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STATE OF NORTH CAROLINA

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

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STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CHATHAM				
PROJECT DESCRIPTION.	CHATHAM	PARK	WAY	FROM
US 15-501 TO US 64				

SITE DESCRIPTION BRIDGE NO. 180B01 ON SR 2700 (CHATHAM PARK WAY) OVER UNNAMED TRIBUTARY TO ROBESON CREEK -L- STA. 76+49 STATE PROJECT REFERENCE NO. R-5963A

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE 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 METHOL. 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 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 OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT, THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

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

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

P. PERRY, E.I.T. T. WENNER, P.G. CG2 EXPLORATION

INVESTIGATED BY <u>CG2, PLLC</u>

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DATE __DECEMBER 2024



Prepared in the Office of: CAROLINAS GEOTECHNICAL GROUP 2400 CROWNPOINT EXECUTIVE DRIVE

SUITE 800 CHARLOTTE, NC 28227 (980) 339-8684



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SIGNATURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REPERENCE NO. SHEET NO. 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

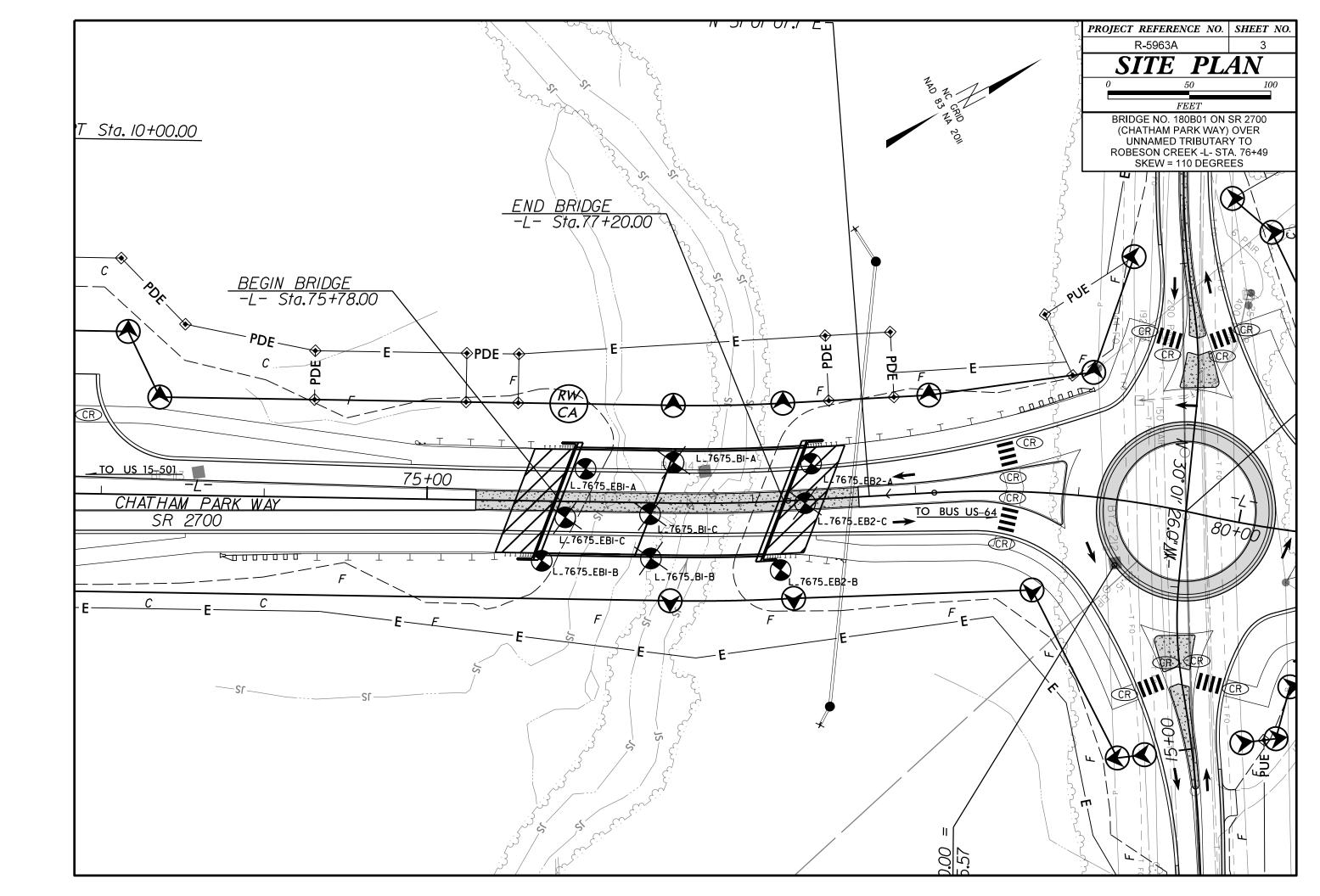
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. 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 DI586). 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:	NI//EI//A	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 CRYSTA	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (5 30% PASSING "2000) (> 30% PASSING "2000)	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.	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-b A-2-4 A-2-5 A-2-6 A-2-7 B-2-7 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. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL COCCORDORO	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
808080808080808	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING 10 50 MX SILT- GRANULAR SILT- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN 5 MX 51 MN 50 MX 50	GRANULAR SILT - CLAY	WEATHERING	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL 35 PIA 12 PIA 135 PIA 35 PIA 35 PIA 35 PIA 35 PIA 35 PIA 36 PIA	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 HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	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 LITTLE OR HIGHLY	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.
CROUP INDEX A A A MY 9 MY 12 MY 16 MY NO MY AMOUNTS OF ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
UISINI TYPES CTONE EPAGS ORGANIC SUILS	√ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND SOLIC SOLIC SOLIC SOLIC	▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	✓ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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 AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	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 (N-VALUE) (TONS/FT ²)	WITH 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 < 4	SOIL SYMBOL SPI ONT TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A	M	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. 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	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	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	MW - TEST DODING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY	INFERRED ROCK LINE MONITORING WELL WITH CORE	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE)	→ PIEZOMETER SPT N-VALUE	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.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK. 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	UNSUITABLE WASTE	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
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(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	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	AR - AUGER REFUSAL MED MEDIUM YST - 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.	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 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.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION 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 TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	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.	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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC PLASTIC PROVIDE ADVING TO	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.
BANGE - WET - (W) SEMISULID; REQUIRES DRIVING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS FRAGMENTS TCR - TRICONE REFUSAL TCR - TRICONE REFUSAL TCR - TRICONE REFUSAL TCR - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK:
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	DENCH MHAN:
ON CONTINUE - 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	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	ROADWAY DESIGN FILES PROVIDED BY NCDOT DATED 07/18/2024.
ATTAIN UPTIMUM MUISTURE	6 CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	BRIDGE BORING COLLAR ELEVATIONS OBTAINED USING CARLSON BRX7 (SURVEY GRADE GPS).
PLASTICITY	X 8' HOLLOW AUGERS -BH	INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	X CME-550X HARD FACED FINGER BITS X-N Q	DURRING WITH FINGED EDEES NUMEROUS GRAINS.	CT = CORING TERMINATED
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST VANUE OF THE PROPERTY HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	REF = REFUSAL
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	NM = NOT MEASURED
COLOR	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
	X DIEDRICH D-50 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). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X CORE BIT VANE SHEAR TEST	SHARP HAMMER BLOWS REGISTRED TO RREAK SAMPLE.	
HODELIENS SUCH AS LIGHT, DANK, STILLANED, ETC. HRE USED TO DESCRIBE HEFERRANCE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

