REFERENCE

**CONTENTS** 

**DESCRIPTION** 

LEGEND (SOIL & ROCK)

SITE PLAN SHEETS

TITLE SHEET

CPT LOGS

SHEET NO.

3-5

3

STATE OF NORTH CAROLINA

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

### **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY GRAHAM

PROJECT DESCRIPTION UPGRADE NC 143 FROM 0.5 MILES NORTH OF APPALACHIAN TRAIL TO NC 28 AND UPGRADE NC 28 FROM 0.2 MILES WEST OF NC 143 TO 0.2 MILES WEST OF SR 1228 (STECOAH RD)

SITE DESCRIPTION RETAINING WALL #27, RETAINING WALL #30, AND RETAINING WALL #32: SUPPLEMENTAL CPT INVESTIGATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CC	1	21

#### **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 SUBSUFFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORCHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOL. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE OR INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS, AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

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

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

CG2 EXPLORATION M. BREWER INVESTIGATED BY \_\_CG2 DRAWN BY \_M. BREWER, P.E. CHECKED BY R. KRAL, P.E. SUBMITTED BY <u>M. Brewer</u>, P.E. DATE OCTOBER 2022

> CAROLINAS **GEOTECHNICAL**

GROUP





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

D. Matthew Brewer -386129C0A4C1462

SIGNATURE

10/17/22

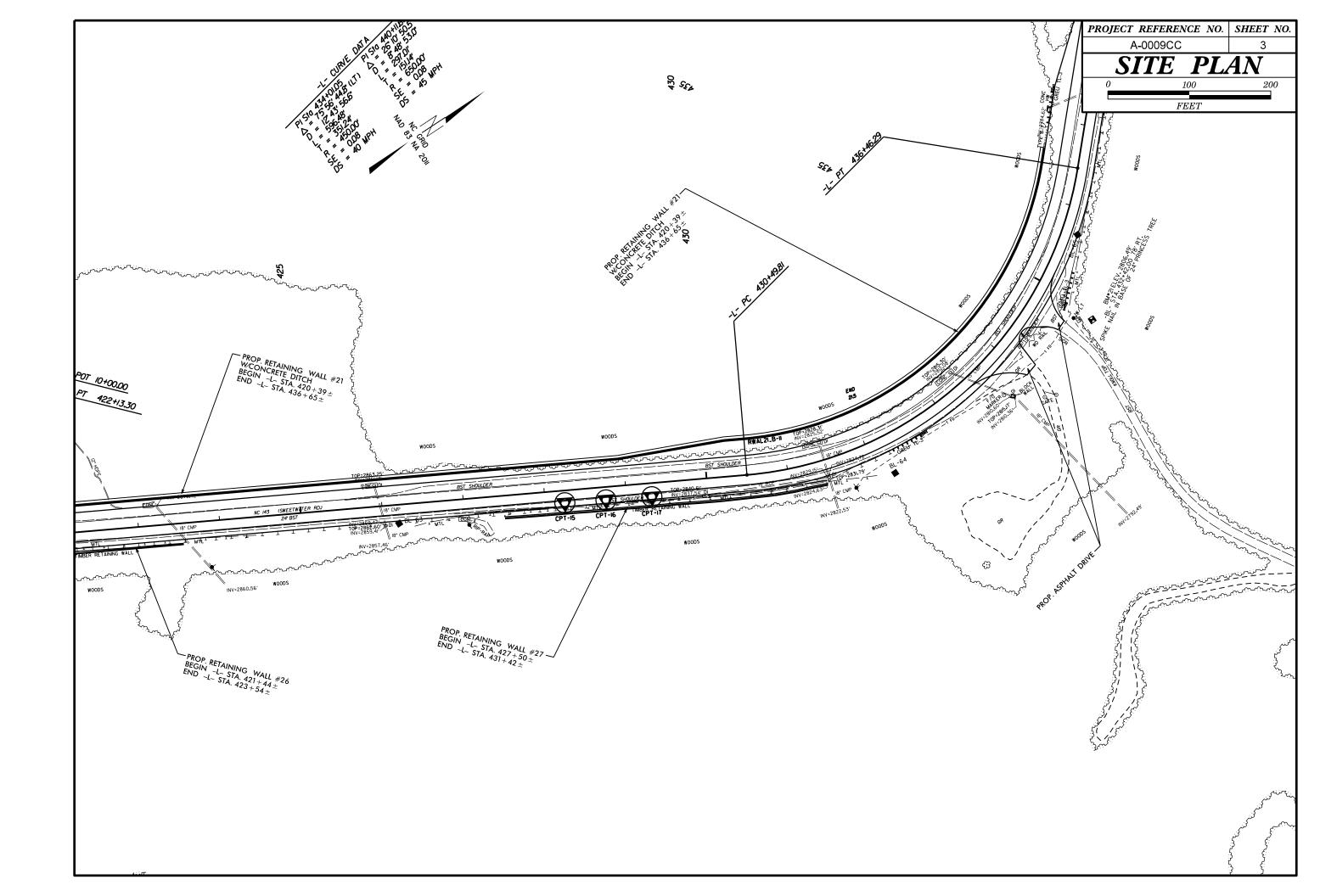
**DOCUMENT NOT CONSIDERED FINAL** UNLESS ALL SIGNATURES COMPLETED

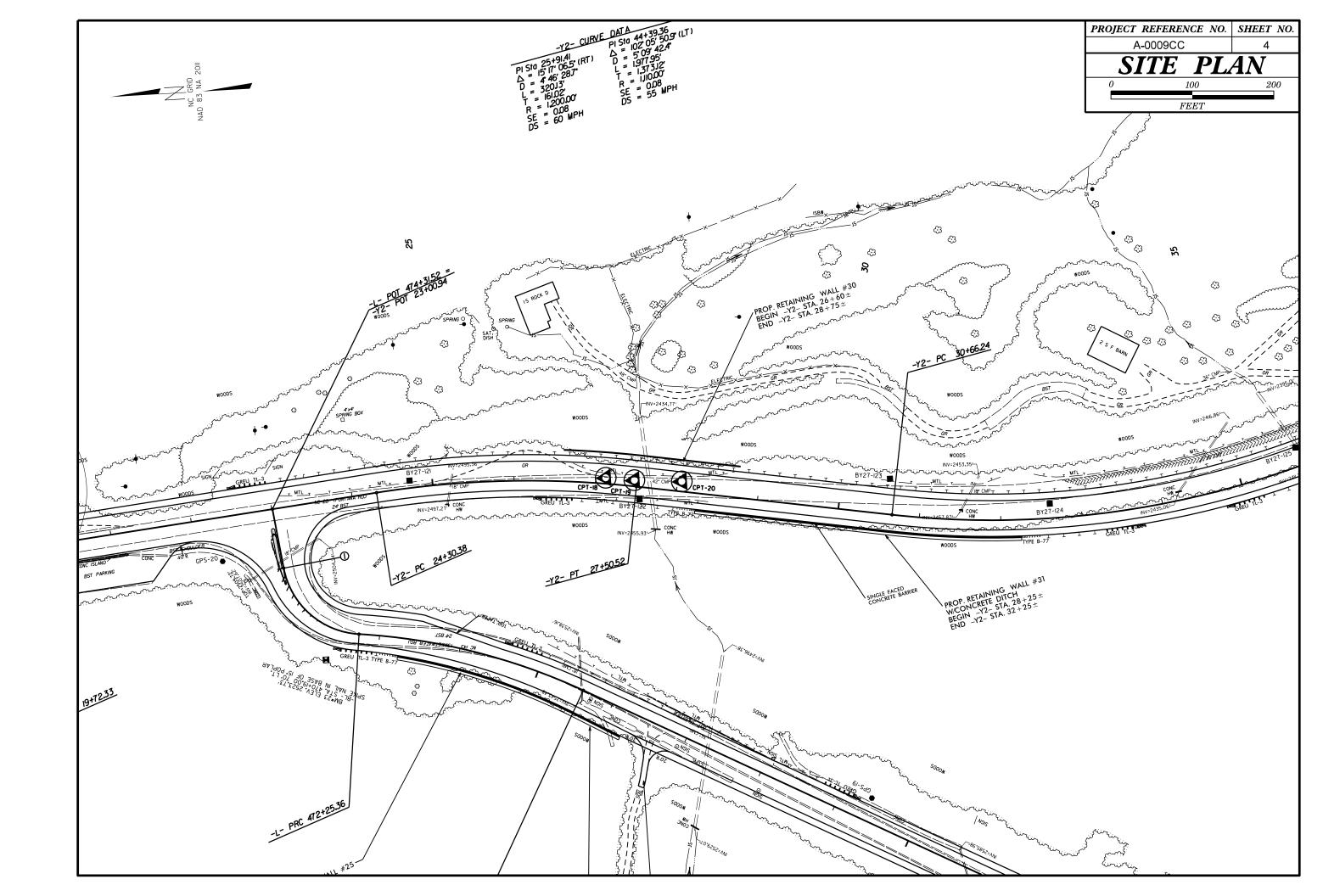
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

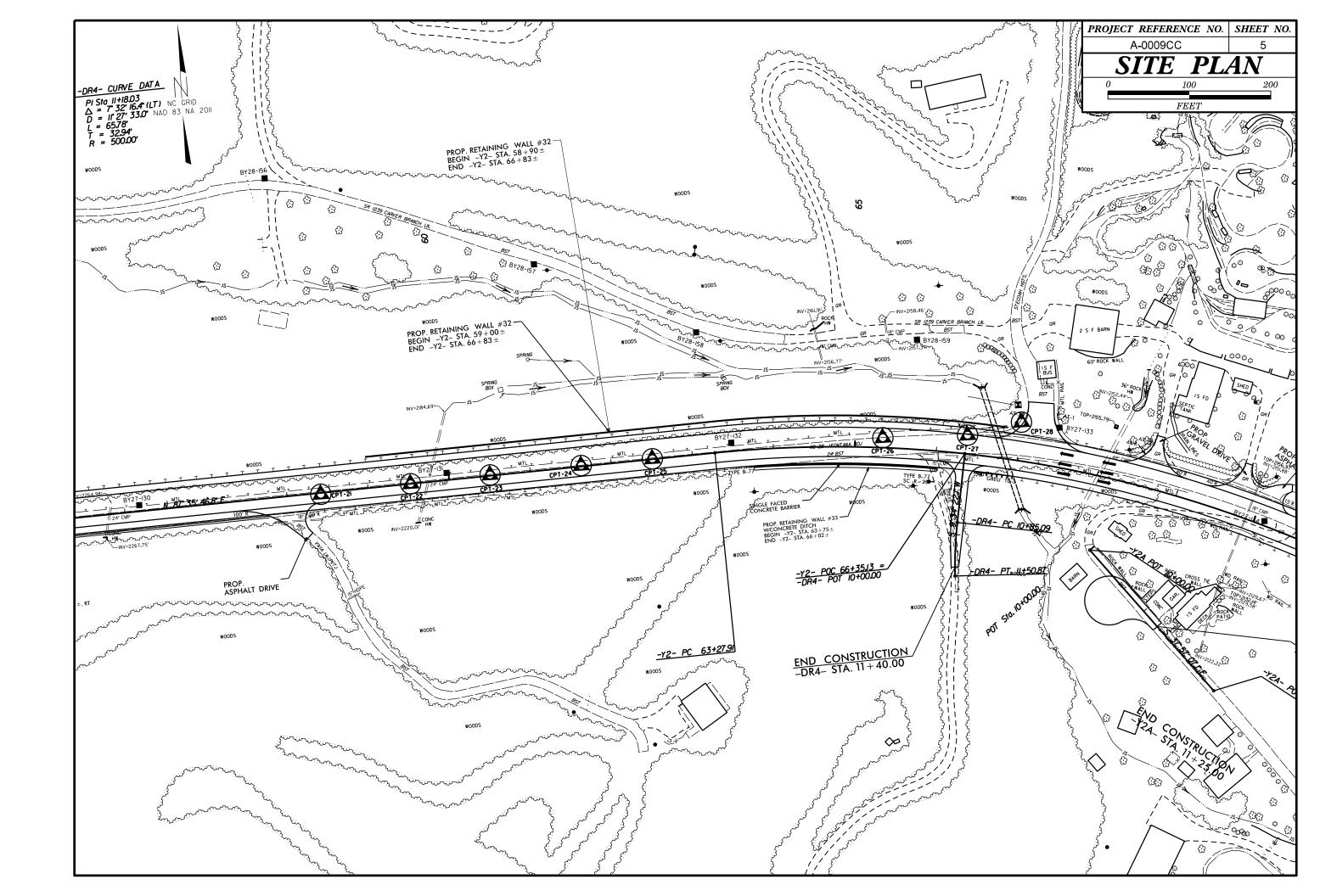
## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

