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582

REFERENCE

44395

**CONTENTS** 

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN PROFILE BORE LOGS 5-6

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY FORSYTH

PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD) WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L--RET WALL 100T-STA = 100+08.65-101+00.00 (CL)-L-STA = 100 + 08.65 - 101 + 00.00 (51.25' - 50.25'RT)

STATE PROJECT REFERENCE NO. U-5824 6

#### **CAUTION NOTICE**

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

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 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.

M. SHIPMAN, EI

H. FISCHER, GIT M.G. MOSELEY

J. MOSELEY

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

DRAWN BY \_B. SMITH, PG

CHECKED BY B. WORLEY, PG

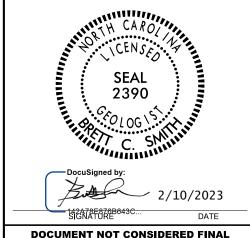
SUBMITTED BY \_\_B. SMITH, PG

DATE \_\_*JULY*, 2022

Prepared in the Office of:



2715 Ashton Drive, Ste Wilmington, NC 28412 Phone: (910) 475-1208



**UNLESS ALL SIGNATURES COMPLETED** 

PROJECT REPERENCE NO. SHEET N

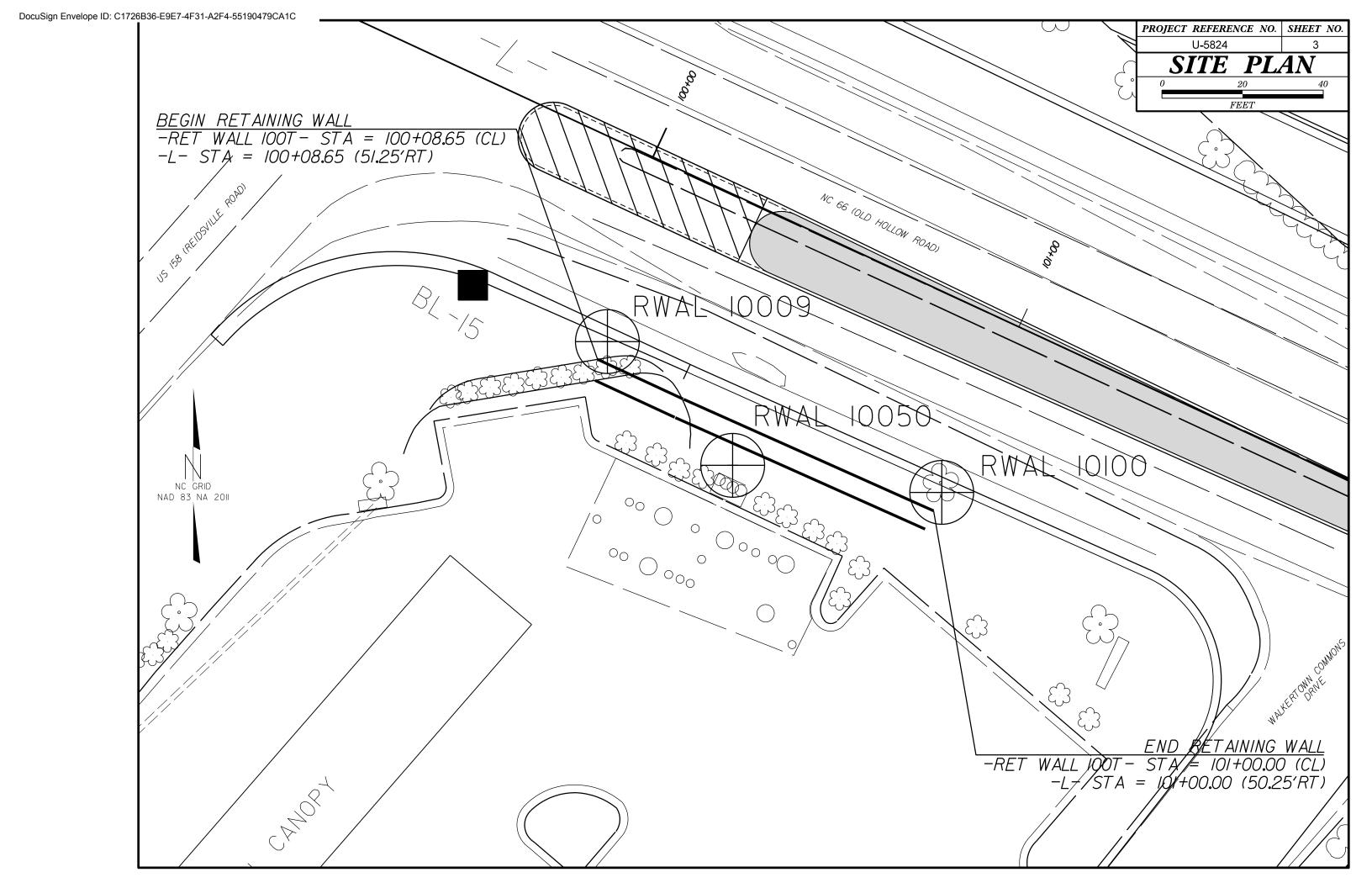
U-5824

2

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

# SUBSURFACE INVESTIGATION

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO 1 206, ASTM DISBOS, SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING; CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	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.  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EDUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ALLUVIUM (ALLUV) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  AQUIFER - A WATER BEARING FORMATION OR STRATA.  ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,WOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6  SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS  ORGANIC MATERIALS	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION	WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.  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 SUFFACE.
CROUP A-1 A-3 A-2-4 A-2-5 A-2-6 A-2-7 A-1, A-2 A-4, A-5 A-6, A-7 A-1, A-2 A-1, A-1, A-2 A-1,	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.  COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LL < 31	ROCK (CR)  WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.  GNEISS, GABRBO, SCHIST, ETC.  NON-CRYSTALLINE ROCK (NCR)  ROCK (NCR)  WULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.  GNEISS, GABRBO, SCHIST, ETC.  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN  SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.  ROCK TYPE INCLUDES PHYLLITE, SLAIE, SANDSTONE, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50  PERCENTAGE OF MATERIAL	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK  SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP)  SHELL BEDS, ETC.  WEATHERING	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.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200 I5 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 3	ORGANIC MATERIAL         GRANUL AR SILT - CLAY SOILS         OTHER MATERIAL           1 RACE OF ORGANIC MATTER 2 - 3%         3 - 5%         1 FACE I - 10%           LITTLE ORGANIC MATTER 3 - 5%         5 - 12%         LITTLE 10 - 20%           MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME 20 - 35%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 18 MX 11 MN 18 MX 11 MN 18 MX 12 MX 14 MN 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE  GROUP INDEX 8 8 8 8 MX 12 MX 16 MX NO MX AMOUNTS OF ORGANIC SOILS	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE  GROUND WATER	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.  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	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL LYPE'S STUME FRAUS. OF MAJOR GRAVEL, AND SAND SAND SAND SAND SOILS SOILS  GEN. RATING  GEN. RATING  EVEL EVIT TO COOD FAIR TO BOOD FAIR TO BOOD WASHINGTON.		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	$\frac{\textit{FISSILE}}{\textit{FLOAT}} - \textit{A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.} \\ \frac{\textit{FLOAT}}{\textit{FLOAT}} - \textit{ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.} \\$
EXCELLENT TO GOOD	SPRING OR SEEP  MISCELLANEOUS SYMBOLS	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT DUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PRETRATION RESISTENCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE)  25/025  DIP & DIP DIRECTION  WITH SOIL DESCRIPTION  SOIL CAMPOL  STATE TO DONNE SLOPE INDICATOR	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,  IF TESTED, WOULD YIELD SPT REFUSAL  SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT  (SEV.) REDUCED IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAQLINIZED	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 ITS LATERAL EXTENT.
GENERALLY GRANULAR MEDIUM DENSE  (NON-COHESIVE) VERY DENSE  4 TO 10  10 TO 30  N/A  N/A  N/A  N/A	SOIL SYMBOL  OPT ONT TEST BORING  SLIPE INDICATOR INSTALLATION INSTALLATION CONE PENETROMETER THAN ROADWAY EMBANKMENT  AUGER BORING  CONE PENETROMETER TEST	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  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	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25  GENERALLY SOFT 2 TO 4 0.25 TO 0.5  SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0  MATERIAL STIFF 8 TO 15 1 TO 2	INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD  THE	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	OF AN INTERVENING IMPERVIOUS STRATUM,  RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK,  ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	→ PIEZOMETER INSTALLATION → SPT N-VALUE	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS  VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270  DPENING (MM) 4.76 2.00 0.42 0.25 0.053  BOULDER COBBLE GRAVEL COARSE FINE SAND SAND SAND SAND	UNDERCUT  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR,)         (COB.)         (GR.)         SAND (CSE. SD.)         SAND (F SD.)         SL.)         (CL.)           CRAIN MM 305         75         2.0         0.25         0.05         0.005           SIZE IN. 12         3 <td>ABBRE VIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED</td> <td>MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, COUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.  MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.</td> <td>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  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</td>	ABBRE VIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, COUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.  MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  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  SOIL MOISTURE SCALE FIELD MOISTURE OESCRIPTION OESCRIPTION OF TERMS  GUIDE FOR FIELD MOISTURE DESCRIPTION	CL CLAY  CPT - CONE PENETRATION TEST  MP - NON PLASTIC  CSE COARSE  DMT - DILATOMETER TEST  PMT - PRESSUREMETER TEST  SAMPLE ABBREVIATIONS	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.  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	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.  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 (SAT,) FROM BELOW THE GROUND WATER TABLE	DPT - DYNAMIC PENETRATION TEST	PIECES CAN BE BROKEN BY FINGER PRESSURE.  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 FINGERNAL.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATIA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (15.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC   SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: N/A
PL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO  EQUIPMENT USED ON SUBJECT PROJECT	TERM         SPACING         TERM         THICKNESS           VERY WIDE         MORE THAN 10 FEET         VERY THICKLY BEDDED         4 FEET	ELEVATIONS OBTAINED FROM THE TIN FILE
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - REQUIRES ADDITIONAL WATER TO	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS AUTOMATIC MANUAL	WIDE   3 TO 10 FEET	NOTES:  MnO = MANGANESE OXIDE
- DRY - (D) ATTAIN OPTIMUM MOISTURE  PLASTICITY	CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:  3.25' HOLLOW STEM AUGERS	THINLY LAMINATED ( 0.008 FEET INDURATION	VE = VERTICAL EXAGGERATION
PLASTICITY INDEX (PI)         DRY STRENGTH           NON PLASTIC         0-5         VERY LOW           SLIGHTLY PLASTIC         6-15         SLIGHT           MODERATELY PLASTIC         16-25         MEDIUM	CME-550X	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824_Rdy_pf)) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1 VE TO BETTER PRESENT
HIGHLY PLASTIC 26 OR MORE HIGH  COLOR  DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	PORTABLE HOIST	BREAKS EASILY WHEN HIT WITH HAMMER.  INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-