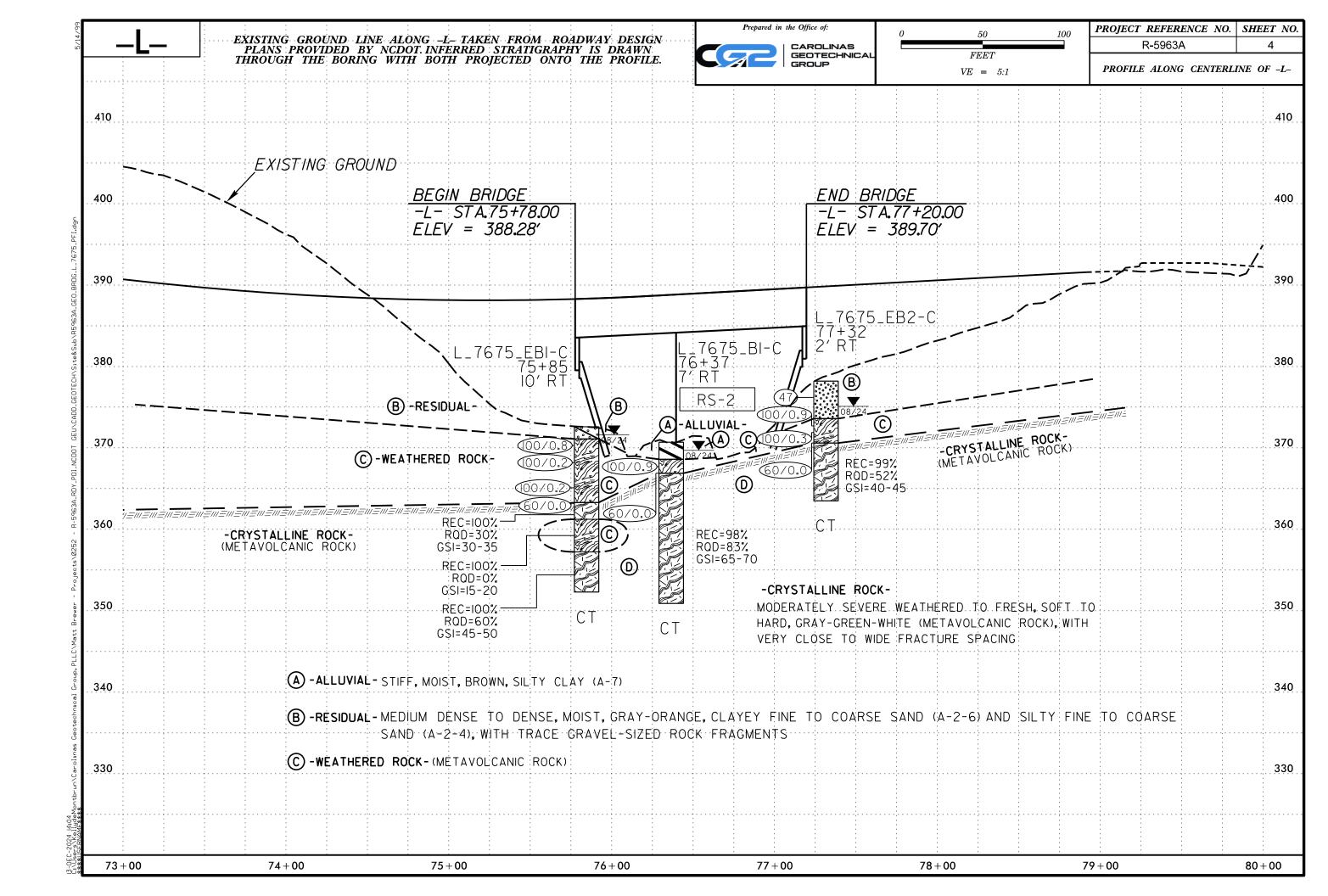
PROJECT REFERENCE NO.	SHEET NO.
R-5963A	2A

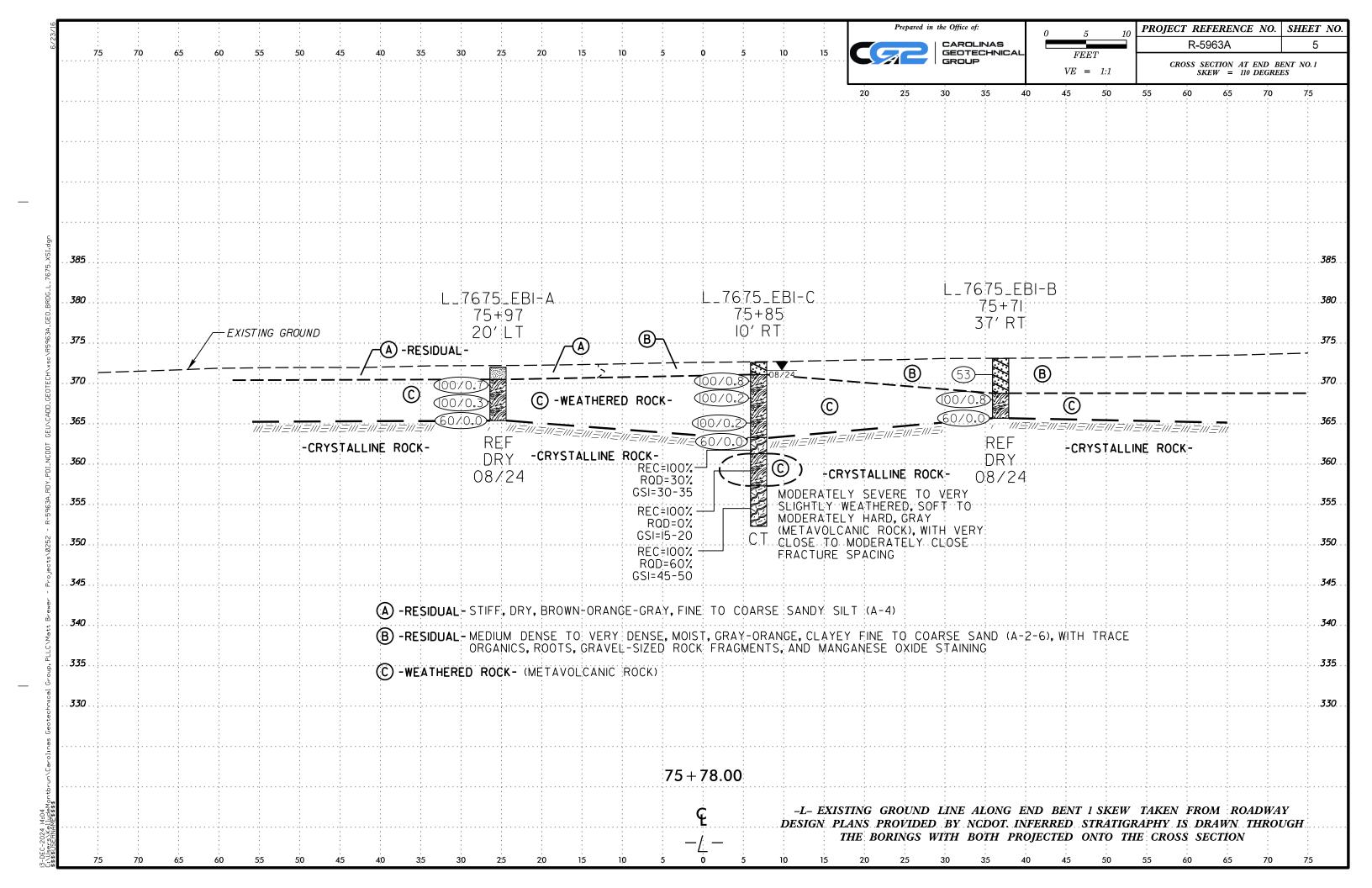
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

