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DESCRIPTION

TITLE SHEET

LEGEND

SITE PLAN

BORE LOGS SITE PHOTOGRAPHS

CROSS SECTIONS

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY _____CUMBERLAND

PROJECT DESCRIPTION **DIVISION 6 - I-95 BUSINESS** AND US 301 ROADWAY IMPROVEMENTS

SITE DESCRIPTION BRIDGE NO. 008 ON US 301 OVER I-95 BUSINESS LOOP SOUTHBOUND LANE

STATE N.C

1





CAUTION NOTICE

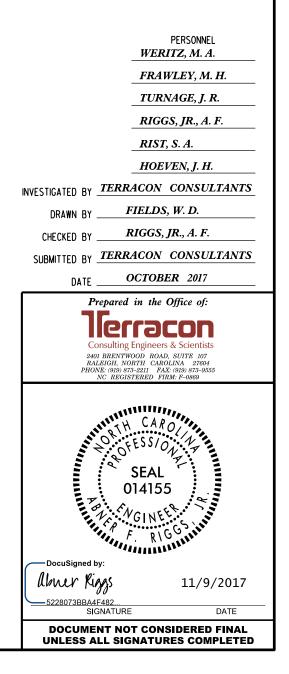
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-6860. THE SUBSIFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 SUBSUFFACE 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 DECREE OF RELIBULITY INHERENT IN THE SUBSUFFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES SUBJFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOSTUFE CONDITIONS MAY VARY CONSDERABLY WITH THE ACCOMPING OL CUMUTIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CALITORIED 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHIONO OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS 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 CONDENSION OR FOR AN THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

- TES: 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 REDUESTED 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.



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

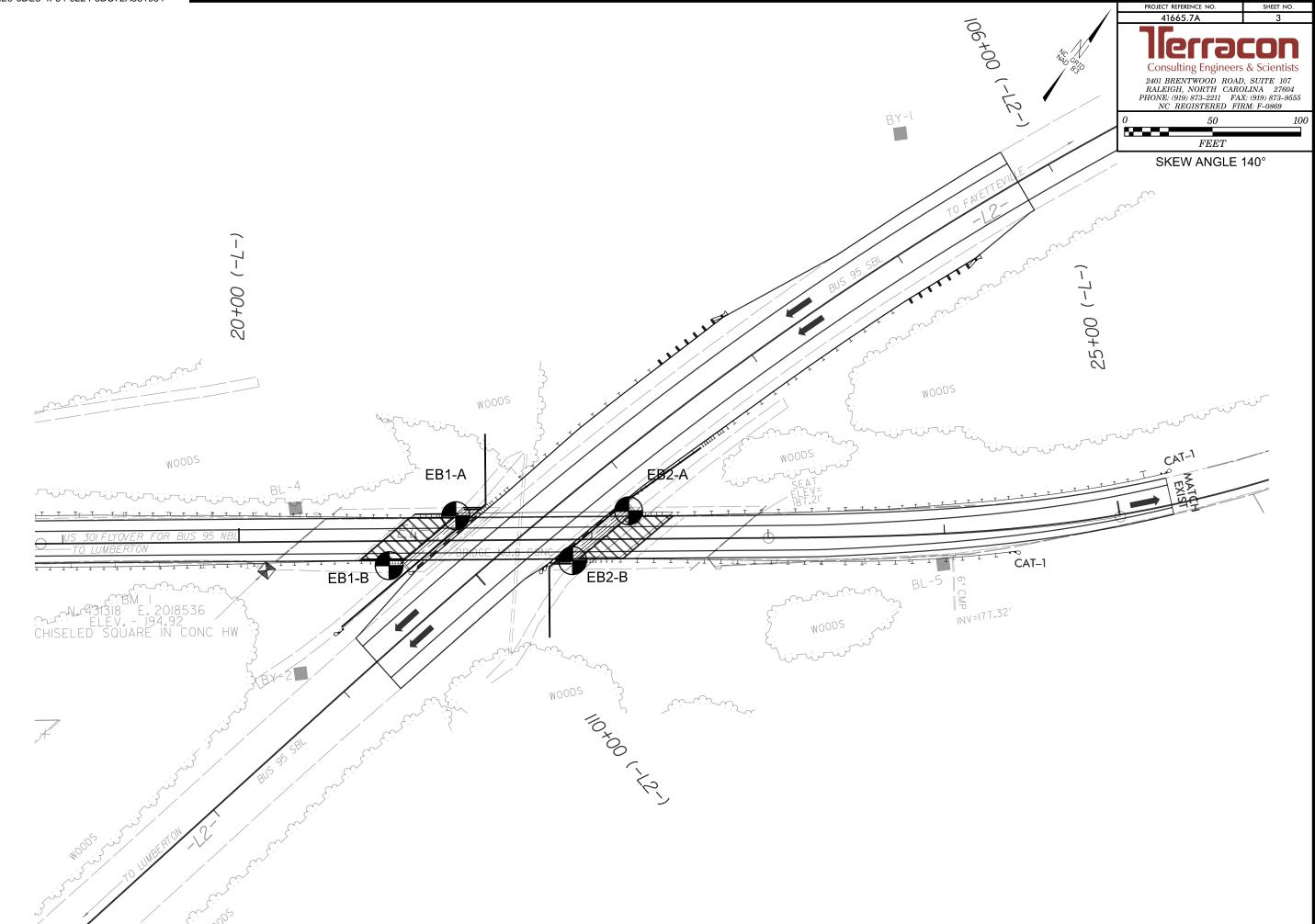
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	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.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PERTRATION BY A SPLIT SPON SAMPLER EQUAL TO R LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
VERY STIFF.GRAY.SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
CLASS. (≤ 35% PASSING 200) (> 35% PASSING 200) URGANIL MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INC GNEISS, GABBRO, SCHIST, ETC.
GROUP 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-b A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL I ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SANDSTONE, ETC
2 000000000 00000 00000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	
■40 38 MX 58 MX 51 MN ■200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL <u>SOILS</u> <u>OTHER MATERIAL</u>	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK
MATERIAL PASSING *40 LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50LS WITH LL 40 MX 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 07 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC 5 - 10% 2 20% HIGHLY 35% AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CC IV SLIJ. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HF OF A CRYSTALLINE NATURE.
	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS S	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ✓ STATIC WATER LEVEL AFTER <u>24</u> HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS
		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA
AS SUBGRADE EXCELLENT TO GUOD FAIR TO POUR POOR POOR ONSUTTABLE	OAULT SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LO
COMPACTNESS OR BANGE OF STANDARD RANGE OF UNCONFINED	-	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND V
PRIMARY SUIL ITPE CONSISTENCY PENELIKALIUM RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²) CENERALLY VERY LOOSE < 4	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.
GRANULAR LUUSE 4 TO 10 MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF
(NON-COHESIVE) UENSE VERY DENSE > 50 VERY SOFT < 2	ARTIFICIAL FILL (AF) OTHER AUGER BORING ON PENETROMETER THAN ROADWAY EMBANKMENT - AUGER BORING EST - INFERRED SOIL BOUNDARY CORE BORING SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMEMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>JF IESTED, WOULD VIELD SPT N V</i>
GENERALLY SOFT 2 T0 4 0.25 T0 0.5 SILT-CLAY MEDIUM STIFF 4 T0 8 0.5 T0 1.0 MATERIAL STIFF 8 T0 15 1 T0 2 (COHESIVE) VERY STIFF 15 T0 30 2 T0 4	TIEVE INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE TTALE ALLUVIAL SOIL BOUNDARY A PIEZOMETER	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.
HARD > 30 > 4		ROCK HARDNESS
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BL
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.
Obdelsh, Code Owner SAND SAND SAND SAND SAND CL	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DE BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY γ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEDLOGIST'S PICK.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	$\begin{array}{ccc} \mbox{CPT} & -\mbox{CONE} \mbox{ PENETRATION TEST } & \mbox{NP} & -\mbox{ NON PLASTIC } & \mbox{7}_{d}^{-}\mbox{ DRY UNIT WEIGHT } \\ \mbox{CSE}_{-}\mbox{ COARSE } & \mbox{ORG}_{-}\mbox{ ORGANIC } \\ \mbox{DMT} & -\mbox{DIATOMETER TEST } & \mbox{PMT} & -\mbox{DRSEMETER TEST } & \mbox{SAMPLE ABBREVIATIONS } \\ \mbox{DPT} & -\mbox{DYNAMIC PENETRATION TEST } & \mbox{SAP}_{-}\mbox{ SAPROLITIC } & \mbox{S}_{-}\mbox{Bulk } \end{array}$	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN
- SATURATED - USUALLY LIQUID; YERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE F0SS F0SSILIFEROUS SLI SLIGHTLY RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC SEMISOLID; REOUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.
	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED WIDE 3 TO 10 FEET THICKLY BEDDED 1. MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.1
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C CLAY BITS X AUTOMATIC MANUAL CME-55 6° CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.02 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY	8" HOLLOW AUGERS	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC Ø-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.
	X D-50 (TER373) X TRICONE 2% * TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.
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 X 3¼" HOLLOW STEM AUGER	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

PROJECT REFERENCE NO.

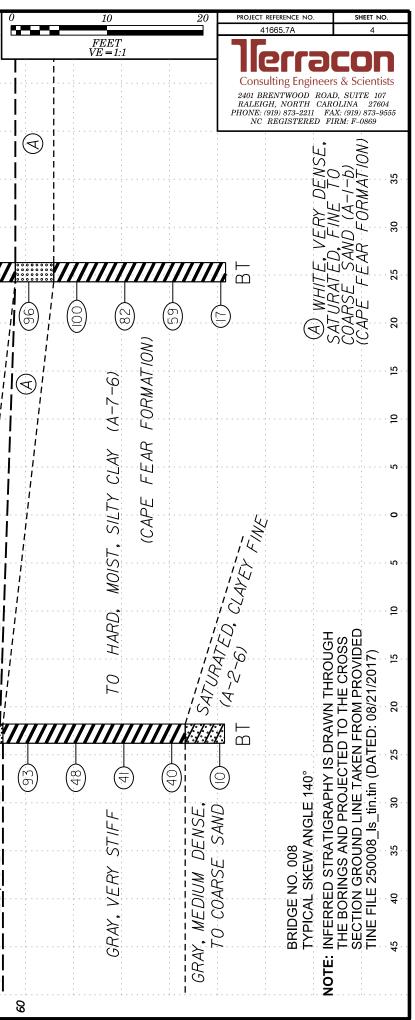
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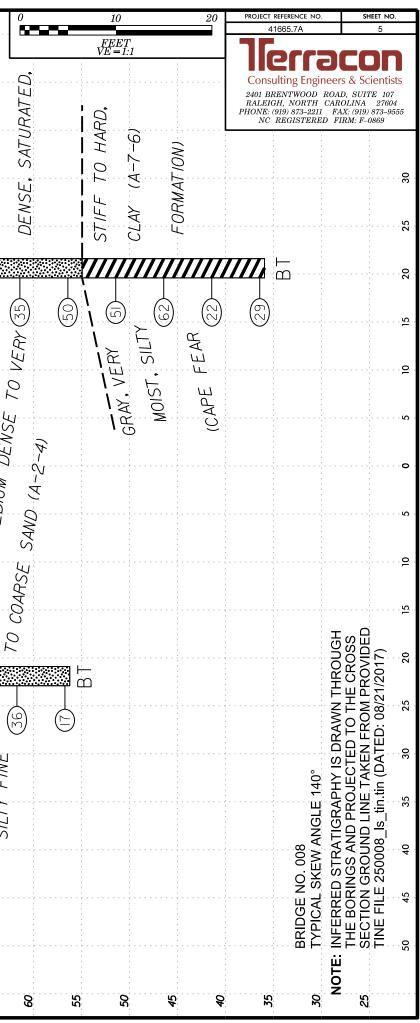
	TERMS AND DEFINITIONS
ED. AN INFERRED) SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
T N VALUES >	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
ОСК ТНАТ	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
ICLUDES GRANITE.	SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED. C.	<u>COLLUVIUM</u> - 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.
21102 111252	$\underline{\text{DIKE}}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	$\overline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
CATINGS IF OPEN, MAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
DCK UP TO NL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL .OSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ARE KAOLINIZED	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.
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	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND 5. SAPROLITE IS	R <u>OCK QUALITY DESIGNATION (ROD)</u> - 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.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
IS REQUIRES	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.
EEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
DR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB.HAMMER FALLING 30 INCHES REQUIRED TO PODUCE 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.
FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
PIECES 1 INCH	<u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEOMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
HED READILY BY	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BY-2, N=431283.72, E=2018587.55
THICKNESS 4 FEET	ELEVATION: 173.80 FEET
.5 - 4 FEET 16 - 1.5 FEET	
03 - 0.16 FEET	NOTES:
08 - 0.03 FEET : 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
AT, PRESSURE, ETC.	
TEEL PROBE;	
PROBE:	
E;	DATE: 8-15-14



EB1-A EB1-A 21+23 14'RTI-L- PLAM. BROWN TO GRAY AND TAN. LOOSE 0 PLAM. BROWN TO GRAY AND TAN. LOOSE 0 PLAM. BROWN TO GRAY AND TAN. LOOSE 0 PLAM. BROWN TO GRAY AND TAN. LOOSE 0 0'07/TT BLACK. VERY SOFT TO MEDUM STIFF. MOIST 0'07/TT BLACK. VERY SOFT TO MEDUM STIFF. MOIST 0'07/TT 0'07/TT BLACK. VERY SOFT TO MEDUM STIFF. MOIST 14'RTI-L- 0 0 0 0 0 0 0 0 0 0 0 0 0
L- EXISTING AN. BROWN TO GRAY AND TAN. LOOSE AN. BROWN TO GRAY AND TAN. LOOSE SILTY FINE TO COARSE SAND (A-2-4) AN AND DARK GRAY. VERY LOOSE TO CLAY. TRACE CLAY. TRACE

