SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

COUNTY _GUILFORD

PROJECT DESCRIPTION NC 68 AT SR 2129 (FOGLEMAN ROAD) TO NC 150 INTERSECTION IN OAK RIDGE INTERSECTION, **INTERSECTION IMPROVEMENTS**

INVENTORY

74 504 IEC RO

STATE	STATE I
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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 LOSS, ROCK CORES AND SOL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHMICAL ENGINEERING UNIT AT (9)9) TO7-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLED DATA AND THE IN STUI (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS AND YARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUENCE ENDERDATIONS AND WAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUENCE TOREORDED ERFERIENTION AND WITH SO THE ONLICE MATTE CARTORS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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PERSONNEL

NO.

SHEETS

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T ENSONNEL
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EJ. EDMONDSON
A. CLISTER
INVESTIGATED BY <i>E. FERREIRA</i> , <i>EI</i>
DRAWN BY <u>E. FERREIRA, EI</u>
CHECKED BY D. BROWN, PE
SUBMITTED BY D. BROWN, PE
DATE



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND VIELD LESS THAN 100 BLOWS ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO 1 206, ASTM DI506), SOIL CLASS IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLL CONSISTENCY COLO TEXTURE MOISTURE AGENTIC CLASSIFICATION AND OTHER PERTINENT FAC	THAT CAN PER FOOT FICATION WING: ORS SUCH	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES AN IXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD S SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 F BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS REPRESENTED BY A ZONE OF WEATHERED ROCK.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMP	.E,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
SOIL LEGEND AND AASHTO CLASSIFICATION	6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MAT CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) 000000000000000000000000000000000000	ERIALS	MINERAL DOBICHL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE BOCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-1 CLASS A-1-a A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A	5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE SINGLASS, GABBRO, SCHIST, ETC.
SYMBOL 000000000000000000000000000000000000			ROCK (NCR) SEDIMENTARY ROCK (NHAI WOULD SPI REPOSE IF ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
2. PASSING SILT		HIGHLY COMPRESSIBLE LL - 51 - 50	SEDIMENTARY ROCK SPILL SEDIMENTS CEMENTED INTO ROCK, BOT M SEDIMENTARY ROCK SPILL SEDIMENTS CEMENTED INTO ROCK, BOT M
*18 50 MX *48 38 MX 58 MX 51 MN	MUCK, PEAT	GRANULAR SILT - CLAY	WEATHERING
*200 15 MX 25 MX 16 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN MATERIAL PASSING #0		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% HIGHLY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RI HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COA (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAM
P1 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 11 MN 11 MN MODERATE GROUP INDEX Ø Ø Ø 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF USUAL TYPES STONE FRACS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK (SLI,) I INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL (RYSTALS ARE DULL AND DISCOLORED, CRYSTAL INE ROCKS RING UNDER HAMMER I
OF MAJOR GRAVEL AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS GEN. RATING GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR POOR POOR POOR POOR	UNSUITABLE	▼	MODERATE (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORATION AND WEATHERING EFFECTS. DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH 4 WITH FERSEN ROCK
PI OF A-7-5 SUBGROUP IS S LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30		- UPIUI - SPRING OR SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FEI
CUNSISTENCY UR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTENCE ON STANDARD RANGE OF L COMPRESSIVE COMPRESSIVE COMPACTNESS	NCONFINED STRENGTH	ROADWAY EMBANKMENT (RE)	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOS (MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WH IF TESTED, WOULD YIELD SPT REFUSAL
GENERALLY VERY LOOSE < 4 GRANULAR LOOSE 4 TO 10 GRANULAR MEDDIM DENSE 10 TO 20	<u>, , , , , , , , , , , , , , , , , , , </u>	SIL SYMBOL	SEVERE ALL RUCK EXCEPT QUARTZ DISCULURED ON STAINED, RUCK FABRIC CLEAR AND EVI (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOLLD YIELD SPT N VALUES > 100 BPF
MATERIAL (NON-COHESIVE) DENSE VERY DENSE 30 TO 50 > 50 10 K 30 TO 50 VERY SOFT < 2	25	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT 	R ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF (V SEV.) DEGREE THAT (
CENERALLY SOFT 2 TO 4 0.25 T SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 Ti MATERIAL STIFF 8 TO 15 1 TC (COHESIVE) VERY STIFF 15 TO 30 2 Ti	0 0.5 1 1.0 2 4	TTETTE INFERRED ROCK LINE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NEMMIN. <u>IF TESTED, WOULD TIELD SFT N VAL</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE. OR DISCERNIBLE ONLY IN SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. ALSO AN EXAMPLE.
HARD 30 > 30 > 1	1		- ROCK HARDNESS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270			VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS I SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053 DOW DED COARSE FINE CUARSE FINE CUARSE FINE CUARSE	CL AY	SHALLOW UNCLASSIFIED EXCAVATION - UNDEPCIUT UNDEPCIUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXC	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLO TO DETACH HAND SPECIMEN.
(BLDR.) (COB.) (GR.) (CSE.SD.) (F SD.) (SL.)	(CL.)		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEL HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DET BY MODERATE BLOWS.
SOL MOISTURE - CORRELATION OF TERMS		BT - BORING TERMINATED MICA - MICACEOUS WEA WEATHERED CL CLAY MOD MODRATELY Y - UNIT WEIGHT CPT - CONF PENETRATION TEST NP - NON PLASTIC Y - DRY LINIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BI POINT OF A GEOLOGIST'S PICK
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION	ESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u> DPT - DYNAMIC PENETRATION TEST <u>SAPPLITIC</u> S - RUIK	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FI FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. PIECES CAN BE BROVEN BY EINGER BESENT
- SATURATED - USUALLY LIQUID: VERV WET, U (SAT.) FROM BELOW THE GROUND WA LLLIQUID LIMIT	SUALLY TER TABLE	e - VOID RATIO SD SAND, SANDY SS SPLIT SPOON F - FINE SL SILT, SILT, SILT, ST SHELBY TUBE FOSS FOSSILIFEROUS SL SLIGHTLY RS ROCK	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. P SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED EINFORMATI
PLASTIC RANGE C - WET - (W) SEMISOLID; REQUIRES DRYING ATTAIN OPTIMUM MOISTURE	то	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING
(PI) PL PLASTIC LIMIT	MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM Th VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 1.5 WIDE 3 TO 10 FEET THICKLY BEDDED 1.5
SL SHRINKAGE LIMIT	TO	DHILL UNITS: AUVANCING TOULS: HAMMER TIPE: CME-45C CLAY BITS X AUTOMATIC MANUAL X CME-55 6' CONTINUOUS FLIGHT AUGER CORE SIZE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 THICKLY LAMINATED < 0
PLASTICITY] <u>X</u> 8' HOLLOW AUGERS <u> </u> -в	
PLASTICITY INDEX (PI) DRY STRE NON PLASTIC 0-5 VERY (N <u>GTH</u> DW	HARD FACED FINGER BITS	FUR SEUIMENTARY RUCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;
SLIGHTLY PLASTIC 6-15 SLIGH MODERATELY PLASTIC 16-25 MEDIL HIGHT PLASTIC 26-09 MODER	т M	VANE SHEAR TEST	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
COLOR		PORTABLE HOIST	BREAKS EASILY WHEN HIT WITH HAMMER.
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, B' MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARA	UE-GRAY). ICE.		INJURATED DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE REFACES AFRONS GRAINS.

