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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CHATHAM

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

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R–5963A	1	

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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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.			
BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	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	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN 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,	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			
VERY STIFF.GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.			
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS OPENING MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND			
CLASS. (≤ 35% PASSING ■200) (> 35% PASSING ■200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	ROCK (CD) VOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	SURFACE.			
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.		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-75 A-3 A-6, A-7 000000000000000000000000000000000000		NON-CRYSTALLINE SEDIMENTARY ROCK THAT WOULD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.			
SYMBOL DODOGOOOD	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED			
7. PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SEDIMENTARY SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY ROCK SEDIMENTARY R	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.			
*10 50 MX *40 30 MX 50 MX 51 MN GRANULAR CLAY PEAT	CRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.			
*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	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	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% 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 501L5 OP	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 10 MX 1	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 OF MAJOR GRAVEL AND SAND GRAVEL AND 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 SAND SHIND GRAVEL AND SAND SULS SULS	STATIC WATER LEVEL AFTER <u>24</u> 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 AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	✓ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FICOD 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.	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		(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 COMPACINESS OF PENETRATION RESISTENCE COMPRESSIVE STRENGTH CONSISTENCY (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 20/025 DIP & DIP DIRECTION WITH SOIL DESCRIPTION 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.			
CENERALLY VERY LOOSE < 4		(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.			
GENERALLY LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A		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	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.			
		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 < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED SOIL BOUNDARY	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 MEDIUM STIFF 4 TO 8 0.5 TO 1.0	TTE/TE 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 (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	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER OF 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 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - 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			
	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.			
BUDLUER CUBBLE 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			
(LSE, SU.) (F SU.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.			
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST 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.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL			
SOIL MOISTURE - CORRELATION OF TERMS	CLCLAY MODMODERATELY γ -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 TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.			
	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK. 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 GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	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.			
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	<u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY			
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.			
PLASTIC SEMISOLID. DEOLUTRES, DRVING, TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
RANGE S - WEI - (W) ATTAIN OPTIMUM MOTOTUPE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING	BENCH MARK:			
		TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET				
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FEET			
SL SHRINKAGE LIMIT		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 ATTAIN OPTIMUM MOISTURE		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	ROADWAY DESIGN FILES PROVIDED BY NCDOT DATED 07/18/2024.			
	CME-55	THINLY LAMINATED < 0.008 FEET	BRIDGE BORING COLLAR ELEVATIONS OBTAINED USING CARLSON BRX7 (SURVEY GRADE GPS).			
PLASTICITY		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				
PLASTICITY_INDEX_(PI) DRY_STRENGTH NON_PLASTIC Ø-5 VERY_LOW	X CME-550X HARD FACED FINGER BITS TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS:	CT = CORING TERMINATED			
SLIGHTLY PLASTIC 6-15 SLIGHT		FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	REF = REFUSAL			
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	NM = NOT MEASURED			
COLOR		BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:				
	X DIEDRICH D-50 Image: Tricone intermediate intermedintermedintermediate intermediate intermediate intermediate interm	INDURATED ORAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:				
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;				
HOUR LENS SUCH HE LIGHT, DHINK, STHERKED, ETC. HRE USED TO DESCRIBE HFFEAKHNUE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14			

PROJECT REFERENCE NO.

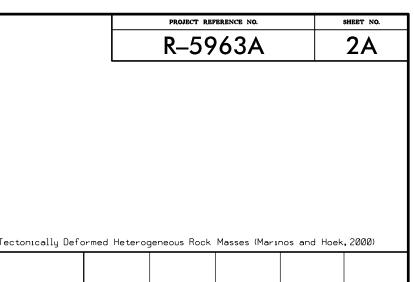
R-5963A

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

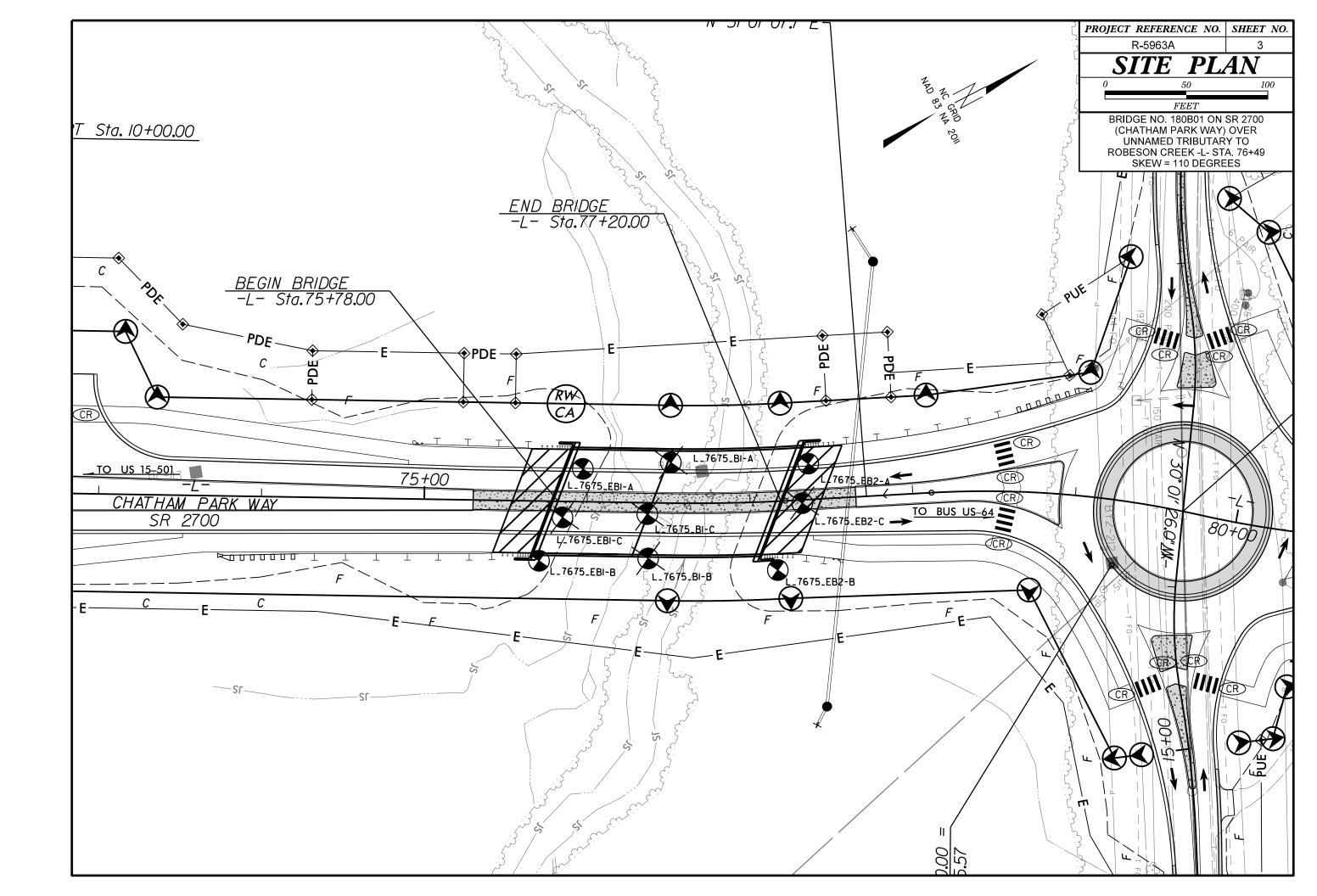
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

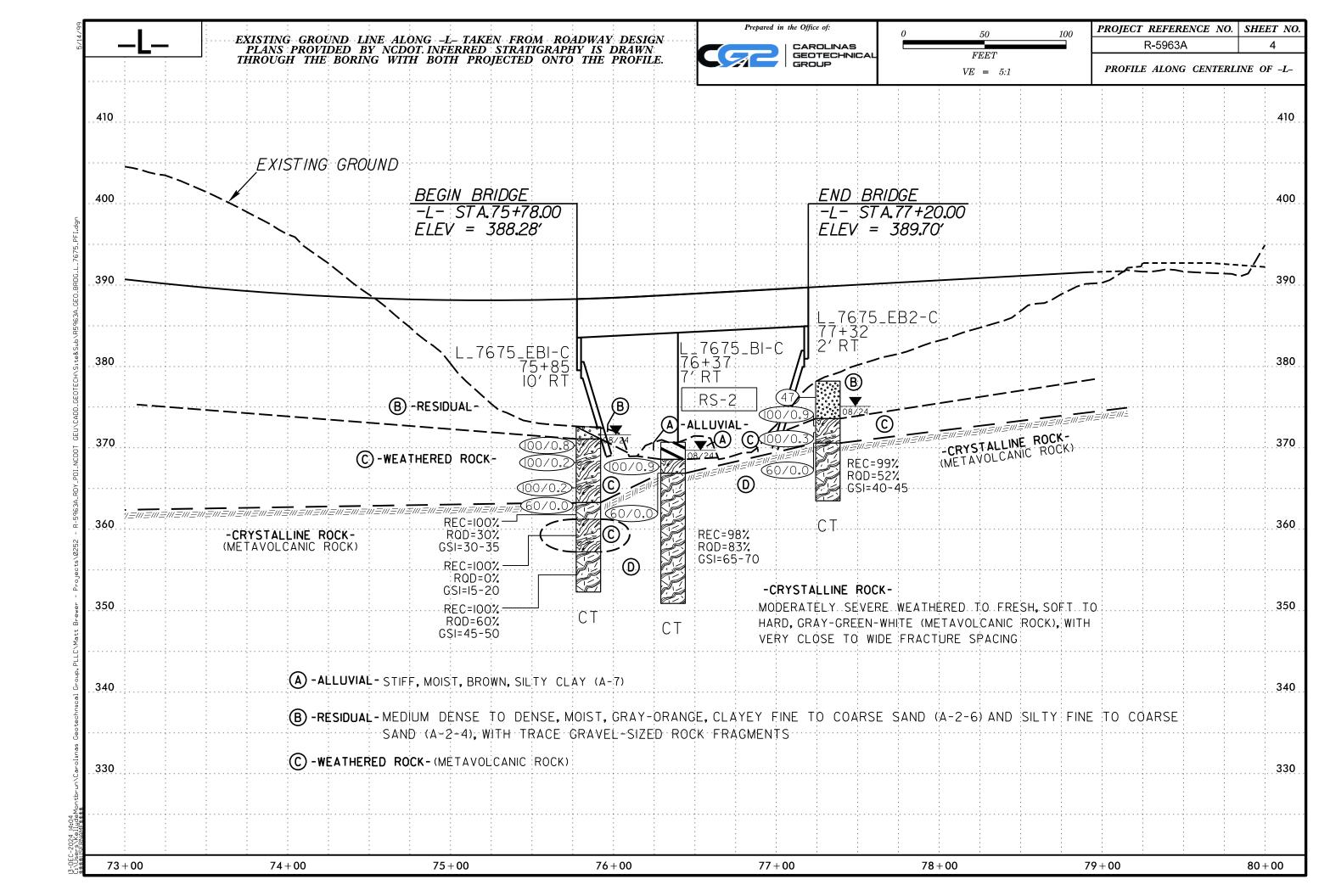
AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed F	Rock Mass (Marı	nos and Hoek,2	2000)			AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for T
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the	Gook Mass (Mari GOOD rough, fresh unweathered surfaces	ghtly weathered, ıron staıned	moderately weathered and surfaces	ided, highly weathered surfaces pact coatings or fillings ar fragments	JR ided, highly weathered surfaces t clay coatings or fillings	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average valu of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for
fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis. STRUCTURE	VERY Very	CREASING SI	FAIR Smooth, altered	POOR Slickenside with compact	VERY POOR Slickensided, F with soft clay	by a slight shift to the right in the columns for fai poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
				ΑLITY		COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			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.
BLOCKY - well interlocked un- disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		70 60				B. Sand- stone with thin inter-
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		5	0			layers of siltstone
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 .
discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces				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	Manual into small rock pr