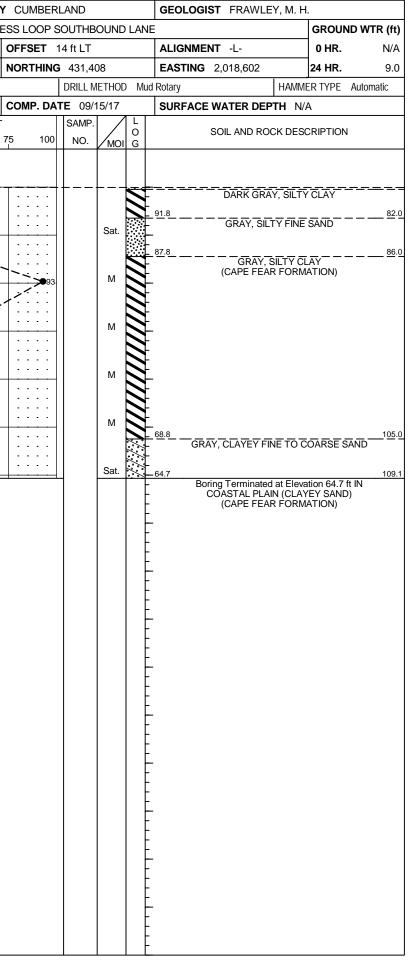


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5 –L– TO LUMBERTON – 2-B -89 T-L– T-L–		► <u>1760</u>	VERY LOOSE TO	SAND AND			SILTY FINE	(A-2-4) CBFFK FORMATION)		(A-7-6) 	1	(A-7-6)
IION THROUGH END BENT 2 @ STA. 22 + 06 - -L- -L- -L- EB2-A EB2-A 16' LT -L- EB2-B 6ROUND SURFACE 12' RT-L			BLAIN, TAN, ORANGE, BROWN AND BLACK,	SATURATED, SILTY FINE TO COARSE	SAND, TRACE MICA (A-2-4, A-2-6)	GRAY, SOFT 5 SILTY CLAY (A-7-6) FORMATION) 1	GRAY, MEDIUM DENSE, SATURATED, (G)	TO COARSE SAND	ORAMGE	TO COARSE SAND	VERY STIFF, MOIST S	;
TO FAYETTEVILLE TO FAYETTEVILLE ROADWAY EMBANKMENT, EB2-A BROWN TO TAN, LOOSE TO MEDIUM DENSE, MOIST, EB2-A SILTY FINE SAND (A-2-4)		E.	UNDIVIDED COASTAL	DENSE, MOIST TO	CLAYEY FINE	COASTAL PLAIN, DARK (I) TO STIFF, MOIST, (BLACK CREEK (2)	COASTAL PLAIN, DARK (3)	DARK GRAY, 20	DARK GRAY AND	SILTY FINE	DARK GRAY, 20	DARK GRAY (6



GEOTECHNICAL BORING REPORT BORE LOG

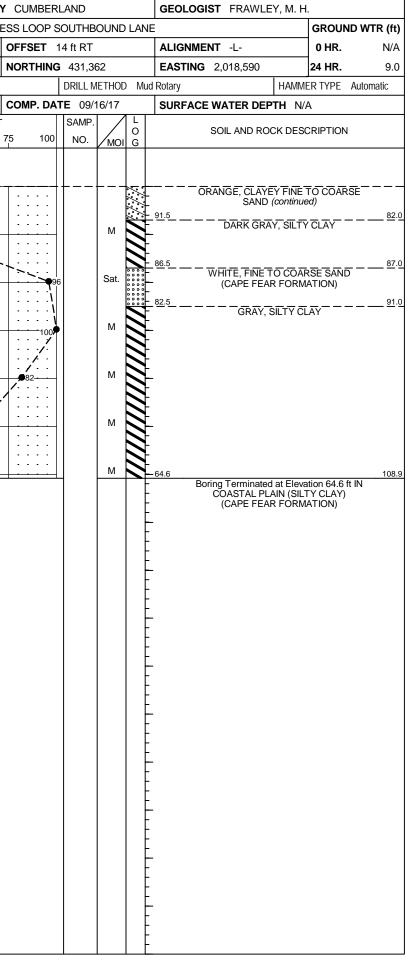
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WBS	41665	5.7A			T	IP 25	8000		C	DUNTY	CUMBEI	RLAND			GEOL	OGIST FRAWLE	EY, M. H.			WBS	41665.	.7A			T	IP 2500	38	(COUN	ΓY
SITE	DESCR		BRI	DGE N	IO. 00	8 ON U	JS 30 [.]	1 OVER	I-95 E	BUSINE	SS LOOP	SOUTHE	BOUN	ID LAN	IE			GROUND WTR	(ft)	SITE	DESCRI	PTION	BRID	DGE N	O. 008	3 ON US	301 OVE	ER I-95	5 BUSI	NES
BORI	NG NO	. EB1-	A		S	STATIO	N 2'	1+23			OFFSET	14 ft LT			ALIGN	IMENT -L-		0 HR. N	√A	BOR	NG NO.	EB1-	A		S	TATION	21+23			С
COLL	AR EL	EV. 17	73.8 ft		Т	OTAL	DEPT	H 109).1 ft		NORTHIN	G 431,4	804		EAST	NG 2,018,602	2	24 HR.	9.0	COLL	AR ELE	V. 17	73.8 ft		Т	OTAL DE	 1	09.1 ft	t	N
DRILL	RIG/HAN	/MER EF	F./DAT	e tef	R373 D	DIEDRICH	H D-50	99% 03	/09/201	7		DRILL	METHO	DD Mu	Id Rotary		HAMMER	R TYPE Automatic	;	DRILL	RIG/HAM	MER EF	F./DATE	E TER	373 DI	IEDRICH D	-50 99%	03/09/2	2017	
DRIL	LER T	URNAG	E. J. F	२.	s	START	DATE	E 09/1	5/17		COMP. DA					ACE WATER DEF	PTH N/A			DRIL	LER TU	JRNAG	SE. J. R	۶.	S	TART DA	TE 09	/15/17		C
	DRIVE			w co						FOOT		SAMP		/ -					_	ELEV	DRIVE	DEPTH	1	W CO					ER FOO	
(ft)	ELEV (ft)	(ft)		0.5ft	1	0	2	25	50		5 100		17	O DI G	ELEV. (ft)	SOIL AND RO	CK DESCI	RIPTION DEPT	H (ft)	(ft)	ELEV (ft)	(ft)	' 	0.5ft	-	0	25	50		75
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GEOTECHNICAL BORING REPORT BORE LOG

		1	B	ORE L	.OG													
WBS 41665.7A		TIP 250008	COUNTY	CUMBER	RLAND		GEOLO	OGIST FRAWLEY, M. H	1.	WBS	4 1665	.7A			TIF	P 250008		COUNTY
SITE DESCRIPTION BI	RIDGE NO.	008 ON US 301 OVER I-	95 BUSINE	ESS LOOP S	SOUTHB	OUND L	NE		GROUND WTR (ft)	SITE	DESCR	IPTION	BRID	GE NO	D. 008	8 ON US 301	I OVER I-S	35 BUSINE
BORING NO. EB1-B		STATION 20+85		OFFSET	14 ft RT		ALIGN	MENT -L-	0 HR. N/A	BOR	ING NO.	EB1-E	В		ST	TATION 20)+85	
COLLAR ELEV. 173.5	ft	TOTAL DEPTH 108.9	ft	NORTHING	3 431,36	62	EASTI	IG 2,018,590	24 HR. 9.0	COL	LAR ELE	EV. 17	'3.5 ft		тс	OTAL DEPT	H 108.9	ft
DRILL RIG/HAMMER EFF./D.	ATE TER37	3 DIEDRICH D-50 99% 03/09	9/2017		DRILL M	IETHOD	/lud Rotary	HAMM	ER TYPE Automatic	DRILL	_ RIG/HAM	MER EF	F./DATE	TER	373 DIE	EDRICH D-50	99% 03/09/	/2017
DRILLER TURNAGE, J	J. R.	START DATE 09/16/	17	COMP. DA	TE 09/1	16/17	SURFA	CE WATER DEPTH N/	Ά	DRIL	LER TU	JRNAG	6E, J. R	-	ST	TART DATE	09/16/1	7
	BLOW COUN		PER FOOT		SAMP.			SOIL AND ROCK DES	CRIPTION	ELEV	DRIVE ELEV	DEPTH	<u> </u>	W COL				PER FOOT
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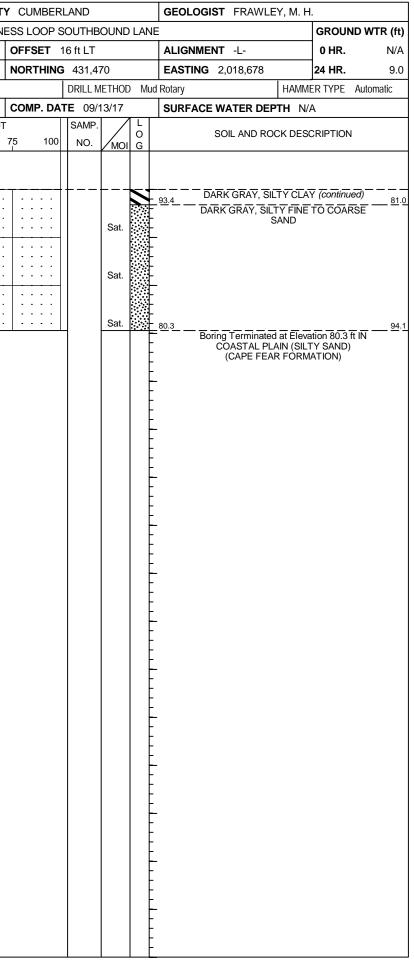


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## GEOTECHNICAL BORING REPORT BORE LOG

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WBS	4166	5.7A			Т	<b>IP</b> 250008		COUNT	Y CUMBE	RLAND			GEOLOGIST FRAWLEY	, M. H.		WBS	4166	5.7A			TIF	P 250008	8	COUNT	ſY
SITE	DESCR		BRI	DGE N	IO. 00	8 ON US 30	1 OVER I-9	95 BUSIN	ESS LOOP	SOUTHE		LAN	E	GR	OUND WTR (ft)	SITE	DESCR	RIPTION	BRI	DGE N	O. 008	ON US 3	01 OVER I	I-95 BUSIN	١E
BOR	ING NO	<b>).</b> EB2-	A		s	TATION 2	2+21		OFFSET	16 ft LT			ALIGNMENT -L-	01	HR. N/A	BOR	ING NO	. EB2-	A		ST	ATION 2	22+21		T
COL	LAR EL	.EV. 17	74.4 ft		Т	OTAL DEP	<b>TH</b> 94.1 ft	:	NORTHIN	<b>IG</b> 431,4	70		EASTING 2,018,678	24	HR. 9.0	COL	LAR EL	<b>EV.</b> 17	74.4 ft		то	TAL DEF	<b>PTH</b> 94.1	ft	T
DRILI	. RIG/HAI	MMER EF	F./DAT	E TEF	R373 D	IEDRICH D-50	99% 03/09	/2017		DRILL	NETHOD	) Mu		HAMMER TY	PE Automatic	DRILL	. RIG/HAI	MMER EF	F./DAT	E TER	R373 DIE	DRICH D-5	50 99% 03/0		1
		TURNAG				TART DAT			COMP. D			-	SURFACE WATER DEPT				LER T						TE 09/13/		Т
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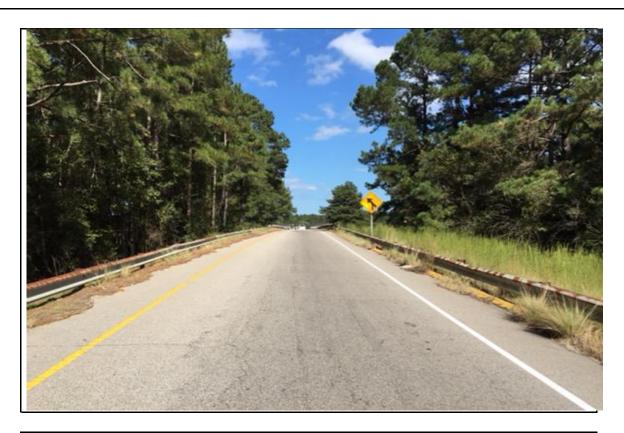
## GEOTECHNICAL BORING REPORT BORE LOG

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WBS	41665	5.7A			TI	P 250008	3	COUNT	Y CUMBER	RLAND			GEOLOGIST FRAWLEY, M.	H	WBS	41665	5.7A			TI	<b>P</b> 250008		COUNT	ſY
SITE	DESCR		BRID	DGE N	O. 008	ON US 30	1 OVER I-9	95 BUSINE	ESS LOOP	SOUTHB		) LAN		GROUND WTR (ft)	SITE	DESCR	IPTION	BRID	GE N	D. 008	ON US 301	1 OVER I-S	95 BUSIN	√ES
BOR	ing no	. EB2-E	3		SI	TATION 2	1+89		OFFSET	12 ft RT			ALIGNMENT -L-	0 HR. N/A	BOR	ing no	. EB2-E	3		ST	TATION 21	1+89		0
COL	LAR EL	<b>EV.</b> 17	4.0 ft		т	OTAL DEP	<b>TH</b> 114.0	ft	NORTHIN	<b>G</b> 431,4	28		EASTING 2,018,670	<b>24 HR.</b> 8.5	COL	LAR EL	<b>EV.</b> 17	4.0 ft		тс	OTAL DEPT	<b>FH</b> 114.0	ft	N
DRILL	. Rig/Han	/MER EF	F./DATE	e ter	8373 DI	EDRICH D-50	0 99% 03/09	/2017		DRILL N	<b>NETHOD</b>	) Mu	l Rotary HAMM	MER TYPE Automatic	DRILL	. RIG/HAN	IMER EF	F./DATE	E TER	373 DIE	EDRICH D-50	99% 03/09	/2017	
DRIL	LER T	URNAG	E, J. F	۶.	SI	FART DAT	<b>E</b> 09/14/1	7	COMP. DA	<b>TE</b> 09/	14/17		SURFACE WATER DEPTH	I/A	DRIL	LER T	URNAG	E, J. R	l.	ST	FART DATE	E 09/14/1	7	C
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W CO 0.5ft		0		PER FOOT	75 100	SAMP. NO.	МОІ	L O G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W COU 0.5ft		0 2	BLOWS F	PER FOO 50 1	)T 75
175		_						1					174.0 GROUND SURI		95		 				· · · · ·	Matc	h Line	<del>.</del>
170	171.5	2.5	1	1	3	• • • • • • • • • • • • • • • • • • •				-	м		UNDIVIDED COAST TAN AND ORANGE TO E FINE SAND, TRACE WOO @ 17.5'	BROWN, SILTY	90	91.5	82.5	8	10	14		• • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	· · ·
165	166.5	- - 7.5 -	3	4	6	• • • • •	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	-					85	86.5	- 87.5	8	14	21	· · · · ·	35	· · · · · · ·	· · ·
160		- - - 12.5 -	7	8	7	· · · · · · · · · · · · · · · · · · ·					Sat.				80	81.5	- - - 92.5	14	22	28			• • • • • • • • • •	
155	156.5	+ - - 17.5	4	2	2	· · / · · · · / · · ·					Sat.		-		75	76.5	- - - 97.5	16	22	29			51	· · ·
150		- - - 22.5	1	1	1	$\begin{array}{c} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 &$					Sat.				70	71.5	- - - 102.5	25	30	32			• • • • • • • • • • • • • •	· · ·
145		27.5	1	2	3			· · · · ·			Sat.		<u> </u>	<u>TO COARSE</u> 25.0 MICA	65	66.5	- - 107.5	10	11	11		22		
140		- - - 32.5	WOH	1	1	$ \begin{array}{c} \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet &$		· · · · · · · · · · · · · · · · · · ·			Sat.		_		60	61.5	- - - 112.5	10	15	14		• • • • • • • • • • •		
135	136.5	- - - 37.5	2	2	3	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					Sat.						+							
130		42.5	2	2	3	• · · · ·					Sat.						+							
125	126.5	- - - 47.5	4	5	6	·\ .\ .\					Sat.		128.0 COASTAL PL DARK GRAY, SILTY FINI SAND	E TO COARSE			+ + +							
11/01 10/1 120	121.5	- - - 52.5	4	6	10			· · · · ·			Sat.		(BLACK CREEK FOF	RMATION)			+ + +							
125 120 120 120 120 120 115 110	116.5	- - - 57.5	6	7	6	· · · · · · · · · · · · · · · · · · ·					Sat.						+							
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100	101.5	- - - 72.5	5	8	10		8				Sat.		0RANGE, SILTY FINE TO	COARSE SAND										
NCDOT BORE DOUBLE	96.5	77.5	6	5	6	· · / · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·			Sat.						+							