		ORE LOG													
<b>WBS</b> 44395.1.1 <b>TIP</b> U-		FORSYTH	GEOLOGIST Shipman, M.		44395.1.1				Y FORSY			GEOLOGIS	<b>T</b> Shipman,		
SITE DESCRIPTION NC 66 (Old Hollow Ro			GROUND WTR (ft)	-		•		w Road) Widening from Harl	<u> </u>						ND WTR (ft)
		OFFSET 5 ft LT	ALIGNMENT RET_WALL_100 TO HR. Dry	-		WAL_10050	STA	<b>ATION</b> 100+50	OFFSET	5 ft RT		ALIGNMEN	T RET_WA	LL_100B0 HR.	-
COLLAR ELEV. 984.2 ft TOTAL	DEPTH 6.0 ft	NORTHING 880,805	<b>EASTING</b> 1,664,382 <b>24 HR</b> . Dry	COLI	LAR ELEV.	976.9 ft	TO.	TAL DEPTH 8.1 ft	NORTHIN			EASTING	<u> </u>	24 HR.	
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD Har	nd Auger HAMMER TYPE N/A	DRILL	L RIG/HAMME	R EFF./DATE N/A	١			DRILL N	METHOD H	and Auger		HAMMER TYPE	N/A
		COMP. DATE 06/13/22	SURFACE WATER DEPTH N/A		LER Fisch			<b>ART DATE</b> 06/13/22	COMP. DA			SURFACE	NATER DEP	TH N/A	
Column   C	BLOWS PER FOOT 25 50 75	SAMP. V L O NO. MOI G	SOIL AND ROCK DESCRIPTION  ELEV. (ft)  DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft) DEF	TH BLOW COU 0.5ft 0.5ft		BLOWS PER FOOT	Γ 75 100	SAMP.	MOI G	:	SOIL AND ROC	CK DESCRIPTION	I
985		· · · · · · · · · · · · · · · · · · ·	984.2 GROUND SURFACE 0.0  ARTIFICIAL FILL	980	+							 -			
980		D D	brown to red-brown, loose to medium dense,	975	<u> </u>					S-5	D XX D XX 17% ***	976.9 975.9 974.9 red-b	ARTIFIC rown, very loos	SURFACE CIAL FILL e to loose, clayey ittle mica, trace g	$\begin{array}{c} 0.0 \\ \text{7, silty}  \boxed{1.0 \\ 2.0 \\ \text{rayel}  \boxed{1} \end{array}$
		XXI	978.2 6.0  Boring Terminated at Elevation 978.2 ft in Artificial Fill (clayey, silty SAND)  - Soil densities estimated.	970	<u> </u>						D	- 1	and tras loose to mediur SAND (A-1-b)	h (plastic) n dense, fine to dense, fine to dense gravel ROLITE	Ì
			Artificial fill likely related to the construction of a nearby gas station and associated retaining wall.		† †			1	.			browr highly	to red-brown, I micaceous, cla th little gravel-s frag	oose to medium o lyey, silty SAND ( ized crystalline ro ments	A-2-5) ck
												- Borii - -	Saprolite (clay	at Elevation 968.8 yey, silty SAND) ies estimated.	3 ft in
													a nearby gas sta	ated to the constr ation and associa ing wall.	uction ted
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COLLAR ELEV. 979.8 ft TOTAL DEPTH 6.0 ft NORTHING 880,767 EASTING 1,664,465 24 HR. Dr.  RILL RIG/HAMMER EFF./DATE N/A  RILLER Fischer, H. START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  LEV DRIVE ELEV (ft) 0.5ft 0.5ft 0.5ft 0 25 50 75 100 NO. MOI G ELEV. (ft)  ROUND SOIL AND ROCK DESCRIPTION DEPTH O.5ft 0.5ft 0.													-	<u> </u>	<i>71</i> \	_	<u></u>	JG							
ORING NO. RWAL_10100 STATION 101+00 OFFSET 5 ft LT ALIGNMENT RET_WALL_100 TO HR. Dr. OLLAR ELEV. 979.8 ft TOTAL DEPTH 6.0 ft NORTHING 880,767 EASTING 1,664,465 24 HR. Dr. RILL RIGHAMMER EFF./DATE N/A  RILLER Fischer, H. START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  EV CHARLES (ft) CHA	WBS	4439	5.1.1			TI	ΙP	U-5	824			C	COU	NTY	FC	DRS	YTH	1			GEOLOG	IST Shipm	nan, M.		
OLLAR ELEV. 979.8 ft TOTAL DEPTH 6.0 ft NORTHING 880,767 EASTING 1,664,465 24 HR. Dr. RILL RIG/HAMMER EFF,DATE N/A  RILLER Fischer, H. START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  EV CHART COMP. DEPTH (ft) (ft) 0.5ft 0.5	SITE	DESCF	RIPTION	I NC	66 (OI	ld Holl	ow	Roa	ad) V	Vide	ening	fror	n Ha	arley	/ Driv	e to	US	158						GROUND W	/TR (ft
OLLAR ELEV. 979.8 ft TOTAL DEPTH 6.0 ft NORTHING 880,767 EASTING 1,664,465 24 HR. Dr. RILL RIG/HAMMER EFF,DATE N/A  RILLER Fischer, H. START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  EV CHART COMP. DEPTH (ft) (ft) 0.5ft 0.5											_			Ť							ALIGNME	NT RET	WALL 10	4	Dry
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RILLER Fischer, H.  START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  BLOWS PER FOOT TELEV (ft)  DEPTH (ft)  O.5ft 0.5ft 0.					TF N/															D F		.,,			
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ELEV (ft) (ft) 0.5ft 0.5					244.001		I AI	KIL	JAIL				D 50		CON	/IP. I	DAI		13/22	1 1	SURFACE	WAIERD	EPIH N	A	
ARTIFICIAL FILL red-brown, very loose to loose, clayey, silty SAND (A-2-5) with trace gravel, mica, and trash (plastic) SAPROLITE red-brown, soft to stiff, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments, trace mica and MnO Boring Terminated at Elevation 973.8 ft in Saprolite (clayey SILT) - Soil densities estimated Artificial fill likely related to the construction of a nearby gas station and associated	ELEV (ft)	ELEV					C	)	2		LOW				75 	1	00		MOI	0	ELEV. (ft)	SOIL AND	ROCK DES		DEPTH (
Trash (plastic) SAPROLITE 973.8 red-brown, soft to stiff, highly sandy, clayey SILT (A-5) with trace gravel-sized crystalline rock fragments, trace mica and MnO Boring Terminated at Elevation 973.8 ft in Saprolite (clayey SILT) - Soil densities estimated Artificial fill likely related to the construction of a nearby gas station and associated	980								· ·	· ·		- 1	· ·	- · ·			-		D		- red	<b>AR</b> I-brown, very	TIFICIAL FII loose to loos	L <b>L</b> se, clayey, silty	0
	975	-															- 1 1	S-2	21%	X 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	976.3 SA 973.8 red SIL BC	ND (A-2-5) w tr	vith trace gra ash (plastic) APROLITE to stiff, highly race gravel- ts, trace mic ted at Eleva lite (clayey \$ ensities estir y related to to is station an	vel, mica, and y sandy, clayey sized crystalline a and MnO tion 973.8 ft in SILT) mated. he construction d associated	I
		-	+ + + + + + + + + + + + + + + + + + +																		- - - - - - - - - - - - - - - - - - -				

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REFERENCE

**CONTENTS** 

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN PROFILE BORE LOGS 5-6

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY FORSYTH

PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD) WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L--RET WALL 100B- STA = 100+10.29 - 101+00.00 (CL)-L-STA = 100+10.29 - 101+00.00 (56.25'-55.25'RT)

STATE PROJECT REFERENCE NO. U-5824 6

#### **CAUTION NOTICE**

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

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 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.

M. SHIPMAN, EI H. FISCHER, GIT

M.G. MOSELEY J. MOSELEY

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

DRAWN BY \_B. SMITH, PG

CHECKED BY B. WORLEY, PG

SUBMITTED BY \_\_B. SMITH, PG

DATE \_\_*JULY*, 2022

Prepared in the Office of:



2715 Ashton Drive, G.C. Wilmington, NC 28412 Phone: (910) 475-1208



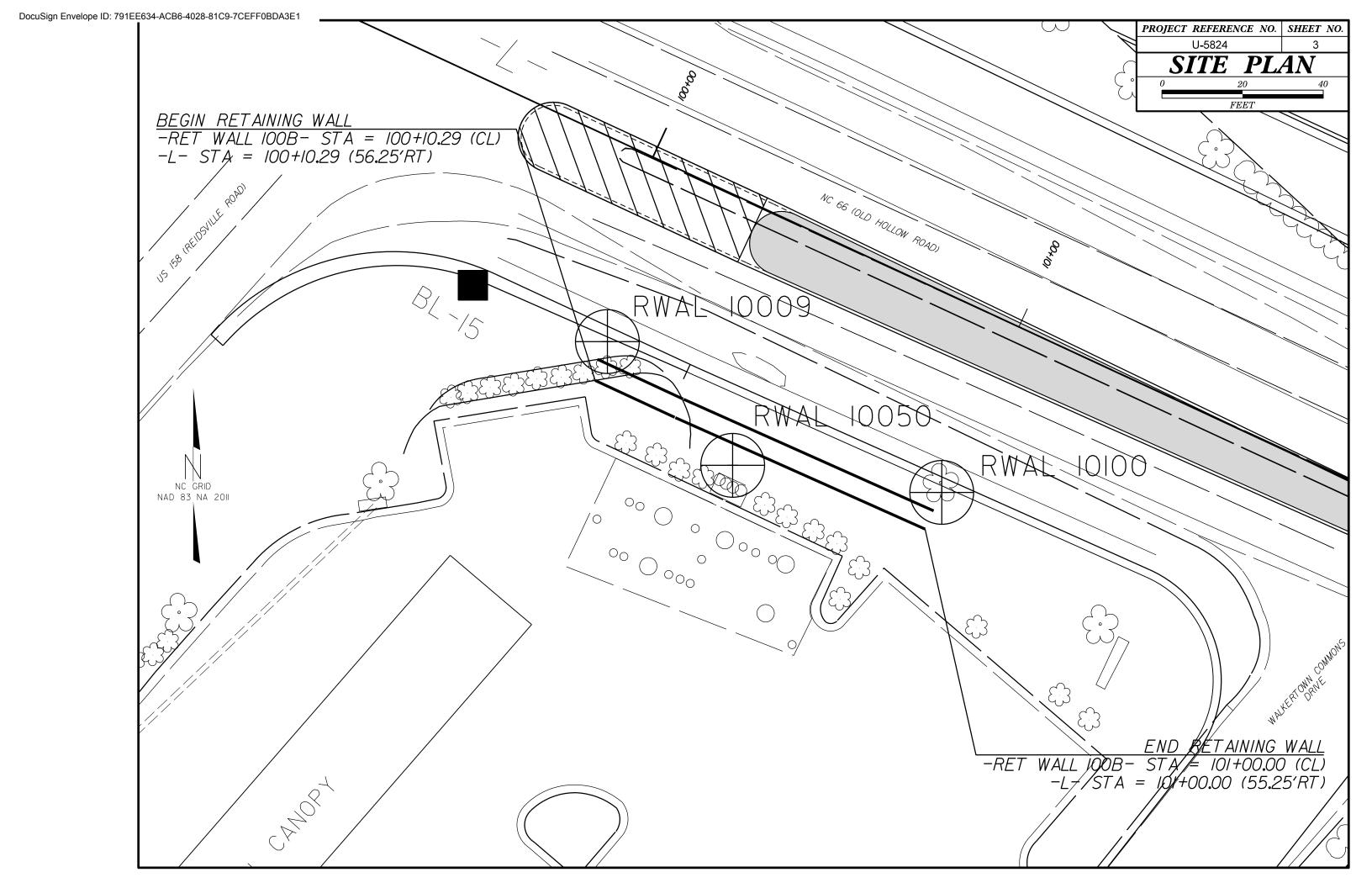
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U-5824 2

