

REFERENCE: R-5020B

PROJECT: 41499

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5020B	1	5

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

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**STRUCTURE**

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**SUBSURFACE INVESTIGATION**

COUNTY COLUMBUS

PROJECT DESCRIPTION US 701 BYPASS FROM SR 1437  
(VIRGIL AVENUE) TO US 7476

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SITE DESCRIPTION TEMPORARY SHORING LEFT OF  
-L- STA. 198 + 50, 218 + 81, 226 + 00

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
3-5	BORE LOGS

PERSONNEL

N.O. MOORE

D.G. PINTER

R.E. SMITH

INVESTIGATED BY N.O. MOORE

DRAWN BY N.O. MOORE

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE FEBRUARY 2020

**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 (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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- 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.
  - 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.



DocuSigned by:

*Nicholas O'Neil Moore*

2/25/2020

8636AEA7851411... SIGNATURE DATE

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**





SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS  
 (PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION									
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 D1586). 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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND 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.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERALOGICAL COMPOSITION									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
SYMBOL										COMPRESSIBILITY									
% PASSING #10, #40, #200										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
MATERIAL PASSING #40 LL, PI										PERCENTAGE OF MATERIAL									
GROUP INDEX										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										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 > 10% > 20% HIGHLY 35% AND ABOVE									
GEN. RATING AS SUBGRADE										GROUND WATER									
EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR POOR UNSUITABLE										▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ▼ STATIC WATER LEVEL AFTER 24 HOURS ▽PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○ SPRING OR SEEP									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES SOIL SYMBOL SPT DMT VST PMT TEST BORING ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING INFERRED SOIL BOUNDARY CORE BORING INFERRED ROCK LINE MONITORING WELL ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS									
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3										ABBREVIATIONS									
SOIL MOISTURE - CORRELATION OF TERMS										AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL. - CLAY CPT - CONE PENETRATION TEST MOD. - MODERATELY ? - UNIT WEIGHT CSE. - COARSE NP - NON PLASTIC 7/2 - DRY UNIT WEIGHT DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST SAP. - SAPROLITIC e - VOID RATIO SD. - SAND, SANDY F - FINE SL. - SILT, SILTY FOSS. - FOSSILIFEROUS SLI. - SLIGHTLY FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT HI. - HIGHLY v - VERY									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:									
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										<input checked="" type="checkbox"/> CME-45C <input type="checkbox"/> CLAY BITS <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL									
PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										<input type="checkbox"/> CME-55 <input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER <input type="checkbox"/> -B <input type="checkbox"/> -H									
OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										<input type="checkbox"/> CME-550 <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> -N									
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										<input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> HARD FACED FINGER BITS									
PLASTICITY INDEX (PI) DRY STRENGTH										<input type="checkbox"/> PORTABLE HOIST <input type="checkbox"/> TUNG-CARBIDE INSERTS									
NON PLASTIC 0-5 VERY LOW										<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER									
SLIGHTLY PLASTIC 6-15 SLIGHT										<input type="checkbox"/> TRICONE <input type="checkbox"/> STEEL TEETH									
MODERATELY PLASTIC 16-25 MEDIUM										<input type="checkbox"/> TRICONE <input type="checkbox"/> TUNG-CARB.									
HIGHLY PLASTIC 26 OR MORE HIGH										<input type="checkbox"/> CORE BIT									
COLOR										HAND TOOLS:									
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.										<input type="checkbox"/> POST HOLE DIGGER									
										<input type="checkbox"/> HAND AUGER									
										<input type="checkbox"/> SOUNDING ROD									
										<input type="checkbox"/> VANE SHEAR TEST									

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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# SUBSURFACE INVESTIGATION

## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS
<p>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:</p>		<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - 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.  <b>ARTESIAN</b> - 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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 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, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.
WEATHERING		
FRESH		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SL.)		ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SL.)		ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)		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.
MODERATELY SEVERE (MOD. SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>
SEVERE (SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i>
VERY SEVERE (V SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>
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 HARDNESS		
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 HARD		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.
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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT		CAN BE GROOVED 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.
VERY SOFT		CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.
FRACTURE SPACING		BEDDING
TERM	SPACING	TERM      THICKNESS
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
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED      0.008 - 0.03 FEET
		THINLY LAMINATED      < 0.008 FEET
INDURATION		
FRIABLE		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.
EXTREMELY INDURATED		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.
BENCH MARK:		ELEVATION:      FEET
<p><b>NOTES:</b>  ROADWAY BORING ELEVATIONS TAKEN FROM TIN FILE  r5020_ls.tin_l80725.tin DATED 01/24/2019</p>		
DATE: 8-15-14		