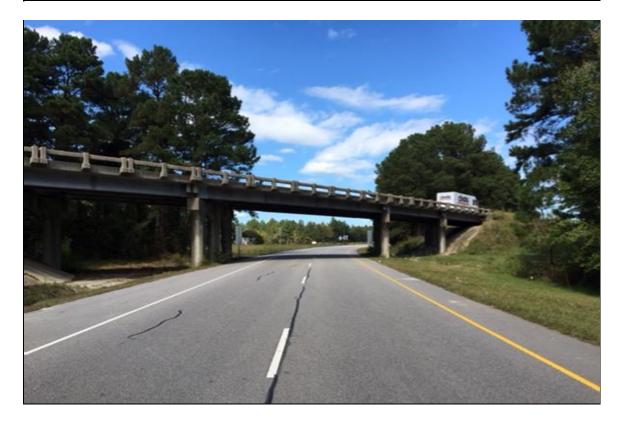
#### SHEET 9 OF 10

CUMBERL	AND			GEOLOGIST FRAWLE	Y, M. H.		
SS LOOP SO	OUTHB	OUND	LAN	E		GROUN	ID WTR (ft)
OFFSET 12	2 ft RT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	431,42	28		EASTING 2,018,670		24 HR.	8.5
	DRILL M	ethod	) Mu	d Rotary	HAMME	R TYPE	Automatic
COMP. DAT		4/17		SURFACE WATER DEP	TH N/A		
	SAMP.	/	L O	SOIL AND ROC	K DESC		
75 100	NO.	/моі					
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			Ň	$\underline{93.0}$ $\underline{}$ \underline{} $\underline{}$ $\underline{$ }\underline{} $\underline{}$ $\underline{}$ \underline{} $$	tinued)		<u>~</u> <u>81.0</u>
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				88.0			86.0
		0-4		ORANGE, SILT	Y COAR	SE SAND	)
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## SITE PHOTOGRAPHS BRIDGE NO. 008 ON US 301 OVER I-95 BUSINESS LOOP SBL



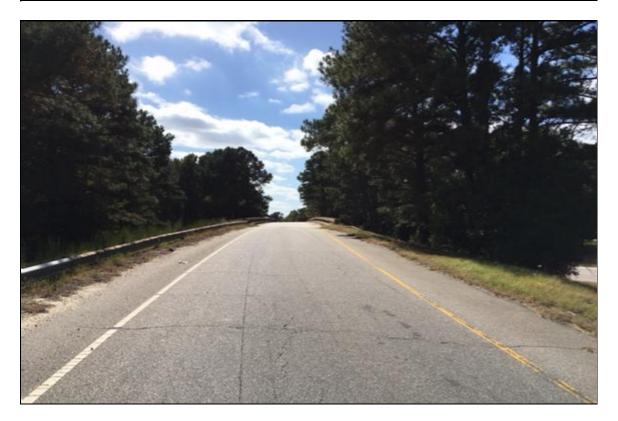
PHOTOGRAPH NO. 1: WEST APPROACH TO END BENT NO. 1 ON -L- ALIGNMENT, LOOKING EAST



PHOTOGRAPH NO. 2: ON -L2- ALIGNMENT, SOUTH OF -L- ALIGNMENT, LOOKING NORTH



PHOTOGRAPH NO. 3: ON -L2- ALIGNMENT, NORTH OF -L- ALIGNMENT, LOOKING SOUTH



PHOTOGRAPH NO. 4: EAST APPROACH TO END BENT NO.2 ON -L- ALIGNMENT, LOOKING WEST

SHEET 10 OF 10

# 50130 N SHEET NO. 2 ය 3 4–5 6–9 10 250129 11 REFERENCE

**CONTENTS DESCRIPTION** TITLE SHEET LEGEND SITE PLAN CROSS SECTIONS BORE LOGS LABORATORY SUMMARY SHEET SITE PHOTOGRAPHS

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND

PROJECT DESCRIPTION **DIVISION 6 - I-95 BUSINESS** AND US 301 ROADWAY IMPROVEMENTS

SITE DESCRIPTION DUAL BRIDGES NO. 129 & NO. 130 ON I-95 BUSINESS LOOP OVER US 301

# 41665 **PROJECT:**

STATE N.C.

1





#### **CAUTION NOTICE**

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INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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NOTES:

- TES: 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 WAVES ANY CLAIMS FOR INCRESSED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- 2.

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TURNAGE, J. R.
HOEVEN, J. H.
INVESTIGATED BY TERRACON CONSULTANTS
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DATE NOVEMBER 2017
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SEAL 014155 F. RIGG THINK
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5228073BBA4E422 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

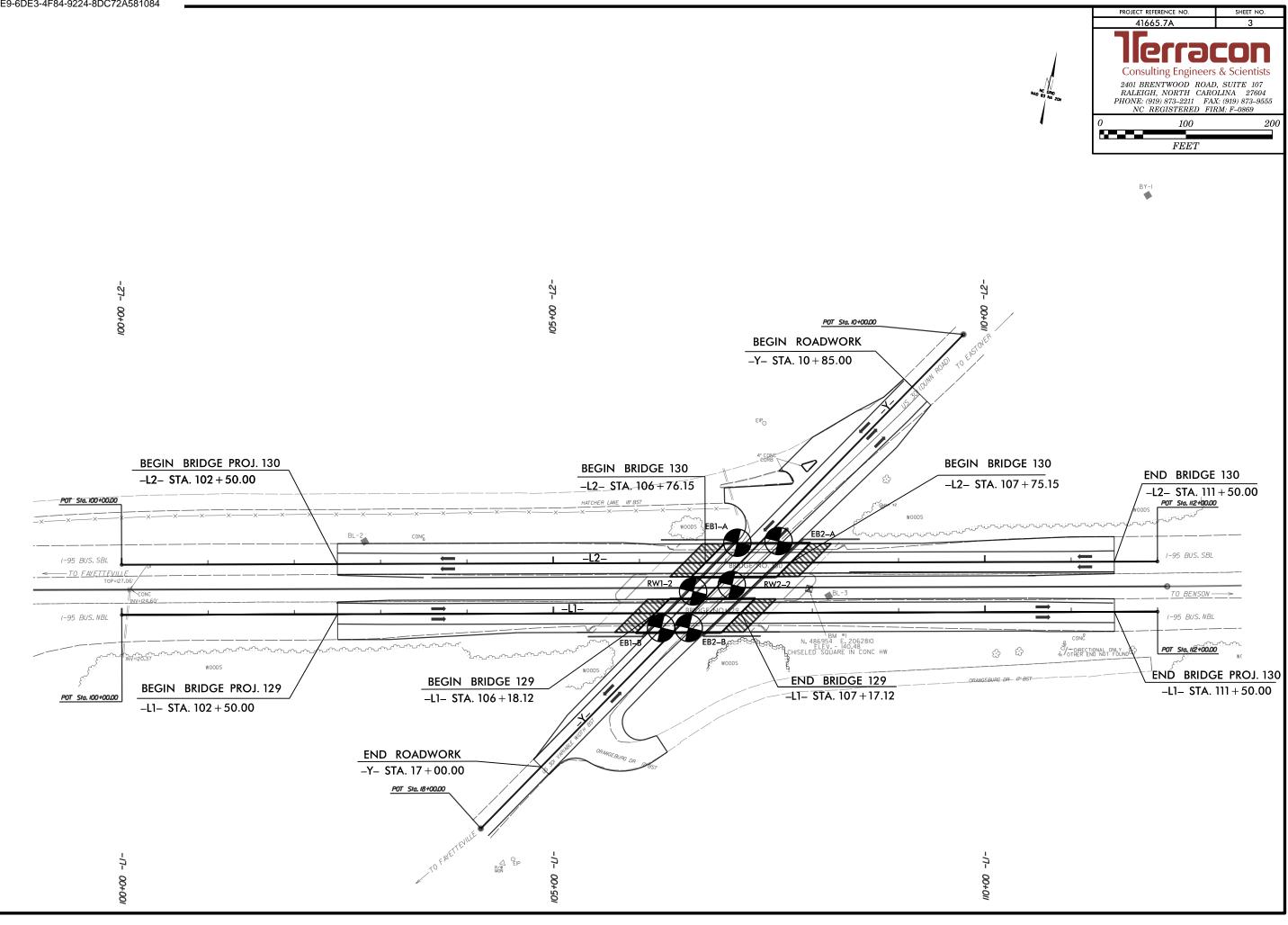
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	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.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PERTRATION BY A SPLIT SPON SAMPLER EQUAL TO R LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
VERY STIFF.GRAY.SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
CLASS.         (≤ 35% PASSING 200)         (> 35% PASSING 200)         URGANIL MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INC GNEISS, GABBRO, SCHIST, ETC.
GROUP         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-b         A-1-b         A-2-4         A-2-5         A-2-6         A-2-7         A-3         A-6, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL I ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SANDSTONE, ETC
2 000000000 00000 00000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	
■40 38 MX 58 MX 51 MN ■200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL <u>SOILS</u> <u>OTHER MATERIAL</u>	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK
MATERIAL PASSING *40 LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50LS WITH LL 40 MX 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	TRACE OF ORGANIC MATTER         2         - 3%         3         - 5%         TRACE         1         - 10%           LITTLE ORGANIC MATTER         3         - 5%         5         - 12%         LITTLE         07         - 20%           MODERATELY ORGANIC         5         - 10%         12         - 20%         SOME         20         - 35%           HIGHLY ORGANIC         5         - 10%         2         20%         HIGHLY         35%         AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CC IV SLIJ. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HF OF A CRYSTALLINE NATURE.
	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS S	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ✓ STATIC WATER LEVEL AFTER <u>24</u> HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS
		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA
AS SUBGRADE EXCELLENT TO GUOD FAIR TO POUR POOR POOR ONSUTTABLE	OAULT SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LO
COMPACTNESS OR BANGE OF STANDARD RANGE OF UNCONFINED	-	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND V
PRIMARY SUIL ITPE CONSISTENCY PENELIKALIUM RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ² ) CENERALLY VERY LOOSE < 4	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.
GRANULAR LUUSE 4 TO 10 MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF
(NON-COHESIVE)         UENSE VERY DENSE         > 50           VERY SOFT         < 2	ARTIFICIAL FILL (AF) OTHER AUGER BORING ON PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMEMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>JF IESTED, WOULD VIELD SPT N V</i>
GENERALLY         SOFT         2 T0 4         0.25 T0 0.5           SILT-CLAY         MEDIUM STIFF         4 T0 8         0.5 T0 1.0           MATERIAL         STIFF         8 T0 15         1 T0 2           (COHESIVE)         VERY STIFF         15 T0 30         2 T0 4	TIEVE INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE TTALE	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.
HARD > 30 > 4		ROCK HARDNESS
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BL
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.
Obdelsh,         Code         Owner         SAND         SAND         SAND         SAND         SAND         CL	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DE BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEDLOGIST'S PICK.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	$\begin{array}{ccc} \mbox{CPT} & -\mbox{CONE} \mbox{ PENETRATION TEST } & \mbox{NP} & -\mbox{ NON PLASTIC } & \mbox{$7$}_{d}^{-}\mbox{ DRY UNIT WEIGHT } \\ \mbox{CSE}_{-}\mbox{ COARSE } & \mbox{ORG}_{-}\mbox{ ORGANIC } \\ \mbox{DMT} & -\mbox{DIATOMETER TEST } & \mbox{PMT}_{-}\mbox{ PENSURMETER TEST } & \mbox{SAMPLE ABBREVIATIONS } \\ \mbox{DPT} & \mbox{DYNAMIC PENETRATION TEST } & \mbox{SAP}_{-}\mbox{ SAPROLITIC } & \mbox{S}_{-}\mbox{Bulk } \end{array}$	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN
- SATURATED - USUALLY LIQUID; YERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e         VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F         - FINE         SL SILT, SILTY         ST - SHELBY TUBE           F0SS F0SSILIFEROUS         SLI SLIGHTLY         RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC SEMISOLID; REOUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.
	FRAGS FRAGMENTS     W - MOISTURE CONTENT     CBR - CALIFORNIA BEARING       HI HIGHLY     V - VERY     RATIO	FRACTURE SPACING BEDDING
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT         USED         ON         SUBJECT         PROJECT           DRILL UNITS:         ADVANCING TOOLS:         HAMMER TYPE:	VERY WIDE         MORE         THAN 10         FEET         VERY THICKLY BEDDED           WIDE         3 TO 10         FEET         THICKLY BEDDED         1.           MODERATELY CLOSE         1 TO 3         FEET         THINLY BEDDED         0.1
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C         CLAY BITS         X AUTOMATIC         MANUAL           CME-55         6° CONTINUOUS FLIGHT AUGER         CORE SIZE:	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.02 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY	8" HOLLOW AUGERS	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC         Ø-5         VERY LOW           SLIGHTLY PLASTIC         6-15         SLIGHT           MODERATELY PLASTIC         16-25         MEDIUM		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.
	X     D-50 (TER373)     X     TRICONE     2%     * TUNGCARB.     SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.
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           X 3¼" HOLLOW STEM AUGER	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

#### PROJECT REFERENCE NO.

## 41665.7A

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	TERMS AND DEFINITIONS
ED. AN INFERRED ) SPT REFUSAL.	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.
T N VALUES >	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.
ОСК ТНАТ	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.
ICLUDES GRANITE,	SUMFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED. C.	<u>COLLUVIUM</u> - 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	$\underline{\text{DIKE}}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
COATINGS IF OPEN.	$\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
IAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ick up to Il Feldspar	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL .OSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ARE KAOLINIZED	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.
RE DISCERNIBLE	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
FONLY MINOR VALUES < 100 BPF	OF AN INTERVENING IMPERVIOUS STRATUM.
IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
5. SAPROLITE IS	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.
IS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
LOWS 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 INTRUGED ROCKS.
EEP CAN BE DETACHED	$\underline{\text{SLICKENSIDE}}$ - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
DR PICK POINT. BLOWS OF THE	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
FRAGMENTS	TO OR LESS THAN Ø.IFOOT PER 60 BLOWS. <u>Strata core recovery (srec.)</u> - total length of strata material recovered divided by Total length of stratum and expressed as a percentage.
IT. SMALL, THIN	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
PIECES 1 INCH HED READILY BY	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: BY-2, N=486,477.58, E=2,062,458.96
4 FEET	ELEVATION: 120.92 FEET
.5 - 4 FEET 16 - 1.5 FEET	
03 - 0.16 FEET	NOTES:
08 - 0.03 FEET : 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
AT, PRESSURE, ETC.	
FEL PROBE:	
PROBE:	
E;	
-•	DATE: 8-15-14

