	20222	FC4		7.	<b>D</b> D 0400	2 / D 5000			HAYWO			CEC	OGIST C.	Cueffered			<b>WBS</b> 3833	0 4 504			7	<b>D</b> D 0400	/ D. E000	COLINITY	/ HAYWO	)D			GEOLOGIST C. Swaffor	.d	
	38332.1				<b>P</b> B-3186				HAYWO	OD		GEO	LOGIST C.	Swafford	ODOLIND I	A/TD (f4)				0/110		P B-3186			HAYWOO	טט			<b>SEULUGIST</b> C. Swaffor		ND MED (6)
			US 23/ US				n Highv		OFFOFT.	44 (1 DT		41.10	NIBATAIT N	4DT	GROUND \	` '	SITE DESC			3/ US	<del>`</del>			<del></del>	OFFOFT	- 0 I T			NI IONIMENT WART		ND WTR (ft)
	ING NO.			_	TATION 2				OFFSET			_	NMENT -Y		0 HR.	22.0	BORING NO					ATION 2			OFFSET				ALIGNMENT -Y1RT-	0 HR.	
	LAR ELE\				OTAL DEF				NORTHING			I	<b>ING</b> 819,2		24 HR.	FIAD	COLLAR EI					TAL DEP			NORTHING				<b>EASTING</b> 819,274	24 HR.	FIAD
			DATE GTO			`						Mud Rotary			/IMERTYPE Au	tomatic	DRILL RIG/HA			E GIC				<u> </u>				D H.S. A.		HAMMER TYPE	Automatic
	LER K.				TART DAT				COMP. DA				ACE WATE	R DEPTH	N/A		DRILLER					ART DAT			COMP. DA			s	SURFACE WATER DEPT	H N/A	
ELEV (ft)	DRIVE ELEV (ft)	EPTH (ft) 0	BLOW CO		0	BLOW 25	S PER 50	FOOT	5 100		MOI C	)		ND ROCK DE		DEPTH (ft)	ELEV DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		0		PER FOOT	75 100	SAMP.	MO	0 I G	SOIL AND ROC	K DESCRIPTION	N
2605																	2585	5 <del>- 0.0</del>										2,5	584.6 GROUND	SURFACE	0
	‡											ţ						İ	5	7	4	11					М	<u>L</u> :- 2,5	583.6 <b>ROADWAY E</b> Medium dense, brown	MBANKMENT n, f SAND (A-2-4)	l), with/ —1
2600	‡											2,600.4	(	ROUND SUF	RFACE	0.0	2,582.	1 2.5	3	4	4	. 68					М			gravel	í i
2600	2,599.4		11 20	16							мЬ	2,599.4		1.0' PAVEMI	NKMENT	1.0	2580 2,579	5.0	6	5	6	1					М	2,3	Loose to medium de	ense, gray, f-c SA	AND — 4
	2.596.5	3.9										2,596.9		DWAY EMBA	NKMENT		2,577.	1 7.5				711 .							(A-:	2-4)	
2595	2.594.6		6 4	4	98		-   -				м	ν. 	1 Dense	, brown, GRA f orange and	<u>VEL (A-1-b)</u> brown with black		2575	+ 3+ 10.0	3	3	3	<b>•</b> 6		1 : : : :			Sat.		574.6		10.
	2,594.6	5.6	6 3	3	6.						мЬ	ÿ: <u> </u>	clayey	SILT (A-5), wit	brown with black	,	2,574.	7 10.0	3	2	2	<b>4</b> · · ·				SS-513	51%		ALLÜ	JVIAL	
	2,591.5		4	<u> </u>	}:::	.												Ŧ				j: : : :	: : : :				$\Box$	1 V 2,5	Soft, gray, SILT ( <i>A</i>		13.