SHEET NO.

PROJECT REFERENCE NO.

	TERMS AND DEFINITIONS
ED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	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
T N VALUES >	A NUTABLE PROPORTION OF CLAP IN THEIR COMPOSITION, SOLH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCONDERED, BUT WHICH DOES NOT NECESSARIY RISE TO DR ABOVE THE GROUND
ICLUDES GRANITE,	SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED. C.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE, 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.
RINGS UNDER	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
COATINGS IF OPEN.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
AMMER BLOWS IF	DIP DIRECTION CUP AZIMUTH? - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
DCK UP TO AL FELDSPAR R BLOWS	FIGUE - A PROPERTY OF SPLITTING ALONG VOID THE FRACTURE.
S. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SUFFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL
H AS COMPARED FELDSPARS DULL	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
OSS OF STRENGTH WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT BUT ARE KAOLINIZED	LEDUE - A SHELF-LIKE HIDE ON PRUJELIJON UF HULK WHUSE IHIUKNESS IS SMALL LUMPARED ID ITS LATERAL EXTENT. LIKNE - A BODY OF SOLI OR BOCY THAT THINS OUT IN ONE OF MORE DIPECTIONS
	<u>MOTILED (MOT.)</u> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTILING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
RE DISCERNIBLE IF STRONG ROCK I ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES (100 BPF IN SMALL AND S. SAPROLITE IS	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 ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
IS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BLOWS REQUIRED	<u>SILL</u> - 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.
EEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPI)- NUMBER OF BLOVS (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.
I FRAGMENTS NT. SMALL, THIN	<u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH HED READILY BY	<u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
THICKNESS	BENCH MARK:
4 FEET	ELEVATION: FEET
16 - 1.5 FEET	NOTES.
03 - 0.16 FEET 08 - 0.03 FEET < 0.008 FEET	BORING ELEVATIONS GENERATED FROM FILE r5725_IS_TINTIN,
EAT, PRESSURE, ETC.	HA = HAND AUGER BORING FIAD = FILLED IMMEDIATELY AFTER DRILLING
TEEL PROBE;	
PROBE;	



March 31, 2021

STATE PROJECT:50474.1.1 (R-5725)COUNTY:GuilfordDESCRIPTION:Intersection improvements at NC 68 at SR 2129 (Fogleman Road) to NC150/Oak Ridge Road (S.R. 2137) in Oak Ridge.