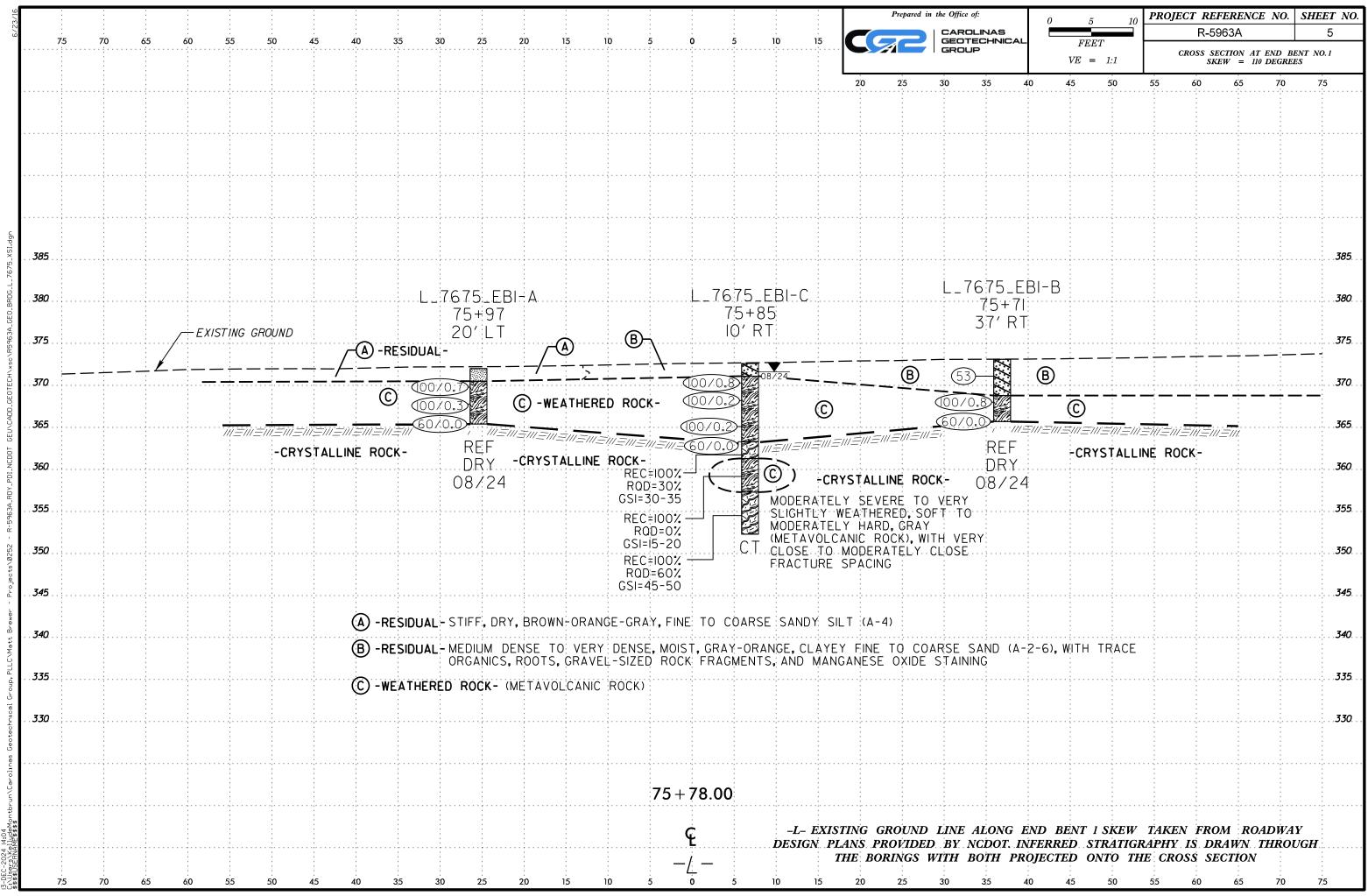


Montest Control Frequential Entrol Montest SURFACE CONDITIONS OF DISCONTINUTIES Entrol Entrol Montest Control Very Rough, fresh unweathered surfaces Entrol Entrol Montest Conton Very Goodo - Very Rough, fresh unweathered surfaces Montestelly Montestelly Montest Conton Very Shorth, moderately Montestelly Montestelly Montest Conton Very Smooth, moderately Montestelly Montest Continued surfaces Montestelly Montestelly Montest Continued surfaces Montestelly Montestelly Montest Conting of Anglichan surfaces Montestelly Montestelly Montest <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th></td<>						
A 60 E. Weak sultstone or clayey shale with sandstone layers 50 B C D E 40 Pformed, driaulted, hale or sultstone drormed an tructure 30 F 20	SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)	VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces		VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
sultstone or clayey shale with sandstone layers eformed, drfaulted, bale or sultstone deformed forming an tructure eformed silty forming e ens of ansformed			A			
eformed silty corming a entropy point pockets ens of ansformed	siltstone or clayey shale with sandstone		В	СЦ	Þ	
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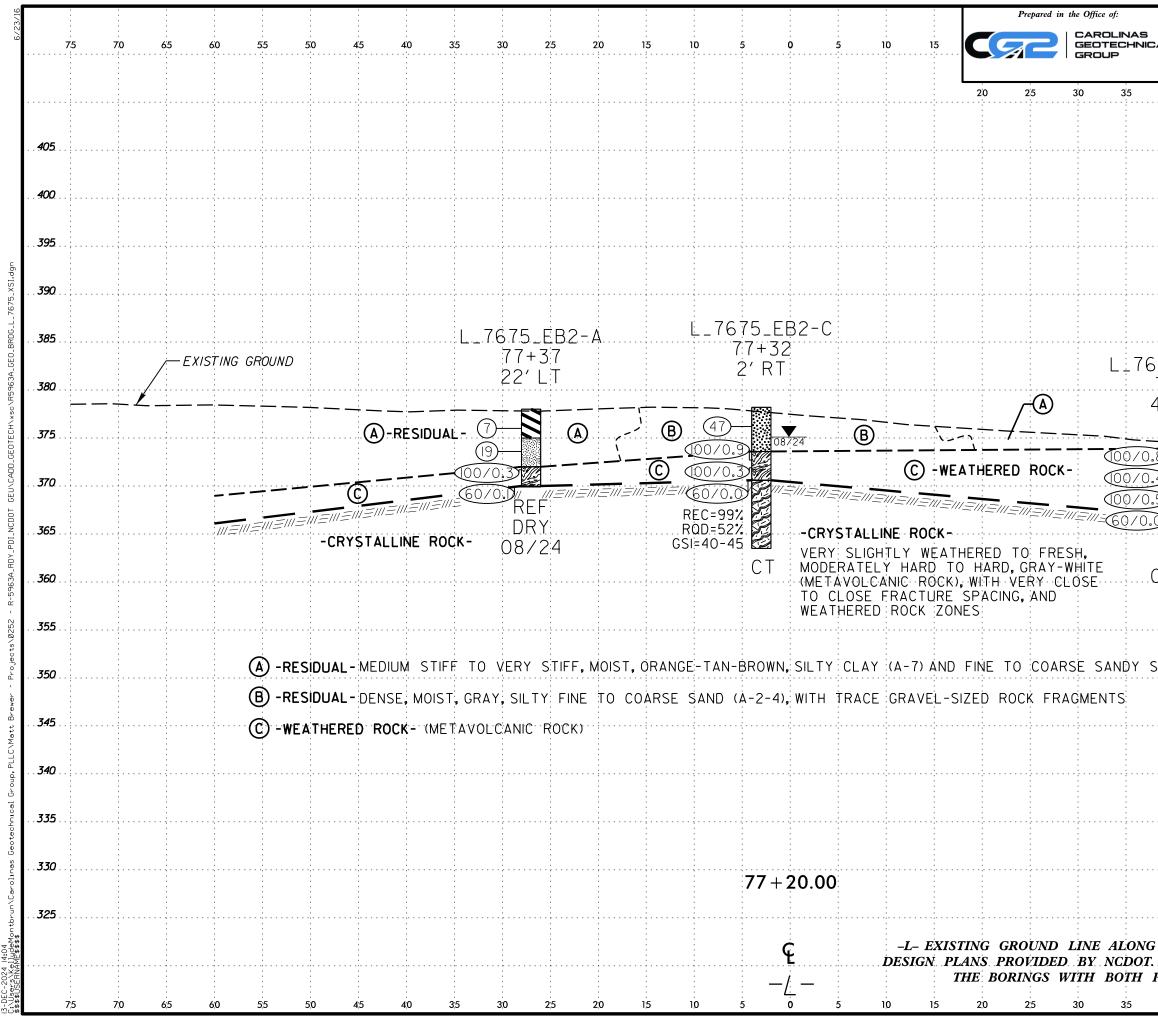






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				001-20 25		REC=S ROD=8 GSI=65-	70		Dr	
							C T			C=67% 22 WEAT ROD=9% 22 =20-25 22
345						· · · · · · · · · · · · · · · · · · ·				WEAT
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. 335					FRAC	TURE SPACIN	IG			CT
			СТ							
		A -ALLUVIAL - MEDIUM ST	IFF TO STIFF.MC)IST.BROWN-GF	AY-ORANGE.	SILTY CLA	((A-7).	WITH TRACE	ORGANIC	S AND GRAVEL
		B -ALLUVIAL - LOOSE, MOI				; ;				
. 320		C -WEATHERED ROCK(ME			:	76+40.0	1			
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365.4 6.6 60/0.0 Brown-Gray (Metavolcanic Rock) 365.4 6.6 60/0.0 Brown-Gray (Metavolcanic Rock) 365.4 6.6 Surficial Organic Soil 0.0 - 0.2'	
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Penetration Test Refusal at Elevation 3 Penetration Test Refusal at Elevation 3 th On Crystalline Rock (Metavolcanic Ref Surficial Organic Soil 0.0 - 0.2' Surficial Organic Soil 0.0 - 0.2'	
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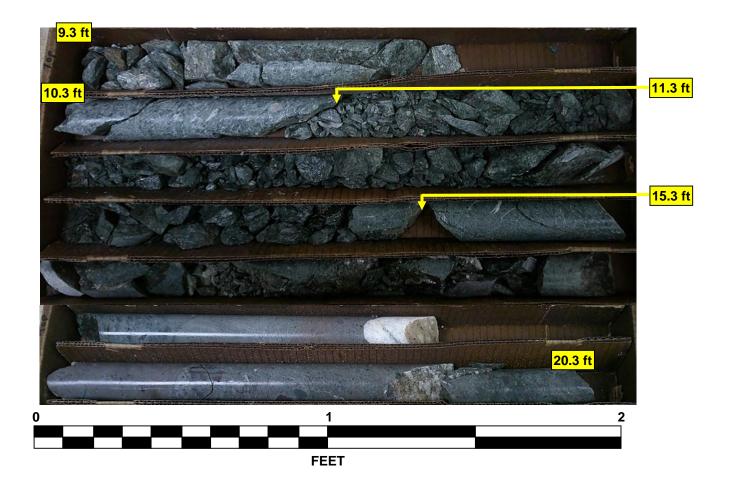
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SITE	DESCRIPTIO	N Ch	atham	Parkv	<i>w</i> ay f	rom US	3 15-!	501 to	US 64	4 Busi	Business GROUND WT						WTR (ft)	SITE DESCRIPTION Chatham Pa					nam Parl	arkway from US 15-501 to US 6									
BORIN	NG NO. L_7	7675_E	B1-C	:	STA	TION	75+8	35			OFFS	ET	10 ft RT	-		ALIG	NMENT	-L-		0 HR.	Dry	BO	BORING NO. L_7675_EB1-C					STAT	TION	75+85			
COLL	AR ELEV.	372.6 ft		ŀ	тот	AL DE	РТН	20.3	ft		NOR	THING	707,	253		EAS	TING 1,953,170 24 HR. 1.0 COLLAR ELEV. 372.6 ft						тоти	AL DEF	PTH 20	.3 ft							
DRILL	RIG/HAMMER E	EFF./DA1	E (EO36	6 Diec	drich D-5	50 96%	6 07/26/2	2024				DRILL	METHOD) S	SPT Core E	Boring		HAMME	R TYPE A	utomatic	DRI	LL RIG/H	AMMER	EFF./D	DATE	GEO3	 EO366 Diedrich D-50 96% 07/26/2024					
DRILL	ER C. Odo	m		:	STA	RT DA	TE (08/12/2	24		сом	P. DA	TE 08			-	-	ATER DE	PTH N/A	4		DR	LLER	C. Od	om			STAF	RT DA	TE 08/1	2/24		
	DRIVE ELEV DEPT		ow co					BLOWS					-	P. 💙 /	L									E NQ						N 11.0 f			
(ft)	(ft) (ft)	0.5ft	0.5ft	0.5f	ft C)	25		50	7	75	100	NO.	мо	O G	ELEV. (DIL AND RO	JCK DESC	RIPTION	DEPTH (ft)	ELE					DRILL	RL	JN	SAMP.	STR REC.		
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	_															F				05			363	.3 + 9. .3 + 10	$\frac{1}{3}$.0 1	V =60/0.0 3:53/1.0/	(1.0)	(0.0)		(2.0)	((
ı L	371.6 + 1.0						• •		•						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- 372.6 371.1			ND SURFA	ICE	0.0 1.5	360)	±	5	5.0	3:27/1.0 3:43/1.0	(5.0)	(0.6)		(40)		
370	±	20	59	41/0	.3		· ·		•			00/0.8 ⁹	•		<u>I</u>	- 3/1.1	Mediur ۲	n Dense, G	Bray-Orange e SAND (A	e, Clayey Fir -2-6)			0.57				3:27/1.0 3:43/1.0 5:26/1.0 5:56/1.0 3:07/1.0	100%	12%		100%	(
ı -	368.4 4.2	100/0.	2			· · ·						00/0.2	,				<u> </u>	WEATH	HERED RO	CK	-			<u>.3 + 15</u> +	3 5	5.0	3:07/1.0 2:31/1.0 2:43/1.0	(5.0)	(3.0)		(5.0) 100%	(;	
	ł		1				- -		-								Gr	ay-Orange	(Metavolca	inic Rock)		355	<u>i</u>	Ŧ			2:43/1.0 3:11/1.0	100%	60%		100%	6	
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GEOTECHNICAL BORING REPORT CORE LOG

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				CHATHAI	N		GEOLOGIS	ST	P. Perry			
501	to US	64 Bus	<u> </u>				1					ND WTR (ft)
5			OF	FSET 1	0 ft RT		ALIGNMEN	T	-L-		0 HR.	Dry
20.	3 ft		NO	RTHING	707,253		EASTING	1,9	953,170	-	24 HR.	1.0
07/2	26/2024	4			DRILL METHOD	SP	T Core Boring			HAMM	ER TYPE	Automatic
)8/1	2/24		cc	MP. DA1	TE 08/14/24		SURFACE	WA	ATER DEF	PTH N	/A	
.0 fi												
1P.).	STI REC. (ft) %	RATA RQD (ft) %	L O G	ELEV. (f	t)	D	ESCRIPTION	AN	D REMARI	KS		DEPTH (ft)
							Begin Cori					
	(2.0) 100%	(0.6)		- 363.3 - 361.3	Moderately Sev	vere	CRYSTAL to Moderately	We	eathered, N	/loderatel	y Hard, G	9.3 ray11.3
	(4.0)	(0.0)		-	(Metavol	lcan	ic Rock), with	Ver	ry Close Fr	acture Sp	bacing	
				- 357.3			GSI WEATHE					15.3
	(5.0)	(3.0) 60%	R				Gray (Meta)		
				-			GSI	= 1	5-20			
			H2	352.3	Moderately Seve	ere t			NE ROCK	oft to Mo	derately F	20.3
				- -	Gray (Metavolcar	nic F	Rock), with Ve	ry C acii	Close to Mo	derately	Close Fra	cture
				-	Boring Terminate	ed at		2.3 f	ft In Crystal	line Rocl	(Metavol	canic
							R Surficial Orga	lock) 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