2590	‡		4 3	4	<b>●</b> 7					-	М	2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2					2570 2,569	3 15.0		111011		ļ		ļ · · · ·					Very loose, gray, f mica	silty SAND (A-2- ceous	-4),
	‡					.						<b>:</b> :						‡	1	WOH	1	1: : : :	: : : :				W 28%				
2585	2,586.5	13.9	3 2	3	1 1 1						l M F						2565	‡				i:::::	: : : :					2,5	566.6Soft, gray, f sandy S	ILT (A-4), micace	<u> </u>
2365	†				<del>  V</del> 5					1	""   <u> </u>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					2,564	3 20.0	1	1	2	1	<del> </del>				l w			, ,	
	2.581.5	100			4	.						7.37.37.						<u> </u>				3					**	2.5	561.6		23.
2580	2,381.3	10.9	3 3	4	7		-   -				м	<u> </u>					2560	+ 3+ 25.0				++5		1 : : : :				me -	RESI Very stiff, brown and	DUAL orange f sandy	
	l Ŧ				-							2,578.4				22.0	2,559.	7 25.0	4	7	11		8	T			w	<b>F</b>		eous, saprolitic	SILI
	2,576.5	23.9			: : : :	.					000	2,573.4	Very loos	ALLUVIA e to loose, gra	<b>L</b> ay, SAND (A-3),			‡													
2575			4 4	5	9					41	W		,	micaceou	is		2555	30.0										2,5	554.6		30.
					:j::::	.					000	2,573.4	Soft to medi	um etiff gray	sandy SILT (A-4	27.0	, , ,	‡	90	10/0.1	]	: : : :			100/0.6				<b>WEATHER</b> Brown, orange, a	RED ROCK nd white GNEIS	
	2,571.5		3 3	1		.					l w	t	contains tra	ce wood fragm	nents, micaceou	s,		<u> </u>										V/2=/			
2570	+			'	•4		+ -			-	<sup>vv</sup>	H		organic od	ior		2,550.	1 <u> </u>	60/0.0						60/0.0	+	+	2,5	550.1 Boring Terminat	ted with Standard	34. d
	l Ŧ						-   -					<b>F</b>						Ŧ										l F	Penetration Test F 2,550.1 ft on Crysta		
2565	2,566.5	33.9	1 3	3							l w 🖹	Į.						Ŧ										F	-		,
2000	‡									11		T .						‡											Other Samples: ST-4 (15.0 - 17.0)		
	2,561.5	38 9				.						Į.						‡													
2560	2,501.5	50.9 W	VOH 1	2	<b>•</b> 3	-				SS-300	43%	Ł						<u> </u>										l Ł			
	1					1::::						2,558.4				42.0		<u>†</u>										1 -			
	2,556.5	43.9	10 07	1 22	::::		[ ] [					7	Hard, tan	RESIDUA and brown, sa	ndy CLAY (A-7),			Ŧ										F			
2555	‡		18 27	33			-   - '	<b>●</b> 60			W	\$	contains tra	ce rock fragm saprolitio	ents, micaceous	5,		‡										-			
/21	‡							: :				3		oapi ontic				‡													
3550	2,551.5	48.9	32 68/0.3	3	::::			!+		1		2,540.0		WEATHERED	ROCK	48.9		‡													
2550	‡						+-		100/0.8	1		計	Brov	vn, GNEISS, n				‡										-			
DOT.0	25465	E2 0			: : : ;	.	:   :											<u>†</u>													
2545	2,546.5	JJ.9	86 14/0.0	र्ग	[				100/0.5	<u> </u>								$\pm$										F			
GPJ I	Ŧ					. T												Ŧ										F			
	2.541.5	58.9				1	-   -			11								‡													
2540	<del> </del>		79 21/0.0	)		.	-   -		100/0.5	•		2,540.0	Doring T-	singted at El	rotion 0 E40 0 ft	60.4		‡													
GEO	‡											ţ.	Donnig Fern	inated at Elevathered Rock	vation 2,540.0 ft (GNEISS)	III1		‡													
1186	‡											ţ						‡													
B31	+											F						+										-			
UBLE	Ŧ											F						Ŧ										F			
ΙDO	‡											F						Ŧ													
SORE	‡											F						‡										-			
OT E	‡											ţ						‡													
NCD	+											+						+										1 +			