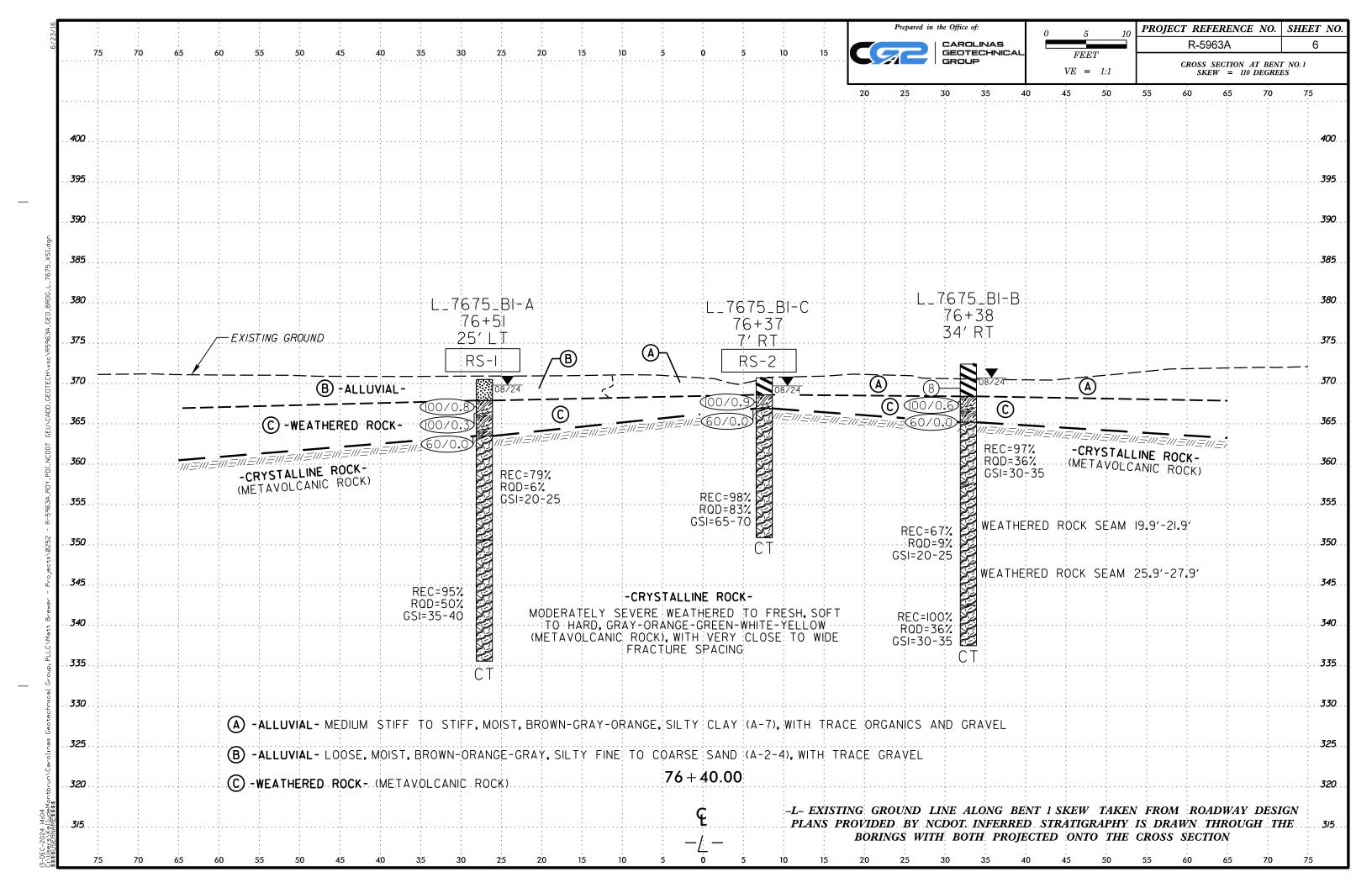
SUBSURFACE INVESTIGATION

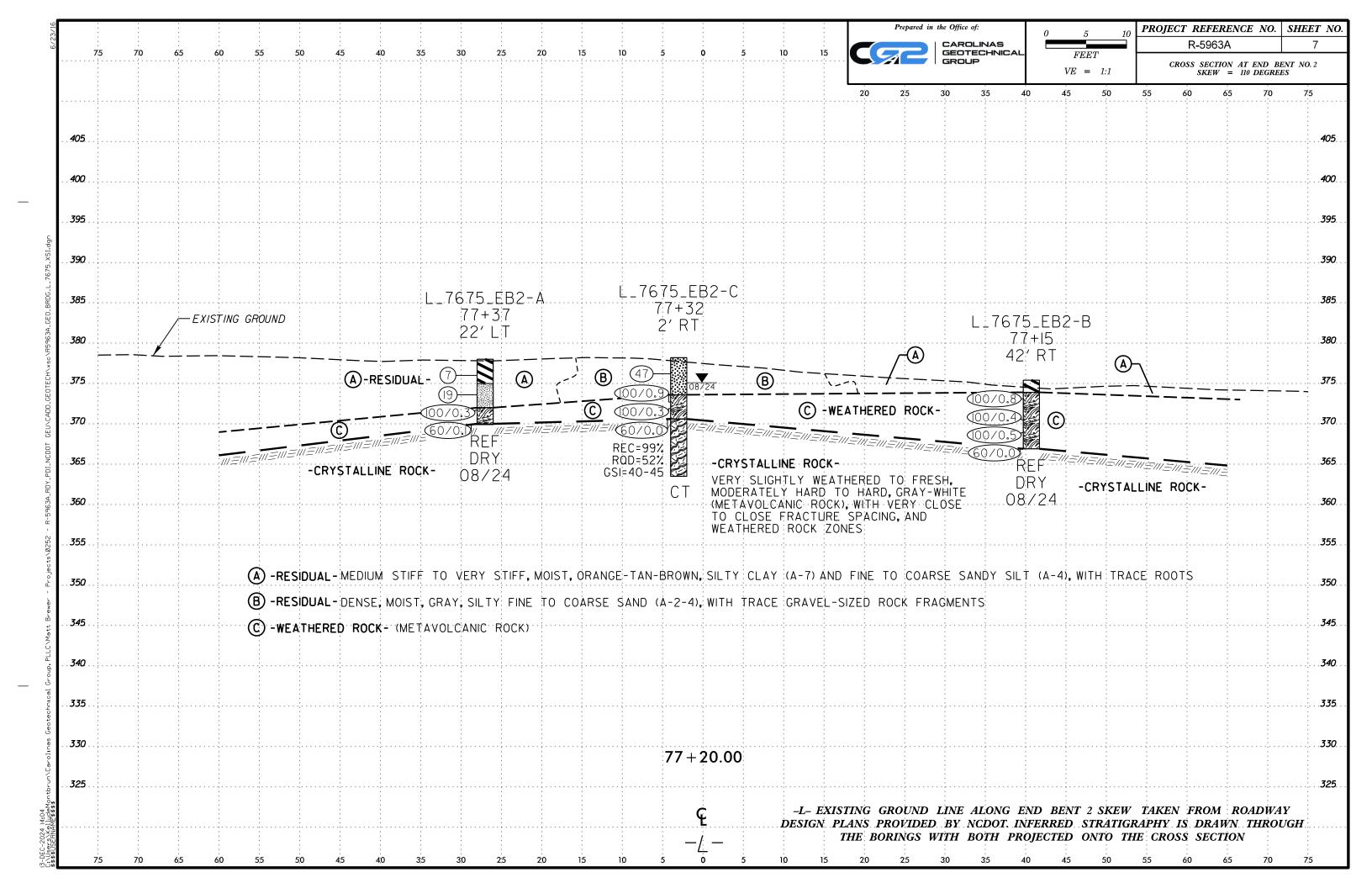
AASHTO LRFD Figure 10.4.6.4-1 $-$ Determination of GSI for Jo	inted Ro	ock Mass (Marinos and Hoek, 2	2000)		AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		o c e s		ν ω υ υ υ υ υ υ υ υ υ υ υ υ υ υ υ υ υ υ	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Guoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	SURFACE CONDITIONS	VERY GOOD Very rough, fresh unweathered surf COOD Rough, slightly weathered, iron stai	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surf With compact coatings or fillings or angular fragments VERY POOR Slickensided, highly weathered surf With soft clau coatings or fillings	
STRUCTURE		DECREASING SU	JRFACE QU	ALITY -	COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities BLOCKY - well interlocked un-	PIECES	90 80 70		N/A N/A	A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. 60
disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets VERY BLOCKY - interlocked,	NG OF ROCK -	60			8. Sand- stone with stone and stone and stone and stone and sultstone or silty shale with sand- stone layers amounts B. Weak siltstone or clayey shale with sandstone layers shale with sandstone layers
partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets	OCKING.		50		The state of the s
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity	 		40	30	C. D. E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H. F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure
DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces	 DECRE# 			20	G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	\	N/A N/A		10	sandstone are transformed into small rock pieces. → Means deformation after tectonic disturbance