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WBS	48599	9.1.1			Т	IP	R-596	63A		CC	DUNT	Y CH	ATHA	M			GEOLOGIST P. Perry	
SITE	DESCR		l Cha	atham	Parkw	/ay f	rom L	JS 15	5-501	to US	64 E	usine	SS				·	GROUND WTR (ft
	NG NO.					•	ION							37 ft RT			ALIGNMENT -L-	0 HR. Dry
	AR ELE									it .		<u> </u>		3 707,2			EASTING 1,953,174	24 HR. Dry
	RIG/HAI											1				ם ח		ER TYPE Automatic
												00					-	
							rt da'				F007		IP. DA	TE 08/	-	1 L T	SURFACE WATER DEPTH N	A
LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	OW CO 0.5ft		0		25 1	SLOW:	5 PER 50	FOOT	75	100	SAMP. NO.	моі	0	SOIL AND ROCK DES	CRIPTION DEPTH (1
375																		ACE 0
370	372.1 _ 	<u> 1.0 </u> <u> 4.3 </u>	8 68	23 32/0.3	30		· · · ·	 	· · · · ·	. . . ●5 . L. 	3		100/0.8	•	м		RESIDUAL Very Dense, Gray-Orange, Coarse SAND (A-2-6), 368.8 gravel-sized rock fragments roots, Manganese Oxic WEATHERED RC	with trace , organics and <u>4.</u> le staining
	<u>365.7 -</u> 	7.4	60/0.0)			<u></u>	<u> </u>	<u> </u>	60/0.0	•			<u>365.7</u> Gray-Orange (Metavolc Boring Terminated with Penetration Test Refusal at ft On Crystalline Rock (Meta	anic Rock) 7 Standard Elevation 365.7
	-																Surficial Organic Soil	0.0 - 0.3'
	- - -																- - -	
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WBS	4859	9.1.1			Т	" IP R-	5963A	4	COUNT	Y CHATHA	M			GEOLO	GIST P. Perry			<u>'</u>	WBS	48599	9.1.1			TIP	R-596	63A	C	OUNT
SITE	DESCF	RIPTION	Cha	atham I	Parkwa	ay from	n US 1	5-501 to	US 64 Bu	siness							/TR (ft)	1	SITE	DESCR	IPTION	Cha	itham Pa	rkway f	rom US	S 15-501	to US	64 Bu
BOR	NG NO	. L_76	675_B1	-A	s	OITAT	N 76	6+51		OFFSET	25 ft LT	-		ALIGNI	MENT -L-	0 HR.	NM	1	BORI	NG NO.	L_76	75_B1	-A	STA	TION	76+51		
COLI	LAR EL	. EV . 37	70.5 ft		Т	OTAL	DEPT	H 34.9	ft	NORTHING	3 707,	319		EASTIN	IG 1,953,204	24 HR.	0.7	- [COLL	AR ELE	EV. 37	70.5 ft		тот	AL DE	PTH 34	l.9 ft	
DRILL	. RIG/HAI	MMER EF	F./DAT	E GI	EO366	Diedrich	n D-50 9	96% 07/26/	2024	•	DRILL	METHO	D S	SPT Core Bor	ng HAMN	IER TYPE Aut	omatic	Π	DRILL	RIG/HAN	IMER EF	F./DAT	E GEO	366 Died	drich D-5	50 96% 07/	26/2024	
DRIL		C. Odom			S	TART	DATE	08/13/	24	COMP. DA	TE 08	3/13/24		SURFA	CE WATER DEPTH N	/A		Γ	DRILI	LER C	. Odom	l		STA	rt da	TE 08/ ⁻	13/24	
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT			BLOWS	PER FOO	T	SAMP	P. ▼/			SOIL AND ROCK DES	CRIPTION			CORE	E SIZE	NQ			тот	AL RUI	N 27.9	ft	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	25	50	75 100	NO.	Имо		ELEV. (ft)			DEPTH (ft)	E	ELEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	UN RQD	SAMP.	REC.	RATA RQD
																		L	(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %
375		\downarrow												L				3	363.5		7.0							
		ŧ												Ł						363.5 -	+	2.9	N=60/0.0	2 (2.9) 100%	(0.0) 0%		(10.2) 79%	(0.8) 6%
		Ŧ												- 370.5	GROUND SURF	ACE	0.0		360	360.6 -	- 9.9 -	5.0	N=60/0.0 2:54/1.0 4:05/1.0 5:38/0.9 5:24/1.0 3:39/1.0 1:53/1.0	(4.3)	(0.8)			
370		+				1						—м-		÷	ALLUVIAL					-	ŧ		3:39/1.0	86%	16%			
		<u>+ 2.1</u> + 3.9	8	38	62/0.3	3				-			40	367.9	Loose, Brown-Orange-Gra Coarse SAND (A-2-4)	, with trace	2.6		355	- 355.6 -	- 14.9		2:58/1.0					
365	366.6	<u>- 3.9</u> -	100/0.3	3						1 100/0.0	۲.				gravel-sized rock fra WEATHERED R] [F	300	-	+	5.0	3:33/1.0 1:11/1.0	(3.0) 60%	(0.0) 0%			
	363.5	7.0												363.5	Orange-Gray (Metavolo		7.0			-	+		3:06/1.0 9:08/1.0		-			
		Ŧ	60/0.0								Ţ			Ŧ	CRYSTALLINE F Gray-Orange (Metavolo	ROCK canic Rock)			350	350.6 -	- 19.9	5.0	4:01/1.0 3:26/1.0		(2.2)		(14.3)	(7.5)
360	-	ŧ												1	REC=79%					-	ł	0.0	7:57/1.0	(4.5) 90%	(2.2) 44%		95%	(7.5) 50%
		‡													RQD=6% GSI=20-25					- 345.6 -	- 24.9		1:51/1.0					
255		‡				::				· · · · · ·					001-20-20			-	345	- 040.0	- 24.3	5.0	1:54/1.0	(4.8)	(3.2) 64%			
355	-	‡																		-	Ŧ		1:57/1.0		64%	RS-1	1	
		‡						· · · ·											340	340.6 -	29.9	5.0	6:07/1.0					
350	_	ŧ												350.6	Gray-Green-White (Metay	volcanic Rock)	19.9			-	Ŧ	5.0	3:42/1.0	100%	(2.1) 42%			
		ŧ													REC=95%	,				-	+		3:00/1.0 1:58/1.0					
		ŧ													RQD=50% GSI=35-40				ł	335.6 -	- 34.9		2:21/1.0					
345	-	ŧ													GSI=35-40					-	+							
		Ŧ									RS-1	-1		F						-	ŧ							
340		Ŧ												F						-	+							
	-	Ŧ																		-	t i							
		Ŧ												-						-	t							
	-	‡	<u> </u>			+				-	!		-0-2		Boring Terminated at Eleva		34.9			-	ł							
		‡												Ę	Crystalline Rock (Metavo	,				-	L							
		‡												Ę	Surficial Organic Soi	0.0 - 0.3'				_	Ŧ							
	-	ŧ												-						-	Ŧ							
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13/24	_	ŧ												Ł				12/13/24		-	ŧ							
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.GD		Ŧ												F				DOT.GDT		-	1							
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GPJ.		‡												Ę				GTM.GPJ		-	ł							
⊠ C	-	‡												-				GTM		-	Ŧ							
E C		ŧ												Ę				GEO		-	Ŧ							
5	-	ŧ												Ł						-	Ŧ							
AUX -		ŧ												Ł				RDWY		-	ŧ							
Acor.		ł												Ł				R5963A		-	ŧ.							
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DO		‡	1											F				DOC		-	ŧ							
SORE	-	‡	1											F				CORE DOUBLE		-	Ł							
		‡	1											Ę				OT C		-	Ŧ							
NCD		+												Ł				NCDOT			ţ							

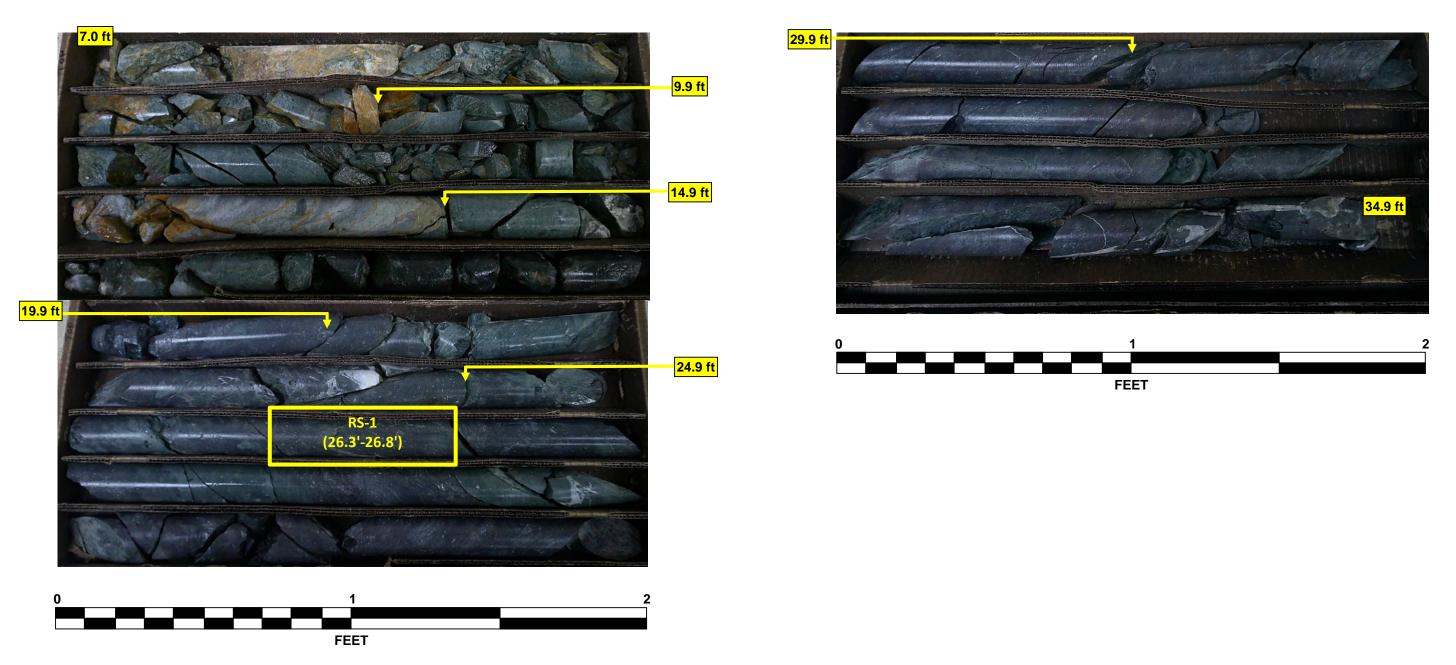
IICAL BORING REPORT CORE LOG

<u>.</u>				HATHA	M	GEOLOGIST	P. Perry		0.501	
i t	0 05 0	64 Bus	<u> </u>				1			ID WTR (ft)
2	9 ft			FSET 2	25 ft LT 707,319	ALIGNMENT	-L- 953,204		0 HR. 24 HR.	NM 0.7
	9 TL 6/2024					T Core Boring	JJJ,204	Намм	ER TYPE	Automatic
	3/24		co	MP. DA	TE 08/13/24	SURFACE WA	TER DFP			
) ft					00, 10/LT			11/	•	
	STR REC.	ATA	L							
	(ft) %	(ft) %	O G	ELEV. (1		DESCRIPTION ANI) REMARK	S		DEPTH (ft)
						Begin Coring				
	(10.2) 79%	(0.8) 6%		- 363.5 -	Moderately Severe	CRYSTALLIN to Moderately Wea	athered, So	ft to Mod	erately Ha	7.0 ard,
				-	Gray-Orange (Met	avolcanic Rock), w Spacir		se to Cl	ose Fracti	ıre
				-		GSI=20	-25			
				-						
				- 350.6						19.9
	(14.3) 95%	(7.5) 50%	P	-	Slightly Weathered,	, Moderately Hard, /ith Very Close to C	Gray-Green	n-White	(Metavolc	
	90%	50%		-	ROCK), W	RS-1: 26.3		ile Spac	ing	
				-	l la se afia sel	Unit Weight:	174.0 pcf	: /4 40) (I	
				-	Uncontined	Compressive Stre		psi (1,10	io kst)	
				-		GSI=35	-40			
				-						
				-						
				- 335.6 	Boring Terminated a	at Elevation 335.6 f	t In Crystalli	ne Rock	(Metavolo	34.9 canic
				-	C C	Rock				
				-		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



