D: R-2519B

OJECT: 35609.1.1

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

CONTENTS

HEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	WBL SITE PLAN
4	WBL CROSS SECTIONS
6	WBL BORE LOG REPORTS
9	WBL SOIL TEST RESULTS
11	EBL SITE PLAN
12	EBL CROSS SECTIONS
14	EBL BORE LOG REPORTS
17	EBL SOIL TEST RESULTS

STRUCTURE SUBSURFACE INVESTIGATION

ROJ. RE	FERENC	E NO.	35609.1.	I(R-1)	2519 B)		F.A. PRO)J	
OUNTY	YAN	CEY	******						
ROJECT	DESCR	RIPTION	US-192	E FR	OM SE	<u>-1186</u>	IN YA	INCEY	
COUNT	TY TO	THE	MULTI-	-LAN	E SECT.	ION	WEST		
OF SP	RUCE	PINE	IN MI	TCHE	LL COU	JNTY			
ITE DES	CRIPTIC	ON _ <i>BR</i>	IDGES	ON	US-19E	WBL	AND	EBL	
OVER	SR-130	98							

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 FELD BORNING LOGS, ROCK CORES, AND SOLL TEST DATA AVAILABLE MAY BE REVIEWED OR HISFECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING LOGS, ROCK CORES, OR SOLL TEST DATA ARE PART OF THE CONTRACT.

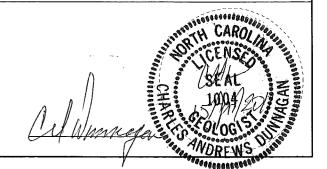
GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORRIDGE, THE LABORATORY SAMPLE DATA AND THE IN SITU UN-PLACED TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELIABLITY NIMERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MONSTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTURE CONDITIONS MORE CONDITIONS MORE CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMMARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DEFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOT THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY PRESON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DEFERRING FROM THE OCCUPANT ON THE SUBSURFACE INFORMATION.

_	M M HAGER
• .	D O CHEEK
_	G K ROSE
_	R D CHILDERS
,	
·	
· <u>· · · · · · · · · · · · · · · · · · </u>	
, –	
-	
INVESTIGATED BY	C A DUNNAGAN
CHECKED BY	W D FRYE, Jr
	W D FRYE, Jr

APRIL 2011

PERSONNEL



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO. 35609.I.I (R-2519B)

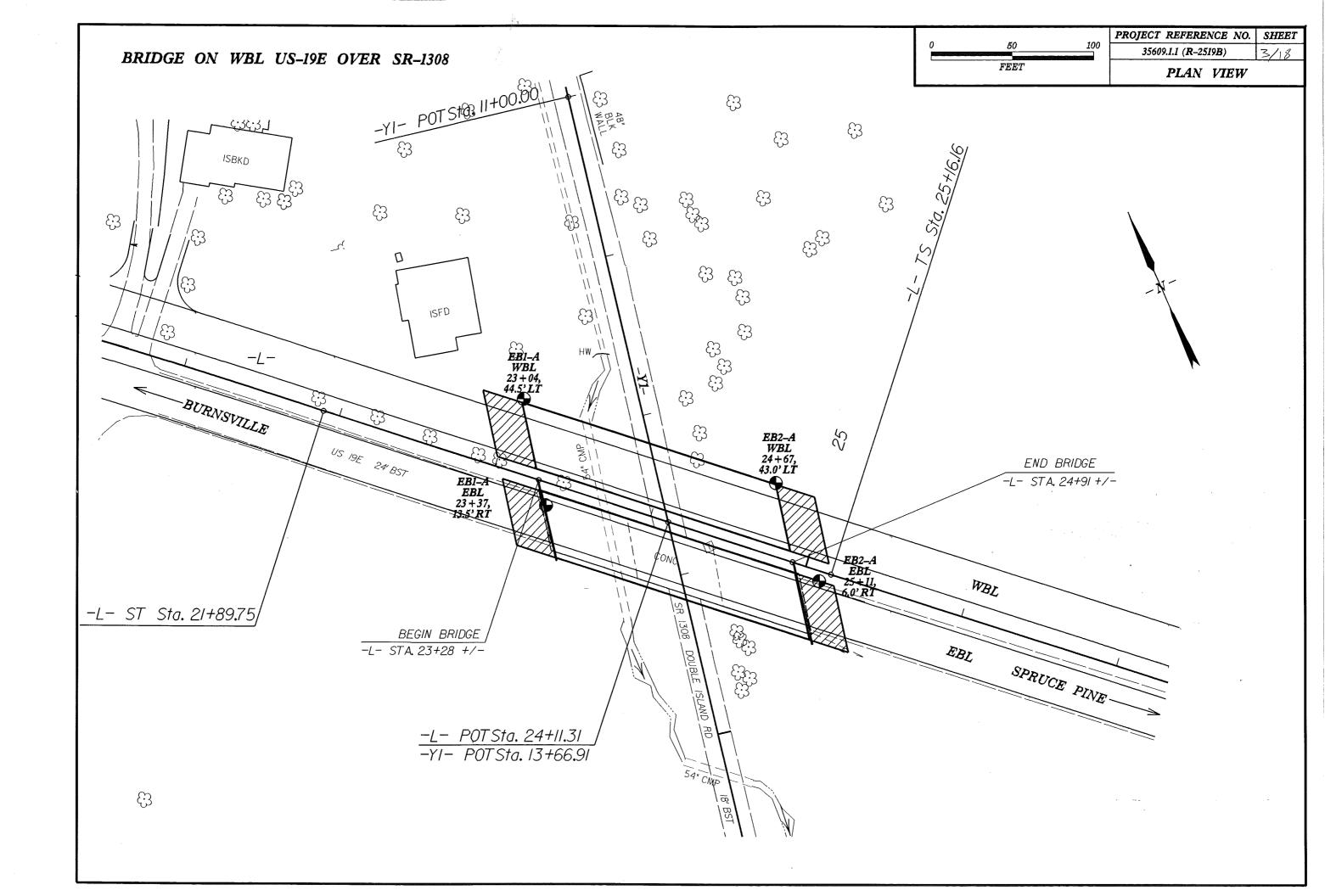
SHEET NO.

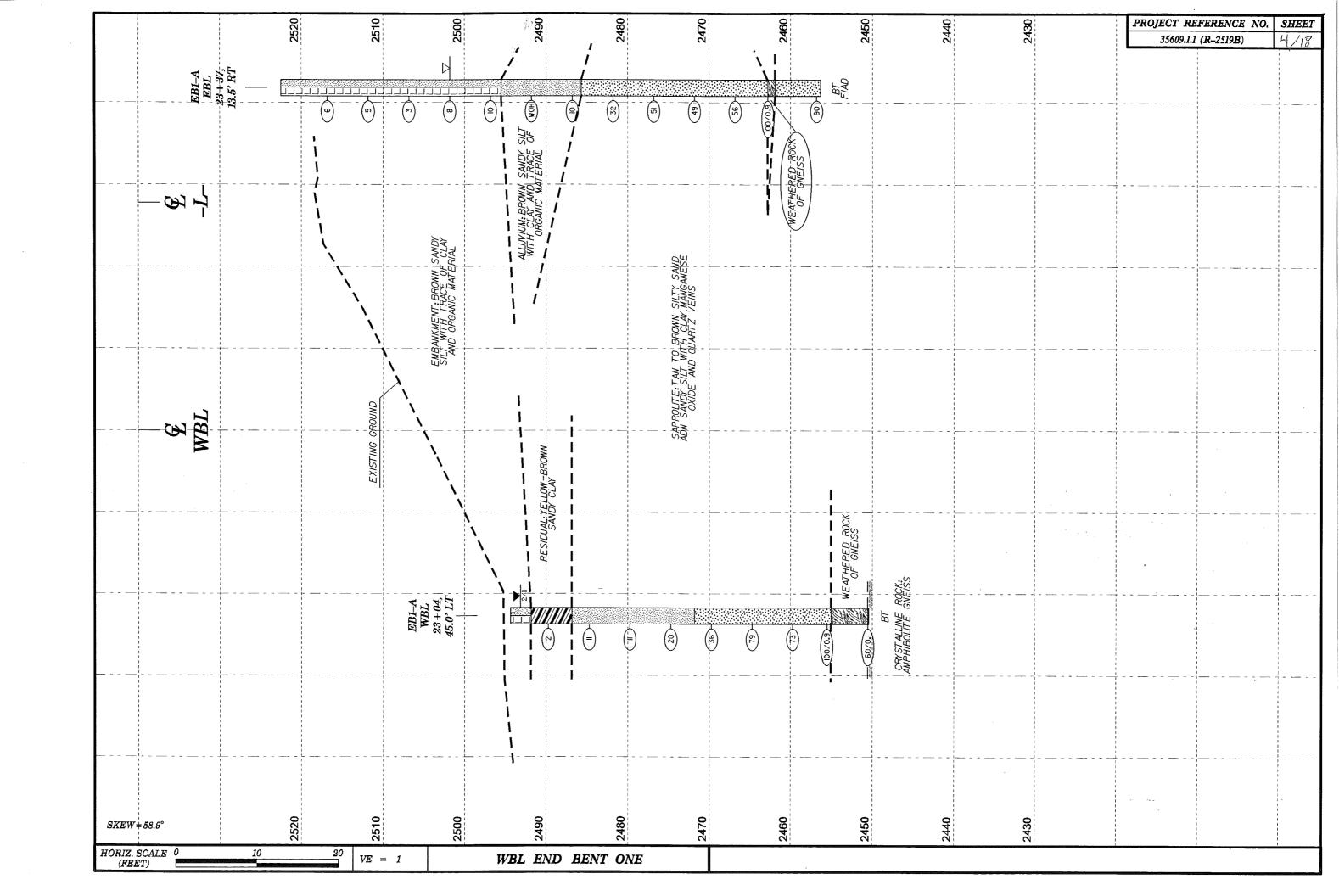
DIVISION OF HIGHWAYS

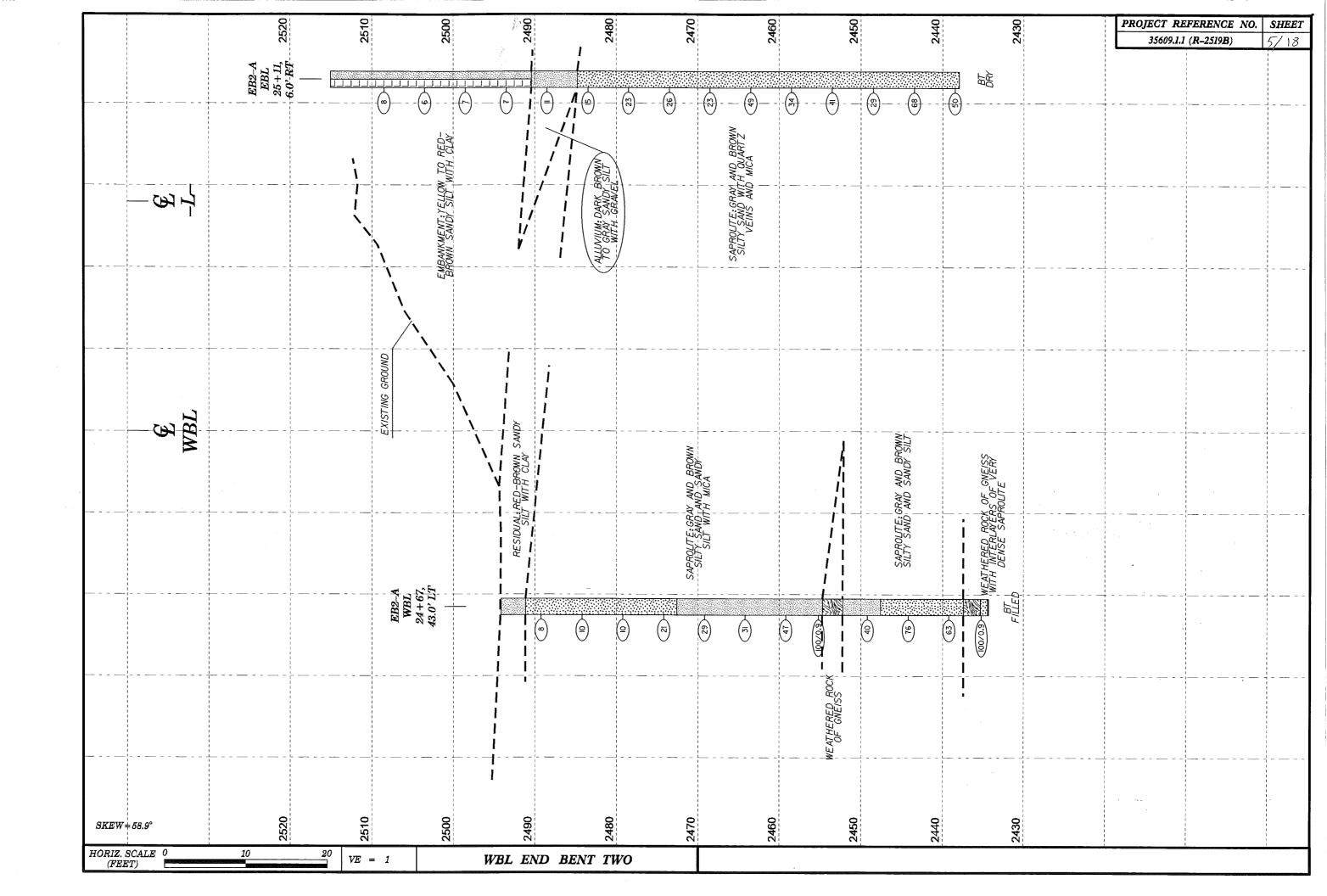
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TEF	MS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV,) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL	PODRLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN & FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ADUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTD SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEDUS - APPLIED TO RUCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STRF, GRA, SLTT CLM, MOST WITH INTERBEDOED FINE SIND LIVERS JISHNY PLUSTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SDIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, DR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) ROCK (WR) ROCK (WR) ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
GENERAL CRANIII AR MATERIALS CILT.CLAY MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS	CRYSTALLINE RDCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (\$\leq 35\% PASSING *200) (> 35\% PASSING *200) ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
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-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	- ROCK (NUR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 2000 000000	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
7. PASSING	HIGHLY COMPRESSIBLE LIOUID LIMIT GREATER THAN 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK STEEL SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
# 10 50 MX GRANULAR SILT- MUCK,	ODCANIC MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
■ 40 38 MX 50 MX 51 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LIDUD LIMIT 48 HX 41 HN 48 HX 41 HN 48 HX 41 HN 48 HX 41 HN SDILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SDME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLISTIC INDEX 6 MX NP 118 MX 110 MX 111 MN 110 MX 110 MX 111 MN 111 MN LITTLE DR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SL).) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE,	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 8 4 MX 8 HX 12 HX 15 HX No HX MODERATE ORGANIC USUAL TYPES STONE FRAGS.		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND FINE SILTY OR CLAYEY SILTY CLAYEY ORIGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI,) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND STILL STI	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE SUBGRADE	E PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MDD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
PI OF A-7-5 SUBGROUP IS ≤ LL - 3Ø ; PI OF A-7-6 SUBGROUP IS > LL - 3Ø	→ O-M SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) POT DHI TEST BORING PESTIGNATIONS	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SDUND WHEN STRUCK, IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
(N-VALUE) (TUNS/FIE)	WITH SOIL DESCRIPTION S - BULK SAMPLE	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANII AB LOOSE 4 TD 18	SDIL SYMBOL AUGER BORING SS - SPLIT SPOON	(SEV.) IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 N/A (NON-COHESIVE) DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER SAMPLE THAN ROADWAY EMBANKMENT - CORE BORING	IF TESTED, YIELDS SPT N VALUES > 100 BPF	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
VERY DENSE >50	ST - SHELBY TUBE SAMPLE SAMPLE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT <2 <6.25 GENERALLY SOFT 2 TO 4 6.25 TO 6.50	MONITORING WELL DO - DOLY CAMPLE	REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. 1F. TESTED, YIELDS SPT. N. VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	PIEZOMETER A PIEZOMETER RT - RECOMPACTED TRIAX		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 . 2 TO 4	ALLUVIAL SOIL BOUNDARY SAMPLE SLOPE INDICATOR	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (RDD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >38 >4	25/825 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARIN ROCK STRUCTURES RATIO SAMPLE	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4,76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD REF—— SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLDGIST'S PICK.	PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
COARSE FINE	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY (BLDR.) (COB.) (GR.) (CSE., SD.) (F. SD.) (SL.) (CL.)	AR - AUGER REFUSAL HI HIGHLY # - MOISTURE CONTENT BT - BORING TERMINATED MED MEDIUM V - VERY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLIP PLANE.
SIZE IN. 12 3	CSE CDARSE NP - NON PLASTIC 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 8.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE CHURCH FOR FIELD MOISTURE	DMT - DILATOMETER TEST ORG ORGANIC γ_d - DRY UNIT WEIGHT DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST WOH-WEIGHT DF HAMMER	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO DR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) PIECE MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO SAP SAPROLITIC FIAD-FILLED IMMEDIATEL F - FINE SD SAND, SANDY AFTER DRILLING	Y SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS SL SILT, SILTY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES SLI SLIGHTLY FRAGS FRAGMENTS TCR - TRICONE REFUSAL	VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH PDINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC SEMISOLID; REDUIRES DRYING TO		FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE, TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER,
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING TERM SPACING IERM IHICKNESS	
COLUD AT COLUMN MOTORIUM MOTORIUM	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	JE HOING VED THICKLY DEDDED A FEET	BENCH MARK: BM#2: SPIKE SET IN 20 WHITE PINE 85.5' RIGHT OF -L- STATION 25+82,75
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	WIDE	ELEVATION: 2512.01 FT.
- DRY - (D) PEOUIRES ADDITIONAL WATER TO	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY " (U) ATTAIN OPTIMUM MOISTURE	BK-51 X 8' HOLLOW AUGERS	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	X CME-45C HARD FACED FINGER BITS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW	TUNG,-CARBIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
LOW PLASTICITY 6-15 SLIGHT	X CME-550 X CASING X W/ ADVANCER HAND TOOLS;	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	er - er -
COLOR	TRICONETUNGCARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	







NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

STATION 23+04	3.9 ft 9/03/2009	OFFSET ANORTHING	801,5	METHO 28/11	L	SOIL AND ROCK ELEV. (ft) -2,494.3 GROUND S	DESCRIPTION DEPTH (SURFACE 0 IBANKMENT
COLLAR ELEV. 2,494.3 ft	9/03/2009 /28/11 DWS PER FOOT	NORTHING	BO1,5 DRILL M TE 02/2 SAMP.	28/11 MOI	L	EASTING 1,046,708 S. Augers H. SURFACE WATER DEPTH SOIL AND ROCK ELEV. (ft) -2,494.3 GROUND S	24 HR. 1.2 AMMER TYPE Automatic N/A DESCRIPTION DEPTH (SURFACE 0 BANKMENT
DRILL RIG/HAMMER EFF/DATE	9/03/2009 /28/11 DWS PER FOOT	COMP. DA	DRILL M	28/11 MOI	L	SOIL AND ROCK ELEV. (ft) SOROUND S GROUND S	AMMER TYPE Automatic N/A DESCRIPTION DEPTH (BURFACE 0 BANKMENT
DRIVE DEPTH BLOW COUNT 0 25 BLOW COUNT 0 25 COUNT COUN	/28/11 DWS PER FOOT	-	SAMP.	28/11 MOI	L	SURFACE WATER DEPTH SOIL AND ROCK ELEV. (ft) -2,494.3 GROUND S	DESCRIPTION DEPTH (SURFACE C DEANKMENT
DRIVE DEPTH BLOW COUNT 0.5ft	WS PER FOOT	-	SAMP.	MOI		SOIL AND ROCK ELEV. (ft) -2,494.3 GROUND S	DESCRIPTION DEPTH (SURFACE 0 IBANKMENT
(ft) ELEV (ft) 0.5ft 0.5ft 0.5ft 0 25		- 1	1 !	моі		ELEV. (ft) -2,494.3 GROUND S	DEPTH (BURFACE (BANKMENT
495 (ft) (tt) 0.5ft 0.5ft 0.5ft 0 25	50	75 100	NO.	V		ELEV. (ft) -2,494.3 GROUND S	DEPTH
2,490.5 3.8 1 1 1 1 2 2			The state of the s	▼ ∇	<u>-</u>		IBANKMENT
490 2,490.5 3.8 1 1 1 1 2 2				V V	- -@[IBANKMENT
2.485.5 8.8				V V			IBANKMENT
2.485.5 8.8				∇			A
405 2.485.57 8.8						2,491.8 Yellow-brown sand	
2,485.5 8.8 4 3 8				Sat.		Yellow-brown	
485 2,485.5 8.8 4 3 8			1			2,486.8	7
+ 4 3 8 ••••						SAPRO	LITE
	I			W	₩‡	Tan silty sand with manganes	e oxide.
					I		
480 2,480.5 13.8 1 3 8 1 . 1				<u>ا</u>	l t	_	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				М	₩Ł		
					F		
475 2,475.5+ 18.8 4 4 16				М	F	-	
					F	2,471.8	2
2,470.5 23.8 12 14 21						SAPRO	LITE
	35			М		 Tan silty sand with trace oxide and qu 	
					W		
465 2,465.5 28.8 16 32 42					₩	_	
10 32 42		74		M	I F	_	
		: : : : :					
460 2,460.5 33.8 33 46 27		72		D	M	-	
		: " ``\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-		鮲		
2,455,57,29,9					斷		
455 2,455.5 38.8 30 70/0.4		100/0.9			<i>y</i>	2,455.0 WEATHERE	ED ROCK
 						Weathered roo	ck of gneiss.
2.450.5 + 43.8						2,450.5	4
60/0.1		60/0.1				-2,450.4/ CRYSTALLI Amphibolite	
‡					<u> </u>	Boring Terminated	d with Standard
					Ιt	Penetration Test Re 2,450.4 ft in amp	
+							
					F		
‡			1			-	
1 1 1 1					ΙĿ		
+					l F	-	
‡					F		
‡							
					<u> </u>	-	
\(\frac{1}{2} \)					F		
						-	
				1	t		
					F		
				1		-	
‡			1	*			



SHEET

\sim	_			\			KEP						·				710
WBS	35609	.1.1			TII	P	R-2519B	,	COUNT	Y YA	NCEY				GEOLOGIST Hager, M. M.		
SITE	DESCR	IPTION	Brid	ge on l	Propos	se	d US-19E	E WBL ov	er SR-13	808.						GROUND V	NTR (ft)
BOR	ING NO.	EB1-	A EBL		ST	LV.	TION 23	+37		OFFS	SET 1	4 ft RT			ALIGNMENT L	0 HR.	20.7
COLI	LAR ELE	V. 2.5	522.5 f		TC	OT.	AL DEPTI	H 66.2 f	t	NOR	THING	801,4	35		EASTING 1,046,694	24 HR.	FIAD
							ME-45 76%				1			D NIW		RTYPE Au	
				1 A	_									1111			ionalic
DRIL	LER C			··		IA	RT DATE			L	P. DA	TE 03/	16/11		SURFACE WATER DEPTH N//	4	
ELEV	DRIVE ELEV	DEPTH		W COL					PER FOOT			SAMP.	▼/	0	SOIL AND ROCK DESC	RIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft) 25		50 .L	75 1	100	NO.	/MOI	G	ELEV. (ft)		DEPTH (ft)
2525																	
	-	-									•		,	ΙF	0001110011001	05	
	1	-	-			Н	1		1	Τ		 			2,522.5 GROUND SURFA ROADWAY EMBANK		0.0
2520	-						1 · · ·			• •	• •			HL	Brown-gray sandy silt with tra material.		
	2.517.8	4.7				$\ \cdot\ $	1:::								material.		
	2,517.0-	- 4.1	1	3	3	П	6					SS-10	М				
2515	_					┞	1			<u> </u>				H#			
	2.512.8-	- 9.7					j:::			::		}		<u> - </u> t			
	-	-	2	2	3		5			$ \cdot $							
2510	-	-				┞				+							
	2,507.8-	- - 14.7					[::::										
	1		1	1	2	•	3		: : : :	::		SS-11	W				
2505	-	-				lŀ	<u> </u>		 					FIL			
	2,502.8	19.7	4	4	4	Ш	'a		: : : :				∇				
2500	1 1		7		7		. ♦ 8		: : : :								
2000	-					╟			 								
	2,497.8-	- 24.7	3	3	7		• • • •										
2495	-	-					. • 10 .							LIF.	2,495.5		27.0
2100	1 7														ALLUVIAL Brown-gray sandy silt with cla	av and trace o	f
	2,492.8-	- 29.7	WOH	WOH	WOH	Ц					: :		w		organic material		
2490		-			ĺ	ĺΤ	<u>```</u>]			Ŀ	•		
						lΓ	¥ · · ·			· · ·				₩F			
	2,487.8-	- 34.7 -	5	6	4		· \ · · ·		: : : :			SS-12	М	-			
2485				.			•	· i · · · ·							2,485.7 SAPROLITE		36.8
	2.482.8-	30.7				П		1						t	Brown silty sand	l.	
	2,402.0	- JJ./	7	11	21	11		32				SS-13		W.F	•		
2480	-					╟		. /		1.				M.			ŀ
	2.477.8-	44.7															
			10	21	30	П			51						•		
2475	-	-				┞			-	+				-	•		
	2,472.8	49.7	13	16	33]					WF.			
2470	1	ļ	13	16	33				49	: : :							
2470	-	<u> </u>				ᆘ			<u> </u>	.				*			
İ	2,467.8-	54.7	9	26	30	$\ \cdot \ $			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \								
2465] -	F		"	,	П			●56					W.F			
1]]	T							1	1				₩ T	0.400.0		
	2,462.8-	59.7_	42	58/0.4							``\				2,462.8 2,461.9 WEATHERED RO	СК	59.7 60.6
2460	_	L				lL					100/0.9			MŁ.	Weathered rock of g SAPROLITE	nelss.	J
	. 457.0	F								.	/-]			W -	Brown silty sand	l.	
	2,457.8-	04./	20	38	52	$\ $: : : :		90			#	2,456.3		66.2
	_	ļ —				Γ				•				T	Boring Terminated at Elevation very dense saprol	on 2,456.3 ft in	n
	-	ţ												E	very dense saproi	ite.	
	-	+												F	•		
	-	F												F			
	-	ţ															
	-	ţ												E			
L	1	L	L	<u> </u>		1_						L	L	Ш.			

NCDOT GEÖTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 356	09.1.	1			TI	P R-2519B	COUNT	Y YANCEY				GEOLOGIS	ST Hager, N	Л. M.		
SITE DES	CRIPT	ION	Brid	ge on	Propo	sed US-19E WBL o	ver SR-13	08.				,		<u></u>	GROUN	ID WTR (ft
BORING N						TATION 24+67		OFFSET 4	13 ft LT	-		ALIGNMEN	NT L		0 HR.	N/A
COLLAR E	LEV.	2,4	94.11	ft	TO	OTAL DEPTH 59.8	t	NORTHING	801,3	92		EASTING	1,046,829		24 HR.	FILLED
						CME-550X 81% 09/03/2					D H.	S. Augers		НАММ	ER TYPE	Automatic
DRILLER						TART DATE 03/01/		COMP. DA					WATER DEF	<u></u>		
DDI				W COI			PER FOOT		SAMP.	-	1 L I	SURFACE	WATER DEF	111 11/	^	
(f) ELE	V 107	PTH ft)	0.5ft		0.5ft		50	75 100	NO.	17	0		SOIL AND RO	CK DESC	CRIPTION	
(ft) (ft)	+	-	0.511	0.510	0.511	T T	T		140.	/MOI	G	ELEV. (ft)			·····	DEPTH (
						_			1							
2495	_	l									╽╶┟	2,494.1	GROUN	ID SURFA	ACE	C
	‡	1					T	7				-	RE	SIDUAL		
	Ì	4	~				: : : :	: : : :				2,491.1	Red-brown s			3
2490 2,490	1.2 <u>T</u> _3	1.9	2	3	5	AR R	-			М				PROLITE ay silty sa		
	Ţ			-			: : : :	: : : :				-	· ·			
2485 2,485	. ‡ .						::::					•				
2,485	'11°	.9	4	5	5	. •10	 	1		м		-				
	Ŧ				-	-						-				
2480 2.480	, 1,	ا ۵					: : : :					-				
2400 2,400	" †"	3.3	2	5	5	. •10		1		w		_				
	ł					::\:: ::::	1::::	::::			M	-				
2475 2,475	12 T 18	8.9										-				
-110	Ŧ		- 5	10	11	•21		1		w		-				
	İ	1				::::\ ::::						- 2,472.6	SAF	ROLITE		21
2470 2,470).2 I 2:	3.9										-	Gray to tan sa			
	Ŧ		6	11	18	•29				М		-				
	1					:::: \:::	: : : :					-				
2465 2,465	2 2	8.9								1		-				
	Ţ		6	17	14				1	М		-				
	‡					:::: :\::\::						- -				
2460 2,460	3:2	3.9										-				
	Ŧ		12	23	24		47			M		_ -				
1	‡						: ```;	L::::				-				
2455 2,455	5.2 <u>†</u> 38	8.9	0.5	7510.4				· · · · ·				- - 2,454.7				39
,	+	i	25	75/0.4				- 100/0.9	'			-	WEATH Weathered	ERED RO		
	Ţ	1				- مر: ا نا نا ا	+	+			1964	2,452.2		PROLITE	•	41
2,450	1.2 4:	3.9	6	13	17							<u>-</u>	Gray to be			
	+		Ü	13	''	●30	1::::					-				
	Ŧ	l								[-				
2,445	52 4	8.9	6	13	17					М		<u>-</u>				
	‡		Ü		''	30	: : : :			"		- -				
ŀ	+	ı				:::: :::	N.:::					-				
2,440).2 5	3.9	18	25	40		•65			D		_				
	‡	-					· · • •					- 2,437.4				56
	‡ .						: : -:					- - 2,435.3	WEATH Weathered	ERED RO		59
2435 2,43	5.2 5	8.9	21	79/0.4			 	100/0.0				2,434.4	SAI	PROLITE		58 59 1 59
	‡	1]			100/0.9				- 2.434.3/	Gray to b	rown silty	sand.	
	‡									1		-	WEATH Weathere	IERED RO		1
¥	+											— Во	ring Terminate	d at Eleva	tion 2,434	.3 ft
	Ŧ									1		-	weathered	I TOCK OF (ji leiss.	
	‡	-								1		-				
	+									1		_				
	Ŧ									1.		-				
	‡									1		-				
	±										1	_				
	Ŧ											-				
	İ	l										- - ·				



WBS	35609	9.1.1			Т	ΊP	R-2519B	COUNT	Y YANCE	,			GEOLOGIST Hager, M.	Μ.		
SITE	DESCR	IPTION	l Brid	lge on	Propo	ose	ed US-19E WBL ov	er SR-13	08.						GROUN	D WTR (ft
	ING NO.						ATION 25+11		OFFSET	6 ft RT			ALIGNMENT L		0 HR.	N/A
COL	LAR ELI	EV . 2,	515.0	ft	T	ОТ	TAL DEPTH 77.0 f		NORTHING	801,3	327	-	EASTING 1,046,829		24 HR.	Caved
							ME-45 76% 09/03/2009					D N\	.l	HAMM	J	Automatic
DRIL	LER R	lose, G	. K.		s	TA	ART DATE 03/07/1	1	COMP. DA				SURFACE WATER DEPT			-
ELEV	DRIVE	DEPTH	T	ow co		П		ER FOOT		SAMP.	V /					
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	1	0 25 5	50	75 100	NO.	МОІ	0 G	SOIL AND ROCK ELEV. (ft)	DES	CRIPTION	DEPTH (f
						П								-		
2520						П										-
	-	F				Ш						F	•			
	-	F								Ì			. ~			
2515			ļ			\mathbb{H}		I	T	<u> </u>	ļ	1 800	2,515.0 GROUND ROADWAY EI			0
	-	ļ				$\ $							Yellow to red-brown			ıy.
2510	-	‡							: : : :				•			
2010	2,509.5	5.5	2	3	5	╂			1		М		-			
		t					.7		1::::		IVI					
2505	0 E04 P-	105		İ	-								<u>. </u>			
	2,504.5	10.5	3	2	4	1[6						- •			
		F						: : : :				F	•			
2500	2.499.5	15.5				┰							-			
	-	<u> </u>	2	3	4	$\ \ $	∮ 7	: : : :	: : : :		w		•			
	-	Ł							::::			ᄩ				
2495	2,494.5	20.5	WOH	3	4	┦┝						- [-			
	-	F	WOR		4		· 7				Sat.		•			
2490	-			!			17:11	: : : :					· 2,490.4			24
2490_	2,489.5	25.5	4	6	5	┨├	1. 1		1		Cot		ALLU Dark brown to gray s		ilt with aray	
	_	t		_			• • • • • • • • • • • • • • • • • • • •				Sat.	æŁ	Dark brown to gray s	ariuy S	all Willi Grav	ci.
2485			· .				14:					F	_ 2,484.8			30
	2,484.5	30.5	13	11	4						w		SAPRO	DLITE		-
	1						1.1.						Dark gray and brown veins ar	sifty sa d mica	ana witn qua a.	artz
2480	2,479.5	35.5				\parallel						li it	-			
			5	10	13	11	23				w	w				
						Ш					-	₩				
2475	2,474.5	- 40.5		10	10	╁			+			F	- -			_
	1	-	4	10	16	$\ $	26					4				
2470	-	-							::::			*				
L410	2,469.5	- 45.5 -	9	11	12	$\{ \mid \cdot \mid$			1			Mt.	-			
	1	-			-				: : : -			斷				
465	[[• • • •			₩				
	2,464.5	5U.5	15	26	23	11		49				#	-			
	1						:::: ::::/					#				
2460	2.459.5	- - 55.5					····/·	• • • •	1			**	-			
Ì	-	-	12	17	17		34 ∶		: : : :			鮲				
	}	<u>.</u>					:::::::\:\:\:\:		::::							
455	2,454.5	- 60.5		17	24	∤├	1.7		+			III.	- -			
	1	-	6	17	24							#				
2450	‡	,					:::: ::/::		::::							
1.00	2,449.5	65.5 -	7	10	19	$\{ \mid$			†l			鮲	-			
	f						29		1::::1			計				
2445	2444.5	70.5						<u>.</u>	<u> </u>				_			
	2,444.5	70.5	17	33	35				8			#	-			
	‡	-						/				鮴				
2440	+	- [·/· · ·				₩				



2 / v

BORELO BORELO	OG REPORT				3/1
WBS 35609.1.1	TIP R-2519B	COUNTY YANCEY	,	GEOLOGIST Hager, M	1. M.
SITE DESCRIPTION Bridge on Pr	roposed US-19E WBL ov	ver SR-1308.			GROUND WTR (ft)
BORING NO. EB2-A EBL.	STATION 25+11	OFFSET (6 ft RT	ALIGNMENT L	0 HR . N/A
COLLAR ELEV. 2,515.0 ft	TOTAL DEPTH 77.0 ft	NORTHING	801,327	EASTING 1,046,829	24 HR. Caved
DRILL RIG/HAMMER EFF/DATE AFO	1045 CME-45 76% 09/03/2009	9	DRILL METHOD NV	V Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Rose, G. K.	START DATE 03/07/1	1 COMP. DA	TE 03/08/11	SURFACE WATER DEP	TH N/A
ELEV (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)		PER FOOT 50 75 100	SAMP. L O NO. MOI G	SOIL AND RO	CK DESCRIPTION DEPTH (ft)
2440 2439.5 75.5 24 27	Matcl	h Line			
2,439.5 75.5 24 27	23	50		2,438.0	77.0
					at Elevation 2,438.0 ft in use saprolite.
				-	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT

	SOI	LS TES	REPORT-	SOILS LA	ABOKA	TORY	
T.I.P. ID #: R	-2519B						
REPORT ON SAMPI	ES OF: Soil	for Qualit	y			· · · · · · · · · · · · · · · · · · ·	
PROJECT:	35609.1.1	(COUNTY: Y	ancey		Owner: NCDO	T
DATE SAMPLED:	3.2. & 3.3.11		E RECEIVED:		T	DATE REPORTEI	D: 3.8.11
SAMPLED FROM:	Bridge		SAMI	PLED BY:	C. A. Dı	ınnagan	
SUBMITTED BY:	W. D. Frye				2006		SPECIFICATION
LABORATORY:	Asheville						
					34,	, et	
			TEST RI				
Project Sample No.	SS-1	SS-2	SS-3	SS-4			
Lab Sample No. A	166099	166100	166101	166102			
HiCAMS Sample #			0.0	0.0	-		
Retained #4 Sieve % Passing #10 Sieve %	97	90	100	99			
Passing #40 Sieve %	89	82	97	84			
Passing #200 Sieve %	51	57	22	26			
1 assing #200 Sieve 70	1 31 1			1			
		ľ	MINUS #10	FRACTIO	N		
Soil Mortar - 100%							
Coarse Sand -Ret. #60	20	16	17	33			
Fine Sand - Ret. #270	35	26	70	50			
Silt 0.05-0.005 mm %	21	24	9	13			
Clay < 0.005 mm %	24	34	4	4			
Passing # 40 Sieve %							
Passing # 200 Sieve %							
i.						· · · · · · · · · · · · · · · · · · ·	
Liquid Limit	36	42	33	26			
Plastic Index	NP NP	NP	NP	NP	<u> </u>		
AASHTO Classification	A-4 (3)	A-5 (4)	A-2-4 (0)	A-2-4 (0)	_		
Quantity	1			 			
Texture Station	25+32	25+32	25+32	25+32			
Hole No.	23132	23+32	23132	23132		 	
Depth (ft) From:	5.8	25.8	35.8	60.8			
To:	6.8	26.8	36.8	61.8			
	OK	OK	OK	OK			
Remarks:	· · · · · · · · · · · · · · · · · · ·		***************************************				
A-166099 - 166102							
CC:	,						
C. A. Dunnagan							
File							
FIIC				 			
							· · · · · · · · · · · · · · · · · · ·
				L			

8-19-2000

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-2519B							
REPORT ON SAM	PLES OF: Soils	for Quality						
						<u></u>		
PROJECT:	35609.1.1	COUNT	Y: Yai	ncey		Owner:	NCDOT	· <u>·</u> ·
DATE SAMPLED:	3.14-3.16.11	DATE RECI	EIVED:	3.17.11		DATE REI	PORTED:	3.24.11
SAMPLED FROM:	Bridge		SAMPI	LED BY:	C. A. I	Dunnagan		
SUBMITTED BY:	W. D. Frye				2006	STAN	DARD SPE	ECIFICATION
LABORATORY:	Asheville		•	,				

			TEST RE	ESULTS				
Project Sample No.	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11	SS-12
Lab Sample No. A	166198	166199	166200	166201	166202	166203	166204	166205
HiCAMS Sample #								
Retained #4 Sieve %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passing #10 Sieve %	98	93	97	97	94	97	97	94
Passing #40 Sieve %	88	85.	88	86	89	89	89	85
Passing #200 Sieve %	46	48	53	29	33 ,	48	58	54

		M	INUS #10 I	FRACTION	V			
Soil Mortar - 100%								
Coarse Sand -Ret. #60	23	18	17	26	17	17	17	18
Fine Sand - Ret. #270	38	. 39	34	56	60	43	31	31
Silt 0.05-0.005 mm %	23	23	23	14.	21	22	23	27
Clay < 0.005 mm %	16	20	26	4	2	18	29	24
Passing # 40 Sieve %								
Passing # 200 Sieve %								

Liquid Limit	39	42	35	32	27	37 ·	38	35
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-4 (2)	A-5 (3)	A-4 (4)	A-2-4 (0)	A-2-4 (0)	A-4 (3)	A-4 (5)	A-4 (4)
Quantity						• .		
Texture								
Station	23+40	23+40	23+40	23+40	23+40	23+37	23+37	23+37
Hole No.							:	
Depth (ft) From:	30.4	5.4	35.4	40.4	50.4	5.2	15.3	35.2
To:	31.4	6.4	36.4	41.4	51.4	6.2	16.3	36.2
	OK	OK	OK	OK	OK	OK.	OK	OK

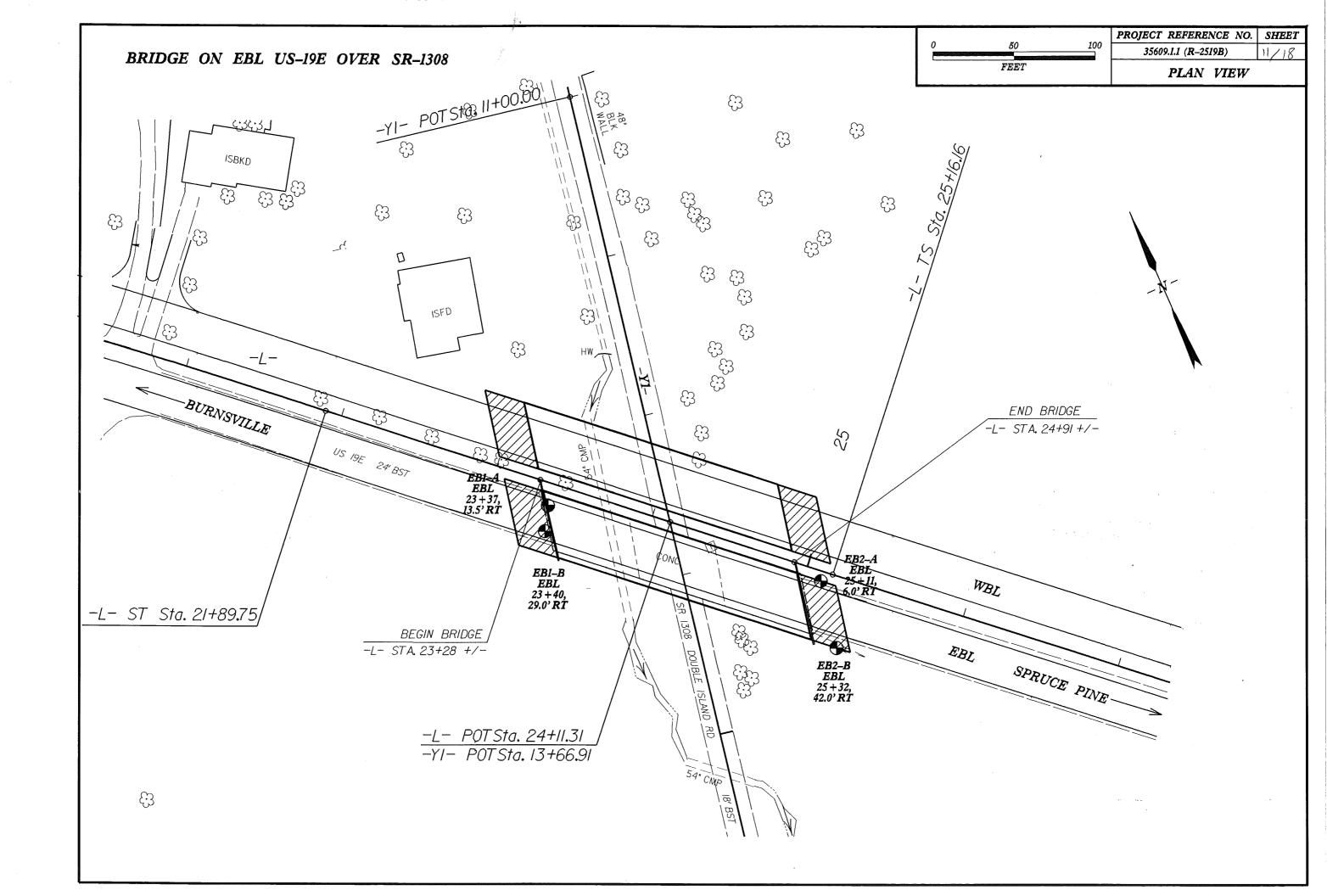
	V 1	 	 	 	
Remarks:					
A-166198 - 166205				 	
CC:				 	
C. A. Dunnagan					
File					
	,				

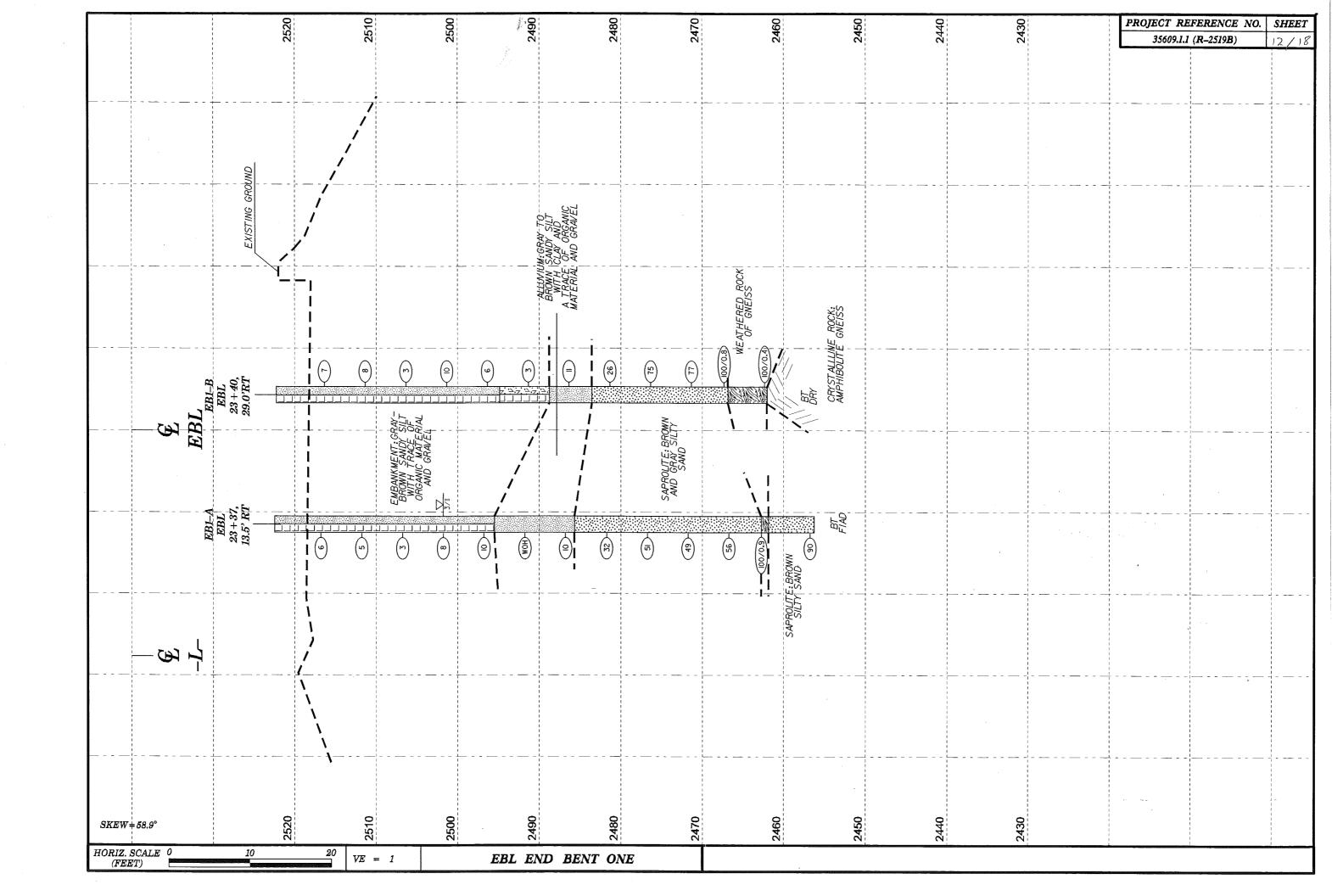
SOILS ENGINEER:	

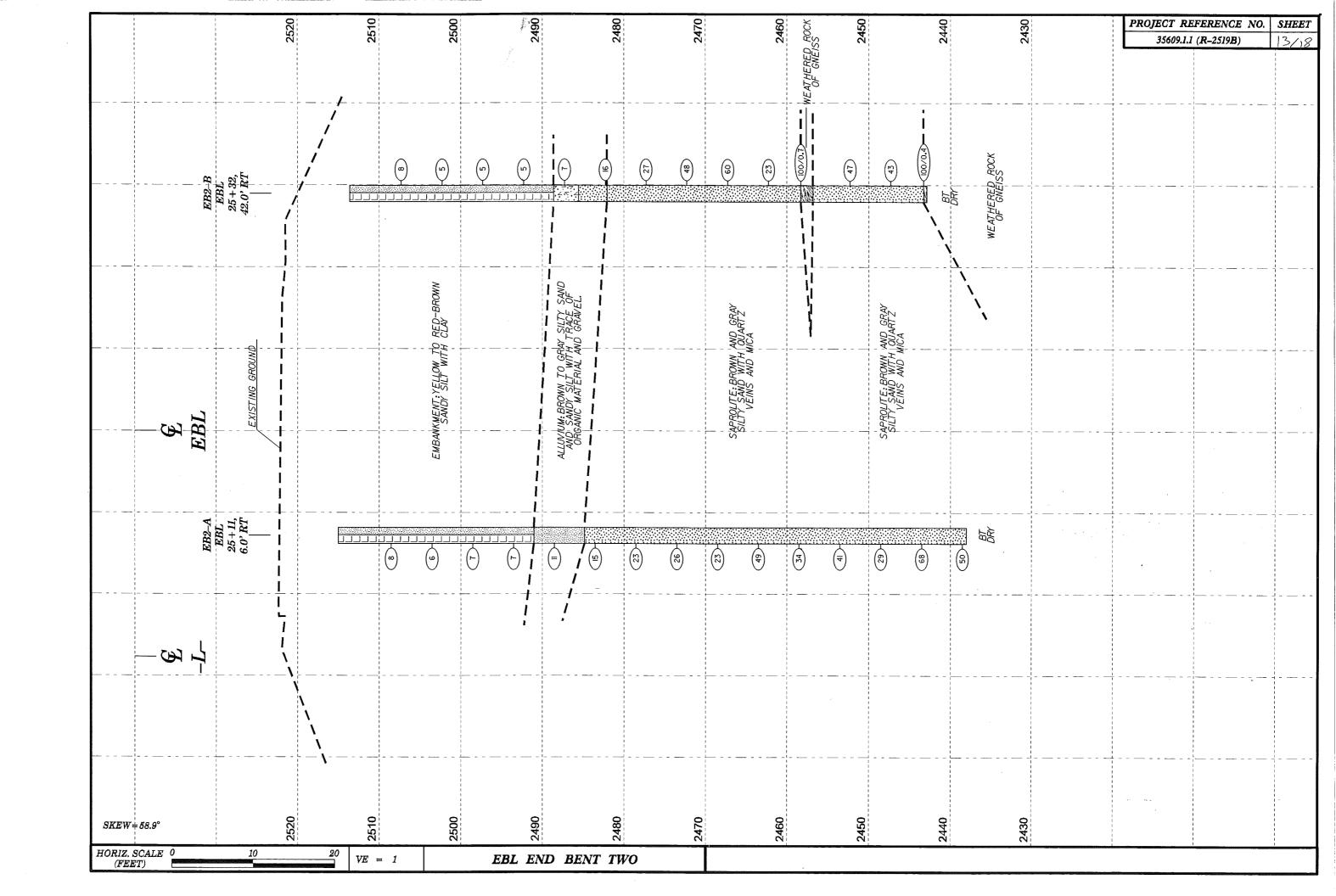
SOILS ENGINEER:

JCS NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R	-2519B	.:						
REPORT ON SAMPI	LES OF: Soils to	or Quality		·	····			
PROJECT:	35609.1.1 (cont.)	COU	NTY: Y	ancov		Owner: NC	DOT	
DATE SAMPLED:	3.16.11	DATE RE				ATE REPORT		111
SAMPLED FROM:	Bridge	DATERE		PLED BY:	C. A. Dun		2. 3.2	
SUBMITTED BY:	W. D. Frye		DINI	, DED DI	2006		D SPECIFIC	CATION
LABORATORY:	Asheville				1 - 5 - 5			
<u> </u>	1 12020 (220							
		T	EST RI	ESULTS				
Project Sample No.	SS-13							
Lab Sample No. A	166206							
HiCAMS Sample #								
Retained #4 Sieve %	0.0		· · · · · · · · · · · · · · · · · · ·	ļ				
Passing #10 Sieve %	99							
Passing #40 Sieve %	75			ļ				
Passing #200 Sieve %	24							<u> </u>
		MIN	TIC #10	FRACTIO)N			
Soil Mortar - 100%		IVIII	05 #10	KACIK				<u> </u>
Coarse Sand -Ret. #60	43					-		
Fine Sand - Ret. #270	40							
Silt 0.05-0.005 mm %	13							
Clay < 0.005 mm %	4							
Passing # 40 Sieve %								
Passing # 200 Sieve %								
Liquid Limit	25							
Plastic Index	NP							
AASHTO Classification	A-2-4 (0)							
Quantity				ļ				
Texture				ļ				
Station	23+37			ļ				
Hole No.	10.2			 				
Depth (ft) From:	40.2			ļ				
То:	41.2 OK			-				
Remarks:	I UK I			1				
A-166206 CC:								
C. A. Dunnagan				1				
File			-	<u> </u>				
FILE								
				1				
				I				
COM CENCIMEED								