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41499.1.3		TIP R-5020B		COUNTY COLUMBUS		GEOLOGIST Moore, N. O.											
SITE DESCRIPTION US 701 Bypass from SR 1437 to US 74/76							GROUND WTR (ft)										
BORING NO. TS_19850_LT		STATION 198+50		OFFSET 14 ft LT		ALIGNMENT -L-	0 HR. 11.6										
COLLAR ELEV. 75.7 ft		TOTAL DEPTH 16.1 ft		NORTHING 211,480		EASTING 2,088,154	24 HR. 8.5										
DRILL RIG/HAMMER EFF/DATE NA				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Smith, R. E.		START DATE 02/05/20		COMP. DATE 02/05/20		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
80																	
75	75.7	0.0	1	3	2										75.7	GROUND SURFACE	0.0
															73.7	ROADWAY EMBANKMENT ORANGE AND BROWN, CLAYEY SAND WITH TRACE ROOT FRAGMENTS	2.0
70	71.1	4.6	1	2	1											UNDIVIDED COASTAL PLAIN GRAY, ORANGE, AND BROWN, MOTTLED, HIGHLY PLASTIC, SILTY CLAY WITH TRACE MICA AND ROOT FRAGMENTS	
65	66.1	9.6	2	3	5												
60	61.1	14.6	2	2	4										62.8	GRAY, COARSE SAND	12.9
															59.6	Boring Terminated at Elevation 59.6 ft IN UNDIVIDED COASTAL PLAIN (COARSE SAND)	16.1

NCDOT BORE SINGLE R5020B\_GEO\_BH.GPJ NC\_DOT.GDT 2/20/20

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41499.1.3		TIP R-5020B		COUNTY COLUMBUS		GEOLOGIST Moore, N. O.											
SITE DESCRIPTION US 701 Bypass from SR 1437 to US 74/76							GROUND WTR (ft)										
BORING NO. TS_21865_LT		STATION 218+81		OFFSET 16 ft LT		ALIGNMENT -L-	0 HR. 8.8										
COLLAR ELEV. 72.5 ft		TOTAL DEPTH 16.0 ft		NORTHING 213,510		EASTING 2,088,027	24 HR. 8.3										
DRILL RIG/HAMMER EFF/DATE NA				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Smith, R. E.		START DATE 02/05/20		COMP. DATE 02/05/20		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
75															72.5	GROUND SURFACE	0.0
	72.5	0.0	1	1	2	3									70.5	ROADWAY EMBANKMENT ORANGE-BROWN, SILTY SAND WITH TRACE MICA AND ROOT FRAGMENTS	2.0
70															68.0	UNDIVIDED COASTAL PLAIN DARK GRAY-BLACK, SILTY SAND WITH TRACE ROOT FRAGMENTS AND ORGANICS	
	68.0	4.5	2	1	1	2									64.7	GREEN-GRAY, HIGHLY PLASTIC, SILTY CLAY WITH TRACE MICA AND ROOT FRAGMENTS	7.8
65															63.0	GRAY, FINE SAND	
	63.0	9.5	2	4	10	14									62.0	DARK GRAY, COARSE SAND WITH TRACE CLAY CONCRETIONS	10.5
60															59.7		12.8
	58.0	14.5	6	5	5	10									56.5	Boring Terminated at Elevation 56.5 ft IN UNDIVIDED COASTAL PLAIN (COARSE SAND)	16.0

NCDOT BORE SINGLE R5020B\_GEO\_BH.GPJ NC\_DOT.GDT 2/20/20

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 41499.1.3	TIP R-5020B	COUNTY COLUMBUS	GEOLOGIST Moore, N. O.
SITE DESCRIPTION US 701 Bypass from SR 1437 to US 74/76			GROUND WTR (ft)
BORING NO. TS_22600_LT	STATION 226+00	OFFSET 38 ft LT	ALIGNMENT -L-
COLLAR ELEV. 73.6 ft	TOTAL DEPTH 15.8 ft	NORTHING 214,228	EASTING 2,087,969
DRILL RIG/HAMMER EFF/DATE NA		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 02/05/20	COMP. DATE 02/05/20	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
75														73.6	GROUND SURFACE	0.0
70	69.9	3.7	1	3	3									71.6	ROADWAY EMBANKMENT ORANGE AND BROWN, SILTY SAND WITH TRACE MICA AND ROOT FRAGMENTS	2.0
65	64.3	9.3	2	3	2									67.1	UNDIVIDED COASTAL PLAIN DARK GRAY-BLACK AND BROWN, SILTY SAND WITH TRACE ORGANICS DARK GRAY, HIGHLY PLASTIC, SILTY CLAY WITH TRACE MICA	6.5
60	59.3	14.3	6	11	13									58.8	LIGHT GRAY, COARSE SAND WITH TRACE MICA	14.8
														57.8	Boring Terminated at Elevation 57.8 ft IN UNDIVIDED COASTAL PLAIN (COARSE SAND)	15.8

NCDOT BORE SINGLE R5020B\_GEO\_BH.GPJ NC\_DOT.GDT 2/20/20