						_		IRE L				1									1				RE L					
	48599.1.1			P R-596				CHATH	AM			GEOLOGIST P.	Perry			WBS	48599	.1.1			TIP R-59	963A	C	OUNTY	CHATHA	M	GEOLOG	IST P. Perry		
	DESCRIPTIO			•		to US						1									rkway from									ND WTR (fi
	NG NO. L_			TATION				OFFSET				ALIGNMENT -L		0 HR.	NM	BORIN		_	_	С	STATION				FSET		ALIGNME		0 HR.	
	AR ELEV.				PTH 19.8		N	IORTHIN				EASTING 1,953		24 HR.	1.0	COLL					TOTAL D				ORTHING	G 707,285		1,953,211	24 HR.	1.(
	. RIG/HAMMEF											T Core Boring	HAM	IMER TYPE Aut	omatic					E GEO	366 Diedrich D			4		DRILL METHOD	SPT Core Boring	HAI	MMER TYPE	Automatic
	LER C. Od				E 08/14/			COMP. DA				SURFACE WATE	RDEPTH	N/A		DRILL	ER C	. Odom			START D	ATE 0	8/14/24	CC	omp. Da	TE 08/14/24	SURFACE	WATER DEPTH	N/A	
ELEV	DRIVE ELEV DEP	TH BLOW	COUNT		BLOWS			- 400	SAMP			SOIL A	ND ROCK DE	SCRIPTION		CORE					TOTAL R	UN 16								
(ft)	(ft) (ft)	0.5ft 0	0.5ft 0.5ft	0	25	50	75	5 100	NO.	Имо	G	ELEV. (ft)			DEPTH (ft)	ELEV			RUN	DRILL RATE	REC. RQD (ft) (ft) % %	SAM	P. STF REC. . (ft) %				DESCRIPTION	AND REMARKS		
																(ft)	(ft)	(ft)	(ft)	(Min/ft)					1					DEPTH (
375												-				366.9	366.9 365.9 7	3.8	1.0	V=60/0 0	(10) (10))	(15.7)	(13 3)	366.9			ring @ 3.8 ft ALLINE ROCK		
	Ŧ										F					365	365.9 7	- 4.8	5.0	<u>4:42/1.0</u> 3:29/1.0		K RS-	2 98%	83%	-	Slightly Weathe (Metavolca	ered to Fresh, Mode	erately Hard to Hard, C ry Close to Wide Frac	Gray-Green-V	Vhite
370	Į Į									╎┳	F	370.7	GROUND SUR		0.0		-			3:19/1.0 3:47/1.0	94% 90%				E	(initial cite		2: 4.8-5.3'	tare epitiening	
	368.6 - 2.1	1 20 80	0/0.4]				Brown, Silty C	LAY (A-7)	2.1	360	360.9	9.8	5.0	<u>3:36/1.0</u> 3:28/1.0	(1.0) (100% (4.7) (4.7) (4.7) (4.5) 94% 90% (5.0) (3.6) 100% 72%)			E	Lincon	Unit Wei	ight: 170.2 pcf Strength: 8,280 psi (1	102 kcf)	
	366.9 3.8	8 20 80 60/0.0	J, U.T		.		· · · ·	100/0.9 60/0.0	F		爵	Brown	VEATHERED I -Gray (Metavol	lcanic Rock)	3.8		-				100% 72%	Ď				Uncon		Sirengin: 0,200 psi (1 Si=65-70	, 102 NOI)	
365	Ŧ								RS-2	7	Ø	Gray-Gre	RYSTALLINE en-White (Meta	ROCK avolcanic Rock)			355.9	14.8		3:28/1.0 <u>5:28/</u> 1.0							63			
	Ī							· · · · · · · · · · · · · · · · · · ·			Ø	-				355			5.0	4:14/1.0 2:45/1.0	(5.0) (4.2) 100% 84%)								
360	Ī										Ø	_	REC=98% RQD=83% GSI=65-7(6 0			-	-		3:31/1.0 4:00/1.0 <u>3:35/1.0</u>				(13.3) 83%						
	Ŧ																350.9	<u> 19.8 </u>	;	3:35/1.0		-			350.9	Boring Termina	ated at Elevation 35	50.9 ft In Crystalline Ro Rock)	ock (Metavolo	anic 19
	ŧ				.						Ø						-								Ę	-				
355	+								1		Ø	-					-	-							Ę		Surficial Org	anic Soil 0.0 - 0.2'		
	1							· · · ·									-	-							F					
									<u> </u>			350.9 Boring Ter	minated at Elev	vation 350.9 ft In	19.8		-	-							Ę					
	±										E			volcanic Rock)			-	-							F					
	‡											Surfi	cial Organic So	oil 0.0 - 0.2'			-	-							Ę					
	+											-					-	-							Ę					
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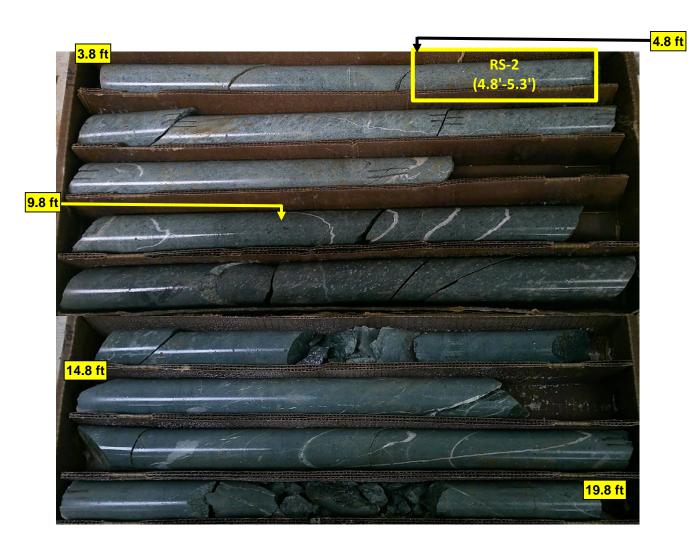
GEOTECHNICAL BORING REPORT

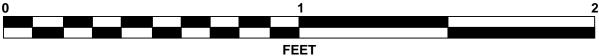
CORE LOG



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





									ORE L									-				
	48599.					IP R-5963			Y CHATH	۸M			GEOLOGIST P.	. Perry				- F		48599		
						-	15-501 to L	JS 64 Bus	1				1				D WTR (ft)	- F		DESCR		
	ing no.			-В		TATION			OFFSET				ALIGNMENT -L			HR.	NM	- F		NG NO.		
COL	LAR ELE	V. 37	72.4 ft		T	OTAL DEP	TH 34.9 ft		NORTHIN	G 707,:	263		EASTING 1,953	3,227		HR.	1.7	Ļ	COLI	AR EL	EV. 3	72.4
	RIG/HAM			e Ge) 96% 07/26/2				METHOD) SP	T Core Boring		HAMMER T	YPE	Automatic	- F		RIG/HAI		
DRIL	LER C.	Odom					E 08/14/2		COMP. DA				SURFACE WATE	ER DEP	TH N/A			-		LER (n
ELEV (ft)		DEPT⊦ (ft)	' <u> </u>	0.5ft		0	BLOWS F	2ER FOO	I 75 100	SAMP	17	0		AND ROC	K DESCRIF	PTION		H			NQ	
()	(ft)	()	0.51	0.51	0.511			1	100	NO.	<u>/ MOI</u>	G	ELEV. (ft)				DEPTH (ft)		ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	H RI (
375																		ļ.	366552	()		
	-	-																Ē	-365-	365.2-	7.2	2
						. <u> </u>			• • • • • •					ALL	SURFACE		0.0			362.5	- 9.9 -	5
370	370.4	- 2.0	2	4	4							N	(A-7), with 1	trace org		Ity CL/ avel-s	ized	-	360	-	ŧ	
1	368.4	4.0	90	10/0.1		::-:			100/0.6	•			368.4	rock fr WEATHE	agments RED ROCK		4.0			357.5	+ + 14.9	
365	365.2	7.2											365.2 Brown	-Gray (M	etavolcanic	Rock)	7.2		355		ŧ	5
		-	60/0.0							T		X			LINE ROCK (Metavolca		ck)	F		-	ŧ	
		-								i		X		REC	2=97%					352.5	<u>+ 19.9</u> T	5
360	$\left\{ \begin{array}{c} - \end{array} \right\}$	_								¦					0=36% =30-35			╞	350	-	Ŧ	
		-								!			357.5 Gray Gray	on Vollow	-White (Met	avolo	14.9			347.5	24.9	
355		-]					ock)	avoica			345		Ŧ	5
															C=67% D=9%			Γ		342.5	29.9	
0.50		-												GSI	=20-25					342.3	<u> </u>	5
350		-								1			- weathe	erea Roci	k Seam 19.9	9-21.9		ŀ	340	-	ŧ	
		-								i		Ø								337.5	- 34.9	_
345		-										×,	Weathe	ered Rocl	k Seam 25.9	9'-27.9				-	ŧ	
		-					· · · ·		· · · · · ·	!			342.5				29.9				ŧ	
340		-							· · · · · ·	!		R)	Gray-0	Green (M	etavolcanic	Rock)					ŧ	
540		-								1					=100% D=36%					-	ŧ	
		-					••••	•••		Ц			337.5 Boring Terr	GSI	=30-35 at Elevation	337 5	34.9				‡	
	4	-											Crystallir	ne Rock (Metavolcan	ic Roc	k)			-	ŧ	
		-																			‡	
		-										-									ŧ	
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ĺ																		NCDOT CORE DOUBLE R5963A_RDWY_GEO_GTM.GPJ_NC_DOT.GDT_12/13/24		-	£	
		-										Ē						DOT			Ŧ	
i	L I											I [۲Ľ			Т	

COUN **TIP** R-5963A Chatham Parkway from US 15-501 to US 64 Bu STATION 76+38 5 B1-B 4 ft TOTAL DEPTH 34.9 ft DATE GEO366 Diedrich D-50 96% 07/26/2024 **START DATE** 08/14/24 TOTAL RUN 27.7 ft RUN REC. RQD (ft) (ft) % % STRATA REC. RQD (ft) (ft) % % DRILL RATE (Min/ft) SAMP. NO. RUN (ft) N=60/0.0 (2.5) (0.8) 0:59/1.0 93% 30% 3:08/1.0 2:47/0.7 (5.0) (2.0) 2:46/0.7 (5.0) (2.0) 2:40/1.0 5:31/1.0 2:41/1.0 2:41/1.0 2.7 (7.5) (2.8) 97% 36% 5.0
 5:31/1.0

 2:31/1.0

 3:17/1.0

 5.0
 2:59/1.0

 3:54/1.0
 82%

 2:33/1.0

 3:04/1.0

 2:33/1.0

 3:04/1.0

 2:46/1.0

 2:46/1.0

 5.0
 1:34/1.0

 2:12/1.0
 60%

 6:26/1.0

 2:54/1.0

 5.0
 2:40/1.0

 3:39/1.0

 6:26/1.0

 2:54/1.0

 5.0
 2:40/1.0

 3:291.0

 5.0
 2:31/1.0

 60%
 0%

 1:00/1.0
 7:20/1.0

 2:32/1.0
 2:32/1.0

 5.0
 2:13/1.0

 2:13/1.0
 36%

 4:23/1.0
 3:45/1.0

 3:45/1.0
 3:45/1.0
 (10.1) (1.4) 67% 9% (5.0) (1.8) 100% 36%

GEOTECHNICAL BORING REPORT

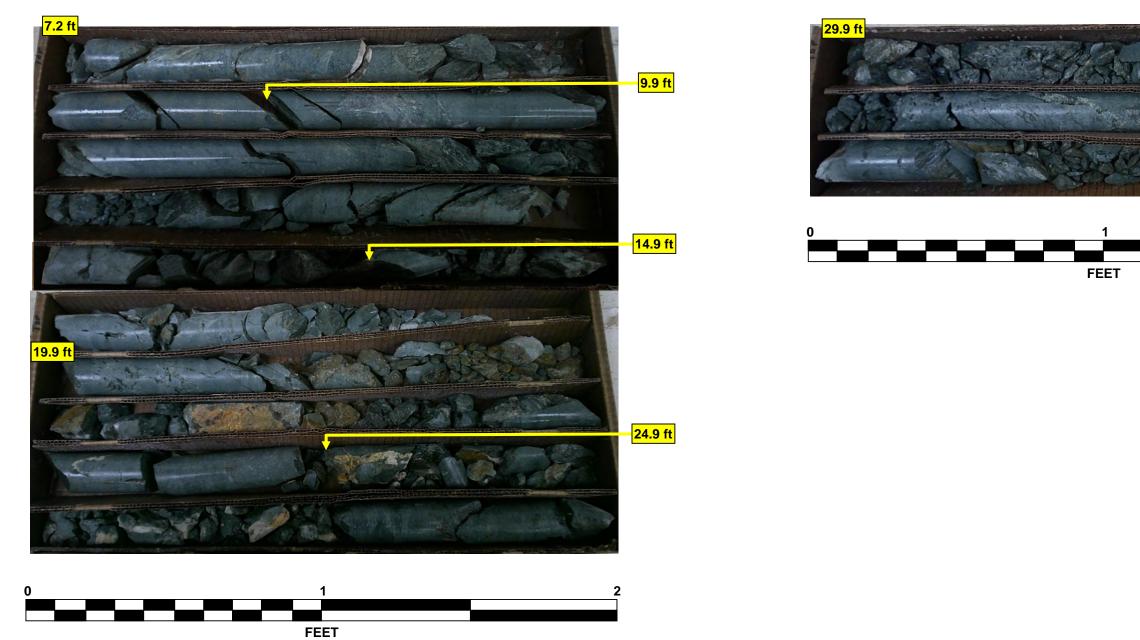
CORE LOG

١T	YC	СНАТНА	M	GEOLOGIST F	P. Perry			
Bus	ines	s		•			GROUM	ID WTR (ft)
	OF	FSET :	34 ft RT	ALIGNMENT -	L-		0 HR.	NM
	NO	RTHING	707,263	EASTING 1,95	3,227		24 HR.	1.7
			DRILL METHOD SP	T Core Boring		HAMME	R TYPE	Automatic
	со	MP. DA	TE 08/14/24	SURFACE WAT	ER DEPI	TH N/A	Ą	
۸ D	L		_					
())	O G	ELEV. (ESCRIPTION AND I	REMARKS	5		DEPTH (ft)
		`		Begin Coring @	7.2 ft			
8) %	R	365.2	Moderately Sever	CRYSTALLINE e to Slightly Weathe	ROCK	o Moder	ately Har	7.2
/0		-	Gray-White-Green (Metavolcanic Rock)	, with Very	/ Close t	o Modera	tely
		-		Close Fracture S				
		- 357.5		GSI=30-3	5			14.9
4) %	R	_	Moderately S Gray-Green-Yellow-V	Severe Weathering, S	Soft to Mo	derately	Hard, Close to (
	P	-		Fracture Spa	cing	un vory (
		F	14	GSI=20-2 eathered Rock Sea/		1.0'		
	R	- 	V	reallieleu Rock Sea	111 19.9-2	1.9		
		F						
		-	10	/eathered Rock Sea	m 25 0' 2'	7 0'		
		_	v	reathered Noek Sea	111 20.0 -21	1.5		
0)		- 342.5	Madarataly Cayora	to Moderately Weath	arad Caf	t to Mod	aratalı I l	29.9
8) %			Gray-Green (Meta	volcanic Rock), with	Very Clos	e to Clo	se Fractu	ire
		- - 337.5		Spacing	-			34.9
		- 337.5	Boring Terminated a	GSI=30-34 t Elevation 337.5 ft Ir	5 n Crystallii	ne Rock	(Metavolo	canic
		-		Rock)				
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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-B 7.2 to 34.9 Feet