										_			<u>UG</u>					
NBS 4	18599.	1.1			TI	P R-59	63A		COU	VTY	CHA	THA	М			GEOLOGIST P. Perry		
SITE DE	SCRI	PTION	Cha	tham	Parkw	ay from	US 1	5-501 to	o US 64	Bus	siness						GROUN	ND WTR (ft)
BORING	3 NO.	L_76	75_EB	31-A	S	TATION	75+	-97			OFFSE	T 2	0 ft LT			ALIGNMENT -L-	0 HR.	Dry
COLLAR	R ELE	V . 37	2.0 ft		т	OTAL DE	PTH	6.6 ft		1	NORTH	IING	707,2	84		EASTING 1,953,162	24 HR.	Dry
ORILL RIC	G/HAM	MER EI	FF./DA	TE G	EO366 [Diedrich D	-50 96	6% 07/26/	2024				DRILL N	IETHOI	D H.S	. Augers HAMME	R TYPE	Automatic
RILLER	R C.	Odom			S	TART DA	ΙΤΕ	08/12/2	24		COMP.	DAT	Γ E 08/	12/24		SURFACE WATER DEPTH N/A	١	
LEV DF	DIV/E T	OEPTH (ft)	BLO	0.5ft	UNT	0		BLOWS				100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DESC ELEV. (ft)		DEPTH (ft)
70 36	71.0		14 100/0.3	42	58/0.2						100	/0.7 /0.3		D		372.0 GROUND SURFA 370.5 RESIDUAL Stiff, Brown-Orange-Gray, Fi Sandy SILT (A-4 WEATHERED RO Brown-Gray (Metavolcar	ne to Coa) CK	
_36	65.4	6.6	60/0.0							- 1						Boring Terminated with 3 Penetration Test Refusal at E ft On Crystalline Rock (Metav	Standard levation 3 olcanic R	865.4

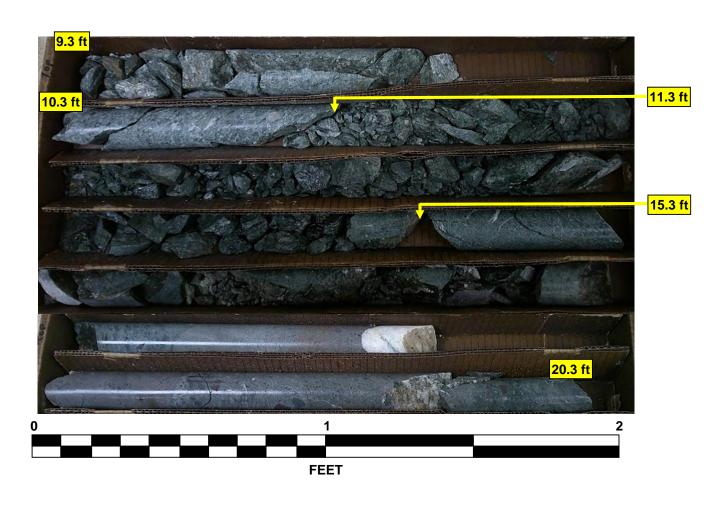
	TIP R-5963A COUN	TY CHATHAM	GEOLOGIST P. Perry	
		TI CHATTAW	1	
30NO NO 1 7075 504	am Parkway from US 15-501 to US 64 E	usiness		GROUND WTR (ft)
ORING NO. L_7675_EB1-	C STATION 75+85	OFFSET 10 ft RT	ALIGNMENT -L-	0 HR. Dry
OLLAR ELEV. 372.6 ft	TOTAL DEPTH 20.3 ft	NORTHING 707,253	EASTING 1,953,170	24 HR. 1.0
RILL RIG/HAMMER EFF./DATE	GEO366 Diedrich D-50 96% 07/26/2024	DRILL METHOD SP	PT Core Boring HAMM	ER TYPE Automatic
RILLER C. Odom	START DATE 08/12/24	COMP. DATE 08/14/24	SURFACE WATER DEPTH N/	'A
5, 1 ELEA 12, 2, 1, 1, 1	COUNT BLOWS PER FO .5ft 0.5ft 0 25 50	75 100 NO. MOI G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft
371.6 = 1.0 20	59 41/0.3		372.6 GROUND SURF, RESIDUAL Medium Dense, Gray-Orang to Coarse SAND (/	ge, Clayey Fine1.5
368.4 † 4.2 100/0.2 100/0.2 365.2 † 7.4		- 100/0.2	WEATHERED RO Gray-Orange (Metavolo	
363.3 9.3 60/0.0		- 100/0.2	CRYSTALLINE R 361.3 Gray (Metavolcanic	
			REC=100% RQD=30% GSI=30-35 WEATHERED RO	15.3
55			Gray (Metavolcanic 352.3 REC = 100% RQD = 0%	Rock)
<u> </u>			GSI = 15-20 CRYSTALLINE R Gray (Metavolcanic	
<u> </u>			REC = 100% RQD = 60% GSI = 45-50 Boring Terminated at Eleva	
			Crystalline Rock (Metavol	Icanic Rock)

GEOTECHNICAL BORING REPORT CORE LOG

									C	0	RE L	.OG				
WBS	48599).1.1			TIP	R-596	3A	C	OUNT	Υ	CHATHA	M	GEOLOGIST P. Perry			
SITE	DESCR	IPTION	Cha	tham Parl	kway f	rom US	3 15-501	to US	64 Bu	sines	ss	GROUND WTR (ft)				
BORI	NG NO.	L_76	75_EB	31-C	STA	ΓΙΟΝ	75+85			OF	FSET	10 ft RT	ALIGNMENT -L-		0 HR.	Dry
COLL	LAR ELE	EV . 37	'2.6 ft		TOT	AL DE	PTH 20.	.3 ft		NC	ORTHING	707,253	EASTING 1,953,170		24 HR.	1.0
DRILL	. RIG/HAM	IMER EF	F./DATE	E GEO3	366 Diec	rich D-5	50 96% 07/2	26/2024				DRILL METHOD SPT	Core Boring	HAMME	R TYPE	Automatic
DRIL	LER C	. Odom			STAI	RT DA	TE 08/1	2/24		CC	OMP. DA	TE 08/14/24	SURFACE WATER DEP	TH N/	A	
COR	E SIZE	NQ			TOT/	AL RUI	N 11.0 f	t								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RATA RQD (ft) %	L O G	ELEV.		ESCRIPTION AND REMARK	(S		DEPTH (ft)
363.3													Begin Coring @ 9.3 ft			
360	363.3 - 362.3 - -		5.0	N=60/0.0 3:53/1.0 3:27/1.0 3:43/1.0 5:26/1.0 5:56/1.0 3:07/1.0	(1.0) \100%/ (5.0) 100%	(0.0) 0% (0.6) 12%		(2.0) 100% (4.0) 100%	(0.6) 30% (0.0) 0%		363.3 - 361.3	Moderately Severe (Metavolcani	CRYSTALLINE ROCK to Moderately Weathered, M ic Rock), with Very Close Fra GSI=30-35	loderately acture Sp	/ Hard, Gra acing	
355	357.3	15.3	5.0	3:07/1.0 2:31/1.0 2:43/1.0 3:11/1.0	(5.0)	(3.0) 60%		(5.0) 100%	(3.0) 60%		357.3		WEATHERED ROCK Gray (Metavolcanic Rock)			15.3
	352.3 -	20.3		2:20/1.0 2:32/1.0							352.3		GSI = 15-20 CRYSTALLINE ROCK			20.3
	-	20.0		2.32/1.0							- - -	Moderately Severe to Gray (Metavolcanic F	o Very Slightly Weathered, S Rock), with Very Close to Mo Spacing	oft to Mod derately 0	derately Ha Close Fract	rd,
	- -										- - -	Boring Terminated at	GSI=45-50 Elevation 352.3 ft In Crystal Rock)	line Rock	(Metavolca	ınic
] -	‡									F	,	Surficial Organic Soil 0.0 - 0	.2'		
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Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs L_7675_EB1-C 9.3 to 20.3 Feet