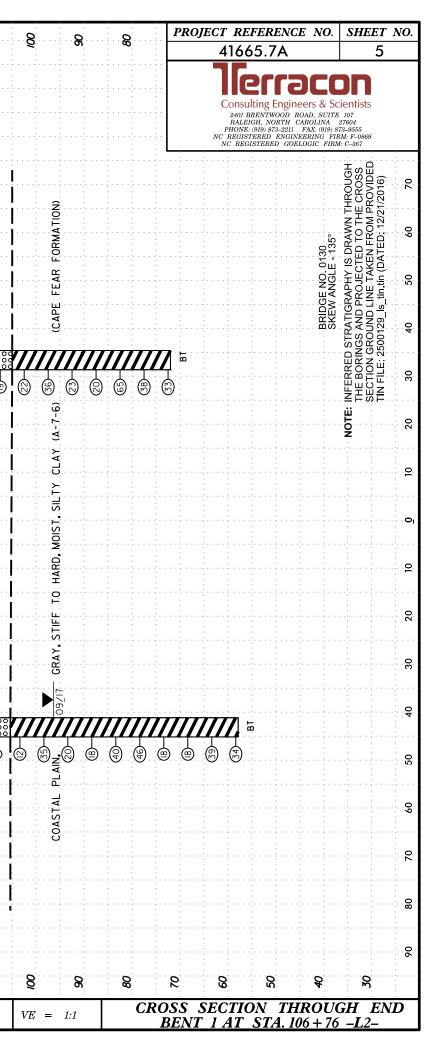


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#### **GEOTECHNICAL BORING REPORT** BORF I OG

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## GEOTECHNICAL BORING REPORT BORE LOG

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#### SHEET 6 OF 11

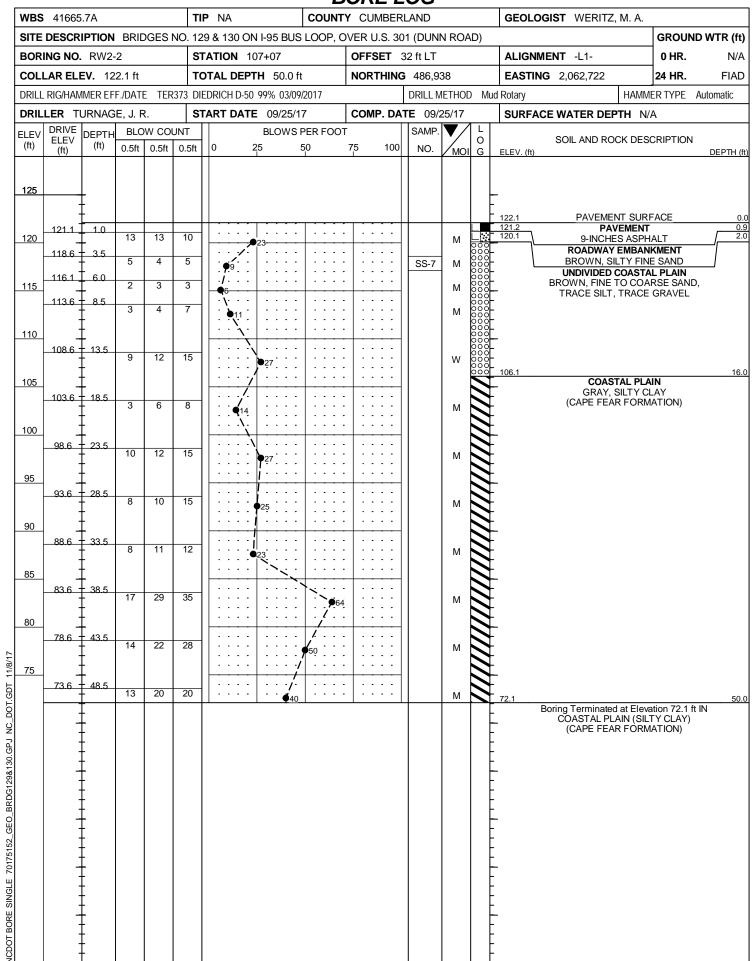
CUMBERLAND			GEOLOGIST WERITZ, M. /	۹.		
VER U.S. 301 (DUN	N ROAD)				GROUN	ID WTR (ft)
OFFSET 17 ft RT			ALIGNMENT -L1-		0 HR.	N/A
NORTHING 486,8	71		<b>EASTING</b> 2,062,654		24 HR.	CAVED
DRILL M	iethod i	Mud	Rotary HA	MME	R TYPE	Automatic
COMP. DATE 09/2	21/17		SURFACE WATER DEPTH	N/A	4	
75 100 NO.			SOIL AND ROCK D	ESC	RIPTION	
			ELEV. (ft)  121.7 GROUND SU ROADWAY EMB BROWN, FINE TO C 118.2 TRACE SILT AN UNDIVIDED COAS BROWN, FINE SANI 110.2	ANI OAF D G STAI D, TF E TC GR/ PLAI Y CL	INCOMENT SEE SANE RAVEL - PLAIN RACE SIL - COARS AVEL N AY	3.5 T 11.0
+ • • • •		\$				
			57.5 Boring Terminated at E COASTAL PLAIN ( (CAPE FEAR FO 24 Hr. Water Level C	SILT RM/	Y CLAY) ATION)	

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# **GEOTECHNICAL BORING REPORT**

**BORE LOG** 



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WBS	41665	5.7A			т	IP NA	COUNTY
SITE	DESCR	IPTION	BRID	GES	NO. 1	29 & 130 ON I-95 BUS	LOOP, OVE
BOR	ING NO	. EB2-E	3		S	<b>TATION</b> 106+57	0
COLI	LAR EL	<b>EV.</b> 12	2.0 ft		Т	OTAL DEPTH 59.2 ft	N
DRILL	. RIG/HAN	IMER EF	F./DATE	E TER		IEDRICH D-50 99% 03/09/2	
DRIL	LER T					TART DATE 09/02/17	′ C
ELEV	DRIVE ELEV	DEPTH	<u> </u>	W CO			ER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25 5	0 75
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	-	F					
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#### **GEOTECHNICAL BORING REPORT BORE LOG**

#### SHEET 7 OF 11

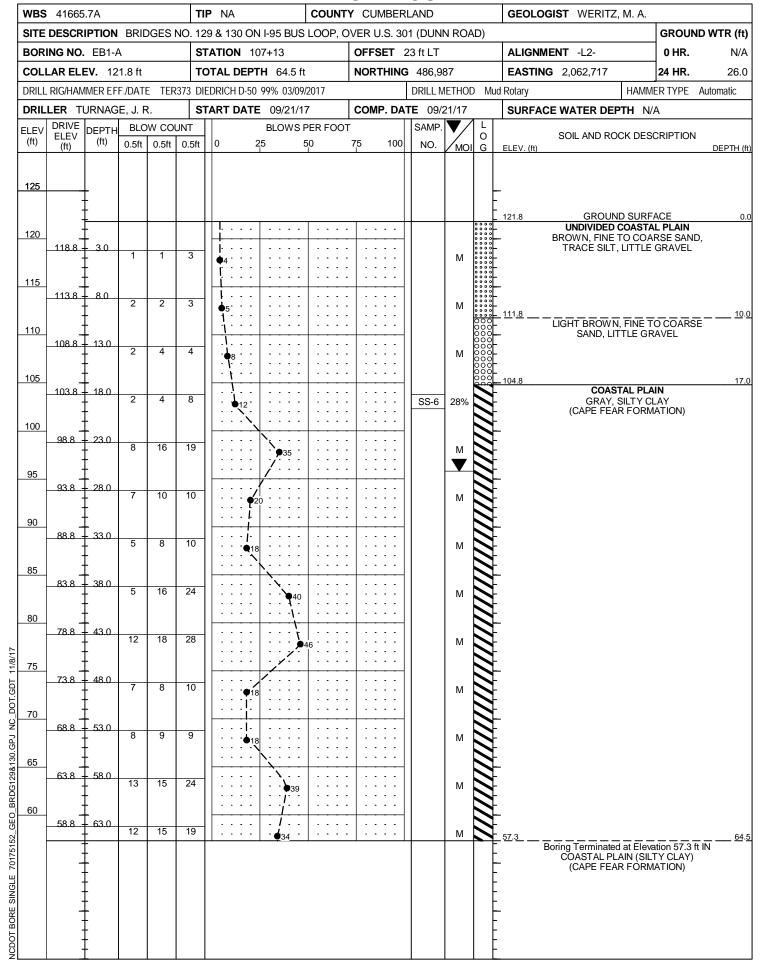
CUMBERL	AND			GEOLOGIST WERITZ, M. A		
VER U.S. 30'		N ROA	D)	-	GRO	OUND WTR (ft)
OFFSET 1	7 ft RT			ALIGNMENT -L1-	ОН	IR. N/A
NORTHING	486,87	78		EASTING 2,062,685	24 H	IR. FIAD
	DRILL M	ETHOD	) Mu	d Rotary HAN	IMER TY	PE Automatic
COMP. DAT		22/17		SURFACE WATER DEPTH	N/A	
75 100	SAMP. NO.	моі	L O G	SOIL AND ROCK DE	SCRIPT	ION DEPTH (ft)
· · · · ·	SS-8	Μ		- 122.0 PAVEMENT SU 121.2 PAVEMENT 10-INCHES ASPHAL CONCRE' UNDIVIDED COAS BROWN, FINE TO CO LITTLE GRA	<b>NT</b> T, 8-INC TE <b>TAL PLA</b>	
· · · · · · · · · · · · · · · · · · ·		M		- 106.0		16.0
	SS-9	17%		- COASTAL P GRAY, SILTY CLA SANDSTO (CAPE FEAR FOF	.Y, TRAC NE	
		М		-		
		M		-		
100/0.4		М		-		
· · · · · · · · · · · · · · · · · · ·		М		-		
		М		-		
		M		- 62.8		59.2
				Boring Terminated at El COASTAL PLAIN (S - (CAPE FEAR FOF	ILTY CL	2.8 ft IN AY)

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## **GEOTECHNICAL BORING REPORT**

**BORE LOG** 



#### **WBS** 41665.7A TIP NA COUNTY SITE DESCRIPTION BRIDGES NO. 129 & 130 ON I-95 BUS LOOP, OV BORING NO. RW1-2 **STATION** 106+62 COLLAR ELEV. 121.6 ft TOTAL DEPTH 50.0 ft DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017 DRILLER TURNAGE, J. R. **START DATE** 09/21/17 ELEV DRIVE DEPTH BLOW COUNT BLOWS PER FOOT ELEV (ft) (ft) 0.5ft 0.5ft 0.5ft 25 50 (ft) 10 125 120 120.6 + 1.0 4 5 . . . . <u>118.1 📘 3.5</u> . . . . . . . 2 3 . . . . . . . . . . 115.6 6.0 . . . 115 3 3 . . . . . . . 113.1 T 8.5 - - -. . . . 5 6 . . . . . . . . . . . 110 . . . . . . . 108.1 👖 13.5 . . . 6 13 4 . . . . . . . . . . . . . . 105 . . . . 103.1 <u>|</u> 18.5 . . . . . . 8 14 6 . . . . . . 22. · - - -100 . . . . 23.5 98.1 . . . . 15 13 21 **b**36 . . . . . . 95 . . . 93.1 28.5 . . . 10 11 12 • • 23- - -. . . . . . . . . . . . . . 90 . . . . . . . 88.1 _____33.5 . . . . . . 9 . . . . . . . . . 85 . . . 83.1 T 38.5 22 43 14 65 . . . 80 78.1 43.5 - - -11 17 21 ·**•**38 . . . . . . . . 75 . . . . 73.1 E 48.5 . . . . 10 14 19

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## **GEOTECHNICAL BORING REPORT BORE LOG**

#### SHEET 8 OF 11

CUMBERLA	AND			GEOLOGIST WERITZ, M. A.		
VER U.S. 301	(DUNN	I ROA	D)		GROU	ND WTR (ft)
OFFSET 33	ft RT			ALIGNMENT -L2-	0 HR.	N/A
NORTHING	486,92	0		EASTING 2,062,680	24 HR.	11.5
D	ORILL MI	ethod	Mu	d Rotary HAMM	ER TYPE	Automatic
COMP. DATE	09/2	1/17		SURFACE WATER DEPTH N/	A	
	SAMP.	▼∕∣	L O	SOIL AND ROCK DES	CRIPTION	1
75 100	NO.	/моі	G	ELEV. (ft)		DEPTH (ft)
			-	-		
			-	121.6 GROUND SURF		
· · · ·				120.1 ROADWAY EMBAN	KMENT	0.0
		М	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	BROWN, SILTY COARSE	L PLAIN	
		М	0 0 0 0 0 0 0 0 0 0 0 0	DARK BROWN TO BROW TRACE SILT	N, FINE S	AND,
		М	0 0 0 0 0 0 0 0 0 0 0 0	-		
		М				
		▼		_ 109.6		<u>12.0</u>
				LIGHT BROWN, FINE T SAND, SOME GR	O COARS	<u>12.0</u> SE
		Sat.		SAND, SOWE GR	HVEL	
				- 104.6 COASTAL PLA	IN	17.0
		м		GRAY, SILTY C (CAPE FEAR FORM	AY	
				(CAFE FEAR FORM	ATION)	
		М				
<u> </u>				-		
		м				
				_		
		М				
				-		
		М				
				-		
		М				
				-		
		М	N	71.6		50.0
				Boring Terminated at Eleva - COASTAL PLAIN (SIL (CAPE FEAR FORM	FY CLAY)	11 IIN
			F	-		
			-			
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			E			