										-		RE I					-	
WBS	48599	9.1.1			Т	IP F	R-5963	A		COUN	ITY	СНАТН	IAM				GEOLOGIST T. Wenner	
SITE	DESCR		Cha	atham	Parkv	vay fr	om US	15-5	01 to	US 64	Busi	ness						GROUND WTR (f
BORI	NG NO.	. L_76	675_EE	32-A	s	TAT	ON 7	7+37			OF	FSET	22	ft LT			ALIGNMENT -L-	0 HR. Dr
	AR ELI						L DEP1		.1 ft			ORTHIN			68		EASTING 1,953,273	24 HR. Dr
	RIG/HA									4			-			DН		J IER TYPE Automatic
	ER L						T DATE				0	OMP. D					SURFACE WATER DEPTH N	
		1	BIC	ow co						• ER FOO				SAMP.		1 L	SURFACE WATER DEFTH IN	
LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft			0	2	25 1	5000S P		75	100		NO.	моі	0	SOIL AND ROCK DES ELEV. (ft)	CRIPTION DEPTH
380	-	+															 378.0 GROUND SURF	ACE
-	377.0	1.0	3	3	4											\mathbf{N}	RESIDUAL Medium Stiff, Orange-Tan, S	
75	374.6 -	- 3.4				┤┝		· ·			•	· · · ·			M			
	372.0	- - 6.0	7	6	13	:	1	9				 			м		(A-4)	
70	370.0	L	100/0.3	3				. .	·	<u> </u>	· - -	100/0.3	§♥			10	370.0 Gray (Metavolcanic	OCK
	- 370.0	<u> </u>	60/0.1			╎┝╍					-	60/0.1	•				CRYSTALLINE R	OCK
	-	ŧ															- (Metavolcanic R Boring Terminated with Penetration Test Refusal at	n Standard Elevation 369.9
	-	Ŧ															ft In Crystalline Rock (Meta	
	-	Ŧ															Surficial Organic Soil	0.0 - 0.6'
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GEOTECHNICAL BORING

					BOR		7				ı —										RE				
WBS 48599.1.1			P R-5963A		UNTY CH				GEOLOGIST T. Wenner			S 4859					R-596				CHATH	AM	GE	EOLOGIST T. Wenne	
SITE DESCRIPTIO									T	GROUND WTR (ft)						- <u>·</u>		S 15-501	to US						GROUND
BORING NO. L_7	'675_EB2-C	S	ATION 77+32	2		ET 2 ft R			ALIGNMENT -L-	0 HR. Dry		RING NO				-	TION				FFSET			IGNMENT -L-	0 HR.
COLLAR ELEV. 3			TAL DEPTH		NOR	HING 70			EASTING 1,953,284	24 HR. 3.1		LAR EL						PTH 14.7		N	ORTHIN	G 707,346		ASTING 1,953,284	24 HR.
DRILL RIG/HAMMER	EFF./DATE									MER TYPE Automatic				EFF./DA	ATE CG2			78% 05/06/				DRILL METHO		-	HAMMER TYPE
DRILLER L. Ard			ART DATE 08			P. DATE (A . 1	SURFACE WATER DEPTH	N/A		LLER				-		FE 08/05	6/24	C	OMP. D	ATE 08/22/24	SU	JRFACE WATER DEP	TH N/A
ELEV DRIVE (ft) DRIVE ELEV (ft)	H BLOW C		0 2 <u>5</u>	OWS PER F	-001 75	100 SAN	/IP. ▼	0	SOIL AND ROCK DES						DRILL			1 7.1 ft	STRA	TAI					
(it) (ft) (it)	0.51	0.51		1			<u>, ум</u>	OI G	ELEV. (ft)	DEPTH (ft)	ELEV (ft)	/ RUN ELEV (ft)	DEPTH (ft)	H RUN (ft)	RATE (Min/ft)	REC. (ft)	JN RQD (ft) %	SAMP. NO.	REC. (ft)	TAL RQD (ft) %	ELEV.	(7)	DESC	RIPTION AND REMARKS	3
380													-			%	%			<u>%</u> C	<u>ELEV.</u>	(π)	Ba	egin Coring @ 7.6 ft	
									- GROUND SURF	-ACE 0.0	370	6 370.6	- 7.6 - 9.7	2.1	N=60/0.0	0 (2.0)	(1.1)		(7.0)	(3.7)	370.6) / am a Oli adatha		CRYSTALLINE ROCK	
377.2 1.0	18 29	18					м		RESIDUAL Dense, Gray, Silty Fine to	-		300.5	<u> </u>	5.0	2:58/1.0	(5.0)	(2.6)		99%	52% , ; J	Ŧ	(Metavo	Icanic Rock)	to Fresh, Moderately Har , with Very Close to Close	Fracture Spacing
375				•47					(A-2-4), with trace grav	el-sized rock	365		Ŧ		3:08/1.0	100%	52%				ł			GSI=40-45	
372.2 6.0	48 52	48/0.4		+ - :	· <u>···</u> ··	00/0.9			WEATHERED F	ROCK		363.5	+ 14.7		N=60/0.0 3:13/1.0 2:58/1.0 0:18/0.1 3:08/1.0 3:04/1.0 3:37/1.0 4:55/1.0 2:43/1.0	į		-			363.5	Boring Termi	inated at Fle	vation 363.5 ft In Crystalli	ne Rock (Metavolcan
370 370.6 7.6						00/0.3 00/0.0			Gray (Metavolcani	7.6			‡								Ę	Boning Term		Rock)	
Ī	00/0.0					[]			Gray-White (Metavolo				‡								-		Sur	ficial Organic Soil 0.0 - 1.0	כ'
I I I					· · · · · · · · · · · ·	· ·			REC=99%				‡								F				
365									- RQD=52% - GSI=40-45	14.7			‡								È.				
			-1 1	I	I				Boring Terminated at Elev Crystalline Rock (Metav	ation 363.5 ft In			ŧ								F				
									- Surficial Organic Soi				Ŧ								F				
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CORE LOG

G REF	PORT			SHEET
	GEOLOGIST T. Wenne	er		
			GROUN	ID WTR (ft)
	ALIGNMENT -L-		0 HR.	Dry
5	EASTING 1,953,284		24 HR.	3.1
THOD SPT	Core Boring	HAMM	ER TYPE	Automatic
'24	SURFACE WATER DEP	TH N/	A	
D	ESCRIPTION AND REMARKS Begin Coring @ 7.6 ft CRYSTALLINE ROCK	6		DEPTH (ft) 7.6
	ered to Fresh, Moderately Hard ock), with Very Close to Close GSI=40-45			nite
				14.7
erminated at	t Elevation 363.5 ft In Crystallir Rock)	ne Rock	(Metavolca	
	Surficial Organic Soil 0.0 - 1.0)'		



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



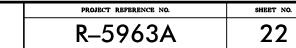
											RE L	.00					
WBS	48599	9.1.1			Т	I P R-59	63A		COUN		СНАТНА	M			GEOLOGIST T. Wenner		
SITE	DESCR		Cha	atham	Parkw	ay from	US 1	5-501 to	0 US 64	Busir	ness					GROUND	WTR (ft
ORI	NG NO.	. L_76	675_EE	B2-B	s	TATION	77+	15		OF	FSET	42 ft RT			ALIGNMENT -L-	0 HR.	Dr
OLL	AR ELI	EV. 37	75.4 ft		Т	OTAL DI	РТН	8.5 ft		NC	ORTHING	3 707,3	304		EASTING 1,953,296	24 HR.	Dr
						CME-550			24					D H		ER TYPE A	
	ER L					TART D				CC	OMP. DA				SURFACE WATER DEPTH N/		
		1	BLC	OW CO				BLOWS				SAMP.		1 L]		~	
LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	1	0.5ft	0	25		50	75	100	NO.	мо	0	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION	DEPTH (
80		+ + +															
375	374.4 -	1.0							<u> </u>				м	\square	- 375.4 GROUND SURFA		1
	-	ŧ	16	64	36/0.3						100/0.8				Very Stiff, Brown, Silty CLAY roots	(A-7), with tra	ce
370	370.9	4.5	100/0.4	1			:	· · · · ·							WEATHERED RC Gray, (Metavolcanic	DCK Book)	
<u>,,,,</u>	369.4	6.0	100/0.2				-				100/0.4				- Gray, (Metavoicanic	RUCK)	
	366.9	8.5					•	 	 	· ·	100/0.5			M	366.9		8
	- - -	+	60/0.0								60/0.0				Boring Terminated with Penetration Test Refusal at B ft On Crystalline Rock (Meta	Elevation 366.	.9 ()
	-	ŧ													- - Surficial Organic Soil (0.0 - 0.2'	
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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)

Ahr M Atmithy

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

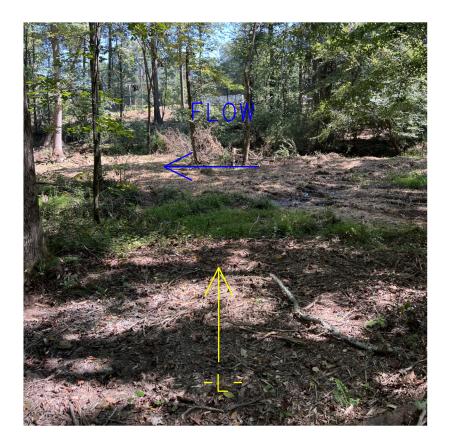


PHOTO #1: VIEW NEAR END BENT NO. 1, FACING UPSTATION



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



CONTENTS

<u>SHEET NO.</u>	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE
5-6	CROSS SECTIONS
7-14	BORE LOGS, CORE LOGS, & ROCK CORE PHOTOGRAPHS
15	SOIL TEST RESULTS
16	SITE PHOTOGRAPHS

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CHATHAM

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

SITE DESCRIPTION BRIDGE NO. 180B02(SB) AND BRIDGE NO. 180B03(NB) ON SR 2700 (CHATHAM PARK WAY) OVER ROBESON CREEK -L- STA. 134+65

5963A Ŕ REFERENCE

599 48. PROJECT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5963A	1	

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 SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSIFICACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOL 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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOLL 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 CAUTOMED 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 OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND COLONTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS FOR UNITERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTION FOR MA THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION,

- NOTES: I, THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR CUARANTEED 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 REDUCETED 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.

P. PERRY, E.I.T.
CG2 EXPLORATION
INVESTIGATED BY <u>CG2, PLLC</u>
DRAWN BY <u><i>M.M.ALISHER, E.I.T.</i></u>
CHECKED BY <u>M. WALKO, P.E.</u>
SUBMITTED BY
DATE
Prepared in the Office of:
GEOTECHNICAL GROUP
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800 CHARLOTTE, NC 28227
(980) 339-8684
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GINE CAN
THEW DUIL
DocuSigned by:
Matt Brewer 01/13/2025
Matt Brewer 01/13/2025

PERSONNEL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN		ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	TERMS AND DEFINITIONS
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.	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 EOUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	<u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA. <u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
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: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION		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 CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	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.
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.		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-8 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7		POCK (NCP) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
STMBOL	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
X PASSING SII T-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY MUCK, *40 30 MX 50 MX 51 MN S0 MX 51 MN		WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	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	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.
LL – – 40 MX 41 MN	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	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 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 HIGHLY		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.) I 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 CRAVEL AND SAND SOULS SOULS		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU		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		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	- O-M- 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 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 IF OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4 DEVICE 4 TO 10	SOIL SYMBOL SIL SYMBOL SUBJECT OF THE ST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER	VERY ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	INFERRED SOIL BOUNDARY - CORE BORING • SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0		VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2		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 (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER - 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	UNCLASSIFIED EXCAVATION -	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		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 - USED IN THE TOP 3 FEEL OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. <u>SLICKENSIDE</u> - 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 A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY γ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\dot{\gamma}_{d}$ - DRY UNIT WEIGHT CSE, - COARSE ORG, - ORGANIC	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 <u>SAMPLE ABBREVIATIONS</u>	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	<u>STRATA ROCK QUALITY DESIGNATION (SRQD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) - WEI - (W) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK:
	HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FEET
SL SHRINKAGE LIMIT		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 ATTAIN OPTIMUM MOISTURE		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	ROADWAY DESIGN FILES PROVIDED BY NCDOT DATED 07/18/2024.
PLASTICITY	CME-55 X 8' HOLLOW AUGERS CORE SIZE: X 8' HOLLOW AUGERS H	INDURATION	BRIDGE BORING COLLAR ELEVATIONS OBTAINED USING CARLSON BRX-7 (SURVEY GRADE GPS).
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550 HARD FACED FINGER BITS X N Q	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	CT = CORING TERMINATED
NON PLASTIC 0-5 VERY LOW		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS:	NM = NOT MEASURED
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST	GENILE BLUW BY HAMMER DISINIEGRAIES SAMPLE.	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	REF = REFUSAL
COLOR		INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).		DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REOUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
			DHTE: 0-13-14

PROJECT REFERENCE NO.