NBS 3	35609	.1.1			TI	IP R-251	9B	COUNT	Y YANCE	Υ			GEOLOGIST Hager, M	. M.		
SITE DE	ESCR	PTION	Brid	ge on	Propo	sed US-1	9E EBL ove	er SR-130)8						GROUN	D WTR (f
BORING	G NO.	EB1-	A EBL		S	TATION	23+37		OFFSET	14 ft RT			ALIGNMENT -L-		0 HR.	20.
COLLA	R ELE	V. 2,	522.5 1	ft	T	OTAL DE	PTH 66.21	ft	NORTHIN	G 801,4	135 .		EASTING 1,046,694		24 HR.	FIA
DRILL RI	IG/HAN	IMER E	FF./DA	TE AF	O1045	CME-45 7	6% 09/03/200	9	1	DRILL I	METHO	D N	W Casing w/ SPT	HAMME	R TYPE	Automatic
ORILLE	R CI	neek, D). O.		S.	TART DA	TE 03/16/1	11	COMP. DA				SURFACE WATER DEP	TH N/A	١	
LEV/ D	RIVE	DEPTH		W COI	UNT	П	BLOWS	PER FOOT	-	SAMP.	V /	11				
(4)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	МО	0 G	SOIL AND ROC ELEV. (ft)	X DESC	RIPTION	DEPTH
									•					-		
2525					İ						ĺ					
.020		-											-	OUDEA	05	
	1	-				 	• • • • •	T		 			- 2,522.5 GROUND - ROADWAY I	MBANK	MENT	
2520	_	-											Brown-gray sandy s	ilt with tra terial.	ce of orga	nic
2,	,517.8-	- - 4.7				: : :							- -			
).E4.E	1	-	1	3	3	6				SS-10	М		- -			
2515	1	_				-		 		1		F	- -			
2.	512.8	- <u>9.7</u> -	2	2	3		: : : : :		.				- -			
510	_	-				T °		1					- -			
2	.507.8	- 147					.		.				<u>-</u>			
		- 14.1	1	1	2	•3				SS-11] w		-			
505	4					 	1	1		1			-			
2,	,502.8	- - 19.7	,			':;:::	: : : : :	: : : :					<u>-</u>			
500	1	-	4	4	4	. ♦8					_W_	ŁM	- -			
500	-	_				 		+		11		F	_ -			
2,	.497.8	- 24.7	3	3	7	: <u> :</u>	: : : : :	1					<u>.</u>			
495	-				'	1. 10	: : : : :						- 2,495.5	10041		:
	.492.8	- - 29.7											 Brown-gray sandy si 			e of
-	,492.8- -	29.7	MÓH	WOH	WOH	0	: : : : :				w		organio	material	•	
490	4	_				\		1		11			- -			
2,	.487.8	- - 34.7]							- -			
105		-	5	6	4	10	<u>. .</u>			SS-12	М		- - 2,485.7			- ;
485	-	-				 	77	 		11			SAPI	ROLITE silty sand		
2,	482.8	- 39.7	7	11	21		- -			CC 12	-		-	only ourid		
480	7	-	·	.,			32			SS-13	1		- -			
	7	-						1		1 .			 -			•
12,	.477.8	- 44.7 -	10	21	30	:::		51					- -			
475		-				• • •		1					- 			
2	472.8	- - 49.7				:::	. .	1::::	.				<u>-</u> -			
	-	•	13	16	33	11 : : :	: : : : :	49	: : : : :				<u>-</u>			
470	7							1	+	11			_			
2.	.467.8	- 54.7	9	26	30	:::		[]					-			
465	1		9		30	:::	: : : : :	●56					- -			
	=	-			[· · · ·	. \	1			<u>-</u>			
2.	.462.8	- 59.7 -	42	58/0.4	-	:::	:			lacksquare		200	_ 2,462.8 _ 2,461.9 WEATHE			
460	£	_							100/0.9]			- Weathered			
	.457.8	- 647							/					silty sand		
1	-8,\u+,	- 04./	20	38	52		<u> </u>		90				2,456.3			
		_					-						Boring Terminated a very den	t Elevatio	n 2,456.3 te.	
	1	-											- Yeiy uen -	25 Saproll		
}	1	-											- -			
	4	_			}	I							<u>.</u>			
	7	-											-			
	1	_				1						1 [- -			



14/1

SHEET

	/			\		KEPUKI	T						14/1
	35609					P R-2519B	<u> </u>	Y YANCEY				GEOLOGIST Hager, M. M.	
						sed US-19E EBL ov	er SR-130				-		GROUND WTR (ft)
	NG NO.					TATION 23+40		OFFSET 2				ALIGNMENT -L-	0 HR. N/A
	AR ELE					OTAL DEPTH 60.3	·	NORTHING			_	EASTING 1,046,686	24 HR. N/A
DRILL	. RIG/HAI	MER E	FF/DAT	re af		CME-45 76% 09/03/20					WN C	Casing w/ SPT HAMMI	ER TYPE Automatic
DRIL	LER C	hilders,				ART DATE 03/14/	11 .	COMP. DAT				SURFACE WATER DEPTH N/	A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W COL	JNT 0.5ft	0 25	PER FOOT	75 100	SAMP. NO.	MOI	O G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft)
2525		- -						•		é ?		2,522.2 GROUND SURFA	CE 0.0
0500	-		-			1::::	T::::					ROADWAY EMBANI	MENT
2520	2,517.3 - -	- - - 4.9 -	2	3	4	• · · · · · · · · · · · · · · · · · · ·			SS-5	М		Gray-brown sandy silt with tr	ace or gravei.
2510	2,512.3	-	2	3	5	8				М		,	
2505	2,507.3	14.9 - - -	1	1	2	4 3							
2500	2,502.3		2	5	5	. •10							
2495	2,497.3	-	2	3	3	6,						2,494.8 ROADWAY EMBANI Gray-brown sandy silt with tr	
2490	2,492.3	29.9	1	2	1	3			SS-6	w		2,488.7 ALLUVIAL	33.5
2485	2,487.3	34.9	3	4	7	. •11			SS-7	M		Dark gray to brown sandy silt trace of organic material and 2,483.5	with clay and a rounded gravel.
2480	2,482.3	39.9	5	7	19	26			SS-8	М		, SAPROLITE Gray silty sand	
2475	2,477.3	44.9	18	27	48			75					
2470	2,472.3	49.9	28	37	42			79	SS-9				٠
2465	2,467.3	54.9	28	41	59/0.3			. 100/0.8				2,466.8 WEATHERED RO Weathered rock of g	
	2,462.3	59.9	100/0.4				(NOTE: 60.2	100/0.4 2'-60.3'@ 60/0.1)				2,462.0 2.461.9 CRYSTALLINE R Amphibolite gnei Boring Terminated at Elevati amphibolite gnie	ss. on 2,461.9 ft in



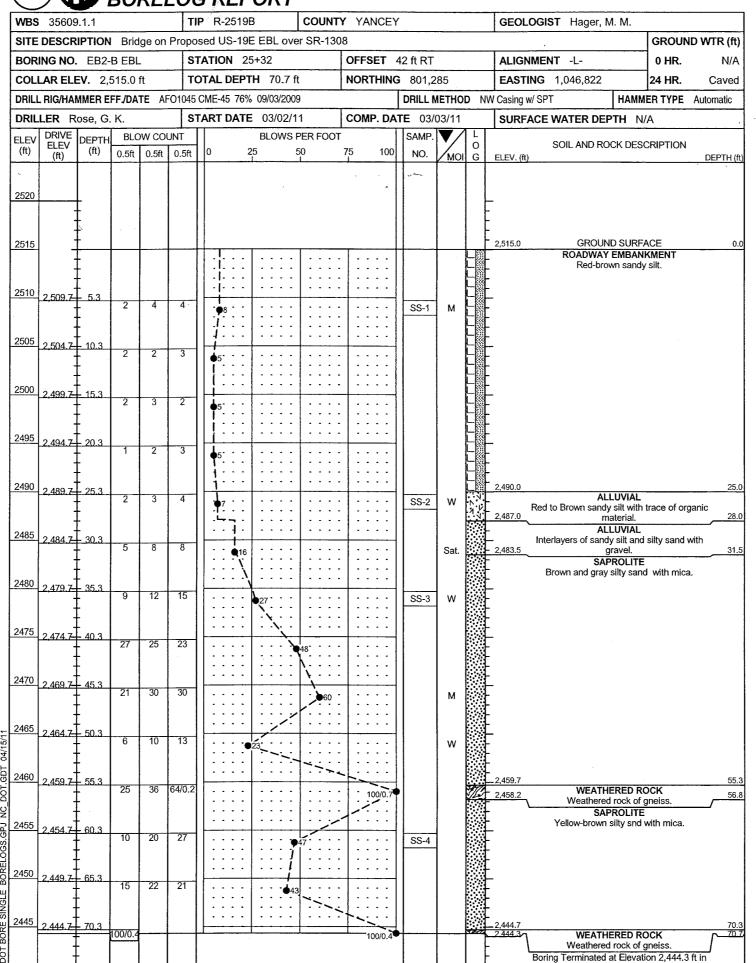
							R-2519B		Y YANCE	1			GEOLOGIST Hager,	141. 141.	
SITE	DESCR	IPTION	Brid	ge on	Propo	sed	US-19E EBL o	ver SR-130)8						GROUND WTR (
BORI	NG NO.	EB2-	A EBL		S	TATI	ON 25+11		OFFSET	6 ft RT	***		ALIGNMENT -L-		0 HR. N/
COLL	AR ELE	EV. 2,	513.6	ft	TO	IATC	L DEPTH 77.) ft	NORTHIN	G 801,3	327		EASTING 1,046,829		24 HR. Cave
DRILL	RIG/HAI	MMER E	FF./DA	TE AF	O1045	CME	-45 76% 09/03/2	009		DRILL	METHO	N QC	W Casing w/ SPT	HAMN	MER TYPE Automatic
DRILL	ER R	ose, G.	K.		S	TAR	T DATE 03/07	7/11	COMP. DA				SURFACE WATER DI		·
ELEV	DRIVE	DEPTH	BLC	W CO	JNT	П	BLOW	S PER FOOT		SAMP.	_	11		•	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	МО	0 1 G	SOIL AND F ELEV. (ft)	OCK DES	CRIPTION DEPTH
2515													:		-
	-					Ц.				<u> </u>	<u> </u>			IND SURF	
	-					:	:						- ROADWA - Yellow to red-br	Y EMBAN own sandy	
2510	-	-				-							-		
-	2,508.1	5.5	2	3	5	:	<u> </u>				l		-		
2505	1	-	-	0		:	8				М		_		
2505	_	-				H			 	11		F	-		
ŀ	2,503.1	10.5	3	2	4			-					- -		
2500	+	-	İ										-		
	2.498.1	15.5						-					- -		
	-,	-	2	3	4	4	7	: : : : :			w		- -		
2495	4	-							1				- -		
_	2,493.1	20.5	WOH	3	4	:		.					<u>.</u>		
	1	-	WOR	3	4		7	: : : : :			Sat.	F	<u>-</u>		
2490	+	-				-	 								24
F	2,488.1	25.5	4	6	5			.	: : : :		Sat.			LLUVIAL	
2485	7	-				:	T 13 : : : :	: : : : :	: : : :		Sal.		_ Dark brown to gr	ay sanuy s	siit with graver.
	2,483.1	30.5				-	1		 	[- - 2,483.4		30
r	2,403.11	- 30.5	13	11	4	:	. 15		: : : :		w		- SA	PROLITE	
2480	1	- 1				Ŀ	• • • • • • • •		<u> </u>				Dark gray and bro	is and mica	and with quartz a.
	2,478.1	35.5				:	\cdots	: : : : :			İ		-		
	1	_	5	10	13		23	.			w		- -		
2475	4	-	ĺ			j.							-		
ŀ	2,473.1	40.5	4	10	16	:			: : : :				• •		
2470	1	-				:	726	: : : : :					•		
		. ,,,				-							-		Name .
ľ	2,468.1	45.5	9	11	12	:	23	: : : : :	: : : :						
2465	‡	-				Ŀ	\						- _		
Ŀ	2,463.1	50.5				:		-					-		
	+	-	15	26	23	:		49					•		•
2460	4	-				F		,	1				.		
F	2,458.1	55.5	12	17	17	:		: : : : :					• •		
2455	‡	:	.			:	. ¶34	: : : : :	: : : :			M	.		
. 700	, ₄₅₀ . ‡					-	\.		 				_ •		
ľ	2,453.1	60.5	6	17	24	:		.	::::			M			
2450	1	_					• • • • • • • • • • • • • • • • • • • •					M	<u>. </u>		
يا	2,448.1	65.5					::: 7	.				W	= •		
	Ŧ	· 1	7	10	19	-	629 .						•		
2445	7	.	1			ļ.	• • • • • • • • • • • • • • • • • • • •		ļ · · · ·			i i	· -		
نإ	2,443.1	70.5	17	33	35]:			: : : :			 	•		
. 1	1	:		~	~	:			8			₩			
2440							,								
2440	2.438.1	75.5				·		/					-		



. -- (.

		.1.1			"	P R-25	190	l con	NTY YA	NCEY				GEOLOGIST	i ilayei, i	/1. IV1.		
TEI	DESCRI	PTION	Brid	ge on	Propo	sed US	-19E EB	L over SR-1	308								GROUN	ID WTR (ft
ORI	NG NO.	EB2-	A EBL		S	TATION	25+11		OFFS	ET 6	ft RT			ALIGNMENT	-L-		0 HR.	N/A
DLL	AR ELE	V . 2,	513.6	ft	TO	OTAL D	EPTH 7	77.0 ft	NOR	THING	801,3	327		EASTING	1,046,829		24 HR.	Caveo
RILL	RIG/HAN	MER E	FF/DA	TE AF	O1045	CME-45	76% 09/0	03/2009	- 		DRILL I	METHO	D NV	W Casing w/ SPT		НАММ	ER TYPE	Automatic
RILL	ER R	ose, G.	. K.		S	TART D	ATE 03	3/07/11	СОМ	P. DAT	E 03/	08/11		SURFACE V	VATER DEF	TH N/	A	
ΕV	DRIVE ELEV	DEPTH	BLC	W CO	JNT		BL	OWS PER FO	ОТ		SAMP.	lacksquare	L		OIL AND RO	CK DESC	RIPTION	
t)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50 .L	75 1	100	NO.	MOI		ELEV. (ft)	OIL AND INC	ON DESC	JAII HON	DEPTH (
35								Match Line				<u>_</u>				nse sapro		
	-												-	-				
	-	-		-										-				
	-	-	-									-		· · · · · · · · · · · · · · · · · · ·				
	-	-																
	-	- - - -												-				
	-	- - - -		-														
	-	- - - -												- - - - -		3		
	-	-												-				
	-	-												· · ·			٠	
	- - - -	-												• - - - •				
	- - - - -	- - - -												- - - -				
400	- - - -													- :				

weathered rock of gneiss.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

	501	LO IESI	KEI OKI	-DOILS LA	ibolatio	K1	
T.I.P. ID #: R-	-2519B						*I
REPORT ON SAMPL	ES OF: Soil	for Quality					
L							
PROJECT:	35609.1.1	CO	OUNTY:	Yancey	C	wner: NCDOT	
DATE SAMPLED:	3.2. & 3.3.11	DATE	RECEIVEL		DA	TE REPORTED:	3.8.11
SAMPLED FROM:	Bridge		SAM	IPLED BY:	C. A. Dunn	agan	,-
SUBMITTED BY:	W. D. Frye		· · · · · · · · · · · · · · · · · · ·		2006	STANDARD SPE	CIFICATION
LABORATORY:	Asheville						
						. ~	
			TEST R	ESULTS			
Project Sample No.	SS-1	SS-2	SS-3	SS-4	T	T	
Lab Sample No. A	166099	166100	166101	166102			
HiCAMS Sample #							
Retained #4 Sieve %	0.6	0.0	0.0	0.0			
Passing #10 Sieve %	97	90	100	99			
Passing #40 Sieve %	89	82	97	84			
Passing #200 Sieve %	51	57	22	26			
		M	INUS #10	FRACTIO	N		
Soil Mortar - 100%							
Coarse Sand -Ret. #60	20	16	17	33			
Fine Sand - Ret. #270	35	26	70	50			
Silt 0.05-0.005 mm %	21	24	9	13			
Clay < 0.005 mm %	24	34	4	4			
Passing # 40 Sieve %							
Passing # 200 Sieve %	1						
Liquid Limit	36	42	33	26			
Plastic Index	NP	NP	NP	NP			
AASHTO Classification	A-4 (3)	A-5 (4)	A-2-4 (0)	A-2-4 (0)			
Quantity					- 		
Texture	25122	25:22	25.22	25:22			
Station	25+32	25+32	25+32	25+32	_		
Hole No. Depth (ft) From:	5.8	25.8	35.8	60.8			
To:	6.8	26.8	36.8	61.8			
X V.	OK OK	OK	OK	OK.			
Remarks:	j ok	OIL	OIL	OR	.1		- I
A-166099 - 166102							
CC:							
,							
C. A. Dunnagan				_			
File				_			

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

									, , , , , , , , , , , , , , , , , , ,
T.I.P. ID #:	R-2519B							,	
REPORT ON SAM	PLES OF: Soi	ls for Quali	ty						
PROJECT:	35609.1.1		COUNTY: Y	ancey		Owner: NO	CDOT		
DATE SAMPLED:	3.14-3.16.11	DATI	E RECEIVED:	3.17.11	DA	TE REPOR	TED:	3.24.1	1
SAMPLED FROM:	Bridge		SAMI	PLED BY:	C. A. Dunn	agan			
SUBMITTED BY:	W. D. Frye				2006	STANDA	RD SPE	CIFICA	TION
LABORATORY:	Asheville		•						
			TEST RI	ESULTS					
Project Sample No.	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	S	S-11	SS-12
Lab Sample No. A	166198	166199	166200	166201	166202	166203	16	66204	166205
HiCAMS Sample #									
Retained #4 Sieve %	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0

M	IINI	IC +	110	FR	AC	TION	ſ

86

29

97

88

53

Soil Mortar - 100%								
Coarse Sand -Ret. #60	23	18	17	26	17	17	17	18
Fine Sand - Ret. #270	38	39	34	56	60	43	31	31
Silt 0.05-0.005 mm %	23	23	23	14	21	22	23	27
Clay < 0.005 mm %	16	20	26	4	2	18	29	24
Passing # 40 Sieve %							<u></u>	
Passing # 200 Sieve %								

Liquid Limit	39	42	35	32	. 27	37 ·	38	35
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-4 (2)	A-5 (3)	A-4 (4)	A-2-4 (0)	A-2-4 (0)	A-4 (3)	A-4 (5)	A-4 (4)
Quantity								
Texture								ì
Station	23+40	23+40	23+40	23+40	23+40	23+37	23+37	23+37
Hole No.								
Depth (ft) From:	30.4	5.4	35.4	40.4	50.4	5.2	15.3	35.2
To:	31.4	6.4	36.4	41.4	51.4	6.2	16.3	36.2
	OK	OK	OK	OK.	OK	OK	OK	OK

Remarks:

A-166198 - 166205

Passing #10 Sieve %

Passing #40 Sieve %

Passing #200 Sieve %

CC:

<u> </u>	
C. A. Dunnagan	
File	•
,	

SOILS ENGINEER:

98

88

93

85

89

48

89

58

85

54

SOILS ENGINEER:

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

L	2519B									
REPORT ON SAMPL	ES OF: Soil	ls for Qualit	У							
PROJECT:	35609.1.1 (co	nt.) C	COUNTY: Y	ancey		Owner: NCD	OT			
DATE SAMPLED:	3.16.11		RECEIVED	: 3.17.11		DATE REPORTE	ED: 3.24.11	L .		
SAMPLED FROM:	Bridge		SAM	PLED BY:	C. A. I	C. A. Dunnagan				
SUBMITTED BY:	W. D. Frye				2006		SPECIFICA	TION		
LABORATORY:	Asheville									
LABORATORI.	Asheville									
			TEST R	ESULTS						
Project Sample No.	SS-13									
Lab Sample No. A	166206									
HiCAMS Sample #										
Retained #4 Sieve %	0.0									
Passing #10 Sieve %	99									
Passing #40 Sieve %	75									
Passing #200 Sieve %	24			<u> </u>			<u> </u>			
		N	MINUS #10	FRACTIO	ON	-				
Soil Mortar - 100%			<u> </u>	_						
Coarse Sand -Ret. #60	43						-			
Fine Sand - Ret. #270	40						-			
Silt 0.05-0.005 mm %	13									
Clay < 0.005 mm %	4			_						
Passing # 40 Sieve %			- 	 -						
Passing # 200 Sieve %		L					<u></u>			
						····	,			
Liquid Limit	25									
Plastic Index	NP			<u> </u>						
AASHTO Classification	A-2-4 (0)									
Quantity										
Texture				<u> </u>						
Station	23+37									
Hole No.										
Depth (ft) From:	40.2	ļ								
To:	41.2	ļ		_			-			
	OK	L					<u> </u>			
Remarks:										
A-166206										
CC:		. —								
C. A. Dunnagan										
File										
r iic				-						
CONTRACTOR				,						
SOILS ENGINEER:	1				•					

CONTENTS

519B

5609.1

3

SHEET

I TITLE SHEET

2 LEGEND

3 SITE PLAN

4 PROFILES

5 CROSS SECTIONS

8 BORE LOG REPORTS

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>35609.1.1 (R-2519B)</u> F.A. PROJ F.A. PROJ	
PROJECT DESCRIPTION Bridge No. 43 on South Bound Lanes of US-19E	
over South Toe River	
SITE DESCRIPTION Replacement of Existing Structure with Dual Structures	

STATE	STATE PROJECT REPERENCE NO.	SHEET NO.	TOTAL
N.C.	35609.1.1 (R-2519B)	1	JI
			-

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 VARROUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING UNIT AT 1919 250-4008. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BORRHOLE, THE LABORATORY SAMPLE DATA MAD THE IN STUTI IN-PLACED IEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELABBLITY INHERENT IN THE STANDARD IEST METHOD. THE OSSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE MATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLUMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WILL AS OTHER NON-CLUMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DEFERENT. FOR BIDDING AND CONSTRUCTION PLANS AND DECEMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEFARTMENT DOES NOT MARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR DENION OF THE OPERATIMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HUNSELF AS TO CONDITIONS TO BE ENCOUNTERED. TO SATISTY HUNSELF AS TO CONDITIONS TO BE ENCOUNTERED. DO THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

	D C Elliot
	D O Cheek
	C J Coffey
	T B Daniel
	R D Childers
	J C Kuhne
NVESTIGATED	BY C A Dunnagan
CHECKED BY	
	C 4 Dunnagan
SUBMITTED BY	O A Dunnagan

PERSONNEL

- All mneyor 201

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

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

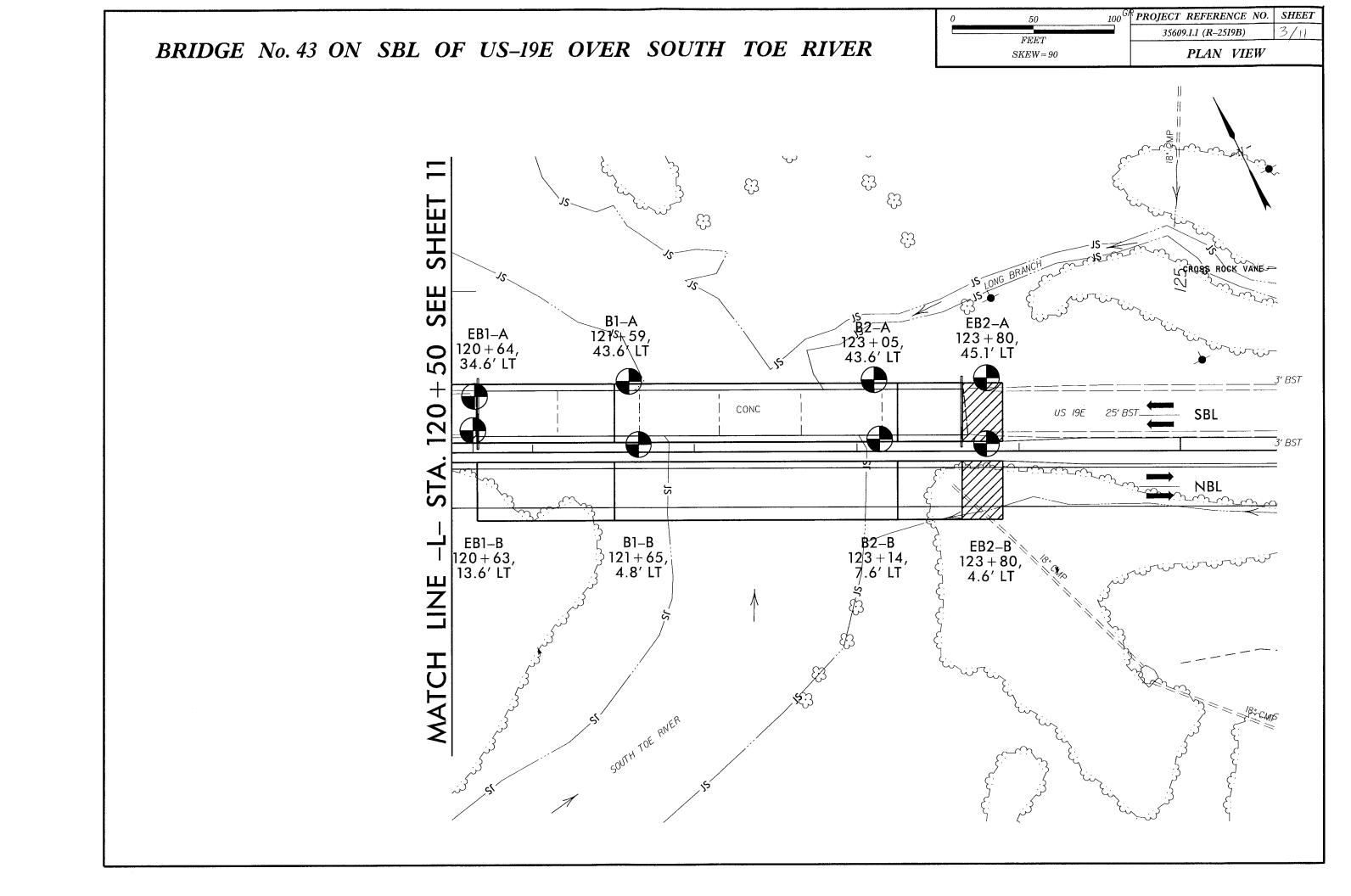
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

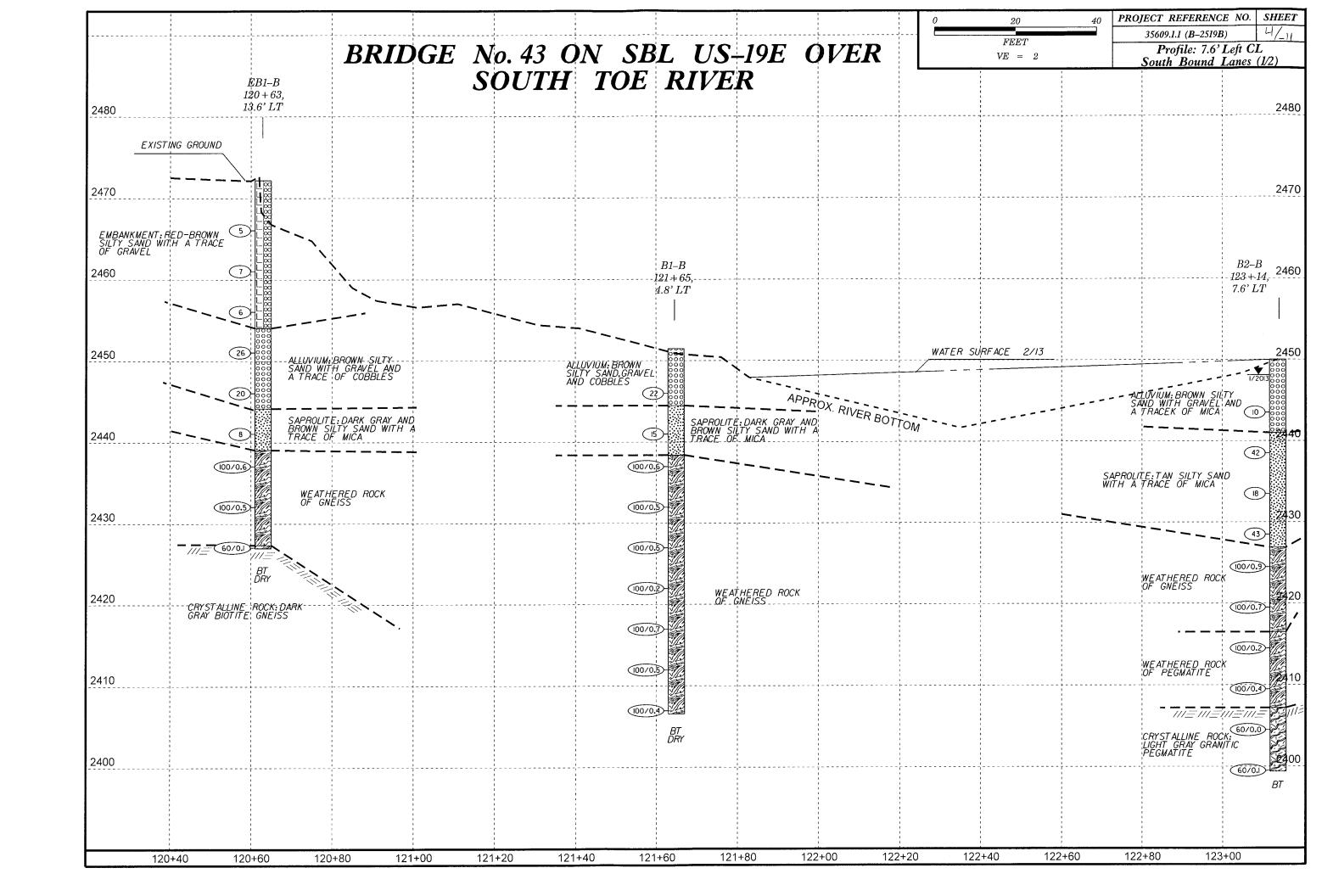
DIVISION OF HIGHWAYS

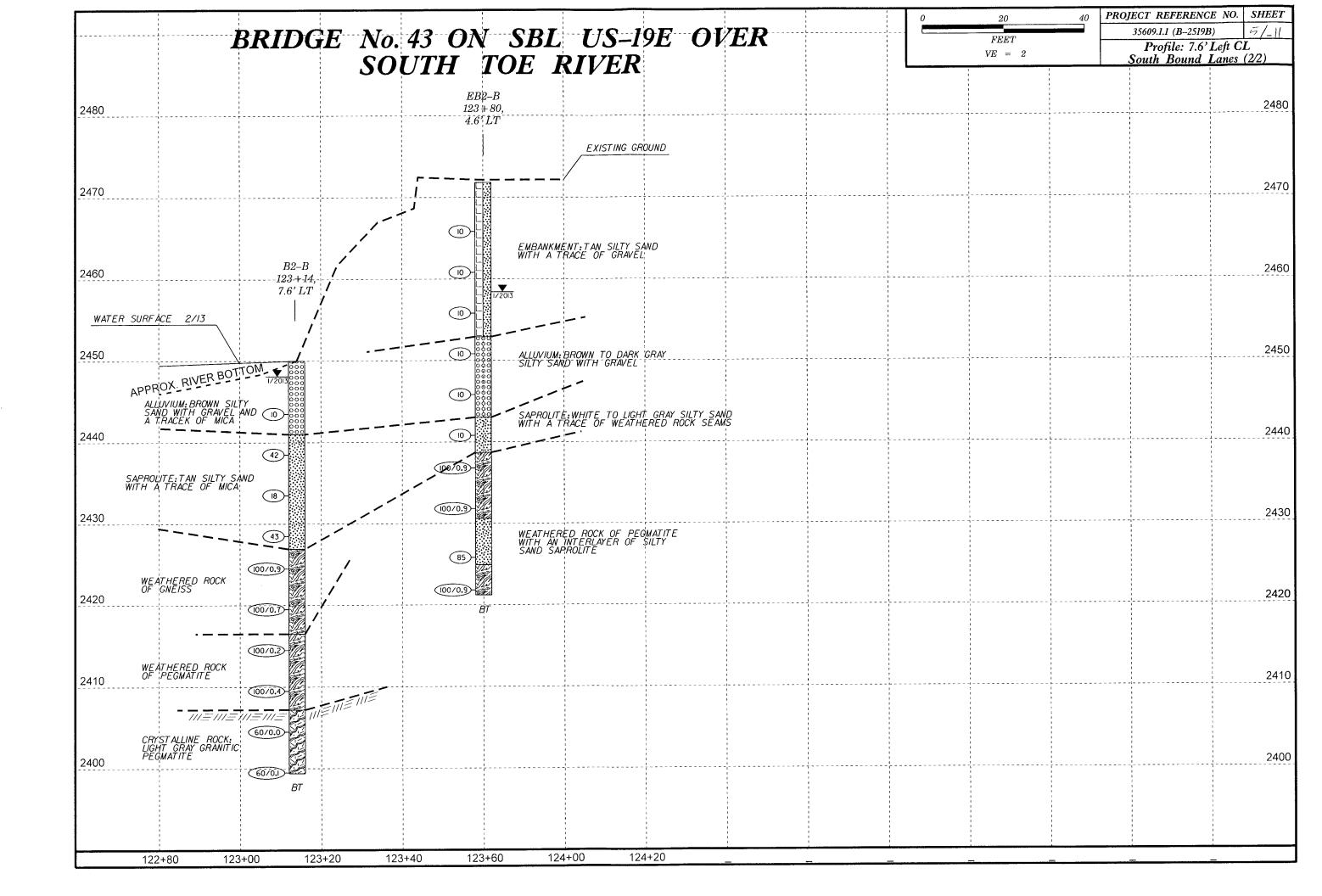
GEOTECHNICAL ENGINEERING UNIT

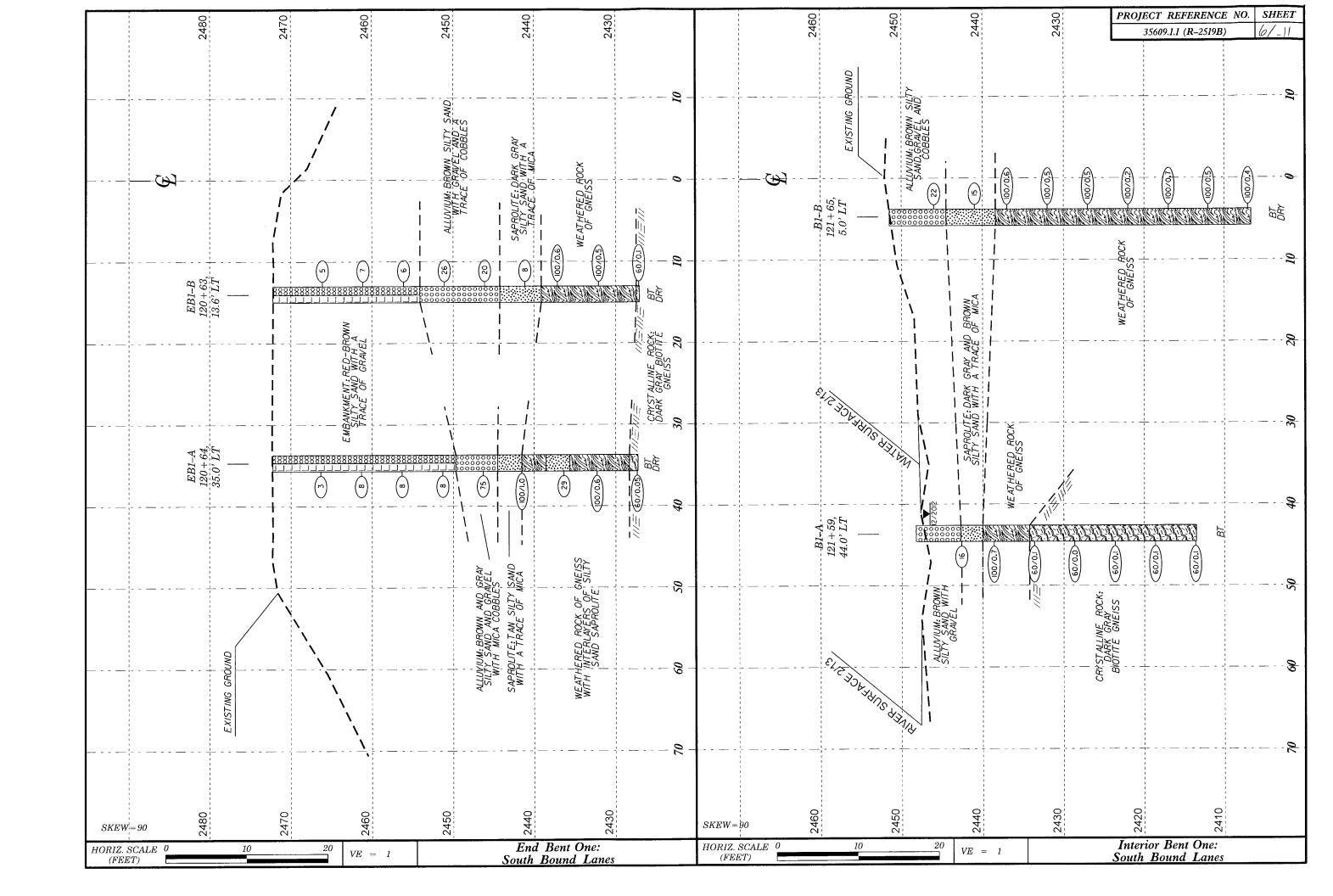
SUBSURFACE INVESTIGATION

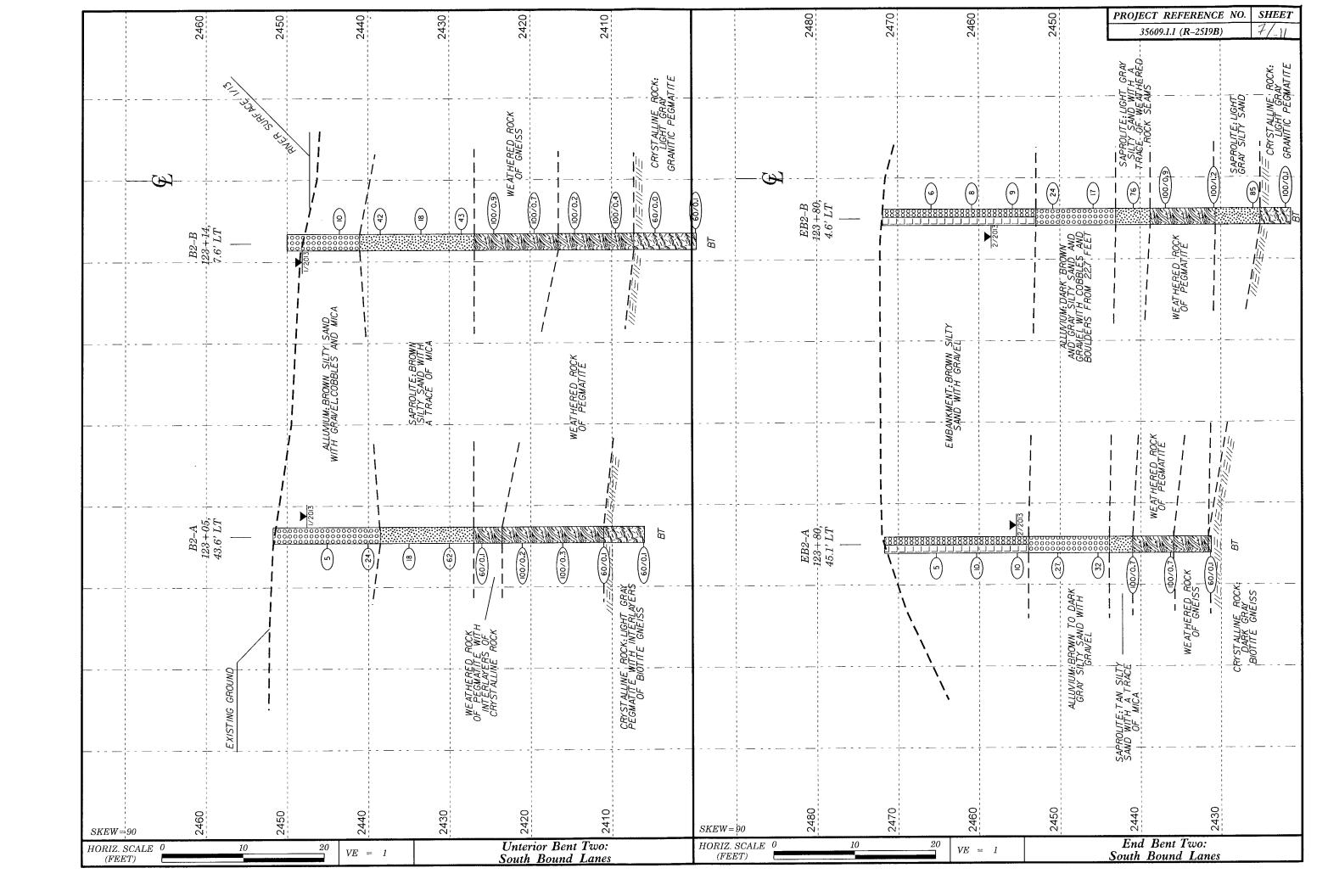
Part Company		SOIL AND ROCK LEGEND, TERM	MS, SYMBOLS, AND ABBREVIATIONS	
The content of the	SOIL DESCRIPTION			TERMS AND DEFINITIONS
The content of the		<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORM</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
## ACCUPATION OF THE PROPERTY		POORLY GRADEO)		
The content of the				
Column C	AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:		TU/FU/A	
The content of the			→ ROCK (WR) BLOWS PER FOOT IF TESTED.	
April Company Compan	CENTERAL CONTROL OF MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELOSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN DESCRIPTIONS	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	GROUND SURFACE.
Accordance Control C	CLASS. (≤ 35% PASSING #200) (> 35% PASSING #200) GROHNIC MATERIALS		GNETSS, GABBRO, SCHIST, ETC. MORDHUE AND MON COASTAL BLAIN	
Second Column Col			- DOCK (NCD) SEDIMENTANT NUCK THAT WOULD TELLU SPI NEFUSAL IF TESTED, NUCK TITE	
Company Comp	SENSON	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
Company Comp		M	(CP) SHELL BEDS, ETC.	
1.5 1.5	# 10 GRANULAR CLAY MUCK.	ODCANIC MATERIAL GRANULAR SILT - CLAY	WEATHERING	
Second S	1 10 100 100 100 100 100 100 100 100 10	30163		
March Marc	LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN COLL C MITH			
Control	PLASTIC INDEX 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN LITTLE OR HIGHLY			THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
## A PRINCE OF THE PRINCE OF T	AMOUNTS OF COLLE		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	
### 15 CANCOLOR SET 1	OF MATING TRAVEL AND FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC			FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
The control of the	MATERIALS SAND SHIND SHIND SAND SOLES			
Company Comp	AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	E		
Constraint Con	SUBGRADE	- O-M- SPRING OR SEEP		
Part Part		MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	
ACT 100	DOIMADY COLL TYPE COMPACTNESS OR DENETBATION DESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) SPT (PT ST BORING SAMPLE		
Control Cont	CONSISTENCY (N-VALUE) (TONS/F12)		SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	1
Married 10 19 19 19 19 19 19 19	GENERALLY LOOSE 4 TO 18	☐ SOIL SYMBOL ☐ AUGER BORING		ITS LATERAL EXTENT.
Management Man	MATERIAL MEDIUM DENSE 10 TO 30 N/A	CODE DODING		
Part Part	I (NUN-CUHESIYE)	ST - SHELBY TUBE		
MILESTER 1 1 2 1 1 2 1 1 2 1 1		MONITORING WELL RS - ROCK SAMPLE		
Married 19	SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	PIEZOMETER DI DECOMPACIO TOLANIA		
MARCH 100 100 11	1102	TTTTT ALLUVIAL SOIL BOUNDARY INSTALLATION SAMPLE	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	
## SUBJECT OF CHAIN SIZE ## 50 40 50 258 278	HARD >30 >4	25/025 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARING		
Section Services Control Ser	TEXTURE OR GRAIN SIZE			
## ABSEVIATIONS PARTICULATE Colored Col		SOUNDING ROD REF— SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	
SOLID CORRECT GROWER SAME S		- ABBREVIATIONS		RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
Minute 1.00 May 1.00	BOULDER COBBLE GRAVEL SAND SAND SILI CLAY			
SITE OF THE PROPERTY OF THE PR	1030.30.7 16 30.7	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST		
SOLI MOISTURE - CORRECTION OF TERMS ONLY DISTRICT FIGURE STATE AT THE MOISTURE SALE IF SOL MOISTURE SCAPE FILE MOISTURE DISTRICT RESOURCE FIRE SOLIC LIBRARY FOR THE MOISTURE SOLIC MOISTURE DISTRICT FIRE FIRE MOISTURE FIRE MO			MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	
SOL MOSTURE SCALE FIELD MOSTURE COMP COMPANDED	SOIL MOISTURE - CORRELATION OF TERMS	PRI PRINCIPLE OCCUPANTAL PRINCIPLE P		A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SATURATED - USUALLY LIQUID LIMIT - GAT JOHN PROFESSION S SELT, SILTY WITH POINT OF PICK, PICES SINCE BROCKER BY FINGER PRESSURE. FINANCE - FRACTURES S SILS, SILTY WITH POINT OF PICK, PICES SINCE BROCK BY FINGER PRESSURE. FINANCE - FRACTURES S SILS, SILTY WITH POINT OF PICK, PICES SINCE BROCK BY FINGER PRESSURE. FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILDING TO - TRICORE REPUSAL FINANCE - FRACTURES SILL SILL SILL SILL SILL SILL SILL SI		e - VOID RATIO SAP SAPROLITIC AFTER DRILLING		
FRACTURE SPACING PLASTIC IVA SEMISOLO, ID, REQUIRES DAYING TO SEMISOLO, ID, REQUIRES ONTING TO SEMISOLO, ID, REQUIRES TO SEMISOLO, ID, REQUIRES ONTING TO SEMISOLO, ID, RE				OF STRATUM AND EXPRESSED AS A PERCENTAGE.
PLASTIC LIMIT - WET - FWI SEMISOLIDI REQUIRES DAYING TO ATTAIN OPTIMUM MOISTURE - WET - FWI - WORLD FEATURE SPACING - WET - FWI - WORLD FEATURE SPACING - WET - FWI - WORLD FEATURE SPACING	(SAT.) FROM BELOW THE GROUND WATER TABLE		VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDEO BY THE
FINAL UNITS IN ATTAIN OPTIMUM MOISTURE PLASTIC LIMIT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OM OPTIMUM MOISTURE SULPMENT USED UN SUBSECT PROJECT OMBILE B. OCRESSES	DI ACTIC			
PLC TRANSITION OF THAT MOISTURE OF THAT	RANGE - WET - (W) SEMISULIU REUDINES DATING TO	EQUIPMENT USED ON SUBJECT PROJECT		
ON OPTIMUM MOISTURE SL SHRINKAGE LIMIT SHRINKAGE LIMIT HEQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE SHRINKAGE LIMIT PLASTICITY PLASTICITY PLASTICITY PLASTICITY PLASTICITY OF 5 VERY LOW ELEVATION: 2471.55 SLICHT HIGH PLASTICITY FIND PLASTICITY FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FIND PLASTICITY FIND PLASTICITY FIND PLASTICITY FIND PLASTICITY FIND PLASTICITY FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL PROPER IN STREET HARD TOOLS IN THE CLUSS BY AND PLASTIC PROPER IN STREET HARD TOOLS IN THE CLUSS BY AND PLASTIC PROP	"" PLL - PLASTIC LIMIT	I DRILL UNITS: HUVHNCING TOULS:	JERN THEN Y BEDDEN A SEET	BENCH MARK: 8L-143 AT -BL- STA 117+13.07, 43.57' LT
SL_ SHRINKAGE LIMIT REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE - ORY - (0) A COURS - (CRE SIZE: - ORY - (0) A COURS - (CRE SIZE: - ORY - (0) A COURS - (CRE SIZE: - ORY - (0) A COURS - (CRE SIZE: - ORY - (0) A COURS - (CRE SIZE: - ORY - (0) A COURS - (CRE SIZE: - ORY - (0) A COURS - (CRE SIZE: - OR - OR - OR - OR - OR - OR - OR - O	OW T OF LINOUR WOLZLONE	CLAY BITS X AUTOMATIC MANUAL	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 2471.55 FT.
PLASTICITY PLASTICITY PLASTICITY INDEX (PI) ORY STRENGTH NONPLASTIC PLASTICITY INDEX (PI) ORY STRENGTH NONPLASTIC PLASTICITY INDEX (PI) ORY STRENGTH NONPLASTIC OF SEDIMENTARY ROCKS, INDURATION IS THE HARDEN SINGER FIRES SUMEROUS GRAINS. WERY CLOSE LESS THAN 0.16 FEET TININLY CLININIATED OR SEDIMENTARY ROCKS, INDURATION IS THE HARDEN SING, HEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDEN SINGER FREES NUMEROUS GRAINS. FRIABLE RUBBINO TOOLS: HAND TOOLS: POST HOLE DIGGER HAND TOOLS: TRICONE		- CONTINUOUS FLIGHT AUGER CORE SIZE:	MODERATELY CLOSE 1 TO 3 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	
PLASTICITY PLASTICITY INDEX (PI) ORY STRENGTH NONPLASTIC OF S VERY LOW PLASTICITY 16-15 SLIGHT MEDIUM MEDIUM MEDIUM DESCRIPTIONS MAY INCLUDE COLOR OR COLOR OR COLOR OR COLOR OR COLOR OR SINIST SITE ARED, SICH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE. HARD FACED FINGER BITS TUNGCARBID INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TO SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. HAND TOOLS: HAND TOOLS: HAND AUGER SOUNDING ROD INDURATED OFFICIAL TO BREAK WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER, OR SEDIMENT ON STREAMER BLOWS REQUIRED TO BREAK SAMPLE;				-
PLASTICITY INDEX (P)) ORY STRENGTH NONPLASTIC 0-5 VERY LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM MED. PLASTICITY 26 OR MORE HIGH DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MED. PLASTICITY CORE BIT TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TUNGCARBIDE INSERTS TOUGH TO THE MATERIAL BY CEMENTING IS THE MADERING OF THE MATERIAL BY CEMENTING IS THE MATERIAL BY CEMENTING IS THE MATERIAL BY CEMENTING IS THE MATERIAL BY CEMENTING IS THE MATERIAL BY CEMENTING IS THE MATERIAL BY CEMENTING IS THE MATERIAL BY CEMENTING, FEAT, PRESSURE, ETC. FOR SEDIMENTARY ROCKS, INDURATION IS THE MATERIAL BY CEMENTING, FEAT, PRESSURE, ETC. FRIABLE GENTLE BLOW BY HAMMER DISTRIBUTION IS THE MATERIAL BY CEMENTING, FEAT, PRESSURE, ETC. FRIABLE GENTLE BLOW BY HAMMER DISTRIBUTION IS THE MATERIAL BY CEMENTING, FEAT, PRESSURE, ETC. FRIABLE GENTLE BLOW BY HAMMER DISTRIBUTION IS THE MATERIAL BY CEMENTING, FEAT, PRESSURE, ETC. FRIABLE GENTLE BLOW BY HAMMER DISTRIBUTION IS THE MATERIAL BY CEMENTING, FEAT, PRESSURE, ETC. FRIABLE GENTLE BLOW BY HAMMER DISTRIBUTION IS THE MATERIAL BY CEMENTING, TEACH, PRESSURE, ETC. FRIABLE HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND AUGER HAND AUGER HAND AUGER HAND AUGER FRIABLE OF THE MATERIAL BY CEMENTING, THE METER MATERIAL BY CEMENTING, TEACH, PRESSURE, ETC. FRIABLE FRIABLE FRIABLE FRIABLE HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: HAND TOOLS: FRIABLE FRIA	PLASTICITY	-1		
NOMPLASTIC		TUNG, CARBIDE INSERTS		
MED. PLASTICITY 16-25 MEDIUM HIGH PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER HAND AUGER COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MEDIUM PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER HAND AUGER SOUNDING ROD INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER. WAND SHEAR TEST WAND SHEAR TEST EXTREMELY :NOURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE:	Hote Charle	X CME-550 X CASING X HA ADVANCED		
HIGH PLASTICITY 26 OR MORE HIGH COLOR DESCRIPTIONS MAY INCLUDE COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE. HAND AUGER SOUNDING ROD INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; OFFICULT TO BREAK WITH HAMMER. VANE SHEAR TEST EXTREMELY :NOURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	MED. PLASTICITY 16-25 MEDIUM	HAND TOUCS:	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
DESCRIPTIONS MAY INCLUDE COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC., ARE USED TO DESCRIBE APPEARANCE. CORE 817 COR	25 57 157		BREAKS EASILY WHEN HIT WITH HAMMER.	
MODIFIES SUCH ASK LIGHT, DARK STREAKED, ETC. ARE SENDED TO BREAK SAMPLE; VANE SHEAR TEST EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;				
		VANE SHEAR TEST		
			SAMPLE BREAKS ACROSS GRAINS.	











NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

WBS	3560	9.1.1			T	TIF	P R-2519B COUN	YANCE	1			GEOLOGIST Elliott, D. C.	
SITE	DESC	RIPTIO	N Bri	idge No	0. 43 (on	SBL of US-19E over South	Γoe River					GROUND WTR (f
BOR	ING NO). EB1	-A		5	ST	TATION 120+64	OFFSET	35 ft LT			ALIGNMENT -L-	0 HR. N/A
	LAR EL			? ft	1	то	DTAL DEPTH 45.0 ft	NORTHIN	G 799,9	966		EASTING 1,055,870	24 HR. Caved
							CME-550X 72% 09/03/2009	L	DRILL	METHO	D N	IW Casing w/ SPT HAN	MER TYPE Automatic
	LER C	····			$\overline{}$		TART DATE 02/11/13	COMP. DA	TE 02/	/11/13		SURFACE WATER DEPTH	N/A
ELEV	DRIVE		T =:	.ow cc		T	BLOWS PER FOO	1	SAMP		1		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	t	0 25 50	75 100	NO.	MOI	O G	SOIL AND ROCK D ELEV. (ft)	ESCRIPTION DEPTH (
2475													
		Ī											RFACE (
		 -				+	<u> </u>			†	L. P.O	ROADWAY EMBA	NKMENT
2470	-	<u> </u>		Ì							F-50	Red-brown silty san	a with gravei.
	2,467.3	4.9	2	2	1			.					
2465		1	4	2	i '		\dagger 3			M		<u>.</u>	
	-	Ŧ									100	_	
	2,462.3	9.9	WOH	3	5	-	.\			М	50	' - -	
2460	-	Ŧ										- - -	
1	2,457.3	14.9	<u></u>								1000	-	
455		-	2	3	5		.∳8			M	L00	- -	
100	-	<u> </u>										- -	
ŀ	2,452.3	19.9	3	3	5	[М		- -	
450	_	+										- 2,449.7 	2
	2,447.3	24.9									000	 Brown and gray silty san 	d and gravel with
ļ			24	30	45			75			0000	mica and cob	
2445	-	-									300	2,444.5 - SAPROLI	
	2,442.3	29.9	40	60/0.5	1							Brown, tan and white silty 2,441.5 mica.	sand with trace of
2440	_	-						- 100/1.0)			WEATHERED Weathered rock	of anoise
	_ 2,437.3	340						- -:-:			777	- 2,438.5 - SAPROLI	
	. د. <i>۱</i> .۵۹ کے	34.3	6	12	17	11	•29			М		- Brown, tan and white silty mica.	sand with trace of
435	_	- -										WEATHERED Weathered rock	
-	2,432.3	39.9	73	27/0.1		li						- Weathered tock (or grieiss.
430	_	_	/ 0	2,770.1				. 100/0.6				<u> </u>	
	- 407.0					$\ \ $						- 2,428.3 - 2,427.3 CRYSTALLINE	ROCK 45
-	2,427.3	44.9	60/0.05			十	<u> </u>	60/0.05		-		Dark gray biotite	gneiss.
	-	-										Boring Terminated w Penetration Test Refus	sal at Elevation
	1	-										2,427.3 ft in biotit	e gneiss.
	1	-										.	
	7	-											
	7	-										<u>.</u>	
	7	-										-	
Ì	‡	-										• •	
-	1	-										•	
-	‡	- -										- •	
	‡	- .			į							· ·	
	1	.										<u>.</u>	
	‡	.										• •	
	1											- -	
	1	-										_	
	Ŧ												
	1	.]										-	

NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

TIP R-2519B COUNTY YANCEY GEOLOGIST Elliott, D. C. WBS 35609.1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge No. 43 on SBL of US-19E over South Toe River 0 HR. ALIGNMENT -L-**STATION** 120+63 OFFSET 14 ft LT BORING NO. EB1-B 24 HR. **EASTING** 1,055,860 Caved COLLAR ELEV. 2,472.2 ft TOTAL DEPTH 45.2 ft **NORTHING** 799,947 HAMMER TYPE Automatic DRILL METHOD NW Casing w/ SPT DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009 SURFACE WATER DEPTH N/A COMP. DATE 02/11/13 DRILLER Cheek, D. O. **START DATE 02/11/13** ELEV DRIVE DEPTH **BLOW COUNT** BLOWS PER FOOT SAMP. SOIL AND ROCK DESCRIPTION 75 (ft) 0.5ft 0.5ft 0.5ft 100 NO. DEPTH (ft ELEV. (ft) 2475 2,472.2 GROUND SURFACE ROADWAY EMBANKMENT Red-brown silty sand with a trace of gravel. 2470 2,467.1 5.1 2 M 2465 2,462.1 10.1 Μ 2460 M 2455 2,454.1 ALLUVIAL Brown silty sand with gravel and a trace of 2,452.1 20.1 12 cobbles. 2450 2,447.1 25.1 M 2445 SAPROLITE Dark gray silty sand with a trace of mica. 2,442.1 30.1 M 2440 WEATHERED ROCK Weathered rock of gneiss. 2,437.1 35.1 74 26/0.2 100/0.6 2435 2,432,1 40.1 100/0.5 2430 2,427.1 45.1 CRYSTALLINE ROCK Dark gray biotite gneiss. Boring Terminated with Standard Penetration Test Refusal at Elevation 2,427.0 ft in biotite gneiss.



	35609			-			REPORT R-2519B		Y YANCE	<u> </u>			GEOLOGIST Elliot, D.C.	<u>; </u>		_
SITE	DESCR	RIPTIO	N Brid	lge No	. 43 o	n SB	L of US-19E ove	r South T	oe River					GR	OUND WTF	R (
BOR	NG NO	. B1-A	١		s	TATI	ION 121+59		OFFSET	44 ft LT			ALIGNMENT -L-	0 H	IR.	1.
COLI	AR EL	EV. 2,	448.2	ft	Т	OTA	L DEPTH 34.7 ff		NORTHIN	3 779,9	930		EASTING 1,055,959	24 ⊦	IR.	1
ORILL	RIG/HAI	MMER E	FF./DA	TE AF	00071	1 CME	-550X 72% 09/03/2	009		DRILL	METHO	D N'	W Casing w/ SPT	HAMMER TY	PE Automa	atio
DRIL	LER C	heek, [D. O.		s	TAR	T DATE 12/18/1	2	COMP. DA	TE 12	18/12		SURFACE WATER DEF	TH N/A		_
LEV	DRIVE	DEPTH	BLC	OW CO	UNT		BLOWS	PER FOOT	r	SAMP		L	COU AND DO	N DESCRIP	TION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	MOI	O G	SOIL AND ROC	N DESCRIP	DEPT	Τŀ
2450													_			
	-													SURFACE		
	-					:					_	000		UVIAL and with grav	el.	
445						-						000	- -			
	2,443.6	4.6	12	5	11		16	: : : :			w	000 000 7-54	- 2,442.7	ROLITE		
440	7	-					T	[] [] [- Dark gray silty san		of mica.	
	 2,438.6-	- - 9.6							,,,,,			1/2	WEATHE	RED ROCK rock of gneiss	,	
	-	-	45	55/0.2					100/0.7				_ vveatilered	ock of griess	·.	
435	-	-											- [→] 2,434.2			1
ļ	2,433.6-	14.6	60/0.1			:			60/0.1	•			CRYSTAL	LINE ROCK		_
	_	_				•							Dark gray i	piotite gneiss.		
430	2,428.8-	10.4				-							-			
İ	Z, 4 Z0.0-	- 19.4	60/0.0						60/0.0				- -			
425	-	-											<u>-</u> -			
123	_ 2,423.6-	- - 24.6											_ •			
	-		60/0.1			.		 	60/0.1	"			<u>-</u> -			
420	-	_											. 			
	2,418.6~	- 29.6	60/0.1			.	,		60/0.1	,			-			
	_	-	00/0.1										- -			
415	-	-				H							<u>.</u> –			
ŀ	2.413.6-	- 34.6 -	60/0.1						60/0.1	H		-	2,413.5Boring Terminated a	t Elevation 2,	413.5 ft in	. :
İ	-	-											- biotite -	gneiss.		
	-	-											 -			
	-	_											- -			
	-	-											<u>-</u>			
	,	-											-			
	-	-									·		• -			
	_	-											-			
	-	-											• •			
İ	-	_											- -			
	-	_														
l	-	-											-			
	7	-											- -			
l	_	-									1		_ -			
i	-	_											<u>-</u> -			
	_	-										<u> </u>	_			
	_	_									1		_			
	7												- -			
	_	-											-			
	-	- -											- -			
	j	-										<u> </u>	<u>.</u>			
	-	-														
	‡	-											- -			
	+	-									1	1	- -			



SHEET

GEOLOGIST Elliot, D.C. **COUNTY YANCEY** TIP R-2519B WBS 35609.1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge No. 43 on SBL of US-19E over South Toe River OFFSET 5ft LT ALIGNMENT -L-0 HR. N/A BORING NO. B1-B **STATION** 121+65 24 HR. **NORTHING** 799,893 **EASTING** 1,055,946 Caved TOTAL DEPTH 44.9 ft COLLAR ELEV. 2,451.5 ft DRILL METHOD NW Casing w/ SPT HAMMER TYPE Automatic SURFACE WATER DEPTH N/A DRILLER Cheek, D. O. **START DATE** 12/18/12 COMP. DATE 12/19/12 SAMP. BLOWS PER FOOT SOIL AND ROCK DESCRIPTION 75 50 NO. 100 DEPTH (ft 2455 **GROUND SURFACE** ALLUVIAL 2450 Brown silty sand, gravel and cobbles. 2,447.0 4.5 31 12 W 2445 SAPROLITE Dark brown silty sand with a trace of mica. 2,4420 9.5 3 2440 WEATHERED ROCK 2,437.0 14.5 Weathtered rock of gneiss. 50 50/0.1 100/0 6 2435 2,432 0 19.5 100/0.5 100/0.5 2430 2,427.0 24.5 100/0.5 100/0.5 2425 2,422.0 29.5 100/0.2 100/0.2 2420 2,417.0 34.5 67 33/0.2 100/0.7 2415 2,412.0 39.5 100/0.5 2410 2,407.0 44.5 Boring Terminated at Elevation 2,406.6 ft in weathered rock of pegmatite.



WBS	35609		,			G REPORT IP R-2519B COUNT	Y YANCEY	,			GEOLOGIST Elliot, D.C.	
SITE	DESCR	RIPTIO	N Bric	lge No	. 43 0	n SBL of US-19E over South T	oe River					GROUND WTR (
BOR	ING NO	. B2-/	١		s ⁻	TATION 123+05	OFFSET 4	44 ft LT			ALIGNMENT -L-] 0 HR. N/.
COLI	LAR EL	EV. 2	451.8	ft	To	OTAL DEPTH 45.8 ft	NORTHING	3 799,8	361		EASTING 1,056,094	24 HR. 4.
DRILL	RIG/HAI	MMER E	FF./DA	TE A	O1045	5 CME-45 76% 09/03/2009		DRILL I	NETHO	D N	W Casing w/ SPT HAMM	MER TYPE Automatic
DRIL	LER C	heek, l	D. O.		s ⁻	TART DATE 01/24/13	COMP. DA	TE 01/	24/13		SURFACE WATER DEPTH N	I/A
LEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT	BLOWS PER FOOT	ī l	SAMP	V /	LO	SOIL AND ROCK DE	SCRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25 50	75 100	NO.	MOI		ELEV. (ft)	DEPTH
455		_									_	
	-	-									. ODOLING CUR	TA 0.5
	-		 					-	 	000	2,451.8 GROUND SUR	
450	7						<u> </u>			0000	 Brown silty sand with a tra cobbles. 	ice of gravel and
	J								Y .	000		
145	2,446.1	5.7_	1	1	4	5			w	000	• -	
	-	_								2000		
	2,441.1	10.7		l						0000		
440	-	-	8	14	10	24	-		W	000		1
	-									000	SAPROLIT	E
135	2,436.1	15.7	2	7	11				М		Dark brown silty sand with	a trace of mica.
100	-		-	'		• • • • • • • • • • • • • • • • • • •			101		- ·	
		- 00.7									•	
30	2,431.1 <u>.</u> -	_ 20.7	23	38	24	♦62-	1		м		• -	
ļ	-	-					::::				2,427.1	:
	2,426.1	25.7	00/0 1				60/0.1	,			WEATHERED I	ROCK
125		L	60/0.1				60/0.1			肠	Weathered rock of pegmati 2,423.6 of crystalline ro	ock.
	-	_									WEATHERED I Weathered rock of p	ROCK
120	2,421.1	30.7	100/0.2				100/0.2	•			- -	. J
	_										•	
	2,416.1	35.7		}						90		
115	,		100/0.3	}			100/0 3	'		90	-	
	1	_								900	.	
110	2,411.1	40.7	60/0.1				60/0.1	,			2,411.1 CRYSTALLINE	ROCK
, 10	-	- -	55,0.1				1				Light gray granitic pegmati of biotite gnei	te with interlayers
	1	- - <u>,</u>									2,406.0	155.
	2,406.1	<u>45.7</u> -	60/0.1				60/0.1	4	-		Boring Terminated wi	th Standard
	-	_									Penetration Test Refuse 2,406.0 ft in granitic	
		-									•	
	-									1 -	_	
]										_	
ĺ	-	-							ĺ		-	
	-	-									-	
	1	_									- -	
	_	-									-	
	1	-									• •	
	}	_									- -	
j	4	_									_	
	†	-		Ì							- •	
	‡	-									- ·	
	-										- -	
	1	-									•	
- 1	1	_	I	l						1 -	_	



SHEET

No.	<u> </u>		5U	KE				POR											10/11
WBS	35609.1	1.1			TI	P R	-2519	В		COUN	ΙΤΥ	YANCE	<u> </u>			GEOLOGIST Elliott, I	D. C.		
SITE	DESCRI	PTIOI	N Brid	lge No	. 43 o	n SBI	of U	S-19E o	ver	South				·		,			ID WTR (ft
	ING NO.				S	TATI	ON 1	23+14				FFSET				ALIGNMENT -L-		0 HR.	N/A
COL	LAR ELE	V. 2,4	450.0	ft	T	JATC	DEP	TH 50.	6 ft		N	ORTHIN	3 799,8	27		EASTING 1,056,080		24 HR.	1.9
DRILL	. RIG/HAMI	MER E	FF./DA	TE A	FO1045	CME	45 76°	% 09/03/	2009				DRILL N	1ETHO	D NW	/ Casing w/ SPT	HAMM	ER TYPE	Automatic
DRIL	LER Che	eek, C). O.		s	TAR	DAT	E 01/2	8/13		С	OMP. DA	TE 01/			SURFACE WATER DI	EPTH N/	Α	
ELEV (ft)	DRIVE ELEV (ft)	EPTH (ft)	BLC 0.5ft	0.5ft		О		BLOV	VS PI	ER FO	75 	100	SAMP. NO.	MOI	L O G	SOIL AND R	OCK DES	CRIPTION	DEPTH (fi
2450							1	T	- 1						200		ND SURF	ACE	0.
2445	2,444.5	5.5					 								0000-	Brown silty sand	with grave mica.	l and a tra	ce of
	2,333.0	_32.32.	4	5	5		∳10		-					w	0000				
2440	2,439.5	10.5	13	20	22	-			42		-			М		2,441.0 SA Tan silty sand	PROLITE I with a tra		9,0
2435	2,434.5	15.5		,															
2430	+		5	9	9			3	-		-			M					
2430	2,429.5	20.5	10	10	33				43		:	· · · · ·		М	-	2,426.9		0.014	23.
2425	2,424.5	25.5	41	59/0.4					-		-	. 100/0.9					HERED R		
2420	2,419.5	30.5	73	27/0.2	2	-						100/0.7							
24 <u>15</u>	2,414.5	35.5	100/0.2	3		-			-		-	100/0.2				2,416.5 WEATH Weathered	HERED R rock of pe		33.
2410	2.409.5	40.5	100/0.2						-		-								
	2,409.5	40.11_	100/0.4	4								100/0.4				2,407.2	ALLINE R	OCK	42.
2405	2,404.5	45.5	60/0.0	<u> </u>					-		-	60/0.0				Light gray			
2400	2,399.5	50.5	60/0 1				· · ·		-		-	60/0.1	-			-2,399.4 Roring Term	inated with	Standard	50.
			60/0.1									00/0.1				Boring Termi Penetration Te 2,399.4 ft in	st Refusal	at Elevati	



	35609				- 1		REPORT R-2519B		Y YANCE	Υ			GEOLOGIST Elliott, D	. C.	
			N Brid	dge No			SBL of US-19E ove	South T	oe River					GROU	JND WTR (
	ING NO						ATION 123+80		OFFSET	45 ft LT			ALIGNMENT -L-	0 HR	
	AR EL			ft			OTAL DEPTH 40.5 ft	·	NORTHIN	G 799,8	330		EASTING 1,056,156	24 HR	. 16.
							CME-45 76% 09/03/200		L.,			D N	W Casing w/ SPT	HAMMER TYPI	E Automatic
									COMP. DATE 02/05/13				SURFACE WATER DEPTH N/A		
LEV	DRIVE	DEPTH		ow co		T	T	PER FOOT	L	SAMP	,	1			
(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft		0 25 5	0	75 100	NO.	MOI	O G	SOIL AND RC	OCK DESCRIPTION	JN DEPTH
						T									
475															
	_	-		İ											
	-	<u>-</u>		ļ	ļ			· · · · ·	1			DÓ		ID SURFACE EMBANKMENT	
470	_	-							1					silty sand with gr	avel.
	1	-										1000	•		
465	2,466.3	5.4	2	2	3	1					м		•		
100	-	-					1						- -		
	2,461.3	- 10.4					:/:					150 150	•		
460	2,461.3.	-10.4	4	5	5		10				М		-		
	1	-			ŀ										
	2,456.3	15.4	<u>-</u> -	-	4						-		•		
155	-	-	3	6	4		•10		+	-	M		2,453.9		1
	1	-					· · · · · · · · ·					000	. AL. Dark brown and gr	LUVIAL ray silty sand and	gravel
150	.2,451.3	20.4	2	11	16	-	27				М	000	with cobbles and I	boulders from 22.	7 feet.
00	7	-										000	- ,		
	2,446.3	- - 25.4										000	. -		
445	2,440.1	- 20.4	10	14	18		•32]	М	000	-		2
	1	-					: : : :					000		PROLITE	2
	2,441.3	30.4	66	34/0.2				 ,,,	· + - · · · ·			(27)	2,441.0	I with trace of mic	: a.
440	-	-	00	34/0.2					100/0.7	Ī				ERED ROCK rock of pegmatite	
	-	-													
435	2,436.3	35.4	67	33/0.2					100/0 7	•			2,435.9 WEAT H	ERED ROCK	3
	-	-											. Weathered	rock of gneiss.	
	2,431.3T	- _40.4											- 2,431.6 - 2,431.2 ₁ CRYSTA	LLINE ROCK	<u></u>
Ì		-	60/0.1	1		T			60/0.1	7			− \ Dark gray	biotite gneiss.	
	1	-											Boring Termin	nated with Standa it Refusal at Eleva	ard
	1	-											2,431.2 ft i	n biotite gneiss.	~
	7	-											-		
	‡	-													
	‡	-											•		
	†	-									ŀ		- ·		
	1	-								İ			• •		
	1	_								İ	ŀ		=		
	7												•		
	1	•											•		
	1	-											· -		
	1	-											- -		
	1	-											-		
	7	-										}	_		
	‡														
	‡												•		
	1	-											 ·		
	1			•									•		
	I											1 -	•		



SHEET

TIP R-2519B COUNTY YANCEY GEOLOGIST Elliott, D. C. WBS 35609.1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge No. 43 on SBL of US-19E over South Toe River 0 HR. 12.1 ALIGNMENT -L-OFFSET 5 ft LT **STATION** 123+80 BORING NO. EB2-B-24 HR. 13.4 **EASTING** 1,056,138 TOTAL DEPTH 50.6 ft **NORTHING** 799,794 COLLAR ELEV. 2,471.8 ft HAMMER TYPE Automatic DRILL METHOD NW Casing w/ SPT DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009 SURFACE WATER DEPTH N/A COMP. DATE 02/07/13 **START DATE 02/07/13** DRILLER Cheek, D. O. **BLOWS PER FOOT** SAMP. SOIL AND ROCK DESCRIPTION 75 (ft) 0.5ft 0.5ft 0.5ft 100 NO. /moi 2475 GROUND SURFACE ROADWAY EMBANKMENT 2470 Tan silty sand with a trace of gravel. 24668 50 3 М 2465 2,461.8 10.0 2460 \blacksquare 5 4 2455 ALLUVIAL 2,451.8 20.0 Brown to dark gray silty sand with gravel. 17 14 10 W 2450 2,446.8 25.0 W 2445 SAPROLITE 2,441.8 30.0 White to light gray silty sand with a trace of weathered rock seams. 18 37 39 М 2440 2,438.7 **WEATHERED ROCK** 2,436.8 35.0 17 43 57/0.4 100/0.9 2435 2,431.8 40.0 37 47 16/0.2 _100/1.2 2430 SAPROLITE White to light gray silty sand. 2,426.8 45.0 12 24 M €85 2,424.9 2425 WEATHERED ROCK Weathered rock of pegmatite. 2,421.8 50.0 2,421.2 68 32/0.1 100/0.6[©] Boring Terminated at Elevation 2,421.2 ft in weathered rock of pegmatite

CONTENTS

.2519B

5609.I.

CONT	ENIS
SHEET	DESCRIPTION
ı	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILES
6	CROSS SECTIONS
8	BORE LOG REPORTS
-	
-	
-	
-	
-	
-	-
-	-
-	-

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

	FERENCE I <u>Yancey</u>	NO. <u>35609.1.1 (R-2</u>	519 B	F.A. PROJ
		OVER SOUTH T		Bound Lanes of US-19E
SITE DES	CRIPTION .	Replacement of Ex	cisting Struc	cture with Dual Structures

				NO.	D 10 10
N.C.	55609.1.1	(R-2519	B)	1	_

CAUTION NOTICE

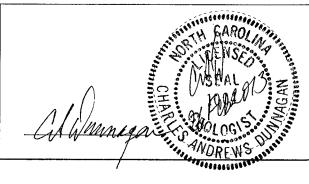
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARROUS FIELD BORNOL DOCS, ROCK CORES, AND SOUL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, CEDITCHNICAL ENDMERRING UNIT AT 1999 250-4088. NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNOL DOSS, ROCK CORES, OR SOUL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND HOCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CEDITECHNICAL INTERPRETATION OF ALL AVAILABLE. SUBSURFACE DATA AND WAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STAR WHITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN STILL IN-PLACEL TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABLITY INHERENT IN THE STANDARD ITST WETHOOL. THE OBSERVED WATER LEVELS OR SOIL MOSTURE CONDITIONS NIONCATED WITH SAMPLES OR SOIL MOSTURE CONDITIONS AND WARY CONSIDERABLY WITH TWA ACCORDING TO CLIVATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMMARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PLANSESS, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT, THE DEPARTMENT DOES NOT MARRAIN OR GUBRANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOT PLANSESS THE INVESTIGATIONS OF THE BEDEFROM THE STATEMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY MINESTER AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY BEASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

	D O Cheek
	C J Coffey
	T B Daniel
	R D Childers
	J C Kuhne
	j O Rume
INVESTIGATED I	BY C A Dunnagan
CHECKED BY	
SUBMITTED BY	C A Dunnagan
DATE	February 2013

PERSONNEL D C Elliot



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

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

SHEET NO.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

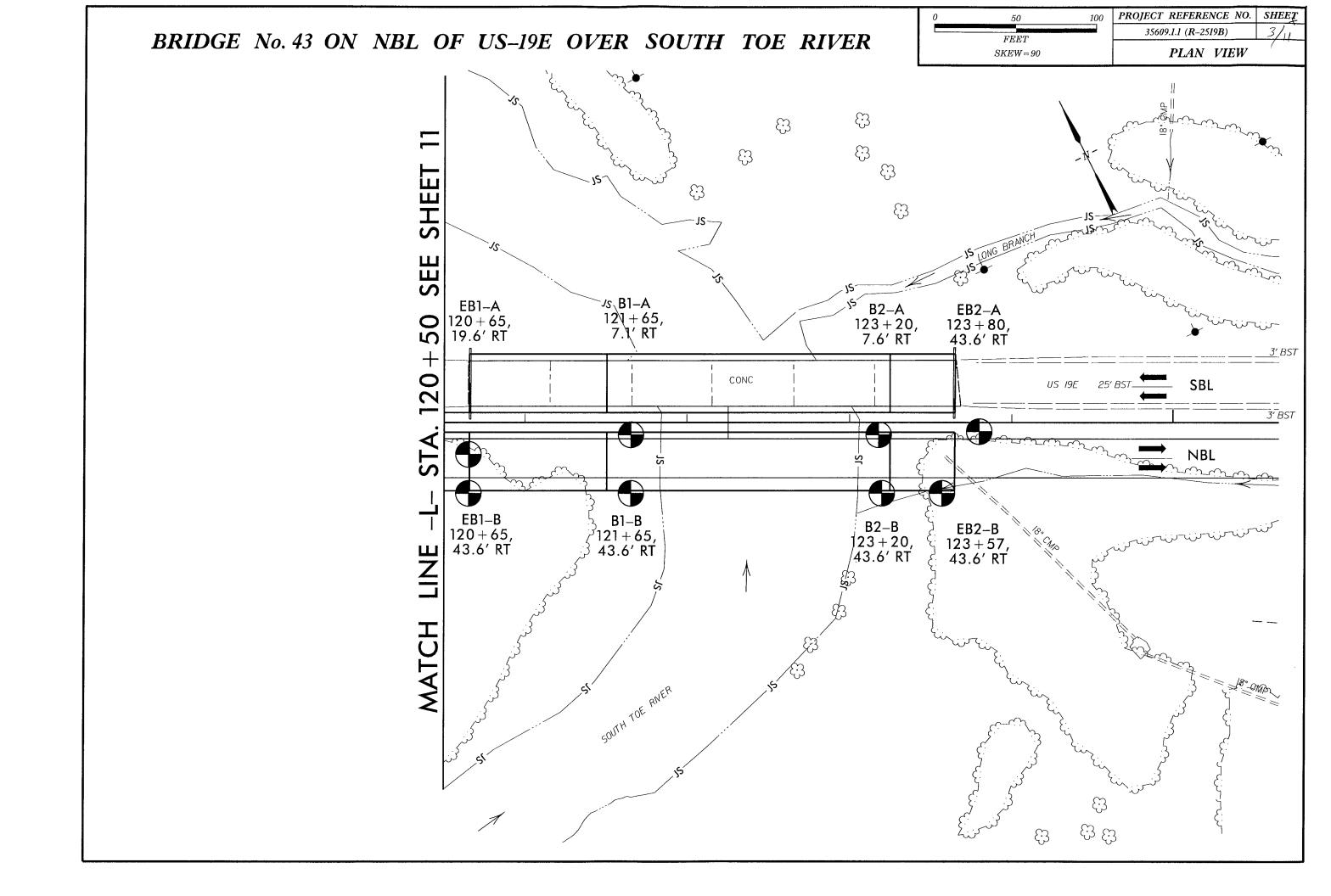
DIVISION OF HIGHWAYS

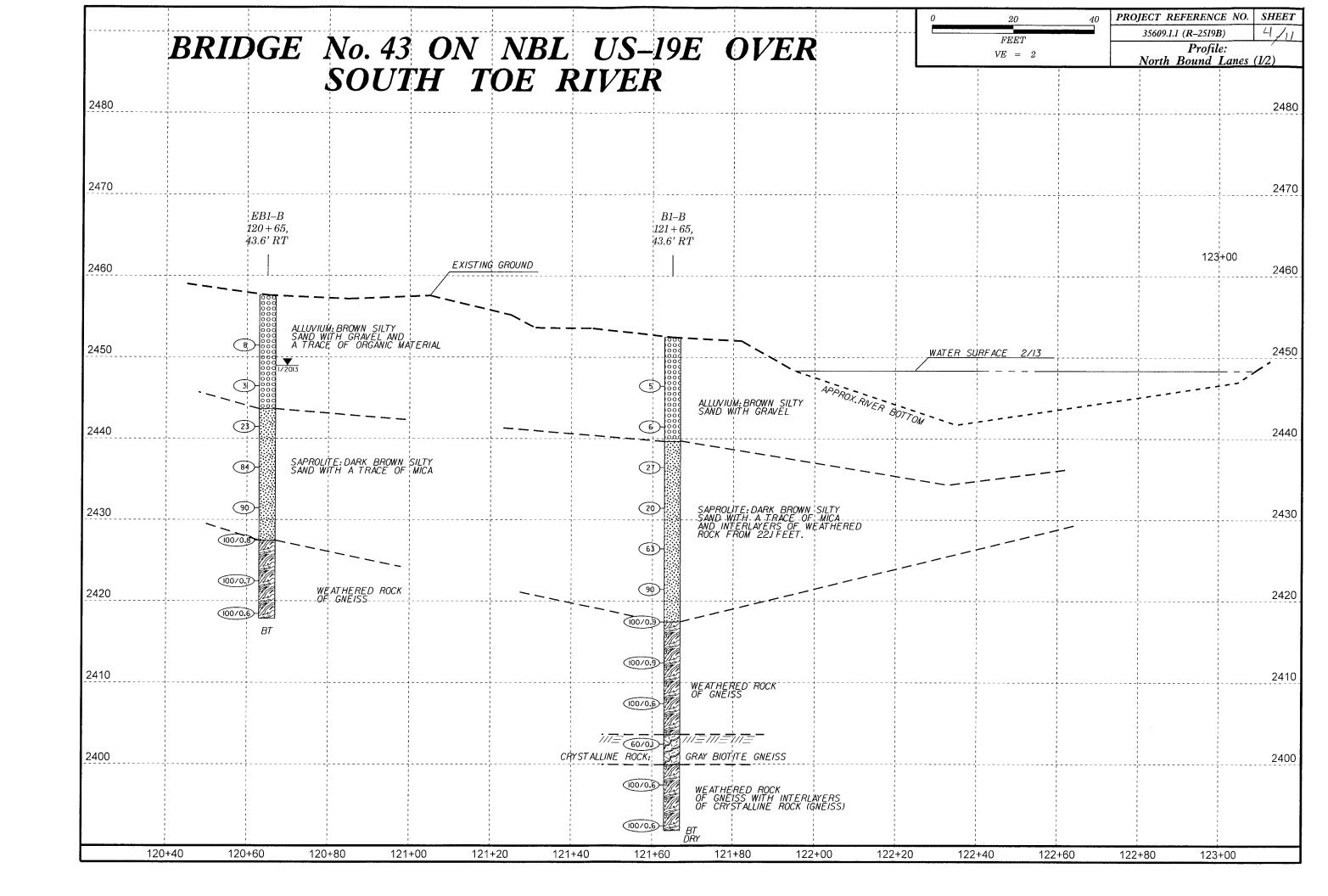
GEOTECHNICAL ENGINEERING UNIT

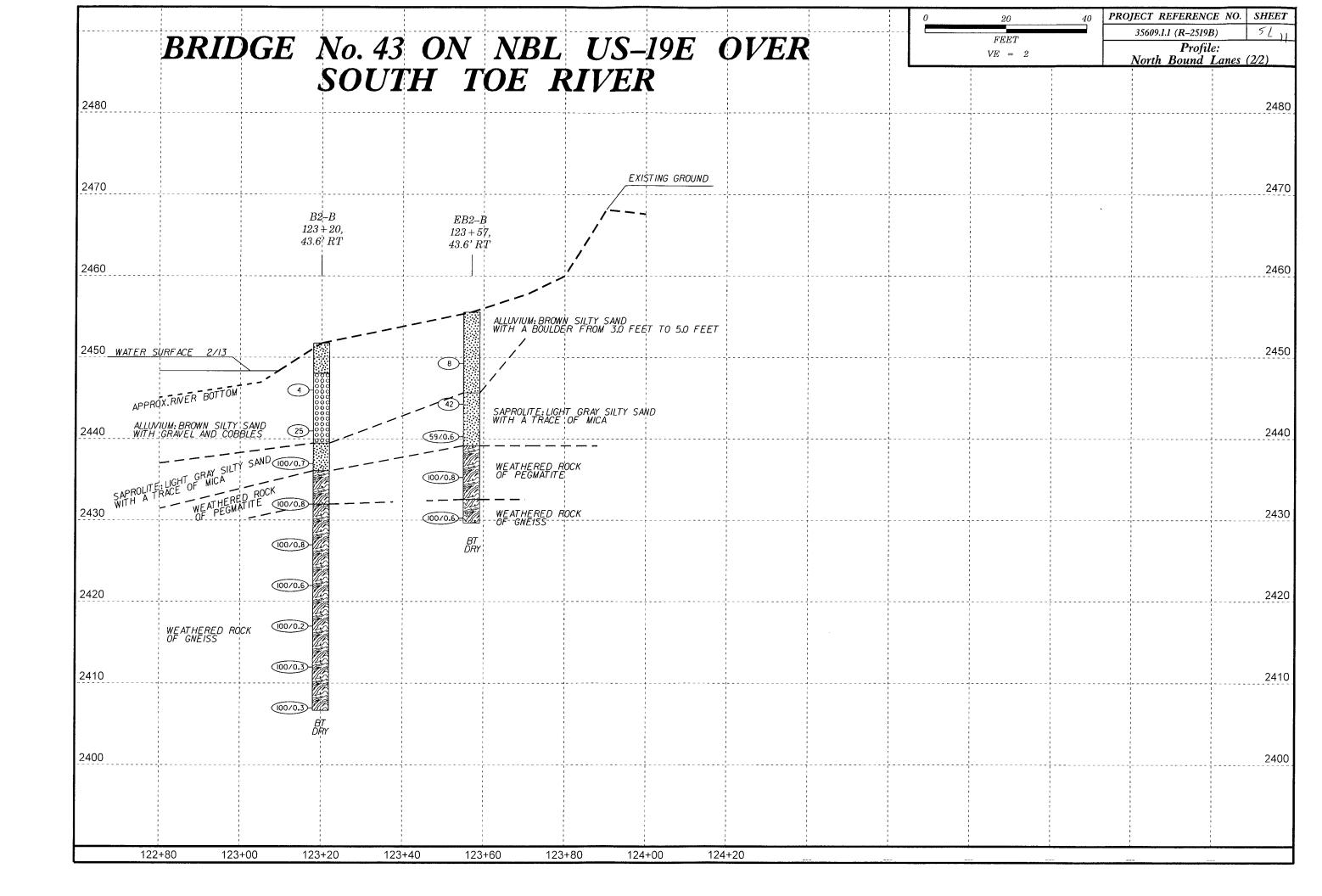
SUBSURFACE INVESTIGATION

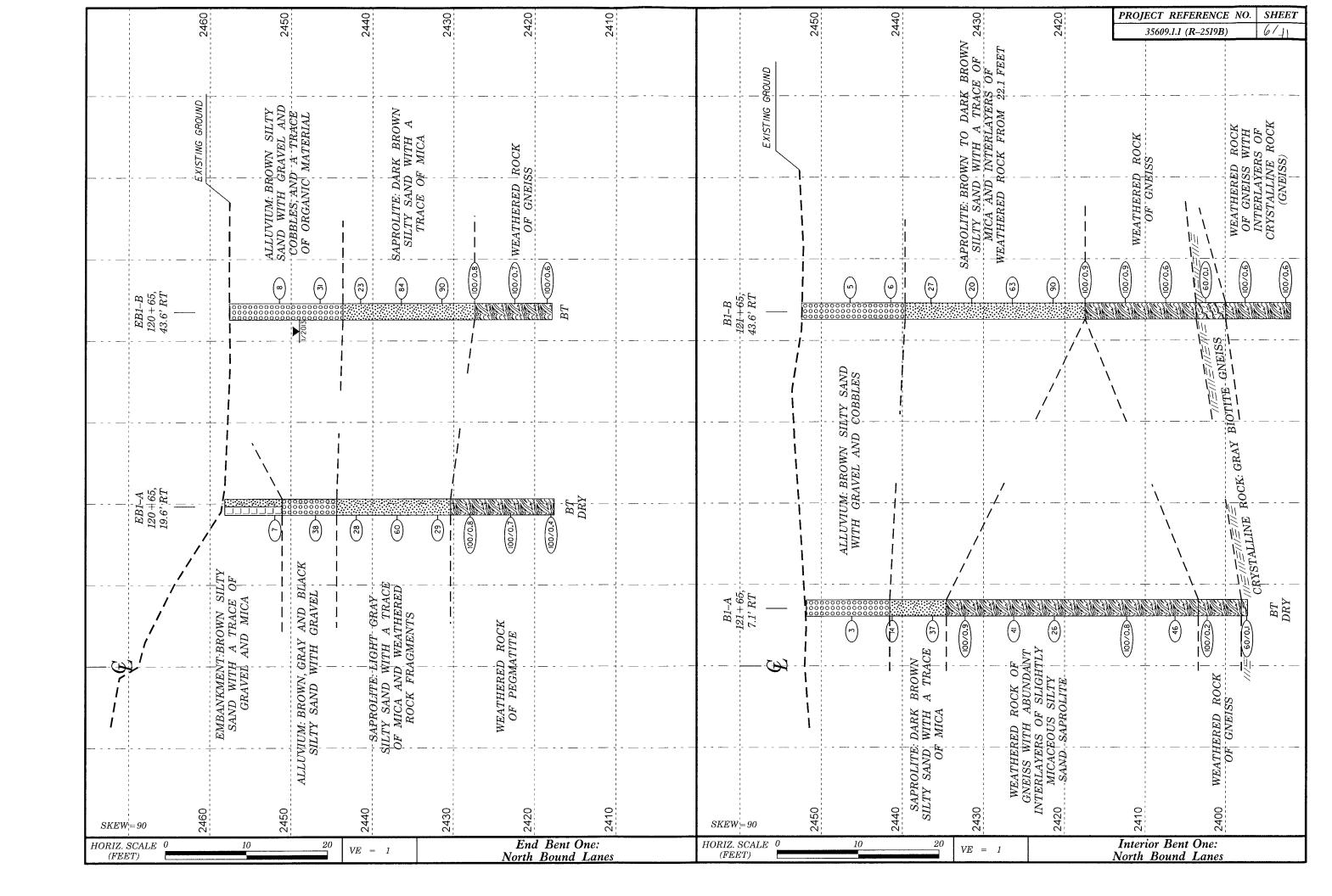
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

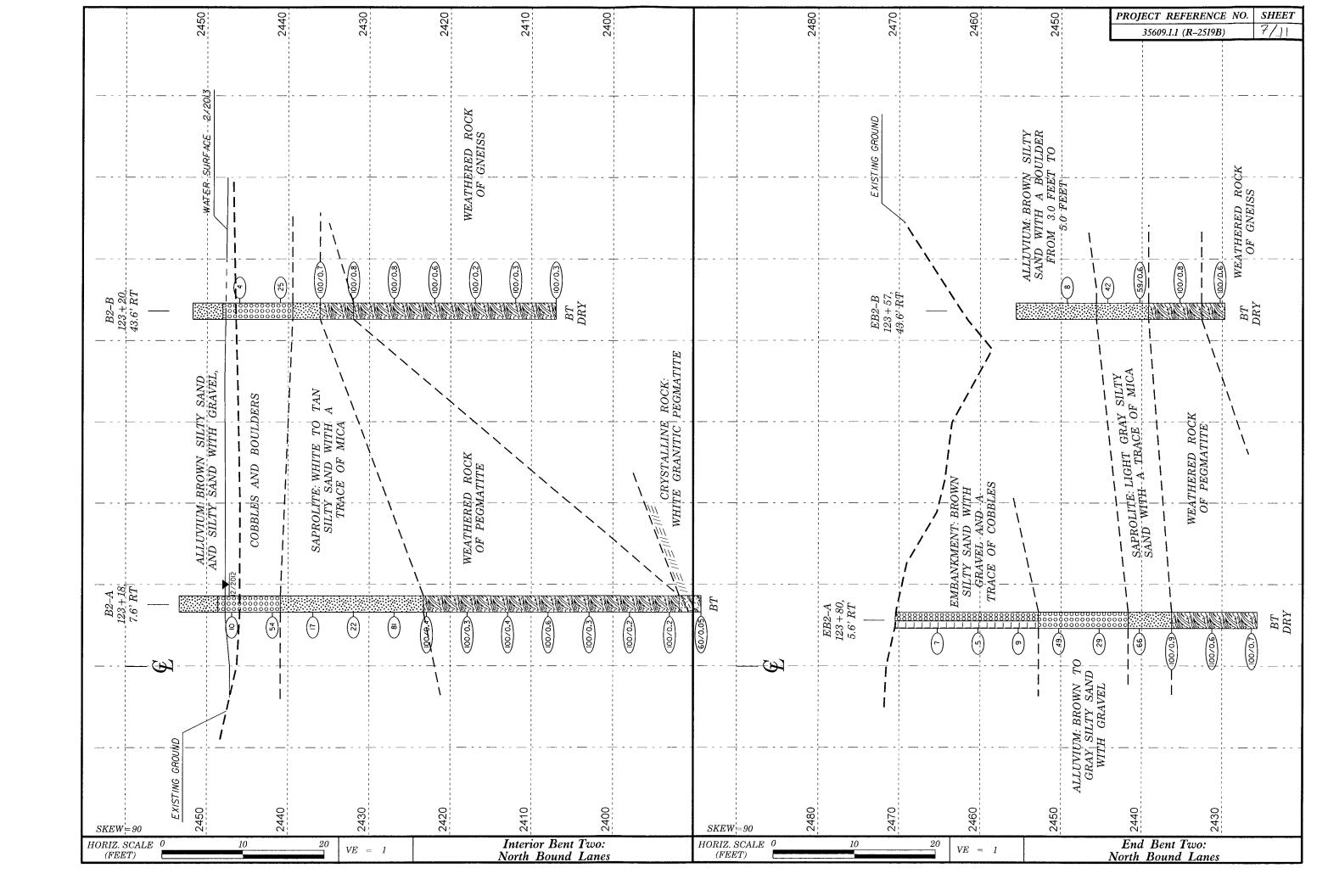
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS										
	SOIL DESCRIPTION			GRADATION		T		OCK DESCRIPTION		TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS			WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, (ALSO					L THAT IF TESTED, WOULD YIELD SPT R NON-COASTAL PLAIN MATERIAL WOULD	ALLUYIUM (ALLUY,) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.	
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM 0-1586). SOIL			POORLY GRADED: GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.				S PENETRATION BY A SPLIT	SPOON SAMPLER EQUAL TO OR LESS THE INSTITION BETWEEN SOIL AND ROCK IS OF	AQUIFER - A WATER BEARING FORMATION OR STRATA.	
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH			ANGULARITY OF GRAINS				ROCK.		TES DEFINEDENTED OF H ZUNE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:			THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,				S ARE TYPICALLY DIVIDED A			ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS. OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION AS SHALE, SLATE, ETC.
YERY STIFF, GRAY, SILTY	YERY STIFF, GRAY, SUTY CLAY, WOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6			SUBANCULAR, SUBROUNDED, OR ROUNDED.			WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 ROCK (WR) BLOWS PER FOOT IF TESTED.			ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEN	ND AND AASHTO CLASSIFIC	CATION		MINERALOGICAL COMPOSITIO		CRYSTALLINE	FINE TO	COARSE GRAIN IGNEOUS AND METAMORPH	IC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATER		ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUAR' WHENEVER THEY ARE CONSIDERE	IZ, FELOSPAR, MICA, TALC, KAOLIN, ETC. ARE U	SED IN DESCRIPTIONS	ROCK (CR)	WOULD TH	ELD SPI REFUSAL IF TESTED. ROCK TYP ABBRO, SCHIST, ETC.	PE INCLUDES GRANITE.	GROUND SURFACE,
CLASS. (≤ 35% PASSING (GROUP A-1 A-3	*2001 (> 35% PASSING *2001 A-2 A-4 A-5 A-6 A-7		milesteren met mie consident	COMPRESSIBILITY		NON-CRYSTALLINE	FINE TO C	COARSE GRAIN METAMORPHIC AND NON-CO		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
	1-2-5A-2-6A-2-7 A-7-5	A-1, A-2 A-4, A-5 A-3 A-6, A-7	SLIGHTLY COMPRESSI		LESS THAN 31	ROCK (NCR)	SEDIMENTA	ARY ROCK THAT WOULD YELLD SPT REFU PHYLLITE, SLATE, SANDSTONE, ETC.	SAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000			MODERATELY COMPRE	SSIBLE LIQUID LIMIT	EQUAL TO 31-50	COASTAL PLAIN	COASTAL I	PLAIN SEDIMENTS CEMENTED INTO ROCK,		CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
0000000000			HIGHLY COMPRESSIBL	PERCENTAGE OF MATERIAL	GREATER THAN 50	SEDIMENTARY ROCK (CP)	SHELL BEI	SAL. ROCK TYPE INCLUDES LIMESTONE, S DS. ETC.	ANUSTONE, CEMENTEU	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
% PASSING FØ MX		GRANULAR SILT- MUCK,	analula literali.	GRANULAR SILT - CLAY				WEATHERING		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
# 40 30 MX 50 MX 51 MN # 200 15 MX 25 MX 10 MX 35 MX 3	15 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	SOILS SOILS PEAT	ORGANIC MATERIAL	SOILS SOILS	OTHER MATERIAL	FRESH ROCK	K FRESH, CRYSTALS BRIGHT, F	FEW JOINTS MAY SHOW SLIGHT STAINING	G. ROCK RINGS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
	NA 30 NA 35 NA 35 NA 36 NA 66 NA 66		TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER	2 - 3% 3 - 5% TRA 3 - 5% 5 - 12% LIT			MER IF CRYSTALLINE.			HORIZONTAL.
LIQUID LIMIT 48 MX 41 PLASTIC INDEX 6 MX NP 18 MX 18	11 MN 46 MX 41 MN 46 MX 41 MN 40 MX 41 MN 9 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN		MODERATELY ORGANIC HIGHLY ORGANIC	5 - 10% 12 - 20% SOM	IE 20 - 35%			STAINED, SOME JOINTS MAY SHOW THIN EN FACE SHINE BRIGHTLY, ROCK RINGS I		DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
GROUP INDEX 6 8 8		HIGHLY	THE POST OFFICE AND ADDRESS OF THE POST OF	SROUND WATER	HLY 35% AND ABOVE	OF (A CRYSTALLINE NATURE.			THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
HIGHAL TYPES STONE FRAGS		AMOUNTS OF SOILS	WATER LE	/EL IN BORE HOLE IMMEDIATELY AFTER D	IDI I ING			STAINED AND DISCOLORATION EXTENDS AIN CLAY. IN GRANITOID ROCKS SOME OC		SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND FINE SILIT	Y OR CLAYEY SILTY CLAYEY EL AND SAND SOILS SOILS	MATTER	_		MILLINO			LORED. CRYSTALLINE ROCKS RING UNDER		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVE	35125	 	<u> </u>	TER LEVEL AFTER 24 HOURS				SHOW DISCOLORATION AND WEATHERING		FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO G	GOOD FAIR TO POOR	FAIR TO POOR UNSUITABLE	PERCHED V	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL, SQUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED				PARENT MATERIAL.		
SUBGRADE DI OF A 7 E SUBGRAUD IS	S = 11 20 DI OF A 7 C C C C	l	O-M- SPRING OR	SEEP		WITH	H FRESH ROCK.			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
	S ≤ LL - 30 :PI OF A-7-6 SUBGR NSISTENCY OR DENSENESS	10UF 15 > LL - 30		MISCELLANEOUS SYMBOLS				DLORED OR STAINED. IN GRANITOID ROCK LY SHOW KAOLINIZATION, ROCK SHOWS SE		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
COMPACY	RANGE OF STANDARD	RANGE OF UNCONFINED	III 20200000000000000000000000000000000	SDY SBY		(MOD. SEV.) AND	CAN BE EXCAVATED WITH A	GEOLOGIST'S PICK. ROCK GIVES "CLUNK"		THE FIELD.
	STENCY PENETRATION RESISTENCE (N-YALUE)	COMPRESSIVE STRENGTH (TONS/FT ²)	ROADWAY EMBANKM		G DESIGNATIONS		TESTED, WOULD YIELD SPT RE		eules:	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VERY L			떠		S - BULK SAMPLE			OLORED OR STAINED.ROCK FABRIC CLEAF IN GRANITOID ROCKS ALL FELDSPARS AF		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANIII AR LOOS	SE 4 TO 10	N/A	SOIL SYMBOL	AUGER BORING	SS - SPLIT SPOON	EXT	ENT. SOME FRAGMENTS OF S	TRONG ROCK USUALLY REMAIN.	ic mocnitized to some	ITS LATERAL EXTENT.
MATERIAL MEDIUM	1 DENSE 10 TO 30 SE 30 TO 50	NZH	ARTIFICIAL FILL (SAMPLE		TESTED, YIELDS SPI N VALUE		5.1.7.6 ADS 0100501101 5 01.7	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - (RREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN
(NON-COHESIVE) VERY D				Y	ST - SHELBY TUBE SAMPLE			DLORED OR STAINED, ROCK FABRIC ELEM ICED TO SOIL STATUS, WITH ONLY FRAGM		SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY S		<0.25	- INFERRED SOIL BO	MW MONITORING WEL		REMA	AINING. SAPROLITE IS AN EX	AMPLE OF ROCK WEATHERED TO A DEGRI	EE SUCH THAT ONLY MINOR	PERCHEO WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT SILT-CLAY MEDIUM		0.25 TO 0.50 0.5 TO 1.0	INFERRED ROCK LI	NE A PIEZOMETER		1		K FABRIC REMAIN. <u>IF TESTED, YIELDS</u> ABRIC NOT DISCERNIBLE, OR DISCERNIBLE		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFE		1 TO 2	→▼→→→ ALLUVIAL SOIL BO	UNDARY A INSTALLATION	RT - RECOMPACTED TRIAXIAL SAMPLE			ARTZ MAY BE PRESENT AS DIKES OR ST		ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY S HARD		2 TO 4 >4	25/025 DIP & DIP DIRECT	ON OF SLOPE INDICATOR INSTALLATION	R CBR - CALIFORNIA BEARING	ALSO	O AN EXAMPLE,			ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
Т	EXTURE OR GRAIN SIZE		ROCK STRUCTURES		RATIO SAMPLE		R	OCK HARDNESS		EXPRESSED AS A PERCENTAGE.
		378	SOUNDING ROD	SPT N-VALUE				FE OR SHARP PICK, BREAKING OF HAND	SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE OPENING (MM)	4 10 40 60 200 4.76 2.00 0.42 0.25 0.075			REF— SPT REFUSAL			VERAL HARD BLOWS OF THE	GEOLOGIST'S PICK. OR PICK ONLY WITH DIFFICULTY, HARD H	AMMER RINWS PENIITOEN	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
DOW DED	COARSE FINE		AD AUGED DEF	ABBREVIATIONS	W MOISTURE CONTENT		DETACH HAND SPECIMEN.	STORES WHEN WITH DIFFICUETT, MANU H	Brinch DEGRA MEGGINED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
	GRAVEL SAND SAND (GR.) (CSE, SD.) (F SE	O SILI LLAY	AR - AUGER REFUSAL BT - BORING TERMINATED	HI HIGHLY MED MEDIUM	w - MOISTURE CONTENT V - VERY			OR PICK, GOUGES OR GROOVES TO 0.25 I		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75	2.0 0.25	0.05 0.005	CL CLAY	MICA MICACEOUS	VST - VANE SHEAR TEST		CAVATED BY HARD BLOW OF MODERATE BLOWS.	A GEOLOGIST'S PICK, HAND SPECIMENS (CAN BE DETACHED	SLIP PLANE.
SIZE IN. 12 3	5.50	0.000	CPT - CONE PENETRATION T CSE, - COARSE	EST MOD MODERATELY NP - NON PLASTIC	WEA WEATHERED			.05 INCHES DEEP BY FIRM PRESSURE OF	KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOIST	TURE - CORRELATION OF 1	TERMS	DMT - DILATOMETER TEST	ORG ORGANIC	7 - DRY UNIT WEIGHT	HARD CAN		CHIPS TO PEICES I INCH MAXIMUM SIZE	BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE	FIELD MOISTURE CHIDE FOR	FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION • - VOID RATIO	N TEST PMT - PRESSUREMETER TEST SAP SAPROLITIC	FIAD-FILLED IMMEDIATELY AFTER DRILLING	1	INT OF A GEOLOGIST'S PICK. N BE GROVED OR GOUGED RE	ADILY BY KNIFE OR PICK. CAN BE EXCA	VATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS)	DESCRIPTION GOIDE FOR		F - FINE	SD SAND, SANDY	WOH-WEIGHT OF HAMMER	FRO	OM CHIPS TO SEVERAL INCHE	S IN SIZE BY MODERATE BLOWS OF A F		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
		JOUID: VERY WET, USUALLY	FOSS FOSSILIFEROUS FRAC FRACTURED, FRACTURE	SL SILT, SILTY ES SLI SLIGHTLY		I.	CES CAN BE BROKEN BY FIN		or prov. piroraa	STRATA ROCK QUALITY DESIGNATION (SRQQ) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL LIQUID LIMIT	(SAT.) FROM BELO	OW THE GROUND WATER TABLE	FRAGS FRAGMENTS	TCR - TRICONE REFUSAL				AN BE EXCAVATED READILY WITH POINT BROKEN BY FINGER PRESSURE. CAN BE		TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC	SEMISOLID:	REQUIRES DRYING TO		DATE LICED ON SUBTREE	00 1501		IGERNAIL.	· · · · · · · · · · · · · · · · · · ·		TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. <u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE (PI) PLASTIC LIMIT		TIMUM MOISTURE	FOUI	PMENT USED ON SUBJECT P		1	TURE SPACING	BEDDI JERM	NG THICKNESS	
PLE T. PERSON CHARL			DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	TERM VERY MIDE	SPACING	VEGY TUTERLY DECORED	> 4 FEET	BENCH MARK: BL-143 AT -BL- STA II7+I3.07, 43.57' LT
OM _ OPTIMUM MOISTURE	- MOIST - (M) SOLID; AT	OR NEAR OPTIMUM MOISTURE		_ CLAY BITS	X AUTOMATIC MANUAL	VERY WIDE WIDE	MORE THAN 10 FEE 3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	ELEVATION: 2471.55 FT.
SL SHRINKAGE LIMIT			MOBILE B	6 CONTINUOUS FLIGHT AUGER	CODE CLAF	MODERATELY CI CLOSE		THINLY BEDOED VERY THINLY BEODED	0.16 - 1.5 FEET 0.03 - 0.16 FEET	
		ADDITIONAL WATER TO	_ BK-51		CORE SIZE:	VERY CLOSE	LESS THAN 0.16 FE	TUICKLY LANIMATED	0.008 - 0.03 FEET < 0.008 FEET	NOTES:
				8' HOLLOW AUGERS	-8			INDURATION	/ N'000 LCC1	-
	PLASTICITY		X CME-45C	_ HARD FACED FINGER BITS		FOR SEDIMENTARY F	ROCKS, INDURATION IS THE H	ARDENING OF THE MATERIAL BY CEMENT	ING, HEAT, PRESSURE, ETC.	
NONPLASTIC	PLASTICITY INDEX (PI) 0-5	ORY STRENGTH VERY LOW	X CME-550	TUNGCARBIDE INSERTS	H		Du	BBING WITH FINGER FREES NUMEROUS G		
LOW PLASTICITY	6-15	SLIGHT		X CASING X W/ ADVANCER	HAND TOOLS:	FRIABLE		NTLE BLOW BY HAMMER DISINTEGRATES		
MED. PLASTICITY HIGH PLASTICITY	16-25 26 OR MORE	MEDIUM HIGH	PORTABLE HOIST	TRICONE STEEL TEETH	POST HOLE DIGGER	MODERAT		AINS CAN BE SEPARATED FROM SAMPLE	WITH STEEL PROBE:	
mod (Enditer)	COLOR			TRICONE * TUNGCARB.	HAND AUGER		BR	EAKS EASILY WHEN HIT WITH HAMMER.		
				CORE BIT	SOUNDING ROD	INDURATE		RAINS ARE DIFFICULT TO SEPARATE WITH	STEEL PROBE:	
1	R OR COLOR COMBINATIONS (TAN, RED, Y			C COVE BIT	VANE SHEAR TEST			FFICULT TO BREAK WITH HAMMER. HARP HAMMER BLOWS REQUIRED TO BREAK	Z CAMPI E.	
MUDIFIERS SUCH AS EIGHT, DAK	RK, STREAKED, ETC. ARE USED TO DESCR	NIDE HEFERMANUE.	<u> </u>	LaJ =		EXTREME		MARP HAMMER BLOWS REDUIRED TO BREAT	N SMITTLE;	
			1.						-	REVISED 02/23/06