ORING NO. 7675_B1-A	GROUND WTR (ft) ORING NO. L, 7675_B1-A STATION 76+51 OFFSET 25 ft.T ALIGNMENT -L 0 HR NA
ORING NO. 7675_B1-A	ORING NO.
Column C	DILAR ELEV. 370.5 ft TOTAL DEPTH 34.9 ft NORTHING 707,319 EASTING 1,953,204 24 HR 0.5
RILLER C. Odom START DATE 08/13/24 COMP. DATE 08/13/24 SURFACE WATER DEPTH N/A	RILLER C. Odom START DATE 08/13/24 COMP. DATE 08/13/24 SURFACE WATER DEPTH N/A
RILLER C. Odom	RILLER C. Odom
START DATE 08/13/24 COMP. DATE 08/13/24 SURFACE WATER DEPTH N/A	START DATE 08/13/24 COMP. DATE 08/13/24 SURFACE WATER DEPTH N/A
EVALUATION PROPERTION PRO	EVALUATION PROPERTY PROPERT
368.4 2.1 8 38 62/0.3 100/0.8 100/0.0 100/0.8 100/0.0 100/0.0 100/0.0 100/0.0 100/0.0 100/0.0 100/0.0 100/0.0 100/0.0 100/0.0	368.4 2.1 8 38 62/0.3 100/0.8 100/0.8 365.5 7.0 60/0.0 60 60 60 60 60 60 60 60 60 60 60 60 60
55 50 Gray-Green-White (Metavolcanic Rock) REC=95% RQD=50% GSI=35-40 RS-1 Boring Terminated at Elevation 335.6 ft In Crystalline Rock (Metavolcanic Rock)	55 50 350.6 Gray-Green-White (Metavolcanic Rock) REC=95% RQD=50% GSI=35-40 RS-1 Boring Terminated at Elevation 335.6 ft In Crystalline Rock (Metavolcanic Rock)
335.6 Boring Terminated at Elevation 335.6 ft In Crystalline Rock (Metavolcanic Rock)	335.6 Boring Terminated at Elevation 335.6 ft In Crystalline Rock (Metavolcanic Rock)

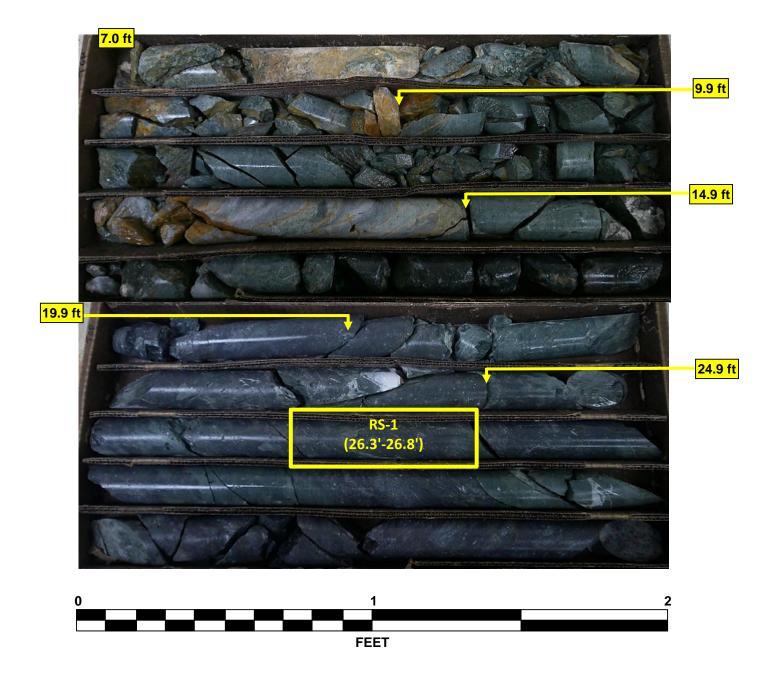
GEOTECHNICAL BORING REPORT

									C	O	RE L	OG						
WBS	48599	.1.1			TIP	R-596	3A	C	TNUC	Υ (CHATHAN	1						
SITE	DESCR	IPTION	Cha	tham Parl	kway fr	rom US	S 15-501	to US 6	34 Bus	sines	ss					GROUND WTR (ft)		
BORI	NG NO.	L_76	75_B1	-A	STAT	ΓΙΟΝ	76+51			OF	FSET 2	5 ft LT		ALIGNMENT -L-		0 HR.	NM	
COLI	AR ELE	V . 37	0.5 ft		TOTA	AL DE	PTH 34	.9 ft		NC	ORTHING	707,319		EASTING 1,953,204		24 HR.	0.7	
DRILL	RIG/HAM	MER EF	F./DATI	E GEO3	66 Died	rich D-5	0 96% 07/2	26/2024				DRILL METHOD	SPT	Γ Core Boring	HAMME	R TYPE	Automatic	
DRIL	LER C	. Odom			STAF	RT DA	TE 08/1	3/24		CC	OMP. DAT	E 08/13/24		SURFACE WATER DEP	TH N/	A		
COR	E SIZE	NQ			TOTA	AL RUI	N 27.9 f	t										
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	RQD	SAMP.	STR REC.	RQD	L			DE	ESCRIPTION AND REMARK	9			
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (ft)		LOCKIF HON AND KLIMAKK			DEPTH (ft)	
363.5	~~~													Begin Coring @ 7.0 ft				
	363.5 -	- 7.0 -	2.9	N=60/0.0 2:54/1.0 4:05/1.0 5:38/0.9	(2.9) 100%	(0.0) 0%		(10.2) 79%	(0.8) 6%		363.5	Moderately Se	vere to	CRYSTALLINE ROCK to Moderately Weathered, So	ft to Mod	erately Ha	7.0 ard,	
360	360.6 -	- 9.9 -	5.0	5:38/0.9 5:34/1.0	(4.3)	(0.8)					#	Gray-Orange	(Meta	volcanic Rock), with Very Clo Spacing	se to Clo	ose Fracti	ure	
	-			5:24/1.0 3:39/1.0 1:53/1.0	86%	16%					1			GSI=20-25				
	355.6 -	- - 14.9		2:58/1.0 3:46/1.0							1			001-20-20				
355	-		5.0	3:33/1.0 1:11/1.0	(3.0) 60%	(0.0) 0%					1							
	-			3:06/1.0 9:08/1.0	00 70	0 70					1							
350	350.6 -	- 19.9	5.0	4:01/1.0	(4.5)	(0.0)		(4.4.0)	(7.5)		350.6	CI:l-41 \\\41-		Madanatal III and Const Const	- \^/ -:4- /	/N 4 = 4 = 1 = 1 = 1	19.9	
	-		5.0	3:26/1.0 7:57/1.0	(4.5) 90%	(2.2) 44%		(14.3) 95%	(7.5) 50%		7			Moderately Hard, Gray-Greer th Very Close to Close Fractu			anic	
	-			3:31/1.0 1:51/1.0							#			RS-1: 26.3-26.8'				
345	345.6 -	- 24.9 -	5.0	2:24/1.0 1:54/1.0	(4.8)	(3.2)					1	Unconf	ined C	Unit Weight: 174.0 pcf Compressive Strength: 7,680	psi (1.10)6 ksf)		
	-	-		1:49/1.0 1:57/1.0	96%	64%	RS-1	1			#			GSI=35-40	. (/ -	,		
0.40	340.6 -	- - 29.9		6:07/1.0 2:17/1.0							1			301-00 40				
340			5.0	3:42/1.0 1:49/1.0	(5.0) 100%	(2.1) 42%					+							
	-	_		3:00/1.0 1:58/1.0	10070	,					1							
	335.6 -	- 34.9		2:21/1.0							335.6	Boring Termina	ted at	Elevation 335.6 ft In Crystalli	ne Rock	(Metavolo	34.9	
	-										Ł	Bonnig Termina	iou ui	Rock)	no rtook	(Wictavoic	Janio	
	-										F		,	Surficial Organic Soil 0.0 - 0.	3'			
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Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs L_7675_B1-A