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

# SUBSURFACE INVESTIGATION

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING; CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VER STIFF, GRAY, SLITY CLAY, MOIST WITH INTERBEDDED FINE SAMD LAYERS, HIGHLY PLASTIC, A-7-6	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.  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED  WEATHERED  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  AQUIFER - A WATER BEARING FORMATION OR STRATA.  ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING  A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERAL OGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (WR)  100 BLOWS PER FOOT IF TESTED.  CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IT TESTED. ROCK TYPE INCLUDES GRANITE, GNETSS, GABBRO, SCHIST, ETC.	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 SURFACE.
GROUP CLASS.  A-1	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLAFL, SANDSTONE, ETC. COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING   10   50 MX   SILT   GRANULAR   SILT     140   39 MX   50 MX   51 MN   SOILS   CAS   PEAT	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEOS, ETC.  WEATHERING	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*288 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 50 MN 5	GRANULAR SILT - CLAY  ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 18 MX 11 MN 18 MX 11 MN 11 MN 18 MX 11 MN 11 MN 11 MN 18 MX 11 MN 11 MN MODERATE OPCOME	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER  OF MAJOR GRAVEL, AND CAND GRAVEL, AND CAND GRAVEL, AND CAND SOLIS SOLIS	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  ▼ STATIC WATER LEVEL AFTER 24 HOURS	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK    (SLI.) I INCH. DPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN, RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA  SPRING OR SEEP	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN  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  WITH FRESH ROCK.	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.  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 CONSISTENCY OR DENSENESS  COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	MODERATELY  ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL  SEVERE  AND DISCOLORED AND A MAJORITY SHOW KADLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH  AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.  IF TESTED, WOULD YIELD SPT REFUSAL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE	WITH SOIL DESCRIPTION  SOIL SYMBOL  SPI TOPT DATE TEST BORING  SLOPE INDICATOR INSTALLATION  SPI TOPT DATE TEST BORING  SLOPE INDICATOR INSTALLATION	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTRIN. SOME FRAMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	LEOGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL   DENSE   30 TO 50   VERY DENSE   > 50   VERY SOFT   < 2   < 0.25   CENERALLY   SOFT   2 TO 4   0.25 TO 0.5	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT CORE BORING SOUNDING ROD  ONE PENETROMETER  CONE PENETROMETER  SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTICES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES \( 100 \) BPF	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE  TINETAL ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION SPT N-VALUE	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 ALSO AN EXAMPLE.	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK,  ROCK QUALITY DESIGNATION (RDD) - 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 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  OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053  BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXC	VERY HARD  CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES  SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD  CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED  TO DETACH HAND SPECIMEN.	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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)  (GRAIN MM 305 75 2.0 0.25 0.05 0.005	ABBREVIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3  SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 <sub>d</sub> - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION  - SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	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 PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  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
LL LIQUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	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 FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE  - WET - (W) SEMISOLIDI REGULES BATHO TO ATTAIN OPTIMUM MOISTURE  (PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING         BEDDING           1ERM         SPACING         1ERM         THICKNESS	BENCH MARK: N/A ELEVATIONS OBTAINED FROM THE TIN FILE
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	EQUIPMENT USED ON SUBJECT PROJECT  DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET 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	(U5824_LS_DTM_TIN_DOT_2022-0I-IO.+in) ELEVATION: N/A FEET  NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  PLASTICITY	CME-49C	VERY CLOSE LESS THAN 0.16 FEET THINKLY LAMINATED 0.008 F.0.03 FEET THINKLY LAMINATED 4.008 FEET  INDURATION	MnO = MANGANESE OXIDE  VE = VERTICAL EXAGGERATION
PLASTICITY   DRY STRENGTH	CME-550X	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS; CENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824_Rdy_pf1) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1 VE TO BETTER PRESENT THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.
COLOR  DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	TRICONE 'TUNGCARB. SOUNDING ROD  CORE BIT VANE SHEAR TEST	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.  EXTREMELY INDURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
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<u> </u>		4395.					U-582			COUN								GEOLOGIST	Shipma	an, M.			—— ⊢		44395				l	U-5824				FORS					GEO	LOGIS	<b>ST</b> Shi	pman, M			
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ВС	RINC	NO.	RWAI	100	09	ST	ATION	100+0	9		OF	FSE	Γ 5 t	ft LT				ALIGNMENT	RET_W	/ALL_1	0 <b>∮T0 HR</b>		` I ⊢				AL_100	50	STAT	ION 1	00+50			DFFSET	5 ft R	Т			ALIG	SNMEN	NT RE	T_WALL	_100 BO HR		Dr
		R ELE\					TAL DE	PTH 6	6.0 ft		NC	ORTH						EASTING 1	,664,382		24 HR		<u> </u>		AR ELE				TOTA	L DEP	<b>ГН</b> 8.1	ft	1	NORTHI							1,664,		24 HR		Dr
DR	ILL RI	G/HAMI	IER EF	F./DA	TE N/A	١							[	DRILL	METI	HOD	Han	nd Auger		HAM	MER TYP	E N/A	[	DRILL R	RIG/HAN	IMER E	FF./DAT	E N/A							DRII	L ME	THOD	) Ha	ind Auge	er		H.	AMMER TYP	PE N/A	
DR		<b>R</b> Fis					ART DA	<b>TE</b> 06	5/13/22		CC	OMP.						SURFACE W	ATER DE	PTH N	V/A				ER Fi	scher,				T DATI	E 06/1	3/22	(	COMP. D			/22		SUR	FACE	WATER	R DEPTH	N/A		
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980	)	‡									•			S-6	15	%		clayey tra 978.2	o red-browr , silty SAND ce mica, an	O (A-2-5) nd trace ti	with little ( rash (plas	gravel, tic)	6.0	975													D D 27%		976.9 975.9 974.9	red- SAI	-brown, ve ND (A-2-5	ARTIFICIA ery loose to b) with little and trash (	L FILL o loose, claye e mica, trace	ey, silty gravel	
		† †																	g Terminate Artificial Fill ( - Soil den	(clayey, s	silty SAND timated.	))		970	-	• • •									1 1		D		968.8	\ → brown	, loose to SAND ( n to red-b	medium o (A-1-b) wit SAPRO prown, loo	lense, fine to h some grave LITE se to medium	elj n dense,	<u></u>
		+																	cial fill likely nearby gas reta		and associ				<u> </u>	• • •												E	-	W	vith little o	ravel-size fragme inated at f	y, silty SAND d crystalline i ents Elevation 968 r, silty SAND)	rock 3.8 ft in	
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SITE	DESCRIPTION	NC 66	6 (Old	Hollo	w Road)	Widening	from Harle	ey Drive to U	S 158						GROUND W	/TR (f
BORI	NG NO. RWA	L_1010	00	ST	ATION	101+00		OFFSET	5 ft LT			ALIGNME	NT RET_W	ALL_100	™ HR.	Dr
OLI	AR ELEV. 97	9.8 ft		то	TAL DEF	<b>TH</b> 6.0	ft	NORTHING	880,7	67		EASTING	1,664,465		24 HR.	Dr
RILL	RIG/HAMMER E	FF./DATE	E N/A	<u>'</u>				<u> </u>	DRILL I	ЛЕТНО	D Ha	and Auger		HAMMI	ER TYPE N/A	
RIL	LER Fischer,	——— Н.		ST	ART DAT	<b>E</b> 06/13	3/22	COMP. DA	TE 06/	13/22		SURFACE	WATER DE	PTH N/	A	
LEV	DRIVE DEPTH		V COUN				S PER FOOT		SAMP.	<b>V</b> /	L	1				
(ft)	(ft) (ft)	0.5ft (	0.5ft 0	).5ft	0	25	50	75 100	NO.	моі	O G	ELEV. (ft)	SOIL AND RO	OCK DESC		EPTH
080				_								_979.8		ID SURFA		(
	Ŧ									D	8:1		-brown, very loa	ose to loos	se, clayey, silty	
75	‡									040/	X;	<sub>976.3</sub>	ND (A-2-5) with tras	i trace gra h (plastic)	vel, mica, and	ئـ — ا
	‡					1			S-2	21%	1			PROLITE stiff, highly	sandy, clayey	
	‡											` \ SILT	(A-5) with traction	e gravel-s	sized crystalline	
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REFERENCE

44395

**CONTENTS** 

7-10

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN **PROFILES** 

BORE LOGS

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY FORSYTH

PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD) WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L--RET WALL 1023- STA = 102+30.00 - 105+58.12 (CL)-L-STA = 102+30.00 - 105+50.00 (65.0'-44.0'RT)

STATE PROJECT REFERENCE NO. U-5824

#### **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 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.

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

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

DRAWN BY \_B. SMITH, PG

CHECKED BY B. WORLEY, PG

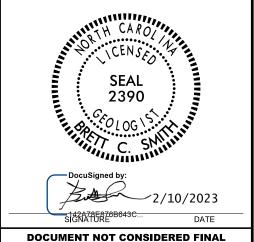
SUBMITTED BY \_\_B. SMITH, PG

DATE \_\_*JULY*, 2022

Prepared in the Office of:



2715 Ashton Drive, G.C. Wilmington, NC 28412 Phone: (910) 475-1208



**UNLESS ALL SIGNATURES COMPLETED** 

U-5824

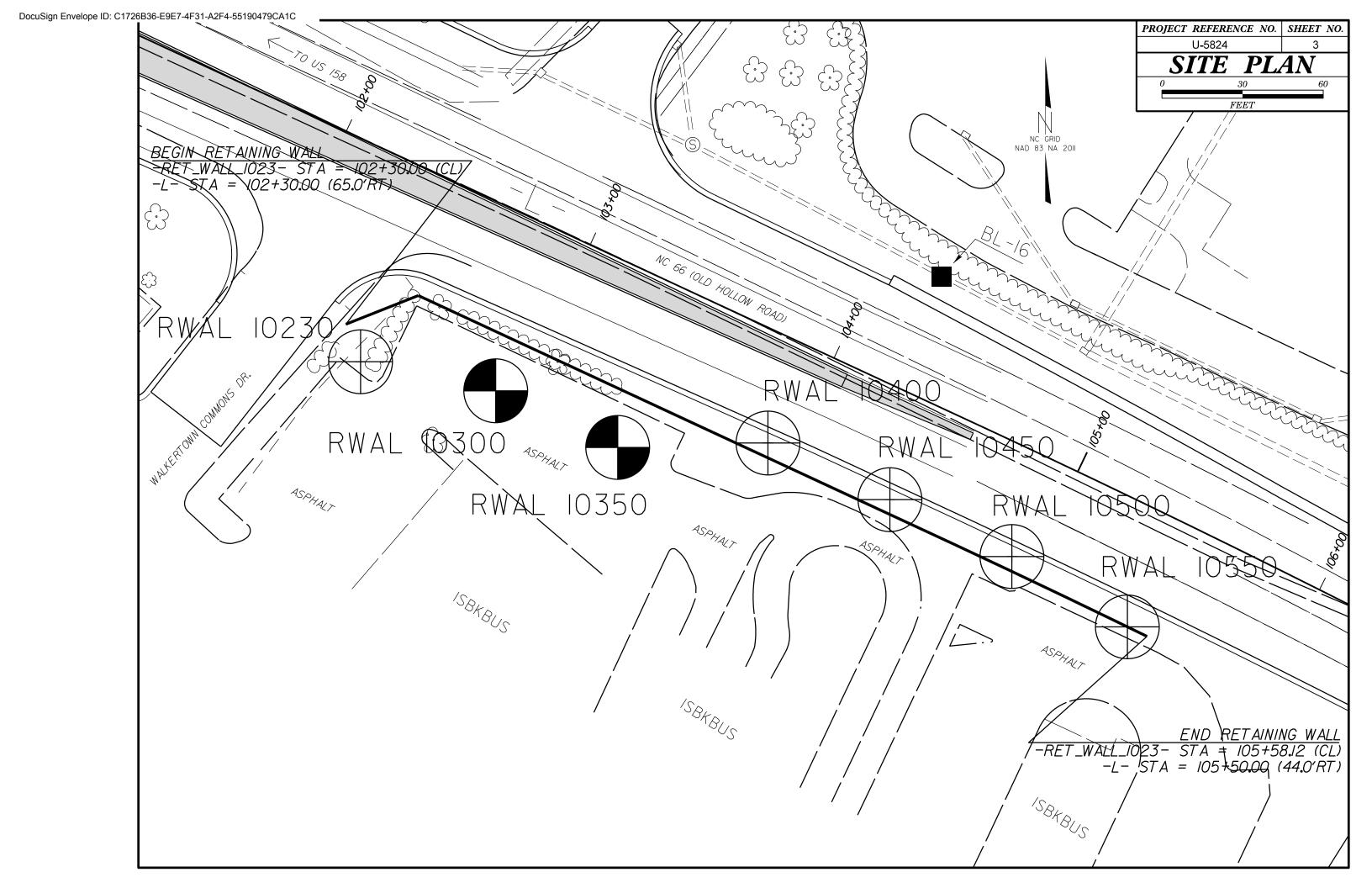
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PROJECT REFERENCE NO.