SHEET

	35609				1		REPORT R-2519B	COUNT	Y YANCE	1			GEOLOGIST Elliot, D	С		
SITE	DESCI	RIPTIO	N Brid	dge No	o. 43 c	n N	BL of US-19E over	South T	oe River						GROUND	WTR (f
BOR	ING NO). EB1	-A		s	TAT	Γ ΙΟΝ 120+65		OFFSET	20 ft RT			ALIGNMENT -L-		0 HR.	N/A
COL	LAR EL	EV . 2	458.2	ft	Т	OTA	AL DEPTH 40.6 ft		NORTHIN	G 799,9	917	,.	EASTING 1,055,846		24 HR.	Caveo
DRILI	RIG/HA	MMER E	FF./DA	TE A	FO007	1 CM	E-550X 72% 09/03/2	009	L	DRILL	METHO	D N	W Casing w/ SPT	HAMME	R TYPE A	utomatic
DRIL	LER C	offey,	Jr., C.		s	TAF	RT DATE 01/09/13	}	COMP. DA				SURFACE WATER DE	1		
ELEV	DRIVE ELEV	DEPTH	BL	ow co	UNT		BLOWS F	ER FOOT	Г	SAMP.	V /	L				
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25 5	0	75 100	NO.	MOI	O G	SOIL AND RO	CK DESC	RIPTION	DEPTH (
2460													_			
		1		ļ. <u></u>										D SURFA		
		I											ROADWAY Brown silty sand w			nd
2455	-	-												nica.	Ü	
	2,453.0	5.2	3	4	3	-					.,		-			
2450		Ŧ					· · · · ·				М	:: 000	2,451.1	UVIAL		7
	2,448.0	10.2				-	· · · · · · · · · · · · · · · · · · ·		1			000	Brown, gray and bla		nd with gra	vel.
		10.2.	15	28	10	11:	· · · · · · • 38·					000	<u>-</u> -			
2445	-	‡					· · · · · j · ·					000	- 			13
	2,443.0	15.2	ļ] :	:::: [::::						SAP	ROLITE		
			10	14	14		28		1		M		Light gray silty sand weathered	with a trad rock fragm	ce of mica a lents.	and
2440	-												<u> </u>			
	2,438.0	20.2	11	23	37	- -					М		•			
2435	-	F						. 60 .			1		• •			
	2,433.0	25.2											-			
	∠,4აs.U -	25.2	10	13	16	1 :	• • • • • • • • • • • • • • • • • • •				М		<u>.</u>			
2430	-	<u></u>					· · · · <u></u> -	<u> </u>	<u> </u>			1477	2,430.4	RED RO	CK.	27.
	2,428.0	30.2											Weathered rock			
			46	54/0.3					100/0.8)						
2425	-	<u> </u>				-							-			
	2,423.0	35.2	32	34	66/0.2								•			
2420	-					:			100/0.7				•			
	- 2.418.0	40.2				-			1				- ·			
	-Z,410.V	40.2	100/0.4	\vdash		╁┸╌		<u> </u>	100/0.4	+		977r	2,417.6 Boring Terminated a	at Elevatio	n 2,417.6 ft	40. in
	-	-	}	:									weathered ro	ck of pegr	natite.	
	-	-	Ì		ĺ											
	-											Ŀ				
	-	_		:								-	- -			
	-			·									•			
	-												•			
	_	-											-			
	-	-														
İ	_	_										<u> </u>				
	-	_		İ								-				
	-											F	•			
	-	-											- -			
	-	-														
	-	-														
	-	-	ĺ		l							-	-			
	-	-										L				
		_										F				
	-	-	İ									F	-			
	4	-										ļ				
	4	-	l			Ì				1		ŀ				



SHEET

GEOLOGIST Elliot, D.C. **TIP** R-2519B COUNTY YANCEY WBS 35609.1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge No. 43 on NBL of US-19E over South Toe River **STATION** 120+65 OFFSET 44 ft RT ALIGNMENT -L-0 HR. BORING NO. EB1-B **NORTHING** 799,896 **EASTING** 1,055,835 24 HR. 8.7 COLLAR ELEV. 2,457.7 ft TOTAL DEPTH 39.8 ft DRILL METHOD NW Casing w/ SPT HAMMER TYPE Automatic DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009 DRILLER Cheek, D. O. **START DATE** 01/23/13 COMP. DATE 01/23/13 SURFACE WATER DEPTH N/A ELEV DRIVE DEPTH BLOW COUNT

(ft) (ft) 0.5ft 0.5ft 0.5ft SAMP. **BLOWS PER FOOT** SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft 75 100 NO. ∕moi| g | ELEV. (ft) 2460 GROUND SURFACE 2.457.7 ALLUVIAL Brown silty sand with gravel and cobbles, and a trace of organic material. 2455 2,452.5 5.2 2450 V 2,447.5 10.2 14 W 2445 SAPROLITE 2,442.5 15.2 14 Dark brown silty sand with a trace of mica. 2440 2,437.5 20.2 25 32 52 М 2435 2,432.5 25.2 14 35 55 2430 2,427.5 30.2 39 61/0.3 WEATHERED ROCK 100/0.8 Weathered rock of gneiss. 2425 2,422.5 35.2 73 27/0.2 100/0.7 2420 2,418.5 39.2 67 33/0.1 Boring Terminated at Elevation 2,417.9 ft in weathered rock of gneiss.

SHEET

WBS	35609	.1.1			TI	P R-2519B	COUNT	Y YANCEY	,			GEOLOGIST Elliot, D C	
SITE	DESCR	IPTIO	N Brid	lge No	. 43 0	n NBL of US-19E ove	r South T	oe River					GROUND WTR (
BORI	ING NO.	B1-A			S	TATION 121+65		OFFSET 8	B ft RT			ALIGNMENT -L-	0 HR. N/
COL	AR EL	Ξ V. 2,	451.9	ft	T	OTAL DEPTH 54.71	t	NORTHING	3 799,8	382		EASTING 1,055,941	24 HR. Cave
DRILL	RIG/HAN	MER E	FF./DA	TE A	FO0071	CME-550X 72% 09/03/	2009		DRILL I	METHO	D NV	V Casing w/ SPT HAM	MER TYPE Automatic
DRIL	LER C	neek, [D. O.		S.	TART DATE 12/19/	2	COMP. DA	TE 12/	20/12		SURFACE WATER DEPTH	V/A
LEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT	BLOWS	PER FOO	г	SAMP.	V /	L	SOIL AND ROCK DE	SCRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50 	75 100	NO.	МОІ	1 }	ELEV. (ft)	DEPTH
2455		-									-	-	
	1	-										2,451.9 GROUND SUR	RFACE
450	1	-				1					000	ALLUVIAL Brown silty sand with gra	•
İ	1										000	arom only cana mar gra	
ŀ	2,447.3	4.6 -	1	2	1	•3				w	000 000 000		
445	1	-					 	+			000 000 000 -	-	
	2,442.3	9.6									000	2 441 6	
440	1		4	8	6	14				W	F	2,441.6 SAPROLIT	E
	7	-				' +					F	Dark brown silty sand with	n a trace of mica.
ŀ	2,437.3	14.6	12	12	25		<u> </u>			м	F		
435	-	-					+	+			3000	-2,434.6	DOOK
	2,432.3	- 19.6										WEATHERED Weathered rock of gneis	s with abundant
430	1		27	42	58/0.4			100/0.9	,			interlayers of slightly mica saprolite.	aceous silty sand
	7	-			ļ							-	
1	2,427.3	24.6	22	17	24					М			
425	‡	- -				41	+	<u> </u>		'*'		-	
	2,422.3	- 29.6					+	+:					
420	1		9	15	11	26				М			
120	†	-					- -					-	
	2,417.3	34.6	48	52									
415	‡	-										-	
	2,412.3	39.6]									
410	2,112.0		37	63/0.3				. 100/0.8	,				
410	-											•	
	2,407.3	44.6	23	19	27		· · · · ·			М			
405	-	- -					46			IVI		-	
	2,402.3	496				:::::	 	- -:-:-				2,403.4 WEATHERED	ROCK
400	2,402.0	. 40.0	100/0.2					100/0.2	'			Weathered rock o	
400	+	-					T						
ŀ	2,397.3	54.6	60/0.1					60/0.1	\downarrow			2,398.0 2,397.2 CRYSTALLINE	
	1	-	99,0.1	1	į			¥			-	Gray biotite gneiss with a Boring Terminated at Elev	
	1											biotite gneis	
	1										-		
	1	-									E	-	
	1										E		
		-									E	_	
	7	-									-	-	
	†	-									F		
	+	-		-									
	‡												
	t	•	{	1					1		F		

NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

TIP R-2519B COUNTY YANCEY GEOLOGIST Elliot, D C WBS 35609.1.1

					· · ·		,,,,		0									NDO! !!!	D. MATTER CO.
				ige No		on NBL o			South T						T				D WTR (f
	ING NO				-	AOITAT						4 ft RT			ALIGNME			0 HR.	N/A
	LAR EL				L_	TOTAL D				NOR.	-	799,8				1,055,924		4 HR.	Caveo
DRILL	RIG/HAI	MMER E	FF./DA	TE A		1 CME-55				, .		DRILL N		D NV	V Casing w/ SP			TYPE	Automatic
DRIL	LER C	heek, [START D	ATE	01/03/13	3	COM	P. DA	TE 01/0			SURFACE	WATER DE	PTH N/A		
ELEV	DRIVE ELEV	DEPTH		ow co					ER FOO			SAMP.	lacktriangledown/			SOIL AND RO	OCK DESC	RIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	5	0	75	100	NO.	MO		ELEV. (ft)			<u></u>	DEPTH (
2455															_				
	-														2,452.5	GROUN	ID SURFAC	E	0
	_			ļ	 					T : :				000	2, 102.0	AL	LUVIAL sand with g		
2450	_						- -			-				0000	-	DIOWII SIRY	Sand With 9	iavei.	
	2,447.5	5.0					.							000					
2445	-	-	2	2	3	• 5]							W	0000					
7 1.17	-	-					.							000	-				
	2,442.5	10.0	2	4	2					: :			M	000			•		
2440	-	-				¥°.				 : :	• •			1000	-2,439.7				12.
	- 2,437.5	150									: :				Brow	n to dark brow	PROLITE n silty sand	with a tra	ice of
	-e, -1311.31	- '.,,,,,,,	17	13	14	1 : :		7					М		mica	and interlayer	s of weathe	red rock	from
2435	_	E								 					-	22			
	2,432.5	20.0	8	9	11		$ \cdot $							Ł					
2430	-	F	°	9	''		•20 Li_						M	F					
	_	F		ļ					r.—.	+				F	-				
	2,427.5	25.0	24	32	31	-							М						
2425	-	-	,						400,	:	÷ ÷ †				-				
	2,422.5	30.0																	
	2,722.0		19	39	51		.				9 90		M						
2420	-	_								-					-				
	2,417.5	35.0	17	83/0.4	-		.							3200	2,417.5	VA/E A TU	ERED ROC		35.
2415	_	F	''	03/0.4						. 10	00/0.9						rock of gne		
	-	F													-				
	2,412.5	40.0	39	61/0.4							2010								
2410	_	-								. "	00/0.9				-				
	2,407.5	45.0								1 : :									
	-,		71	29/0.1						10	00/0.6								
2405	-	<u> </u>								 					2,403.7				48.
	2,402.5	50.0	60/0.1								50/0.1			ST		CRYSTA Gray and wh	LLINE ROC		
2400	_	E	00/0.1				.							3	2,400.0	·			52.
	_	Ĺ 														WEATH thered rock of	ERED ROC	K interlave	rs of
	2,397.5	<u> 55.0 </u>	80	20/0.1						10	00/0.6					crystalline	rock (gneis	ss).	
2395	_	ļ.							· · · ·						_				
	2,392.5	60 n												梦	0.204.0				00
		-	84	16/0.1		+	<u>.</u> .			10	00/0.6			-	2,391.9 Borii	ng Terminated			ft in
	-	-														weathered	rock of gne	iss.	
	-	-												lt					
		_												F	_				
	-	-												F	-				
	-	<u> </u>																	
,	-	<u> </u>							8					<u> </u>					
	-	<u> </u>																	
	_	<u> </u>												E					
	L	<u> </u>	L	<u>L</u>	<u></u>	1						Ll							

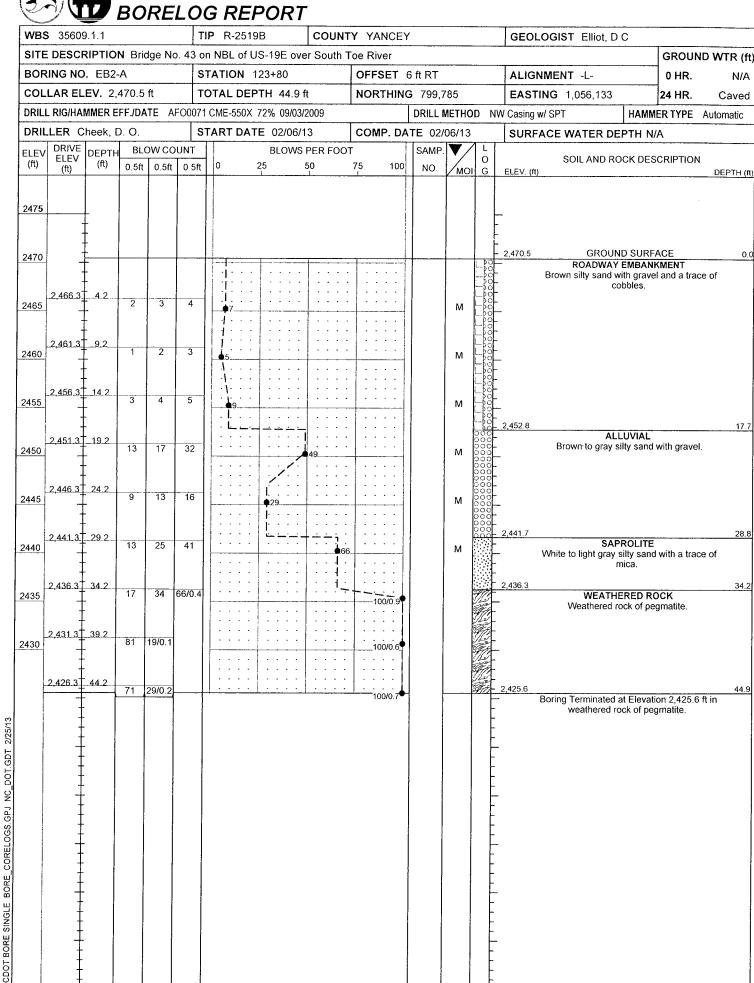
SHEET

	1.1			IP R-2519B	COUNT	Y YANCE	1			GEOLOGIST Elliot, D	U	
SITE DESCRI	I PTION Bri	dge No	. 43 o	n NBL of US-19E ove	r South T	oe River					GROU	ND WTR (
BORING NO.	B2-A		s	TATION 123+18		OFFSET	8 ft LT			ALIGNMENT -L-	0 HR.	-
COLLAR ELE	V. 2,453.4	ft	T	OTAL DEPTH 64.4 ft	t	NORTHIN		2		EASTING 1,056,077	24 HR.	
				CME-550X 72% 09/03/2			·,		D N/	W Casing w/ SPT	HAMMER TYPE	
DRILLER Ch				TART DATE 12/12/1		COMP. DA				SURFACE WATER DE	l	ratoriatio
DRIVE ,		OW COL		TT	PER FOOT		SAMP.	V /	L	JOINTAGE WATER DE	- ITT 18/74	
(ft) ELEV (ft)	(ft) 0.5ft	т т	0.5ft	{	50	75 100	}	MOI	0 G	SOIL AND RO	CK DESCRIPTIO	N DEPTH (
2455												
F						T					D SURFACE .UVIAL	0
2450							1			Brown	silty sand.	
T	5.5		į			 				- - 2,448.6		4
4,447.34	7	5	5	10			-	M	000	ALL Brown silty sand w	.UVIAL ith gravel, cobble	s and
2445					7	 			0000	bou –	ılders.	
2,442.9	10.5	21	33		1::::				000			
2440	3	'	JJ		♦ 54 · ·			W	000	2,440.9		12
\neg \top	45.5							ĺ		_ SAPI White to tan silty sa	ROLITE nd with a trace of	mica.
2,437.9	15.5	9	8	17				м	1			
2435	1								<u> </u>	_		
2,432.9	20.5			: : : \					*			
1420	8	8	14	22				М	1			
2,429.1	24.3	37	44					Į		_		
	17	37	44		TT	- ₱81		М	Ł			
425			-						F			
2,422.9	30.5								Tari	2,423.3		30.
+	100/0.4					100/0.4					RED ROCK ck of pegmatite.	
420										-	-	
2,417.9	35.5 100/0.3					100/0.3						
415								in Can				
2,412.9	40.5									-		
	100/0.4	ĺ				100/0.4		100				
410								14 3 AH		•		
2,407.9	15.5	77/0.1						22 3 A				
405						· 100/0.6		22				
2,402,9	50.5							200		•		
- 2, 4 u2.9+ 5	100/0.3					100/0.3		2 2 A				
400								(2) V M				
2,397.9	55.5					10070.0		7				
395	100/0.2					100/0.2		10 × 10				
I		1						102				
2,392.9 6	100/0.2					100/0.2		1977		2,391.7		61.
390		ļ								CRYSTAL	LINE ROCK	۵
2,389 0 6	60/0.05		+	1		60/0.05	 			Boring Termina	ted with Standard	64.4
‡									E	Penetration Test I	Refusal at Elevati n pegmatite.	on
†									-		, ,	
Ī									F			
1									F			
Ī									F			
1 T	1 1								Γ			



WBS	35609	9.1.1			TI	P R-2519B		COUNT	AY YA	NCEY				GEOLOGIST Elliot, D C	
SITE	DESC	RIPTIO	N Brie	dge No	o. 43 oı	n NBL of US	-19E ove	r South T	oe Riv	er					GROUND WTR (
BOR	ING NO	. B2-E	3		S.	TATION 12	3+20		OFFS	ET 4	4 ft LT			ALIGNMENT -L-	0 HR. N/A
COL	LAR EL	EV. 2,	451.8	ft	TO	OTAL DEPT	H 45.1 ft	t	NORT	HING	799,7	79		EASTING 1,056,062	24 HR. Cave
DRILI	RIG/HA	MMER E	FF./DA	TE A	FO0071	CME-550X 72	2% 09/03/2	2009			DRILL N	IETHO	D NV	V Casing w/ SPT HAMI	MER TYPE Automatic
DRIL	LER C	heek, l	D. O.		s ⁻	TART DATE	12/13/1	2	COM	P. DA	TE 12/	13/12		SURFACE WATER DEPTH	√A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	-T	0 25		PER FOOT	75	100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DE	SCRIPTION DEPTH (
2455														-	
2450	- - -	<u> </u>												2,451.8 GROUND SUR ALLUVIAL Brown silty sa 2,448.1	
2445	2,447.0 -	4.8	2	1	3							w	000	ALLUVIAL Brown silty sand with grav	
2440	2,442.0 - -	9.8	8	8	17		25 · · ·					М	000000000000000000000000000000000000000	-2,439.5	12
2435	2,437.0 -	14.8	8	28	72/0.2		T.T. • • • • • • • • • • • • • • • • • •	1 1 1	10	0/0.7			-	SAPROLIT White silty sand with a 2,436.1	E trace of mica. 15
	2,432.0	19.8	9	51	49/0.3				- 10	0/0.8				Weathered rock of p	pegmatite. 19 ROCK
430	2,427.0	24.8	35	65/0.3										. Weathered rock of	fgneiss.
425	2,422.0	29.8							10	0/0.8				-	
420	- -	-	93	7/0.1					. 10	0/0.6					
415	.2,417.0 - -	34.8	100/0.:	2					. 10	0/0,2					
410	2,412.0 - -	39.8	100/0.:						. 10	0/0.3					
	2,407.0	44.8	100/0.3						10	0/0.3				2,406.7 Boring Terminated at Eleva weathered rock of p	45. ation 2,406.7 ft in egmatite.
	- - - -	- - -													
	1 1 1	- - -											-		
	-	-											- - -		
	-	-											-		
	- -	-											- - - -		
	-	- - 						*					<u> </u>		

SHEET





	35609	.1.1			Т	IP R-2	519B		COUN.	TY Y	ANCEY	,			GEOLOGIST Elliot, D C	
	DESCR			ige No					South							GROUND WTR (
	ING NO						N 123+			+		44 ft RT			ALIGNMENT -L-	0 HR. N/
COLL	LAR EL	EV. 2,	455.6	ft	T	OTAL [DEPTH	25.9 ft		NOF	RTHING	3 799,7	'62		EASTING 1,056,095	24 HR. Cave
ORILL	RIG/HAN	MER E	FF./DA	TE A	FO1045	5 CME-45	5 76% 09	9/03/2009)	,		DRILL	METHO	D N	IW Casing w/ SPT HAMI	MER TYPE Automatic
DRIL	LER C	heek, [D. O.		S	TART [DATE	02/04/13	3	COL	MP. DA	TE 02/	04/13		SURFACE WATER DEPTH N	I/A
(ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	T	0	25 	LOWS P		75	100	SAMP.	MOI	L O I G	SOIL AND ROCK DE	SCRIPTION DEPTH
460	-	- - -											i		- -	
455	-	- -		-						_ 1		<u> </u>	ļ <u>.</u>	1000	- 2,455.6 GROUND SURI	
	-	-	ł												Brown silty sand with a bou	
1		-		1									ļ		to 5.0 feet.	
450 j.	2,450.3	5.3	2	4	4			==+		+=			w			
Ì	1	-													- -	
445	2,445.3	103					· · · ·								- - 2,445.7	
	,	- 12.2	19	21	21			•42							 SAPROLITI Light gray silty sand with 	
Ì	1	-													-	
140	2,440.3	15.3	44		7/0.4	<u> </u>	.			. ` ` ` `					-	
i	1	-	41	52	7/0.1		.			. .	59/0.6			770	2,439.2 WEATHERED F	ROCK 16
	7	-								. :				7/1	. Weathered rock of p	
35	2,435.3	20.3	35	65/0.3			- -								-	
	‡	-				• •					100/0.8				- - 2,432.6	23
	0.400.0									. .	: : :				WEATHERED F Weathered rock of	ROCK
130	2,430.3	25.3	83	17/0.1		 				Ш.	100/0.6	-		9/1	- 2,429.7 Boring Terminated at Eleva	25

ID: R-2519B

ROJECT: 35609.1.1

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

CONTENTS

SHEET	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-9	CROSS SECTIONS
10-25	BORE LOG & CORE REPORTS WITH CORE PHOTOGRAPHS
26	ROCK TEST RESULTS
27	SITE PHOTOGRAPHS

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 35609.1.1 (R-2519B) F.A. PROJ. N/A
COUNTY Yancey/Mitchell
PROJECT DESCRIPTION US 19 East from NC 80 in Yancey County to
Multi-Lane Section West of Spruce Pine in Mitchell County

SITE DESCRIPTION Bridge No. C48 on US 19 East Over Big Crabtree Creek

Dual Structures on US 19 over Big Crabtree Creek

Bridge No. 48 - Left Lane Bridge No. 329 - Right Lane

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNIC, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE YAPIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR RISPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNIC LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT INCESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNIOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE WI SITU WHIPLACE TEST DATA CAN BE RELIED ON ONLY TO THE GEORGE OF RELIBBLITY NHERETRY WITHE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NOICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS ONCOMPTIONS OF A STREAM OF THE SUBSURFACE INVESTIGATION TO CONTITIONS OF THE SUBSURFACE INVESTIGATION TO CONTITIONS OF THE SUBSURFACE INVESTIGATION TO CONTITIONS OF THE OBJECT OF THE SUBSURFACE INVESTIGATION TO CONTITIONS OF THE SUBSURFACE OF THE SUBSURFACE WITH THE ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC CONDITIONS INCLUDING

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLAIS 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 IN THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTEDED, THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HUMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAMF FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE MIDICATED IN THE SINSURIER FOR MITOSE MIDICATED MITOSE MIDICATED IN THE SINSURIER FOR MITOSE MICHAEL MITOSE MIDICATED MITOSE MICHAEL SINSURIER FOR MITOSE MICHAEL MITOSE MICHAEL MITOSE MICHAEL MITOSE MICHAEL MICHAEL MITOSE MICHAEL MITOSE MICHAEL MITOSE MITOSE MITOSE MITOSE MITOSE MICHAEL MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITOSE MITO

PERSONNEL

	_	P. Payne
		R. DeLost
		M. Gragg
	-	C. Banning
		S. Gower
	-	
	-	
	-	
	_	
	INVESTIGATED B	ү <i> </i>
	CHECKED BY	J. Provance
	SUBMITTED BY_	F&H
SEAL 036026	DATE	3/23/2012
OP OF ESSION	11/1/1/2	
SIN OF SSION		
A DEN		
	/ /: III 등	
AMANANE	20 1111	
O36028 PANON PE	angin.	
) - "Jillyen"	€ -	······································

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

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

PROJECT REFERENCE NO. R-2519B

SHEET NO.

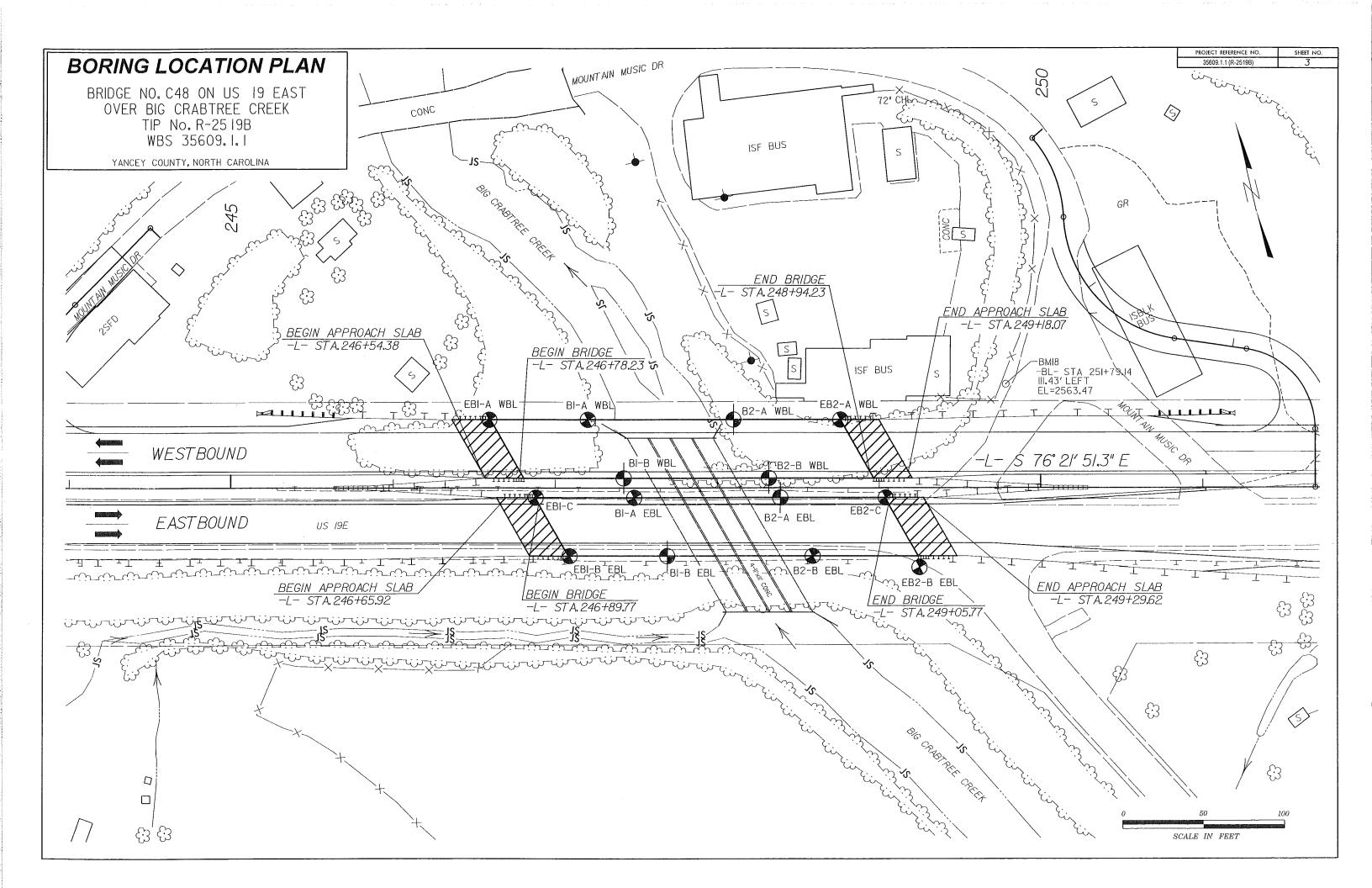
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

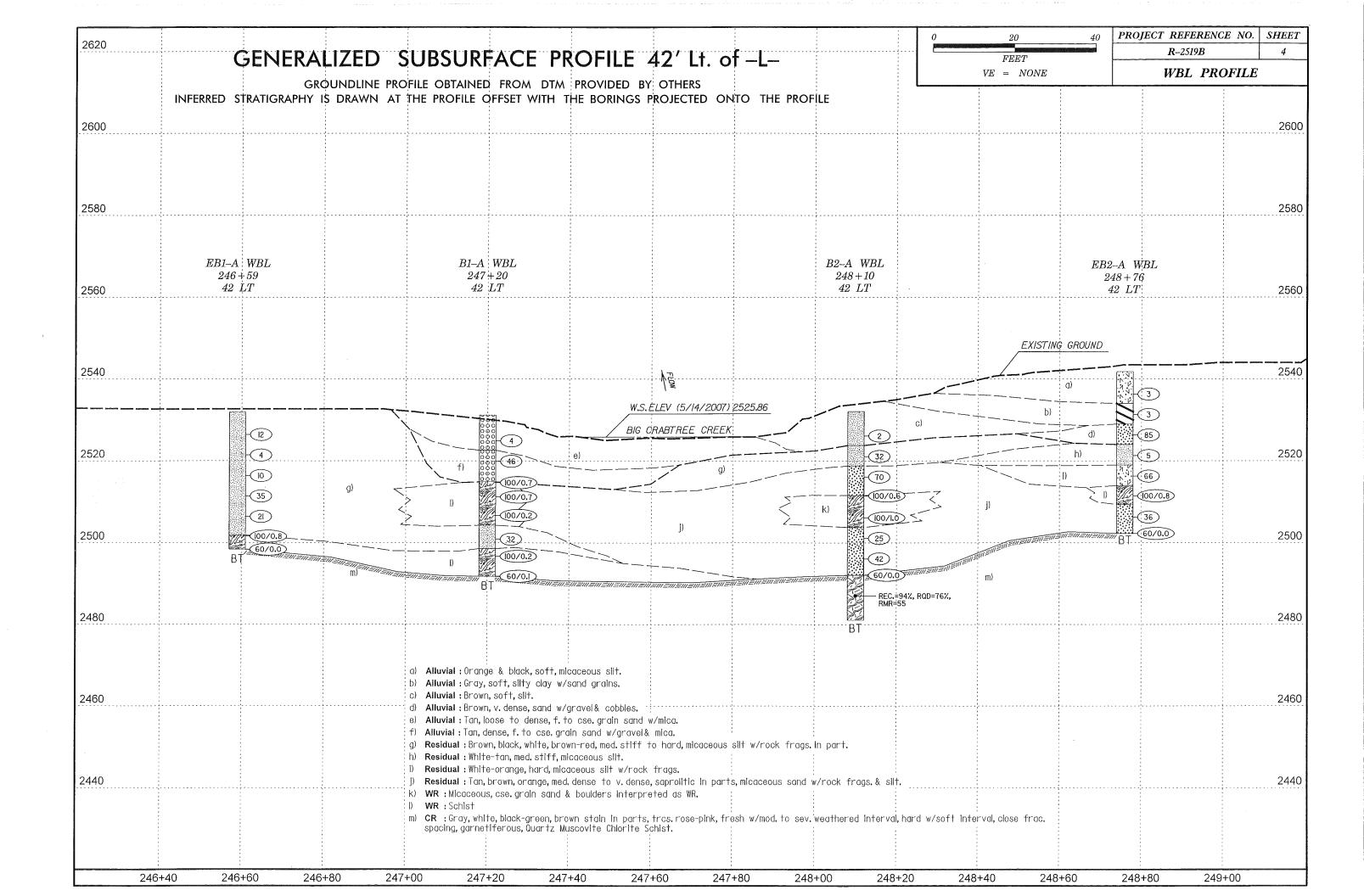
DIVISION OF HIGHWAYS

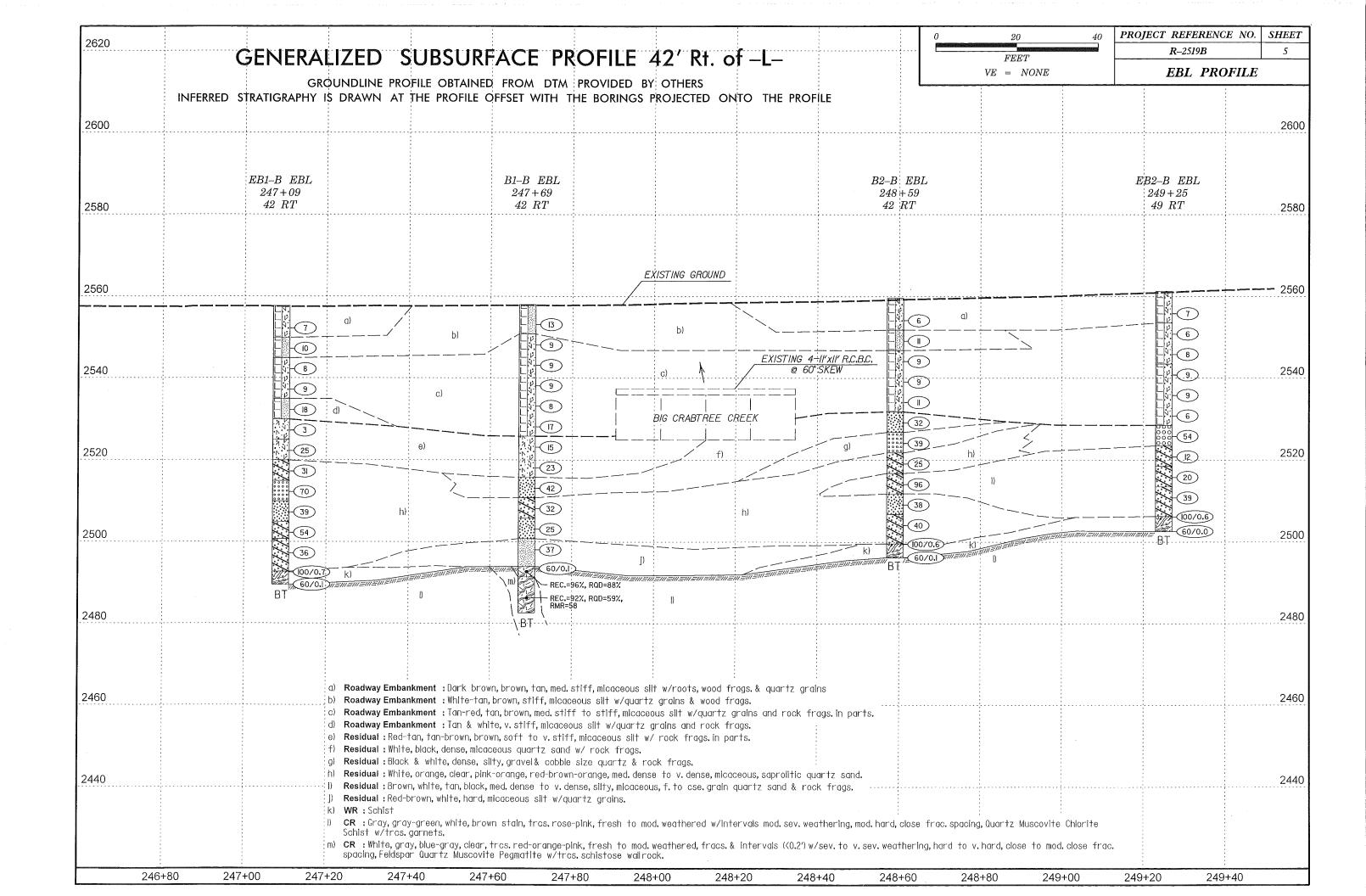
GEOTECHNICAL ENGINEERING UNIT

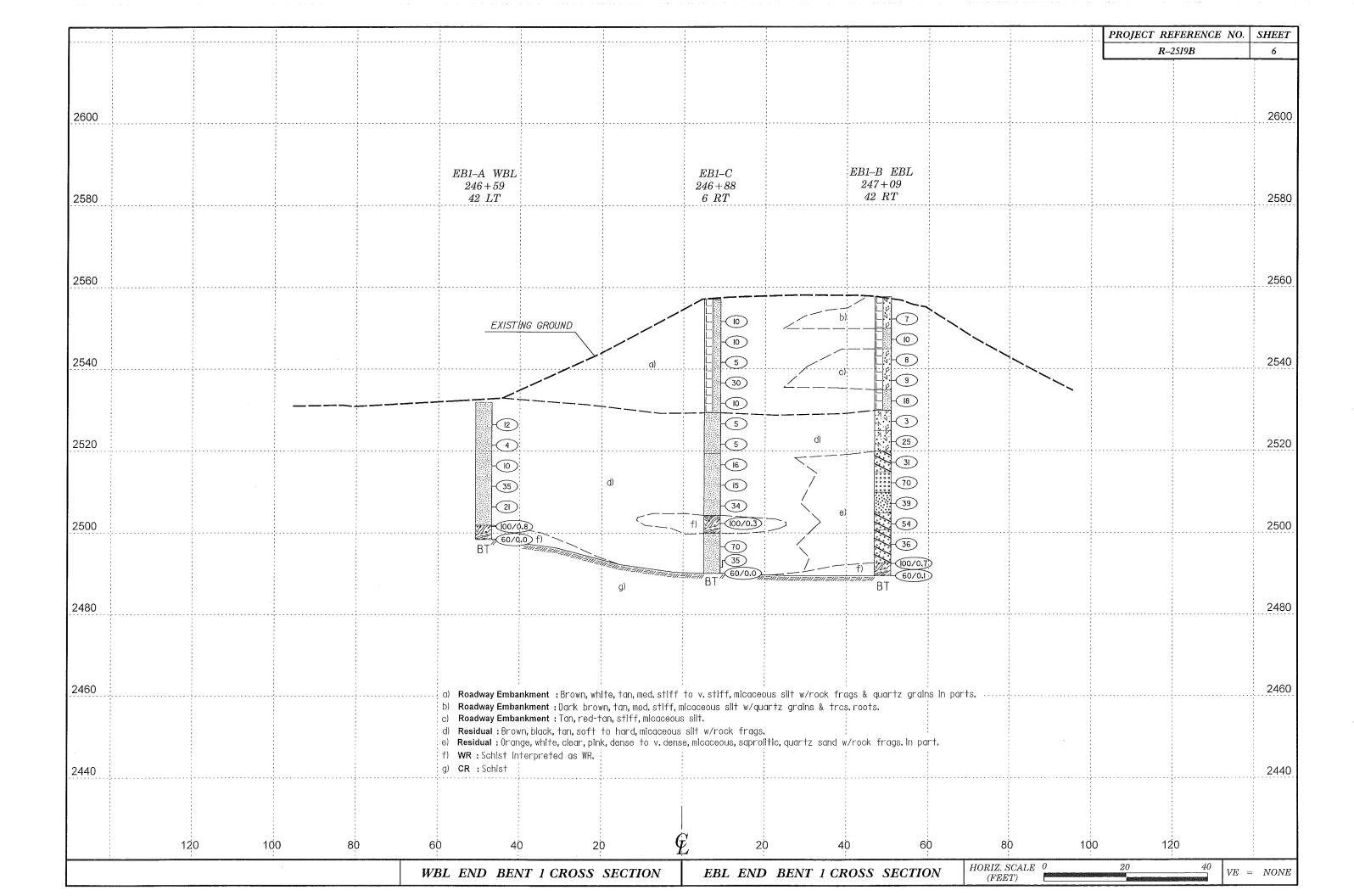
SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TER	RMS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SDIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, (ALSO	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 188 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1286, ASTM D-1586). SOIL	POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN Ø.1 FOOT PER 6Ø BLOWS.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY, SULY CLAY, MOIST WITH INTERBEDOED FINE SAND LATERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED,	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION		AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤35% PASSING *200) (>35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, ONLESS, GABBRO, SCHIST, ETC.	GROUND SURFACE. CALCAREOUS (CALC.) - SDILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	MON-COVETAL LINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL BOOGGOOGG	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANOSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDEO BY TOTAL
% PASSING SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
GRANULAR CLAY MUCK	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL	<u>WEATHERING</u>	ROCKS OR CUTS MASSIVE ROCK.
■ 2000 15 HX 25 HX 10 HX 35 HX 35 HX 35 HX 35 HX 36 HN 36 HN 36 HN 36 HN 36 HN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LIQUID LINIT 48 HX 41 HN 48 HX 41 HN 48 HX 41 HN 48 HX 41 HN SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 16 - 28% MODERATELY ORGANIC 5 - 18% 12 - 28% SOME 28 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	HORIZONTAL. DIP_DIRECTION (DIP_AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 18 MX 18 MX 118 MX 118 MX 118 MX 118 MX 118 MX 111 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX Ø Ø Ø 4 HX 8 MX 12 HX 16 HX No MX MODERATE ORGANI	ONCOLD WATCH	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
OS HA TOP CRANE THE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
MATERIALS SAND SAND SHAVEL AND SAND SULES SULES	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAGE	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL,
SUBGRADE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 3Ø ; PI OF A-7-6 SUBGROUP IS > LL - 3Ø		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK,	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE (N-VALUE) (TONS/F12)	ROADWAY EMBANKMENT (RE) ROADWAY EMBANKMENT (RE) POPT DET TEST BORING WITH SOIL DESCRIPTION W/ CORE	IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VERY LONG	→ Ψ ···································	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLT LOOSE 4 TO 10	1 🖶	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 N/A (NON-COHESIVE) DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER ————————————————————————————————————		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
VERY DENSE >50	INFERRED SOIL BOUNDARY MONITORING WELL	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT . (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT <2 <0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.50		REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AI INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE A PIEZOMETER INSTALLATION	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES & 188 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	ALLUVIAL SOIL BOUNDARY SLOPE INDICATOR	COMPLETE ROCK REDUCED TO SDIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/825 DIP & DIP DIRECTION OF	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AI
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES ONE PENETROMETER TEST	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	● SOUNDING ROD	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK,	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLIP PLANE.
SIZE IN. 12 3	CSE COARSE ORG ORGANIC	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE COURSE TO SEE A MOISTURE DECORATION OF TERMS	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
(ATTERBERG LIMITS) ODESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	• - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXI FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	CHARLE WHITE WHILE CHARLE EXCHANGE WITH FORM OF FICK, FIECES I INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TH
PLASTIC PLASTIC PROPERTY TO	HI HIGHLY Y - VERY RATIO	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE - WET - (W) SEMISOLID, REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS	BENCH MARK: USGS Hub #162 left side of bridge between
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	□ □ □ □ □ AUTOMATIC □ MANUAL	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET HIGH THICKLY BEDDED 1.5 - 4 FEET	EBI-C and BI-E EBL in existing pavement
SL_ SHRINKAGE LIMIT	MOBILE B	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	ELEVATION: 2564,05 FT
- DRY - (0) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 8.16 TO 1 FEET VERY THINLY BEDDED 8.03 - 8.16 FEET VERY CLOSE LESS THAN 8.16 FEET THICKLY LAMINATED 8.088 - 8.03 FEET	NOTES:
	☐ B-HULLOW AUGERS ☐ ☐-B	THINLY LAMINATED < 0.008 FEET INDURATION	,
PLASTICITY	→ X CME-45C	INDUKATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC Ø-5 VERY LOW	TUNGCARBIDE INSERTS -H	CHARTIE WITH CHARTE THEFT IN THE CONTROL	
LOW PLASTICITY 6-15 SLIGHT	CME-5509 X CASING X W/ ADVANCER HAND TOOLS:	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	TRICONE TUNG,-CARB, HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN. RED. YELLOW-BROWN, BLUE-GRAY).	X CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
The same of the sa		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS,	