Consulting Engineers & Scientists

## **GEOTECHNICAL BORING REPORT**

BORE LOG

COLLAR ELEY.         122 ft         TOTAL DEPTH         60.1 ft         NORTHING         487.000         EASTING         2.062.763         24 HR.         F/A           DRUL REVAMMER FF. ADAL         TERTO TAC BODI/T         DRUL MELTON         MR King v         MARKER TYPE ALL         M									DRE L							
BORING NO. EE2:A         STATION 107:61         OFSET 25 /L T         ALGAMENT 1-2: NORTHING 497:000         0 HR.         N           COLLAR LEW. 12:2:1         TOTAL DEPTH 60.11         NORTHING 497:000         EASTING 2.002:703         PLANE TPLAY         24 HR.         FA           DBILL ROMANDART FLANT         TISTAT DATE 0922/17         COMP DATE 0922/17         SURFACE WATER DEPTH NA         SURFACE WATER DEPTH NA           DBILL ROMANDART FLANT         TISTAT DATE 0922/17         COMP DATE 0922/17         SURFACE WATER DEPTH NA           DBILL ROMANDART FLANT         TISTAT DATE 0922/17         COMP DATE 0922/17         SURFACE WATER DEPTH NA           DBILL STAT TOAT         DEGN COUNT         BLOWS PER FOOT         SURFACE WATER DEPTH NA           DIS         DEGN COUNT         BLOWS PER FOOT         SURFACE WATER DEPTH NA           DIS         DEGN COUNT         BLOWS PER FOOT         NO         DECN COUNT           DIS         DEGN COUNT         BLOWS PER FOOT         NO         DECN COUNT         DECN COUNT           DIS         DIS         DATE OF A FORMANT         DECN COUNT         MO         DECN COUNT         DECN COUNT           DIS         DIS         DIS         DIS         DIS         DIS         DIS         DIS           DIS         DIS												GEOLOG	IST WERITZ	z, M. A.		
COLLAR ELEV.         122.11         TOTAL DEPTH         68.1 ft         NORTHING         487,000         EASTING         2.062.763         24 HR.         F/A           DRULL REVAMUALE LT (AAIE         TEX37         DEDAG 105 99% (0.04%207)         DRULL BUILTOD Multicity         SURFACE WATER DEPTH         NA           DRULL REVAMUALE LT (AAIE         TEX37         DEDAG 105 99% (0.04%207)         DRUE MULTICID Multicity         SURFACE WATER DEPTH         NA           ELEV         DPUL BELOW COUNT         BLOW SPERFOOT         DRUE MULTICID         SURFACE WATER DEPTH         NA           126					OGES N	1					ROAD)					) WTR (f
DRILL REMAMURE EFF. DATE         TERDS         DERILLER         START DATE         0922/17         DRILL METHOD         Multimethod         Solid         Solid         Automate           DRILL METHOD         Mark Carrier         0922/17         COMP. DATE         0922/17         SURFACE WATER DEPTH         NA           EVENUE         Provide         BLOW COMP.         Solid         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51 <th></th> <th>0 HR.</th> <th>N/.</th>															0 HR.	N/.
DRILLEY         UNACE, J. R.         START DATE         09/22/17         COMP. DATE         09/22/17         SURFACE WATER DEPTH         NA           ELEV         DEPTH         BLOW SPER FOOT         BLOW SPER FOOT         BLOW SPER FOOT         SOIL AND ROOK DESCRIPTION         SOIL AND ROOK DESCRIPTION         DEPTH           128         Image: Comp and the second seco	COLL	AR EL	<b>EV.</b> 12	2.2 ft		т	TAL DEPTH 69.1 ft						2,062,763		24 HR.	FIA
Into         Deprint ELEV         BLOW COUNT (0)         BLOW SPER FOOT (1)         SAMP         V         L b         SOIL AND ROCK DESCRIPTION (1)         DEPRINT (1)         DEPR	DRILL	RIG/HAN	MER EF	F./DATE	E TER	373 DI	DRICH D-50 99% 03/09/20	17		DRILL M	ETHOD N	Nud Rotary		HAMM	ER TYPE	utomatic
Image: High Processor Procesor Processor Procesor Processor Processor Processor Processor Proce	DRILI		URNAG				ART DATE 09/22/17	(	COMP. DAT		_	SURFACE	WATER DE	PTH N/	Ą	
120         132         PAVEMENT SURFACE           121         113         2         4         4         5           115         114         7         4         4         5           115         114         7         4         4         6           110         100         122         9         9           110         100         126         3         6         10           101         104         17         4         5         7           105         104         17         7         10         6           105         104         17         7         10         6         7           100         9         10         10         10         10         10         10           103         104         17         7         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10		ELEV		<u> </u>					75 100		/ 0	ELEV. (ft)	SOIL AND RO	OCK DES	CRIPTION	DEPTH
115     114.6     7.6     4     4     5     19     111     112.6     3     6     10       110     100.6     12.6     3     6     10     10.8     10.4     17.6     4     5     7       100     104.6     17.6     4     5     7     1.4     7     1.4     7       101     100.6     12.6     3     6     10     1.4     7     1.4       102     104.6     17.6     4     5     7     1.4     7       102     104.6     17.6     4     5     7     1.4     7       103     06.6     22.6     12     17     27     1.4       90     96.6     22.6     7     9     11     1.4       91     10.6     1.4     1.7     1.4     1.7       92     94.6     37.6     5     8     16     1.4       93     94.6     37.6     7     1.4     17       17     1.4     1.7     1.4     1.7     1.4       17     1.4     1.7     1.4     1.7       180     1.4     1.7     1.4     1.7       17     1.4     <			- 26					· · · · ·			000		9-INCH	VEMENT ES ASPH	ALT	
114.5       1.6       4       4       6         110       102.8       12.6       3       6       100         106       104.6       17.6       4       5       7         100       09.6       22.6       12       17       27         95       04.6       27.6       9       9       11         90       96.6       32.6       7       9       11         91       0.6       7.6       12       17       27         95       04.6       37.6       8       16       10       11         90       80.6       37.6       7       9       11       10         91       0.6       7.1       14       17       11       12         70       66.6       57.6       7       7       14       17         70       66.6       57.6       15       20       28       10       12       10         65       64.6       57.6       10       12       16       10       11       12         70       65.6       62.6       10       12       16       16       10       10 <td< td=""><td>115</td><td></td><td>-</td><td>4</td><td>4</td><td>5</td><td>· • 9 · · · · · · · · · · · · · · · · ·</td><td>· · · · ·</td><td>· · · · ·</td><td></td><td></td><td>0 0 0</td><td>BROWN, FINE</td><td>TO COA</td><td>RSE SAND,</td><td></td></td<>	115		-	4	4	5	· • 9 · · · · · · · · · · · · · · · · ·	· · · · ·	· · · · ·			0 0 0	BROWN, FINE	TO COA	RSE SAND,	
109.5       12.6       3       6       10         106       104.6       17.6       4       5       7         109       96.6       22.6       12       17       27         109       96.6       22.6       12       17       27         109       96.6       22.6       12       17       27         109       96.6       22.6       7       7       1         99       80.6       22.6       7       9       11       1         90       80.6       22.6       7       9       10       1       1         90       80.6       22.6       7       7       1       1       1       1         90       80.6       72.6       7       9       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1 <td>113</td> <td>114.6</td> <td>- 7.6 - -</td> <td>4</td> <td>4</td> <td>6</td> <td></td> <td>· · · · ·</td> <td>· · · · · · · · · · · · · · · · · · ·</td> <td></td> <td>M</td> <td>o o o o o</td> <td></td> <td></td> <td></td> <td></td>	113	114.6	- 7.6 - -	4	4	6		· · · · ·	· · · · · · · · · · · · · · · · · · ·		M	o o o o o				
106       104.6       17.6       4       5       7         100       96.6       22.6       12       17       27         95       94.6       27.6       9       9       11         90       80.6       37.6       7       9       11         91       94.6       37.6       7       9       11         92       94.6       37.6       7       9       11         93       94.6       37.6       7       9       11       10         94.6       37.6       7       14       17       14       17         104.6       5       8       16       10       11       12         105       10       11       12       12       12       14       17         105       10       11       12       12       14       17       14       17         10       11       12       12       12       14       17       14       17         10       11       12       12       16       14       17       14       17         10       12       16       14       16 <t< td=""><td>110</td><td>109.6-</td><td>12.6</td><td>3</td><td>6</td><td>10</td><td></td><td>· · · · ·</td><td></td><td></td><td>0 0 0</td><td>107.2</td><td></td><td></td><td></td><td>1</td></t<>	110	109.6-	12.6	3	6	10		· · · · ·			0 0 0	107.2				1
99.5       22.6       12       17       27         95       94.6       27.6       9       9       11         90       80.6       32.6       6       7       9         91       92       32.6       6       7       9         92       94.6       37.6       8       16       7         93       94.6       37.6       8       16       7         94       9       11       10       11       12         73       74.6       47.6       10       11       12         70       69.6       52.6       7       7       7         65       64.6       57.6       15       20       28         60       59.6       62.6       10       12       16         55       54.6       67.6       11       15       50       16         60       59.6       62.6       10       12       16       16         55       54.6       67.6       11       15       50       16       16         60       59.6       62.6       10       12       16       16       16       1	<u>105</u>	104.6	17.6	4	5	7		· · · · ·					GRAY,	SILTY CL	.AY	
95       94.6       27.6       9       9       11         90       89.6       32.6       6       7       9         85       84.6       37.6       5       8       16         90       89.6       37.6       5       8       16         90       79.6       42.6       7       14       17         76       74.6       47.6       10       11       12         76       74.6       47.6       10       11       12         70       69.6       52.6       7       7       7         66       64.6       57.6       15       20       28         60       59.6       62.6       10       12       16         56       54.6       67.6       11       15       0       48.       0         65       54.6       67.6       11       15       0       48.       0       0         65       54.6       67.6       11       15       0       48.       0       0         66       62.6       10       12       16       0       16       0       16         66 <td>100</td> <td>99.6 -</td> <td>22.6</td> <td>12</td> <td>17</td> <td>27</td> <td></td> <td>· · · · ·</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	100	99.6 -	22.6	12	17	27		· · · · ·								
90 80 80 80 84 84 85 84 86 74 86 74 86 74 86 74 86 74 86 74 86 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 74 87 77 74 87 74 87 74 87 77 77 87 74 87 77 77 87 74 87 77 77 87 74 87 77 77 87 74 87 77 77 77 87 77 77 87 77 77	95	- 94.6 -	27.6		-			· · · · ·	· · · · ·							
85       84.6       37.6       5       8       16         80       79.6       42.6       7       14       17         70       69.6       52.6       7       7       7         65       64.6       57.6       15       20       28         60       59.6       62.6       10       11       12         70       69.6       57.6       15       20       28         60       59.6       62.6       10       12       16         55       54.8       67.6       11       15       15       20       28         60       59.6       62.6       10       12       16       16       16       16       17       16         55       54.8       67.6       11       15       15       20       28       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	90	-		9	9	11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	· · · · ·								
B4 b       37 b       5       8       16         80       79.6       42.6       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -	~	89.6 -	- 32.6 	6	7	9	•16 ••••	· · · · ·	· · · · · · · · · · · · · · · · · · ·							
79 6       42 6       7       14       17         75       74 6       47 6       10       11       12         70       69 6       52 6       7       7       7         65       64 6       57 6       15       20       28       10         60       59 6       62 6       10       12       16       12       48       10       11       15       15       20       28       10       12       16       16       16       16       16       16       16       16       16       16       17       16       16       16       17       16       16       17       17       16       16       17       16       16       16       17       17       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       16       17       16       16       16       16       16       16       16       16       16       16       16       16       <	85	84.6 <del>-</del>	- 37.6 -	5	8	16	24	· · · · ·	· · · · · · · · · · · · · · · · · · ·							
70       69.6       52.6       7       7       7         65       64.6       57.6	80		42.6	7	14	17	••••••••••••••••••••••••••••••••••••••	· · · · ·	· · · · · ·							
69 b       59 b       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7       7 </td <td>75</td> <td>74.6 -</td> <td>47.6</td> <td>10</td> <td>11</td> <td>12</td> <td>••••• ••••• ••••• •••••</td> <td>· · · · ·</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	75	74.6 -	47.6	10	11	12	••••• ••••• ••••• •••••	· · · · ·								
60       59.6       62.6         59.6       62.6         55       54.6       67.6         60       11       15       15         55       54.6       67.6         60       11       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         15       15       15         16       15       15         17       16       16         16       16       17         17       16       17         18       17       17         19       10	<u>70</u>	- 69.6 -	- - - 52.6	7	7	7		· · · · ·								
60 59.6 62.6 10 12 16 62.6	<u>65</u>	64.6 -	57.6	15	20	28		· · · · ·								
55 54.6 67.6 11 15 15	60	- - - - - - - - -	62.6					· · · · ·								
Image: 11     15     15     · · · · ·     · · · · ·     · · · · ·     M     Image: 53.1     6       Image:	55	- - 	- 6Z 6				· · · · · · · · · · · · · · · · · · ·	· · · · ·								
	-			11	15	15	••••• • • • <u>•</u> 30 •••				<b>N</b>		COASTAL PI	_AIN (SIL]	FY CLAY)	6 IN

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	ING NO.			JGLS	NO.			TION 1			5 L	50	г, <b>с</b>	
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-	LAR ELI			E TER	2373		_	RICH D-5				17		NOR
	LER T							RT DAT		9/25/				СОМ
ELEV	DRIVE	DEPTH	BLC	W CO	UNT		Τ		Bl	OWS	S PE	R F	00	Г
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5	ift	1	0	25		50			75
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	118.6 -	- 3.5 -	5	4	5				:	· · ·	-		-	.
115	116.1	6.0	2	3	3	,		·/···			•	· ·		
	113.6 -	- 8.5	3	4	7			· · · · ·	:	· · ·	-	: :	-	.
110	-	-						· · · · ·			•	· ·	•	· · · ·
105	108.6 - - - -	- 13.5 - -	9	12	1:	5		· · · · · ·	•27		- - -	· · ·	-	· · · ·
100	- 103.6 - - - -	- 18.5 - -	3	6	8	,		•14	-	· · ·	- - -	· · ·		  
95	98.6 - - - -	<u>23.5</u>	10	12	1:	5		· · · · ·	<b>↓</b> 27	· · ·	-	· · ·	-	
90	93.6 -	- 28.5	8	10	1:	5		· · · · ·	•25 •		-	· ·	-	· · · ·
85	88.6 - - - -	- 33.5 - -	8	11	12	2		· · · · ·	●23.		-	  	-	  
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	73.6	- 48.5	13	20	20	_				/ 4			-	

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DOT BORE

## L BORING REPORT RE LOG

#### SHEET 9 OF 11

CUMBERLAND		GEOLOGIST WERITZ, M. A.	
VER U.S. 301 (DUNN	ROAD)		GROUND WTR (ft)
OFFSET 26 ft RT		ALIGNMENT -L2-	0 HR. N/A
NORTHING 486,938	3	EASTING 2,062,722	24 HR. FIAD
DRILL ME	THOD Mud	Rotary HAMN	ER TYPE Automatic
COMP. DATE 09/25	5/17	SURFACE WATER DEPTH N	A
75 100 NO.	MOI G	SOIL AND ROCK DES	
· · · · · · · · · · · · · · · · · · ·	MOI G M □ □ □ M □ □ □ 0000 0000 M 0000 0000 M 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 00000 0000 00000	ELEV. (ft)  122.1 PAVEMENT SUR 121.2 PAVEMENT 120.1 9-INCHES ASPH ROADWAY EMBAN BROWN, SILTY FIN UNDIVIDED COAZT BROWN, FINE TO COA TRACE SILT, TRACE	ALT 0.9 KMENT 2.0 KMENT L L L L L L L L L L L L L L L L L L L
	W 0000- 0000- 0000		
		106.1 COASTAL PL/ GRAY, SILTY C (CAPE FEAR FORM	LAY
		72.1 Boring Terminated at Elev COASTAL PLAIN (SIL (CAPE FEAR FORM	TY CLAY)

#### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 41665.7A TIP: 250129 & 250130

COUNTY: CUMBERLAND

DESCRIPTION: US 301 Over I-95 Business Loop SBL

				Depth					% by \	Neight		%	%	Passing (sie	ves)		
Sample No.	Alignment	Station	Offset (feet)	Interval (feet)	AASHTO Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organ
SS-7 SS-8 SS-9	-L1- -L1-	107+07	32 LT	3.5-5.0	A-1-b (0)	16	NP	82.6	11.2	1.7	4.5	5	89	46	6	16.0	N/D N/D N/D N/D
SS-8	-L1-	106+57	17 RT	2.8-4.3	A-3 (0)	15	NP	82.5 32.3	11.7	0.9 12.5	4.9 32.9	2	93 99	52 78 94	6	16.9	N/D
SS-9	-L1-	106+57	17 RT	17.8-19.3	A-7-6 (12)	48	36	32.3	22.3	12.5	32.9	0	99	78	49	16.8	N/D
SS-6	-L2-	107+13	23 LT	10.0-19.5	A-7-6 (26)	57	41	9.6	27.2	16.9	46.3	0	100	94	68	27.7	N/D
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N/D - NOT DETERMINED