7.0 to 34.9 Feet





		BOKE E	.00			
WBS 48599.1.1	TIP R-5963A	COUNTY CHATHA	AM	GEOLOGIST P. Perry		
SITE DESCRIPTION Chatham Par	kway from US 15-501 to l	US 64 Business			GROUN	ID WTR (ft)
BORING NO. L_7675_B1-C	STATION 76+37	OFFSET	7 ft RT	ALIGNMENT -L-	0 HR.	NM
COLLAR ELEV. 370.7 ft	TOTAL DEPTH 19.8 ft	NORTHING	707,285	EASTING 1,953,211	24 HR.	1.0
DRILL RIG/HAMMER EFF./DATE GEO3	66 Diedrich D-50 96% 07/26/202	24	DRILL METHOD SPT	Core Boring	HAMMER TYPE	Automatic
DRILLER C Odom	START DATE 08/14/24	COMP. DA	TE 08/14/24	SURFACE WATER DEP	TH N/A	

SI' BC CC DR ELEV DRIVE ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0.5ft SAMP. BLOWS PER FOOT SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft 75 NO. 100 GROUND SURFACE 370 ALLUVIAL Stiff, Brown, Silty CLAY (A-7) 20 80/0.4 WEATHERED ROCK 100/0.9 366.9 I 3.8 Brown-Gray (Metavolcanic Rock) 60/0.0 365 CRYSTALLINE ROCK RS-2 Gray-Green-White (Metavolcanic Rock) REC=98% RQD=83% GSI=65-70 360 355 Boring Terminated at Elevation 350.9 ft In Crystalline Rock (Metavolcanic Rock) Surficial Organic Soil 0.0 - 0.2'

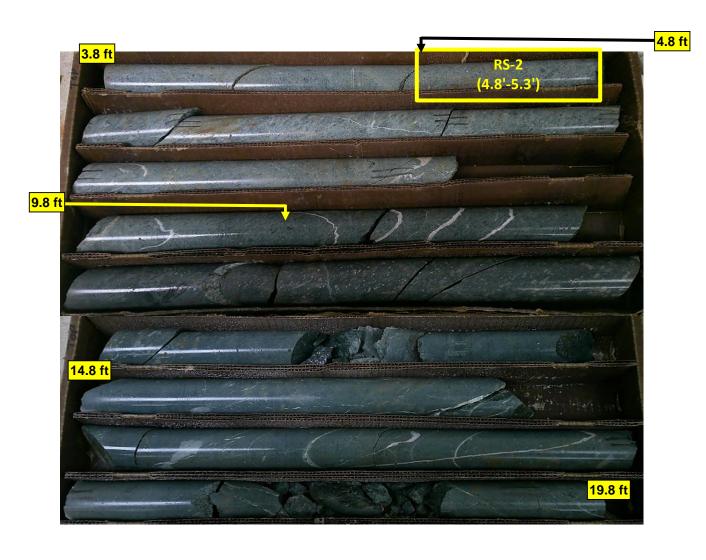
GEOTECHNICAL BORING REPORT

									C	OF	RE LOG				
WBS	48599	.1.1			TIP	R-596	3A	С	OUNT	Υ	CHATHAM	GEOLOGIST P. Perry			
SITE	DESCR	PTION	I Cha	atham Pa	rkway	from L	JS 15-50	1 to U	S 64 E	Busin	ess			GROUN	ID WTR (ft)
BOR	ING NO.	L_76	75_B1	1-C	STA	ΓΙΟΝ	76+37			OF	FSET 7 ft RT	ALIGNMENT -L-		0 HR.	NM
COL	LAR ELE	V . 37	'0.7 ft		тот	AL DE	PTH 19.	.8 ft		NO	RTHING 707,285	EASTING 1,953,211		24 HR.	1.0
DRILL	RIG/HAN	MER E	FF./DA	TE GEO3	366 Died	rich D-	50 96% 07/	26/2024			DRILL METHOD SP	T Core Boring	HAMM	IER TYPE	Automatic
DRIL	LER C.	Odom	1		STAI	RT DA	TE 08/1	4/24		CO	MP. DATE 08/14/24	SURFACE WATER DEF	TH N	/A	
COR	E SIZE	NQ			TOTA	AL RU	N 16.0 f	t				•			
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	LOG	D ELEV. (ft)	ESCRIPTION AND REMARK	s		DEPTH (ft)
366.9	()			, ,	,,,	70		70	70		(\(\)	Begin Coring @ 3.8 ft			32()
365	366.9 365.9	- 3.8 - 4.8	1.0	N=60/0.0 4:42/1.0	(1.0)	(1.0) \100%/	RS-2	(15.7) 98%	(13.3) 83%		_ 366.9	CRYSTALLINE ROCK Fresh, Moderately Hard to H	ard Gra	v-Green-W	3.8
	1 7	-	5.0	3:29/1.0 3:19/1.0 3:47/1.0 3:52/1.0 3:36/1.0	(4.7)	(4.5)	110-2	3070	0070		- (Metavolcanic F	Rock), with Very Close to Wide	Fracture	e Spacing	Tille
	360.9	- - _ 9.8		3:47/1.0 3:52/1.0	94%	90%					-	RS-2: 4.8-5.3'			
360	- 000.0	-	5.0	3:28/1.0 3:37/1.0	1 (5.0)	(3.6) 72%					Unconfined	Unit Weight: 170.2 pcf Compressive Strength: 8,280	psi (1,19	92 ksf)	
		- -		3:11/1.0 3:28/1.0	100%	1270					-	GSI=65-70			
355	355.9	14.8	5.0	5:28/1.0	(F.O)	(4.2)					-				
000		- -	5.0	4:14/1.0 2:45/1.0	(5.0) 100%	(4.2) 84%					_ -				
	350.9	- - _{10.0}		3:31/1.0 4:00/1.0							-				40.0
	350.9	<u> 19.8</u> -		3:35/1.0						72	Boring Terminated a	t Elevation 350.9 ft In Crystall	ine Rock	(Metavolca	19.8 anic
		-									- -	Rock)			
		- -									-	Surficial Organic Soil 0.0 - 0.	2'		
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Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs

L_7675_B1-C 3.8 to 19.8 Feet





MDC 40500 4 4		ORE LOG	CEOLOGICE D. D.	
WBS 48599.1.1 SITE DESCRIPTION Chatham Park		CHATHAM	GEOLOGIST P. Perry	CPOLIND WITE (#1)
	STATION 76+38	OFFSET 34 ft RT	ALIGNMENT -L-	GROUND WTR (ft) 0 HR. NM
BORING NO. L_7675_B1-B				
COLLAR ELEV. 372.4 ft	TOTAL DEPTH 34.9 ft	NORTHING 707,263	EASTING 1,953,227	24 HR. 1.7
	366 Diedrich D-50 96% 07/26/2024			ER TYPE Automatic
DRILLER C. Odom	START DATE 08/14/24	COMP. DATE 08/14/24	SURFACE WATER DEPTH N/	A
DRIVE ELEV (ft)	─	75 100 NO. MOI G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft
375			- 372.4 GROUND SURFA	ACE 0.0
370 370.4 2.0 2 4 4 368.4 4.0	4		ALLUVIAL Medium Stiff, Gray-Orange (A-7), with trace organics ar	id gravel-sized
365 365.2 7.2		100/0.6	WEATHERED RO Brown-Gray (Metavolca	DCK nic Rock)
60/0.0		60/0.0	CRYSTALLINE RO	
360			REC=97% RQD=36% GSI=30-35	
355			Gray-Green-Yellow-White Rock)	Metavolcanic (Metavolcanic
350			REC=67% RQD=9% GSI=20-25 Weathered Rock Seam	19 9'-21 9'
			-	
345			Weathered Rock Seam - 342.5	25.9'-27.9'
340			Gray-Green (Metavolca REC=100%	
			RQD=36% GSI=30-35 Boring Terminated at Eleva	34.9 tion 337.5 ft In
			_ Crystalline Rock (Metavol	can is received.