:	:	1 1					1		PROJECT REFERENCE	NO. SHEET
									R-2519B	7
			1–A WBL 247+20	B1–B WBL 247 + 42	B1–A EBL 247+49		B EBL 17+69			
2580			42 LT	6 LT	6 RT		2 RT			2580
										; ; ;
1										
) 	Note: Boring BI-B WBL was re the original boring and aquir	edrilled within I foot of					1			1
2560	a depth of 49.2 feet to 64.	.2 feet.								2560
1					8 0					
			EXISTING GROUND		14	/				
) [6]	/	9			
2540				d) 6) () () (9)		9)			2540
					9	c)	9			
	\			e) 33	J [3]		8			
			000 000 000 g)	- 16			17			
2520			0000 h)	(100	(0.7) (25)	, k)	1 1 15			2520
			000	45	78		23			
			100/0.7	m) 56	55		42			
			100/0.2		0.0 000 54 m)		32			
2500			(32) n)	9)	69		25			2500
:			(100/0.2 p)		(100/0.5)	0)	-37			! !
			60/0.1 r)		q) BT 60/0.0	ISMEMENTEN SMERKEN	60/0,1			1
			BT REC.=94%, R	QD=54%	REC.=95%, RQD=59%,	s)	REC. ±96%, RQ)=88%)=59%,		
2480			REC.=96%, RC RMR=66	DD=85%, BI	REC.=100%, RQD=87%	//	RMR=58	1		2480
T							8-1			
			t:Tan & brown, loose to t:Brown, tan, stiff to v.) () ()
		c) Roadway Embankmen	t:Tan, brown, red-brown-t	tan, soft to v. stiff, mice	iceous silt w/quartz gr		tros. wood.			
2460			t : Dark brown, med. stiff,t : Tan-black, med. dense t							2460
		f) Roadway Embankmen	t :Tan & brown, stiff, v.f icaceous f. to cse. grain :	.to f.sandy, micaceous s						
		h) Alluvial : Tan, dense,	f.to cse.grain sand w/g	ravel& mica.	1					
			medium dense, micaceous s wn, v. stiff to hard, micac		: artz & mica vein,rock	frags.				
2440		k) Residual : Red-tan &	brown, stiff to v. stiff, n	nicaceous silt w/rock fr	ags.			•		2440
2440		m) Residual: Tan-gray, w	vhlte, brown, red-brown, ye		dense, micaceous, sapro	olltic, f. to ese. grain	quartz sand w/rod	k frags.In part.		
 			. hard, micaceous silt w/ro . white, hard, micaceous silt							
		p) WR :Schist						and to u band		1
0.400		close to mod. close f	e-gray-clear, trcs. red-ora Frac. spacing, megacrystalli	ne,Feldspar Quartz Musc	ovite Pegmatite w/schi	stose wallrock, musc	ovite pods & trcs.	microcline.		2430
2430		on frac. walls, hard, v	, gray-green, white, scatte colose to close frac. space	olng, Muscovite Feldspar	Quartz Chlorite Schist	w/trcs.garnet & mi	crocline.	ev.weathering :		2430
! ! !		s) CR : Gray, gray-gree	en, white, brown stain, tros cing, Quartz Muscovite Chl	,rose-pink, fresh to mo	d. weathered w/interval					
:				53. 54	;		•			
	120 100	80 60	40	20	20	40	60	: 80	100 120	
		the state of the s	i i	. <u> </u>	<i>a</i>				•	

:	;) }		PROJECT REFERENCE	E NO. SHEET
								R-2519B	8
2580			B2–A WBL 248+10 42 LT	$B2\!-\!B$ WBL $B2\!-\!A$ EB $248\!+\!32$ $248\!+\!39$ 6 LT 6 RT		2–B EBL 248+59 42 RT			258
2560	Note: Boring B2-B WBL wa of the original boring an core from a depth of 39	s redrilled within Ifoot d aquired 16 feet of 9.7 feet to 55.7 feet.							2560
2540			EXISTING GROUNI	D 9 9 9 10 1 10 10 10 10 10 10 10 10 10 10 10 1	g) b) a)			,	2540
2520			(2) (e) (72) (72)	g) 6 60 60 (00%) 60 (00%)	(f) (h)	32 39 25			2520
2500			(100/0,6) (100/1,0) (100/1,0) (25) (100/1,0) (100/	Q) 6070.1 6 (0070.1 1007) 1007 REC.=94%, RQD=50%, 1007 RMR=51 607	0.3 n) 0.5 0) 0.5 n) 0.6 n)	96 38 40 (00/0.6) 60/0.1			2500
2480		b) Roadway Embank		RE RE	c.=96%,RQD=92%, R=68 e quartz,rock frags.& wo	od in parts.			2480
2460		d) Roadway Embank e) Alluvial: Brown, f) Alluvial: Black & g) Residual: White, h) Residual: Tan, v.	ment: Tan-red, tan, brown, s soft silt. brown, stiff, micaceous silt gray, orange, black, med. stif	stiff, micaceous slit w/quartz sand size w/rock frags. f to hard, micaceous, slit, saprolitic in p dense, micaceous, slity, quartz sand, sapi tz and rock frags.	arts w/quartz & feldspar				2460
2440		m) WR:Schist. m) Residual:Tan, mo n) Residual:Red-br o) WR:Schist. p) CR:Gray, white				-d w/soft interval, (close frac. spacing, garnetif	erous,	2440
2430		q) CR : White, clear Muscovite Pegma spacing, Muscovit r) CR : Gray, gray-	& gray, brown-orange stal tite w/muscovite & chlorite e Feldspar Schist w/trc. mic green, white, trcs. rose-pink	in, tros. orange-pink, fresh to mod. weath e pods & two 0.7'-1.0' Intervals of white, crocline. , fresh w/sli. weathered interval, hard to , brown stain, sli. weathered Feldspar Quo	blue-clear, brown-orange, ma v. hard, mod. close to close	d. sev. weathered, mo	ed. hard, v. close to close fr	rac.	2430
	120 100	80 60	40	20	20 40	60	80	100 120	; ; ;
		YY	BL BENT 2 CROS	e election EDI	BENT 2 CROSS	CECTION	HORIZ. SCALE 0	20 40	VE = NONH

				PROJECT REFERENCE NO. SHE
				R -2519 B 9
2600				26
	EB2-A WBL	EB2-C	$\it EB2-B$ $\it EBL$	
2580	$EB2 ext{-}A \hspace{0.2cm}WBL \ 248 + 76 \ 42 \hspace{0.2cm}LT$	$EB2-C \ 249+04 \ 6 \ RT$	$EB2 ext{-}B EBL \ 249 ext{+} 25 \ 49 RT$	25
2300				
				25
2560				
	EXISTING GROUND		b) (6)	
2540		9		25
	3 d)	(E)	12 19 19 19 19 19 19 19	
	3 f)	e) 12 ===		
2520	(85) g)	29 h)	000 54	25
2020	(66)	(B)	20	
	(100/0.8 k)	(100/0.4)	39	
	36 m))	10 = 11 = 11 = 11 = 11 = 11 = 11 = 11 =	100/0.6	
2500	BT 60/0.0 <i>VII = I</i>	n) B1	BT (60/0.0)	25
2480				24
	a) Roadway Embankment : Brown-t b) Roadway Embankment : Dark br	an, brown, loose to med. dense, micaceous, f. grain so own, med. stiff to stiff, micaceous silt w/quartz gr	and w/rock frags. rains,roots and wood frags.	
	c) Roadway Embankment : Light br d) Alluvial : Orange & black, soft n	own, tan, med. stiff to v. stiff, micaceous silt.		
	e) Alluvial : Tan-brown, stiff, micac f) Alluvial : Gray, soft, silty clay w	eous silt w/cse.rock frags & roots.		20
2460	g) Alluvial : Brown, v. dense sand w	/gravelto cobble size rock frags. dense to v.dense, med. to cse. grain quartz & mica		24
	i) Residual: White-ton, med. stiff, i	micaceous siltown, med. dense to dense, silty, micaceous, f. to cse		
	k) Residual : White-orange, hard, mi i) WR : Schist			
2440	m) Residual: Brown & orange,dens	e, micaceous saprolitic sand.		24
	n) CR :Schist			
120 100	80 60 40	20 🐔 20	40 60 80	100 120
	WBL END BENT 2 CROSS	O OFFICE OF THE PROPERTY OF TH	2 CROSS SECTION HORIZ. SCA (FEET)	$LE ext{ } 0 ext{ } 20 ext{ } 40 ext{ } VE = NC$

WBS	35609.1	1.1			TI	IP R-2519B	COUNT	Y YANCEY				GEOLOGIST DeLost, F	₹.		
SITE	DESCRIP	TION	Brid	ge No.	C48 o	n US 19 East Over Big	Crabtree	Creek						GROUN	D WTR (f
OR	NG NO.	EB1-/	\ WBL		s	TATION 246+59		OFFSET	42 ft LT			ALIGNMENT -L-		0 HR.	N/A
OL	AR ELEV	1. 2,5	531.9	ft	T	OTAL DEPTH 33.5 f	:	NORTHING	798,0	96		EASTING 1,068,060		24 HR.	FIA
RILL	RIG/HAMM	ER EF	F./DAT	E F&F	10404 (CME-45C 87.6% 08/15/20	11		DRILL N	METHO	D H.:	S. Augers	HAMME	RTYPE	Automatic
RIL	LER Gov	ver, S	,		S.	TART DATE 01/18/1	2	COMP. DA	TE 01/	18/12		SURFACE WATER DEP	TH N/A	4	
 EV	DRIVE D	EPTH	BLC	w co	UNT	BLOWS	PER FOOT	*	SAMP.	V		SOIL AND RO	CK DESC	RIPTION	
t)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50 1	75 100	NO.	МО		ELEV. (ft)	JK DEGC	7111111111	DEPTH
35															
	<u> </u>											* ODOLIN		.05	
	+						T	1	+				SIDUAL		(
0	+							1				Brown & black, stiff	to hard, i 4-4).	micaceou	s silt
	2,527.4	4.5	2	6	6		:			١.,		•			
25				"	ľ	12				М		-			
	Ŧ					 						-			
	2,522.4	9.5	1	2	2	4	: : : :			М		•			
20	‡					1						-			
	2,517.4	14.5				'\' : : : : : :						• •			
5	1		2	3	7	10				М		• •			
J	‡											- ·			
	2,512.4	19.5	10	17	18		: : : :			Sat.		•			
0	1		,,,	''	"	35				Oat.					
	<u></u> . <u>+</u>					: : : : /: : : :						•			
	2,507.4	24.5	9	9	12	■ 21				М		• •			
5	#							+				_			
	2,502.4	29.5													3
0	‡		36	64/0.3				100/0.8	'			WEATHE Weathered	RED RO	CK	
<u></u>	24984	33.5							ا		90	2,498.4			3
	1		60/0.0					60/0.0				Boring Termina Penetration Test	Refusal a	at Elevatio	ก
	#											2,498.4 ft on Crys	talline Ro	ock (Schis	t).
	‡											•			
	‡											•			
	+											- .			
	<u> </u>														
	1														
	<u> </u>								1			•			
	Ŧ														
	#										[-			
	‡											•			
	‡											•			
	+														
	‡														
	<u></u>											.			
	Ŧ										[<i>.</i>			
	‡											·			
	#											• •••			
	‡											•			
	‡											•			
	+											-			
	+														
	1											-			

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

1068 0162

GEOLOGIST Payne, P. TIP R-2519B COUNTY YANCEY WBS 35609,1.1 GROUND WTR (ft) SITE DESCRIPTION Bridge No. C48 on US 19 East Over Big Crabtree Creek ALIGNMENT -L-0 HR. **STATION** 246+88 OFFSET 6 ft RT N/A BORING NO. EB1-C 24 HR. FIAD **NORTHING** 798,043 **EASTING** 1,068,077 COLLAR ELEV. 2.557.1 ft TOTAL DEPTH 67.0 ft DRILL RIG/HAMMER EFF./DATE F&H5404 CME-45C 82% 10/21/2011 DRILL METHOD H.S. Augers HAMMER TYPE Automatic DRILLER Banning, C. COMP. DATE 01/10/12 SURFACE WATER DEPTH N/A **START DATE** 01/10/12 ELEV DRIVE DEPTH BLOW COUNT **BLOWS PER FOOT** SAMP. SOIL AND ROCK DESCRIPTION (ft) ELEV (ft) (ft) 0.5ft 0.5ft 0.5ft 50 75 100 NO. DEPTH (ft GROUND SURFACE ROADWAY EMBANKMENT Brown, white & red, med, stiff to hard 2555 micaceous silt w/some rock frags (A-4). 2,552.6+ 4.5 4 6 M 2550 2 547.6 D 2545 2,542.6 14.5 2540 2,537.6 19.5 12 17 13 D 2535 2,532.6+ 24.5 4 D 2530 RESIDUAL 2,527.6 29.5 Brown, v. stiff, micaceous silt w/rock frags. М (A-4).2525 2,522.6 34.5 2 2520 Brown, black & tan, med, stiff to hard, 2,517.6+ 39.5 micaceous silt w/rock frags (A-4). 10 2515 2,512.6+ 44.5 М 2510 2,507.6+ 49.5 17 W 일 2505 WEATHERED ROCK 2,502.6 54.5 Weathered rock (Schist) 100/0.3 100/0.3 2,499.9 窗 2500 RESIDUAL Tan, hard silt w/rock frags. (A-4). 2,497.6 59.5 22 36 W 2495 2,492.6 64.5 25 Sat. 2,490 1 67.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,490.1 ft on Crystalline Rock (Schist).

SITE							COUNT						₹,		
	DESCR	IPTION	Bride	ge No.	C48 o	n US 19 East Over Big	Crabtree	Creek					T	GROUN	ID WTR (f
	NG NO.					TATION 247+09		OFFSET 4	2 ft RT			ALIGNMENT -L-		0 HR.	N/
COL	LAR ELE	EV. 2,5	557.7	ft	T	OTAL DEPTH 68.2 ft		NORTHING	798,0	03		EASTING 1,068,089	:	24 HR.	FIA
DRILL	. RIG/HAM	MER EF	F./DAT	E F&I	15404 0	CME-45C 82% 10/21/2011			DRILL N	ETHO	3.H C	S. Augers	HAMMEI	RTYPE	Automatic
	LER B					TART DATE 01/24/1		COMP. DAT				SURFACE WATER DEF	TH N/A		
LEV	DD0/F	DEPTH		W CO		1 1	PER FOOT		SAMP.	V/	1 4	0011 AND DO	014 DE001		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	моі	O G	SOIL AND RO	CK DESCI	RIPTION	DEPTH
2560															
	-	-									1	- - . 2,557.7 GROUN	D SURFA	`E	
	-	-									LŅ.	ROADWAY	EMBANKI	MENT	
2555	-					-						 Dark brown & tan, r w/trc. roots & c 			ıs silt
	2,553.2	4.5	3	4	3		: : : :					.			
	-		3	4	"	4 7	: : : :			М		• •			
2550	_					 						2,549.9 . White & tan, stiff, r	nicaceous	silt w/qu	artz —
	.2,548.2	9.5	5	5	5	10		: : : :		м		. grai	ns (A-4).		
2545	_	-				-					L#	2,544.9			1
	2,543.2	14.5				-1						Tan & red-tan, stif	f, micaceo	us silt (A	-5).
	-		2	4	4	. •8	: : : :			М	Fi.	•			
2540	_	-													
	2,538.2	19.5	1	3	6		: : : :			M		•			
coc	-	-	·			- 29				101					
535						\						2,534.9 Tan & white, v. stiff,			2 uartz
	2,533.2	24.5	3	10	8	18				М		. and rock	frags. (A-	4).	
530	,											_2,529.9			2
	2,528.2	29.5				-/					7.7		BIDUAL	 ıs silt (A.	
	-	-	1	2	1	€ (3				М	N	· Tan a brown, box	, 1111000000	10 0111 (71	٥,٠
525	_	_									11	2,524.9 Tan, brown, hard,	micaccou	o oilt uule	<u>3</u>
	.2,523.2	34.5	12	14	11		1:::	1::::		Sat.	L)		s. (A-5).	5 SHL W/H	JCK
	-	- 1	12	'		25	: : : :			Sal.	Si				
520	0.540.0											_2,519.9 Orange-white, dens			olitic 3
	2,518.2	_39.5	16	13	18	31				М		. quartz sand w/	rock frags.	(A-2-6).	
515	_														4
	2,513.2	44.5					155.1	: : : :			0000	. White, clear, v. den	se, micace sand (A-3)		olitic
	_		26	33	37			70		М	0000	·	,		
2510	_	-						+			0000	2,509.9 White & off-white	e dense n	nicaceou	<u>4</u>
	2,508.2	49.5	7	12	27					М	<u>[</u>	saprolitic qua			
2505	-	-								".		_2,504.9			52
.000	2 502 2	- 54 5						 .				Orangish white,			
	2,503.2	_ 54.5 -	20	26	28		54			М		saprolitic qua	artz sand (/	4-2-6).	
500	_	-				/					$\sqrt{}$	2,500.7 Pink-orange, dense	e, micaceo	us sapro	litic 5
	2,498.2	59.5			0.7							quartz s	and (A-2-7).	
	-	_	4	15	21	 9 36 .				M	<u> </u>				
495	7	_						+				-			
	2,493.2	64.5	51	49/0.2		- 4	<u> </u>	100/0.7	RS-1		7	2,492.7 WEATH	RED ROC	.K	65
2490	†	- 1						- 100/0./	170+1			Weathere			
	2,489, 6	- 68.1 -	60/0.1					60/0.1			V// ₂ /	-2,489.5 Boring Termin			68
	1	-										Penetration Test 2,489.5 ft on Crys	Refusal at	Elevation	
		-									-			. , = 51110	
	1	_													
1	1										l [

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WDO	-		bU	KE		S REPORT		Y YANCEY				GEOLOGIST Payne, P.		
	35609.		Datala			P R-2519B 1 US 19 East Over B						GEOLOGIST Payrie, P.	GROUN	D WTR (ft)
		**********		ge No.		TATION 247+20	.g Crabtree	OFFSET 4	12 ft l T			ALIGNMENT -L-	0 HR.	N/A
	ING NO.			F±		OTAL DEPTH 39,4		NORTHING		2		EASTING 1,068,120	24 HR.	FIAD
	LAR ELE					ME-45C 87.6% 08/15/2		NORTHING	DRILL MI) NIV	<u> </u>	IER TYPE	
	LER Go			E FOI		FART DATE 01/24/		COMP. DA			7 1111	SURFACE WATER DEPTH N		/ latoriago
ELEV	Done I	DEPTH		w co			PER FOOT	,	SAMP.	W/	L	SOIL AND ROCK DES		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI	O G	ELEV. (ft)		DEPTH (ft)
2535 2530		-									000 000 000 000	2,531.2 GROUND SURF ALLUVIAL Tan, loose, micaceous f. to wmica (A-1-I	cse. grain s	0.0 sand
2525	2,525.9	5.3	1	2	2	44				М	000 000 000 000 000 000 000	2,522.6		8.6
2520	2,520.9	10.3	10	20	26		3 46 − − − − − − − − − − − − − − − − − − −			М	000000000000000000000000000000000000000	Tan, dense, f. to cse. grain mica (A-1-b) - SPT blow counts at 10.3' to by gravel exceeding 2"	11.8' influe:	nced
2515	2,515.9	15.3 19.3	20		54/0.2			100/0.7				2,514,9 WEATHERED R Weathered rock (16.3
2510	2,506.9	24.3	20 100/0.2	80/0.2				100/0.7				<u>.</u>		
2505 2500	2,501.9	29.3	8	16	16	32				М		2,504.3 RESIDUAL Brown-red, hard, micaced frags. (A-2-4		26,9 ck
2495	2,496.9	34.3	100/0.2					100/0.2				2,498.6 WEATHERED R Weathered rock (\$		32.6
	2.491.9		60/0.1					60/0.1				2,491.8 Boring Terminated with Penetration Test Refusa 2,491.8 ft on Crystalline for the control of the contro	l at Elevatio	39.4 n t).

WBS	35609	9.1.1			Т	IP R-2519B	COUNTY	YANCEY				GEOLOGIST DeLost, R.		
SITE	DESCR	IPTION	Brid	ge No	. C48 o	n US 19 East Over Big	Crabtree	Creek					GROUN	WTR (ff
BOR	ING NO.	B1-B	WBL		S	TATION 247+42		OFFSET 6	6 ft LT			ALIGNMENT -L-	0 HR.	N/A
COL	LAR EL	EV . 2,	551.0	ft	T	OTAL DEPTH 64.2 ft		NORTHING	798,0	41		EASTING 1,068,133	24 HR.	FIAD
DRILL	RIG/HA!	MER EF	F./DAT	E F&	H0404 (CME-45C 87,6% 08/15/20	11		DRILL N	IETHO	D SF	T Core Boring HA	MMER TYPE /	Automatic
	LER G					TART DATE 02/06/1	·····	COMP. DA	ΓE 03/	01/12		SURFACE WATER DEPTH	N/A	
ELEV	DRIVE	DEPTH	BLO	OW CC	TAUC	BLOWS	PER FOOT		SAMP.	W/		COULAND DOOK D	FOODIDTION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0,5ft	0 25 5	50	75 100	NO.	МО	O G	SOIL AND ROCK D ELEV. (ft)	ESCRIPTION	DEPTH (
												-		,
2555														
		Ŧ												
		Ŧ											RFACE	C
2550	_	-									_\v\.	ROADWAY EMB Red-brown, soft, mica	ANKMENT	
	2,547.1	3.9										frags., quartz grains and		
2545	2,547.1	7.9	2	1	3	•4				D		- -		
2343	-	<u> </u>						 	•					
	2,542.1	8.9		3	3	: : : : : : :				_		 Dark brown, med. stiff w/rock frags. 		t
2540	_	t	4	3	3	Q 6				D		- -		
		<u> </u>				::\: ::::						2,538.8 Tan & black, med, de	ense to dense.	12
	2,537.1	13.9	4	10	11	21		: : : :		Sat.		micaceous sand w/roo	k frags. (A-2-4)	
2535	_	-										_		
	2.532.1	180										"		
2530	2,002.1,	-10.5	10	14	19	33				Sat.		-		
2000	-	<u> </u>			.	/		2						
	2,527.1	23.9				:::::						RESIDUA Tan & white, med. der		3
2525		L	5	6	10	16				W		- saprolite w/alternating qu - (A-2-5)	artz & mica baı	
		F										- (A-2-5) -		
	2,522.1	28.9	24	52	48/0.2							- - 2,521.1		29
2520	_		-,	02	10/0/2			100/0.7			110	WEATHERED		
	-					:::: :::[-		+				. RESIDU	L.	32
	2,517.1	33.9	19	21	24					w		 White-tan, dense, mice w/alternating quartz & mice 		
2515	-	-						 						<u>37</u> .
	2,512.1	38.9					`::::				0000	White & brown, v. der saprolite w/alternating of	se, micaceous	
2510	2,509.8	_	18	17	39		9 56			W	0000	mica bands _2,509.8	(A-3),	41.
	2,509.8-	- 41.2	60/0.0					60/0.0	RS-4			. CRYSTALLINE		
	-	_										- Crystalline rock (i	egmatite)	
2505	_	_										-		
	-													
	_											. 2,501.8 Crystalline rock (F	egmatite).	49.
500	-	-											-9///-	
	_	-										2,497.3		53.
495	-	-										Crystalline rock	(Schist).	
100	-	-										- •		
	-	-										2,492.1		58.
490	-	_										Crystalline rock (F	egmanie).	
		_						: : : :						
-						1		1			54	2,486.8 Boring Terminated at Ele	ration 2 ARR 9 F	64.
İ	_	-										– Boring Ferminated at Ele Crystalline Rock (F		. 111
	4	-										Note: Boring B1-B WE	L was redrilled	
	-	-										within 1 foot of the orig aquired 15 feet of core fro	inal boring and	
		-										feet to 64.2		_
	-	-									-			
	-	-		Ι.	1				i		I			

SHEET 12

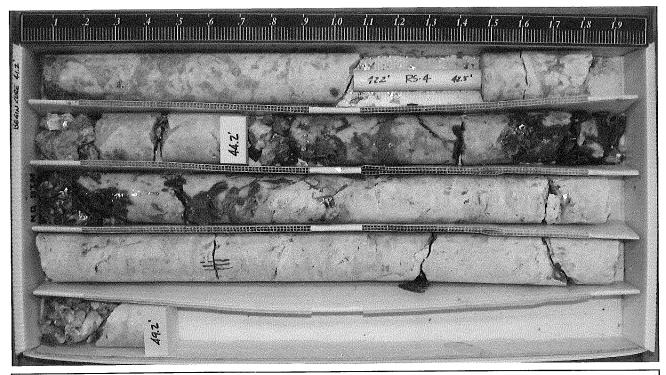


NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

STEDESCRIPTION Bridge No. C48 on US 19 East Over Big Crabtree Creek GROUND WTR (ft)	MDS	25600	1 1		NL D						v v	ANCEV	GEOLOGIST DeLost, R		
BORING NO. B1-B WBL STATION 247+42 OFFSET 6 ft LT ALIGNMENT -L- 0 HR. N/A				l Dride	no No. CA								GEOLOGIST DELOSI, R	<u>. </u>	CROUND WED (#)
COLLAR ELEV. 2,551.0 ft					ge No. C4	Т			DIG CI	ann ee	Т		ALICAMAENT I		` '
DRILLER GOWER, S. START DATE 02/06/12 COMP. DATE 03/01/12 SURFACE WATER DEPTH N/A CORE SIZE NQ2 TOTAL RUN 23.0 ft RUN (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)	\vdash					 					┼		* ***		
DRILLER Gower, S. START DATE 02/06/12 COMP. DATE 03/01/12 SURFACE WATER DEPTH N/A											NO				
CORE SIZE NG2 TOTAL RUN 23.0 ft	 				E F&H040						Γ				
ELEV RUN CH CH CH CH CH CH CH C	<u> </u>			S. 		-					CO	MP. DATE 03/01/12	SURFACE WATER DEP	T H N/A	\
ELEV (ft)	COR	5.44		1	DDII I			N 23.0 f		۸۳۸	ļ.,				
2509.8 2,509.8 41.2 3.0 N=60/0.0 (2.6) (1.5) (3.6) (3.2) (5.0) (3.2) (5.0) (3.2) (5.0) (3.2) (ELEV			RATE	REC.	RQD		REC.	RQD	0		ESCRIPTION AND REMARKS	3	
2,509.8					(IVIIII/IL)	- %	%		<u>%</u>	_ %	G	ELEV. (ft)	5 / 6 / 6 //6 //		DEPTH (f
2505 3.49 100% 64% 3.47 100% 64% 3.47 100% 64% 3.47 4.554 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.55 4.56 4.	2509.8	2,509.8	41.2	3.0	N=60/0.0		(1.5)				Cára)	_ 2,509.8			41.:
2505 3.49 100% 64% 3.47 100% 64% 3.47 100% 64% 3.47 4.554 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.54 4.55 4.56 4.		2,506.8	44.2		4:56 3:09	87%		RS-4	95%	59%	1				
2,501.8	2505			5.0	3:01							 muscovite pegi 	natite w/muscovite pods & tra	aces mic	rocline.
2,501.8 49.2 5.50 5.50 4.42 (5.0) (4.4) 7.29 100% 88% 5.51 4.2 5.01 4.71 (4.7) (2.3) 3.32 3.32 3.32 3.32 3.32 3.32 3.32		1			3:47 4:54	10070	"								
2495 7:29 100% 88% 5:51 5:14 5:01 (4.7) (2.3) 94% 46% 3:32 3:06 3:53 4:03 94% 4:16 4:53 4:48 2.486.8 64.2 4:48 4		2,501.8	49.2	5.0	5:57	/5.0\	(4.4)		(4.5)	(3 Q)		Unia			
2495 2496.8 54.2 5.14 5.01 2496.8 54.2 5.10 2496.8 54.2 5.01 5.0 4.11 (4.7) (2.3) 3.42 94% 46% 3.32 3.30 2490 350 350 44.8) 44.8) 44.8) 44.8) 2490 2490 2490 2490 2490 2490 2490 2490 2490 2490 2490 2490 2490 2490 2490 350 350 44.8) 44.8	2500		•	3.0	7:29		88%			87%		- R1=2, R		RMR=52	·
2495 5.0 4:11 (4.7) (2.3) 3:42 94% 46% 3:32 3:06 2,491.8 59.2 3:06 4:03 96% 96% 96% 4:16 4:53 2,486.8 64.2 4:48 2486.8 64.2 4:48 2486.8 64.2 4:48 Consider a constraint of the constraint of		2 406 9	E4.0		5:14										
2,491.8 59.2 3:06 2,491.8 59.2 3:06 3:53 (4.8) (4.5) 96% 90% 4:16 4:53 4:48 2,486.8 64.2 4:48 2,486.8 64.2 4:48 2,486.8 64.2 4:48 2,486.8 64.2 4:48 2,486.8 64.2 4:48 2,486.8 64.2 4:48 2,486.8 64.2 64.2 64.2 64.2 64.2 64.2 64.2 64.2	2405	2,490.0	34.2	5.0	4:11				(4.9) 94%	(2.8) 54%		Muscovite Pegma	tite w/muscovite pods & vein	s, tros. m	nicrocline.
2,491.8 59.2 3.53 (4.8) (4.5) (4.5) (4.5) 96% 4:03 4:03 4:48 (4.5) 4:48 (4.5) 4:48 (4.6) 4:53	2430	‡			3:32	94%	46%			- 1,70	5	_	frac. w/rough walls		
4:03 4:16 4:16 4:16 4:48 2,486.8 64.2 4:48 4:		2,491.8	59.2		3:06 3:53				/E 4\	(4.5)					
4:16 4:53 2,486.8 4:53 4:48 2,486.8 & crenulated; 6 35°-50° fracs. W/mod. sev. weathering, Iron oxide stain; 1 20° frac. w/rough walls; 1 60° frac. along schistocity White, clear, blue-gray, olive green-gray, scat. pink-orange, fresh, v. hard, mod. close to wide frac. spacing, Feldspar Quartz Muscovite Pegmatite W/scat. microcline. 3 0° fracs. w/v.hard walls Uniaxial compressive strength=281 KSF R1=2, R2=17, R3=2 Boring Terminated at Elevation 2,486.8 ft in Crystalline Rock (Pegmatite). Note: Boring B1-B WBL was redrilled within 1 foot of the original boring	2490			5.0	3:59 4:03				96%	85%					
2,486.8 64.2 4:48		1										& crenulated; 6 35°-5	0° fracs. w/mod. sev. weather	ing, Iron	oxide stain; 1
W/scat. microcline. 3 0° fracs. w/v.hard walls Uniaxial compressive strength=281 KSF R1=2, R2=17, R3=2 Boring Terminated at Elevation 2,486.8 ft in Crystalline Rock (Pegmatite). Note: Boring B1-B WBL was redrilled within 1 foot of the original boring		2,486.8	64.2		4:48						X-7	White, clear, blue-gra	y, olive green-gray, scat. pink	orange,	fresh, v. hard,
Uniaxial compressive strength=281 KSF R1=2, R2=17, R3=2 Boring Terminated at Elevation 2,486.8 ft in Crystalline Rock (Pegmatite). Note: Boring B1-B WBL was redrilled within 1 foot of the original boring		\pm										_ mod. close to wide fr	w/scat. microcline.	Muscovi	ite Pegmatite
R1=2, R2=17, R3=2 Boring Terminated at Elevation 2,486,8 ft in Crystalline Rock (Pegmatite). Note: Boring B1-B WBL was redrilled within 1 foot of the original boring		Ŧ											3 0° fracs, w/v.hard walls		1
Boring Terminated at Elevation 2,486.8 ft in Crystalline Rock (Pegmatite). Note: Boring B1-B WBL was redrilled within 1 foot of the original boring		Ŧ										Unia		1 KSF	
		7										Boring Terminated at		line Roc	k (Pegmatite).
and aquired 15 feet of core from a depth of 49.2 feet to 64.2 feet.		‡													
		#										and aquired 15 fe	et of core from a depth of 49.	2 feet to	64.2 feet.
		‡										• •			
		‡										.			
		+										<u>-</u>			
		<u>+</u>										• •			
		7										· •			
		Ŧ										-			
	Ì	Ŧ										•			
		‡										-			
		#										•			
		‡										• •			
	Ì	士													
		Ŧ										-			
		Ŧ					İ				-	•			
		‡										<u>-</u>			
		‡	ļ				ļ					•			
		1					1					-			
		<u>†</u>							l		-	· ·			
		1					Ì		Ì		-				
		Ŧ									F	_			
		‡									ļ	•			
		‡	1			1					ļ				
		‡							l		ļ	- ·			
		1					l		l		ŀ				
											<u>}</u>				

CORE PHOTOGRAPHIC RECORD

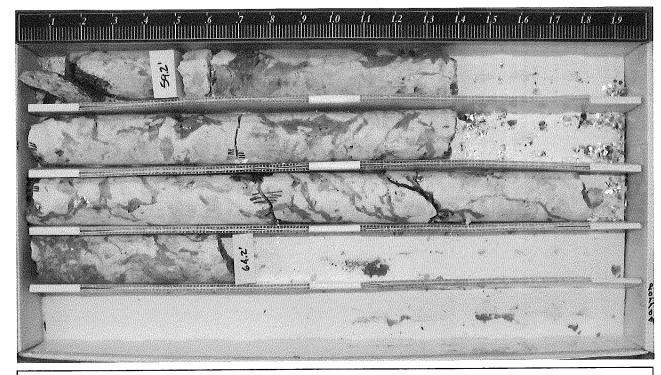
Bridge C48 On US 19 East Over Big Crabtree Creek



B1-B WBL - 247+42 @ 6' Lt. Box 1 of 3



B1-B WBL - 247+42 @ 6' Lt. Box 2 of 3



B1-B WBL - 247+42 @ 6' Lt. Box 3 of 3





	-		BO	KE		G REPORT	1		···	<u>-</u>			
	3 35609					IP R-2519B	<u> </u>	Y YANCEY				GEOLOGIST DeLost, R.	-
SITE	DESCR	RIPTION	1 Brid	lge No.		on US 19 East Over Big	Crabtree	T	·				GROUND WTR (ft)
⊢—	RING NO.					TATION 247+49		OFFSET (ALIGNMENT -L-	0 HR . N/A
COL	LAR EL	EV. 2	,557.9	ft	T	OTAL DEPTH 64.5 ft		NORTHING	798,02	28		EASTING 1,068,136	24 HR. FIAD
DRIL	L RIG/HAN	MER E	FF./DAT	E F&I	H5404 C	CME-45C 82% 10/21/201		r	DRILL M	ETHOL) H.S	S. Augers HAMME	R TYPE Automatic
DRII	LER B	anning	, C.		S	TART DATE 01/18/1	2	COMP. DAT				SURFACE WATER DEPTH N/	4
ELEV (ft)	DRIVE ELEV (ft)	DEPTI (ft)	' 	0.5ft		-	PER FOOT	75 100	SAMP.	MOI	L O G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft)
2560	T .												
	2,557.9	-00	6	4	4			1		D	000	2,557.9 GROUND SURFA ROADWAY EMBANK	MENT
2555	_	‡									000	Tan & brown, loose to m micaceous f. grain sand w/	rock frags. &
	2,553.4	4.5	5	6	8	1 : 1 : : : : :				D	000	trcs. roots (A-3).
0550		‡	ľ			14,							7.0
2550	2.548.4	1 05										2,550.1 Brown, v. stiff, f. sandy silt	W/micaceous 7.8
	2,548.4	9.5	6	6	10	16	: : : :			М		rock frags. & tres. roof	s (A-4).
2545						/							12.8
	2,543.4	14.5	4	4	5	{ :/:: ::::						Tan & brown, stiff, micaceo wood (A-5).	us silt w/trcs.
	:	ł	"	"	ľ	. •9				М		•	
2540	-	<u> </u>					 						
	2,538.4	19.5	2	4	5	9	: : : :	: : :		D			
2535	_	Ł				. \						2,535.1	22.8
	2,533.4	24.5	<u> </u>	<u> </u>		1 - 1						Tan & brown, stiff, f. to v micaceous silt (A	
	-	F	2	4	9	13.				M		•	
2530	_	F										<u>-</u>	
	2,528.4	29.5	2	3	5		: : : :			М		•	
2525	-	ļ.										- - 2,525.1	32.8
	2,523.4	34.5										RESIDUAL Tan & brown, v. stiff to hard,	
	-	-	45	15	10	25	: : : :			W	Į.	w/cse. grain quartz vein and gravel size rock frags, in low	d mica band,
2520	_	-										- graver size rook rage, in low	or part (r t +).
	2,518.4	39.5	34	43	35		: ```.	39 78		W		•	
2515	-	ļ						1				_ <u>2,515.1</u>	42.8
2010	2,513.4 ⁻	- - 44.5	•				1./				0000	Tan-gray & white, v. der micaceous, f. to cse. grain	nse, silty,
		-	9	21	34		9 55			Sat.	0000	(A-3),	444.12 541.13
2510	_	-					+				000	2,510.1 Yellow-tan, v. dense, micao	eeous quartz 47.8
	2,508.4	49.5	24	30	24		1			Sat.	000	sand w/rock frags. (A	
2505	-	-					-/-				200		52.8
2.000	2,503.4	- - 54.5									0000	Tan, v. dense, micaceous frags. (A-3).	
	-	Ī	10	36	33		9 .6	9		D	0000	, wagar (, , a).	
2500	-	-					<u> -</u>				47/	2,500.1 WEATHERED RO	57.8 CK
	2,498.4	59.5	100/0.5					100/0.5				Weathered rock (So	chist)
2495	-	-										•	
2400	2 493 4	- 64.5								·		2,493,4	64.5
	1	-	60/0.0					60/0.0			-	Boring Terminated with Penetration Test Refusal a	Standard at Elevation
		_									þ	2,493.4 ft on Crystalline Ro	ock (Schist).
	‡	-									F		
	+	-									F		
	7	-									F	<u>-</u>	
	‡	-									þ		
		-		Lj				,,,,	<u> </u>		止		

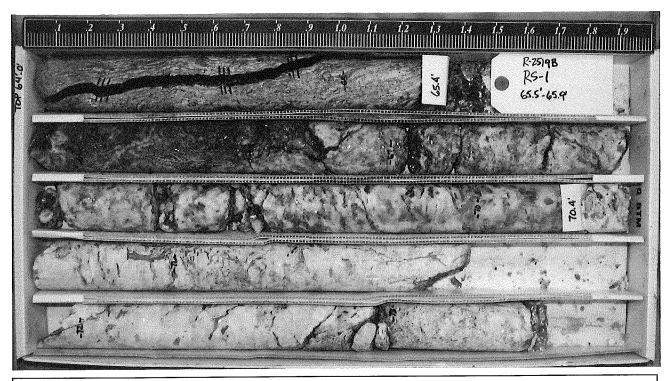
15	DV.	07/	BO	RE	LO	GF	REP	ORT								
WB	S 35609	9,1,1	······································		7	IP F	R-2519I	3	COUNT	Y YANCEY	,			GEOLOGIST DeLost, R.		
SITE	DESCF	RIPTION	N Brid	ge No.	C48 c	on US	19 Eas	st Over Big	Crabtree	Creek					GROUND W	TR (ft)
BOF	RING NO.	. B1-E	B EBL		s	TATI	ON 24	47+69		OFFSET	42 ft RT	•		ALIGNMENT -L-	0 HR.	N/A
COL	LAR EL	EV. 2	,558.0	ft	7	OTAI	. DEPT	H 75.4 ft	t	NORTHING	797,9	88		EASTING 1,068,148	24 HR.	FIAD
DRIL	L RIG/HAI	MMER E	FF./DAT	E F&	H5404	CME-4	5C 82%	6 10/21/201	1		DRILL I	METHO	о н.:	S. Augers HA	AMMER TYPE Autor	matic
DRII	LER B		, C.		s	TAR	DATE	01/25/1	2	COMP. DA		Υ		SURFACE WATER DEPTH	N/A	
ELEV (ft)	ELEV	DEPTI	'	DW CC			,		PER FOO		SAMP.	17	0	SOIL AND ROCK I	DESCRIPTION	
(11)	(ft)	- (11)	0.5ft	0.5ft	0.5ft	0		25	50	75 100	NO.	MOI	G	ELEV. (ft)	DI	EPTH (ft)
2560		ł														
		<u> </u>	1			 	.]	I	T			ļ		2,558.0 GROUND SI ROADWAY EMB		0.0
2555		Ĺ					-							Brown & tan, stiff, mica grains and wood		
	2,554.1	3.9	2	7	6	╢:	- j	: : : :				М		- - -	,	
		‡				:	£::			.						
2550	2,549.1	8.9		<u> </u>	<u> </u>	<u> -</u>	 						7,	Tan, red-tan & red-bro stiff, micaceous silt w/g		
		1	3	4	5	- 1	9					M		- frags. (A		
2545	_	_												<u>-</u>		
İ	2,544.1	13.9	2	4	5] : [l					М	발	• -		
05.40	:	ţ					· · · · · ·						Li	- -		
2540	2,539.1	18.9	3	4	5	-	<u> </u>							<u> </u>		
	:	-	3	*	3	:	9					M		- -		
2535	0.504.5	<u> </u>									1.		_ \(\bar{\bar{\bar{\bar{\bar{\bar{\bar{	<u>.</u>		
	2,534.1	23.9	5	4	4	֓֞֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	8					м		- -		
0500		‡				:	/ 							• •		
2530	2,529.1	28.9	3	11	6	-								- -		
	-	<u> </u>	3	''		:	- 🍎 17 J -					М		• •		
2525	0.504					-	- 1 -						 			<u>32.2</u>
	2,524.1	33.9	4	6	9		- •15					М		 Red, tan & brown, stiff to silt w/rock frag 		
2520	-	-				-	/-							•		
2020	2,519.1	38.9	7	10	13	-	\			1		D	11	- •		
	-	-	'	"	"	:		23		: : : :		ט	7.7	. 0.545.0		
2515	2,514.1	130				-		·/···		1				White, dense, micace	ous quartz sand	<u>42.2</u>
!		-	27	24	18	:		42		: : : :		М		· (A-2-4).	
2510	-	-				-		::/::						_ <u>2,510.8</u> _ Red-brown & white, de		<u>47.2</u>
	2,509.1	48.9	12	15	17	-						М		saprolitic quartz s	and (A-2-6).	
	-	-						32				141	///	2,505.8		E2 2
2505	2,504.1	_53.9				ŀ		<i>[</i>						White, med. dense, mid	caceous saprolitic	<u>52,2</u>
	-		6	10	15			25				М	F	·	A-2-5).	
2500	-	-				-	: : :	/::::						2,500.8 Red-brown & white, har	ed missassus sitt	<u>57.2</u>
	2,499.1	58.9	9	13	24	-						м	F	w/quartz grain	is (A-4).	
	1	_											F			
2495	2,494.1	63.9											F	2,494.0		64.0
***	1	-	60/0.1			-				60/0.1	RS-1			CRYSTALLINI 2.491.4 Crystalline rock (Quartz	E ROCK Muscovite Chlorite	
2490		-				-							毵	- Crystalline rock (Qdartz Schist - Crystalline rock (Feldspa)	66.6
	}	-				-				: : :]				Pegmati		İ
2510 2505 2500 2495 2490	1	-														
2485	-	-				-								-		
		-				-								2,482.6 Boring Terminated at Ele	vation 2 482 6 ft in	75,4
		-												Crystalline Rock (Pegmatite).	}

NCDOT GEOTECHNICAL ENGINEERING UNIT

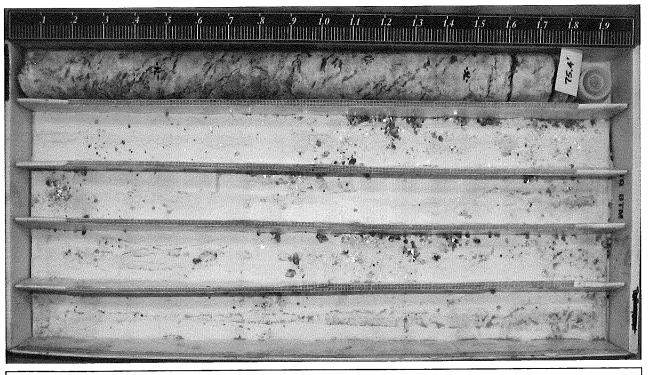
12	YU		CO	RE B	OR	ING	RE	POI	RT					
WBS	35609	.1.1			TIP	R-251	9B	С	OUNT	ΥY	'ANCEY	GEOLOGIST DeLost, R		
SITE	DESCR	PTION	Bridg	je No. C4	8 on U	S 19 E	ast Over	Big Cr	abtree	Cre	ek		GRO	JND WTR (ft)
BOR	NG NO.	B1-B	EBL		STAT	ION	247+69			OF	FSET 42 ft RT	ALIGNMENT -L-	0 HR	. N/A
COL	LAR ELE	V. 2,	558.0 f	t	TOTA	AL DE	PTH 75.	4 ft		NC	RTHING 797,988	EASTING 1,068,148	24 HR	. FIAD
DRILL	RIG/HAM	MER EF	F./DATE	F&H540	4 CME	-45C 8	2% 10/21/2	2011			DRILL METHOD H	.S. Augers	HAMMER TYPE	E Automatic
DRIL	LER Ba	anning,	C.		STAF	RT DA	TE 01/2	5/12		CC	MP. DATE 01/26/12	SURFACE WATER DEPT	TH N/A	
COR	E SIZE	NQ2			TOTA	L RUI	1 11.4 f	t						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RATA RQD (ft) %	L O G	ELEV. (ft)	DESCRIPTION AND REMARKS	3	DEPTH (ft)
2494												Begin Coring @ 64.0 ft		
	3,484.8	- 64.0 - 65.4	1.4	2:12 0:48/0.4	(1.4) (100%)	(1.3) 93%	D0.4	(2.5) 96%	(2.3) 88%	S	2,494.0 Gray gray-gree	CRYSTALLINE ROCK en, white, brown stain, trcs. rose-	pink, fresh to m	64.0
2490	2,487.6-	70,4	5.0	1:44 2:00 2:58 2:12 2:26 3:42 5:13	(4.3) 86% (4.9) 98%	(2.1) 42% (4.1) 82%	RS-1	(8.1) 92%	(5.2) 59%		weathered w/inte frac. spacing 3 20°-30° fracs. White, gray, bl weathered, fracs. & hard, close to n	ervals mod. sev. weathering, harc, Quartz Muscovite Chlorite Schi w/sev. weathering & heavy iron s ue-gray, clear, trcs. red-orange- intervals (<0.2') w/sev. to v. sev nod. close frac. spacing, Feldspa	f to mod. hard, st w/trc. garnets stain, contact @ pink, fresh to m weathering, ha ar Quartz Musco	close s. 0 85° od. ard to v.
2,144	2,482.6	- - 75.4		3:59 3:08 4:47							F 16 0°-15° fracs. w/ - 2,482.6	Pegmatite w/trcs. schistose wall r iron stain & some loose grains; t stain & some sev, weathering	5 40°-60° fracs.	w/iron
											R1=4	niaxial compressive strength=696, R2=17, R3=10, R4=20, R5=7, Rock Type B at Elevation 2,482,6 ft in Crystal	RMR=58	natite).
	+										- 			

CORE PHOTOGRAPHIC RECORD

Bridge C48 On US 19 East Over Big Crabtree Creek



B1-B EBL - 247+69 @ 42' Rt. Box 1 of 2



B1-B EBL - 247+69 @ 42' Rt. Box 2 of 2

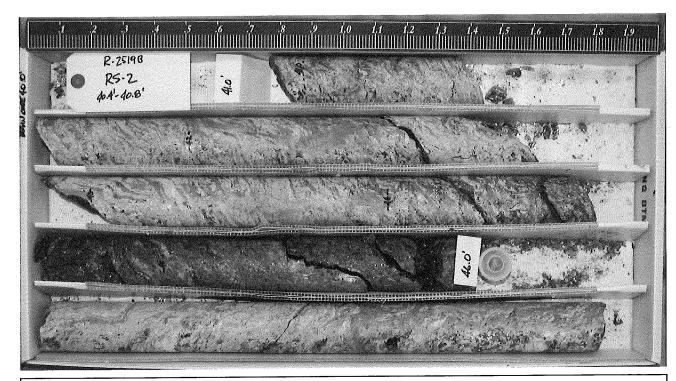
WBS	3560	9.1,1			Т	IP R-2519	В	COUNT	Y YANCE				GEOLOGIST Payne, P.		
SITE	DESCF	RIPTION	l Brid	lge No	. C48 c	on US 19 Ea	st Over Big	Crabtree	Creek					GROUND W	TR (f
BOR	ING NO	B2-A	WBL		s	STATION 2	48+10		OFFSET	42 ft LT			ALIGNMENT -L-	0 HR.	N/A
COL	LAR EL	EV. 2,	532.1	ft	Т	OTAL DEP	TH 51.0 ft	i	NORTHING	3 798,0	060		EASTING 1,068,207	24 HR.	FIAI
					H0404	CME-45C 87.	6% 08/15/20	11	1	DRILL I	METHO	D N		IAMMER TYPE Autor	
	LER G					TART DAT			COMP. DA				SURFACE WATER DEPTH		
LEV	DRIVE	DEPTH	T	OW CC		П		PER FOOT	L	SAMP		1 [
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	МО	0 G	SOIL AND ROCK ELEV. (ft)		EPTH
									•					<u> </u>	
535															
		Ŧ											-		
		 	-	 	ļ	 		,			ļ	200SW	2,532.1 GROUND S ALLUV		
530	-	‡											Brown, soft		
		‡	ŀ										- -		
	2,527.1	5.0	WOH	1	1						Sat.		-		
25	-	+]		2,523.8		
	2.522.1	10.0				: : >;		: : : :					- RESID		
20	'	- 10.0	10	10	22		332	: : : :			М		- White, hard, mica -	ceous silt (A-4).	
ĻU	-	‡					1	<u> </u>	1::::						1
	2,517.1	15.0		<u> </u>] ::::		1:4::	1 : : : :				Tan, v. dense, sand w/ (A-2-	quartzite rock frags.	
15		+	40	47	23			•	70		М		-	1).	
	-	F						[•		
	2,512.1	20.0	50	50/0.1	-			1	<u> </u>				- - 2,511.6		2
10	_	_	30	00/0.1					100/0.6				- WEATHERE Micaceous cse. grain		
	-	L					: : : :	: : : :					interpreted		
	2,507.1	25.0	80	20/0.5	1]			100	•		
05	_	-		l					100/1.0			7	- - - 0 500 0		_
	0.500.4	00.0					-::::-		+÷÷::				_ 2,503.8 - RESID		28
	2,502.1	30.0	10	12	13		25				М		Tan, med. dense to c sand w/rock fra		
00		_												.301 (1 1 1 /).	
	2,497.1	35.0					- 1						-		
95	-	_	10	21	21		42				М		•		
	-	-					: : : :						- •		
1	2,492.1	40.0	00/0.0				: ::ˈ <u>:</u> -		60/0.0	De a			2,492.1		40
90	-	_	60/0.0						60/0.0	RS-2			CRYSTALLII Crystalline rock (Quart	NE ROCK Muscovite Chlorite	
	-	-											. Schis	it)	
	-												•		
85	_	-										5	-		
	-								: : : :				• •		
1	_	-					• • • •						2,481.1		51
		-											Boring Terminated Penetration Test Rei	with Standard	
	1	-											. 2,481.1 ft in Core Loss	Interval Interpreted	
	‡	<u>-</u> -	ļ										. as Crystalline R	ock (achist).	
	-	-										<u> </u>	-		
	+	-										F	•		
	1	-			İ								•		
	†	-											-		
	1	- 1													
	7														
	7	-											-		
	1	:													
	7	.										F			
	7	.											-		
	1	:	-		ŀ										
	Į	. 1								1		I [

NCDOT GEOTECHNICAL ENGINEERING UNIT

	35609	7.1.1			L	R-251	20		OUNT	1 1	ANCEY		GEOLOGIST Payne, P.			
SITE	DESCR	IPTION	Bridg	ge No. C4	8 on U	S 19 E	ast Over	Big Cr	abtree	Cre	ek				GROU	ND WTR (ft
BOF	NNG NO.	B2-A	WBL		STA	TION	248+10			OF	FSET 4	2 ft LT	ALIGNMENT -L-		0 HR.	N/A
COL	LAR ELI	ΞV. 2,	532.1 f	ft	тот	AL DE	PTH 51.	0 ft		NC	RTHING	798,060	EASTING 1,068,207		24 HR.	FIAD
DRIL	L RIG/HAN	IMER EF	F./DATI	E F&H040	04 CME	-45C 8	7.6% 08/15	/2011				DRILL METHOD NW	Casing W/SPT & Core	HAMM	ER TYPE	Automatic
DRII	LER G	ower, S			STAI	RT DA	TE 01/2	4/12		CC	MP. DAT	E 01/24/12	SURFACE WATER DEP	TH N/	A	
COF	RE SIZE	NQ2					1 11.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	L O G	ELEV. (f		ESCRIPTION AND REMARK	s		DEPTH (
492.													Begin Coring @ 40.0 ft			
2490. 2485	3,497:1, 2,486.1		5.0	N=60/0.0 2:02 2:19 2:30 2:36 2:44 3:00 1:52 2:84 3:28 4:59	(0.9) 90% (4.9) 98% (4.4) 88%	(0.8) (3.3) 66% (4.3) 86%	RS-2	(10.3) 94%	(8.4) 76%		2,492.1	w/mod. to sev. we (44.5'-44.9'), close fre Schistocity = 1-3m 50.4'-51.0'; 2 0° frat fracs. w/hard walls, a Unia R1=1, F	Begin Coring @ 40.0 ft CRYSTALLINE ROCK green, brown stain in parts, eathered interval (44,3'-44.9'), e. spacing, garnetiferous, Qi Schist. m & crenulated to contorted es. wilron stain; 6 30' fracs. v elong gneissosity; 3 60°-70° fr exial compressive strength=21 R2=17, R3=10, R4=20, R5=7, Rock Type B with Standard Penetration Te ess Interval Interpreted as Cry	hard w/ uartz Mus 30°-66 v/iron states, w/h 0 KSF RMR=5	soft interv scovite Ch 0°; core lo ain; 5 45°- eavy iron 5	al nlorite sss 50° stain

CORE PHOTOGRAPHIC RECORD

Bridge C48 On US 19 East Over Big Crabtree Creek



B2-A WBL – 248+10 @ 42' Lt. Box 1 of 2



B2-A WBL – 248+19 @ 42' Lt. Box 2 of 2

NBS	35609	.1.1				IP R-2519B	COUNTY YANCEY				GEOLOGIST DeLost, R.	
SITE	DESCR	IPTION	Bride	ge No.	C48 o	n US 19 East Over Big	Crabtree Creek					GROUND WTR (
30RI	ING NO.	B2-B	WBL		s	TATION 248+32	OFFSET	6 ft LT			ALIGNMENT -L-	0 HR. N
COLI	LAR ELE	EV. 2.	552.1	ft	Т	OTAL DEPTH 55.7 ft	NORTHING	798,0	20		EASTING 1,068,220	24 HR. FIA
ORILL	. RIG/HAM	MER EF	F./DAT	E F&I	H0404 (CME-45C 87.6% 08/15/20	 11	DRILL N	IETHOL) SP	T Core Boring HAMM	ER TYPE Automatic
	LER G			11		TART DATE 01/31/12		l			SURFACE WATER DEPTH N	
LEV	DRIVE	DEPTH	1	ow co		1 1	PER FOOT	SAMP.		L		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25 5	50 75 100	NO.	МОІ	0 G	SOIL AND ROCK DES	CRIPTION DEPTH
			ļ									
555												
	-	-									- ·	
	-		ļ	<u> </u>	ļ			-		533	2,552.1 GROUND SURF	
550	-	-									Brown, stiff to v. stiff, mi	caceous silt
	- 2,547.3	- 40									. w/gravel size quartz, rock frags. (A-4).	
	-2,54 <i>1</i> .3	4.8	2	10	14	24			М		•	
545	-	_				 / 	: : : : : : : : : :				- •	
	2,542.3	9.8			ļ,	::/:: :::::						
540	1	_	2	6	4	10			М		<u>. </u>	
	7	-									2,539,0 Brown, loose micaceous sa	and w/quartz &1
ŀ	2,537.3	14.8	4	4	6	•10			Sat.		rock frags. (A-2	
535		-				1 . 410						1.
	2,532.3	- "10.0									RESIDUAL	
	2,332.3	- 19.0	8	11	12	23			М	S t	Orange, white & black, med micaceous saprolitic silt w	/feldspar and
530	1	- -				/-	 				_ quartz grains (A	-4).
	2,527.3	24.8				:/:: ::::				::::t		
525	I	-	4	3	3	6			М	₩F		
	7	-								M.	- -	
	2,522.3	29.8	13	14	16				м			
520		-				• • • • • • • • • • • • • • • • • • •			.,,		-	
	0.547.07	-										
	2,517.3]	34.8	17	68	32/0.1		100/0.6				2,516.3 WEATHERED RO	3:
515	1	-					(00/0.0				- Weathered rock (S	
	2,512.3	39.8									2,512.4	39
510	Ŧ	-	60/0.1								CRYSTALLINE R Crystalline rock (S	ock chist)
	7	-									SPT from 39.8' to 39.9' wa	s advanced in
	‡	•									original boring location. Where redrilled within 1 foot of this	
05	1	-									operations began at 39.7 fee	et and included
	‡										off tills log as per NODC	r request.
	‡											
00	1	-									-	
-	1										0.400.4	
		•									2,496.4 Boring Terminated at Elevati Core Loss Interval Interprete Rock (Pegmatit	d as Crystalline
											Note: Boring B2-B WBL v within 1 foot of the origina aquired 16 feet of core from feet to 55.7 fee	vas redrilled I boring and a depth of 39.7

NCDOT GEOTECHNICAL ENGINEERING UNIT COUNTY YANCEY GEOLOGIST DeLost, R. WBS 35609.1.1 TIP R-2519B GROUND WTR (ft) SITE DESCRIPTION Bridge No. C48 on US 19 East Over Big Crabtree Creek **STATION** 248+32 OFFSET 6 ft LT ALIGNMENT -L-0 HR. N/A BORING NO. B2-B WBL NORTHING 798,020 24 HR. FIAD TOTAL DEPTH 55.7 ft **EASTING** 1,068,220 COLLAR ELEV. 2,552.1 ft DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER Gower, S. **START DATE** 01/31/12 COMP. DATE 03/02/12 SURFACE WATER DEPTH N/A TOTAL RUN 16.0 ft CORE SIZE NQ2 DRILL RATE DEPTH RUN ELEV SAMP. REC. (ft) RQD (ft) DESCRIPTION AND REMARKS (ft) ELEV (ft) (ft) NO. (ft) (Min/ft) Begin Coring @ 39.7 ft CRYSTALLINE ROCK 2;517:4+ 38.7 1.0 3:16 (0.6) (0.5) 5.0 N=60/0.1 60% 50% (15.0) (8.0) 2,512.4 94% 50% White, clear & gray, brown-orange stain & trcs. pink-orange, fresh to mod. 2510 (4.8) (1.1) 96% 22% weathered, v. hard, close to mod. close frac. spacing, megacrystalline, Feldspar Quartz Muscovite Pegmatite w/muscovite & chlorite pods and two 0.7'-1.0' intervals of white, blue-clear, brown-orange, mod. sev. 2,506.4 45.7 weathered, med. hard, v. close to close frac. spacing Muscovite Feldspar 2:52 2:72 2:50 3:16 (5.0) (3.7) 100% 74% 5.0 2505 Schist w/trc. microcline. 2,501.4+ 50.7 3:54 4:04 1:52 2:15 2:18 (4.6) (2.7) 92% 54% 2500 2,496.4+ 55.7 1:56 Boring Terminated at Elevation 2,496.4 ft in Core Loss Interval Interpreted as Crystalline Rock (Pegmatite). Note: Boring B2-B WBL was redrilled within 1 foot of the original boring and aquired 16 feet of core from a depth of 39.7 feet to 55.7 feet.