001, 05000107101		The state of the s		
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION  HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	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.	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  AQUIFER - A WATER BEARING FORMATION OR STRATA.	
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER FOLIAL TO OR LESS THAN ALFOOT PER GO		
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.	
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,  VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAID LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING	
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.	
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS COCANAGE MATERIALS	MINERALOGICAL COMPOSITION		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.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD 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.	UNEISS, CABBROY, SCRIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY	NON-CATSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM	
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.	
2 PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.	
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT	
*40   30 MX   50 MX   51 MN   FEAT   *200   15 MX   25 MX   10 MX   35 MX   35 MX   35 MX   36 MN   36 MN   36 MN   36 MN   36 MN   50	GRANULAR SILT - CLAY		ROCKS OR CUTS MASSIVE ROCK.	
MATERIAL MATERIAL	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	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.	
MUDERALE ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE	
OPCANIC SULS		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 FRACS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.	
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM	
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.	
HS SUBURADE PUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.	
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.	
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.	
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO	
CONSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	☐ 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  SOIL SYMBOL  SPT 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	<b> </b> 图	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 (NON-COHESIVE) VERY DENSE	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT 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.	
VERT DENSE / DW	CODE DODING A COMPDING DOD	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	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.	
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE  MONITORING WELL  TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF	
MATERIAL   STIFF   8 TO 15   1 TO 2	A ALLUMIA CON POUNDARY A PIEZOMETER	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	
HARD > 30 > 4	INSTALLATION SPT N-VALUE		RUN AND EXPRESSED AS A PERCENTAGE.	
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.	
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND	
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	WORD WE THE TOP OFFICE OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO	
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - UNDERCUT UNDERCUT 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 VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF	
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL	
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY  MOD MODERATELY  7 - UNIT WEIGHT  CDT - COME DENETRATION 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	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	
SOLI MOISTURE SCALE FIELD MOISTURE	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.	STRATA ROCK QUALITY DESIGNATION (SRQD) - 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	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 - WET - (W) SEMISULIDE REQUIRES DRING TO	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: N/A	
(PI) PL PLASTIC LIMITATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS		
- 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:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	NOTES:	
DECUMPES ADDITIONAL WATER TO	CME-45C CLAY BITS AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET		
- DRY - (D)  ATTAIN OPTIMUM MOISTURE	CME-550 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	SURVEY AND ROADWAY DESIGN FILES PROVIDED BY TGS ENGINEERS ON 10/12/2022	
PLASTICITY	X 8*HOLLOW AUGERS	INDURATION		
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550X HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;		
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST CASING WY ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;  PROACE FACELY AND HIT HITH HAMPER.		
COLOR	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.		
COLON	X DIEDRICH D50 TRICONE TUNG,-CARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	CHARP HAMMER BLOWS REGULTED TO RREAK SAMPLE.		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X CONE PENETROMETER	EXTREMELY INDURATED SHARE BLOWS REQUIRED TO BREAK SHAPELE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1	







CAROLINAS
GEOTECHNICAL
GROUP

#### A-0009CC Graham County Project Number:240020068

### **Cone Penetration Test**

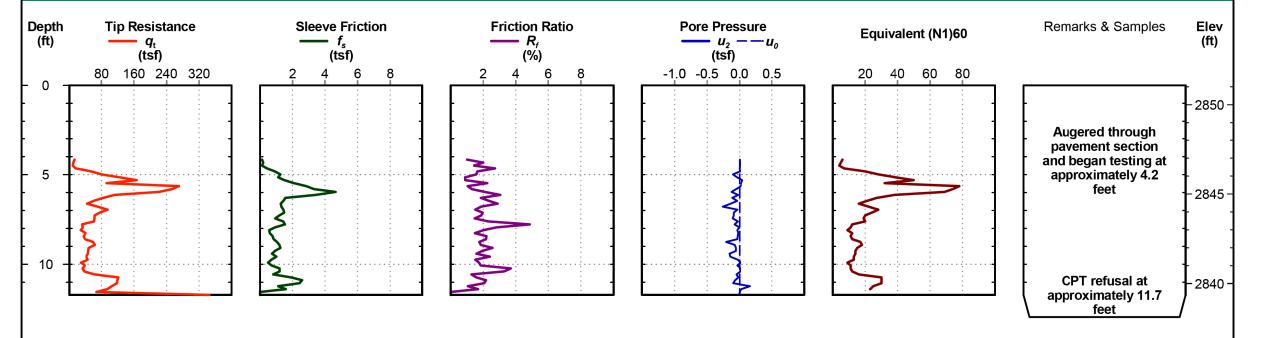
**CPT-15** 

**Date:** Jul. 27, 2022

**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 621875.8 Easting: 596544.5 Elevation: 2851.1 Total Depth: 11.7 ft
Termination Criteria: Maximum Reaction Force



CAROLINAS
GEOTECHNICAL
GROUP

#### A-0009CC Graham County Project Number:240020068

### **Cone Penetration Test**

**CPT-16** 

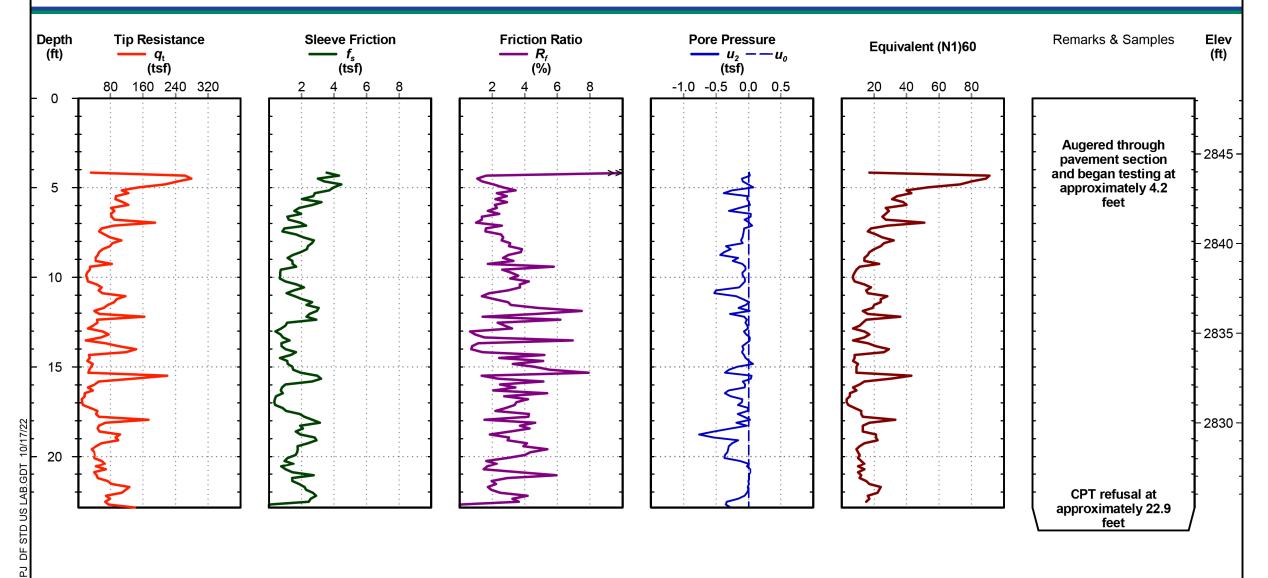
**Date:** Jul. 27, 2022

**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 621920.2 Easting: 596570.0 Elevation: 2848.1 Total Depth: 22.9 ft
Termination Criteria: Maximum Reaction Force

Cone Size:



-L-STA. 428+74 Page 1 of 1 16' RT

**CPT-16** 

CAROLINAS GEOTECHNICAL

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-17** 

**Date:** Jul. 27, 2022

**Estimated Water Depth:** 

STA. 429+31 17' RT

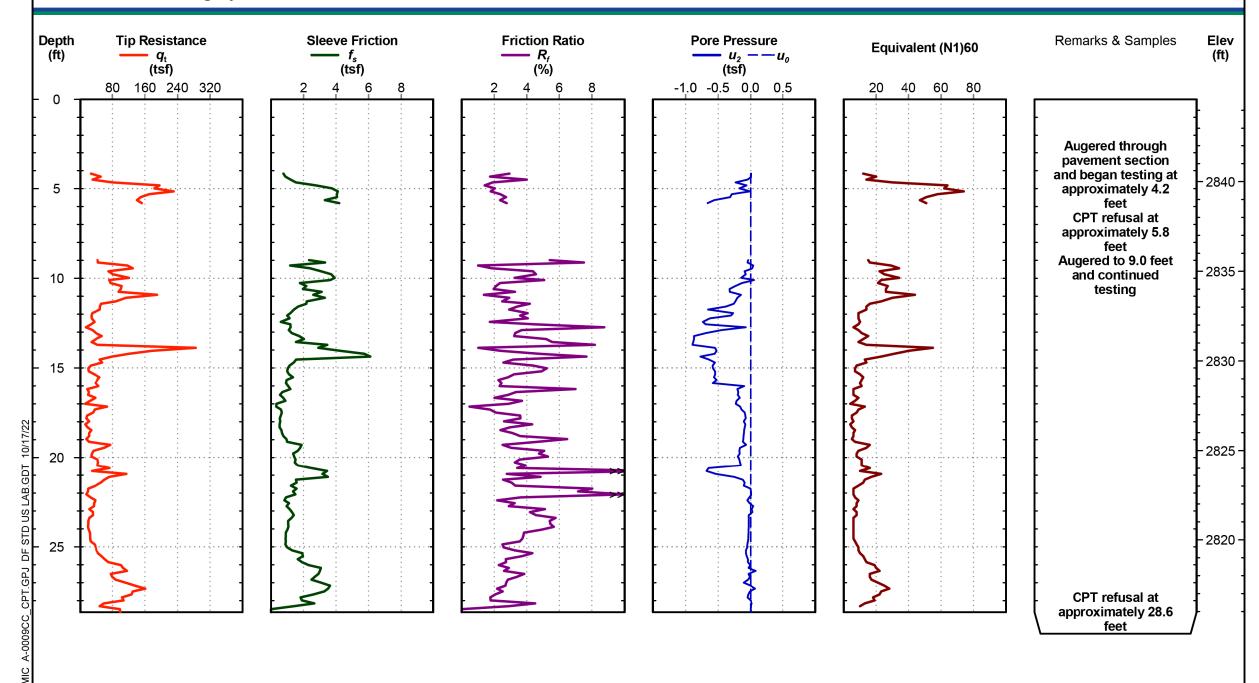
Page 1 of 1

Rig/Operator: M. Brewer

Northing: 621969.3 Easting: 596597.6 Elevation: 2844.6

Total Depth: 28.6 ft Termination Criteria: Maximum Reaction Force

Cone Size:



CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-18** 

**Date:** Jul. 27, 2022

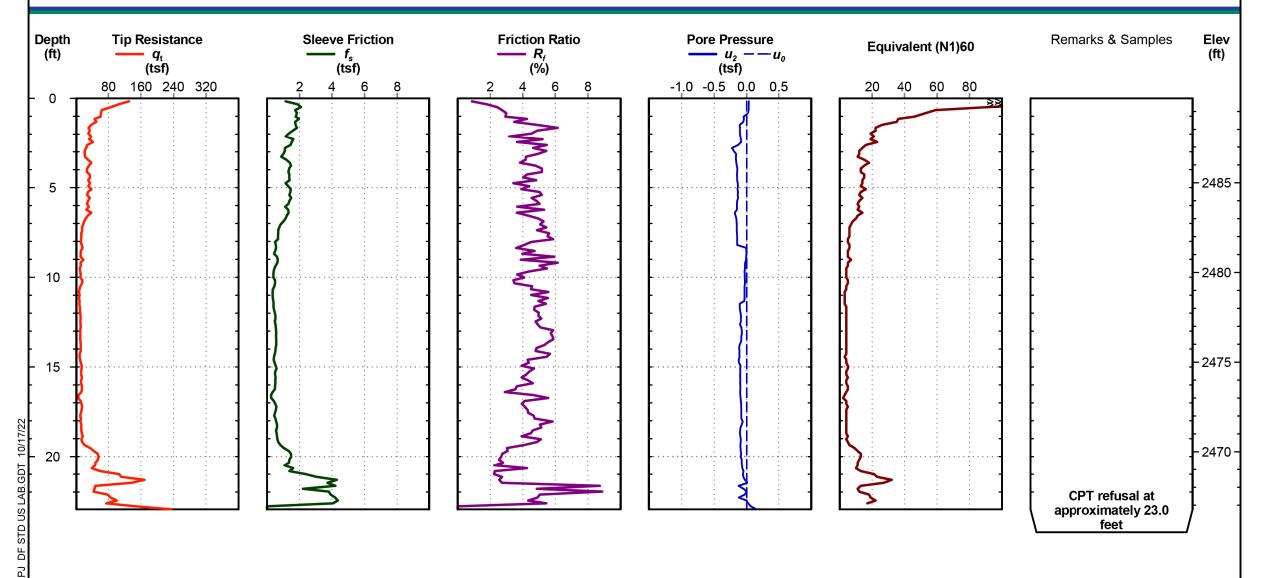
**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 625536.4 Easting: 596544.5 Elevation: 2489.7

Total Depth: 23.0 ft
Termination Criteria: Maximum Reaction Force

Cone Size:



-Y2-STA. 27+12 7' LT Page 1 of 1

**CPT-18** 

CAROLINAS GEOTECHNICAL

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-19** 

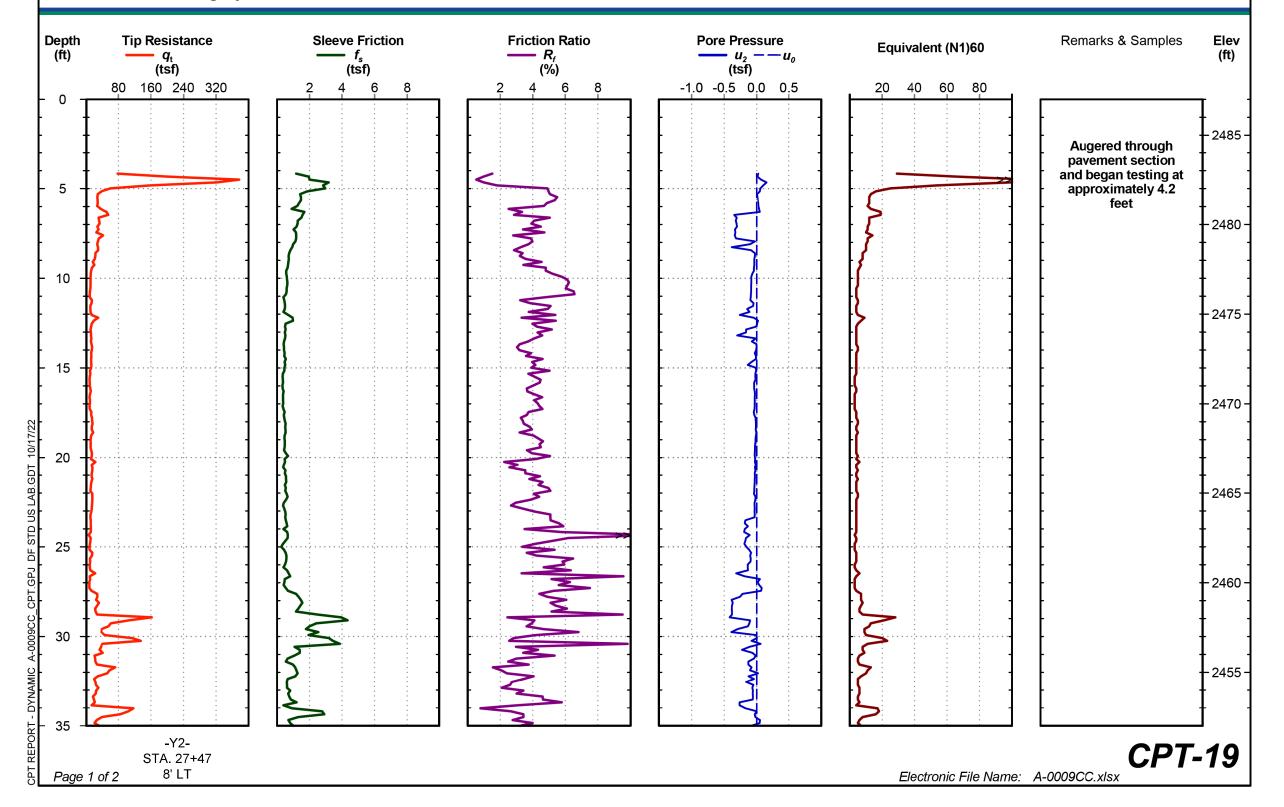
**Date:** Jul. 27, 2022

**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 625500.5 Easting: 596539.8 Elevation: 2487.0

Total Depth: 39.4 ft
Termination Criteria: Maximum Reaction Force



CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-19** 

Elev

**Date:** Jul. 27, 2022

**Estimated Water Depth:** 

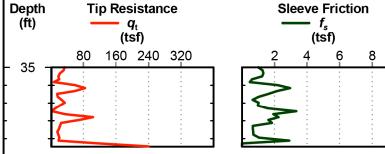
Rig/Operator: M. Brewer

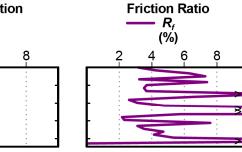
Northing: 625500.5 Easting: 596539.8 Elevation: 2487.0

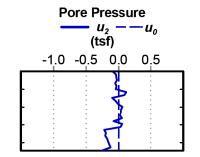
Total Depth: 39.4 ft

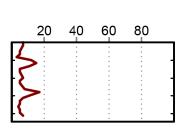
Termination Criteria: Maximum Reaction Force

Cone Size:

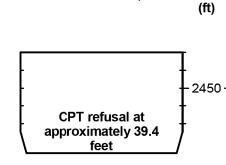








Equivalent (N1)60



Remarks & Samples

Page 2 of 2

-Y2-STA. 27+47 8' LT

**CPT-19** 

CAROLINAS
GEOTECHNICAL
GROUP

#### A-0009CC Graham County Project Number:240020068

### **Cone Penetration Test**

**CPT-20** 

**Date:** Jul. 27, 2022

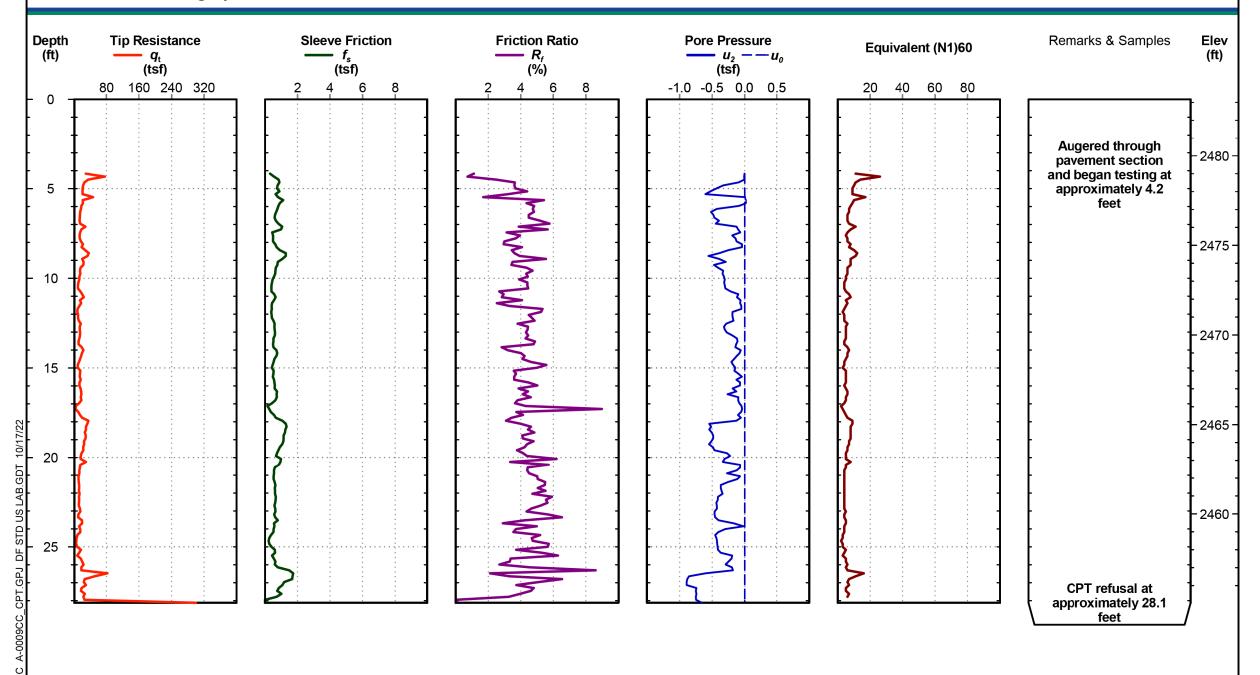
**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 625442.7 Easting: 596534.7 Elevation: 2483.2

Total Depth: 28.1 ft
Termination Criteria: Maximum Reaction Force

Cone Size:



-Y2-STA. 28+05 Page 1 of 1 12' LT

CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-21** 

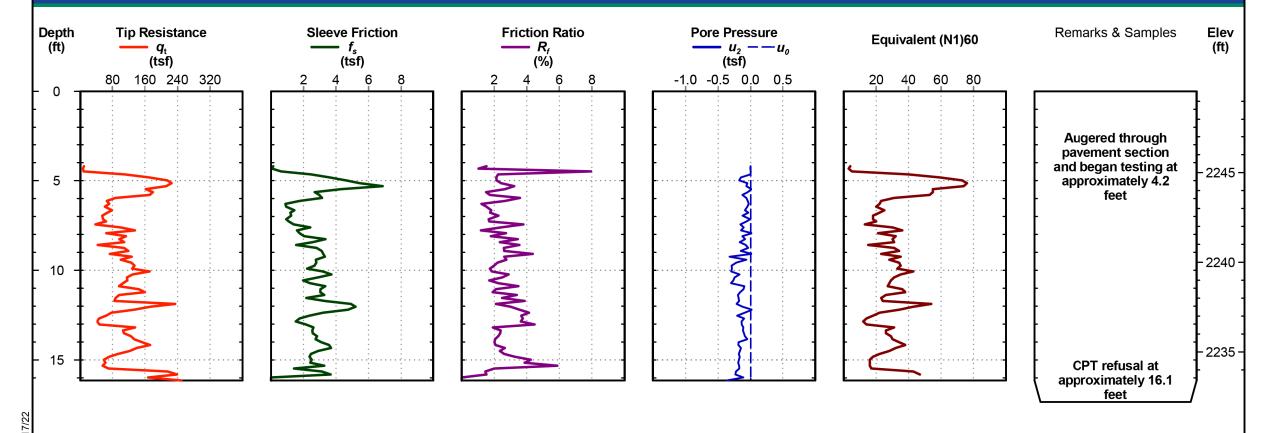
**Date:** Jul. 28, 2022

**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 623919.9 Easting: 598416.3 Elevation: 2249.6

Total Depth: 16.1 ft Termination Criteria: Maximum Reaction Force



CAROLINAS GEOTECHNICAL

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-22** 

**Date:** Jul. 28, 2022

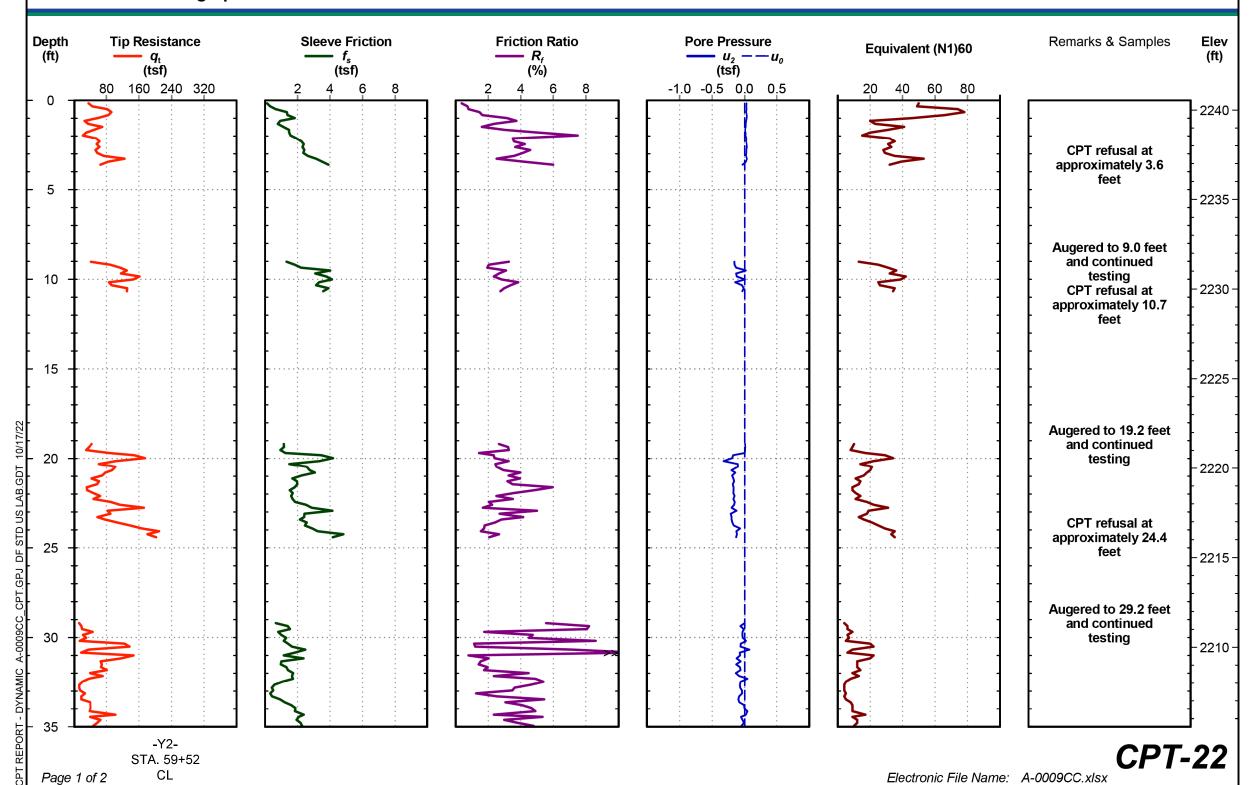
**Estimated Water Depth:** 

Rig/Operator: M. Brewer

**Northing:** 623929.5

**Easting:** 598527.0 **Elevation:** 2240.5

Total Depth: 39.7 ft Termination Criteria: Maximum Reaction Force



CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-22** 

Elev

**Date:** Jul. 28, 2022

**Estimated Water Depth:** 

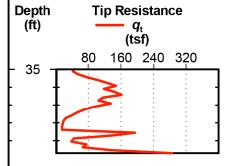
Rig/Operator: M. Brewer

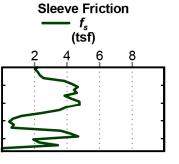
Northing: 623929.5 Easting: 598527.0 Elevation: 2240.5

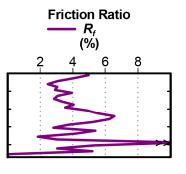
Total Depth: 39.7 ft

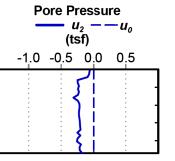
Termination Criteria: Maximum Reaction Force

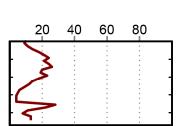
Cone Size:



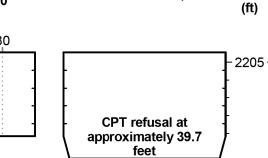








Equivalent (N1)60



Remarks & Samples

Page 2 of 2

-Y2-STA. 59+52 CL

**CPT-22** 

CAROLINAS
GEOTECHNICAL
GROUP

#### A-0009CC Graham County Project Number:240020068

### **Cone Penetration Test**

**CPT-23** 

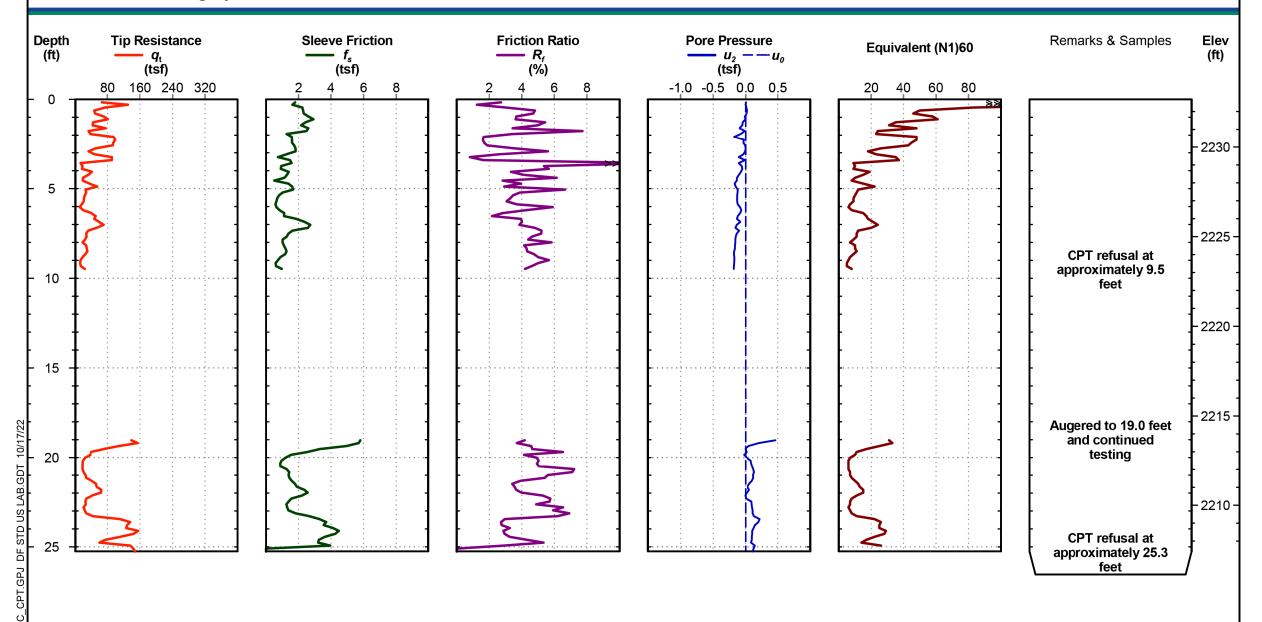
**Date:** Jul. 28, 2022

**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 623935.0 Easting: 598625.2 Elevation: 2232.7 Total Depth: 25.3 ft
Termination Criteria: Maximum Reaction Force

Cone Size:



-Y2-STA. 60+51 Page 1 of 1 1' LT

**CPT-23** 

CAROLINAS GEOTECHNICAL

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-24** 

**Date:** Jul. 28, 2022

**Estimated Water Depth:** 

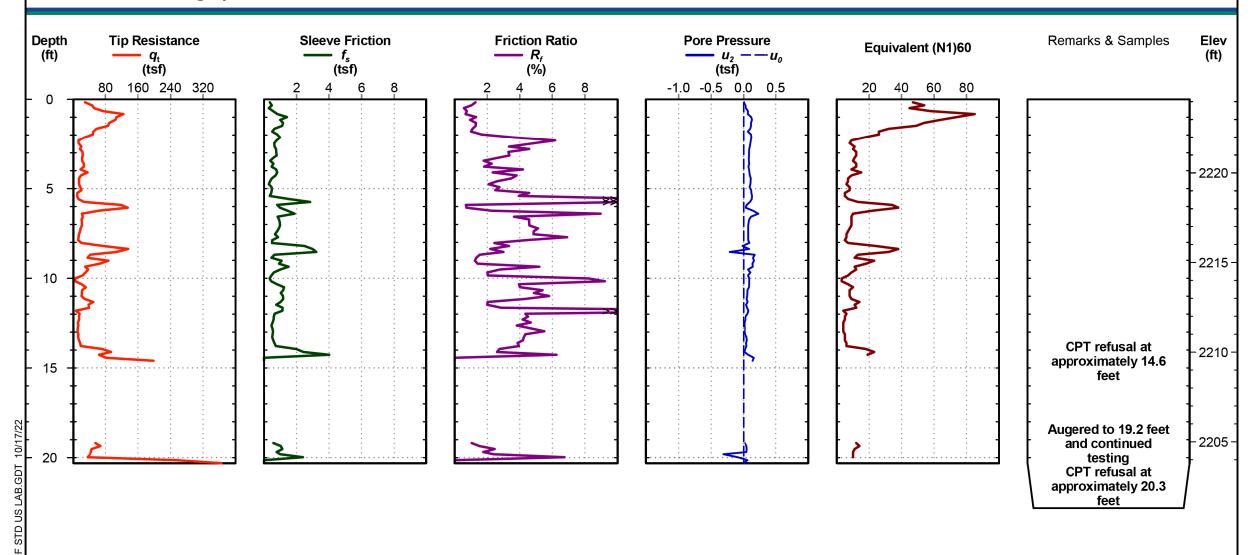
Rig/Operator: M. Brewer

Northing: 623934.4 Easting: 598737.0 Elevation: 2224.1

Total Depth: 20.3 ft

Termination Criteria: Maximum Reaction Force

Cone Size:



-Y2-STA. 61+62 5' RT Page 1 of 1

**CPT-24** 

CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-25** 

**Date:** Jul. 28, 2022

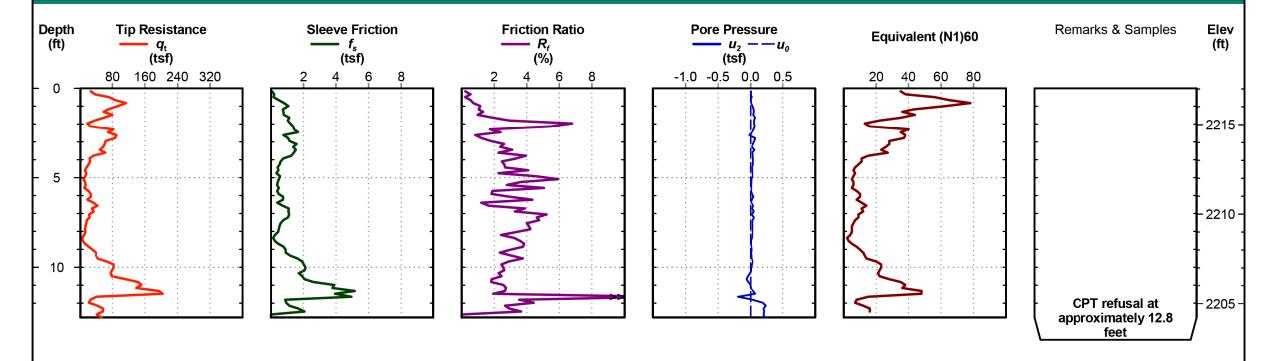
**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 623942.5 Easting: 598824.7 Elevation: 2217.0