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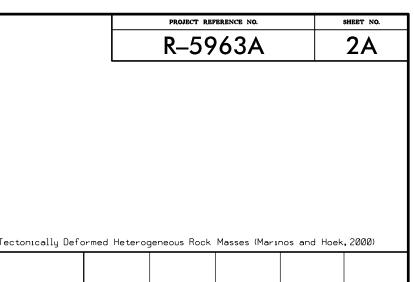
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

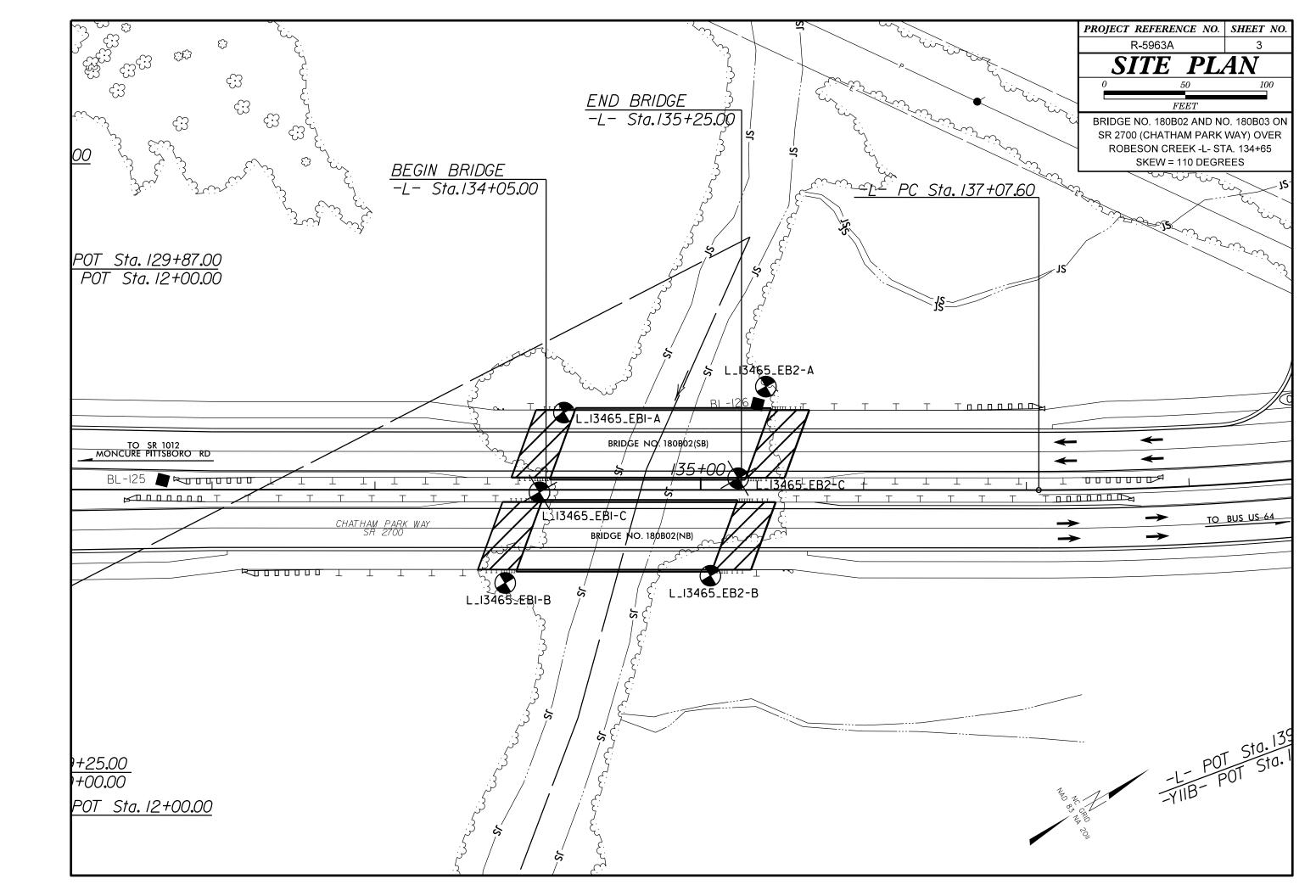
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

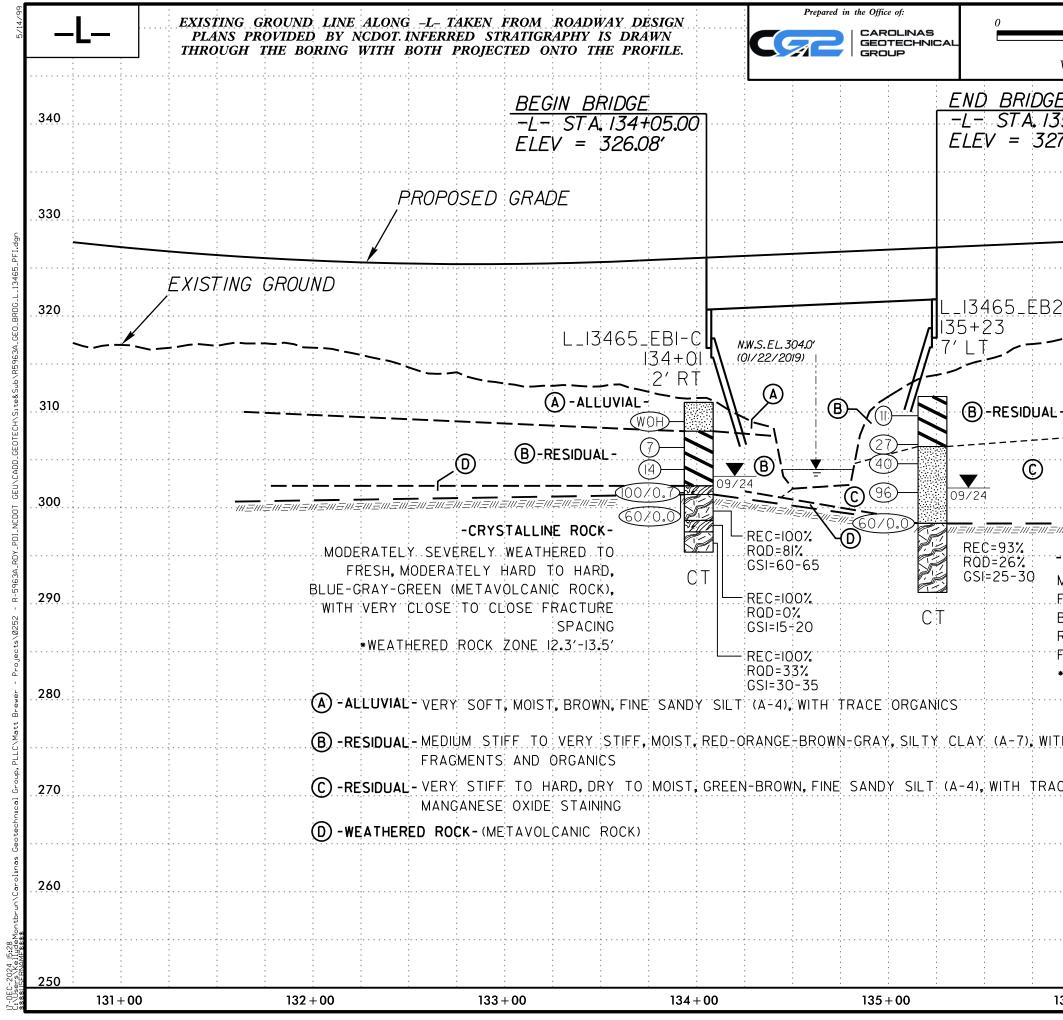
AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed F	Rock Mass (Marı	nos and Hoek,2	2000)			AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for T
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the	Gook Mass (Mari GOOD rough, fresh unweathered surfaces	ghtly weathered, ıron staıned	moderately weathered and surfaces	ided, highly weathered surfaces pact coatings or fillings ar fragments	JR ided, highly weathered surfaces t clay coatings or fillings	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average valu of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for
fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis. STRUCTURE	VERY Very	CREASING SI	FAIR Smooth, altered	POOR Slickenside with compact	VERY POOR Slickensided, F with soft clay	by a slight shift to the right in the columns for fai poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
				ΑLITY		COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			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.
BLOCKY - well interlocked un- disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		70 60				B. Sand- stone with thin inter-
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		5	0			layers of siltstone
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 .
discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces				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	Manual into small rock pr



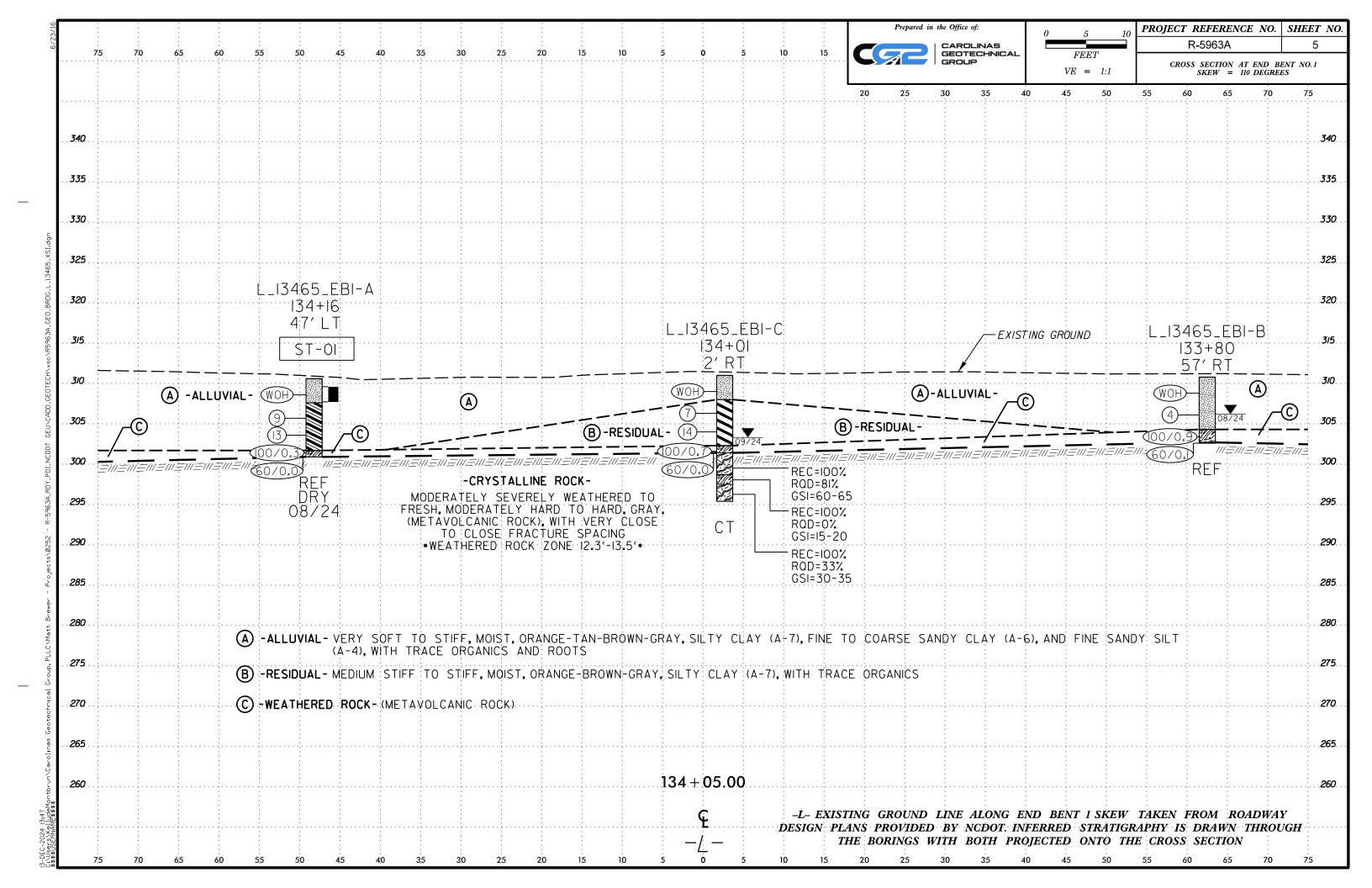
Montest Control Frequential Entrol Montest SURFACE CONDITIONS OF DISCONTINUTIES Entrol Entrol Montest Control Very Rough, fresh unweathered surfaces Entrol Entrol Montest Conton Very Goodo - Very Rough, fresh unweathered surfaces Montestelly Montestelly Montest Conton Very Shorth, moderately Montestelly Montestelly Montest Conton Very Smooth, moderately Montestelly Montest Continued surfaces Montestelly Montestelly Montest Continued surfaces Montestelly Montestelly Montest Conting of Anglichan surfaces Montestelly Montestelly Montest <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th></td<>						
A 60 E. Weak sultstone or clayey shale with sandstone layers 50 B C D E 40 Pformed, driaulted, hale or sultstone drormed an tructure 30 F 20	SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)	VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces		VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
sultstone or clayey shale with sandstone layers eformed, drfaulted, bale or sultstone deformed forming an tructure eformed silty forming e ens of ansformed			A			
eformed silty corming a entropy point pockets ens of ansformed	siltstone or clayey shale with sandstone		В	СЦ	Þ	
forming a a with pockets ers of ansformed	torming an			30		
	forming a with pockets ers of ansformed			¢	H	+ ¹⁰