SUBJECT: Roadway Subsurface Inventory

Project Description

The project consists of improvements to NC 68, located within the municipal boundaries of Oak Ridge in North Carolina. The total length of the project is approximately 0.53 miles, with 10 alignments as shown in the table below. The project corridor contains mainly commercial properties with some undeveloped land.

Alignment	Description	Beg/End Stations
-L1-	NC 68	11+50.00 to 21+17.15
-L2-	NC 68	10+00.00 to 39+50.00
-Y1-	Linville Road	10+50.00 to 13+62.65
-Y2A-	Oak Ridge Road	15+50.00 to 19+01.64
-Y2B-	Oak Ridge Road	10+00.00 to 18+00.00
-DR1-	Driveway	10+00.00 to 11+71.94
- DR2-	Driveway	10+00.00 to 11+70.00
- DR3-	Driveway	10+00.00 to 11+39.15
-RABT1-	Roundabout	10+00.00 to 12+51.33
-RABT2-	Roundabout	10+00.00 to 12+51.33

Plans call for the improvement of NC 68 (-L1- and -L2-), from approximately 68± feet south of its intersection with Fogleman Road to 1,070± feet north of its intersection with NC 150/Oak Ridge Road (Y2B). The improvements include widening the existing roadways, new concrete medians, two new roundabouts on the Y-lines, curb and gutter, and installation of sidewalks. The driveway leading to Oak Ridge Dentistry (DR3) will be realigned with a roundabout (-RABT1-) to connect to the new alignment. Linville Road (-Y1-) will be widened with an alignment shift and will also be connected to the roundabout (-RABT1-). Oak Ridge Road will be widened and will connect to a second roundabout (-RABT2-). The ramps on NC 68 heading south, west, and east will be removed, with new thru lanes and turn lane configurations.

A geotechnical field investigation was conducted for this project in February of 2021. Drilling was performed by Catlin of Williamsburg, NC using a track-mounted CME-55 drill rig. The drill rig was equipped with an automatic hammer with an efficiency of 94.7%. All drilling activities were supervised by Stewart personnel.

A total of 19 Standard Penetration Test (SPT) borings and 7 Hand Auger borings were performed for the project. Representative soil samples from select borings were collected in the field for laboratory analysis.

Physiography & Geology

The project site is located in Guilford County, North Carolina, which lies within the Piedmont Geologic Province of North Carolina. The site is part of the Charlotte Belt, adjacent to the Carolina Slate Belt region, which is generally characterized by low grade metamorphosed volcanic rock. Review of the

Geologic Map of Region G, North Carolina (P. Albert Carpenter, 1982) shows that the site is underlain by Porphyritic granite (Pzpgr) north of the intersection of SR 150 and US 68, and the site is underlain by Mica gneiss and schist (mgs) south of the intersection.

Soil Properties

Soils encountered at the site include artificial fill, roadway embankment, alluvial, and residual soils.

Artificial fill was encountered on -L2- and -DR3- consisting of medium stiff (A-7-5) to and stiff silt (A-4), with a Plasticity Index (PI) of 26 to 32 and was moist.

Roadway embankment was encountered in borings along -L1-, -L2-, -Y2A-, -Y2B-, -Y1-, -DR1-, -DR2-, and -DR3-. The material was very loose to dense Silty SAND (A-2-4) and Clayey SAND (A-2-6 and A-2-7) and medium stiff to very stiff Sandy Lean CLAY (A-6) and Silty Plastic CLAY (A-7-5 and A-7-6). The samples were moist to wet. Laboratory test samples had PIs of 12 and 50.

Alluvial soil associated with a nearby creek was encountered along -L2- with material classified as very loose to medium stiff Silty SAND (A-2-4) and Clayey SAND (A-2-6) and soft Silty CLAY (A-7-5) and Sandy Lean CLAY (A-6). The samples were wet to saturated.