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

# SUBSURFACE INVESTIGATION

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,  VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC. A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	NI//EI//A	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE 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.
LLASS. (\$ 39% PASSING *2000) (> 39% PASSING *2000)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 B-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
7. PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR SIL1-	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	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL 40 MX 41 MN LITTLE OR P1 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOLLS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
CEN RATING FAIR TO		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE 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 CONSISTENCY RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
M-AHOG) (10M2)-1 )	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4 TO 10 GRANULAR LOOSE 4 TO 10	SOIL SYMBOL  Opt ont test boring  SLOPE INDICATOR INSTALLATION	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 DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT  AUGER BORING  CONE PENETROMETER TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT TEST	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY   SOFT   2 TO 4   0.25 TO 0.5     SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0	INFERRED ROCK LINE MN MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL   STIFF   8 TO 15   1 TO 2	PIEZOMETER COT NOVALUE	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	INSTRUCTION	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPPOLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - 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
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND 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
(CSE, 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	CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
COLL MOISTINE COLE FIELD MOISTINE	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 SAMPLE ABBREVIATIONS  DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	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	STRATA ROCK QUALITY DESIGNATION (SROD) - 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  LL LIQUID LIMIT	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS,) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING  TERM SPACING TERM THICKNESS	BENCH MARK: N/A
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATIONS OBTAINED FROM THE TIN FILE (U5824_LS_DTM_TIN_DOT_2022-0I-IO.+in) ELEVATION: N/A FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL _ SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	MnO = MANGANESE OXIDE
PLASTICITY	CME-55	INDURATION	FIAD = FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550X	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	VE = VERTICAL EXAGGERATION
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST CASING W/ ADVANCER HAND TOOLS:  POST HOLE DIGGER	CDAING CAN DE CEDADATED FORM CAMPLE MITH CTEEL DOOR	A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824_Rdy_pfi) AS A GUIDE.IT SHOULD
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.	BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE.
COLOR	TRICONE TUNG,-CARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	SUMMIT ELECTED TO DRAW THE WALL AT A 1:1VE TO BETTER PRESENT
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.	THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED  SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
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		BURE LUG					
<b>WBS</b> 44395.1.1	TIP U-5824 COUI	NTY FORSYTH	GEOLOGIST Shipman, M.	<b>WBS</b> 44395.1.1	TIP U-5824 COUN	TY FORSYTH	GEOLOGIST Shipman, M.
SITE DESCRIPTION NC 66 (OIC	d Hollow Road) Widening from Ha	arley Drive to US 158	GROUND WTR (ft)	SITE DESCRIPTION NC 66 (Old	Hollow Road) Widening from Har	ley Drive to US 158	GROUND WTR (ft)
BORING NO. RWAL_10450	<b>STATION</b> 104+50	OFFSET 5 ft LT	ALIGNMENT RET_WALL_10230 HR. Dry	BORING NO. RWAL_10500	<b>STATION</b> 105+00	OFFSET 5 ft LT	ALIGNMENT RET_WALL_10230 HR. Dry
COLLAR ELEV. 976.4 ft	TOTAL DEPTH 13.0 ft	NORTHING 880,629	<b>EASTING</b> 1,664,777 <b>24 HR.</b> Dry	COLLAR ELEV. 975.1 ft	TOTAL DEPTH 6.1 ft	NORTHING 880,608	EASTING 1,664,823 24 HR. Dry
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD		DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD	
DRILLER Shipman, M.	START DATE 06/15/22	COMP. DATE 06/15/22		DRILLER Shipman, M.	START DATE 06/13/22	COMP. DATE 06/13/22	SURFACE WATER DEPTH N/A
			SURFACE WATER DEPTH N/A			<del>'</del>	SURFACE WATER DEPTH N/A
ELEV Cft) DRIVE ELEV (ft) DEPTH BLOW COL		75 100		ELEV DRIVE DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft 0.5ft	I		SOIL AND ROCK DESCRIPTION
(11)	0.011	75 100 NO. MOI G	ELEV. (ft) DEPTH (ft)	(ii) V o.oit o.oit (	0.01   5	75 100 NO. MOI C	<i>i</i>
980			-	980			-
			ļ				ļ.
075		· ·   · · · ·     M 🗛	- 976.4 GROUND SURFACE 0.0 - 074.0 ARTIFICIAL FILL 4.5				- - 975.1 GROUND SURFACE 0.0
975			$\frac{1}{2}$ brown to orange-brown, loose to medium $r = \frac{1.5}{1}$	975		· · · · · · S-11 18%	ARTIFICIAL FILL
+			dense, siity SAND (A-2-4) with trace graver   971.9 and mica   4.5	+		.	brown to orange-brown, soft to medium stiff, moderately plastic, highly sandy, silty CLAY (A.7.5) with little gravel trace mice and track
970		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	RESIDUAL   orange-brown and red-brown, soft to medium	970			(A-7-5) With little graver, trace filled and trasiff
<del>                                      </del>		I II I III.	L stiff, slightly plastic, highly sandy, silty CLAY I	†			969.0 \ SAPROLITE 6.1
		1 1 1 1 6/4/50*	(A-7-5) with trace gravel-sized crystalline rock fragments and mica				orange-brown to gray-brown, loose to medium dense, highly micaceous, silty SAND
965 +		S-21   30%   N	SAPROLITE				- (A-2-4) with trace gravel-sized crystalline rock fragments
		· ·   · · · ·	1 963.4 stiff, highly micaceous, highly sandy, clayey 13.0 SILT (A-5) with trace gravel-sized crystalline				Boring Terminated at Elevation 969.0 ft in
			rock fragments				Saprolite (silty SAND)
‡			Boring Terminated at Elevation 963.4 ft in Saprolite (clayey SILT)				- Soil densities estimated.
			- Soil densities estimated.				- Artificial Fill associated with landscaped area of the shopping center.
							area of the shopping center.
			- Artificial Fill associated with landscaped     area of the shopping center.				<u> </u>
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WBS 44398.1.1 TIP U-8824 COUNTY FORSYTH GEOLOGIST Shipman, M.  SITE DESCRIPTION NC 66 (Old Hollow Road) Wildening from Harley Drive to US 158  BORING NO. RWAL_10550 STATION 105+50 OFFSET CL ALIGNMENT RET_WALL_10230 R. Dr.  COLLAR ELEV. 974.2 ft TOTAL DEPTH 6.0 ft NORTHING 880,582 EASTING 1,664,866 24 HR. 0.8  DRILL RIGHAMMER EFF,DATE NA DRILL METHOD Hard Aloger HAMMER TYPE NA  DRILLER Shipman, M. START DATE 66/13/22 COMP. DATE 66/13/22 SURFACE WATER DEPTH N/A  COUNTY FORSYTH OFFSET CL ALIGNMENT RET_WALL_10230 R. Dr.  DRILL RIGHAMMER EFF,DATE NA  DRILLER Shipman, M. START DATE 66/13/22 COMP. DATE 66/13/22 SURFACE WATER DEPTH N/A  SOIL AND ROCK DESCRIPTION DEPTH (II) 0.5th 0.5th 0.5th 0.5th 0.25 50 75 100 No. Mr. Mr. Mr. Mr. Mr. Mr. Mr. Mr. Mr. Mr
STATION 105+50   OFFSET CL   ALIGNMENT RET_WALL_102-30 HR.   Dr.
COLLAR ELEV. 974.2 ft TOTAL DEPTH 6.0 ft NORTHING 880,582 EASTING 1,664,866 24 HR. 0.8  DRILL RIGHAMMER EFF./DATE N/A  DRILLER Shipman, M. START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  ELEV (ft) (ft) DEPTH (ft) 0.5ft 0.5f
DRILLER Shipman, M.  START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  BLOW COUNT (ft) DEPTH ELEV (ft) 0.5ft 0.
DRILLER Shipman, M.  START DATE 06/13/22 COMP. DATE 06/13/22 SURFACE WATER DEPTH N/A  BLEV (ft) PORIVE (ft) DEPTH (ft) 0.5ft 0
BLEV (ft)   DRIVE ELEV (ft)   DEPTH (ft)   D
975  976  977  978  978  979  979  979  979
970  970  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13  21%  S-13

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582

REFERENCE

44395

**CONTENTS** 

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN **PROFILES** BORE LOGS

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY FORSYTH

PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD) WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L--RET WALL 5300- STA = 53+00.00 - 54+52.13 (CL)-L-STA = 53+00.00 - 54+50.00 (52.5'LT)

STATE PROJECT REFERENCE NO. U-5824

#### **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 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.

M. SHIPMAN, EI

H. FISCHER, GIT M.G. MOSELEY

J. MOSELEY

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

DRAWN BY \_B. SMITH, PG

CHECKED BY B. WORLEY, PG

SUBMITTED BY B. SMITH, PG

DATE \_\_*JULY*, 2022

Prepared in the Office of:



2715 Ashton Drive, G.C. Wilmington, NC 28412 Phone: (910) 475-1208



**UNLESS ALL SIGNATURES COMPLETED** 

U-5824

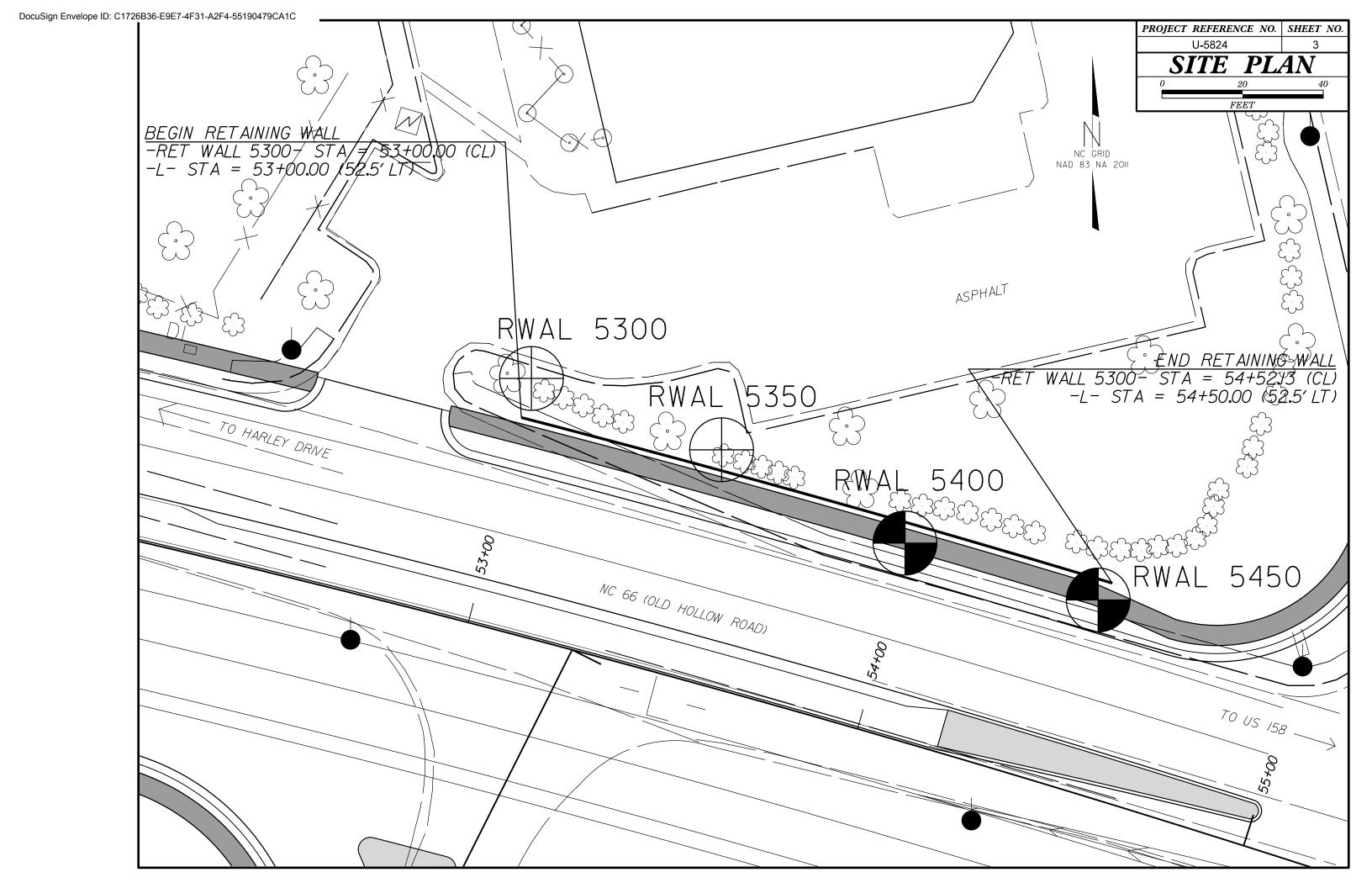
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PROJECT REFERENCE NO.