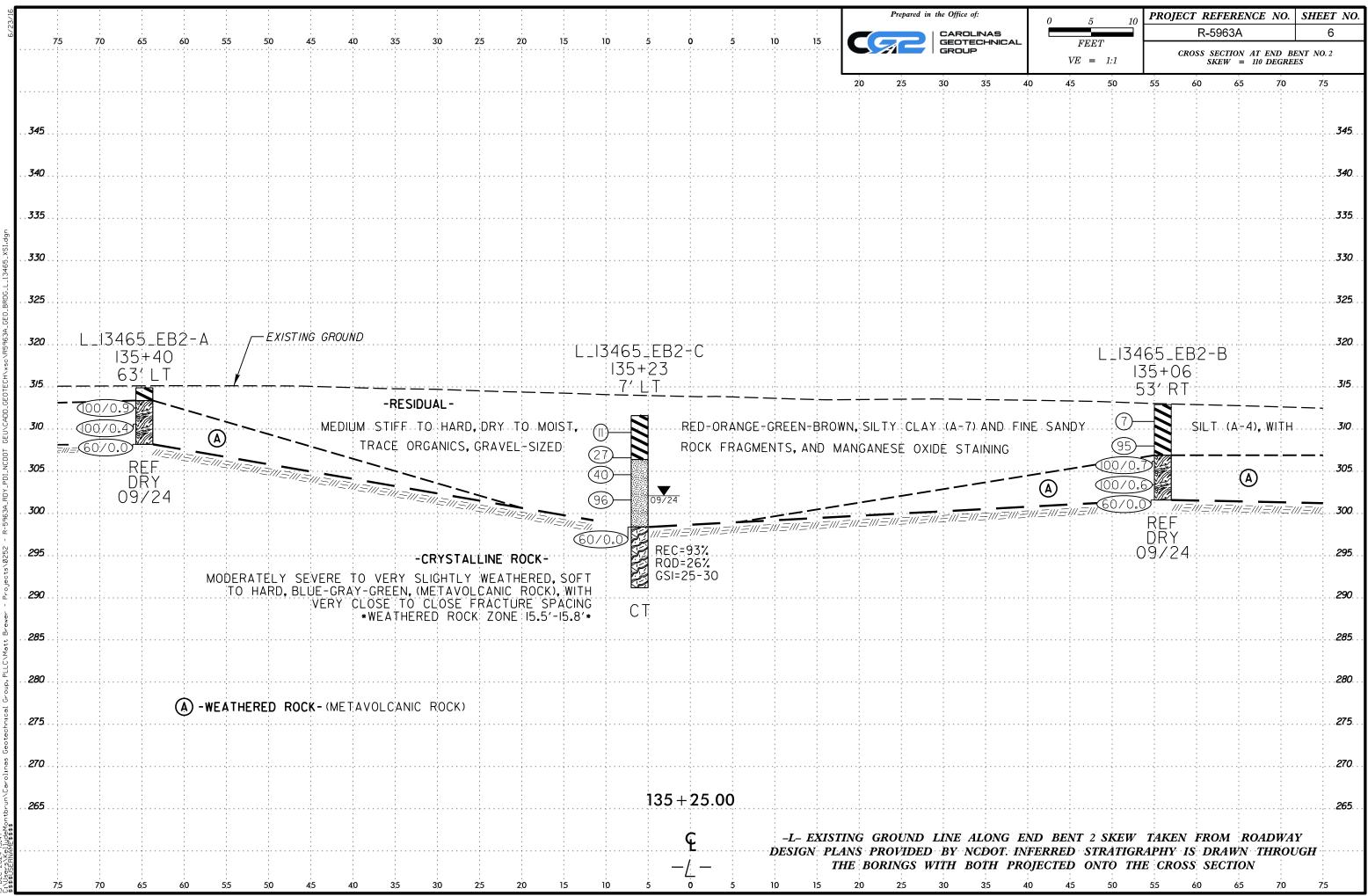
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			330
°-C - ─ ─ ─			320
			310
n <u>=m</u> =m=m=	<u></u>	= <u>m=m=m=m=m=m=</u> m=m=m=m	300
MODERATE FRESH, SO BLUE-GRA	FT TO HAR Y-GREEN (M	LY WEATHERED TO D, ETAVOLCANIC DSE TO CLOSE	290
	SPACING ED ROCK ZO	DNE 15.5'-15.8'	280
	GRAVEL-SIZ L-SIZED RO	ED ROCK CK FRAGMENTS AND	270
			260
36+00		137+00	250





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WBS	48599.1.1	1			Т	IP	R-5963A	4	COUNT	CHATH	AM			GEOLOGI	ST P. Perry			
SITE	DESCRIPTI	ION	Cha	tham I	Parkwa	ay f	rom US 1	5-501 to	US 64 Bus	iness							GROU	ND WTR (ft)
BORI	NG NO. L	_134	465_E	B1-A	S	TA	TION 13	34+16		OFFSET	47 ft L	-		ALIGNME	NT -L-		0 HR.	Dry
COLL	AR ELEV.	31	0.6 ft		Т	от	AL DEPT	H 9.7 ft		NORTHIN	G 712	311		EASTING	1,955,433		24 HR.	Dry
DRILL	RIG/HAMMEI	R EFF	F./DATE	E C	G24113	S CM	1E-550X 78	% 05/06/20)24		DRILL	METHO	D H	I.S. Augers		НАММ	ER TYPE	Automatic
	.ER J. Est						RT DATE			COMP. DA								
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(ft)	(ft) (1	ft)	0.5ft	0.5ft	0.5ft	C) 2	25	50	75 100	NO.	мс		ELEV. (ft)				DEPTH (f
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310	309.6 - 1	.0	WOL	WOU	WOH	╢								310.6	AL	ID SURF		0.
			WON	WOII			0					M 22%	, 🌉	- 307.6	/ Soft, Brown, F	ace orgar	nics	<u>, 3</u>
305	+	9	3	3	6	1	9					м		St St	tiff, Orange-Tar andy CLAY (A-	n-Gray, F 6), with tr	ine to Coa ace organ	arse nics
	304.6 + 6	.0	4	5	8	11	• • • 13				11	м		F			5	
	301.7 - 8 300.9 - 9	.9 .7	100/0 0				::: <u>:</u>	· · · · ·						301.7				8.
F	<u>-300.9 + 9</u>		100/0.3 60/0.0			\uparrow				100/0.3 60/0.0	┛			<u> </u>	Gray-White (N	ERED R Metavolca	anic Rock) / 9
	ŧ													F F Pene	Boring Termir etration Test R	efusal at	Elevation	300.9
	‡													ft O	n Crystalline Ro	ock (Meta	avolcanic	Rock)
	+													- <u>Othe</u>	<u>er Samples:</u> T-01 (1.0 - 3.0)			
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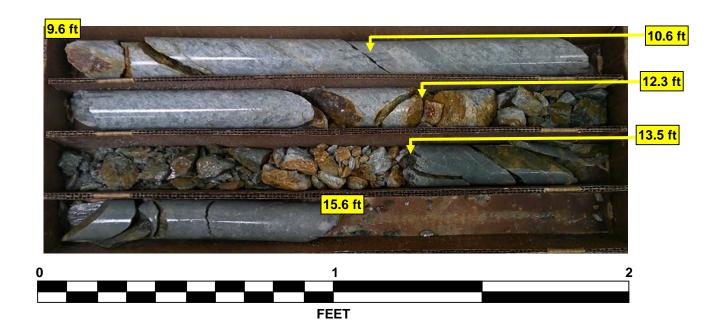
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	DESCRIPTIO			Parkw	vay	from US 1	5-501 to l	JS 64 Bus	siness								VTR (ft)	- F		DESCR		
BOR	I NG NO . L_1	3465_E	B1-C	5	STA	ATION 13	84+01		OFFSET	2 f	t RT			ALIGNMENT -L-		0 HR.	Dry	ſ	BORI	NG NO.	L_13	46
COL	LAR ELEV. 3	311.0 ft		T	гот	TAL DEPT	H 15.6 f	t	NORTHIN	G	712,2	74		EASTING 1,955,46	8	24 HR.	7.7	Γ	COLL	AR ELE	EV. 31	1.0
DRILL	. RIG/HAMMER E	EFF./DAT	E C	G2411	3 Cl	ME-550X 78	% 05/06/20	24		D	RILL M	etho) SF	T Core Boring	HAMN	IER TYPE AU	Itomatic	ſ	DRILL	RIG/HAM	IMER EF	F./I
DRIL	LER J. Estep	D		5	STA	ART DATE	08/01/2	4	COMP. D	ATE	09/0)4/24		SURFACE WATER	DEPTH N	/A		f	DRILI	ER J.	Estep	_
ELEV	DRIVE ELEV DEPT	H BLC	ow co	UNT			BLOWS	PER FOO	T		SAMP.	▼/	L					F	CORE	SIZE	NQ	
(ft)	(ft) (ft)		0.5ft	0.5f	t	0 2	5	50	75 100	0	NO.	мо		ELEV. (ft)	ROCK DES		DEPTH (ft)	h	ELEV	RUN ELEV	DEPTH	F
							-											ľ	(ft)	ELEV (ft)	(ft)	
315																		[301.4			
	+													-				Ē	300	301.4 - 300.4 _	- <u>9.6</u> 10.6	L
1	1													311.0 GRC	UND SURF	ACE	0.0			-	-	
310	310.0 1.0		WOH	WO										_	ALLUVIAL					- 295.4 -	- 15.6	
	307.3 3.7				' •	N	· · · ·					М		Very Soft, Brov <u>308.0</u>	n trace orga	nics			ŀ	-	- 10.0	t
205	1 I	3	3	4		7			.			М	N	Medium Stiff to	RESIDUAL Stiff, Orang		,			-	Ł	
305	305.0 6.0	3	4	10		••••14							N			ace organics				-	F	
1	302.3 8.7 301.4 9.6	16	84/0.2	,		:: !	· · · · ·					_ ♥_		302.3 301.4 WFA	THERED R	OCK	<u>8.7</u> 9.6			-	F	
300		60/0.0		1			 	· · · ·	100/0.7					Orange-Gr	ay (Metavolo	canic Rock)	9.0			-	F	1
	l 1						· · · ·								STALLINE F		12.3 13.5			-	-	
	<u>{</u>			1										201.0	REC=100%					-	F	1
		+		1	╉	1		1		┻┤					RQD=81% GSI=60-65		15.6			-	F	
	l 1														THERED R		-			-	-	
	<u>+</u>														Metavolcanio					-	-	
	Ŧ												F		REC=100% RQD=0%					-	-	
	Ŧ													CRY	GSI=15-20 STALLINE F	ROCK	_			-	-	
	 														Metavolcanio					-	-	
	ļ												F		REC=100% RQD=29%					-	-	
	l Ŧ														GSI=25-30					-	-	
	1												F	- Boring Termin Crystalline R	ated at Elev ock (Metavo	ation 295.4 ft Ir blcanic Rock)	1			-	-	
	ļ													Surficial	Organic Soi	0.0 - 0.3'				-		
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	‡																	NCDOT CORE DOUBLE R5963A_RDWY_GEO_GTM.GPJ_NC_DOT.GDT_12/17/24		-	Ē	
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																		DOT		-	F	
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SITE DESCRIPTION Chatham Parkway from US 15-501 to US 64 Business GROUND WTR (f BORING NO. L_13465_EB1-C STATION 134+01 OFFSET 2 ft RT ALIGNMENT -L- 0 HR. D COLLAR ELEV. 311.0 ft TOTAL DEPTH 15.6 ft NORTHING 712,274 EASTING 1,955,468 24 HR. 7 DRILL RIG/HAMMER EFF/DATE CG24113 CME-550X 78% 05/06/2024 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER J. Estep START DATE 08/01/24 COMP. DATE 09/04/24 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 6.0 ft ELEV. (ft) DESCRIPTION AND REMARKS DEPTH N/A 01.4 0.4 0.7 KCT RCD Kft KIC RY Moderately Weathered to Very Slightly Weathered, Moderately Hard, Gray (Metavolcanic Rock), with VClose Fracture Spacing 1 01.4 0.0 0.50 0.50/1.0 (2.1) 0.00/1.0 297.5 0.01/4 CRYSTALLINE ROCK 00% 0% 0.0% 0% 0.0% 0% 0.0% 0%	VBS 48599.1.1	TIP R-5963A COUNTY	Y CHATHAM	GEOLOGIST P. Perry	
BORING NO. L_13465_EB1-C STATION 134+01 OFFSET 2 ft RT ALIGNMENT -L- 0 HR. D COLLAR ELEV. 311.0 ft TOTAL DEPTH 15.6 ft NORTHING 712,274 EASTING 1,955,468 24 HR. 7 DRILL RIGHAMMER EFFJDATE CG24113 CME-550X 78% 05/06/2024 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER J. Estep START DATE 08/01/24 COMP. DATE 09/04/24 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 6.0 ft ELEV. (ft) DESCRIPTION AND REMARKS DEPTH 04/24 DESCRIPTION AND REMARKS DEPTH 01.4 0.4 4 4 0.4 0.6 ELEV. (ft) DESCRIPTION AND REMARKS DEPTH 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.6		I		· ·	GROUND WTR (ft
COLLAR ELEV. 311.0 ft TOTAL DEPTH 15.6 ft NORTHING 712,274 EASTING 1,955,468 24 HR. 7 DRILL RIGHAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER J. Estep START DATE 08/01/24 COMP. DATE 09/04/24 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 6.0 ft Comp. DATE 09/04/24 SURFACE WATER DEPTH N/A OIL4 DEPTH (ft) RUN (ft) DRILL RATE (ft) RUN (ft) RUN (ft) RUN (ft) RUN (ft) RUN (ft) COMP. RUN (ft) SAMP. (ft) STRATA REC. RUN (ft) DEPTH (ft) DEPTH (ft) RUN (ft) OPHIA (ft) RUN (ft) OPHIA (ft) RUN (ft) OPHIA (ft) NO. SAMP. (ft) STRATA (ft) Comp. SAMP. (ft) STRATA (ft) DEPTH DESCRIPTION AND REMARKS DEPTH 01.4 98.5 10 48.5 10 100%, 70%, 3537/10 100%, 70%, 100%, 42% 100%, 298, 100%,		-		ALIGNMENT -L-	
DRILL RIGHAMMER EFF/DATE CG24113 CME-550X 78% 05/06/2024 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER J. Estep START DATE 08/01/24 COMP. DATE 09/04/24 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 6.0 ft Image: Core Social of the				EASTING 1,955,468	
DRILLER J. Estep START DATE 08/01/24 COMP. DATE 09/04/24 SURFACE WATER DEPTH N/A CORE SIZE NQ TOTAL RUN 6.0 ft Image: Complex comp				l	
CORE SIZE NQ TOTAL RUN 6.0 ft ILEV RUN (ft) DEPTH (ft) RUN (ft) DRILL (ft) RC (ft) RUN (ft) SAMP. (ft) STRATA REC. ROD (ft) DESCRIPTION AND REMARKS 001.4 DE DE RUN (ft) DE RC (ft) SAMP. (ft) STRATA (ft) DESCRIPTION AND REMARKS 001.4 DE DE RC (ft) RC (ft) SAMP. (ft) STRATA (ft) DESCRIPTION AND REMARKS 001.4 DE DE RC (ft) SAMP. (ft) STRATA (ft) DESCRIPTION AND REMARKS 001.4 D6 1.0 N-60/00 (1.0) (0.7) SAMP. (5.0) STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) DESCRIPTION AND REMARKS 295.4 1005 0.0 STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) DESCRIPTION AND REMARKS 295.4 1005 0.7 STATA (ft) STATA (ft) STATA (ft) STATA (ft) STATA (ft) DESCRIPTION AND REMARKS 295.4 1005 <td></td> <td></td> <td></td> <td>-</td> <td></td>				-	
RUN (ft) DEPTH (ft) RUN (ft) DRILL (ft) RUN (ft) DRILL (ft) RUN (ft) SAMP. (ft) STRATA REC. (ft) L (ft) DESCRIPTION AND REMARKS 001.4					
295.4 15.6 5:16/1.0 100% 0% 297.5 GSI=60-65 1 295.4 15.6 3:30/1.0 100% 0% 295.4 GSI=60-65 1 100% 0% 295.4 100% 0% 295.4 WEATHERED ROCK 1 00% 29% 295.4 GSI=60-65 1 1 00% 29% 295.4 WEATHERED ROCK 1 00% 29% 295.4 Weathered to Fresh, Moderately Hard to Hard, Gray (Metavolcanic Rock), with Very Close to Close Fracture Spacing 1 00% 29% 0 0 0 0 0 00% 0 0 0 0 0 0 0 00% 0 0 0 0 0 0 0 0 0 0 0		% % %	G ELEV. (ft) 301.4	Begin Coring @ 9.6 ft CRYSTALLINE ROCK	DEPTH
Boring Terminated at Elevation 295.4 ft In Crystalline Rock (Metavolcanic Rock)	200 3004 100 5.0 4:54/1.0 3:57/1.0 3:00/1.0 3:00/1.0 295.4 15.6 5:16/1.0 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Moderately Weathere (Metavolca 297.5 295.4 Moderately Severely V	anic Rock), with VClose Fracture GSI=60-65 WEATHERED ROCK Gray (Metavolcanic Rock) GSI=15-20 CRYSTALLINE ROCK Weathered to Fresh, Moderately ock), with Very Close to Close Fra	Spacing 12 13 15 Hard to Hard, Gray
			-	t Elevation 295.4 ft In Crystalline Rock)	Rock (Metavolcanic