CORE PHOTOGRAPHIC RECORD

Bridge C48 On US 19 East Over Big Crabtree Creek



B2-B WBL - 248+32 @ 6' Lt. Box 1 of 2



B2-B WBL - 248+32 @ 6' Lt. Box 2 of 2

SILL RIGHAMMER EFF.DATE F8HJOL CMF-8C 876% 89152011 DRILL METHOD SPT Core Boring HAMMER TYPE Automatical Richard Cover, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH N/A	WBS	35609	9.1.1			1	TIP R-2519B	COUNTY	Y YANCEY				GEOLOGIST Payne, P			
DILLAR FLEV. 2,558.9	SITE	DESCR	IPTION	Brid	ge No.	C48	on US 19 East Over Big	Crabtree	Creek						GROUND	WTR (ft
RILLER GOWER, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLE	BOR	ING NO.	B2-A	EBL		5	STATION 248+39		OFFSET 6	6 ft RT			ALIGNMENT -L-		0 HR.	N/A
RILLER GOWER, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 COMP. DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RILLER GOWER, S. START DATE 01/201/2 SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLER GOWER, S. START DATE OF SUBFACE WATER DEPTH NA RICLE	COL	LAR ELI	EV. 2.	558.9	ft	1	TOTAL DEPTH 81.5 f	t	NORTHING	798,0	07		EASTING 1,068,224		24 HR.	FIAD
RILLER GOINT, S. START DATE 01/20/12 COMP. DATE 01/20/12 SURFACE WATER DEPTH NA EV DISTRICT DEPTH 0.58 0.50						H0404	CME-45C 87.6% 08/15/20	<u> </u> 11		DRILL N	METHOD	SP		НАММ	RTYPE A	utomatic
EV BLEY (1) 0.58 0.58 0.58 0.58 0.58 0.58 0.58 0.58									COMP. DA	TE 01/	20/12			!		
Sol, AND ROCK DESCRIPTION DEP Sol, AND ROCK DESCRIPTION DEP 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-4), Sol, 2,556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-4), Sol, 2,556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift (A-5), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-4), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY EMBANKMENT Brown, siff, micraeous sift wireck frage, (A-6), D 2.556.9 GROUND SURFACE ROADWAY BROWN, sol, siff, si			_	T	W CO					_,	7		OSIG MOL WATER DEF	111 14//		
2.584.9 GROUND SURFACE 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 Brown, stiff, micaceous silf (A-8). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.724.9 Gray, hard, silf window frage, (A-4). 2.584.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUND SURFACE Brown, stiff, micaceous silf (A-8). 3.725.9 GROUN	elev (ft)	ELEV		'		,	 			Ī	171			CK DESC	CRIPTION	DEDT I
2,554.5 4.6 3 4 5 6 6 411 DD 2 2,534.9 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0		(10)	 	10.011	1	1		<u> </u>		1	7 IVIOI	9	ELEV. (II)	****		DEPTH (
2,554.5 4.6 3 4 5 6 6 411 DD 2 2,534.9 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0																
55 2.554.3 4.0 3 4 5 6 6 9 11 1 D D D D D D D D D D D D D D D D	2560		+									-		O SURFA	ACE	0.
55 2.554.5 4.8 3 4 5 6 6 6 6 7 1 2 2 2 3 6 6 7 1 2 2 3 6 7 1 2 2 3 6 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 7 1 2 2 3 3 7 1 2 2 3 7 1 2		-	-				1									
2.554.9	2555	-	‡					: : : :							W/IOCK II ays	•
50 2,549.9 9,0 0 2 3 6 6 6 11		2,554.3	4.6	4	1	5							-			
2 2 3 6 6 6 6 6 6 6 6 6 6 7 1 1 1 1 1 1 1 1 1		-	t	ľ	7	ľ	9		: : : :							
2 2 3 6 6 6 6 6 6 6 6 6 6 7 1 1 1 1 1 1 1 1 1	550	2 540 0	90	1									_			
45 2,544 9 14.0 3 4 5 6 10 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			- J.U	2	3	6	- •9				ם	-#F	-			
45 2,544 9 14.0 3 4 5 6 10 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		-	ţ					: : : :	::::				2,546.6			12
40 2,539 9 19.0 3 5 5 1010 25 2,534 9 24.0 4 5 6 111 30 2,529 9 29.0 3 6 6 122 25 2,524 9 34.0 8 32 28 25 2,524 9 34.0 8 32 28 26 2,519 9 39.0 100/0.5 27 2,511.6	545	2.544.9	14.0									_\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Brown, stiff, mi	caceous	silt (A-5).	
25 2,534.9 24.0 4 5 6 111		-,	+	3	4	5	9				D	다				
25 2,534.9 24.0 4 5 6 111		-	Į.													
25 2,534.9 24.0 4 5 6 111	540	2,539.9	19.0		<u> </u>								-			
25 2,524.9 34.0 8 32 28		-	t	3	5	5	- 10				D					
25 2,524.9 34.0 8 32 28		-	-									- -				
25 2,524.9 34.0 8 32 28	35	2,534.9	24.0	1	=	-	- - 						-			
30 2,529,9 29,0 3 6 6 4 12. Black & brown, stiff, micaceous silt w/rock frags. (A-5). 25 2,524,9 34,0 6 32 28 6 760 25 2,514,9 44,0 3 3 3 3 6 6 7		1	<u> </u>	"	١	"	• • • • • • • • • • • • • • • • • • •	: : : :			U	計				
20		_	-						::::				_2,531.6 	ŪVΙΔι—		27
25	530	2,529.9	- 29.0	3	6	6			-				 Black & brown, stiff 	micaced	ous silt w/roc	k
25 2,524.9 34.0 8 32 28		-	-	-			12.	: : : :				%	_	i. (A-5).		
Gray, hard, slit w/rock frags. (A-4). 20	:oe	1	<u> </u>		1							<u> </u>		IDUAL		32
20	25	2,524.9	_ 34.0	8	32	28	 :::: :::::	Seco -	1:::-		w	# t			ags. (A-4).	
20 2,519,9 39,0 100/0.3 100/0.	İ	-	L					- 1				#	2 521 6			27
15 2,514.9 44.0 3 3 3 3 6 6	₅₂₀	2540.7	20.0						† ::::				WEATHE			37
RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4). RESIDUAL Gray & white, med. stiff to v. stiff, micaceous silt w/rock frags. (A-4).		∠,519.9	- 39.0 -	100/0.3					100/0 2			77	- Weathered	rock (So	chist)	
15 2,514.9 44.0 3 3 3 3 4 6		1	<u>.</u>				;===+================================	ļ	100/0.3					IDI : E:		41
10 2,509.9 49.0 7 9 13 22	515	2 514 0										#	_ Gray & white, r	ned, stiff	to v. stiff,	
05 2,504.9 54.0 100/0.3 100/0.3 100/0.3 100/0.5 100/0.5 100/0.5 100/0.5 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3		-,1/1-7.53		3	3	3	6				w	₩F	micaceous silt v	v/rock fra	ıgs. (A-4).	
05 2,504.9 54.0 100/0.3 100/0.3 100/0.3 100/0.5 100/0.5 100/0.5 100/0.5 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3		1	_			1						酃				
05 2,504.9 54.0 100/0.3 100/0.3 100/0.3 100/0.5 100/0.5 100/0.5 100/0.5 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3 RS-3	510	2,509.9	- - 49.0] \		• • • •			獙	-			
05 2,504.9 54.0 100/0.3 100/0.3 100/0.3 100/0.3 100/0.3 100/0.5 100/0.5 100/0.5 2,489.9 69.0 100/0.5 60/0.0 RS-3 CRYSTALLINE ROCK		-	-	7	9	13	22				l w	∰⊦				
2,499.9 59.0 100/0.3 100/0.3 100/0.5 2,499.9 69.0 100/0.5 100/0.5 2,489.9 69.0 100/0.5 60/0.0 RS-3 CRYSTALLINE ROCK		7	-									₩£	2,506.6		-17	52.
100 2,499.9 59.0 100/0.3 100/0.3 100/0.5 100/0.5 100/0.5 2,489.9 69.0 2,488.4 70.5 60/0.0 RS-3 CRYSTALLINE ROCK	505	2,504.9	- 54.0	100/2 2												
100/0.3 2,494.9 64.0 100/0.5 100/0.5 100/0.5 100/0.5 100/0.5 100/0.5 RS-3 CRYSTALLINE ROCK		1	-	100/0.3					100/0.3						,	
100/0.3 2,494.9 64.0 100/0.5 100/0.5 100/0.5 100/0.5 100/0.5 100/0.5 RS-3 CRYSTALLINE ROCK		1	-			•			: : :							
2,494.9 64.0 100/0.5 100/0.5 2,489.9 69.0 2,488.4 70.5 60/0.0 RS-3 CRYSTALLINE ROCK	00	2,499.9	- 59.0	100/0 3				· · · · ·				10				
0 2,489.9 69.0 2,488.4 70.5 60/0.0 RS-3 CRYSTALLINE ROCK		‡	-	.00,0.0					100/0.3		1	**				
0 2,489.9 69.0 2,488.4 70.5 60/0.0 RS-3 CRYSTALLINE ROCK	OF.	<u></u>	-						::::			**				
2,488.4 70.5 60/0.0 RS-3 CRYSTALLINE ROCK	95	2,494.9	- 64.0	100/0.5					+:		7 X					
2,488.4 70.5 100/0.5 2,488.4 CRYSTALLINE ROCK		7	-						100/0.5							
2,488.4 70.5 100/0.5 2,488.4 CRYSTALLINE ROCK	90	<u>, , , , , </u> ‡							: : :							
+ 60/0.0				100/0.5				· · · · ·	- 2000				2.488.4			70.
		z,408.4 	. /u.a.	60/0.0					100/0.5	RS-3			CRYSTAL			
Crystalline rock (Quartz Muscovite Chlorite Schist)	185	Ŧ	-) - -				covite Chlorit	е
		†	-				1							,		
		1	: l						::::] [3	斜				
	80	Ŧ	.								5					



WBS	S 35609.1.1	TIP R-2519B	COUNTY YANCE	<u> </u>	GEOLOGIST Payne, P.	
SITE	E DESCRIPTION Bridge No. C	C48 on US 19 East Over Big	Crabtree Creek			GROUND WTR (ft)
BOR	RING NO. B2-A EBL	STATION 248+39	OFFSET	6 ft RT	ALIGNMENT -L-	0 HR. N/A
COL	LAR ELEV. 2,558.9 ft	TOTAL DEPTH 81.5 ft	t NORTHIN	G 798,007	EASTING 1,068,224	24 HR. FIAD
DRILI	L RIG/HAMMER EFF./DATE F&H0	404 CME-45C 87.6% 08/15/20)11	DRILL METHOD SI	PT Core Boring HAI	MMER TYPE Automatic
DRIL	LLER Gower, S.	START DATE 01/20/1	2 COMP. DA	ATE 01/20/12	SURFACE WATER DEPTH	N/A
ELEV (ft)		 i	PER FOOT 50 75 100	SAMP. L O NO. MOI G	SOIL AND ROCK D	ESCRIPTION DEPTH (
2480	 	Mato	ch Line			
					2,477.4 Boring Terminated at Ele Crystalline Rock	vation 2,477.4 ft in (Schist).





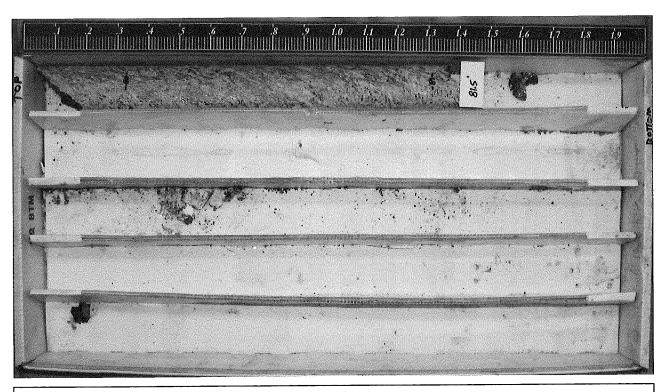
							i REI				
	35609		<u> </u>		L	R-251					YANCEY GEOLOGIST Payne, P.
				ge No. C4			ast Over	Big Cr	abtree		
	NG NO.			•			248+39	c #		 	FFSET 6 ft RT ALIGNMENT -L- 0 HR. N/.
	LAR ELI						PTH 81.			NU	ORTHING 798,007 EASTING 1,068,224 24 HR. FIAI DRILL METHOD SPT Core Boring HAMMER TYPE Automatic
				E F&MU4	_		7.6% 08/15 TE 01/2			<u></u>	OMP. DATE 01/20/12 SURFACE WATER DEPTH N/A
	LER G E SIZE),				N 11.0 ft				SURFACE WATER DEFTIL TVA
Т		T	RUN	DRILL	REC.		SAMP.	STR REC.	ATA	L	
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	(ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	NO.	REC. (ft) %	RQD (ft) %	0 G	ELEV. (ft) DEPTH
2485	2,482.4	76.5	5.0	N=60/0.0 2:21 2:16 2:20 2:24 2:28 3:32 2:44 2:42 2:22 2:48	(1.0) \100% (5.0) 100% (5.0) 100%	(4.8)	RS-3	(10.6)	(10.1)		Begin Coring @ 70.5 ft CRYSTALLINE ROCK Gray, gray-green, while, tros: ose-pink, fresh wisli, weathered interval, hard to v. hard, mod. close frac. spacing, Quartz Miscovite Chlorite Schist Wigarnets & Interval (17.5-78.0 ymile, black-green, brown stain, sl.) weathered Feldspar Quartz Muscovite Pegmatite. Contact (@ 55°; schistotly = furm-2mm @ 65°-70°, crenulated to contorted; 25°5° fracs. wifrregular walls & sl. iron stain; 36°-20° fracs. wihard walls sl. sl. stain; core loss @ 78.0-78.2 & 81.3-81.5° Uniavial compressive strength=184 KSF R1=1, R2=20, R3=20, R4=20, R5=7, RMR=68 Rock Type B Boring Terminated at Elevation 2,477.4 ft in Crystalline Rock (Schist).

CORE PHOTOGRAPHIC RECORD

Bridge C48 On US 19 East Over Big Crabtree Creek



B2-A EBL – 248+39 @ 6' Rt. Box 1 of 2



B2-A EBL - 248+39 @ 6' Rt. Box 2 of 2

WBS	35609	3.1.1			Ti	IP R-2519B	COUNT	YANCEY				GEOLOGIST DeLost, R.		
SITE	DESCR	IPTION	Brid	ge No.	C48 o	n US 19 East Over Big	Crabtree	Creek					GROUND WTR	
	ING NO.					TATION 248+59		OFFSET 4	12 ft RT			ALIGNMENT -L-	0 HR. N	
COL	LAR ELI	EV . 2	559 6	ft	T	OTAL DEPTH 63.4 ft		NORTHING	797.9	67		EASTING 1,068,235 24 HR.		
					_	CME-45C 82% 10/21/2011		***************************************			п н с	1	.MMER TYPE Automatic	
				E FOI				COMP DA			11.0			
	LER B	F	T			TART DATE 01/24/1		COMP. DA	SAMP.		1 1 1	SURFACE WATER DEPTH	N/A	
LEV (ft)	DRIVE ELEV	DEPTH (ft)	0.5ft	0.5ft		4 1	PER FOOT 50	75 100	1	17	ō	SOIL AND ROCK D	ESCRIPTION	
	(ft)	(1.7)	0.510	0,511	U,SIL		<u> </u>	7.5	NO.	MO	G	ELEV. (ft)	DEPTI	
2560		<u> </u>									<u> </u>	_2,559.6 GROUND SL		
		_										ROADWAY EME Brown, med. stiff, mica		
		t				i : : : : : : :	: : : :	::::				frags. (A		
555	2,555.1	4.5	3	3	3	1				D		-		
	-	-								-		0.554.0		
EEA	0.550.4	‡ <u>, , , , , , , , , , , , , , , , , , ,</u>										_2,551.8 Tan-white, stiff, mica	ceous silt (A-4).	
บอง	2,550.1	9.5	4	4	7	- 11		1		М		-		
	-	L									H	2,546.8	1	
545	2,545.1	14.5									□ 3;	Tan-red & tan, stiff, mica grains (A	ceous silt w/quartz	
	-		4	4	5	. •9				М	F.F	- grains (A	-5).	
	-	ļ		1										
540	2,540.1	19.5		<u> </u>		-						-		
	-	Ĺ	3	4	5	9		: : : :		М				
	-	F									日建			
535	2,535.1	_24.5	4	5	6							_		
	-		4	"		- 011		: : : :		M				
	-	-				: : :`N : : : :					_ <u>\</u> \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_2,531.8	AL2	
530	2,530.1	29.5	4	11	21	\				D	F	 Black & white, dense, r 	nicaceous quartz	
	-	-	,			32						sand w/rock frag	•	
	-					- - -		: : : :			2000	2,526.8 Black & white, dense, si	Ity gravel & cobble	
25	2,525.1	34.5	7	22	17					М	0 0 0 0	size quartz & rock	frags. (A-3).	
	-										0000	2,521.8	9	
-20	2,520.1	- ^^ =				: : : : 7 : : :						Orange & white, med. d	lense, micaceous	
120	Z,5ZU. L	_ 39.5	18	14	11	•25		1		М		- saprolitic quartz sand w/	rock frags, (A-2-6),	
												2,516,8	. 4	
515	2,515. <u>1</u>	44.5						T: : :			>	Tan, v. dense, micaceou	s, silty quartz sand	
		- 17.0	21	36	60			>996		М		and rock frags.	(A-2-1).	
	-	-										2,511.8	4	
510	2,510.1	49.5					· · · · · · ·				L	Red-brown-orange 8 micaceous saprolitic qu	white, dense, artz sand w/rock	
	4	-	14	17	21	• • • • • • • • • • • • • • •				М	-	frags (A-2	-4).	
	1	-									Į. Į	2,506.8	5	
505	2,505.1	54.5	22	18	22						//	Orange, white & black, o saprolitic quartz sa		
	1	-	~~	10		•40		::::		M				
	}	_						: : :						
500	2,500.1	_ 59.5	91	9/0.1				100/0,6				-2,499.6 WEATHERED	6 BOCK	
	1	-										Weathered rock		
	2,496.3	63.3	60/0.1			• • • • • • • • • • • • • • • • • • •		60/0.1				2,496.2	6	
	-	_	JU/U, 1					30/0.1				Boring Terminated v Penetration Test Refu	sal at Elevation	
	7	-									F	2,496.2 ft on Crystallin		
	1	-												
	\pm	-									<u> </u>			
	7	-									F			
	‡	-									-			
	1	-										•		
		-									-			
	1	.												
- 1		l l		: I										



WBS	35609	9.1.1			וד	IP R-2519B	COUNT	Y YANCEY				GEOLOGIST DeLost, R.		
SITE	DESCR	RIPTION	Brid	ge No.	C48 o	on US 19 East Over Big	j Crabtree	Creek					GROUND	WTR (ft
30R	ING NO.	EB2-	A WBI		s	TATION 248+76		OFFSET 4	2 ft LT			ALIGNMENT -L-	0 HR.	N/A
COL	LAR EL	EV. 2,	541.8	ft	T	OTAL DEPTH 39.5 f	Ċ	NORTHING	798,04	4 5		EASTING 1,068,271	24 HR.	FIAC
ORILL	RIG/HAN	VMER EI	F./DAT	E F&l	-10404 C	CME-45C 87.6% 08/15/20	11		DRILL M	ETHO	Э Н.	S. Augers HAMN	IER TYPE Au	tomatic
DRIL	LER G		S.		S	TART DATE 01/30/1	2	COMP. DA	ΓE 01/3	30/12		SURFACE WATER DEPTH N	'A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	' ——	0.5ft		4 !	PER FOOT	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DES	CRIPTION	DEPTH (f
2545		 - -										_		
		‡]					7.37	2,541.8 GROUND SURF	ACE	0.
2540	_	‡									7	Orange & black, soft, micade	ceous silt (A-5).
	2,537.3	4.5							·		7.7			
2535		Ŧ	1	1	2	6 3				М	1	-		
.000	-	‡										2,534,0 Gray, soft, silty clay w/sand	grains (A.7.5	<u></u> <u>.7</u> .
	2,532.3	9.5	3	2	1		: : : :			М		- Oldy, soll, oldy would	granto (717-o	
530	-	‡				3 3		1						12.
	2,527.3	14.5										RESIDUAL Brown, v. dense, sand w/gr	avel & cobble	
2525		‡	9	32	53			>085		Sat.		(A-2-5). Blow count influenced by		•
.OL.O	-	‡										_2,524.0 gravel and cobb	les.	. 17 ـــر
	2,522.3	19.5	2	3	2					Sat.		White-tan, med. stiff, micad	ceous silt (A-4)	١.
520	-	‡				•5				oat,		- - - 2 540 0		22.
	2,517.3°	7 24 5					1				. 1			
	-	- 24.11	19	32	34		966	3		М	11	White-orange, hard, micaco frags. (A-5).	ous siit w/roc	K
515	_	ţ					: : j_				17	2,514.0	001/	27.
	2,512.3	29,5	60	40/0.3			: : : :					WEATHERED R Weathered rock (S		
510	_	<u> </u>	00	10,0.0				- 100/0.8				- 		32.
	2,507,3 ⁻	24.5				:::: :[:::	= = = =					RESIDUAL Brown & orange, dense,	micaceous	
		.34.5	16	18	18	36				М		saprolitic sand (A		
505	_	-						1				- -		
-	2,502.3	39.5	60/0.0			- <u> - </u>	<u> </u>	60/0.0				2,502.3	Standard	39.
			60/0.0					60/0.0				Boring Terminated with Penetration Test Refusal 2,502.3 ft on Crystalline F	at Elevation	
	-	-										. •		
	-	-										-		
	7	-										- -		
	-	-										- •		
·	-	-												
	-											•		
		-										-		
	-	-										•		
	-	_										•		
	_	_										- ·		
	1	}										•		
	_	<u>-</u>										-		
	1	_												
	1	_									<u> </u>	•		
	7	_										-		
	1	_												
	1	[•		

SITE								Y YANCEY				GEOLOGIST DeLost, R.	
	DESCR	RIPTION	N Brid	ge No.	C48 c	on US 19 East Over Big	Crabtree	Creek					GROUND WTR
ORI	NG NO.	EB2	-C		s	TATION 249+04		OFFSET (ft RT			ALIGNMENT -L-	0 HR.
COLL	AR EL	EV . 2	.559.9	ft	Т Т	OTAL DEPTH 54.8 ft		NORTHING	797.9	92		EASTING 1,068,287 24 HR.	
						CME-45C 82% 10/21/2011			DRILL		D HS		24 HR. FI
	ER B					TART DATE 01/20/1		COMP. DA	L			SURFACE WATER DEPTH N/A	
			51.6	ow cc		F 1	PER FOOT		SAMP.		11	GOIT AGE WATER BEFTI	1
LEV (ft)	DRIVE ELEV (ft)	DEPTI (ft)	0.5ft			4 i		75 100	NO.	ΓZ	Ö	SOIL AND ROCK DESC	
-	(11)		10.01	0.01	0.011		1	1	1101	/MO	l G	ELEV. (ft)	DEPT
			ŀ										
560							T	1		 	 [:	2,559.9 GROUND SURFA ROADWAY EMBANK	
	•	‡			-							Brown-tan & brown, loose to	med. dense,
555	2,555.2	4.7					: : : :					micaceous f. grain sand w (A-2-6).	rock irags.
555	ــــــــــــــــــــــــــــــــــــــ	‡ 	9	7	4	. •11		1		D		- -	
		‡			İ	: :: ::::							
550	2,550.2	9.7	<u> </u>	ļ		- 				ŀ		<u>. </u>	
İ		F	4	4	5	9				D		•	
		ļ.										2,546.9	766
545	2,545.2 <u>`</u>	14.7	3	4	4					١.,		Light brown & tan, med. st micaceous silt (A	iii to v. stiii, 5).
		t	ľ		"					М			
	•	ł											
40	2,540.2	19.7	2	3	6	40		1		м		-	
		‡				- 4				""		• . •	
		<u> </u>	-			\		: : : :					
35 🗆	2,535.2 <u> </u>	24.7	4	8	8	16		 		М			
	-	F						: : : :				2,531.9	
20	2,530.2	20.7				::::::						ALLUVIAL	
3U	_, <u></u>	29.7	4	6	6			 		М		Tan-brown, stiff, micaceous s frags. & roots (A-	
	-	Ŀ	1						·		₩t	2,526,9	,
25 2	2,525.2 [~]										0000	RESIDUAL	
	-		9	16	13	29					0000	 Tan-black, med. dense, silt quartz sand w/mica & rock 	rags. (A-3).
	-	Ĺ				:::::/:::::					9 0 0 0 9 0 0 0	2,521.9	
20 2	2,520.2	39.7			40	/						Orange-white & brown, me dense, silty quartz sand w/s	d. dense to nica & rock
	_	-	3	5	13							frags. (A-2-6).	mod a rook
	-	-											
15 2	2,515.2	44.7	3	10	24							_	
	-	-	"	10	_	• • • • • • • • • • • • • • • • • • •							
	3	-									777	2,511.9 WEATHERED RO	CK .
0 2	2,510.2	49.7	100/0.4					100/0,4				- Weathered rock (Sc	
	-	-											
		-										0.505.4	
4	2,505.2	54./	60/0.1					60/0.1			9777	2,505.1 Boring Terminated with	Standard (
	1	-									F	Penetration Test Refusal a 2,505.1 ft on Crystalline Ro	t Elevation



C TOWN	<u>// U</u>		bU	KE		G REPORT	COLINIT	V MANOEW				OFFICIAL PLANE		
\vdash	35609		L D.:			IP R-2519B	L	Y YANCEY				GEOLOGIST DeLost, R.	GROUND V	ACT (64)
_						n US 19 East Over Big	Crabtree	T	10 & DT			ALICAINTAIT I		
	ING NO.					TATION 249+25		OFFSET 4	***************************************			ALIGNMENT -L- EASTING 1,068,298	0 HR.	N/A
	LAR EL					OTAL DEPTH 58.7 ft		NORTHING			- U.C		24 HR.	FIAD
	L RIG/HAN			E F&I		CME-45C 82% 10/21/2011		COMP DAT	DRILL M) H'S	T	RTYPE Aut	omatic
	LER B	T		ow co		TART DATE 01/20/1	Z PER FOOT	COMP. DAT	SAMP.	2/12	111	SURFACE WATER DEPTH N/	+	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft			4	50	75 100	NO.	MOI	0	SOIL AND ROCK DESC		DEPTH (ft)
	(11)			<u> </u>	 					ZIVIOI		ELEV. (II)		DEP IN (IU
2565														
2000		‡									-	-		
		‡									-	2,561.3 GROUND SURFA	ACE	0.0
2560		‡										ROADWAY EMBANI Dark brown, med. stiff, mi		
		‡										w/roots & wood (A	k-5).	
2555	2,556.8	4.5	4	3	4	7				М				
2000	1 -	‡						1						
	2,551.8	9.5	1	3	3			: : : :				Tan & brown, med. stiff to st silt w/quartz grains & wood		5
2550	-	‡	'	3	3	6				M		· ·		
		‡												
2545	2,546.8	14.5	3	4	4	8				М				
2010	-	‡												17.8
	2,541.8-	19.5	3	4	5							ROADWAY EMBANN Tan, med. stiff to stiff, micac		
2540		-	"	4		9				М		-		
	-	<u> </u>												
2535	2,536.8-	24.5	1	4	5	9				М				
2000	-	-				-						-		
	2,531.8-	29.5		2		: ::: :::::								
2530	-	<u> </u>	2	2	4	6;				М		-		
	-					:::::					200	2,528.5 RESIDUAL		32.8
2525	2,526.8-	34.5	29	36	18		39 54 · · ·				000 000 000 000	Brown, v. dense, med. to micaceous quartz sand w.	cse. grain silt (A-1-b).	
2020	-	-									000	2.523.5		37.8
	2,521.8-	39.5	40	-							\mathbb{Z}	White & back, med. dense s cse. grain quartz sand w		•
2520	-	_	13	5	′	12					$\langle \cdot \rangle$	(A-2-6).		1
	0.540.0											2.518.5 Orange-white, med. dense, s		<u>42.8</u>
2515	2,516.8- -	- 44.5	4	10	10	20					///	f. to cse, grain quartz sa	nd (A-2-7).	1
	-	-									///	_2,513.5		47.8
	2,511.8-	49.5_	17	20	19						///	Brown & white, silty, dense micaceous f. to cse. grain		
2510	_	-	''	20	13	39					///	(A-2-6).		
											///			1
2505	2,506.8-	- D4.D	90	10/0.1		:::: ::::-		100/0.6			777	2,506.3 WEATHERED RO		55,0
	_	•										Weathered rock (Se	chist)	50.7
	2,502.6-	58.7 -	60/0.0			1 1		60/0.0			-	2,502.6 Boring Terminated with	Standard	58.7
	_	-			1							Penetration Test Refusal - 2,502.6 ft on Crystalline Re		1
	1	-									F			1
		-									F			
		-									 	•		
		_												
		-			***************************************						-			
	‡	-												
	‡	-												
	l		L						L					

PROJECT NO.: R2519-B W.B.S. NO.: 35609.1.1

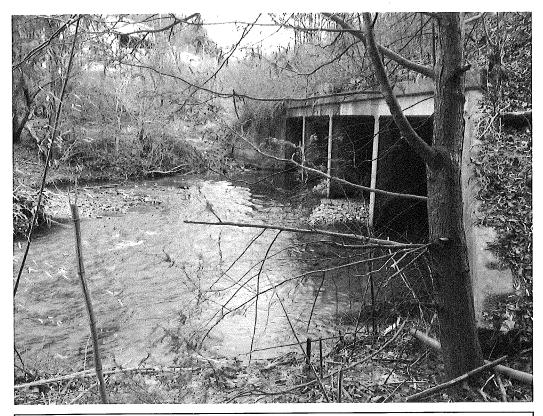
COUNTY: Yancey

Bridge #C48 on US 19E over Big Crabtree Creek

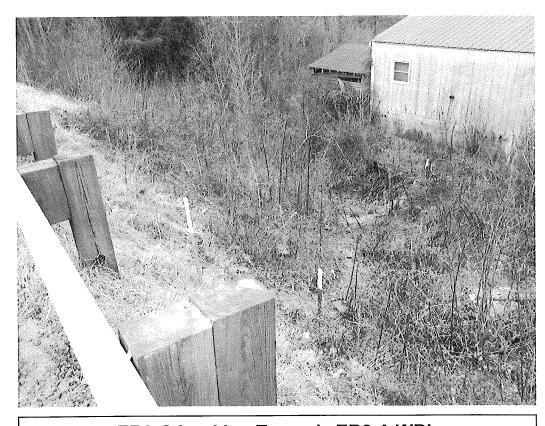
Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B1-B EBL	65.5-65.9	Sch/Peg contact	Zabg	86%	4.11	1.99	163	4,851			sli. weathered
RS-2	B2-A WBL	40.4-40.8	Schist	Zabg	80%	4.10	1.99	172	1,449			fresh
RS-3	B2-A EBL	70.7-71.1	Schist	Zabg	100%	4.12	1.98	172	1,279			fresh
RS-4	B1-B WBL	42.2-42.5	Pegmatite	Zabg	50%	4.07	1.99	161	1,949			fresh
				,								
											er se et e	
		•										VIII - V
		:										
	-											
		,										
					74.57.98.27							
												, , , , , , , , , , , , , , , , , , ,
							.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					

SITE PHOTOGRAPHIC RECORD

Bridge C48 on US 19 Over Big Crabtree Creek



B1-A WBL Looking Along Profile Towards EB2-A WBL



EB2-C Looking Towards EB2-A WBL



EB2-C Looking Towards EB1-C



EB2-C Looking Towards B2-B EBL

ID:R-25191

OJECT: 35609.1.1

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

CONTENTS

SHEET DESCRIPTION I TITLE SHEET 2 LEGEND 3 SITE PLAN

PROFILE

STRUCTURE SUBSURFACE INVESTIGATION

	VANIOEV AUTOUELL	F.A. PROJ
OUNTY	YANCEY-MITCHELL	
ROJECT DESCRIPTION	US-19E FROM SR-1186	TO THE MULTI-LANE
	SECTION WEST OF SP	RUCE PINE
ITE DESCRIPTION	RETAINING WALL LEFT OF	-L- STATION
	NTERVAL 79+00 TO 87+	50

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	35609.1.1 (R-2519B)	1	브

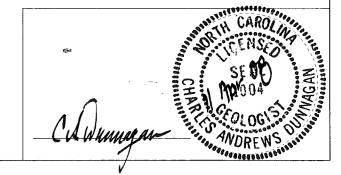
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORNIS LOSS, ROCK CORES, AND SON LEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORRING LOSS, ROCK CORES, OR SON. TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CECTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNIGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN STILL (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELABILITY NHERENT IN THE STANDARD TEST WETHOU. THE OBSERVED WATER LEVELS OR SOIL MOSITIME CONDITIONS SINCATED IN THE SUBSIFIER OR NIVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE EMPESTICATIONS ARE AS RECORDED AT THE TIME OF THE EMPESTICATION. THESE WATER LEVELS OR SOIL MOSITIME CONDITIONS TO CLIMATIC CONDITIONS TO CANDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CLIMATIC CONDITIONS TO CLIMATIC CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CLIMATIC CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CLIMATIC CONDITIONS TO CONDITIONS TO CONDITIONS TO CONDITIONS TO CLIMATIC CONDITIONS TO CONDI

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND BY MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOLUMENTS FOR PRILING DESIGN REFORMATION ON THIS PROJECT, THE DEFARTMENT DOES NOT MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOT PHEN THE REPORT OF PROJECT, THE DEPARTMENT AS TO THE STYPE OF MATERIALS AND COUDTIONS TO BE EXCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY MANSELF AS TO CONDITIONS TO BE EXCOUNTEDED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAMS FOR ADDITIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE HIDICATED IN THE SUBSURFACE INFORMATION.

APRIL 2008



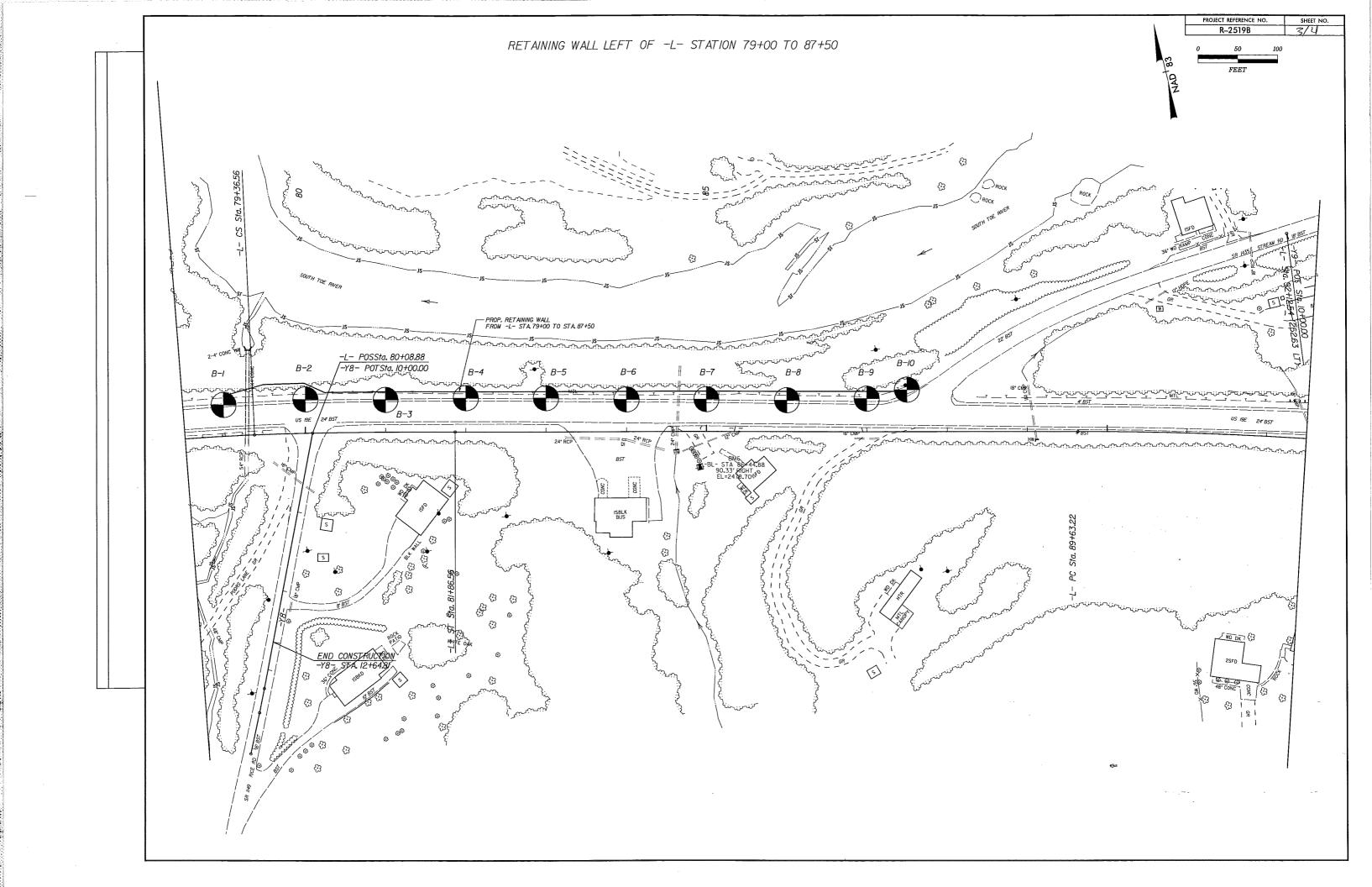
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

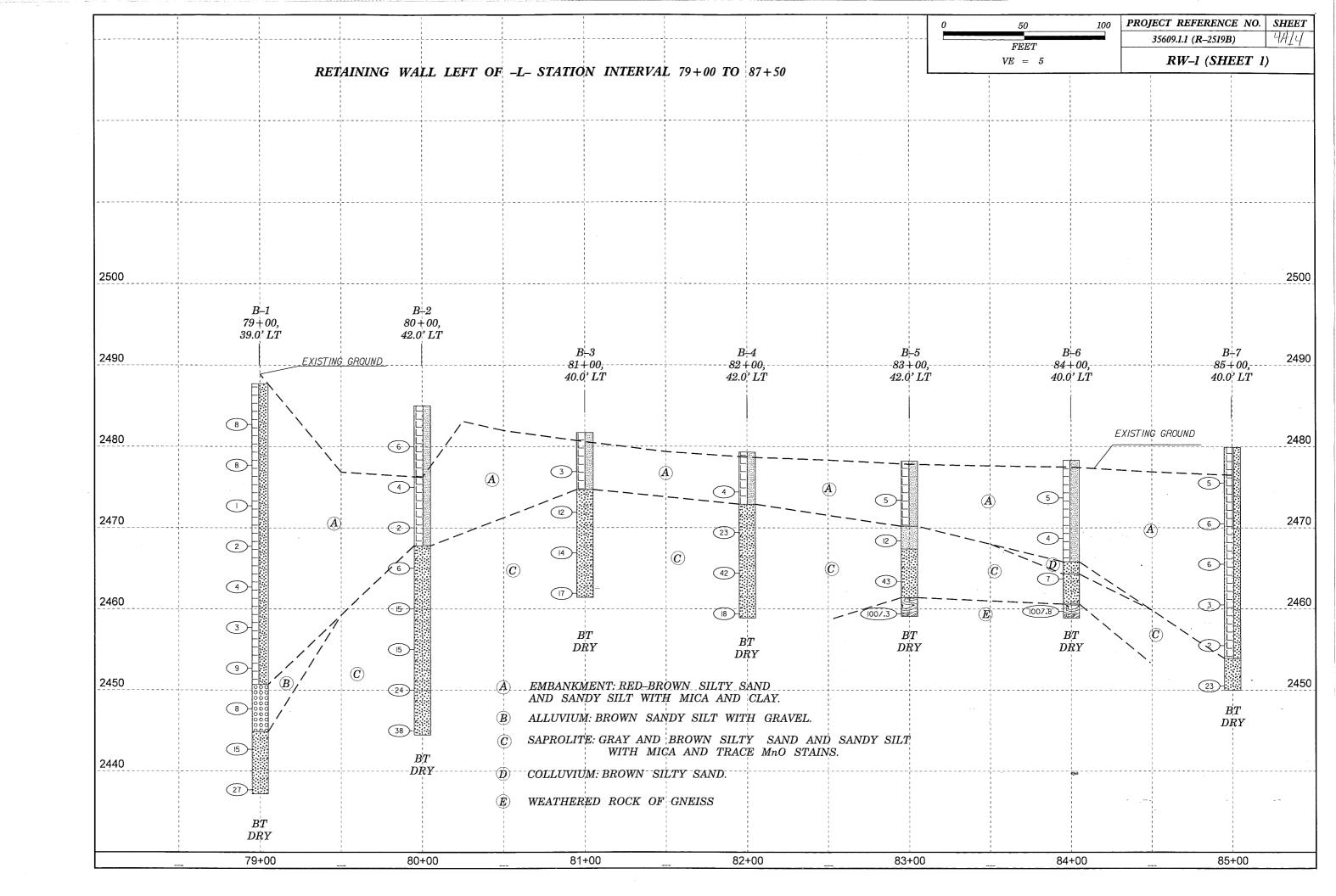
DIVISION OF HIGHWAYS

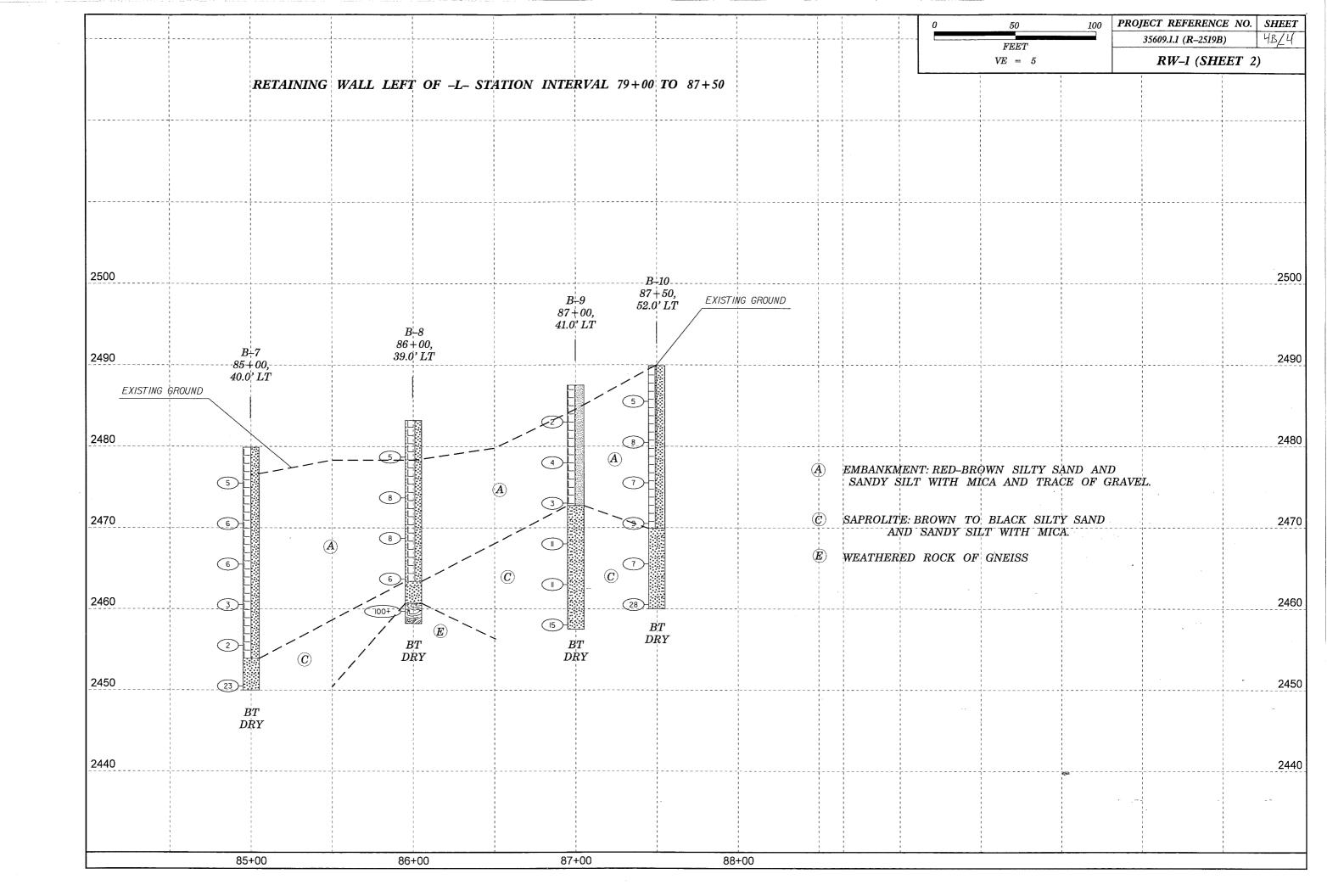
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