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

# SUBSURFACE INVESTIGATION

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL   SOIL   SOIL   SOIL   SENT-CONSOLIDATED, DESCRIPTION	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.  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS;  ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERAL OGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.  COMPRESSIBLE  COMPRESSIBLE  LL < 31  COMPRESSIBLE  LL < 31  LL ≥ 31 - 50  LL > 50  PERCENTAGE OF MATERIAL  ORGANIC MATERIAL  GRANULAR  SOILS  TRACE  THACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%,  LITTLE ORGANIC MATTER 3 - 5%, 5 - 12%, LITTLE 10 - 20%,  MODERATELY ORGANIC > 10%, > 20%, HIGHLY 35%, AND ABOVE  GROUND WATER  WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  FAMILY AFTER DATE AFTER 24 HOURS  PRING OR SEEP  MISCELLANEOUS SYMBOLS  ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  ARTIFICIAL FILL (AF) OTHER HOLE IMMEDIATELY AFTER DRING INSTALLATION  ARTIFICIAL FILL (AF) OTHER  THAN ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  ARTIFICIAL FILL (AF) OTHER  THAN ROADWAY EMBANKMENT (RE)  WITH SOIL SYMBOL  ARTIFICIAL FILL (AF) OTHER  THAN ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  AUGER BORING  CONE PENETROMETER  TEST	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL. IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED ROCK (UR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  CRYSTALLINE ROCK (UR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  NON-CRYSTALLINE ROCK (UR) FINE TO COASTS GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES CRANITE, GMEISS, GABBRO, SCHIST, ETC.  NON-CRYSTALLINE ROCK (UR) ROLLINE SEDIMENTARY ROCK HAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  WEATHERING  FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SL.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.  SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SL.) I INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS IF OF A CRYSTALL AND DULL SOUND HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS OF STRENGTH SHOW CLAY, ROCK HAS DULL SOUND LUNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT OR STRENGTH TO STRONG SOIL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  AQUIFER - A WATER BEARING FORMATION OR STRATA.  ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  ARGILACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.  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 SURFACE.  CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  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.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  DIP -THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  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 ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTILING IN SOILS USUALLY INDICATES POOR ACRATION AND LACK OF GOOD DRAINAGE.
VERY SOFT   < 2   < 0.25	INFERRED SOIL BOUNDARY  ———————————————————————————————————	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, OUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.	OF AN INTERVENING IMPERVIOUS STRATUM.  RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPPOLITE (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  OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053  BOULDER (COB) (GR.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	UNDERCUT  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL  ABBREVIATIONS	VERY HARD  CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD  CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.  MODERATELY  CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOWS.	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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
SIZE   IN.   12   3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORNIG TERMINATED MICA MICACEOUS WEA WEATHERED  CL CLAY MOD MODERATELY CPT - CONE PENETRATION TEST NP - NON PLASTIC CSE COARSE ORG ORGANIC  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC E - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.  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 PIECES CAN BE BROKEN BY FINGER PRESSURE.	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 WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.  STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
LL LIQUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	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 FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE  - WET - (W) SEMISULIS REGULES BYTING TO ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE         SPACING         BEDDING           1ERM         SPACING         1ERM         THICKNESS	BENCH MARK: N/A
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT PEQUIPES ADDITIONAL WATER TO	EQUIPMENT USED ON SUBJECT PROJECT  DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS X AUTOMATIC MANUAL	TERM	ELEVATIONS OBTAINED FROM THE TIN FILE  (U5824_LS_DTM_TIN_DOT_2022-0I-I0.+in) ELEVATION: N/A FEET  NOTES:  MnO = MANGANESE OXIDE
- DRY - (U) ATTAIN OPTIMUM MOISTURE	CME-55   G* CONTINUOUS FLIGHT AUGER   CORE SIZE:   -B	THINLY LAMINATED (0.008 FEET INDURATION	VE = VERTICAL EXAGGERATION
PLASTICITY	X CME-55ØX	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.  INDURATED  GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT INVE USING THE ROADWAY PROFILE FILE (U5824_Rdy_pfi) AS A GUIDE.IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A INVE TO BETTER PRESENT THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.
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.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-



		BURE LUG				
<b>WBS</b> 44395.1.1		NTY FORSYTH	GEOLOGIST Shipman, M.	<b>WBS</b> 44395.1.1	TIP U-5824 COUNTY FORSYTH	GEOLOGIST Shipman, M.
`	ld Hollow Road) Widening From H	<del></del>	GROUND WTR (ft)	,	Hollow Road) Widening From Harley Drive to US 158	
BORING NO. RWAL_5300	STATION 53+00	OFFSET 10 ft LT	ALIGNMENT RET_WALL_53000 HR. Dry	BORING NO. RWAL_5350	STATION 53+50 OFFSET 5 ft LT	
COLLAR ELEV. 998.8 ft	TOTAL DEPTH 6.1 ft	NORTHING 882,480	<b>EASTING</b> 1,659,983 <b>24 HR.</b> Dry	COLLAR ELEV. 998.3 ft	TOTAL DEPTH 5.0 ft NORTHING 882,	
DRILL RIG/HAMMER EFF./DATE N/	/A	DRILL METHOD	Hand Auger HAMMER TYPE N/A	DRILL RIG/HAMMER EFF./DATE N/A	DRILL	METHOD Hand Auger HAMMER TYPE N/A
DRILLER Shipman, M.	<b>START DATE</b> 06/14/22	COMP. DATE 06/14/22	SURFACE WATER DEPTH N/A	DRILLER Fischer, H.	<b>START DATE</b> 06/14/22 <b>COMP. DATE</b> 06	
ELEV (ft) DEPTH BLOW COL (ft) (ft) (ft) 0.5ft 0.5ft		OOT SAMP. V L O NO. MOI G	SOIL AND ROCK DESCRIPTION  ELEV. (ft)  DEPTH (ft)	ELEV CHI DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft 0.5ft		I / I O I SOIL AND ROCK DESCRIPTION I
995			998.8 GROUND SURFACE 0.0  ARTIFICIAL FILL orange-brown, red-brown, brown, and tan, loose to medium dense, silty SAND (A-2-4) with some gravel, trace mica, and trace amounts of trash (plastic) SAPROLITE orange-brown and red-brown, medium stiff to stiff, highly plastic, silty CLAY (A-7-6) with some sand Boring Terminated at Elevation 992.7 ft in Saprolite (silty CLAY)	995	S-18	998.3 GROUND SURFACE 0.0  ARTIFICIAL FILL brown to orange-brown, loose to medium dense, silty SAND (A-2-4) with trace gravel and mica, trace trash (plastic) 5.0  SAPROLITE orange-brown and red-brown, medium stiff to hard, moderately plastic, silty CLAY (A-7-5) with some sand and trace gravel-sized crystalline rock fragments  Boring Terminated by Hand Auger Refusal at Elevation 993.3 ft in Saprolite (silty CLAY)
			- Soil Densities Estimated Artificial Fill likely related to the construction of the nearby Walgreens.			- Hand Auger Refusal at 5.0 feet interpreted as hard, silty CLAY Soil Densities Estimated.
VCDOT BORE DOUBLE U5624_GEO_RWAL_53+00.GPJ NC_DOT.GDT 7/14/22						- Artificial Fill likely related to the construction of the nearby Walgreens.

BORE LOG				
WBS         44395.1.1         TIP         U-5824         COUNTY         FORSYTH	GEOLOGIST Fischer, H.		U-5824 COUNTY FORSYTH	GEOLOGIST Fischer, H.
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening From Harley Drive to US 158			w Road) Widening From Harley Drive to US 158	GROUND WTR (
BORING NO. RWAL_5400 STATION 54+00 OFFSET 5 ft RT			ATION 54+50 OFFSET 5 ft RT	ALIGNMENT RET_WALL_53000 HR. D
COLLAR ELEV. 1,002.5 ft TOTAL DEPTH 10.5 ft NORTHING 882,4			TAL DEPTH 10.5 ft NORTHING 882,425	<b>EASTING</b> 1,660,123 <b>24 HR.</b> D
	L METHOD H.S. Augers HAMMER TYPE Au			
DRILLER Moseley, M.G. START DATE 06/28/22 COMP. DATE 06/	06/28/22 SURFACE WATER DEPTH N/A		ART DATE 06/28/22   COMP. DATE 06/28/22   BLOWS PER FOOT   SAMP.	SURFACE WATER DEPTH N/A
ELEV (ft)         DRIVE ELEV (ft)         DEPTH (ft)         BLOW COUNT (ft)         BLOWS PER FOOT (ft)         SAMP.           0         25         50         75         100         NO.	SOIL AND ROCK DESCRIPTION	DEPTH (ft)    DEPTH (ft)	BLOWS PER FOOT SAMP.  0 25 50 75 100 NO. MOI	O SOIL AND ROCK DESCRIPTION G
1,002.5 0.0 4 5 7	D SAPROLITE tan and red-orange, loose to dense, silty SAND (A-2-4) with some to little mica and	0.0 1005 1,003.2 0.0 3 3 7 2, silty 2a and 999.2 4.0	D	1,003.2 GROUND SURFACE SAPROLITE tan, red-orange, and white, medium dense to dense, silty SAND (A-2-4), with little to trace
998.5 + 4.0   5   15   20	D little to trace gravel-sized crystalline rock fragments	995 994.2 99.0 17 10 20	D D	mica, tracé MnO and gravel-sized crystalline rock fragments
ACDOT BORE DOUBLE U8824 GEO, RWAL, 53-400 GPJ N/C DOT 77/4/22	M System 1 Boring Terminated at Elevation 992.0 ft in Saprolite (sitty SAND)  Boring Terminated at Elevation 992.0 ft in Saprolite (sitty SAND)  Boring Terminated at Elevation 992.0 ft in Saprolite (sitty SAND)	10.5		Boring Terminated at Elevation 992.7 ft in Saprolite (silty SAND)

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582

REFERENCE

44395

**CONTENTS** 

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN **PROFILES** BORE LOGS

STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY FORSYTH

PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD) WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L--RET WALL 5370-STA = 53+70.00-55+50.00 (CL)-L-STA = 53 + 70.00 - 55 + 39.79 (64.50' - 100.16'RT)

STATE PROJECT REFERENCE NO. 8 U-5824

#### **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 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.

M. SHIPMAN, EI

H. FISCHER, GIT

M.G. MOSELEY

J. MOSELEY

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

DRAWN BY \_B. SMITH, PG

CHECKED BY B. WORLEY, PG

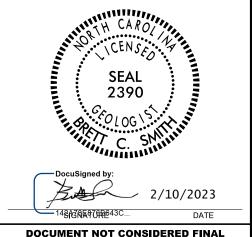
SUBMITTED BY \_\_B. SMITH, PG

DATE \_\_*JULY*, 2022

Prepared in the Office of:



2715 Ashton Drive, G.C. Wilmington, NC 28412 Phone: (910) 475-1208



**UNLESS ALL SIGNATURES COMPLETED** 

PROJECT REFERENCE NO. SHEET N

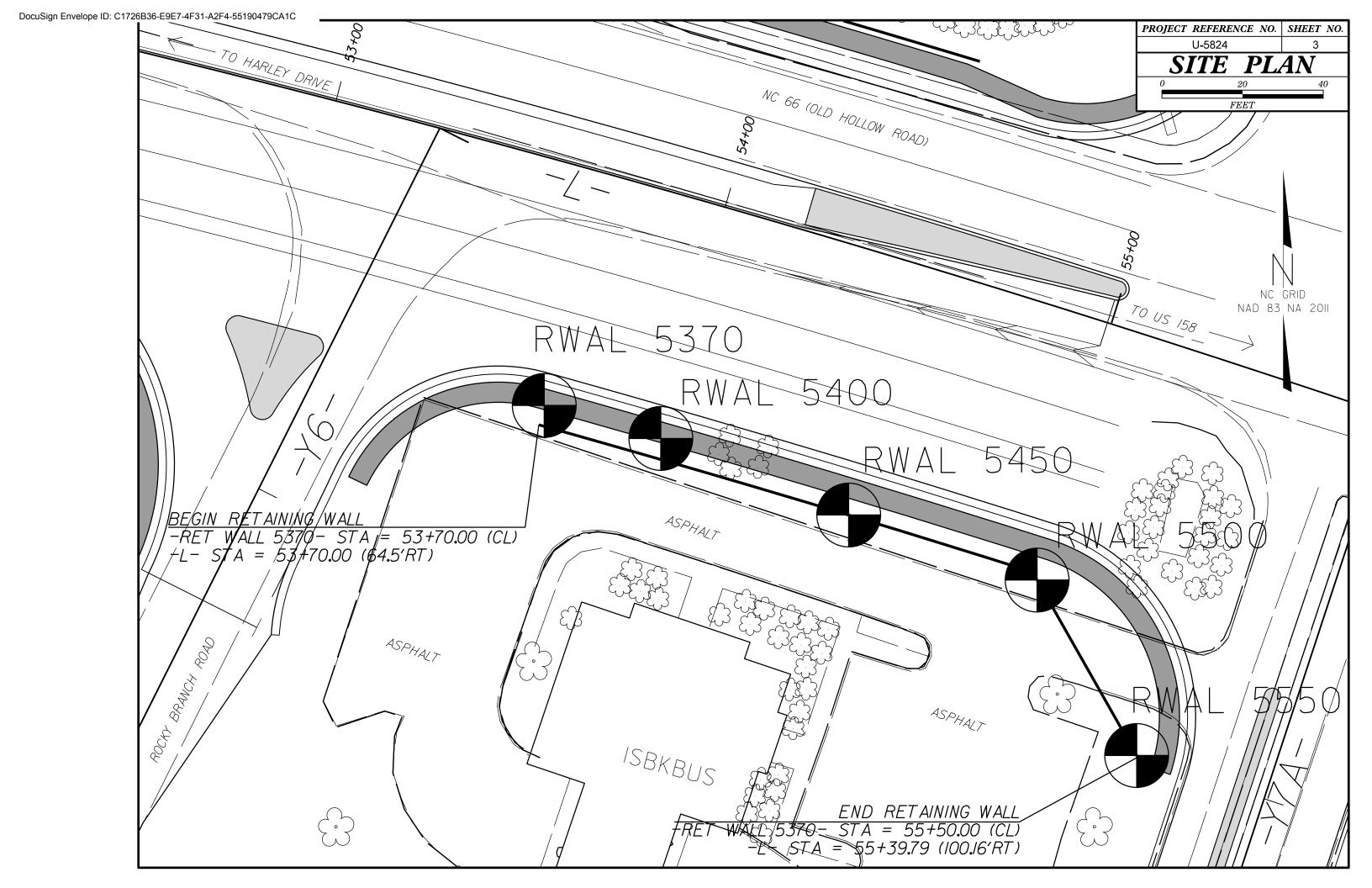
U-5824

2

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

# SUBSURFACE INVESTIGATION

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN BE BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DISBO), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING; CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALDGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SUTY CLAY, MOIST WITH INTERBEDDED FINE SAMD LAVERS, HIGHLY PLASTIC.A-7-6	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.  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <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. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (WR)  100 BLOWS PER FOOT IF TESTED.  CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, OMEISS, GABBRO, SCHIST, ETC.	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 SURFACE.  CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3-6 A-3 A-6, A-7 SYMBOL 0000 0000 0000 0000 0000 0000 0000 0	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK STAL PLAIN COASTAL PLAIN COASTAL PLAIN COASTAL PLAIN SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  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 58 MX G MX 51 MN G MX 51 MN G MX 51 MN G MX 50 MX 50 MX 51 MN G MX 51 MN	PERCENTAGE OF MATERIAL  GRANULAR SILT - CLAY	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
*200   15 MA   25 MA   10 MA   35 MA   35 MA   35 MA   35 MA   35 MA   36 MA   36 MA   36 MA   36 MA   36 MA    MATERIAL PASSING *40	ORGANIC MATERIAL         SOILS         SOILS         OTHER MATERIAL           TRACE OF ORGANIC MATTER 2 - 3%         3 - 5%         TRACE 1 - 10%           LITTLE ORGANIC MATTER 3 - 5%         5 - 12%         LITTLE 10 - 20%           MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME 20 - 35%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, AND AND ADMINISTRATION OF THE STAIN OF T	OIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE  GROUND WATER	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. OF MAJOR GRAYEL AND MATERIALS SAND GRAYEL AND GRAYEL AND SOND GRAYEL AND SOND SOILS  GRAYEL AND GRAYEL AND SAND SOILS  GRAYEL AND SAND SOILS  GRAYEL AND SAND SOILS  GRAYEL AND SAND SOILS	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  STATIC WATER LEVEL AFTER 24 HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	─────────────────────────────────────	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLDRED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	PARENT MATERIAL.  FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBCROUP IS < LL - 30 :PI OF A-7-6 SUBCROUP IS > LL - 30  CONSISTENCY OR DENSENESS  COMPACTNESS OR RANGE OF STANDARD PENETRATION RESISTENCE COMPRESSIVE STRENGTH  CONSISTENCY  CONSISTENCY	MISCELLANEOUS SYMBOLS  The roadway embankment (re) 25/025 dip & dip direction	MODERATELY SEVERE (MOD. SEV.)  AND CAN BE EXCAPATED WITH SHIP SHIP SHIP SHIP SHIP SHIP SHIP SHI	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  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
CUNSISTENCT	WITH SOIL DESCRIPTION  OF ROCK STRUCTURES  SOIL SYMBOL  OF ROCK STRUCTURES  SLOPE INDICATOR INSTALLATION  ARTIFICIAL FILL (AF) OTHER THAN BOADWAY EMBANKMENT  AUGER BORING  CONE PRETTOMETER TEST	SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTITLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTILING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50 VERY DENSE > 50 VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED SOIL BOUNDARY	VERY SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY   MEDIUM STIFF   4 TO 8	## MONITORING WELL TEST BORING WITH CORE  ###### ALLUVIAL SOIL BOUNDARY △ PIEZOMETER INSTALLATION ─ SPT N-VALUE	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 ALSO AN EXAMPLE.	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 RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS  VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270  OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053  BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXC	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. COUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	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 SIZE IN. 12 3  SOIL MOISTURE - CORRELATION OF TERMS	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERD CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	MEDIUM  CAN BE GROOVED OR COUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE  POINT OF A GEOLOGIST'S PICK.	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 I FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	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 PIECES CAN BE BROKEN BY FINGER PRESSURE.	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 (SAT.) FROM BELOW THE GROUND WATER TABLE  PLASTIC - CRIMING IN DEGULES ADVISE ADVIS	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	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 FINGERNAIL.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W)  SEMISOLIDI REGULARS DATING TO ATTAIN OPTIMUM MOISTURE	FRACL - FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS ## - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING	BENCH MARK: N/A
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT  DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM	ELEVATIONS OBTAINED FROM THE TIN FILE (U5824_LS_DTM_TIN_DOT_2022-01-10.+in) ELEVATION: N/A FEET
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C CLAY BITS X AUTOMATIC MANUAL  CME-55 CORE SIZE:	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           THINLY LAMINATED         < 0.008 FEET	NOTES:  Mno = MANGANESE OXIDE
PLASTICITY	3.25° HOLLOW STEM AUGERS	INDURATION  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	VE = VERTICAL EXAGGERATION
PLASTICITY INDEX (PI)   DRY STRENGTH	VANE SHEAR TEST TUNGCARBIDE INSERTS CASING W/ ADVANCER POST HOLE DIGGER	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824_Rdy_pf) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1 VE TO BETTER PRESENT
HIGHLY PLASTIC 26 OR MORE HIGH  COLOR	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER TRICONE TRICONE SOUNDING ROD CORE BIT VANE SHEAR TEST	BREAKS EASILY WHEN HIT WITH HAMMER.  GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.
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.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14



	BORE LOG				
<b>WBS</b> 44395.1.1 <b>TIP</b> U-5824	COUNTY FORSYTH	GEOLOGIST Fischer, H.	<b>WBS</b> 44395.1.1	TIP U-5824 COUNTY FORSYT	
SITE DESCRIPTION NC 66 (Old Hollow Road) Widenin	ng from Harley Drive to US 158	GROUND WTR (ft)	SITE DESCRIPTION NC 66 (Old	Hollow Road) Widening from Harley Drive to U	
BORING NO. RWAL_5370 STATION 53+70	OFFSET 5 ft LT	ALIGNMENT RET_WALL_53700 HR. Dry	BORING NO. RWAL_5400	STATION 54+00 OFFSET 5	5 ft LT ALIGNMENT RET_WALL_53700 HR. Dry
COLLAR ELEV. 999.2 ft TOTAL DEPTH 10			COLLAR ELEV. 999.6 ft	TOTAL DEPTH 10.5 ft NORTHING	
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/	2/2021 DRILL METHOD	H.S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE SUM		DRILL METHOD H.S. Augers HAMMER TYPE Automatic
DRILLER Moseley, M.G. START DATE 06/2		SURFACE WATER DEPTH N/A	DRILLER Moseley, M.G.		TE 06/28/22 SURFACE WATER DEPTH N/A
ELEV   DRIVE   ELEV   (ft)   DEPTH   BLOW COUNT   BLOW   DEPTH   BLOW COUNT   BLOW   COUNT   B	NS PER FOOT SAMP. C C C C C C C C C C C C C C C C C C C	SOIL AND ROCK DESCRIPTION  ELEV. (ft)  DEPTH (ft)	ELEV (ft) DEPTH (ft) DEPTH (ft) 0.5ft 0.5ft 0	I	SAMP. L O SOIL AND ROCK DESCRIPTION NO. MOI G
999.2 0.0 8 13 17		999.2 GROUND SURFACE 0.0 RESIDUAL	1000 999.6 0.0 8 12	15	
995 995.2 4.0 7 6 6	м	red and tan, hard, highly plastic, silty CLAY (A-7-5) with trace gravel-sized crystalline rock fragments and mica SAPROLITE red, orange, brown, and white, medium dense, clayey, silty SAND (A-2-5) and silty SAND (A-2-4) with some mica, little gravel-sized crystalline rock fragments, and	990.6 + 9.0	5 • 9 · · · · · · · · · · · · · · · · · ·	red, very stiff, highly plastic, silty CLAY  (A-7-5) with some sand and trace  gravel-sized crystalline rock fragments  SAPROLITE  red, brown, and white, loose, clayey, silty  SAND (A-2-5) and silty SAND (A-2-4) with some mica, little gravel-sized crystalline rock  fragments, and trace MnO  10.5
NODOT BORE DOUBLE U5824_GEO_RWAL_53+70.GPJ NC_DOT.GDT 7/19/22		988.7 trace MnO 10.5  Boring Terminated at Elevation 988.7 ft in Saprolite (sitty SAND)  Saprolite (sitty SAND)			Boring Terminated at Elevation 989.1 ft in Saprolite (silty SAND)

ВО	RE LOG				
WBS         44395.1.1         TIP         U-5824         COUNTY	FORSYTH G	GEOLOGIST Fischer, H.	<b>WBS</b> 44395.1.1	TIP U-5824 COUNTY FORSYTH	GEOLOGIST Fischer, H.
SITE DESCRIPTION NC 66 (Old Hollow Road) Widening from Harley I	Drive to US 158	GROUND WTR (ft)	SITE DESCRIPTION NC 66 (Old	Hollow Road) Widening from Harley Drive to US 158	GROUND WTR (ft)
_		LIGNMENT RET_WALL_53700 HR. Dry	BORING NO. RWAL_5500	STATION 55+00 OFFSET CL	ALIGNMENT RET_WALL_53700 HR. Dry
		<b>EASTING</b> 1,660,094 <b>24 HR.</b> Dry	COLLAR ELEV. 1,001.0 ft	TOTAL DEPTH 10.7 ft NORTHING 882,301	<b>EASTING</b> 1,660,141 <b>24 HR.</b> Dry
DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550X 83% 11/12/2021	DRILL METHOD H.S. A	•	DRILL RIG/HAMMER EFF./DATE SUM		
	COMP. DATE 06/28/22 S SAMP. ▼ L	SURFACE WATER DEPTH N/A	DRILLER Moseley, M.G.	START DATE         06/28/22         COMP. DATE         06/28/22           NT         BLOWS PER FOOT         SAMP.	SURFACE WATER DEPTH N/A
DRIVE   DEPTH   BLOW COUNT   BLOWS PER FOOT		SOIL AND ROCK DESCRIPTION  EV. (ft) DEPTH (ft)	ELEV DRIVE ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0		SOIL AND ROCK DESCRIPTION  G
1005			1.001.0 0.0		
1000 1,000.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	D	000.0 GROUND SURFACE 0.0 RESIDUAL	1000 9 13	13 26 D	RESIDUAL 998.5 red, very stiff, moderately plastic, highly 2.5
995 996.0 4.0 6 5 9	SS-110 16%  M 997	with some sand and trace gravel-sized	995 991.8 9.2 10 8	6 12	sandy, silty CLAY (A-7-6) with little r = = = = = = = = = = = = = = = = = =
		Boring Terminated at Elevation 989.5 ft in Saprolite (sitty SAND)			Boring Terminated at Elevation 990.3 ft in Saprolite (sitty SAND)