Native residual soils were encountered in all borings except for borings DR1_1130 HA, L2_1690 HA, L2_1800 HA, L2_1900 HA, and Y2B_1612 HA. The soils types primarily consist of loose to very dense, Clayey SAND (A-2-6) and Silty SAND (A-2-4), and medium stiff to very stiff Sandy SILT (A-4), Silty CLAY (A-7-5 and A-7-6), and Clayey SILT (A-5). The samples were moist to wet. Laboratory testing on clay samples had PIs ranging from 25 to 26.

Rock Properties

Weathered rock nor bedrock was encountered in any of the 19 borings.

<u>Groundwater</u>

Of the 19 borings, groundwater was not encountered during the drilling process. Thirteen borings were left open for a 24+ hour stabilization period, and six borings were left open until the end of day, after which groundwater was measured in one boring at a depth of 5.6 feet below the current ground surface (el. 903.5 \pm feet). Two hand auger borings had groundwater measured at depths of 2 and 4 feet below the current ground surface (el. 881.9 \pm feet and 936.5 \pm feet).

Areas of Special Geotechnical Interest

Alluvial Soils

Alluvial soil was encountered along the two alignments as shown below.

Alignment	Station	Offset (ft)
-L2-	17+00± to 19+00±	80-90± RT

<u>Groundwater</u>

Groundwater was encountered within 6 feet of finished grade in the following locations:

Alignment	Station
-L2-	39+00±
-Y2B-	14+80±

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Artificial Fill

Artificial fill was encountered at the following locations:

Alignment	Station	Offset (ft)
-L2-	10+00± to 13+00±	20-30± RT
-DR2-	10+60±	CL

Items of Interest

USTs, ASTs and gas pumps, or indictors thereof, were noted on the plans near the right-of-way at the following location(s):

Туре	Alignment	Station	Offset (ft)
Gas Valve	-L1-	39+10± to 39+42±	230± RT to 235± RT
Gas Valve	-L2-	20+80±	40± LT
UST	-L2-	24+88	80± RT
Gas Valve	-Y2A-	16+42±	27± LT

Ponds and Wetland Locations

Туре	Alignment	Station	Offset (ft)
Stream	-L2-	17+00±	80± RT

Soil with High Plasticity Indices

Based on laboratory testing, soil at the following locations was determined to be highly plastic (PI=26 to 35).

Alignment	Station	Offset (ft)
-L2-	11+00± to 15+00±	35± RT
-L2-	33+50± to 35+50±	29± LT
-L2-	38+00± to 39+50±	18± RT
-Y1-	12+00± to 13+00±	19± RT
-Y2B-	16+50± to 18+00±	46± LT
-DR3-	10+50± to 11+39±	CL

Based on laboratory testing, soil at the following locations was determined to be highly plastic (PI=35 or greater).

Alignment	Station	Offset (ft)
-Y2B-	$11+50\pm$ to $13+50\pm$	46± RT

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	NOTE: EXISTIN TAKEN FROM NOVEMBER 20 IS DRAWN THI PROJECTED 0	G GROUND SURFA ELECTRONIC TIN 18), INFERRED STR ROUGH THE BORING INTO THE CROSS	CE SHOWN WAS FILE (DATED ATIGRAPHY GS WITH BOTH SECTION.	930	
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SAMF NO	OFFSET STATION	DEPTH AASHTO INTERVAL CLASS.	L.L. P.I. C. SAND	% BY WEIGHT F. SAND SILT CL	% PASSING LAY 10 40 5.7 100 89	(SIEVES) % 200 MOIST	URE ORGANIC				
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		NOTE: EXISTING GROU	JND SURFACE SHOWN W	4S				WILDIUM DENSE,	WINIL, MUIST, SILT	1 JANU (A-2-4)	
915		TAKEN FROM ELECT NOVEMBER 2018), INF IS DRAWN THROUGH PROJECTED ONTO T	RONIC TIN FILE (DATED ERRED STRATIGRAPHY THE BORINGS WITH BOTI HE CROSS SECTION.	H							
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~ <u> </u>		GROUND	SURF ACE		735	
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SILIY HIGHLY PLASI	/C-CLAY-	(A-1-6)	· · · · · · · · · · · · · · · · · · ·			
STIC,CLAY (A-7-5)					925	
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-4) ———————————						
Y SAND (A-2-4)						
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F,RED,MOIST,SILTY	HIGHLY	PLASTIC	CLAY (A-7-6)		930.	
STIC,CLAY (A-7-5)					925	
SAND (A-2-4)						
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, SILTY HIGHLY PLAS	STIC CLA	Y (A-7-6.)			
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ED,MOIST,HIGHLY PL	AST IC, C	LAY (A-7-	-5)		925	
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40 5	50	60	D	70		