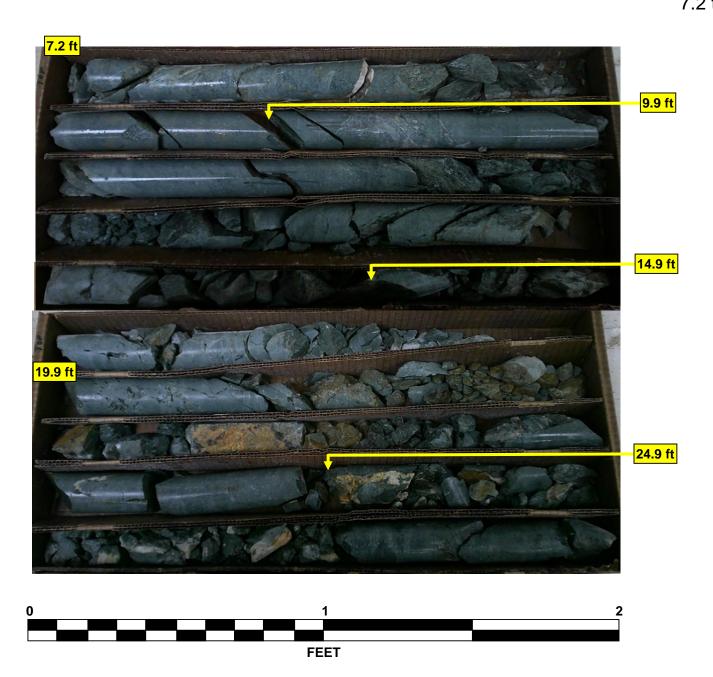
GEOTECHNICAL BORING REPORT CORE LOG

									C	O	ELOG			
WBS	48599).1.1			TIP	R-596	3A	C	TNUC	Υ (THAM GEOLOGIS	ST P. Perry		
SITE	DESCR	IPTION	Cha	tham Parl	kway fr	om US	15-501	to US 6	64 Bus	sines			GROUND	WTR (ft)
BORI	NG NO.	L_76	75_B1	-B	STAT	ION	76+38			OF	ET 34 ft RT ALIGNMEN	NT -L-	0 HR.	NM
COLL	AR ELI	EV . 37	2.4 ft		TOTA	AL DEF	PTH 34.	9 ft		NC	HING 707,263 EASTING	1,953,227	24 HR.	1.7
DRILL	RIG/HAN	IMER EF	F./DATE	E GEO3	66 Died	rich D-5	0 96% 07/2	26/2024			DRILL METHOD SPT Core Boring	HAMME	ER TYPE A	utomatic
DRILI	ER C	. Odom			STAF	RT DA	TE 08/1	4/24		CC	P. DATE 08/14/24 SURFACE	WATER DEPTH N/	Α	
CORE	SIZE	NQ			TOTA	L RUN	l 27.7 f	t						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STR REC. (ft) %		LOG	DESCRIPTION LEV. (ft)	AND REMARKS		DEPTH (ft)
36652											Begin Cori	ing @ 7.2 ft		
360	365.2 - 362.5 - - - - 357.5 -	7.2 - 9.9 - - - - 14.9	5.0	N=60/0.0 0:59/1.0 3:08/1.0 2:47/0.7 2:56/1.0 2:40/1.0 5:31/1.0 2:41/1.0 3:17/1.0	(2.5) 93% (5.0) 100%	(0.8) 30% (2.0) 40%		(7.5) 97%	(2.8) 36%		65.2 CRYSTAI Moderately Severe to Slightly W Gray-White-Green (Metavolcanic Close Fra	LLINE ROCK /eathered, Soft to Moder	rately Hard, to Moderately	7.2
355	352.5 -	19.9	5.0	2:59/1.0 3:54/1.0 2:33/1.0 3:04/1.0 2:46/1.0	(4.1) 82%	(0.6) 12%		(10.1) 67%	(1.4) 9%		Moderately Severe Weath Gray-Green-Yellow-White (Metavo Fractui	ering, Soft to Moderately lcanic Rock), with Very re Spacing I=20-25	Hard, Close to Clos	
350	347.5 -	24.9	5.0	1:34/1.0 2:12/1.0 3:39/1.0 6:26/1.0 2:54/1.0	(3.0) 60%	(0.8) 16%						ck Seam 19.9'-21.9'		
345	- - - 342.5 -	29.9	5.0	2:40/1.0 1:18/1.0 1:00/1.0 7:20/1.0 2:32/1.0	(3.0) 60%	(0.0) 0%					Weathered Roo	ck Seam 25.9'-27.9'		29.9
340	337.5 -	34.9	5.0	2:13/1.0 2:13/1.0 4:23/1.0 3:25/1.0 3:45/1.0	(5.0) 100%	(1.8) 36%		(5.0) 100%	(1.8) 36%					34.9
												Rock)		



Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs

L_7675_B1-B 7.2 to 34.9 Feet





					В	ORE L	OG						
WBS 48599.1.1			TI	P R-5963A	COUNT	Y CHATHA	M			GEOLOGIST T. We	nner		
			Parkw	ay from US 15-501 to	US 64 B							GROUN	D WTR (ft
BORING NO. L			S	TATION 77+37		OFFSET :	22 ft LT			ALIGNMENT -L-		0 HR.	Dry
COLLAR ELEV.				OTAL DEPTH 8.1 ft		NORTHING				EASTING 1,953,273		24 HR.	Dry
		TE CO		CME-550X 78% 05/06/202					D H.	S. Augers			Automatic
DRILLER L. Ard				TART DATE 08/05/2		COMP. DA		05/24		SURFACE WATER D	EPTH N	/A	
ELEV DRIVE ELEV (ft) DEP	···	0.5ft			PER FOOT	75 100	SAMP. NO.	MOI	O G	SOIL AND F	ROCK DES	CRIPTION	DEPTH (
380 377.0 1.1 375 374.6 3. 370 370.0 8.	3 4 7 0 100/0.3		13					M M		Medium Stiff, Ora 375.0 Very Stiff, Tan, F 372.0 WEAT 370.0 Gray (Meta Boring Term Penetration Test ft In Crystalline I	ine to Coal (A-4) CHERED RO etavolcanic FALLINE RO volcanic Ro ninated with Refusal at	Silty CLAY (See Sandy Seconds OCK Rock) OCK OCK OCK OCK) Standard Elevation 3 volcanic Rock	SILT