									<u> </u>	<u>RE L</u>	UG							
WBS	44395.1.1			TI	<b>P</b> U-	5824		COUN	TY	FORSYT	Н			GEOLOGI	ST Fischer	, H.		
SITE	DESCRIPTION	I NC	66 (O	ld Holl	ow Ro	ad) W	idening	from Hai	ley D	rive to U	S 158						GROUN	ID WTR (ft)
BOR	ING NO. RWA	L_555	50	S	ΓΑΤΙΟ	N 55	+50		OF	FSET	CL			ALIGNME	NT RET_W	/ALL_53	00 HR.	Dry
COLI	LAR ELEV. 1,	000.4	ft	TO	OTAL I	DEPTI	<b>H</b> 10.3	ft	NC	ORTHING	882,2	57		EASTING	1,660,165		24 HR.	Dry
DRILL	RIG/HAMMER E	FF./DA	TE SI	JM2603	CME-5	50X 83	% 11/12/2	2021			DRILL N	ИЕТНО	<b>D</b> H	.S. Augers		HAMM	ER TYPE	Automatic
DRIL	LER Moseley	, M.G.		S	TART I	DATE	06/28/	22	CC	OMP. DA	TE 06/	28/22		SURFACE	WATER DE	PTH N	Ά	
ELEV (ft)	DRIVE ELEV (ft) DEPTH (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	0	25		PER FOO	75	100	SAMP. NO.	MOI	L O G	ELEV. (ft)	SOIL AND RO	OCK DES	CRIPTION	DEPTH (fi
1005														 - -				
1000	1,000.4 0.0	12	21	20				.			SS-124	13%		- 1,000.4 		ND SURF	ACE	0.
	‡						4	1			33-124	13%			orange, hard, sandy, silty CL	moderatel		
995	996.5 + 3.9	7	6	8			 			 		М		<u> </u>	ravel-sized cry	stalline ro	k fragmen	ts
990	†				-	<u>  14</u>						'''		red_	and orange, m (A-2-4) with tr		nse, silty S	
	991.5 + 8.9	00		40/0.4	: :									991.0	` fragme	ents and m	ica	9.
	<del></del> ‡	29	57	43/0.4						100/0.9	<u> </u>		777	990.1		HERED RO Granite)	OCK	10.
	1													Bo	ring Terminate Weathere	d at Eleva		ft in
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REFERENCE

44395

**CONTENTS** 

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN **PROFILES** BORE LOGS

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY FORSYTH

PROJECT DESCRIPTION NC 66 (OLD HOLLOW ROAD) WIDENING FROM HARLEY DRIVE TO US 158

SITE DESCRIPTION RETAINING WALL ALONG -L--RET WALL 5617- STA = 56+17.20 - 59+07.56 (CL)-L-STA = 56+17.20 - 59+00.00 (74.33'-52.5'RT)

STATE PROJECT REFERENCE NO. 9 U-5824

#### **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 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.

M. SHIPMAN, EI

H. FISCHER, GIT M.G. MOSELEY

J. MOSELEY

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

DRAWN BY \_B. SMITH, PG

CHECKED BY B. WORLEY, PG

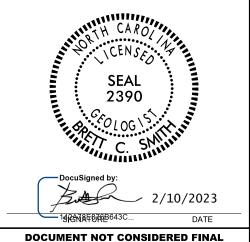
SUBMITTED BY \_\_B. SMITH, PG

DATE \_\_*JULY*, 2022

Prepared in the Office of:



2715 Ashton Drive, Ste Wilmington, NC 28412 Phone: (910) 475-1208



**UNLESS ALL SIGNATURES COMPLETED** 

PROJECT REFERENCE NO. SHEET N

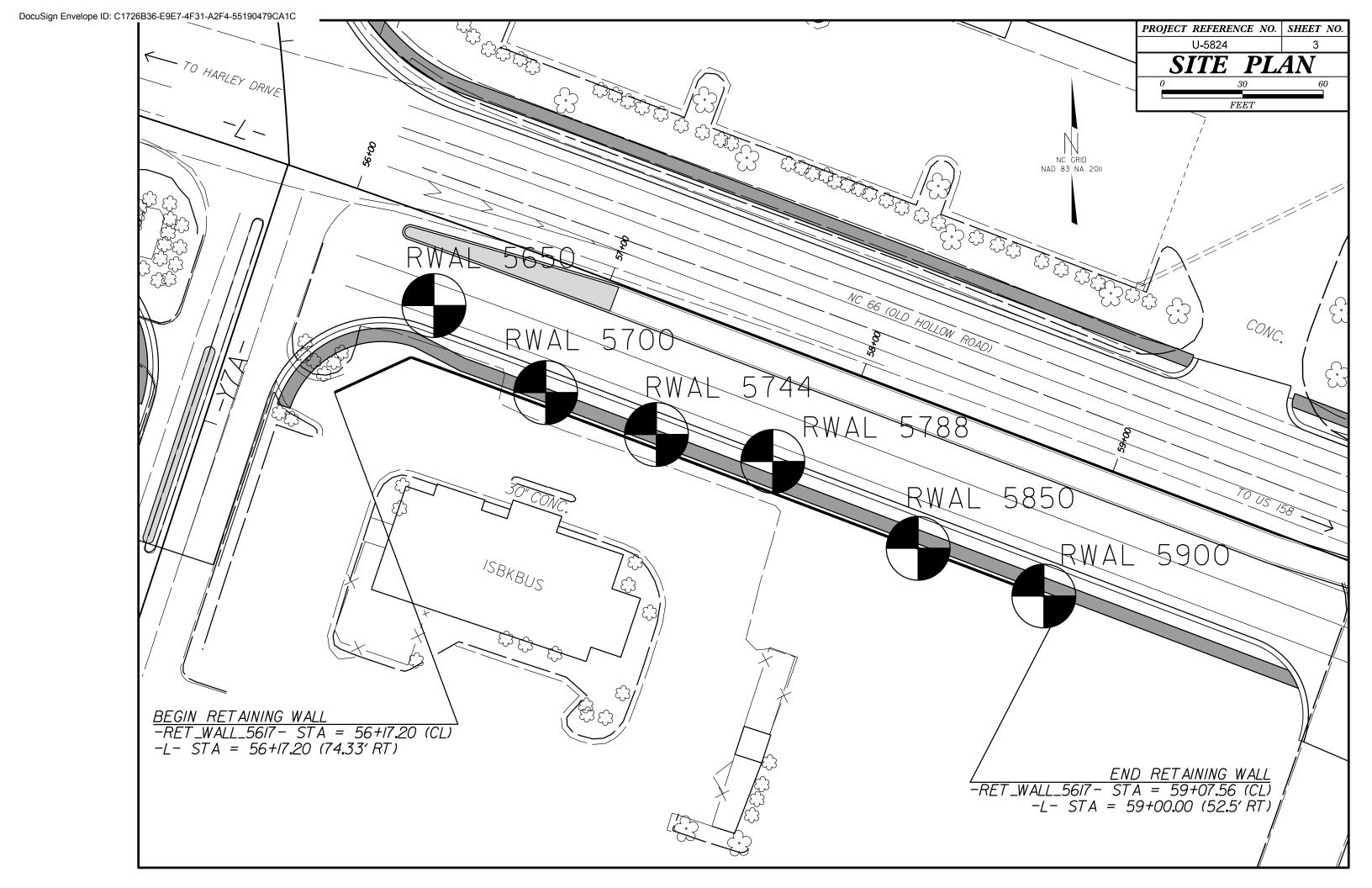
U-5824

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

# SUBSURFACE INVESTIGATION

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN BE BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DISBO), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING; CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALDGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SUTY CLAY, MOIST WITH INTERBEDDED FINE SAMD LAVERS, HIGHLY PLASTIC.A-7-6	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.  GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <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. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (WR)  100 BLOWS PER FOOT IF TESTED.  CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, OMEISS, GABBRO, SCHIST, ETC.	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 SURFACE.  CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3-6 A-3 A-6, A-7 SYMBOL 0000 0000 0000 0000 0000 0000 0000 0	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK STAL PLAIN COASTAL PLAIN COASTAL PLAIN COASTAL PLAIN SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  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 58 MX G MX 51 MN G MX 51 MN G MX 51 MN G MX 50 MX 50 MX 51 MN G MX 51 MN	PERCENTAGE OF MATERIAL  GRANULAR SILT - CLAY	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
*200   15 MA   25 MA   10 MA   35 MA   35 MA   35 MA   35 MA   35 MA   36 MA   36 MA   36 MA   36 MA   36 MA    MATERIAL PASSING *40	ORGANIC MATERIAL         SOILS         SOILS         OTHER MATERIAL           TRACE OF ORGANIC MATTER 2 - 3%         3 - 5%         TRACE 1 - 10%           LITTLE ORGANIC MATTER 3 - 5%         5 - 12%         LITTLE 10 - 20%           MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME 20 - 35%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, AND AND ADMINISTRATION OF THE STAIN OF T	OIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE  GROUND WATER	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. OF MAJOR GRAYEL AND MATERIALS SAND GRAYEL AND GRAYEL AND SOND GRAYEL AND SOND SOILS  GRAYEL AND GRAYEL AND SAND SOILS  GRAYEL AND SAND SOILS  GRAYEL AND SAND SOILS  GRAYEL AND SAND SOILS	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  STATIC WATER LEVEL AFTER 24 HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	─────────────────────────────────────	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLDRED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	PARENT MATERIAL.  FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBCROUP IS < LL - 30 :PI OF A-7-6 SUBCROUP IS > LL - 30  CONSISTENCY OR DENSENESS  COMPACTNESS OR RANGE OF STANDARD PENETRATION RESISTENCE COMPRESSIVE STRENGTH  CONSISTENCY  CONSISTENCY	MISCELLANEOUS SYMBOLS  The roadway embankment (re) 25/025 dip & dip direction	MODERATELY SEVERE (MOD. SEV.)  AND CAN BE EXCAPATED WITH SHIP SHIP SHIP SHIP SHIP SHIP SHIP SHI	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  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
CUNSISTENCT	WITH SOIL DESCRIPTION  OF ROCK STRUCTURES  SOIL SYMBOL  OF ROCK STRUCTURES  SLOPE INDICATOR INSTALLATION  ARTIFICIAL FILL (AF) OTHER THAN BOADWAY EMBANKMENT  AUGER BORING  CONE PRETTOMETER TEST	SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTITLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTILING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50 VERY DENSE > 50 VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED SOIL BOUNDARY	VERY SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY   MEDIUM STIFF   4 TO 8	## MONITORING WELL TEST BORING WITH CORE  ###### ALLUVIAL SOIL BOUNDARY △ PIEZOMETER INSTALLATION ─ SPT N-VALUE	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 ALSO AN EXAMPLE.	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 RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS  VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270  OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053  BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT  UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE  UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXC	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. COUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	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 SIZE IN. 12 3  SOIL MOISTURE - CORRELATION OF TERMS	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERD CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	MEDIUM  CAN BE GROOVED OR COUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE  POINT OF A GEOLOGIST'S PICK.	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 I FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	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 PIECES CAN BE BROKEN BY FINGER PRESSURE.	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 (SAT.) FROM BELOW THE GROUND WATER TABLE  PLASTIC - CRIMING IN DEGULES ADVISE ADVIS	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	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 FINGERNAIL.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W)  SEMISOLIDI REGULARS DATING TO ATTAIN OPTIMUM MOISTURE	FRACL - FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS ## - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING	BENCH MARK: N/A
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT  DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM	ELEVATIONS OBTAINED FROM THE TIN FILE (U5824_LS_DTM_TIN_DOT_2022-01-10.+in) ELEVATION: N/A FEET
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C CLAY BITS X AUTOMATIC MANUAL  CME-55 CORE SIZE:	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           THINLY LAMINATED         < 0.008 FEET	NOTES:  Mno = MANGANESE OXIDE
PLASTICITY	3.25° HOLLOW STEM AUGERS	INDURATION  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	VE = VERTICAL EXAGGERATION
PLASTICITY INDEX (PI)   DRY STRENGTH	VANE SHEAR TEST TUNGCARBIDE INSERTS CASING W/ ADVANCER POST HOLE DIGGER	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	A PRELIMINARY RETAINING WALL ENVELOPE WAS DRAWN AT 1:1 VE USING THE ROADWAY PROFILE FILE (U5824_Rdy_pf) AS A GUIDE. IT SHOULD BE NOTED THAT THIS IS NOT AN OFFICIAL RETAINING WALL ENVELOPE. SUMMIT ELECTED TO DRAW THE WALL AT A 1:1 VE TO BETTER PRESENT
HIGHLY PLASTIC 26 OR MORE HIGH  COLOR	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER TRICONE TRICONE SOUNDING ROD CORE BIT VANE SHEAR TEST	BREAKS EASILY WHEN HIT WITH HAMMER.  GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	THE SUBSURFACE DETAILS ALONG THE LENGTH OF THE WALL PROFILE.
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.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14