							SOIL AND ROC	CK LEGEND, TERM	s, symbo	DLS, AN	ND ABBREVIA	ATIONS		
		SOIL DESCRIPTIO)N			UELL COARES	GRADATION	TOOK FIRE TO COADES	LIABL BOOK	TO NOV		DESCRIPTION	5154 AV 1055	TERMS AND DEFINITIONS
	DERED TO BE THE UNCONSOL				s	UNIFORM - INDICATES THAT SO	OOD REPRESENTATION OF PARTICLE SIZES F IL PARTICLES ARE ALL APPROXIMATELY THE	HUM FINE TO COARSE. E SAME SIZE.(ALSO	ROCK LINE II	INDICATES THE	E LEVEL AT WHICH NON-CO	IF TESTED, WOULD YIELD SPT REI DASTAL PLAIN MATERIAL WOULD YI	IELD SPT REFUSAL.	ALLUYIUM (ALLUY,) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER,
100 BLOWS PER	PENETRATED WITH A CONTIN R FOOT ACCORDING TO STAN	DARD PENETRATION TEST (AASHTO T206,	ASTM D-15861, SOIL		POORLY GRADED) GAP-GRADED - INDICATES A MIX	XTURE OF UNIFORM PARTICLES OF TWO OR M	MORE SIZES.	IN NON-COAS	STAL PLAIN MA		SAMPLER EQUAL TO OR LESS THAN N BETWEEN SOIL AND ROCK IS OFT		AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND,
CONSISTENCY, O	N IS BASED ON THE AASHTO COLOR, TEXTURE, MOISTURE, A	ASHTO CLASSIFICATION, AND	D OTHER PERTI	INENT FACTORS SUCH		THE ANCHI ADITY OF DOMESTIC	ANGULARITY OF GRAINS SS OF SOIL GRAINS IS DESIGNATED BY THE	TEDMC, ANCHI AD	OF WEATHERE ROCK MATERI	RIALS ARE TYP	PICALLY DIVIDED AS FOLLO	DWS:		ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALUGI	ICAL COMPOSITION, ANGULARI VERY STIFF, GRAY, SILTY CLAY,	VOIST WITH INTERBEDDED FINE SAND				SUBANGULAR, SUBROUNDED, OR		TERMS: HINGULAN,	WEATHERED			AIN MATERIAL THAT WOULD YIELD	SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
	SOIL LEGEND	AND AASHTO CL	ASSIFICA	ATION			MINERALOGICAL COMPOSITIO	ON	ROCK (WR)	155,	BLOWS PER FOOT	IF TESTED. GRAIN IGNEOUS AND METAMORPHIC	POCK 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
GENERAL	GRANULAR MATERIAL			ORGANIC MATER	IALS	MINERAL NAMES SUCH AS QUAR' WHENEVER THEY ARE CONSIDERE	TZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE U	USED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)			T REFUSAL IF TESTED, ROCK TYPE		GROUND SURFACE.
GROUP	(≤ 35% PASSING #20 A-1 A-3 6	Z) (> 35% PASS 1-2 A-4 A-5		A-1, A-2 A-4, A-5		WHENEVER THET HAE CONSIDERE	COMPRESSIBILITY		NON-CRYSTALLI	INF	FINE TO COARSE	GRAIN METAMORPHIC AND NON-COA		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-	1-a A-1-b A-2-4 A-2-	A-2-6 A-2-7	A-7-5 A-7-6	A-3 A-6, A-7		SLIGHTLY COMPRESSI	IBLE LIQUID LIMIT	LESS THAN 31	ROCK (NCR)		INCLUDES PHYLLI	CK THAT WOULD YEILD SPT REFUS TE, SLATE, SANDSTONE, ETC.		OF SLOPE,
SYMBOL 88	0000000					MODERATELY COMPRE HIGHLY COMPRESSIBL		EQUAL TO 31-50 GREATER THAN 50	COASTAL PLAIN SEDIMENTARY R			EDIMENTS CEMENTED INTO ROCK,E ICK TYPE INCLUDES LIMESTONE,SA		CORE RECOVERY (REC.I - TOTAL LENGTH OF ALL MAYERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
A PASSING			,	SILT-			PERCENTAGE OF MATERIAL	L	(CP)		SHELL BEDS, ETC,	THERING		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 40 30	MX 50 MX 51 MN			GRANULAR CLAY SOILS SOILS	MUCK, PEAT	ORGANIC MATERIAL	GRANULAR SILT - CLAY SOILS SOILS	OTHER MATERIAL	FRESH F	מחרי במבניו ה		INTS MAY SHOW SLIGHT STAINING.	DOCK DINCE INDED	ROCKS OR CUTS MASSIVE ROCK,
* 200 15	MX 25 MX 10 MX 35 MX 35 M	35 MX 35 MX 36 MN 36 MN	36 MN 36 MN	30123		TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER		ACE 1 - 10% TLE 10 - 20%		HAMMER IF CR		THE SHE SHOW SETONE STREETING.	HOCK RINGS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL,
IOUID LIMIT PLASTIC INDEX	6 MX NP 16 MX 41 MN	40 MX 41 MN 40 MX 41 MN 11 MN 11 MN 10 MX 10 MX	40 MX 41 MN	SOILS WITH		MODERATELY ORGANIC	5 - 10% 12 - 20% SOM	ME 20 - 35%	VERY SLIGHT F	ROCK GENERAL	LLY FRESH, JOINTS STAINE	D, SOME JOINTS MAY SHOW THIN (E SHINE BRIGHTLY, ROCK RINGS U	CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
GROUP INDEX	0 0 0	4 MX 8 MX 12 MX		LITTLE CR MODERATE	HIGHLY ORGANIC	HIGHLY ORGANIC	SROUND WATER	SHLY 35% AND ABOVE		OF A CRYSTAL	LLINE NATURE.			THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STO		R CLAYEY SILTY	CLAYEY	AMOUNTS OF ORGANIC	SOILS	V WATER LE	VEL IN BORE HOLE IMMEDIATELY AFTER D	DRILLING				ED AND DISCOLORATION EXTENDS IN STANIED OF THE STANIED OF THE STANIES OF THE STAN		SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
		AND SAND SOILS	SOILS	MATTER		l _	ATER LEVEL AFTER 24 HOURS		(CRYSTALLINE ROCKS RING UNDER		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN, RATING			F 2005	FAIR TO DOOR		5700	WATER, SATURATED ZONE, OR WATER BEARIN	ING STRATA	(MOD.)	GRANITOID RO	OCKS, MOST FELDSPARS ARE	DISCOLORATION AND WEATHERING E E DULL AND DISCOLORED, SOME SHI	OW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TI		POOR POOR	UNSULTABLE					DULL SOUND U		SHOWS SIGNIFICANT LOSS OF ST	RENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF	A-7-5 SUBGROUP IS			UP IS > LL - 30		O-M SPRING OF			MODERATELY 4	ALL ROCK EXC	CEPT QUARTZ DISCOLORED	OR STAINED, IN GRANITOID ROCKS		THE STREAM,
	1	STENCY OR DENS		RANGE OF UNCON	INED		MISCELLANEOUS SYMBOLS		(MOD, SEV.) A	AND CAN BE E	EXCAVATED WITH A GEOLOG	V KAOLINIZATION. ROCK SHOWS SE' GIST'S PICK. ROCK GIVES 'CLUNK'S		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SO	OIL TYPE COMPACTNE			COMPRESSIVE STF (TONS/FT ²	RENGTH)	ROADWAY EMBANKM WITH SOIL DESCRI		NG SAMPLE DESIGNATIONS	1		OULD YIELD SPT REFUSAL			JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERAL	VERY LOO	5E <4				SOIL SYMBOL	AUGER BORING	S - BULK SAMPLE				OR STAINED, ROCK FABRIC CLEAR NITOID ROCKS ALL FELDSPARS ARE		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANULA MATERIA	R LOUSE.	4 TO ENSE 10 TO		N/A		ARTIFICIAL FILL	(AE) OTHER 1	SS - SPLIT SPOON SAMPLE			E FRAGMENTS OF STRONG F TELDS SPT N VALUES > 100			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-CO		30 TO SE >50				THAN ROADWAY EM		ST - SHELBY TUBE	VERY SEVERE	ALL ROCK EXC	CEPT QUARTZ DISCOLORED	OR STAINED, ROCK FABRIC ELEME		MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
	VERY SOF	(2	-	⟨∅,25		- INFERRED SOIL BO	DUNDARY MW MONITORING WEL	SAMPLE) SOIL STATUS, WITH ONLY FRAGME OF ROCK WEATHERED TO A DEGRE		PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERAL SILT-CLA		2 TO TIFF 4 TO		Ø.25 TO Ø.5		INFERRED ROCK LI		RS - HULK SAMPLE				IC REMAIN, <u>IF TESTED, YIELDS S</u>		INTERVENING IMPERVIOUS STRATUM.
MATERIA	L STIFF	8 70	15	0.5 TO 1.0 1 TO 2		イマティイ ALLUVIAL SOIL BO	MOTALIATION A	RT - RECOMPACTED TRIAXIAL SAMPLE				NOT DISCERNIBLE, OR DISCERNIBLE MAY BE PRESENT AS DIKES OR STR		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESI)	HARD	>30		2 TO 4		25/025 DIP & DIP DIRECT	TION OF SLOPE INDICATO	OR CBR - CALIFORNIA BEARING	A	ALSO AN EXAM				ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
	TEX	TURE OR GRAIN	SIZE			ROCK STRUCTURES	SPT N-VALUE	RATIO SAMPLE				HARDNESS		EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEV			60 200			SOUNDING ROD	REF SPT REFUSAL				SCRATCHED BY KNIFE OR S ARD BLOWS OF THE GEOLOG	SHARP PICK, BREAKING OF HAND S SIST'S PICK.	PECIMENS REQUIRES ,	PARENT ROCK.
OPENING (MM)	4,		8.25 Ø.075	0.053			ABBREVIATIONS				ATCHED BY KNIFE OR PICK HAND SPECIMEN.	ONLY WITH DIFFICULTY. HARD HA	AMMER BLOWS 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
BOULDER (BLDR.)	COBBLE GRA	, SANU	FINE SAND		CLAY (CL.)	AR - AUGER REFUSAL BT - BORING TERMINATED	HI HIGHLY MED MEDIUM	w - MOISTURE CONTENT V - VERY				K. GOUGES OR GROOVES TO 0.25 IN	NCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
GRAIN MM		(635. 30.)	(F SD.) Ø.25	0.05 0.005		CL CLAY	MICA MICACEOUS	VST - VANE SHEAR TEST		EXCAVATED E BY MODERATE		OGIST'S PICK. HAND SPECIMENS C	AN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
SIZE IN.	12 3					CPT - CONE PENETRATION 1 CSE COARSE	NP - NON PLASTIC	WEA WEATHERED 7 - UNIT WEIGHT	MEDIUM	CAN BE GROO	OOVED OR GOUGED 0.05 INC	HES DEEP BY FIRM PRESSURE OF		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 L FOOT INTO SOIL WITH
		RE - CORRELATION	ON OF TE	ERMS		DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATIO	ORG ORGANIC ON TEST PMT - PRESSUREMETER TEST	7d- DRY UNIT WEIGHT			CAVATED IN SMALL CHIPS T GEOLOGIST'S PICK.	TO PEICES 1 INCH MAXIMUM SIZE E	BY HARD BLOWS OF THE	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
	DISTURE SCALE JERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR F	FIELD MOISTURE DES	SCRIPTION	e - VOID RATIO F - FINE	SAP SAPROLITIC SD SAND, SANDY	FIAD - FILLED IMMEDIATELY AFTER DRILLING				BY KNIFE OR PICK, CAN BE EXCAV		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
***************************************	•	- SATURATED -	USUALLY LIG	QUID; VERY WET, USU	IALLY	FOSS FOSSILIFEROUS	SL SILT, SILTY	WOH - WEIGHT OF HAMMER			BE BROKEN BY FINGER PR		ION : Upite uniful, ITIN	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
LL	_ LIQUID LIMIT			THE GROUND WATE		FRAC FRACTURED, FRACTU FRAGS FRAGMENTS	RES SLI SLIGHTLY TCR - TRICONE REFUSAL					EXCAVATED READILY WITH POINT OF BY FINGER PRESSURE, CAN BE		STRATA ROCK QUALITY DESIGNATION (SRGD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC RANGE	_			REQUIRES DRYING T	0	FOUR	IDMENT LICED ON CHRIECE	DDO ICCT		FINGERNAIL.				TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL	PLASTIC LIMIT	۱#/	ATTAIN OPTI	IMUM MOISTURE			IPMENT USED ON SUBJECT P	HAMMER TYPE:	TERM	ACTURE S	SPACING SPACING	BEDDI TERM	THICKNESS	BENCH MARK: _
	OPTIMUM MOISTURE	- MOIST - (M)	SOLID: AT (OR NEAR OPTIMUM	MOISTURE	DRILL UNITS:	ADVANCING TOOLS:	X AUTOMATIC MANUAL	VERY WIDE		MORE THAN 10 FEET	VERY THICKLY BEDDED THICKLY BEDDED	> 4 FEET 1.5 - 4 FEET	BENCH MARK!
OM SL	_ SHRINKAGE LIMIT					MOBILE B	CLAY BITS		WIDE MODERATEL		3 TO LØ FEET 1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	ELEVATION: - FT.
				DDITIONAL WATER T	0		6' CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE VERY CLOSI		0.16 TO 1 FEET LESS THAN 0.16 FEET	VERY THINLY BEDDED THICKLY LAMINATED	0.03 - 0.16 FEET 0.008 - 0.03 FEET	NOTES:
			HITHIN UPIL	IMUM MOISTURE		BK-51	X 8' HOLLOW AUGERS	B				THINLY LAMINATED JRATION	< 0,008 FEET	-
		PLASTICITY INDEX (PI)		DDV CTDENCT!		CME-45C	HARD FACED FINGER BITS	N	FOR SEDIMENTA	ARY ROCKS, INC		OR HILLOIN NG OF THE MATERIAL BY CEMENTI	ING, HEAT, PRESSURE, ETC.	
NONPLASTIC		0-5		DRY STRENGTH VERY LOW		X CME-550	TUNGCARBIDE INSERTS	H		ABLE		WITH FINGER FREES NUMEROUS GR		
LOW PLASTIC		6-15 16-25		SLIGHT MEDIUM		_	CASING W/ ADVANCER	HAND TOOLS:	1			BLOW BY HAMMER DISINTEGRATES	-	€ate ·
HIGH PLASTIC		26 OR MORE		HIGH		PORTABLE HOIST	TRICONE STEEL TEETH	POST HOLE DIGGER	MODE	ERATELY INDU		AN BE SEPARATED FROM SAMPLE EASILY WHEN HIT WITH HAMMER.	WITH STEEL PROBE;	
		COLOR					TRICONE 'TUNG,-CARB,	HAND AUGER SOUNDING ROD -	INDU	URATED		ARE DIFFICULT TO SEPARATE WITH	STEEL PROBE:	er jene
	S MAY INCLUDE COLOR O				GRAY).		CORE BIT	VANE SHEAR TEST				T TO BREAK WITH HAMMER.	(CAMPI F	
MUUIFIER	S SUCH AS LIGHT, DARK,	DIREMKEU, ETC, AME USEE	D TO DESCRIE	DE APPEARANCE.		L=i =			EXTR	REMELY INDUR		AMMER BLOWS REQUIRED TO BREAK BREAKS ACROSS GRAINS.	SHMPLE;	







CONTENTS

DESCRIPTION TITLE SHEET LEGEND SITE PLAN **PROFILE**

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO	35609.I.I (R-2519B) F.A. PROJ
COUNTY	
PROJECT DESCRIPTION	
	SECTION WEST OF SPRUCE PINE
SITE DESCRIPTION	RETAINING WALL LEFT OF -L- STATION
51.12 52001 11011 <u></u>	INTERVAL 125+00 TO 130+00

STATE STATE PROJECT REFERENCE NO. SHEET TOTAL SHEETS 35609.1.1 (R-2519B)

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 HOT FOR CONSTRUCTION ON PAY PURPOSES. THE VARIOUS FELD BORNIEL GOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, CEOTECHNOLE, DENDRERING LINTA T (1919) 250-040B, REITHER THE SUBSURFACE PLAIS AND REPORTS. NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

THE BODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELAMMARY ONLY AND IN MAINY CASES THE FINAL DESIGN DETAILS ARE DEFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, FEFER TO THE CONSTRUCTION PURPOSES, FEFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT, THE DEPARTMENT DOES NOT WARRANT OR QUARANTEE THE SUFFICIENCY OR ACCURACY OF THE ENVESTIGATION MADE, FOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH ROPEFROENT SUBSURFACE INVESTIGATIONS AS HE DEEMS INCESSARY TO SATISFY HUMBLE AS TO CONDITIONS TO BE ENCOUNTEDED ON THIS PROJECT, THE CONTRACTOR SHALL HAVE NO CLAMFOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

	T B DANIEL
	CJCOFFEY
	R D CHILDERS
	G K ROSE
	· —
	The state of the s
IVESTIGATED	BY C A DUNNAGAN
HECKED BY	W D · FRYE, Ir

SUBMITTED BY W D FRYE, Jr

PERSONNEL

DRAWN BY: _C A DUNNAGAN

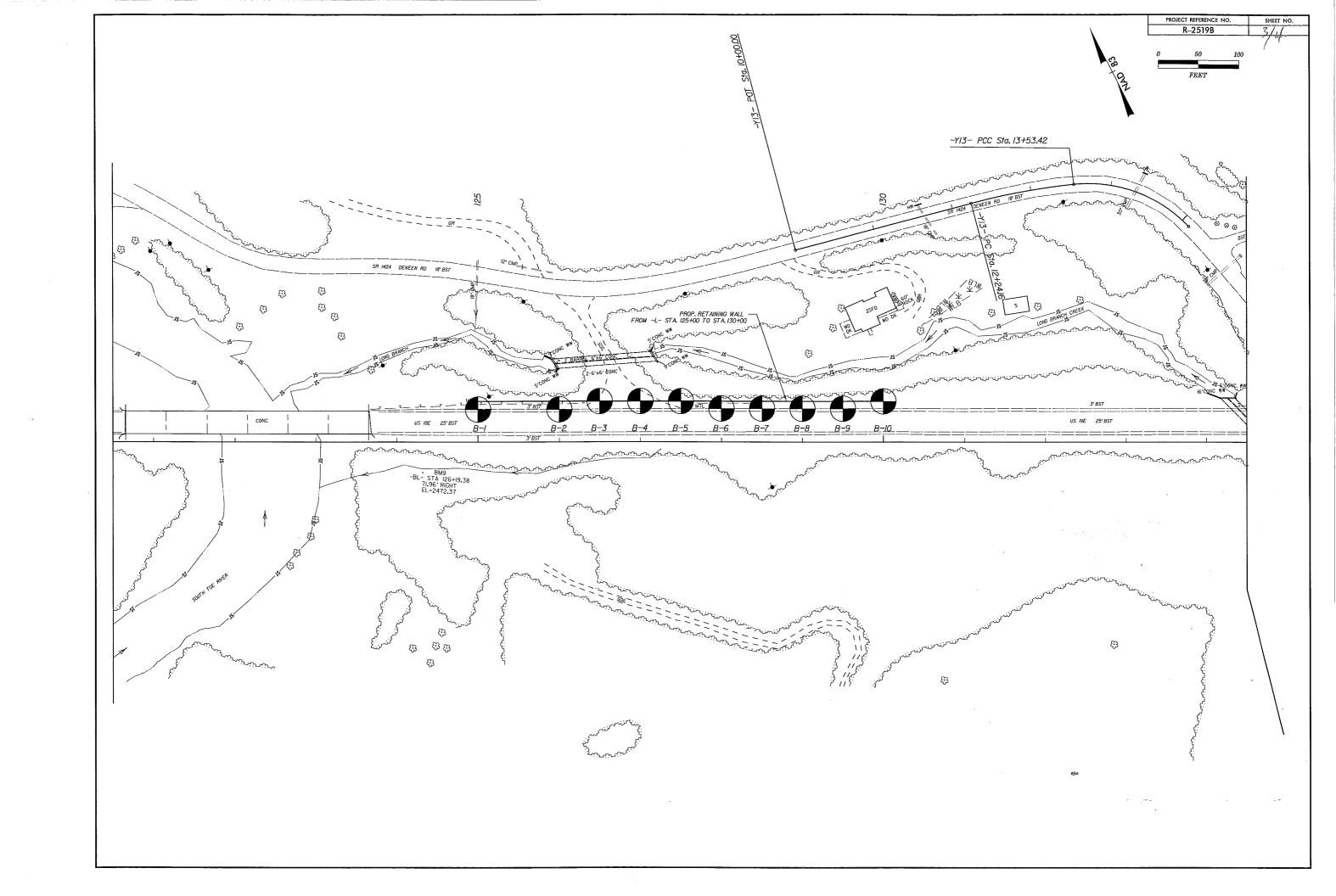
NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

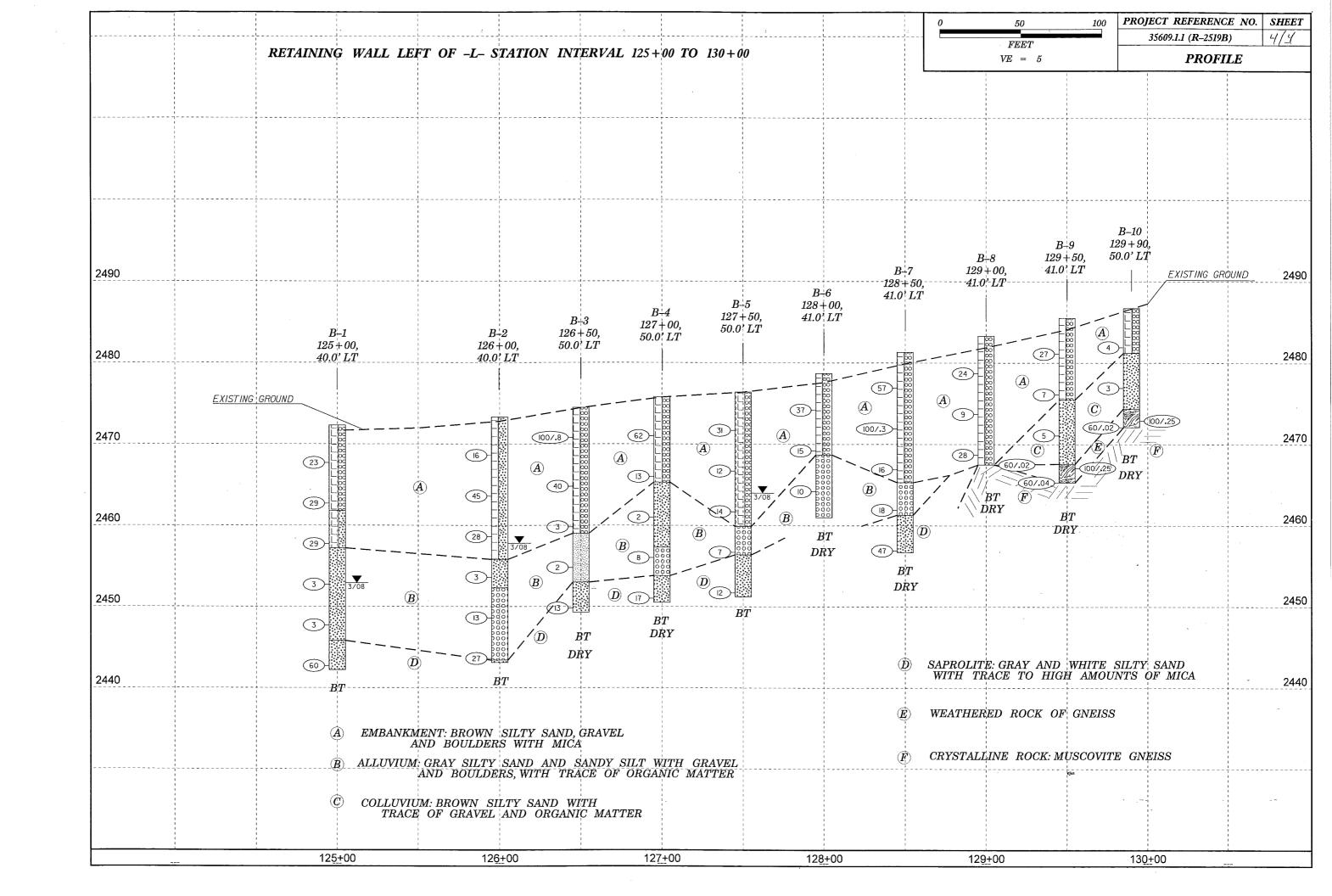
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE,

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

	SOIL AND ROCK	K LEGEND, TERMS	S, SYMBOLS, A	AND ABBREV	IATIONS	
SOIL DESCRIPTION	GRADATION				DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 120 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASAHTO 1206, ASTM 0-1586), SOIL CLASSIFICATION IS BASED ON THE ASAHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SI PRODRLY GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MOR ANGULARITY OF GRAINS	IAME SIZE. IALSO	ROCK LINE INDICATES SPT REFUSAL IS PEN IN NON-COASTAL PLA OF WEATHERED ROCK.	S THE LEVEL AT WHICH NON- ETRATION BY A SPLIT SPOOT IN MATERIAL, THE TRANSIT	AT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED -COASTAL PLAIM MATERIAL WOULD VIELD SPT REFUSAL. N SAMPLER EQUAL TO OR LESS THAN Ø.I FOOT PER 60 BLOWS, ION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE LLOWS:	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND, ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAS, SUTY CLAY, MOST WITH INTERBEDDED FINE SAND LAVERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TELL SUBANGULAR, SUBROUNDED, OR ROUNDED.	RMS: ANGULAR,	WEATHERED S	NON-COASTAL I	PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION		ROCK (WR) CRYSTALLINE	BLOWS PER FO	OT IF TESTED. SE GRAIN IGNEOUS AND METAMORPHIC ROCK 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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USE WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	D IN DESCRIPTIONS	ROCK (CR)	GNEISS, GABBRO		GROUND SURFACE. <u>CALCAREOUS (CALC.) -</u> SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4.A-5	COMPRESSIBILITY		NON-CRYSTALLINE ROCK (NCR)	SEDIMENTARY F	GE GRAIN METAMORPHIC AND NON-COASTAL PLAIN ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CLHSS. A-T-6	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LE MODERATELY COMPRESSIBLE LIQUID LIMIT GR HIGHLY COMPRESSIBLE LIQUID LIMIT GR	DUAL TO 31-50	COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN	LLITE, SANDSTONE, ETC. I SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED TC.	$ \begin{array}{c} \underline{\text{CORE RECOVERY (REC.)}} - \text{TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE, $
% PASSING SILT- CRANULAR SILT- CLAY MUCK.	PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SILT - CLAY ORGANIC MATERIAL ORGANIC MATERIAL ORGANIC MATERIAL	THER MATERIAL		WE	ATHERING	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
* 40 38 MX 58 MX 51 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE	1 - 10%		ESH, CRYSTALS BRIGHT, FEW . IF CRYSTALLINE,	JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT PLASTIC DOEX 6 MX NP 18 MX 14 MX 11 MX 11 MX 11 MX 12 MX 16 MX 11	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE MODERATELY ORGANIC 5 - 10% 12 - 20% SOME HIGHLY ORGANIC >10% >20% HIGHL*	20 - 35%	(V SLI.) CRYSTALS		INED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, ACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH) -</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC USUAL TYPES STONE FRAGS. TANK CALLY OR CLAYEY STATE ORGANIC	GROUND WATER	D.L. INC	SLIGHT ROCK GEN	NERALLY FRESH, JOINTS STA	INED AND DISCOLORATION EXTENDS INTO ROCK UP TO LAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STURE THRUS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	LELI-10	CRYSTALS	S ARE DULL AND DISCOLORE	D. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS,	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
CEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO	VPW DEBCHED WATER CATHRATED TONE OF WATER BEADING	STRATA	(MOD.) GRANITOII	D ROCKS, MOST FELDSPARS A	W DISCOLORATION AND WEATHERING EFFECTS. IN ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
SUBGRADE	SPRING OR SEEP		WITH FRE	ESH ROCK.		FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS		SEVERE AND DISC	COLORED AND A MAJORITY SH	ED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL 10W KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH 10W KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH 10W ROCK ROCK ROLL ROLL ROLL ROLL ROLL ROLL ROLL ROL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY CONSISTENCY (1-YALUE) RANGE OF UNCONFINED PENETRATION RESISTENCE (1-YALUE) (TONS/FT2)	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION Port OFT ONT TEST BORING	SAMPLE DESIGNATIONS		ED, WOULD YIELD SPT REFUSA	LOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. 9L	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE (4 GRANIII AB LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING	S - BULK SAMPLE SS - SPLIT SPOON	(SEV.) IN STREM	NGTH TO STRONG SOIL. IN G SOME FRAGMENTS OF STRON		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 17/H 10 TO 50	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT - CORE BORING	SAMPLE ST - SHELBY TUBE	1	ED, YIELDS SPT N VALUES > K EXCEPT QUARTZ DISCOLORE	100 BPF ED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	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
VERY DENSE 550 VERY SOFT (2 (0.25	INFERRED SOIL BOUNDARY MM MONITORING WELL	SAMPLE	(V SEV.) THE MASS REMAININ	S IS EFFECTIVELY REDUCED IG. SAPROLITE IS AN EXAMPL	TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK LE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR BRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENUE IMPERVIOUS STRATUM.
GENERALLY SUP-1 2 10 4 0.25 TO 0.50	INFERRED ROCK LINE PIEZOMETER INSTALLATION	RT - RECOMPACTED TRIAXIAL	COMPLETE ROCK RED	DUCED TO SOIL, ROCK FABRIC	C NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	25/825 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION	SAMPLE CBR - CALIFORNIA BEARING	ALSO AN	EXAMPLE.	MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO DR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES SPT N-VALUE	RATIO SAMPLE			K HARDNESS	EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD REF— SPT REFUSAL			BE SCRATCHED BY KNIFE OF L HARD BLOWS OF THE GEOL	R SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES . .OGIST'S PICK.	PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
DPENING (MM)	ABBREVIATIONS AR - AUGER REFUSAL HI HIGHLY	w - MOISTURE CONTENT	TO DETA	ACH HAND SPECIMEN.	ICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLOR.) (CUH.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.) GRAIN MM 305 75 2.0 0.25 0.05 0.005	BT - BORING TERMINATED MED, - MEDIUM CL CLAY MICA MICACEGUS CPT - CONE PENETRATION TEST MOD MODERATELY	V - VERY VST - VANE SHEAR TEST WEA WEATHERED	HARD EXCAVA		ICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOLL MOISTURE - CORRELATION OF TERMS	CSE COARSE NP - NON PLASTIC DMT - DILATOMETER TEST ORG ORGANIC DPT - DYNAMIC PENETRATION TEST PMT - PRESSURMETER TEST	γ - UNIT WEIGHT $\gamma_{ m d}$ - DRY UNIT WEIGHT	HARD CAN BE		INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. S TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	3 INCHORD FEWER HARTON TEST TRANSFER TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 01.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO SAP SAPROLITIC F - FINE SD SAND, SANDY	FIAD - FILLED IMMEDIATELY AFTER DRILLING	FROM C		Y BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS N SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID: VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE LL LIQUID LIMIT	FOSS, - FOSSLIFEROUS SL SILT, SILTY FRAC, - FRACTURED, FRACTURES SLI SLIGHTLY FRAGS, - FRAGMENTS TCR - TRICONE REFUSAL	WOH - WEIGHT OF HAMMER	VERY CAN BE SOFT OR MORE	CARVED WITH KNIFE, CAN B E IN THICKNESS CAN BE BRO	E EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH DKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	STRATA ROCK DUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PR	OJECT	FINGERN	RE SPACING	BEDDING	TOPSDIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS:	HAMMER TYPE:	TERM	SPACING	TERM THICKNESS VERY THICKLY BEDDED > 4 FEET	BENCH MARK: _
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE	CLAY BITS	X AUTOMATIC MANUAL	VERY WIDE WIDE	MORE THAN 10 FEET 3 TO 10 FEET	VERY HICKLY BEDUED	ELEVATION: - FT.
SL SHRINKAGE LIMIT REQUIRES ADDITIONAL WATER TO	G' CONTINUOUS FLIGHT AUGER	CORE SIZE:	MODERATELY CLOSE CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- ORY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 8' HOLLOW AUGERS	B	VERY CLOSE	LESS THAN 0.16 FEET	THINLY LAMINATED < 0.008 FEET DURATION	-
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH	HARD FACED FINGER BITS		FOR SEDIMENTARY ROCK	······	ENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC Ø-5 VERY LOW	X CME-550 LASING W/ ADVANCER CASING W/ ADVANCER		FRIABLE		NG WITH FINGER FREES NUMEROUS GRAINS: E BLOW BY HAMMER DISINTEGRATES SAMPLE.	×
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH	HAND TOOLS: POST HOLE DIGGER	MODERATELY		G CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	€±
HIGH PLASTICITY 26 OR MORE HIGH COLOR	TRICONE 'TUNGCARB.	HAND AUGER		BREAKS	S EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT	SOUNDING ROD · VANE SHEAR TEST	INDURATED		S ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DULT TO BREAK WITH HAMMER.	* · · · · · · · · · · · · · · · · · · ·
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		- THUS SUCHU (CS)	EXTREMELY I		HAMMER BLOWS REQUIRED TO BREAK SAMPLE; LE BREAKS ACROSS GRAINS.	
	the same of the sa		-k			REVISED 02/23/06





D: R-2519B

OJECT: 35609.1.1

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

CONTENTS

SHEET DESCRIPTION

I TITLE SHEET

2 LEGEND

3 SITE PLAN

4 PROFILE

STRUCTURE SUBSURFACE INVESTIGATION

PROJ.REFERENCE NO COUNTYYANCEY-M	35609.I.I	F.A. PROJ.
PROJECT DESCRIPTION		
SITE DESCRIPTION	RETAINING WALL LEFT INTERVAL 198+00 TO	

N.C. 35609.1.1 (R-2519B) 1 4

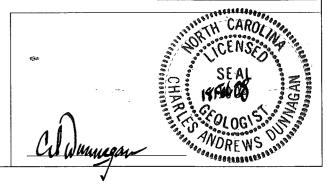
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE BIVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARROUS FELD BORNE, LOGS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSFORTATION, GEOTECHNICAL ENORGENING UNIT AT 1993 250-4088. HITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNEG LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNICS OR BETWEEN SAMPLED STATA AND THE MISTURE OF SUBSURFACE AND AND THE MISTURE OF SUBSURFACE AND AND THE MISTURE OF SUBSURFACE OF RELABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSITURE CONDITIONS MORCATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOSISTURE CONDITIONS MAY ANY CONSIDERABLY WITH THE ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WHID, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMMENT ONLY AND IN MAINY CASES THE FIRML DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PLANS AND DOLDMENTS FOR FIRML DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHIMON OF THE PREPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HUMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY BEASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE WIDICATED IN THE SUBSURFACE RIFORMATION.

. <u> </u>	T B DANIEL
	C J COFFEY
_	R D CHILDERS
<u>-</u> .	G K ROSE
	
· ·	
,	
INVESTIGATED BY	C A DUNNAGAN
CHECKED BY	₩ D FRYE,Jr
SUBMITTED BY	W D FRYE, Jr
DATE	JANUARY 2008



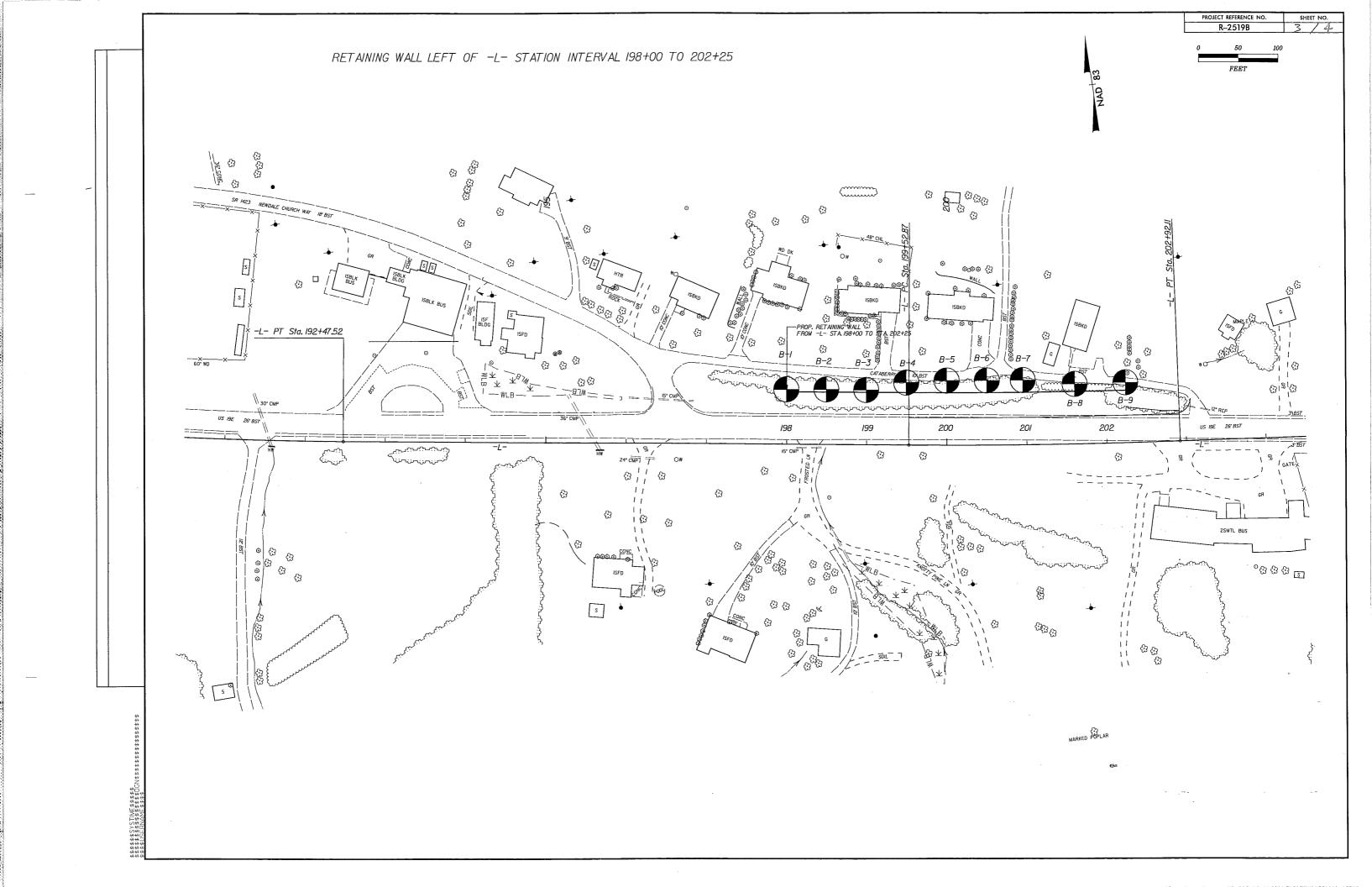
DIVISION OF HIGHWAYS

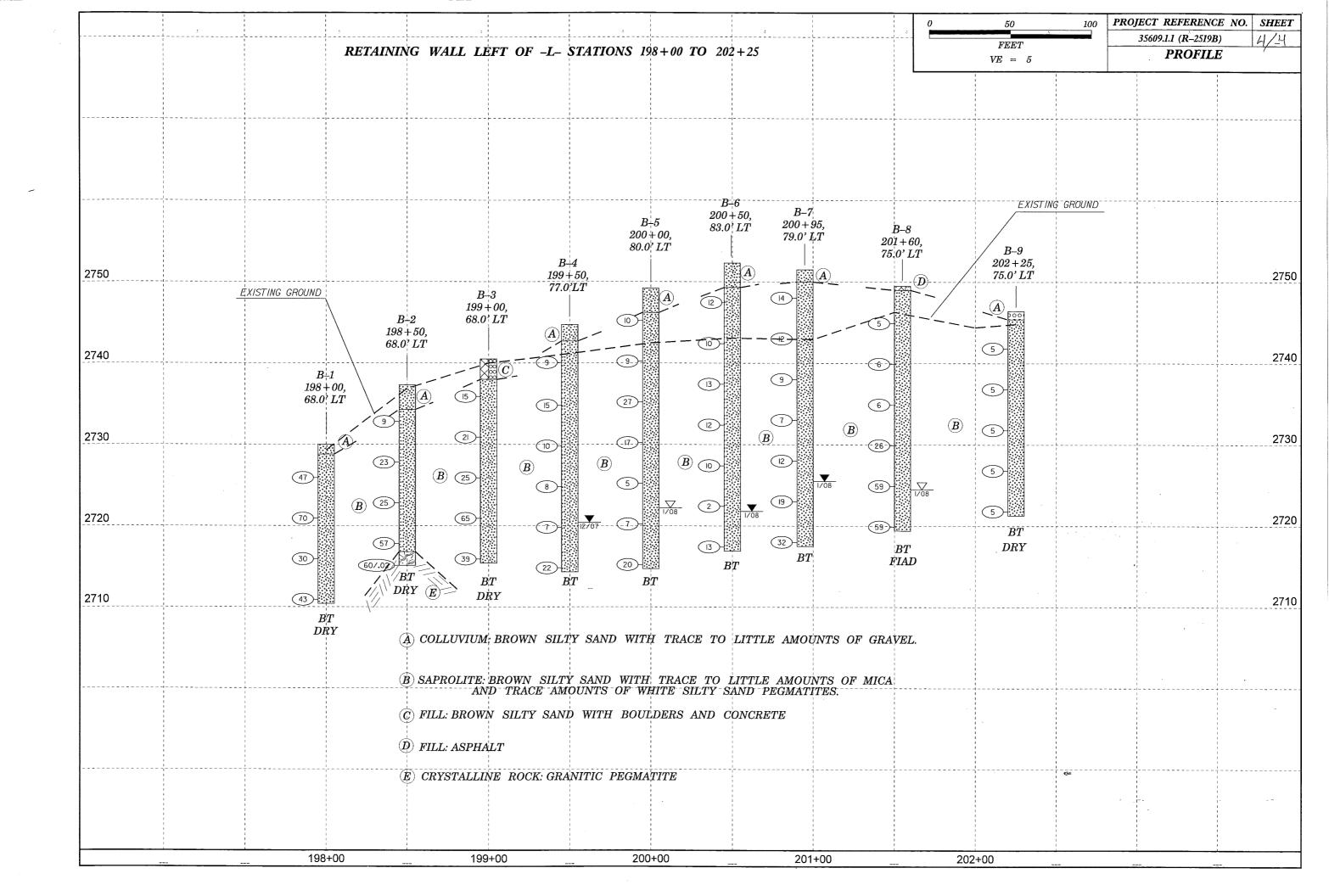
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

				LEGEND, IERN	, or proces,			TERMO AND DESTRUCTIONS
SOIL DESCRIPTION		WELL GRADED - INDICATES A C	GRADATION	ROM FINE TO COARSE.	HARD ROCK IS NON		JESCRIPTION IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIA THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	_S	UNIFORM - INDICATES THAT SO	GOOD REPRESENTATION OF PARTICLE SIZES FR DIL PARTICLES ARE ALL APPROXIMATELY THE	SAME SIZE. (ALSO	ROCK LINE INDICAT	ITES THE LEVEL AT WHICH NON-CO.	NASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:			XTURE OF UNIFORM PARTICLES OF TWO OR MO	ORE SIZES.		PLAIN MATERIAL, THE TRANSITION	N BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUC	1	THE ANCHI ADITY OF POUNDIES	ANGULARITY OF GRAINS SS OF SOIL GRAINS IS DESIGNATED BY THE T	TEDMS - VNCIII VB		ARE TYPICALLY DIVIDED AS FOLLO	DWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAT, SHITY CLAY, WOIST WITH INTERBEDDED FINE SAND LATERS, RIGHLY PLASTIC, A-7-6		SUBANGULAR, SUBROUNDED, OR		ENIST MICOLANT	WEATHERED ROCK (WR)		AIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION			MINERALOGICAL COMPOSITION	N		OLOWS FER FOOT	GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATE	RIALS	MINERAL NAMES SUCH AS QUAR WHENEVER THEY ARE CONSIDER	TZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE US	SED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)		REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	GROUND SURFACE,
CLASS, (\$\leq 35% PASSING #200) (> 35% PASSING #200)		WHENEVER THE HAE CONSIDER	COMPRESSIBILITY		NON-CRYSTALLINE	FINE TO COARSE	GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS CCALC.I - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE, COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
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-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-1, A-2 A-4, A-5 A-3 A-6, A-7		SLIGHTLY COMPRESS		LESS THAN 31	ROCK (NCR)		K THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE TE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL 2000 CO.		MODERATELY COMPRE HIGHLY COMPRESSIBL	ESSIBLE LIQUID LIMIT I	EQUAL TO 31-50 GREATER THAN 50	COASTAL PLAIN SEDIMENTARY ROCK	SPT REFUSAL, ROO	EDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD CK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
Z PASSING	7	7,0,12,7,00,11,12,00,15	PERCENTAGE OF MATERIAL	-	(CP)	SHELL BEDS, ETC.		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 10 50 MX S0 MX 51 MN S0LT-	MUCK, PFAT	ORGANIC MATERIAL	GRANULAR SILT - CLAY SOILS SOILS	OTHER MATERIAL			THERING	ROCKS OR CUTS MASSIVE ROCK,
* 40 38 MX 50 MX 51 MN * 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN SOILS	, car	TRACE OF ORGANIC MATTER	2 - 3% 3 - 5% TRAC	CE 1 - 10%		FRESH, CRYSTALS BRIGHT, FEW JOI ER IF CRYSTALLINE,	INTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH		LITTLE ORGANIC MATTER MODERATELY ORGANIC	3 - 5% 5 - 12% LITT 5 - 10% 12 - 20% SOM				D, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR	HIGHLY	HIGHLY ORGANIC	>10% >20% HIGH			TALS ON A BROKEN SPECIMEN FACE CRYSTALLINE NATURE,	E SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
GROUP INDEX 8 8 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE AMOUNTS OF	ORGANIC SOILS		GROUND WATER		SLIGHT ROCK	GENERALLY FRESH, JOINTS STAINE	O AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRACS. OF MAJOR GRAVEL, AND SAND GRAVEL, AND SAND SOULS SOULS MATTER	00120	I	EVEL IN BORE HOLE IMMEDIATELY AFTER DI	RILLING			Y, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS,	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND SAND SAND SAND		4	ATER LEVEL AFTER 24 HOURS		MODERATE SIGNIF	FICANT PORTIONS OF ROCK SHOW D	DISCOLORATION AND WEATHERING EFFECTS, IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR POOR	UNSUITABL	PERCHED	WATER, SATURATED ZONE, OR WATER BEARIN	NG STRATA			E DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DISHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SUBGRADE		SPRING OF	R SEEP		HTIW	FRESH ROCK.		FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS			MISCELLANEOUS SYMBOLS	,			OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
RANGE OF STANDARD RANGE OF UNCON		T ROADWAY EMBANKI	ent CDT	***************************************		CAN BE EXCAVATED WITH A GEOLOG STED, WOULD YIELD SPT REFUSAL	GIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK,	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPRESSIVE ST CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE ST (N-VALUE) (TONS/FT ²		WITH SOIL DESCR		DESIGNATIONS S - BULK SAMPLE			OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	<u> </u>
GENERALLY VERY LOOSE <4		SOIL SYMBOL	AUGER BORING	SS - SPLIT SPOON	(SEV.) IN ST		NITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE 10 TO 30 N/A		ARTIFICIAL FILL	(AF) OTHER	SAMPLE		STED, YIELDS SPT N VALUES > 100		LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS,
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50		THAN ROADWAY EN	MBANKMENT - CORE BORING	ST - SHELBY TUBE			OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS.MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT <2 <0.25		- INFERRED SOIL BO	OUNDARY MM MONITORING WEL	SAMPLE	REMAJ	NING, SAPROLITE IS AN EXAMPLE	O SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0,25 TO 0		INFERRED ROCK L		HS - HOLK SHMPLE	1		IC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
MATERIAL STIFF 8 TO 15 1 TO 2	1	TTTTT ALLUVIAL SOIL BO	MITALIATINI A	RT - RECOMPACTED TRIAXIAL SAMPLE			NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND IAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4		25/025 DIP & DIP DIRECT	SLOPE INDICATOR			AN EXAMPLE,		ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR GRAIN SIZE		ROCK STRUCTURES		RATIO SAMPLE		ROCK	HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		SOUNDING ROD	REF— SPT REFUSAL			NOT BE SCRATCHED BY KNIFE OR S ERAL HARD BLOWS OF THE GEOLOG	SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053			ABBREVIATIONS		1		ONLY WITH DIFFICULTY, HARD HAMMER BLOWS 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
BOULDER COBBLE GRAVEL COARSE FINE SILT	CLAY	AR - AUGER REFUSAL	HI HIGHLY	w - MOISTURE CONTENT	то п	DETACH HAND SPECIMEN.		TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.)	(CL.)	BT - BORING TERMINATED	MED MEDIUM	V - VERY VST - VANE SHEAR TEST			K, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE LOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.00	5	CL CLAY CPT - CONE PENETRATION	MICA MICACEOUS TEST MOD MODERATELY	WEA WEATHERED	BY M	MODERATE BLOWS.		STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3		CSE COARSE DMT - DILATOMETER TEST	NP - NON PLASTIC ORG ORGANIC	γ - UNIT WEIGHT γ - DRY UNIT WEIGHT			CHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF L FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE COURSE FOR FIELD MOISTURE OF THE PROPERTY OF THE PROP		DPT - DYNAMIC PENETRATIO	ON TEST PMT - PRESSUREMETER TEST	FIAD - FILLED IMMEDIATELY	1	NT OF A GEOLOGIST'S PICK.		THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DI	SCRIPTION	e - VOID RATIO F - FINE	SAP SAPROLITIC SD SAND, SANDY	AFTER DRILLING			BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, US		FOSS FOSSILIFEROUS	SL, ~ SILT, SILTY		1	CES CAN BE BROKEN BY FINGER PR		STRATA ROCK DUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
(SAT.) FROM BELOW THE GROUND WA	ER TABLE	FRAC FRACTURED, FRACTU FRAGS FRAGMENTS	JRES SLI SLIGHTLY TCR - TRICONE REFUSAL				EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH EN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLIDE REQUIRES DRYING	го		TRUE DE DU DUD TEAT D	DO IFOT		ERNAIL.	DEBBINO	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE		EQU	IPMENT USED ON SUBJECT P	l		URE SPACING	BEDDING TERM THICKNESS	
		DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	TERM VERY WIDE	SPACING MORE THAN 10 FEET	VERY THICKLY BEDDED > 4 FEET	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM SL SHRINKAGE LIMIT	MOISTURE	MOBILE B	CLAY BITS	X AUTOMATIC MANUAL	WIDE	3 TO 10 FEET	THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: _ FT.
DEUTIDES ADDITIONAL WATER	τn	-	6' CONTINUOUS FLIGHT AUGER	CORE SIZE:	MODERATELY CLO CLOSE	Ø.16 TO 1 FEET	VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE		BK-51	X 8 HOLLOW AUGERS	B	VERY CLOSE	LESS THAN 0.16 FEET	THINLY LAMINATED < 0.008 FEET	_
PLASTICITY		- X CME-45C	HARD FACED FINGER BITS				URATION	1
PLASTICITY INDEX (PI) DRY STRENGTH			TUNG,-CARBIDE INSERTS		FOR SEDIMENTARY RO		ING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT		X CME-550	CASING W/ ADVANCER	H	FRIABLE		WITH FINGER FREES NUMEROUS GRAINS; BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED, PLASTICITY 16-25 MEDIUM		PORTABLE HOIST	TRICONE STEEL TEETH	HAND TOOLS: POST HOLE DIGGER	MODERATE		CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	€± ·
HIGH PLASTICITY 26 OR MORE HIGH				HAND AUGER	MUDERATE		EASILY WHEN HIT WITH HAMMER.	
COLOR		- L.	TRICONE TUNG,-CARB.	SOUNDING ROD -	INDURATE		ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; .T TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	-GRAY).		CORE BIT	VANE SHEAR TEST	FUTDELE		I TO BREAK WITH HAMMER. AMMER BLOWS REQUIRED TO BREAK SAMPLE;	
3507 NO CLOTT, DANK, STILLINEU, CIT., ARE USED TO DESCRIBE APPEARANCE.					EXTREMEL		BREAKS ACROSS GRAINS.	