Certified Lab Technician Signature

0,	Ave. Wet		Shear Stren	igth Values	
。 anic	Unit Wt.	Total	Total Friction	Effective	Effective
anic	(pcf)	Cohesion	(φ)	Cohesion	Friction
D	N/D	(psf) N/D	N/D	(psf) N/D	(φ') N/D
D	N/D	N/D	N/D	N/D	N/D
D	N/D	N/D	N/D	N/D	N/D
D	N/D	N/D	N/D	N/D	N/D
U	IN/D	IN/D	IN/D	N/D	IN/D
		İ			
		1	1		

Stephanie H. Huffman

114-01-1203 Certification Number

## SITE PHOTOGRAPHS BRIDGES NO. 129 & 130 ON I-95 BUSINESS LOOP OVER US 301 (DUNN ROAD)



PHOTOGRAPH NO. 1: WEST APPROACH TO END BENT NO. 1 BETWEEN -L1- AND -L2- ALIGNMENTS, LOOKING EAST



PHOTOGRAPH NO. 2: ON -Y- ALIGNMENT, NORTH OF -L1- AND -L2-ALIGNMENTS, LOOKING SOUTH



PHOTOGRAPH NO. 3: ON -Y- ALIGNMENT, SOUTH OF -L1- AND -L2-ALIGNMENTS, LOOKING NORTH



PHOTOGRAPH NO. 4: EAST APPROACH TO END BENT NO.2 BETWEEN -L1- AND -L2- ALIGNMENTS, LOOKING WEST

#### SHEET 11 OF 11

250008

REFERENCE

## **CONTENTS**

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#### SHEET NO. 2

LEGEND (SOIL & ROCK) SITE PLAN (WALLS 1 & 2) WALL ENVELOPES AT END BENT 1 & END BENT 2 LABORATORY SUMMARY SHEET

TITLE SHEET

**DESCRIPTION** 

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY _CUMBERLAND

PROJECT DESCRIPTION **DIVISION 6 - I-95 BUSINESS** AND US 301 ROADWAY IMPROVEMENTS

SITE DESCRIPTION <u>MSE WALLS</u> AT END BENT 1 AND END BENT 2 - BRIDGE NO. 008 ON US 301 OVER I-95 BUSINESS LOOP SOUTHBOUND LANE

# $\mathbf{v}$ 4166 PROIEC

STATE N.C

SHEETS NO



6

1



#### CAUTION NOTICE

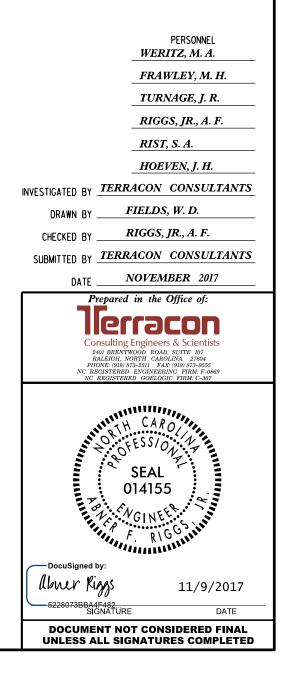
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-6860. THE SUBSIFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 SUBSUFFACE 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 DECREE OF RELIBULITY INHERENT IN THE SUBSUFFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES SUBJFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOL MOSTUFE CONDITIONS MAY VARY CONSDERABLY WITH THE ACCOMPING OL CUMUTIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CALITORIED 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHIONO OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS 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 CONDENSION OR FOR AN THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

- TES: 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 REDUESTED 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.



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

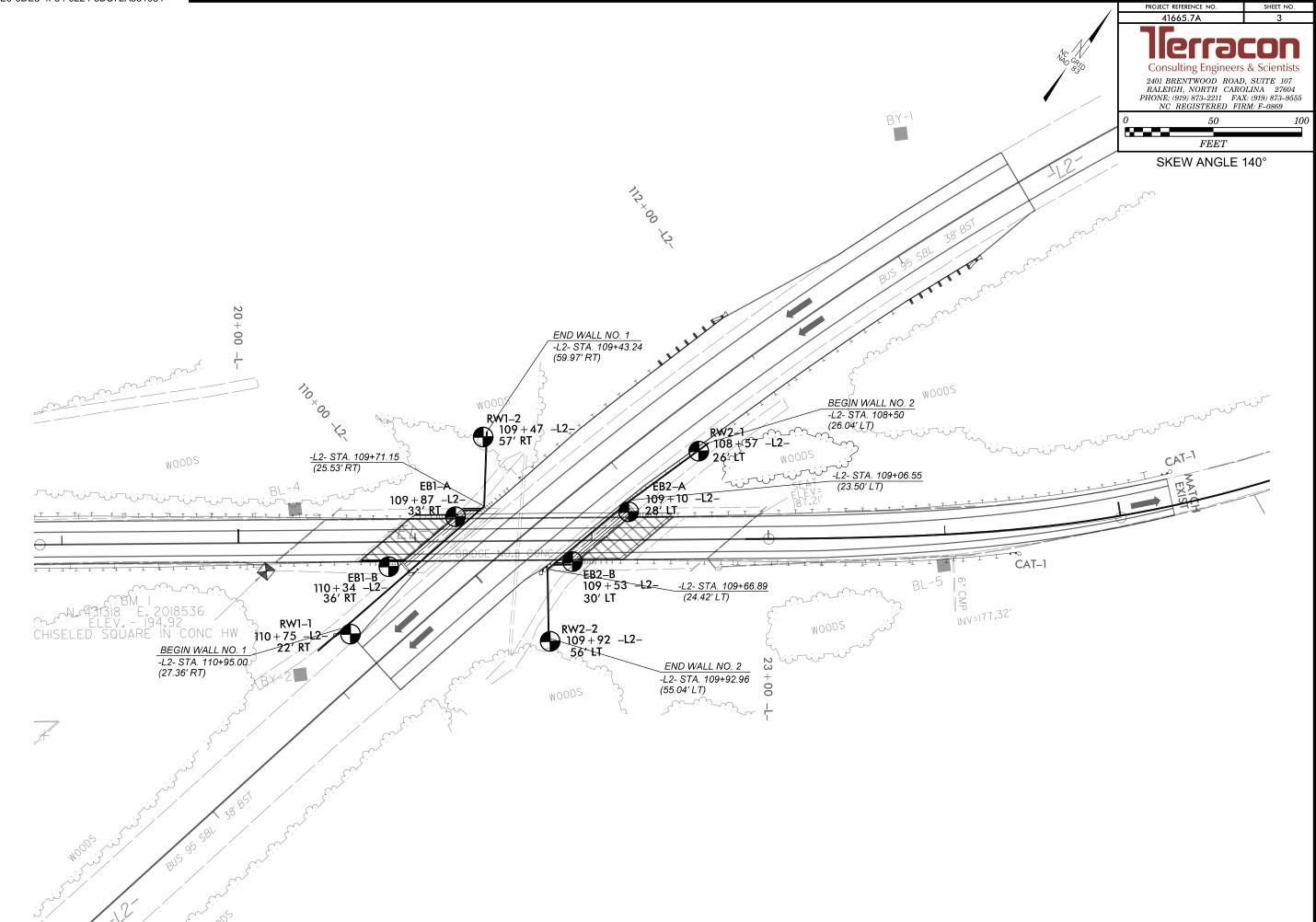
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	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.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PERTRATION BY A SPLIT SPON SAMPLER EQUAL TO R LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
VERY STIFF.GRAY.SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
CLASS.         (≤ 35% PASSING 200)         (> 35% PASSING 200)         URGANIL MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INC GNEISS, GABBRO, SCHIST, ETC.
GROUP         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-b         A-1-b         A-2-4         A-2-5         A-2-6         A-2-7         A-3         A-6, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL I ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SANDSTONE, ETC
2 000000000 00000 00000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	
■40 38 MX 58 MX 51 MN ■200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL <u>SOILS</u> <u>OTHER MATERIAL</u>	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK
MATERIAL PASSING *40 LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50LS WITH LL 40 MX 41 MN 40 MX 11 MN 11 MN 40 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10 MX 10	TRACE OF ORGANIC MATTER         2         - 3%         3         - 5%         TRACE         1         - 10%           LITTLE ORGANIC MATTER         3         - 5%         5         - 12%         LITTLE         07         - 20%           MODERATELY ORGANIC         5         - 10%         12         - 20%         SOME         20         - 35%           HIGHLY ORGANIC         5         - 10%         2         20%         HIGHLY         35%         AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CC IV SLIJ. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HF OF A CRYSTALLINE NATURE.
	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS S	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ✓ STATIC WATER LEVEL AFTER <u>24</u> HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS
		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA
AS SUBGRADE EXCELLENT TO GUOD FAIR TO POUR POOR POOR ONSUTTABLE	OAULT SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LO
COMPACTNESS OR BANGE OF STANDARD RANGE OF UNCONFINED	-	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND V
PRIMARY SUIL ITPE CONSISTENCY PENELIKALIUM RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ² ) CENERALLY VERY LOOSE < 4	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.
GRANULAR LUUSE 4 TO 10 MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF
(NON-COHESIVE)         UENSE VERY DENSE         > 50           VERY SOFT         < 2	ARTIFICIAL FILL (AF) OTHER AUGER BORING ON PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMEMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>JF IESTED, WOULD VIELD SPT N V</i>
GENERALLY         SOFT         2 T0 4         0.25 T0 0.5           SILT-CLAY         MEDIUM STIFF         4 T0 8         0.5 T0 1.0           MATERIAL         STIFF         8 T0 15         1 T0 2           (COHESIVE)         VERY STIFF         15 T0 30         2 T0 4	TIEVE INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE TTALE ALLUVIAL SOIL BOUNDARY A PIEZOMETER	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.
HARD > 30 > 4		ROCK HARDNESS
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BL
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.
Obdelsh,         Code         Owner         SAND         SAND         SAND         SAND         SAND         CL	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DE BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEDLOGIST'S PICK.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	$\begin{array}{ccc} \mbox{CPT} & -\mbox{CONE} \mbox{ PENETRATION TEST } & \mbox{NP} & -\mbox{ NON PLASTIC } & \mbox{$7$}_{d}^{-}\mbox{ DRY UNIT WEIGHT } \\ \mbox{CSE} & -\mbox{ COARSE } & \mbox{ORG} & -\mbox{ ORGANIC } \\ \mbox{DMT} & -\mbox{ DIATOMETER TEST } & \mbox{PMT} & -\mbox{ PRESSUREMETER TEST } & \mbox{SAMPLE ABBREVIATIONS } \\ \mbox{DPT} & -\mbox{ DYNAMIC PENETRATION TEST } & \mbox{SAP} & -\mbox{ SAPACLITIC } & \mbox{S} & -\mbox{SULK } \end{array}$	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN
- SATURATED - USUALLY LIQUID; YERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e         VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F         - FINE         SL SILT, SILTY         ST - SHELBY TUBE           F0SS F0SSILIFEROUS         SLI SLIGHTLY         RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC SEMISOLID; REOUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.
	FRAGS FRAGMENTS     W - MOISTURE CONTENT     CBR - CALIFORNIA BEARING       HI HIGHLY     V - VERY     RATIO	FRACTURE SPACING BEDDING
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT         USED         ON         SUBJECT         PROJECT           DRILL UNITS:         ADVANCING TOOLS:         HAMMER TYPE:	VERY WIDE         MORE         THAN 10         FEET         VERY THICKLY BEDDED           WIDE         3 TO 10         FEET         THICKLY BEDDED         1.           MODERATELY CLOSE         1 TO 3         FEET         THINLY BEDDED         0.1
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C         CLAY BITS         X AUTOMATIC         MANUAL           CME-55         6° CONTINUOUS FLIGHT AUGER         CORE SIZE:	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.02 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY	8" HOLLOW AUGERS	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC         Ø-5         VERY LOW           SLIGHTLY PLASTIC         6-15         SLIGHT           MODERATELY PLASTIC         16-25         MEDIUM		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.
	X     D-50 (TER373)     X     TRICONE     2%     * TUNGCARB.     SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.
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           X 3¼" HOLLOW STEM AUGER	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

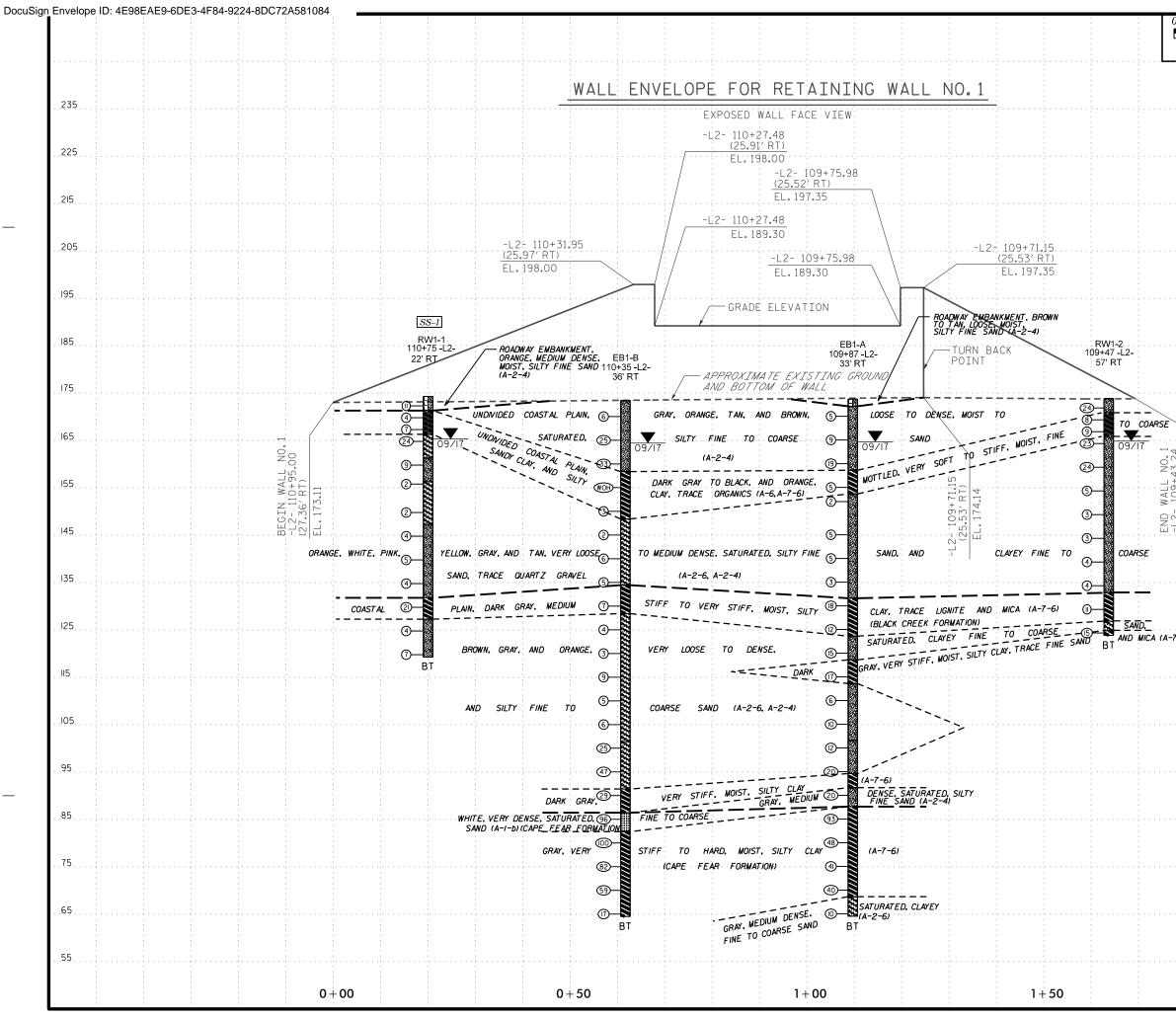
#### PROJECT REFERENCE NO.