GEOTECHNICAL BORING REPORT



Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs L_13465_EB1-C 9.6 to 15.6 Feet



								D	<u>ORE L</u>	.06							
WBS	48599	.1.1			Т	ΊP	R-5963A	COUNT	Y CHATHA	M			GEOLOGI	ST P. Perry			
SITE	DESCRI	PTION	Chat	ham P	Parkwa	ay f	from US 15-501 to U	S 64 Busi	iness							GROUN	D WTR (ft
	NG NO.						ATION 133+80		OFFSET	57 ft RT			ALIGNME	NT -L-		0 HR.	5.3
	AR ELE						TAL DEPTH 8.2 ft		NORTHING		27			1,955,505		24 HR.	4.6
				CG2			E-550X 78% 05/06/2024	,	1	1) H.S	 S. Augers		HAMM	J IER TYPE	
	LER J.						ART DATE 08/01/2		COMP. DA					WATER DEF			
ELEV (ft)		DEPTH (ft)		W CO 0.5ft	UNT		BLOWS	PER FOOT 50		SAMP. NO.		L O G	ELEV. (ft)	SOIL AND RO			DEPTH
<u>315</u> 310	309.8 -	-	WOH	WOH	WOF		• •		· · · · · · · · · · · · · · · · · · ·		м		 	ery Soft to Soft, hdy SILT (A-4),	Brown- with trac	Orange, Fii	ne and
305			3 60/0.1	2 9	2 91/0.4				- 100/0.9		M				ERED R Metavolo LLINE R avolcanio ated with efusal at ck (Meta	OCK canic Rock) OCK c Rock) h Standard Elevation 3 volcanic Ro	302.6
													- - - - - - - - - - - - - - - - - - -				

													<u>_OG</u>							
WBS 4	48599	.1.1			Т	P R	-5963/	4		COUN	TY C	HATH	M			GEOLOG	ST P. Perri	ry		
SITE DE	ESCR	IPTION	Chat	ham F	arkwa	y fron	n US 1	5-501	to US	64 Bu	sines	6							GROUND) WTR (f
ORING	g no.	L_13	465_EI	B2-A	S	ΓΑΤΙΟ	DN 13	35+40			OF	FSET	63 ft LT			ALIGNME	NT -L-		0 HR.	Dr
OLLA					_		DEPT				+		G 712,4			EASTING	1,955,482		24 HR.	Dr
RILL RI				E CG2	24113 C	ME-55	50X 78%	5 05/06/	2024						о н.:	S. Augers		HAMN	LIER TYPE A	
RILLE							DATE				cc	MP. DA	TE 09				WATER DE			
		DEPTH	1	w co						ER FOO			SAMP		1 - 1	1				
(ft) E	ELEV (ft)	(ft)	·	0.5ft	i	0	2	25	50)	75	100	NO.	мо	O G	ELEV. (ft)	SOIL AND R	OCK DES	CRIPTION	DEPTH
310	313.9 - 	-	5		92/0.4		 	· · · · · · ·	 	· · · ·	· ·	100/0.9	I I				R dium Stiff to H CLAY (A-7), gravel-sized Mangane	with trace rock fragi se Oxide	ge-Brown, S e organics, nents, and staining	
			60/0.0										11			- Pen		HERED R e (Metavol inated wit Refusal at Rock (Met	OCK canic Rock) h Standard Elevation 30 avolcanic Ro	08.2

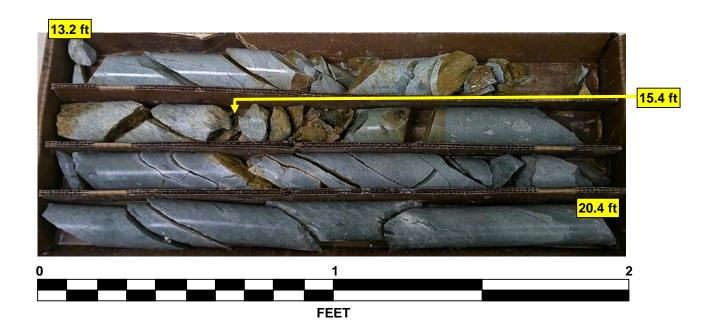
GEOTECHNICAL BORING REPORT CORE LOG

										D	ORE		7																
WBS	48599	.1.1			•	TIP	R-5963	A	(COUNT	Y CHATH	AM				G	EOLOGIST P. Perry	1		WBS	48599	.1.1			TIP	R-596	63A	C	OUN
SITE	DESCRI	IPTION	Cha	tham	Parkv	way fro	om US	15-501	to US	5 64 Bu	siness							GROUND WTR (ft)		SITE	DESCR	IPTION	Cha	tham Par	kway f	rom US	S 15-501	to US	64 E
BORI	NG NO.	L_13	3465_E	B2-C		STAT	ION 1	35+23			OFFSET	7 ft L	Т			A	LIGNMENT -L-	0 HR. NM	[BOR	NG NO.	L_13	465_E	B2-C	STA	TION	135+23		
COLI	AR ELE	EV. 3 ⁷	11.6 ft			ΤΟΤΑ	L DEP	TH 20).4 ft		NORTHIN	G 71	2,38	33		E	ASTING 1,955,522	24 HR. 9.5		COL	AR ELE	EV. 31	11.6 ft		тот	AL DE	PTH 20).4 ft	
DRILL	RIG/HAM	IMER EF	F./DATI	Ε (CG2411	13 CME	E-550X 7	8% 05/0	6/2024			DRIL	L ME	ethoi	DS	SPT Co	ore Boring HAMM	IER TYPE Automatic		DRILL	RIG/HAM	IMER EF	F./DAT	E CG24	113 CN	1E-550X	78% 05/06	6/2024	
DRIL	LER C.	. Odom	I		;	STAR	T DAT	E 09/	04/24		COMP. D	ATE (09/0	4/24		S	URFACE WATER DEPTH N	/A	[DRIL	LER C	. Odom	1		STA	RT DA	TE 09/0)4/24	
LEV	DRIVE ELEV	DEPTH	BLC	-	DUNT			BLO	WS PE	ER FOO	T	SAM	MP.	▼/			SOIL AND ROCK DES		1 [COR	E SIZE	NQ			тот	AL RU	N 7.2 ft		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5f	ft 0		25	50)	75 10	0 NO	э.	Ло		ELE	EV. (ft)	DEPTH (ft)		ELEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	UN RQD	SAMP.	STF REC.	
																				(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft %
5																				298.4									
	-	E														E					298.4 - 296.2 ⁻		2.2	N=60/0.0 2:01/1.0	(2.2) 100%	(0.0)		(6.7) 93%	(1. 26
	210.6				_			· · ·					_			311	1.6 GROUND SURF. RESIDUAL			295	_	-	5.0	2:36/1.0	(45)	(1.9)			
)	310.6 -	- 1.0	4	5	6	- -	11							М		F	Stiff to Very Stiff, Red-Oran	nge, Silty CLAY			-	-		2.24/1.0 3:43/1.0 6:20/1.0	90%	30%			
	- 307.6	- 4.0								· · · · · ·	.					F	(A-7), with trace organics a rock fragment	ts			291.2	20.4		2:24/1.0 3:43/1.0 6:20/1.0 4:40/1.0 3:36/1.0	<u> </u>				<u> </u>
	- 305.6 -	6.0	5	6	21			27		· · · ·	 			М		- 306 -	Very Stiff to Hard, Green-	-Brown, Fine			-	F							
-	-	-	8	16	24	•		· ·	• 40	~~ ·		11		М		F	Sandy SILT (A-4), with trac rock fragments and Mang	ce gravel-sized			-	F				1			1
	302.6 -	- 9.0 -	29	54	42		· · · ·		· ·			96	╞	V		ŀ	staining	,			-	Ł							
)	-	È.	1								• • • • •			D		F					-	E				1			1
	298.4	13.2	60/0.0				 	· ·	· ·	· · ·		, 				- 298	3.4 CRYSTALLINE R	13.2			-	F							1
		Ł	00,0.0							· · ·	.	11				Ł	Blue-Gray-Green (Metavo	olcanic Rock)			-	F							1
5		F	1						•••							F	REC=93%				-	F							1
	_							· ·		· · ·	.	11				Ł	RQD=26% GSI=25-30				-	-							
		-			_								┢		K P	291	1.2 Weathered Rock Zone Boring Terminated at Eleva				-	-							
	-	F														F	Crystalline Rock (Metavo	blcanic Rock)			-	-							
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						GEOLOGIST P. Perry							
01 1		64 Bus						GROUN	ID WTR (ft)				
23				FSET	7 ft LT	ALIGNMENT -L-		0 HR.	R. NM				
	4 ft			RTHING		EASTING 1,955,522		24 HR.	9.5				
5/06	/2024				1	Core Boring	HAMME	R TYPE	Automatic				
9/0	4/24		со	MP. DA	TE 09/04/24	SURFACE WATER DEP	FH N//	Α					
? ft													
P.	I REC.	RATA RQD	L O		D	ESCRIPTION AND REMARKS	3						
•	(ft) %	(ft) %	G	ELEV. (DEPTH (ft)				
	(6.7)	(1.9) 26%		- 298.4		Begin Coring @ 13.2 ft CRYSTALLINE ROCK			13.2				
	93%	26%		-	Moderately to Very s (Metavolcanic Ro	Slightly Weathered, Soft to Ha ock), with Very Close to Close	ard, Blue Fractur	-Gray-Gre e Spacing	een I				
				-		GSI=25-30							
				291.2		eathered Rock Zone 15.5'-1			20.4				
					Boring Terminated at	Elevation 291.2 ft In Crystalli Rock)	ne Rock	(Metavolo	canic				
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Chatham Park Way from US 15-501 to US 64 Business Chatham County, North Carolina Rock Core Photographs L_13465_EB2-C 13.2 to 20.4 Feet

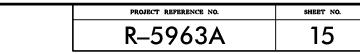


			DUR	ELOG					
WBS 48599.1.1		TIP R-5963A	COUNTY CH	THAM		GEOLOGIS	T P. Perrry		
SITE DESCRIPTION C	hatham Park	way from US 15-501 to L	IS 64 Business					GROUND W	r <mark>R (ft</mark>)
BORING NO. L_13465	EB2-B	STATION 135+06	OFFS	ET 53 ft RT		ALIGNMEN	T -L-	0 HR.	Dry
COLLAR ELEV. 312.9		TOTAL DEPTH 11.3 f		HING 712,33	8	EASTING	1,955,565	24 HR.	Dry
		I 3 CME-550X 78% 05/06/2024		DRILL M	ETHOD H.S	S. Augers		HAMMER TYPE Auton	
DRILLER C. Odom		START DATE 09/03/2		P. DATE 09/0		-	WATER DEP		
	BLOW COUNT	r BLOWS	PER FOOT 50 75	SAMP. 100 NO.	MOI G			CK DESCRIPTION	EPTH (
315 311.9 1.0 310 3	3 3 4	4	· · · · · · · · · · · · · · · · · · ·	· · ·		312.9 Medi	RES	D SURFACE SIDUAL d, Orange-Brown, Silty ith trace organics, ick fragments, and	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	9 21/0.2	1		00/0.6		306.9	Manganese WEATHE	ock fragments, and Oxide staining ERED ROCK Metavolcanic Rock)	6
				50/0.0●		- E - Penet	ration Test Re	ated with Standard fusal at Elevation 301.6 ck (Metavolcanic Rock)	

	SOIL TEST RESULTS																	
BORING	SAMPLE	OFFSET	STATION	NODTUINO	EASTING	DEPTH	AASHTO	1.1	P.I.	% BY WEIGHT				% PAS	SING (SIEVES)		%	%
ID	NO.	OFFSEI	STATION	NORTHING	LASTING	INTERVAL	CLASS.			C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
L_13456_EB1-A	ST-01	47'LT	134+16 -L-	712311	1955433	1.0 - 3.0'	A-4(4)	26	8	7.8	22.9	35.0	34.3	100.0	98.1	73.8	22.0	2.4

Atx M Atmithy

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

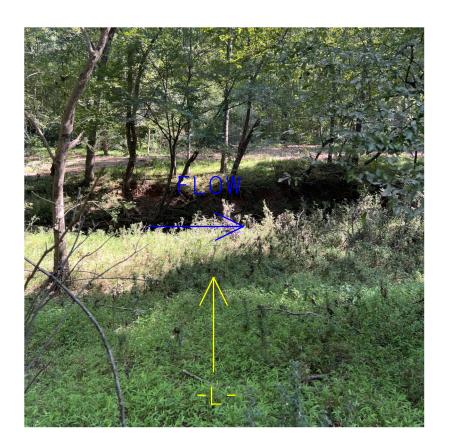


PHOTO #1: VIEW NEAR END BENT NO. 1, FACING UPSTATION



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