GEOTECHNICAL BORING REPORT ROPELOG

GEOTECHNICAL BORING REPORT CORFIGG

Mart		E	BORE LOG			C	ORE LOG		
SORING NO. 1.7675 EB2-C STATION 77+32 OFFSET 2 RT ALIGNMENT -L OHR Dry COLLAR ELEV 378.2 TOTAL DEPTH 1.7 NORTHING 707.346 EASTING 1.953.284 24 HR 3.1	WBS 48599.1.1	TIP R-5963A COUN	ITY CHATHAM	GEOLOGIST T. Wenner	WBS 48599.1.1	TIP R-5963A COUNT	TY CHATHAM	GEOLOGIST T. Wenner	
COLLAR ELEV. 378 2 ft TOTAL DEPTH 14.7 ft NORTHING 707.346 EASTING 1,953.284 24 HR. 3.1 DRILL RIGHAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILLER L. Ard DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78% 60606/224* DRILL METHOD SPT Core Boring HAMMER FEF./DATE C624*13 CME-550X 78	SITE DESCRIPTION Chatham Pa	arkway from US 15-501 to US 64	Business	GROUND WTR (ft)	SITE DESCRIPTION Chatham Pa	rkway from US 15-501 to US 64 I	Business		GROUND WTR (ft)
DRILLER L Ard START DATE C824113 CME-550X 78% 05/08/2024 C0MP. DATE 08/22/24 SURFACE WATER DEPTH N/A	BORING NO. L_7675_EB2-C	STATION 77+32	OFFSET 2 ft RT	ALIGNMENT -L- 0 HR. Dry	BORING NO. L_7675_EB2-C	STATION 77+32	OFFSET 2 ft RT	ALIGNMENT -L-	0 HR. Dry
DRILLER L. Ard START DATE 08/05/24 COMP. DATE 08/22/24 SURFACE WATER DEPTH N/A	COLLAR ELEV. 378.2 ft	TOTAL DEPTH 14.7 ft	NORTHING 707,346	EASTING 1,953,284 24 HR. 3.1	COLLAR ELEV. 378.2 ft	TOTAL DEPTH 14.7 ft	NORTHING 707,346	EASTING 1,953,284	24 HR. 3.1
ELEV CH CH CH CH CH CH CH C	DRILL RIG/HAMMER EFF./DATE CG2	24113 CME-550X 78% 05/06/2024	DRILL METHOD SF	PT Core Boring HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE CG24	4113 CME-550X 78% 05/06/2024	DRILL METHOD S	PT Core Boring HAM	MER TYPE Automatic
Company Com	DRILLER L. Ard	START DATE 08/05/24	I	SURFACE WATER DEPTH N/A	DRILLER L. Ard	START DATE 08/05/24	COMP. DATE 08/22/24	SURFACE WATER DEPTH	N/A
(ft)	ELEV DRIVE DEPTH BLOW COUN		11 1.7 101	SOIL AND ROCK DESCRIPTION	CORE SIZE NQ	TOTAL RUN 7.1 ft			
377.2 1.0 8 29 18		0.5ft 0 25 50	75 100 NO. MOI G		ELEV RUN ELEV (ft) DEPTH RUN RATE (Min/ft)	RUN SAMP. STRATA REC. RQD NO. (ft) (ft)	L O G ELEV. (ft)	DESCRIPTION AND REMARKS	DEPTH (ft)
377.2 1.0	380			_	370.6			Begin Coring @ 7.6 ft	
370 370.6 7.6 100/0.3 100/0.3 100/0.3 370.6 7.6 60/0.0 60/0.	1 1 1	<u> </u>		376.2 GROOND GOTT 710E 6.0	370.6 + 7.6 2.1 N=60/0.0 368.5 + 9.7 3:13/1.0	$0 \mid (2.0) \mid (1.1) \mid (7.0) \mid (3.7) \mid 95\% \mid 52\% \mid 99\% \mid 52\%$	370.6 Very Slightly Wea	thered to Fresh, Moderately Hard to Ha	7.6 ard, Gray-White
370 370.6 7.6 100/0.3 100/0.3 100/0.3 100/0.3 370.6 7.6 60/0.0 60/0	18 29	18	<u>M</u>	Dense, Gray, Silty Fine to Coarse SAND	5.0 \(\frac{2.38\/1.1}{3.08\/1.0}\)	(5.0) (2.6) (100% 52%	(Metavolcanic	Rock), with Very Close to Close Fractu	ure Spacing
370 370.6 7.6 100/0.3 100/0.3 100/0.3 370.6 7.6 60/0.0 60/0.	37/1 1 / 1	0/0.4	<u> </u>	_ (A-2-4), with trace gravel-sized rock - 373.6 fragments 4.6	365 3:04/1.0 3:37/1.0			GSI=40-45	
Crystalline Rock (Metavolcanic Rock)	372.2 1 6.0		100/0.9	WEATHERED ROCK Gray (Metavolcanic Rock)	363.5 + 14.7 4.53/1.0		363.5 Boring Terminated	at Elevation 363.5 ft In Crystalline Roc	
Crystalline Rock (Metavolcanic Rock)	1 azo 370.6 + 7.6			- 370.6 7.6 - CRYSTALLINE ROCK				•	
Crystalline Rock (Metavolcanic Rock)				Gray-White (Metavolcanic Rock)			F	Surficial Organic Soil 0.0 - 1.0'	
Crystalline Rock (Metavolcanic Rock)	265			REC=99%					
Crystalline Rock (Metavolcanic Rock)	300			- GSI=40-45 - 363.5 14.7	‡		-		
	‡			Boring Terminated at Elevation 363.5 It in					
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Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs **L_7675_EB2-C** 7.6 to 14.7 Feet



	В	ORE LOG		
WBS 48599.1.1	TIP R-5963A COUNT	Y CHATHAM	GEOLOGIST T. Wenner	
SITE DESCRIPTION Chatham Pa	arkway from US 15-501 to US 64 B	usiness		GROUND WTR (ff
BORING NO. L_7675_EB2-B	STATION 77+15	OFFSET 42 ft RT	ALIGNMENT -L-	0 HR . Dr
COLLAR ELEV. 375.4 ft	TOTAL DEPTH 8.5 ft	NORTHING 707,304	EASTING 1,953,296	24 HR. Dr
DRILL RIG/HAMMER EFF./DATE CG2	4113 CME-550X 78% 05/06/2024	DRILL METHOD H.S	S. Augers HAMM	ER TYPE Automatic
DRILLER L. Ard	START DATE 08/05/24	COMP. DATE 08/05/24	SURFACE WATER DEPTH N/	A
ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP	BLOWS PER FOOT 0.5ft 0 25 50	75 100 NO. MOI G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (
	5/0.3	M	375.4 GROUND SURFA 373.9 Very Stiff, Brown, Silty CLAY roots WEATHERED RO	(A-7), with trace
370.9 4.5 369.4 6.0 100/0.4 100/0.5 366.9 8.5 60/0.0		100/0.4	Gray, (Metavolcanic 366.9	Rock)
			Boring Terminated with Penetration Test Refusal at I ft On Crystalline Rock (Meta Surficial Organic Soil (Elevation 366.9 volcanic Rock)
			-	
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PROJECT REFERENCE NO. SHEET NO. 22

	ROCK TEST RESULTS								
SAMPLE NO.	BORING	STATION	OFFSET	NORTHING	EASTING	DEPTH INTERVAL	ROCK TYPE	UNIT WEIGHT (PCF)	UNCONFINED COMPRESSIVE STRENGTH
RS-1	L 7675 B1-A	76+51 -L-	25' LT	707319	1953204	26.3 - 26.8'	METAVOLCANIC ROCK	174.0	7,680 psi (1,106 ksf)
RS– 2	L_7675_B1-C	76+37 -L-	7' RT	707285	1953211	4.8 - 5.3'	METAVOLCANIC ROCK	170.2	8,280 psi (1,192 ksf)

Alx M Atmulhy

AUTHORIZED SIGNATURE NCDOT CERT NO. 130-04-0212 Prepared in the Office of:

F&ME CONSULTANTS, INC. COLUMBIA, SOUTH CAROLINA NCDOT LAB CERT. NO. 130–0212

PROJECT REFERENCE NO.	SHEET NO.
R-5963A	23
SITE PHO	TOS



PHOTO #1: VIEW NEAR END BENT NO. 1, FACING UPSTATION



PHOTO #2: VIEW NEAR END BENT NO. 2, FACING DOWNSTATION