## 41665.7A

2

	TERMS AND DEFINITIONS
ED. AN INFERRED ) SPT REFUSAL.	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.
T N VALUES >	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.
DCK THAT	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
ICLUDES GRANITE,	SURFACE.
AL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED. C. MAY NOT YIELD	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
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	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
CATINGS IF OPEN, MAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ock up to NL Feldspar	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIG∎NAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
OSS OF STRENGTH WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
Inch Stribert	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
EVIDENT BUT ARE KAOLINIZED	ITS LATERAL EXTENT.
	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
RE DISCERNIBLE	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
F STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND	RESIDENCE MESS SOLE SOLE FORMED IN FREE OF THE WEATHERING OF NOCK
5. SAPROLITE IS	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.
LOWS 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.
DR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPI) - 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
FRAGMENTS	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
IT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
PIECES 1 INCH HED READILY BY	LENGTH OF CAC USELTIT DESIGNATION CANOD? I MERIONE OF NOCK OUNLIT DESIGNATED OF 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.
	BENCH MARK: BY-2, N=431283.72, E=2018587.55
THICKNESS 4 FEET	
.5 - 4 FEET	ELEVATION: 173.80 FEET
16 - 1.5 FEET 03 - 0.16 FEET	NOTES:
08 - 0.03 FEET 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
AT, PRESSURE, ETC.	
TEEL PROBE;	
PROBE:	
E;	DATE: 8-15-14





0	20	40	PROJECT REFERENCE NO.	SHEET NO.
	FEET		41655.7A	4
			Consulting Engir 2401 BRENTWOOD RALEIGH, NORTH PHONE: (919) 873-2211 NC REGISTERED ENGI NC REGISTERED GOD	DCON Neers & Scientists ROAD, SUITE 107 CAROLINA 27604 FAX.GNU 077 055
			NC REGISTERED ENGIN	NEERING FIRM: F-0869 ELOGIC FIRM: C-367
				225
				215
				205
				195
				185
				175
E				165
43.24				
EL. 173.90 EL. 173.90 EL. 173.90				155
239 				145
				135
				125
A-7-6)				
				105
				75
				65

240				ALL FNVFL	OPF FOR RF	TAINING WALL	NO 2
		1 I I I I 1 I I I 1 I I 1 I I 1 I I 1 I I 1 I I 1 I 1			EXPOSED WALL F		
230	······			-L2- 10	)9+09.58 3.57′LT)_		
220				El	195.36 -L2- 109+61.9 (24.40′LT)	7	· · · · · · · · · · · · · · · · · · ·
210				·····	EL.196.67		· · · · · · · · · · · · · · · · · · ·
		-L2- (23.	- 109+06.55 50′LT)		L. 187.47 -L2- 109+61.9	-L2:	- 109+66.89 (24.42′LT)
200			195.36		EL. 187.47		EL. 196.67
190				GR	ADE ELEVATION		
180	<u>SS-</u> RW2 108+5	2-1 7 -L2-	TURN BACK	EB2-A / AND 109+10 -L2- /	ROXIMATE EXISTINU BOTTOM OF WALL 10	<i>G GROUND</i> EB2-B 9+53-L2-	BACK 105
	26' L ROADWAY EMBANKMENT. TAN TO			28'LT		30' LT	
. 170			COASTAL PLAIN,		() ROWN, ORANGE, AND		(6)- 8- ISE TO DENSE, (6)- (25)-
. 160		09/17	ے۔ ی 0 - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0) - (0			 966.85	(5- (6)- (8)-
150	BEGIN WALL NO. 2 -L2- 108+50.00 (26.04: LT) EL. 174.10		MOIST TO +601 -25- 103,550' LT)	SATURATED. SILTY	FINE TO COARSE (4)-	10	
	● EL2- EL.1 EL.1	AND CLAYEY FINE SA		TRACE WOOD FF	<b>S</b>		3- 3-
140	©-				@		- @-
.130	© 	COAST AL	PLAIN. DARK GRAY. SOFT	TO STIFF, MOI			
120	0— ©—	COASTAL PLAIN, L	 DARK GRAY.	LOOSE TO		830	®-
	ଞ <b>ି</b> ଞ୍ଚ BT		-==:	DARX GRAY.	CLAYEY FINE TO 3	COARSE SAND, T	RACE MICA (3)-
lio			DARK GRAY.	AND OP	TY STIFF (5)		
.100	·····		SILTY FINE (2)-	TO COLOR	MEDIUM DENSE TO	DENSE. SATUR	
90			DARK GRAY (6)-	DARK GRAY, MOIST. SILT	VERY STIFF	SENSE, SATURATED,	
			DARK GRAY. (6– SILTY FINE TO (36–	AND ORANGE.	MEDIUM DENSE TO 3		
80			······ (17)	COARSE SAW	⁰ (A-2-4) <u>50</u>	VERY DENSE. SATURATED	
					GRAY. VERY STIFF	TO HARD, MOIST,	
60					ICAPE FEAR	FORMATION)	
(A) UND	WIDED COASTAL PLAIN, TAN, GRAY, AND					BT	
084 50 70	NGE TO DARK GRAY, MOTTLED, MEDIUM STIFF STIFF, MOIST TO WET, SILTY CLAY (A-7-6)						

	0	20	40	PROJECT REFERENCE NO	
		FEET		41665.7A	5
					DCON
				Consulting Engi 2401 BRENTWOOD RALEIGH, NORTH	neers & Scientists ROAD, SUITE 107 CAROLINA 27604 1 FAX: (919) 873-9555 INEERING FIRM: F-0869 DELOGIC FIRM: C-367
				PHONE: (919) 873–221 NC REGISTERED ENG NC REGISTERED GO	1 FAX: (919) 873–9555 INEERING FIRM: F–0869 DELOGIC FIRM: C–367
					220
					210
					200
					190
2					
2 -L2- 「					180
	NOTE: OFFS	ETS ARE TO FR	ONT FAC	E OF MSE WALL.	
					170
09/17					
	02 C				160
@	WALL NO. 2 109492.96 4' LT) 73.16				
	EL 17				150
					140
					170
					130
SAND.					120
(A-2	-4. A-2-6)				
					liO
					100
					90
					80
					70
					60
					50
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1		2 -	- 00		

#### LABORATORY TESTING SUMMARY

	PROJECT NUMBER:	4166	65.7A	-		TIP:	25	8000	-		COUNTY	с <u></u> С	UMBERLAN	D	_
	DESCRIPTION:	US 301 Over	r I-95 Busines	s Loop SBL											
			T	Depth					% by V	Veight		%	%	Passing (sie	eves)
Sample No.	ble No. Alignment	Station	Offset (feet)	Interval (feet)	AASHTO Class.	ASHTO Class.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	70 Retained #4 Sieve	#10	#40	
SS-1	-L2-	110+75	22 RT	1.0-2.5	A-2-4 (0)	16	NP	58.5	28.1	2.8	10.6	0	100	76	
SS-1 SS-3	-L2- -L2-	108+57	26 LT	3.5-5.0	A-7-6 (8)	41	26	27.9	28	12.9	31.2	0	100	87	
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N/D - NOT DETERMINED

% Moisture

N/D 18.6

#200

15 48

	Ave. Wet		Shear Strer	noth Values	
%	Unit Wt.	Total	Shear Strer Total Friction	Effective	Effective
Organic	(pcf)	Cohesion	(φ)	Cohesion	Friction
N/D	N/D	(psf) N/D	N/D	(psf)	( <b>ა</b> ') N/D
N/D N/D	N/D N/D	N/D N/D	N/D N/D	N/D N/D	N/D N/D
N/D	N/D	IN/D	IN/D	N/D	IN/D
	ļ	l			
	I	I			

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number

<u>୨ ଓ 250130</u>	CONTENTS <u>SHEET NO.</u> 1 2 3 4–5 6	DESCRIPTION TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN (WALLS 3 & 4) WALL ENVELOPES AT END BENT 1 & END BENT 2 LABORATORY SUMMARY SHEET	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT STRUCTURE SUBSURFACE INVESTIGATION
REFERENCE: 250129			COUNTY <u>CUMBERLAND</u> PROJECT DESCRIPTION <u>DIVISION 6 - I-95 BUSINESS</u> <u>AND US 301 ROADWAY IMPROVEMENTS</u> SITE DESCRIPTION <u>DUAL BRIDGES NO. 0129 &amp; NO. 0130</u> <u>ON I-95 BUSINESS LOOP OVER US 301</u>
PROJECT: 41665			

STATE N.C

41665

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 SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-6860. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOLL 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 SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INVESTIGATORS SERES RECORDED AT THE SIM AS OTHER MON-CHANTIC GARTORS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CALITORIED 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS 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 OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FOM THE ACTUAL CONDENSATIONS FOR ANY EXTENSION OF TIME FOR ANY REASON RESULTING FOR THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

- TES: 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 REGUESTED 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.
- 2.



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

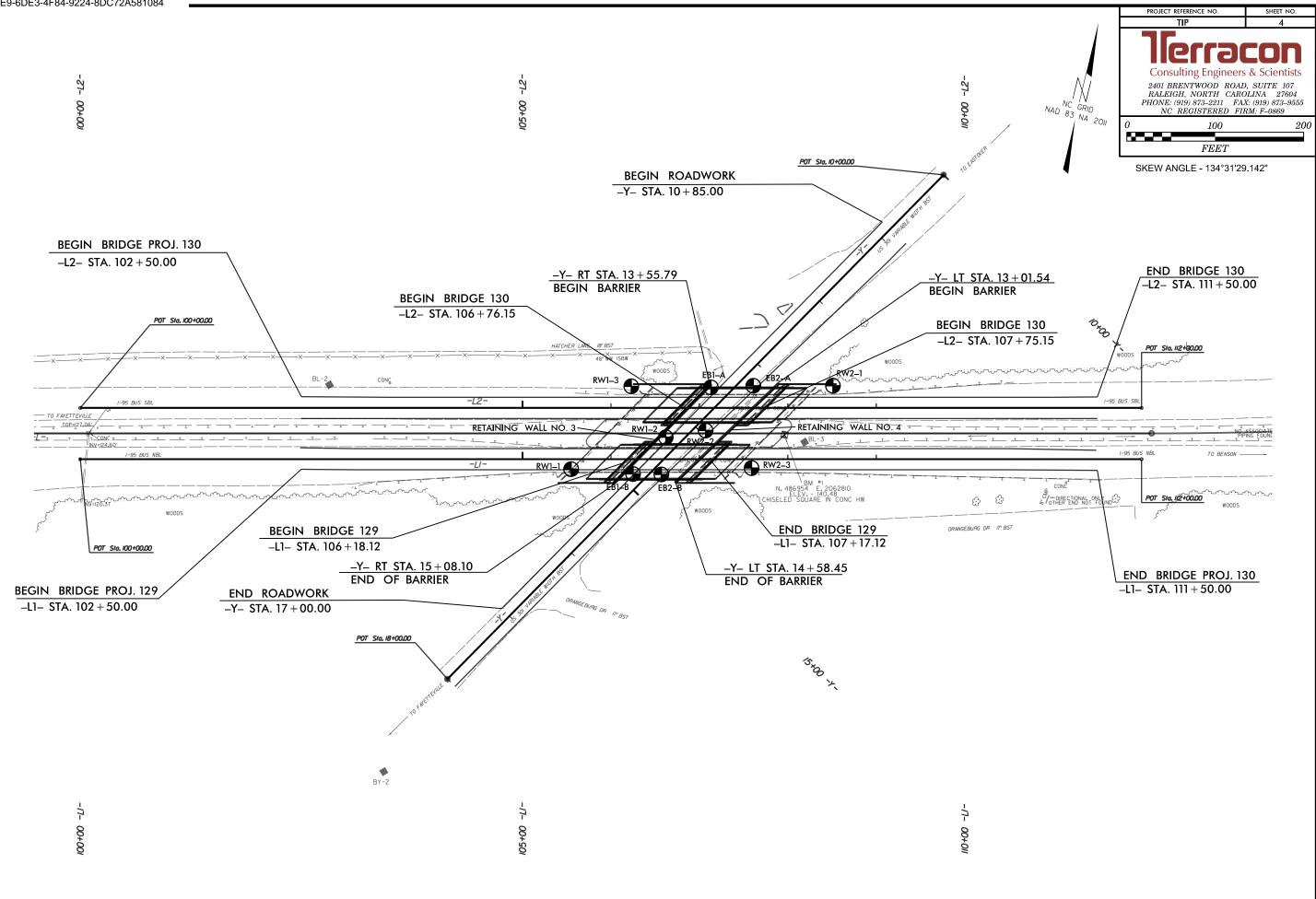
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	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.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PERTRATION BY A SPLIT SPON SAMPLER EQUAL TO R LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
VERY STIFF.GRAY.SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
CLASS.         (≤ 35% PASSING 200)         (> 35% PASSING 200)         URGANIL MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INC GNEISS, GABBRO, SCHIST, ETC.
GROUP         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-b         A-1-b         A-2-4         A-2-5         A-2-6         A-2-7         A-3         A-6, A-7	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL I ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SANDSTONE, ETC
2 000000000 00000 00000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK
*10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	
■40 38 MX 58 MX 51 MN ■200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL <u>SOILS</u> <u>OTHER MATERIAL</u>	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK
MATERIAL PASSING *40 LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50LS WITH LL 40 MX 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN	TRACE OF ORGANIC MATTER         2         - 3%         3         - 5%         TRACE         1         - 10%           LITTLE ORGANIC MATTER         3         - 5%         5         - 12%         LITTLE         07         - 20%           MODERATELY ORGANIC         5         - 10%         12         - 20%         SOME         20         - 35%           HIGHLY ORGANIC         5         - 10%         2         20%         HIGHLY         35%         AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY CC IV SLIJ. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HF OF A CRYSTALLINE NATURE.
	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS SOILS S	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ✓ STATIC WATER LEVEL AFTER <u>24</u> HOURS	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS
		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA
AS SUBGRADE EXCELLENT TO GUOD FAIR TO POUR POOR POOR ONSUTTABLE	OAULT SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LO
COMPACTNESS OR BANGE OF STANDARD RANGE OF UNCONFINED	-	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND V
PRIMARY SUIL ITPE CONSISTENCY PENELIKALIUM RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ² ) CENERALLY VERY LOOSE < 4	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS A TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.
GRANULAR LUUSE 4 TO 10 MATERIAL MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF
(NON-COHESIVE)         UENSE VERY DENSE         > 50           VERY SOFT         < 2	ARTIFICIAL FILL (AF) OTHER AUGER BORING ON PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING SOUNDING ROD	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS AR SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMEMENTS OF (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>JF IESTED, WOULD VIELD SPT N V</i>
GENERALLY         SOFT         2 T0 4         0.25 T0 0.5           SILT-CLAY         MEDIUM STIFF         4 T0 8         0.5 T0 1.0           MATERIAL         STIFF         8 T0 15         1 T0 2           (COHESIVE)         VERY STIFF         15 T0 30         2 T0 4	TIEVE INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE TTALE	COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.
HARD > 30 > 4		ROCK HARDNESS
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BL
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.
Object         Office         SAND         SAND         SAND         SAND         CL	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DE BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEDLOGIST'S PICK.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	$\begin{array}{ccc} \mbox{CPT} & -\mbox{CONE} \mbox{ PENETRATION TEST } & \mbox{NP} & -\mbox{ NON PLASTIC } & \mbox{$7$}_{d}^{-}\mbox{ DRY UNIT WEIGHT } \\ \mbox{CSE}_{-}\mbox{ COARSE } & \mbox{ORG}_{-}\mbox{ ORGANIC } \\ \mbox{DMT} & -\mbox{DIATOMETER TEST } & \mbox{PMT} & -\mbox{DRSEMETER TEST } & \mbox{SAMPLE ABBREVIATIONS } \\ \mbox{DPT} & -\mbox{DYNAMIC PENETRATION TEST } & \mbox{SAP}_{-}\mbox{ SAPROLITIC } & \mbox{S}_{-}\mbox{Bulk } \end{array}$	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN
- SATURATED - USUALLY LIQUID; YERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e         VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F         - FINE         SL SILT, SILTY         ST - SHELBY TUBE           F0SS F0SSILIFEROUS         SLI SLIGHTLY         RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC SEMISOLID; REOUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.
	FRAGS FRAGMENTS     W - MOISTURE CONTENT     CBR - CALIFORNIA BEARING       HI HIGHLY     V - VERY     RATIO	FRACTURE SPACING BEDDING
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT         USED         ON         SUBJECT         PROJECT           DRILL UNITS:         ADVANCING TOOLS:         HAMMER TYPE:	VERY WIDE         MORE         THAN 10         FEET         VERY THICKLY BEDDED           WIDE         3 TO 10         FEET         THICKLY BEDDED         1.           MODERATELY CLOSE         1 TO 3         FEET         THINLY BEDDED         0.1
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	CME-45C         CLAY BITS         X AUTOMATIC         MANUAL           CME-55         6° CONTINUOUS FLIGHT AUGER         CORE SIZE:	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.02 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY	8" HOLLOW AUGERS	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC         Ø-5         VERY LOW           SLIGHTLY PLASTIC         6-15         SLIGHT           MODERATELY PLASTIC         16-25         MEDIUM		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER.
	X     D-50 (TER373)     X     TRICONE     2%     * TUNGCARB.     SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.
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           X 3¼" HOLLOW STEM AUGER	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