Total Depth: 12.8 ft
Termination Criteria: Maximum Reaction Force

Cone Size:



Page 1 of 1

CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-26** 

**Date:** Jul. 28, 2022

**Estimated Water Depth:** 

Rig/Operator: M. Brewer

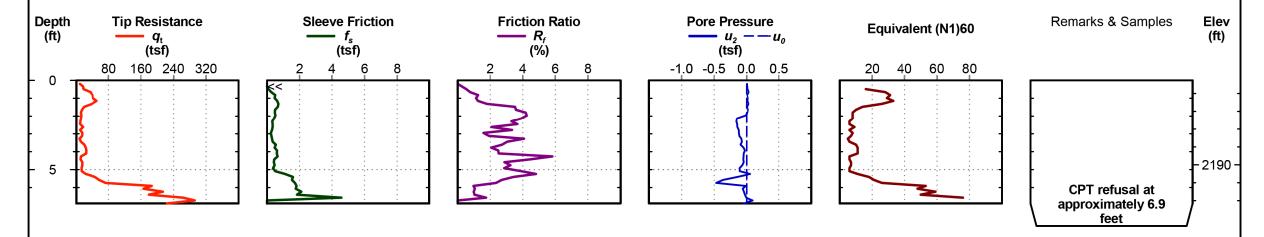
**Northing:** 623952.0

**Easting:** 599109.0 **Elevation:** 2194.7

Total Depth: 6.9 ft

Termination Criteria: Maximum Reaction Force

Cone Size:



Page 1 of 1

CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-27** 

**Date:** Jul. 28, 2022

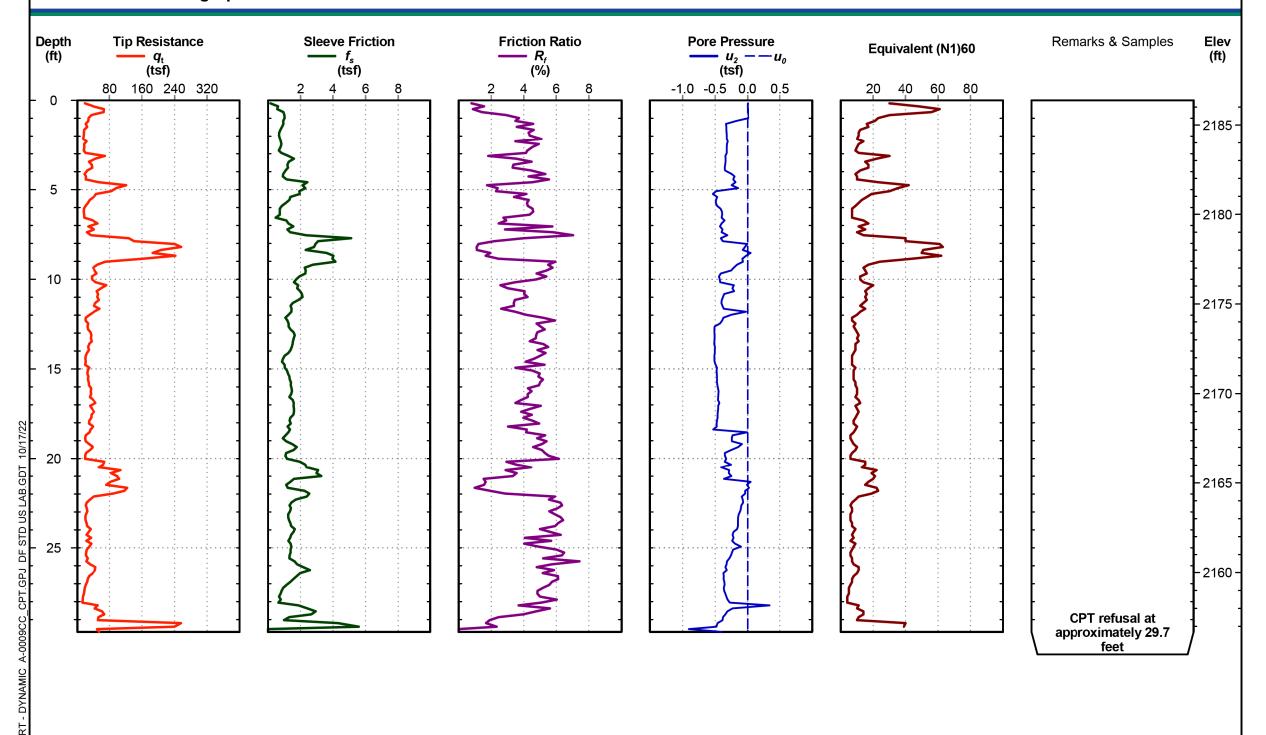
**Estimated Water Depth:** 

Rig/Operator: M. Brewer

Northing: 623949.3 Easting: 599213.0 Elevation: 2186.4

Total Depth: 29.7 ft
Termination Criteria: Maximum Reaction Force

Cone Size:



-Y2-STA. 66+36 23' LT Page 1 of 1

CAROLINAS GEOTECHNICAL GROUP

#### A-0009CC **Graham County** Project Number:240020068

### **Cone Penetration Test**

**CPT-28** 

Elev

**Date:** Jul. 28, 2022

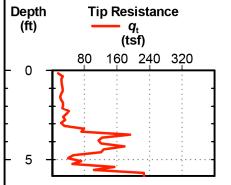
**Estimated Water Depth:** 

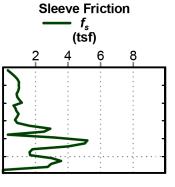
Rig/Operator: M. Brewer

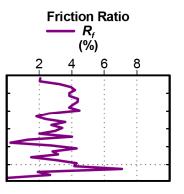
Northing: 623961.1 Easting: 599279.9 Elevation: 2180.1

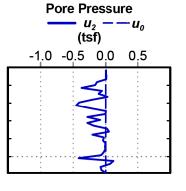
Total Depth: 5.9 ft
Termination Criteria: Maximum Reaction Force

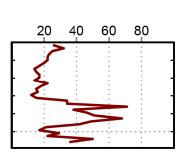
Cone Size:



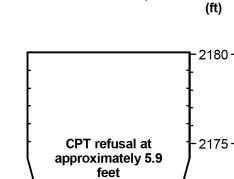








Equivalent (N1)60



Remarks & Samples

Page 1 of 1