									ORE													,																					
WBS	4439	5.1.1		Т	<b>IP</b> U-582	4	С	TNUO	<b>f</b> FOR	SYTH	l			GEO	LOGIS	ST Sh	hipman	1, M.				WB	S 44	1395.1	.1			TIF	P U-	5824		CO	UNTY	FORS	YTH			GEO	DLOGIS	<b>T</b> Shipr	nan, M.		
SITE	DESCF	RIPTION	NC 66	`	low Road)		ing from	n Harle	y Drive	to US	158								_	OUND V	VTR (ft)	SIT	E DES	CRIP	TION	NC 6	6 (Old					g from	<u>_</u>	Drive to								_	JND WTR (ft
BOF	ING NO	. RWA	L_5650	s	TATION	56+50			OFFSE	<b>T</b> 21	1 ft LT			ALIG	NMEN	NT RE	ET_WA	ALL_5	61 7 <b>0 H</b>	IR.	Dry	BOI	RING	NO.	RWAI	5700	)	ST	TATIO	<b>N</b> 57	+00			DFFSET	5 ft L	T		ALIG	GNMEN	RET_	WALL_5	6 7 <b>0 HR</b>	. Dry
COL	LAR EL	<b>EV.</b> 1,0	002.2 ft	Т	OTAL DEI	<b>PTH</b> 1	0.6 ft		NORTI	HING	882,2	289		EAS	TING	1,660	),282		24 H	IR.	Dry	COI	LAR	ELEV	. 999	9.2 ft		TC	OTAL I	DEPT	<b>H</b> 10.	5 ft	1	IORTHI	NG 88	32,25	7	EAS	TING	1,660,32	4	24 HR	. Dry
DRIL	L RIG/HA	MMER E	FF./DATE	SUM260	3 CME-550X	83% 11/	12/2021				DRILL N	NETHO	D H.	S. Auger	s			HAM	MER TY	<b>PE</b> Aut	tomatic	DRII	L RIG	/HAMI	IER EF	F./DAT	E SU	M2603	CME-5	50X 83	% 11/12	2/2021			DRII	LL ME	THOD	H.S. Auger	rs		HAN	MER TYP	E Automatic
DRII		/loseley,	M.G.	S	TART DA	<b>ΓE</b> 06/	15/22		COMP	DATE	<b>E</b> 06/	15/22	!	SUR	FACE	WATE	ER DEP	1 HT	N/A			DRI			seley,	M.G.		ST	TART I	DATE	06/1	5/22		COMP. I	DATE	06/15	5/22	SUR	RFACE V	VATER [	EPTH	N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft 0.		0	BLC 25	OWS PEF 50		75 _	100	SAMP. NO.	'/	101	ELEV. (	ft)	SOIL A	AND RO	CK DES	SCRIPT		DEPTH (ft	ELE\ (ft)	DR EL (f	⊏v	EPTH (ft)	0.5ft	0.5ft		0	25		/S PER I	FOOT 7	5 1	SAI		MOI G			SOIL AND	ROCK DE	SCRIPTIC	N
1005		0.0	9 9	) 14		· <u>I</u>	··-		<del> </del>	.		D		1,002.2		C	GROUNI RES	ND SURF			0.0	1000	999	9.2	0.0	7	7	10		17	· · ·				.	-16 2	23%	999.2	browr	to red-bro	UND SUR RESIDUA wn, very s	L stiff, highly	plastic,2.
995	998.1	+ - 4.1 -	10 1	3 17		. \\ . \\_30					SS-14			- - - -	verv	stiff to	, orange- hard, m ty CLAY	noderate	elv plasti	c. hiahly		000		5.2		7	7	7		•14 · \ ·							М		red-bi	rown, stiff,	mica sandy SIL mica SAPROLIT	T (A-4) wit	h trace7.
993	993.1	9.1	10 1	8 19		.   . ',	.			.		М		994.8 _ - - - 991.6	_ `	silty SA	wn, red-b AND (A-2 minated	2-4) with	and white th trace r	e, dense, nica 91.6 ft in	, 10.6		990	-	9.0	10	8	20			28				<u>-                                     </u>	+	M	988.7 - 988.7 	¬mediu	n dense, s	ilty SAND mica	vation 988.	h some 10.
NCDOT BORE DOUBLE U5824_GEO_RWAL_56+17.GPJ NC_DOT.GDT 7/18/22		+++++++++++++++++++++++++++++++++++++++															Saprolite	; (silty S.	SAND					+																			

												LOG																											
	<b>S</b> 443						U-5824				FORSY			GE	OLOGI	ST Ship	oman, M.					4439					<b>P</b> U-582				FORSY			GE	EOLOGI	ST Shipma		Г	
SITI	DES	CRIPT	ION	NC 6	6 (Old		w Road) \		ng from										UND WT	TR (ft)	SITE	DESCF	RIPTION	NC NC	66 (O		ow Road)		ng from									ł	O WTR (ft)
BOF	RING N	10. F	RWAL_	_5744	1	ST	ATION 5	7+44			DFFSET	5 ft LT		ALI	IGNME	NT RET	_WALL_	5617 <b>0 HF</b>	₹.	Dry			. RWA			ST	TATION	57+88		- 0	OFFSET	11 ft LT				NT RET_V		70 HR.	Dry
COL	LAR E	ELEV.	998.	.6 ft		то	TAL DEP	<b>TH</b> 10	).6 ft	N	NORTHIN	IG 882,				1,660,3		24 HF		Dry	COLL	AR EL	<b>EV</b> . 99	98.6 ft		TC	OTAL DEI	<b>PTH</b> 10	).5 ft	ı	NORTHIN	I <b>G</b> 882,	231	EA	ASTING	1,660,408		24 HR.	Dry
DRIL	L RIG/I	HAMM	R EFF	./DAT	E SU	M2603 (	ME-550X	83% 11/1	12/2021			DRILL	METHOD	H.S. Aug	jers		HAI	MMER TYP	PE Autor	matic	DRILL	RIG/HA	MMER E	FF./DA	TE SI	UM2603	CME-550X	83% 11/1	12/2021			DRILL	METHOD	H.S. Aug	gers		HAMM	ER TYPE	Automatic
	LLER						ART DAT				COMP. D	ATE 06			RFACE	WATER	DEPTH	N/A					loseley				TART DA				COMP. D			SU	JRFACE	WATER DE	PTH N	A	
ELEV (ft)	DRIV ELE (ft)	/E DE	⊢		V COU		0	BLOV 25	WS PER 50	FOOT	5 10	11		G ELEV	/. (ft)	SOIL AN	D ROCK DI	ESCRIPTIO		EPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	-	0.5ft	UNT 0.5ft	0	BLO\ 25	WS PER 50	R FOOT 7	5 100	SAMP NO.	MOI	0 G		SOIL AND R	OCK DES	CRIPTION	
1000		6 = 0	).0	10	8	12	: : : <del> </del>	20	· · · · ·				М	998.6			ROUND SUI RESIDUA rown, very :	\L	v plastic.	0.0	1000	998.6	0.0	6	11	10		21				SS-7	12%	998.6			ND SURFA		0.0
995	994.	5 4	.1	7	7	9	• • • • • • • • • • • • • • • • • • •	3				SS-11	30%	991.2	hig	hly sandy,	silty CLAY mica and N	(A-7-5) with InO	h trace	7.4	995	994.6	4.0	7	7	10	/	17					М	- - - 991.3	plas trac	tic, highly san e gravel-sized a	dy, silty CL crystalline and mica	AY (A-7-6) v rock fragme	with
990	989.	5 - 9	0.1	3	4	4	/ · · · / · · ·					1	М	988.0		SILT ring Termi	SAPROLI ad orange-b (A-4) with nated at Ele prolite (sand	rown, stiff, ittle mica evation 988		10.6	990	989.6	9.0	4	4	5	• • • • • • • • • • • • • • • • • • •						М	988.1	1	d-brown and o SILT (A- ring Terminate	4) with little	n, stiff, sand mica ion 988.1 ft	10.5
NCDOT BORE DOUBLE U5824_GEO_RWAL_56+17.GPJ NC_DOT.GDT 7/18/22		+																																					

	<b>_</b>	BORE LOG				
<b>WBS</b> 44395.1.1	TIP U-5824 COUN	TY FORSYTH	GEOLOGIST Shipman, M.	<b>WBS</b> 44395.1.1 <b>TIP</b> U-582	24 COUNTY FORSYTH	GEOLOGIST Shipman, M.
SITE DESCRIPTION NC	6 (Old Hollow Road) Widening from Hai	<del>-i</del>	GROUND WTR (ft)	SITE DESCRIPTION NC 66 (Old Hollow Road)		GROUND WTR (ft)
BORING NO. RWAL_585		OFFSET CL	ALIGNMENT RET_WALL_561 70 HR. Dry	BORING NO. RWAL_5900 STATION		ALIGNMENT RET_WALL_56 70 HR. Dry
COLLAR ELEV. 997.2 ft	TOTAL DEPTH 10.6 ft	<b>NORTHING</b> 882,199	<b>EASTING</b> 1,660,462 <b>24 HR.</b> Dry		<b>PTH</b> 10.3 ft <b>NORTHING</b> 882,181	<b>EASTING</b> 1,660,509 <b>24 HR.</b> Dry
	E SUM2603 CME-550X 83% 11/12/2021	DRILL METHOD H.		DRILL RIG/HAMMER EFF./DATE SUM2603 CME-550)		
DRILLER Moseley, M.G.	START DATE 06/15/22	COMP. DATE 06/15/22	SURFACE WATER DEPTH N/A	-	ATE 06/15/22 COMP. DATE 06/15/22	SURFACE WATER DEPTH N/A
ELEV CRIP (ft) DEPTH (ft) BLO (5.5ft)	V COUNT         BLOWS PER FOO           0.5ft         0.5ft           0         25           50	75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION  ELEV. (ft) DEPTH (ft)	ELEV   DRIVE   DEPTH   BLOW COUNT	BLOWS PER FOOT SAMP. L  25 50 75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION
1000			- 997.2 GROUND SURFACE 0.0	996.7 + 0.0		
995	5 5 10 10 10 10 10 10 10 10 10 10 10 10 10		red-brown, brown, and orange-brown, stiff to very stiff, highly plastic, silty CLAY (A-7-5)	995 5 4 5 99	D D	
993.1 4.1 8	10 13		with trace gravel-sized crystalline rock fragments and mica	992.9 3.8 5 6 8	14 · · · · · · · · · · · · · · · · · · ·	red-brown and orange-brown, stiff, highly plastic, highly sandy, silty CLAY (A-7-5) with
988.1 + 9.1	6 8		SAPROLITE red-brown and orange-brown, stiff, silty 986.6 CLAY (A-7) with trace mica and MnO 10.6	987.9 8.8 4 4 4 4	.	989.6 SAPROLITE red-brown and white, loose, silty SAND red-brown and white, loose, silty SAND red-brown and white, loose, silty SAND red-brown and white, loose, silty SAND
4			986.6 CLAY (A-7) with trace mica and MnO 10.6  Boring Terminated at Elevation 986.6 ft in Saprolite (silty CLAY)			10.3   10.3