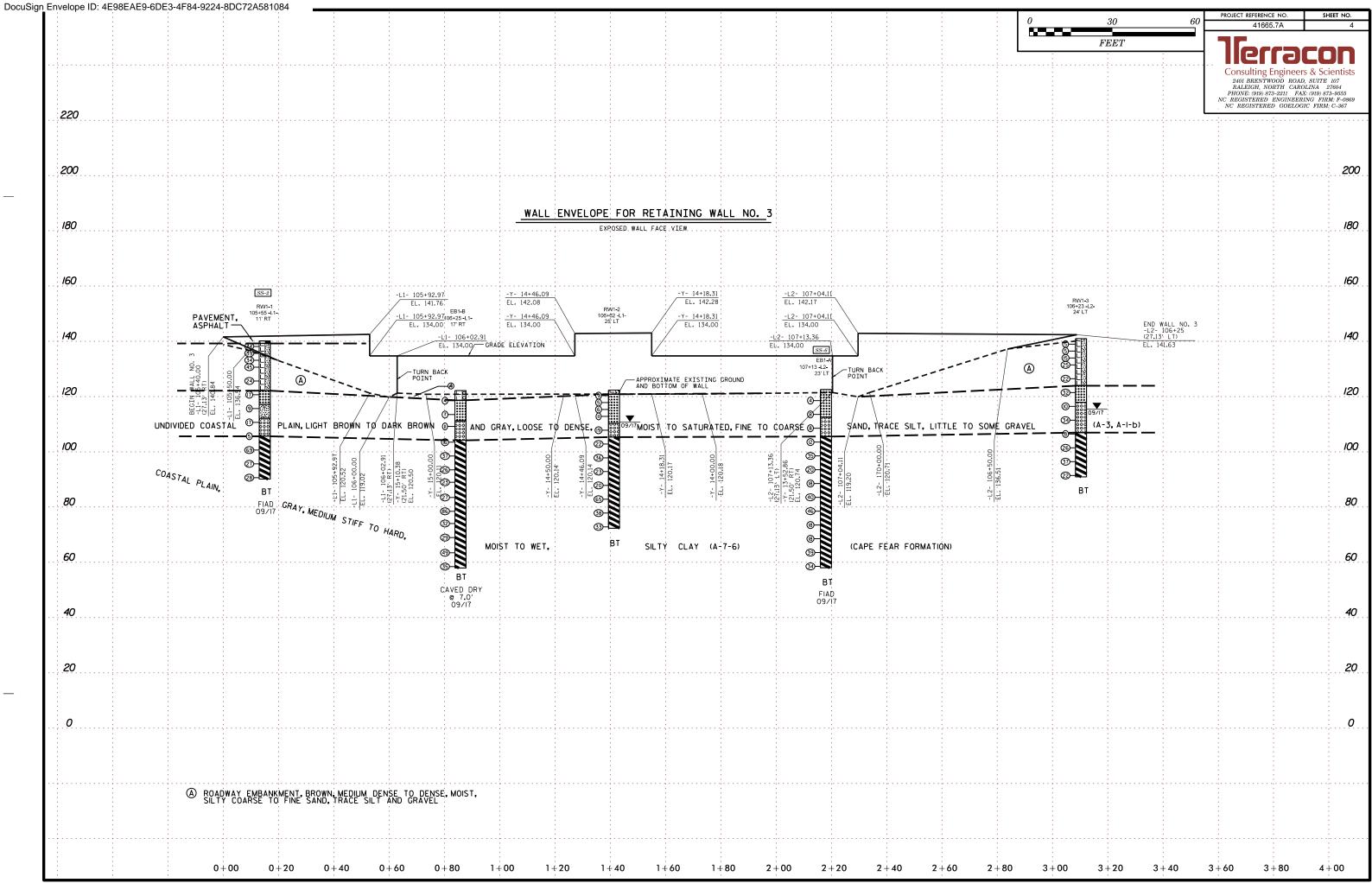
#### PROJECT REFERENCE NO.

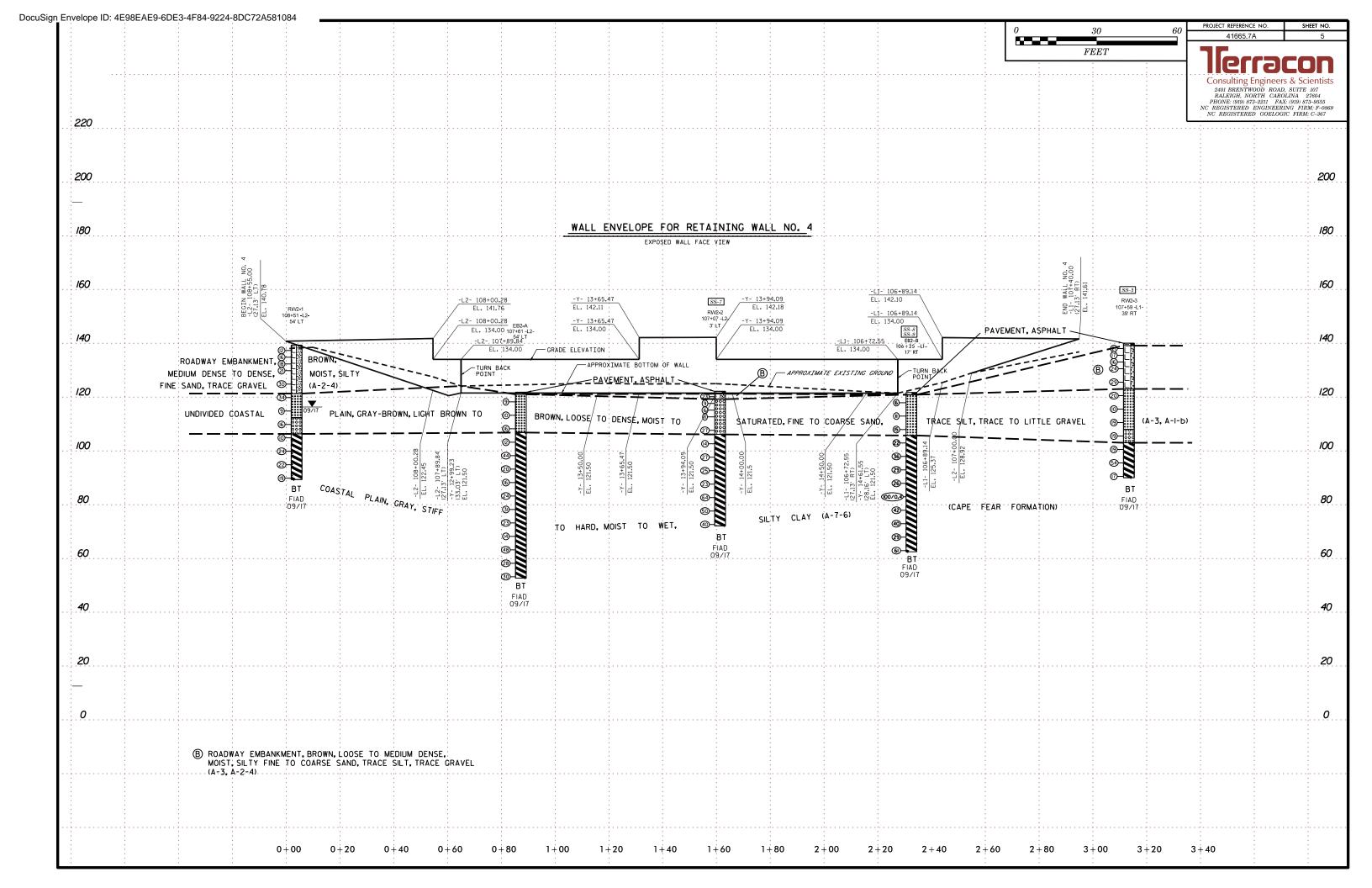
## 41665.7A

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	TERMS AND DEFINITIONS
ED. AN INFERRED ) SPT REFUSAL.	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.
T N VALUES >	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.
ОСК ТНАТ	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
ICLUDES GRANITE,	SURFACE.
AL PLAIN IF TESTED. C.	<u>CALCAREOUS (CALC.)</u> - SOLS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - 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.
	$\underline{\text{DIKE}}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	$\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
CATINGS IF OPEN, MAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
DCK UP TO NL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY. ROCK HAS	$\underline{FLOAT}$ - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL .OSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VIDENT BUT	LEDCE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
RE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
F STRONG ROCK F ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND 5. SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
IS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
LOWS REQUIRED	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.
EEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
DR PICK POINT. BLOWS OF THE	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 BOUAL
FRAGMENTS	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
IT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
PIECES 1 INCH HED READILY BY	<u>STRATA ROCK QUALITY DESIGNATION (SRQD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SECMENTS WITHIN A STRATUM EQUAL TO OR CREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BY-2, N=486,477.58, E=2,062,245.96
THICKNESS 4 FEET	
.5 - 4 FEET	ELEVATION: 120.92 FEET
16 - 1.5 FEET 03 - 0.16 FEET	NOTES:
08 - 0.03 FEET 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
AT, PRESSURE, ETC.	
TEEL PROBE;	
PROBE:	
E;	
	DATE: 8-15-14







#### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 41665.7A **TIP:** 250129 & 250130

COUNTY: CUMBERLAND

DESCRIPTION: DUAL BRIDGES NO. 0129 & NO. 0130 ON I-95 BUSINESS LOOP OVER US 301

			Offset	Depth	AASHTO			% by Weight				%	% Passing (sieves)				0/
Sample No.	Alignment	Station	(feet)	Depth Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organi
SS-2 SS-6	-L1- -L2-	105+55	11 RT	3.5-5.0	A-2-4 (0)	15	NP	73.5	15.6	3.1	7.8	0	100	63	12	11.1	N/D N/D
SS-6	-L2-	107+13	23 LT	10.0-19.5	A-7-6 (26)	57	41	9.6	27.2	16.9	46.3	0	100	94	68	27.7	N/D
SS-7	-L2-	107+07	3 LT	3.5-5.0	A-1-b (0)	16	NP	82.6	11.2	1.7	4.5	5	89	46	6	16.0	N/D N/D N/D
SS-8	-L1-	106+25	17 RT	2.8-4.3	A-3 (0)	15	NP	82.5	11.7	0.9	4.9	2	93	52	6	16.9	N/D
SS-9	-L1-	106+25	17 RT	17.8-19.3	A-7-6 (12)	48	36	32.3	22.3	12.5	32.9	0	99	78	49	16.8	N/D
SS-9 SS-3	-L1-	107+59	10 RT	3.5-5.0	A-2-4 (0)	12	36 NP	71.5	19.5	4.1	4.9	0	99 99	64	11	4.3	N/D
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<b>├</b>									1		+	+ +		+	+		
N/D - NOT DET		1	1				1		1		1			1	1		

N/D - NOT DETERMINED

Certified Lab Technician Signature

Ave. Wet unit         Shear Strength Values           0         Total Cohesion (ost)         Total Friction (\$)         Effective Cohesion (ost)           D         N/D         N/D         N/D           D         D         D         D	Effective Friction (&') N/D N/D N/D N/D
Constion         (pcf)         Conesion (psf)         (d)         Constin (psf)           D         N/D         N/D         N/D         N/D	(@`) N/D N/D N/D
D         N/D         N/D         N/D         N/D           D         N/D         N/D         N/D         N/D         N/D	N/D N/D N/D
D         N/D         N/D         N/D           D         N/D         N/D         N/D         N/D	N/D N/D
D         N/D         N/D         N/D           D         N/D         N/D         N/D         N/D           D         N/D         N/D         N/D         N/D	N/D
D         N/D         N/D         N/D           D         N/D         N/D         N/D         N/D	
D N/D N/D N/D N/D	N/D
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Stephanie H. Huffman

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