19B

TITLE SHEET

LEGEND SITE PLAN PROFILE

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS**

CONTENTS GEOTECHNICAL ENGINEERING UNIT **DESCRIPTION**

STRUCTURE SUBSURFACE INVESTIGATION

PROJ.REFERENCE NO	35609.I.I (R-2519B) YANCEY-MITCHELL	F.A. PROJ			
PROJECT DESCRIPTION _	US-19E FROM SR-1186	TO THE MULTI-LANE			
	SECTION WEST OF SPRUCE PINE				
SITE DESCRIPTION	RETAINING WALL RIGHT	OF -L- STATION			
	INTERVAL 226+50 TO	230+00			

STATE	STATE PROJECT REPERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	-	1	4

CAUTION NOTICE

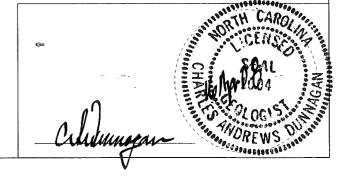
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FELD BORNING LOGS, ROKC CORES, AND SOL TEST DATA VAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE IL.C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING LINIT AT 1919 250-4088. RELITER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CEMERAL SOLL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARRES ARE BASED ON A GEOTECHNICAL UNTERPRETATION 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 DOLLY TO THE DEGREE OF RELIBBUILTY INTERFEIT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS MICHAELD WITH 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 INCLIDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MAINY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION OF UNIFORMATION ON THIS PROLECT. THE DEFARMATION TO SOME WARRANT OR GUARANTE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPENION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HUNSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT, THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERENCE FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

1 B DANIEL
C J COFFEY
R D CHILDERS
_
_
_
C A DUNNAGAN
W D FRYE, Jr
W D FRYE, Jr

APRIL 2008



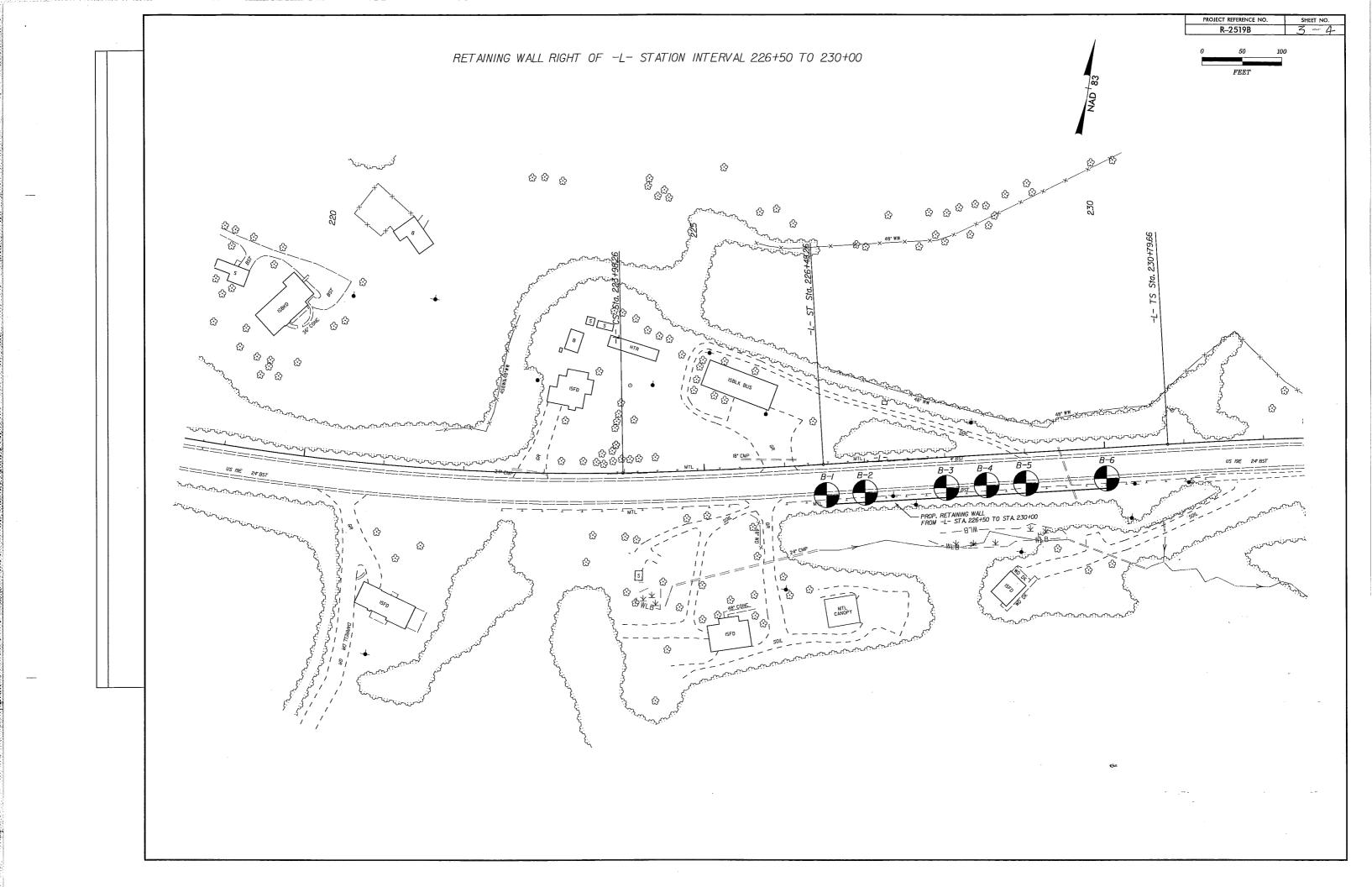
SHEET NO.

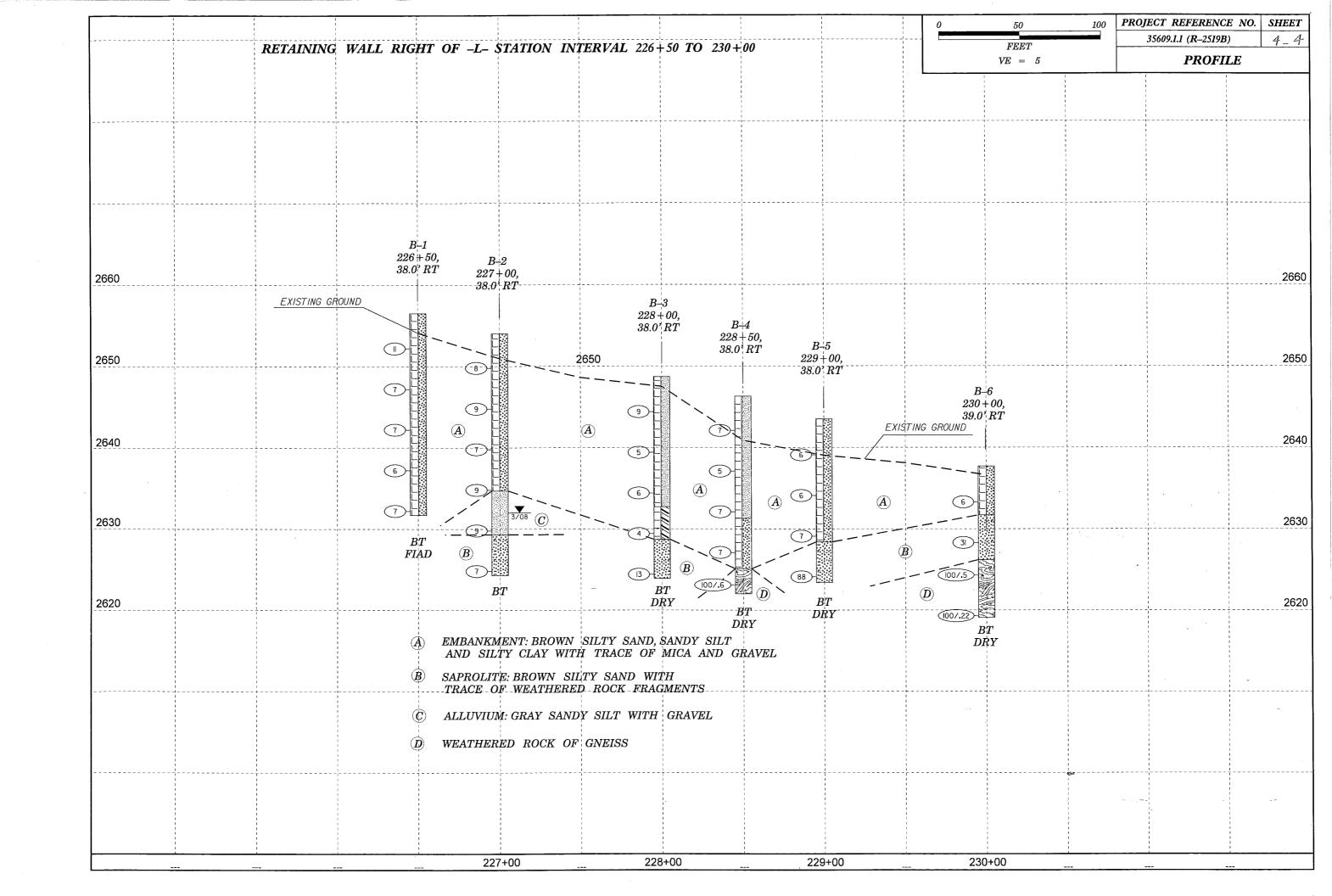
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS			
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL	POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ACQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SUTY CLAY, NOIST WITH INTERBEDDED FINE SAND LATERS, NIGHTY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS; ANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 ROCK (WR)	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	THE TO COMPET CHAIN TOUTON AND METAMORPHIC DOCK 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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, GMEISS, GABBRO, SCHIST, ETC.	GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-6 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EGUAL TO 31-50	ROCK (NCR) INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	SEDIMENTARY ROCK STREET, SEDIMENTS CEMENTED INTO NOCK, BUT MAT NOT FIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	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.
% PASSING ■ 1Ø 58 MX GRANULAR SILT- MUCK,	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
= 40 30 MX 50 MX 51 MN SOILS S	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
TOUR LIMIT	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 18 MX 10 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN LITTLE OR HIGHLY	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANI		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOULS SOULS MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND STATE STA	STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORYIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITAB	E	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK,	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-Value) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SPT CPT SPT CP	IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE <4	S - BULK SAMPLE AUGER BORING	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELOSPARS ARE KAOLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GRANULAR LUUSE 4 TO 10 MATERIAI MEDIUM DENSE 10 TO 30 N/A	SS - SPLIT SPOON ARTIFICIAL FILL (AF) OTHER SS - SPLIT SPOON SAMPLE	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
NON-COHESIVE)	THAN ROADWAY EMBANKMENT - CORE BORING ST - SHELBY TUBE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT <2 <0.25	INFERRED SOIL BOUNDARY MONITORING WELL SAMPLE MONITORING WELL SOURCE SAMPLE	(V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 0.50 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE A PIEZOMETER A PIEZOMETER	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 180 BPF IL COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTT+√√ ALLUVIAL SOIL BOUNDARY SAMPLE SLOPE INDICATOR	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/025 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARING ROCK STRUCTURES RATIO SAMPLE	ALSO AN EXAMPLE. ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES .	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD REF — SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOILDER CORRIE SPANEL COARSE FINE SILT SLAY	ABBREVIATIONS AR - AUGER REFUSAL HI, - HIGHLY W - MOISTURE CONTENT	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS,
BOULDER COBBLE GRAYEL SAND SAND SILT CLAY (BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MED MEDIUM V - VERY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	BY MODERATE BLOWS.	SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE NP - NON PLASTIC	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE CHINE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST FIAD - FILLED IMMEDIATE	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTEMBERG LIMITS) DESCRIPTION	F - FINE SD SAND, SANDY	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT,) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SL SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY	VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS MITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC LIQUID LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE - WET - (W) SEMISULIU; REUUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER,
PLC T LEWSLING CTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET	BENCH MARK: _
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET THINN Y BEDDED 916 1.5 FEET	ELEVATION: FT.
REQUIRES ADDITIONAL WATER TO	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 8° HOLLOW AUGERSB	VERT CLUSE LESS THAN 0.16 FEET THINLY LAMINATED < 0.008 FEET	
PLASTICITY	X CME-45C AARD FACED FINGER BITS	INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW	TUNG,-CARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
LOW PLASTICITY 6-15 SLIGHT	CASING W/ ADVANCER HAND TOOLS;	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	€Eat
MED, PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONESTEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE 'TUNG,-CARB,	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY),	CORE BIT	DIFFICULT TO BREAK WITH HAMMER,	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
			POLICE - PO 103 105





9B

CONTENTS SHEET DESCRIPTION TITLE SHEET LEGEND SITE PLAN PROFILE

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ.REFERENCE NO		F.A. PROJ
PROJECT DESCRIPTION		
	RETAINING WALL RIG	HT OF -I - STATION
SITE DESCRIPTION	INTERVAL 273+75 T	

STATE STATE PROJECT REFERENCE NO. SHEET TOTAL NO. SHEETS N.C. 35609.1.1 (R-2519B)

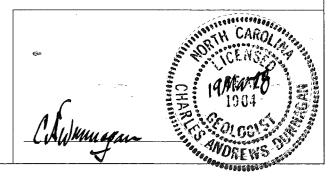
CAUTION NOTICE

THE SUBSURFACE REFORMATION AND THE SUBSURFACE RIVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARBOUS FELD BORRIES LOSE, ROCK CORES, AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR HISFECTED IN BALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTION, CEOTECHNICAL ENDIMERING UNIT AT (19) 250-403B. RETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNIGS OR BETWEEN SAMPLED STRATA AN BE WITHIN THE BORRHOLE, THE LABORATORY SAMPLE DATA AND THE NISTUR UN-FLACED TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELABILITY WHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTURE CONDITIONS NONCATED IN THE SUBSURFACE RIVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS NON VARY CONSIDERABLY WITH THRE ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

	T B DANIEL
_	C J COFFEY
	R D CHILDERS
	-
· <u></u>	
_	
	, forte
_	
INVESTIGATED BY	C A DUNNAGAN
CHÉCKED BY	W D FRYE, Jr
SUBMITTED BY	W D FRYE, Jr

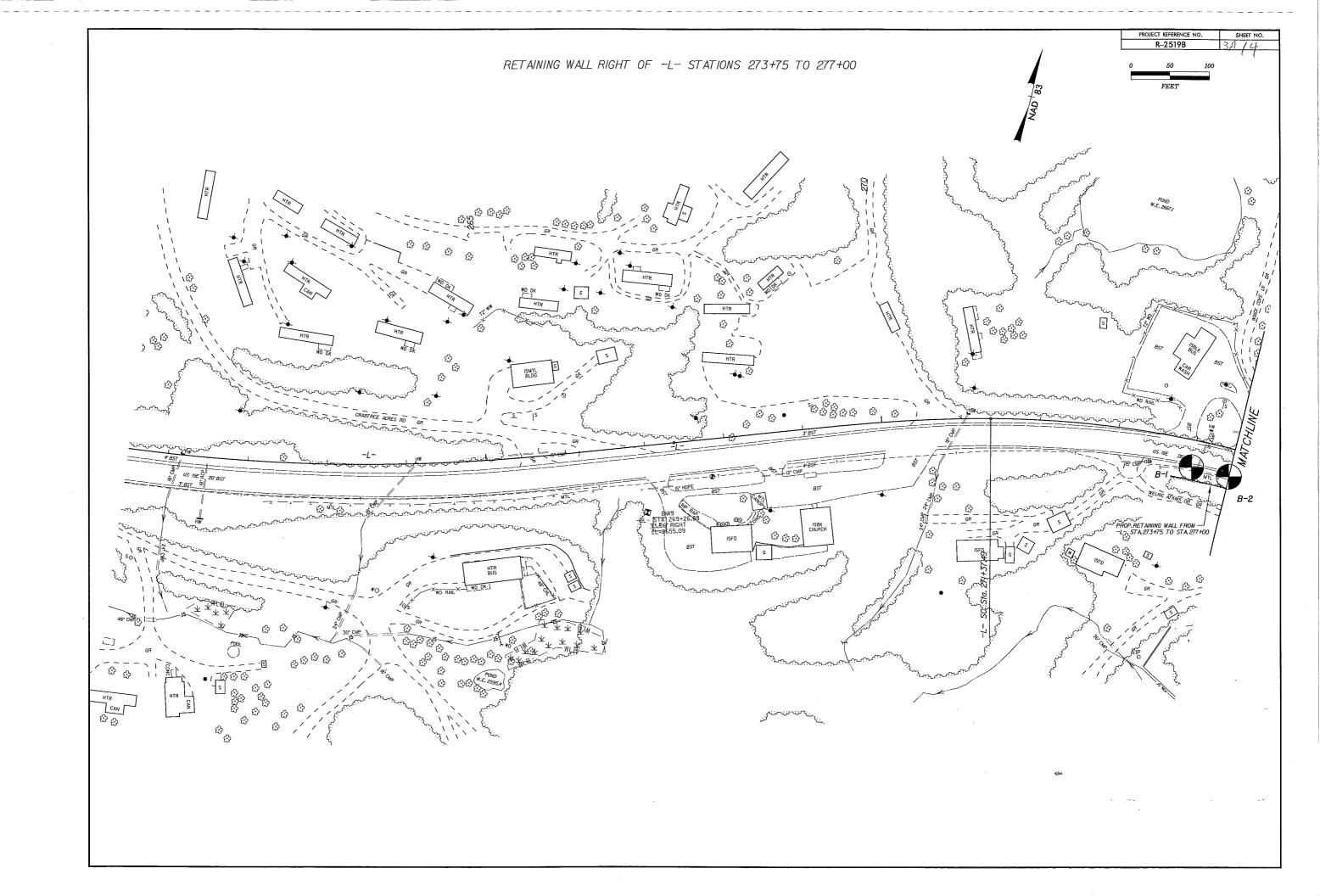


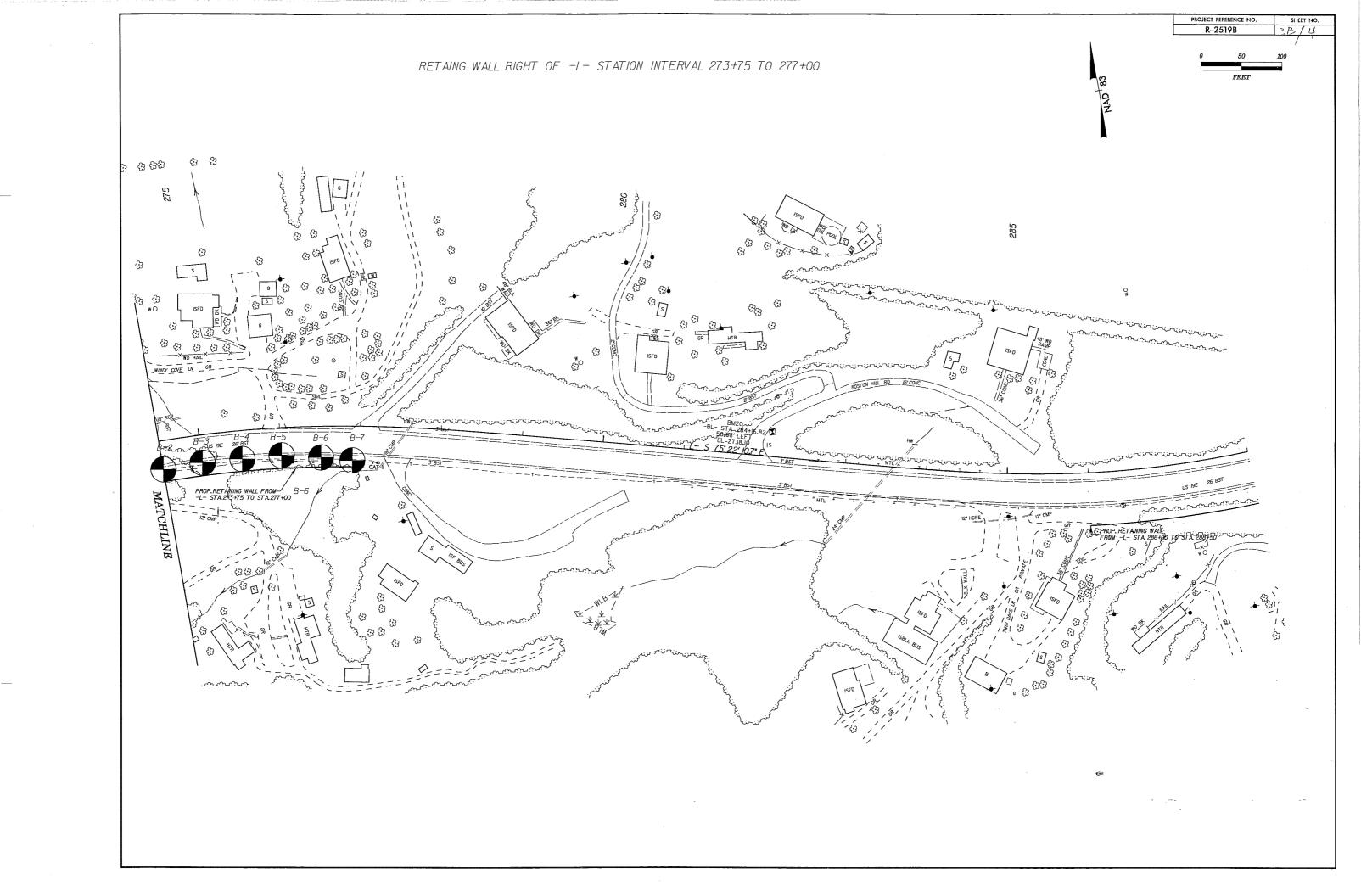
DIVISION OF HIGHWAYS

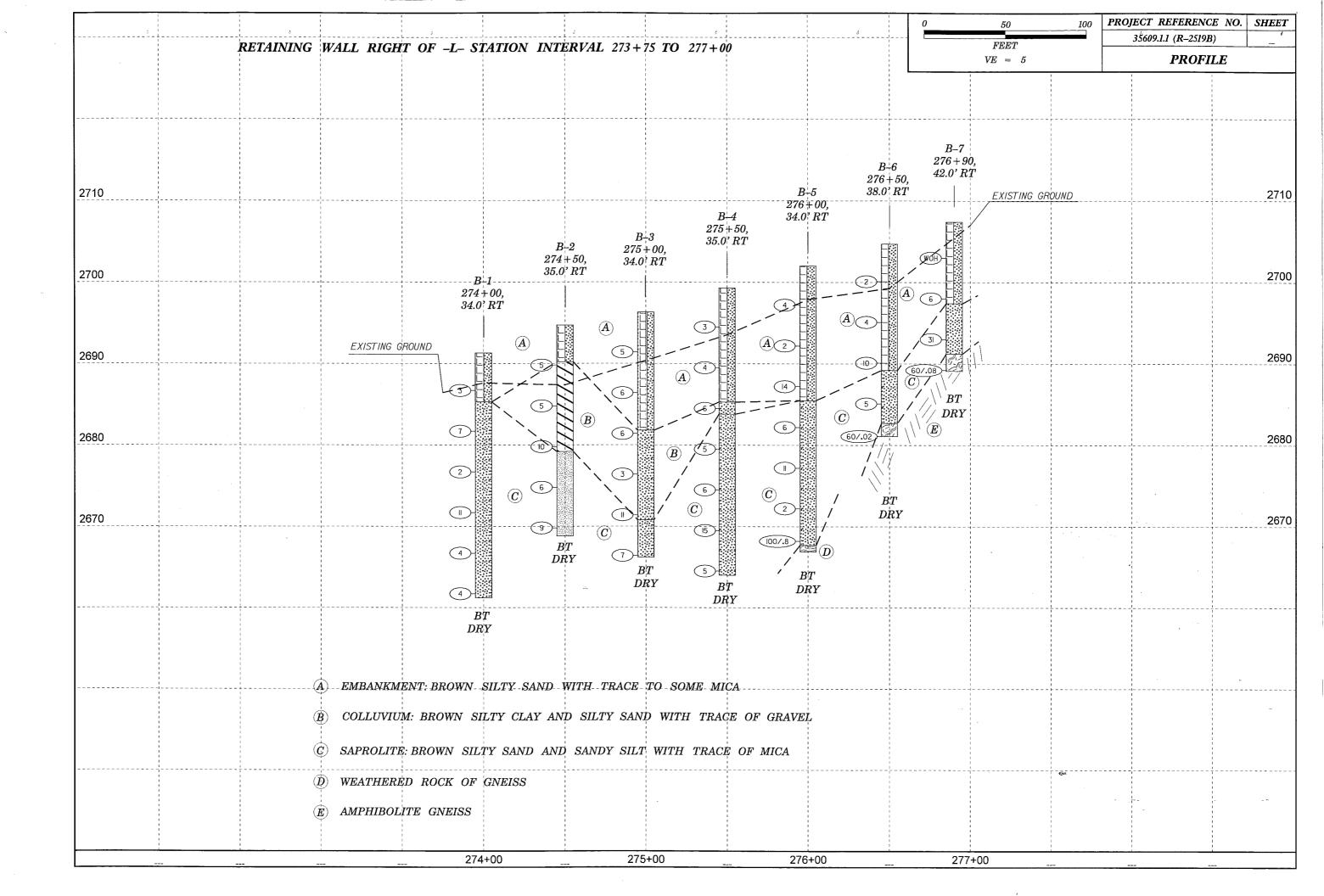
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION ND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVI

			SOIL AND ROC	K LEGEND, TERM	s, symbols	, AND ABBREVI	ATIONS		
SOIL DESCR	RIPTION	LICIL COADED VIDEO	GRADATION CONTRACTOR OF PARTIES O	ON CINE TO COADES	HADD COOK TO		DESCRIPTION	TUESCOSS.	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONTINUOUS FLIGHT POW		WELL GRADED - INDICATES A GOOD REPRES	ENTATION OF PARTICLE SIZES FR ES ARE ALL APPROXIMATELY THE	UM FINE TO COARSE. SAME SIZE (ALSO	ROCK LINE INDICA	TES THE LEVEL AT WHICH NON-C	T IF TESTED, WOULD YIELD SPT REFUSAL.AN COASTAL PLAIN MATERIAL WOULD YIELD SPT	REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATIO	ON TEST (AASHTO T206, ASTM D-1586). SOIL	POORLY GRADED). GAP-GRADED - INDICATES A MIXTURE OF UN	NIFORM PARTICLES OF TWO OR MO	RE SIZES.	IN NON-COASTAL	PLAIN MATERIAL, THE TRANSITION	SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT ON BETWEEN SOIL AND ROCK IS OFTEN REPRE		ACUIFER - A WATER BEARING FORMATION OR STRATA,
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC I CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF T	ATION, AND OTHER PERTINENT FACTORS SUCH		ULARITY OF GRAINS	COMO, ANCHI AD	OF WEATHERED RO ROCK MATERIALS	ARE TYPICALLY DIVIDED AS FOLL	LOWS:		ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND, ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PL VERY STIFF, GRAY, SULY CLAY, WOIST WITH INTERBEDDED.		THE ANGULARITY OR ROUNDNESS OF SOIL SUBANGULAR, SUBROUNDED, OR ROUNDED.	GRAINS IS DESIGNATED BY THE TO	EHMS: ANGULAH,	WEATHERED	NON-COASTAL P	LAIN MATERIAL THAT WOULD YIELD SPT N VA	LUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASH			LOGICAL COMPOSITION	1	ROCK (WR)	250		A.T.	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
GENERAL GRANULAR MATERIALS SIL	T-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPA	R, MICA, TALC, KAOLIN, ETC. ARE US		CRYSTALLINE ROCK (CR)	WOULD YIELD SE	E GRAIN IGNEOUS AND METAMORPHIC ROCK TH PT REFUSAL IF TESTED, ROCK TYPE INCLUDE:		GROUND SURFACE.
	35% PASSING *200)	WHENEVER THEY ARE CONSIDERED OF SIGNI			NON-CRYSTALLINE	GNEISS, GABBRO,	, SCHIST, ETC. E GRAIN METAMORPHIC AND NON-COASTAL PLA	IN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE,
GROUP A-1 A-3 A-2 A CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7	4 A-5 A-6 A-7 A-I, A-2 A-4, A-5 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE	COMPRESSIBILITY LIQUID LIMIT L	ESS THAN 3I	ROCK (NCR)	SEDIMENTARY RO	OCK THAT WOULD YEILD SPT REFUSAL IF TES .ITE, SLATE, SANDSTONE, ETC.		COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE,
SYMBOL 0000000000		MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE	LIQUID LIMIT E		COASTAL PLAIN SEDIMENTARY ROCK	COASTAL PLAIN	SEDIMENTS CEMENTED INTO ROCK, BUT MAY N		CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
% PASSING			ENTAGE OF MATERIAL	INCHIENT MAN 30	(CP)	SHELL BEDS, ETC	С.	CEMENTED	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 10 50 MX # 40 30 MX 50 MX 51 MN	GRANULAR SILT- MUCK, CLAY PEAT	ORGANIC MATERIAL GRANULAR SOILS	SILT - CLAY	OTHER MATERIAL		WE	ATHERING		ROCKS OR CUTS MASSIVE ROCK.
# 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MX		TRACE OF ORGANIC MATTER 2 - 3%	3 - 5% TRAC	E 1 - 10%	FRESH ROCK	FRESH, CRYSTALS BRIGHT, FEW JU ER IF CRYSTALLINE,	OINTS MAY SHOW SLIGHT STAINING, ROCK RIN	GS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 40 MX 41 MN 40 MX 41 MN 40 N	MX 41 MN 48 MX 41 MN SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10%	5 - 12% LITTI 12 - 20% SOME		VERY SLIGHT ROCK	GENERALLY FRESH, JOINTS STAIN	NED, SOME JOINTS MAY SHOW THIN CLAY COAT		DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 M	MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10%	>20% HIGH			TALS ON A BROKEN SPECIMEN FAI CRYSTALLINE NATURE.	CE SHINE BRIGHTLY, ROCK RINGS UNDER HAM	4ER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
	MX 12 MX 16 MX No MX MODERATE ORGANIC SOILS		GROUND WATER		SLIGHT ROCK	GENERALLY FRESH, JOINTS STAIN	NED AND DISCOLORATION EXTENDS INTO ROCK		<u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND CAND CRAVEL AND SAND	SILTY CLAYEY ORGANIC SOILS SOILS MATTER		E HOLE IMMEDIATELY AFTER DR	RILLING			AY, IN GRANITOID ROCKS SOME OCCASIONAL F CRYSTALLINE ROCKS RING UNDER HAMMER B		FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES,
MATERIALS SAND SHAND GRAVEE AND SHAND CEN, RATING	JULES SULLS THE PROPERTY OF TH	STATIC WATER LEVEL	AFTER 24 HOURS		MODERATE SIGNIF	FICANT PORTIONS OF ROCK SHOW	DISCOLORATION AND WEATHERING EFFECTS.	IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD	FAIR TO POOR FAIR TO POOR UNSUITABLE	<u> </u>	JRATED ZONE, OR WATER BEARING	G STRATA			RE DULL AND DISCOLORED, SOME SHOW CLAY. *D SHOWS SIGNIFICANT LOSS OF STRENGTH A		PARENT MATERIAL.
SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI		O-M SPRING OR SEEP			1	FRESH ROCK.			FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OF		MISC	ELLANEOUS SYMBOLS				O OR STAINED. IN GRANITOID ROCKS, ALL FEL OW KAOLINIZATION. ROCK SHOWS SEVERE LOSS		FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
DDIMADY COTI TYPE CUMPACINESS UK DENGT	ANGE OF STANDARD RANGE OF UNCONFINED FRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE)	SPT CPT	SAMPLE		AN BE EXCAVATED WITH A GEOLG STED, WOULD YIELD SPT REFUSAL	OGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHE	N STRUCK.	THE FIELD.
CUNSISTENCT	(N-VALUE) (TONS/FT ²)	WITH SOIL DESCRIPTION	DPT DMT TEST BORING	DESIGNATIONS S - BULK SAMPLE			D OR STAINED ROCK FABRIC CLEAR AND EVIO	ENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE LOOSE	<4 4 TO 1Ø	SOIL SYMBOL	AUGER BORING	SS - SPLIT SPOON		RENGTH TO STRONG SOIL. IN GRANT, SOME FRAGMENTS OF STRONG	ANITOID ROCKS ALL FELDSPARS ARE KAOLINIZ	ZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
MATERIAL MEDIUM DENSE	10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER	CORE BORING	SAMPLE		STED, YIELDS SPT N VALUES > 1			LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) VERY DENSE	30 TO 50 >50	THAN ROADWAY EMBANKMENT	- COME BONING	ST - SHELBY TUBE			D OR STAINED, ROCK FABRIC ELEMENTS ARE I		MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	(2) (0,25	- INFERRED SOIL BOUNDARY	MONITORING WELL	SAMPLE DO DOOK CAMPLE	REMA	NING, SAPROLITE IS AN EXAMPLE	OF ROCK WEATHERED TO A DEGREE SUCH TO	HAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT SILT-CLAY MEDIUM STIFF	2 TO 4	INFERRED ROCK LINE	∧ PIEZOMETER	RS - ROCK SAMPLE	1		RIC REMAIN. IF TESTED, YIELDS SPT N VAL		INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF (COHESIVE) VERY STIFF	8 TO 15 1 TO 2 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY	△ INSTALLATION	RT - RECOMPACTED TRIAXIAL SAMPLE	SCATT	ERED CONCENTRATIONS, QUARTZ	NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN MAY BE PRESENT AS DIKES OR STRINGERS, S		ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD	>30 >4	25/025 DIP & DIP DIRECTION OF	SLOPE INDICATOR INSTALLATION	CBR - CALIFORNIA BEARING	ALSO	AN EXAMPLE.	LIADDNICCO		ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR C	GRAIN SIZE	ROCK STRUCTURES	— SPT N-VALUE	RATIO SAMPLE			HARDNESS		EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
	40 60 200 270	SOUNDING ROD	REF)— SPT REFUSAL			NOT BE SCRATCHED BY KNIFE OR FRAL HARD BLOWS OF THE GEOLO	SHARP PICK, BREAKING OF HAND SPECIMENS IGIST'S PICK.	REQUIRES .	PARENT ROCK.
	0.42 0.25 0.075 0.053		ABBREVIATIONS				K ONLY WITH DIFFICULTY, HARD HAMMER BLO	WS 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
BOULDER CUBBLE GRAVEL C	DARSE FINE SILT CLAY SAND SAND SILT CLAY		HI, - HIGHLY	w - MOISTURE CONTENT	1	DETACH HAND SPECIMEN.	CK, GOUGES OR GROOVES TO 0.25 INCHES DEE	D CAN DE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
	SE, SD.) (F SD.) (SL.) (CL.)		MED MEDIUM MICA MICACEOUS	V - VERY VST ~ VANE SHEAR TEST	HARD EXCA	AVATED BY HARD BLOW OF A GEO	DLOGIST'S PICK, HAND SPECIMENS CAN BE DET		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 SIZE IN 12 3	0.25 0.05 0.005		10D MODERATELY NP - NON PLASTIC	WEA WEATHERED	I .	40DERATE BLOWS. BE GROOVED OR GOLIGED 0.05 IN	ICHES DEEP BY FIRM PRESSURE OF KNIFE OR	PICK POINT	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORR	ELATION OF TERMS	DMT - DILATOMETER TEST C	ORG ORGANIC	7 DRY UNIT WEIGHT	HARD CAN	BE EXCAVATED IN SMALL CHIPS	TO PEICES I INCH MAXIMUM SIZE BY HARD B		A 140 LB.HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTUR			PMT - PRESSUREMETER TEST SAP SAPROLITIC	FIAD - FILLED IMMEDIATELY	I .	IT OF A GEOLOGIST'S PICK. BE GROVED OR GOUGED READILY	BY KNIFE OR PICK, CAN BE EXCAVATED IN F	RAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION		F - FINE S	SD SAND, SANDY	AFTER DRILLING WOH - WEIGHT ØF HAMMER	FROM		SIZE BY MODERATE BLOWS OF A PICK POINT.		STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED (SAT,)	 USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE 	FRAC FRACTURED, FRACTURES S	GL, - SILT, SILTY GLI, - SLIGHTLY	non negoti oi timinen	1		EXCAVATED READILY WITH POINT OF PICK, P	IECES I INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
PLASTIC LIQUID LIMIT		FRAGS FRAGMENTS 1	TCR - TRICONE REFUSAL		SOFT OR M		KEN BY FINGER PRESSURE, CAN BE SCRATCHE		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.
RANGE < + WET - (W)	SEMISOLID; REQUIRES ORYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT	USED ON SUBJECT PF	ROJECT	-	URE SPACING	BEDDING		TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	The state of the s	DRILL UNITS: ADVANCI	NG TOOLS:	HAMMER TYPE:	TERM	SPACING	TERM THIC	KNESS	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M	SOLID; AT OR NEAR OPTIMUM MOISTURE			X AUTOMATIC MANUAL	VERY WIDE WIDE	MORE THAN 10 FEET		FEET 4 FEET	
SL SHRINKAGE LIMIT		MOBILE B CL			MODERATELY CL		THINLY BEDDED 0.16 -	0.15 FEET	ELEVATION: - FT.
- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		CONTINUOUS FLIGHT AUGER	CORE SIZE:	CLOSE VERY CLOSE	0.16 TO 1 FEET LESS THAN 0.16 FEET	THICKLY LAMINATED 0.008 -	0.03 FEET	NOTES:
DI ACTIV			HOLLOW AUGERS	B	ļ		THINLY LAMINATED < 0.0 OURATION	Ø8 FEET	-
PLASTIC PLASTICITY INC		M CAC-45C	RD FACED FINGER BITS	N	FOR SEDIMENTARY RO		VING OF THE MATERIAL BY CEMENTING, HEAT,	PRESSURE, ETC.	
NONPLASTIC 0-5	VERY LOW	X CME-558	IGCARBIDE INSERTS	H	FRIABLE		WITH FINGER FREES NUMEROUS GRAINS;		· ·
LOW PLASTICITY 6-15 MED. PLASTICITY 16-25	SLIGHT MEDIUM	CAS	SING W/ ADVANCER	HAND TOOLS:	LUTHOLE	GENTLE	BLOW BY HAMMER DISINTEGRATES SAMPLE.		©±
HIGH PLASTICITY 26 OR MC			CONE STEEL TEETH	POST HOLE DIGGER	MODERATE		CAN BE SEPARATED FROM SAMPLE WITH STEE EASILY WHEN HIT WITH HAMMER.	L PROBE:	
COLO	DR	<u></u>	CONE TUNGCARB.	HAND AUGER	INDURATE		ARE DIFFICULT TO SEPARATE WITH STEEL PI	ROBE:	er i jere
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBIN			RE BIT	SOUNDING ROD - VANE SHEAR TEST	PARIORIE		LT TO BREAK WITH HAMMER,		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. A	ARE USED TO DESCRIBE APPEARANCE.				EXTREMEL		HAMMER BLOWS REQUIRED TO BREAK SAMPLE; BREAKS ACROSS GRAINS,		
		1				CHIE LL		·····	







CONTENTS

9B

HEET DESCRIPTION

I TITLE SHEET

2 LEGEND

3 SITE PLAN

4 PROFILE

5 CROSS SECTIONS

8 SOIL TEST RESULTS

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO	25609.1.1	F.A. PROJ
COUNTY	YANCEY-MITCHELL	
PROJECT DESCRIPTION _	US-19E FROM SR-1186	TO THE MULTI-LANE
	SECTION WEST OF SP	
SITE DESCRIPTION	RETAINING WALL RIGHT	T OF -L- STATION
	INTERVAL 305+00 TO	

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	SHEETS
N.C.	35609.1.1 (R-2519B)	1	8

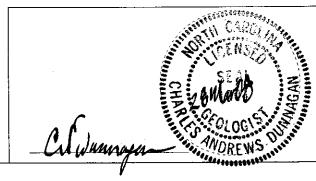
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STIDDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PERPOSES. THE VARIOUS FELD BORNO, COS. ROCK CORES. AND SOL TEST DATA AVAILABLE MAY PERPOSES. REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION. COTTEMBLAY LENGMERON UNIT AT 1993 250-4088. RETHER THE SUBSURFACE PLANS AND REPORTS. NOR THE FIELD BORNO LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SON, AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALABLE SUBSUBFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUBFACE CONDITIONS BETWEEN BARRES OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATIONY SAMPLE DATA AND THE IN STILL ON-PLACE) TEST DATA CAN BE RELED ON ONLY TO THE DEGREE OF RELIBELITY INMERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOM, MOSTUME CONDITIONS INDICATED AT THE STRATAGE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOM, MOISTURE CONDITIONS THE ACCORDING TO CLIMATIC CONDITIONS MELDED AND AND THE MAY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS DITHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE DEFENENT FOR BIDDING ARE PRELIMENTED ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR QUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, JOY OF THE INTERPRETATIONS AND COPINGO OF THE COPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE EXCOUNTED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE RIVESTIGATIONS AS HE DEEMS NECESSARY TO ASSIST MINESELF AS TO CONDITIONS TO BE ENCOUNTEDED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERENCE FROM THE STED METERS FROM THE METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FROM THE STED METERS FRO

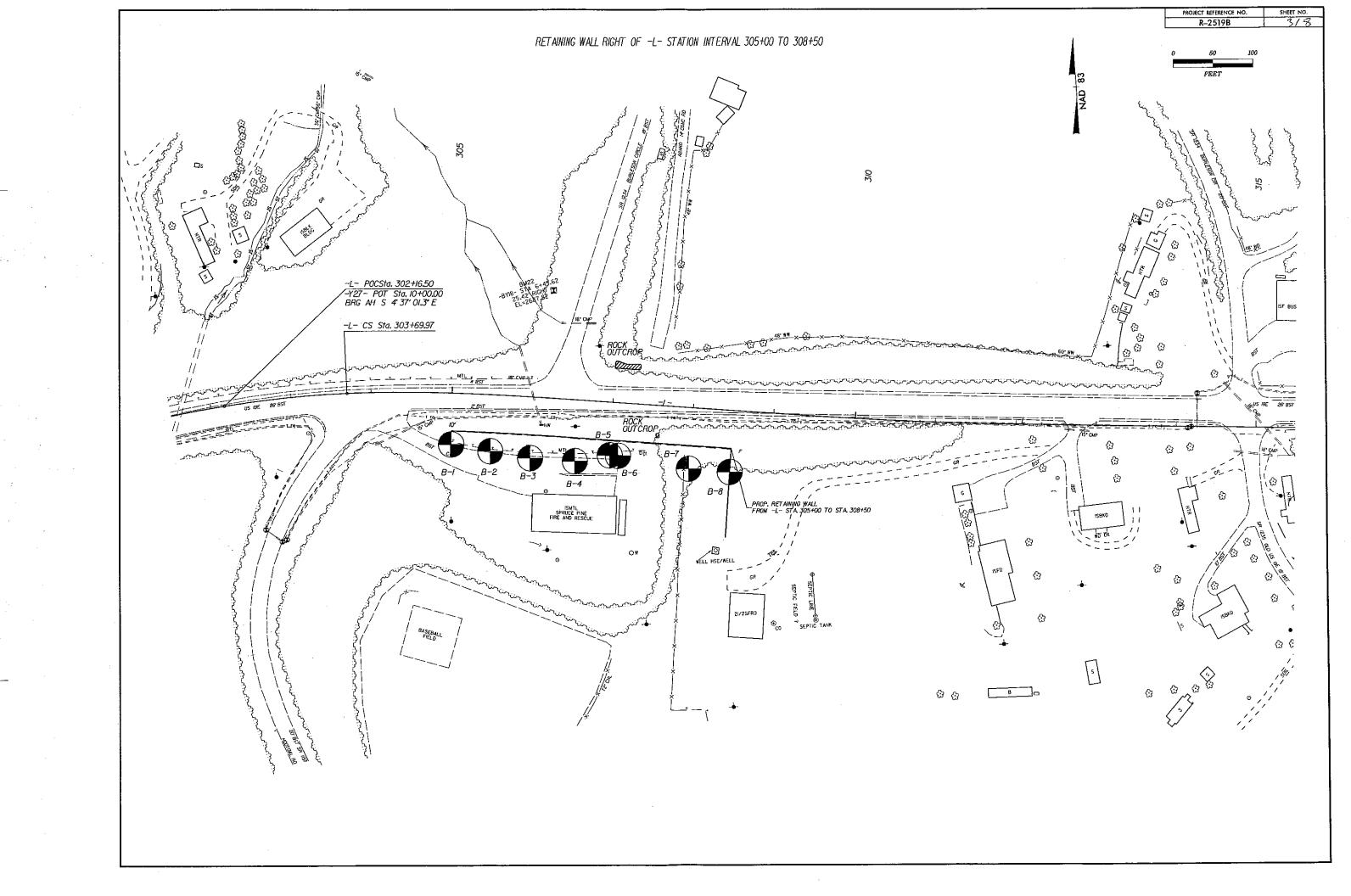
_	T B DANIEL
_	C J COFFEY
_	R D CHILDERS
_	
_	
_	
_	
INVESTIGATED BY	C A DUNNAGAN
CHECKED BY	W D FRYE, Jr
SUBMITTED BY_	W D FRYE, Jr
DATE	MARCH 2008

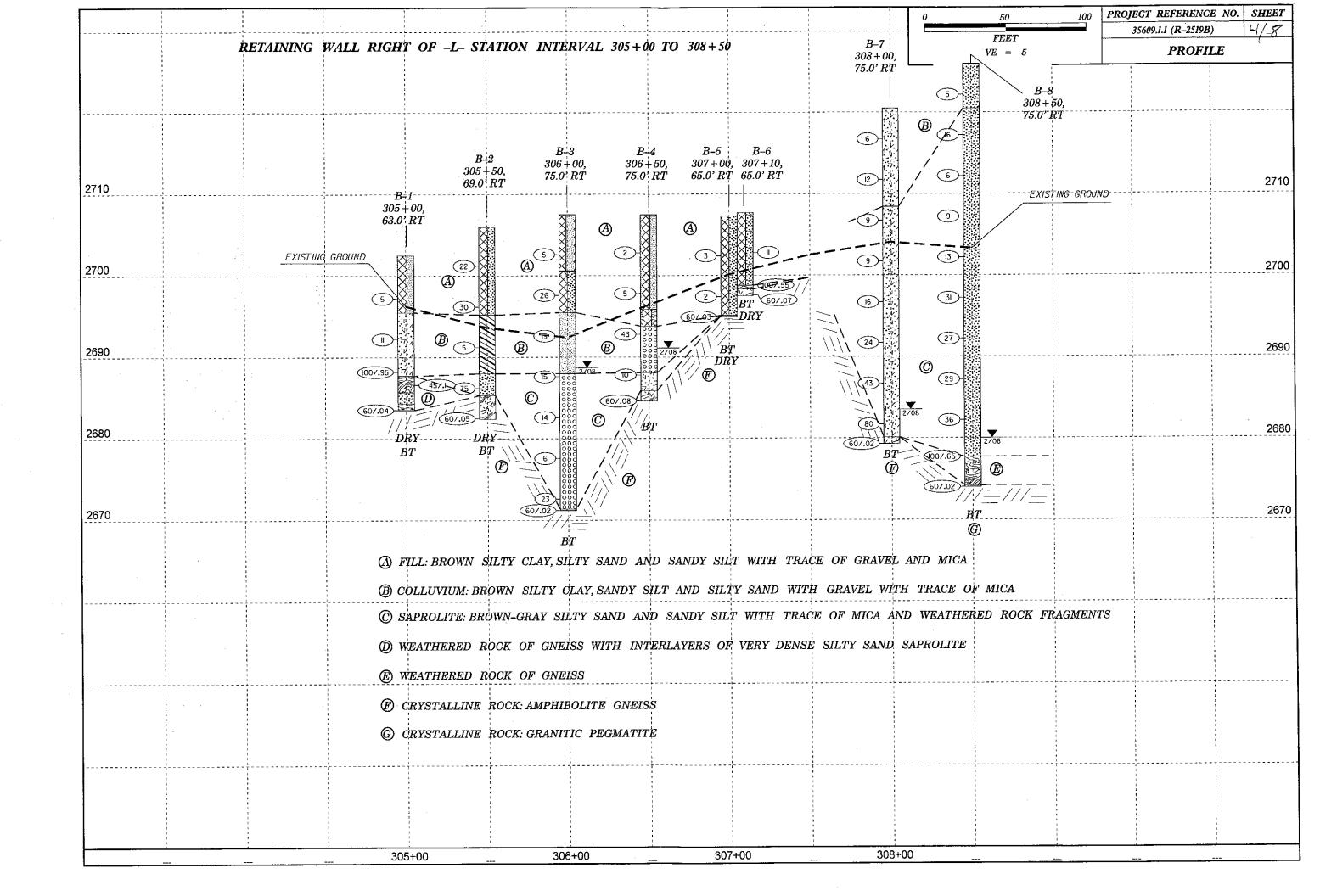


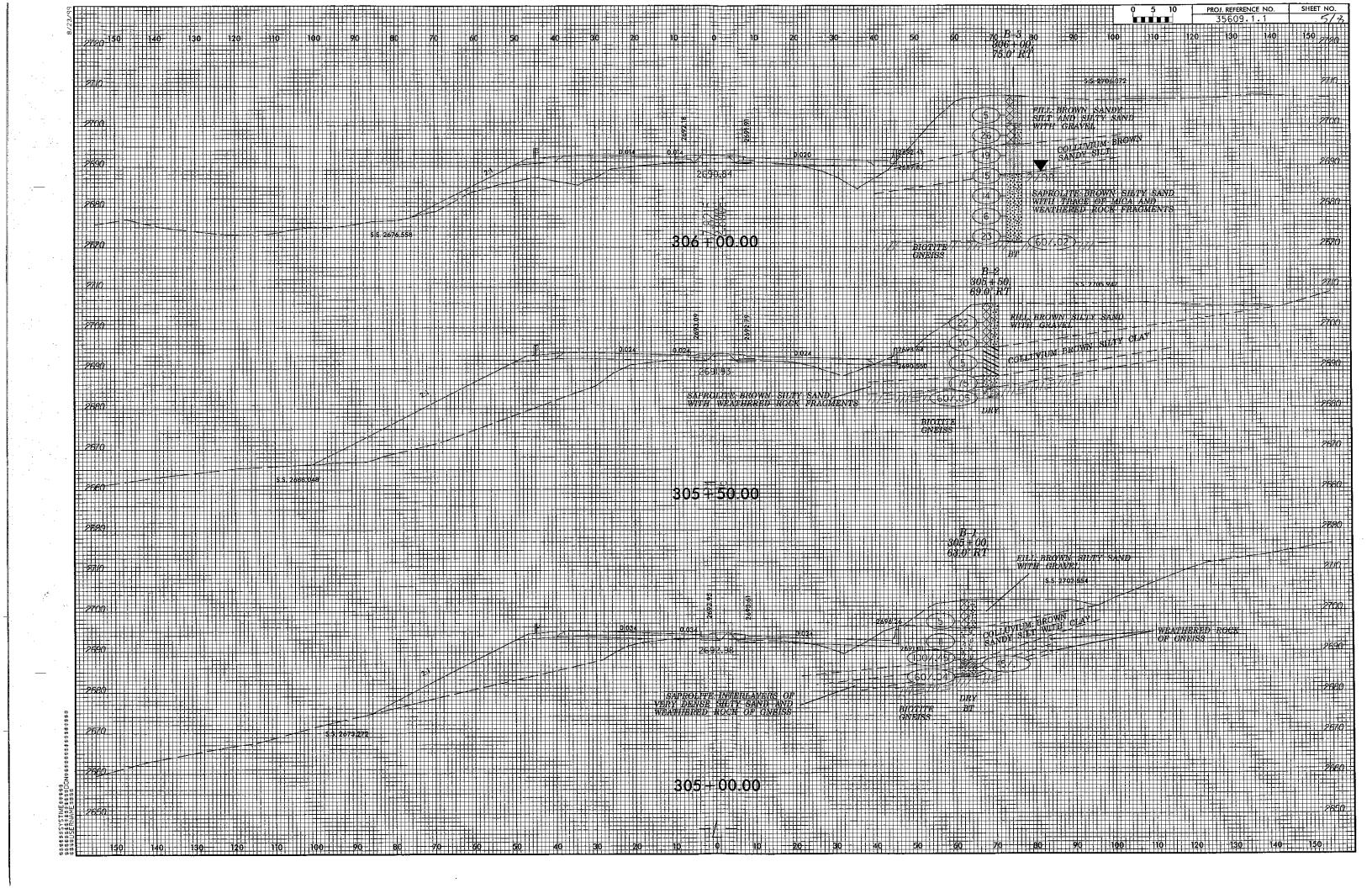
DIVISION OF HIGHWAYS

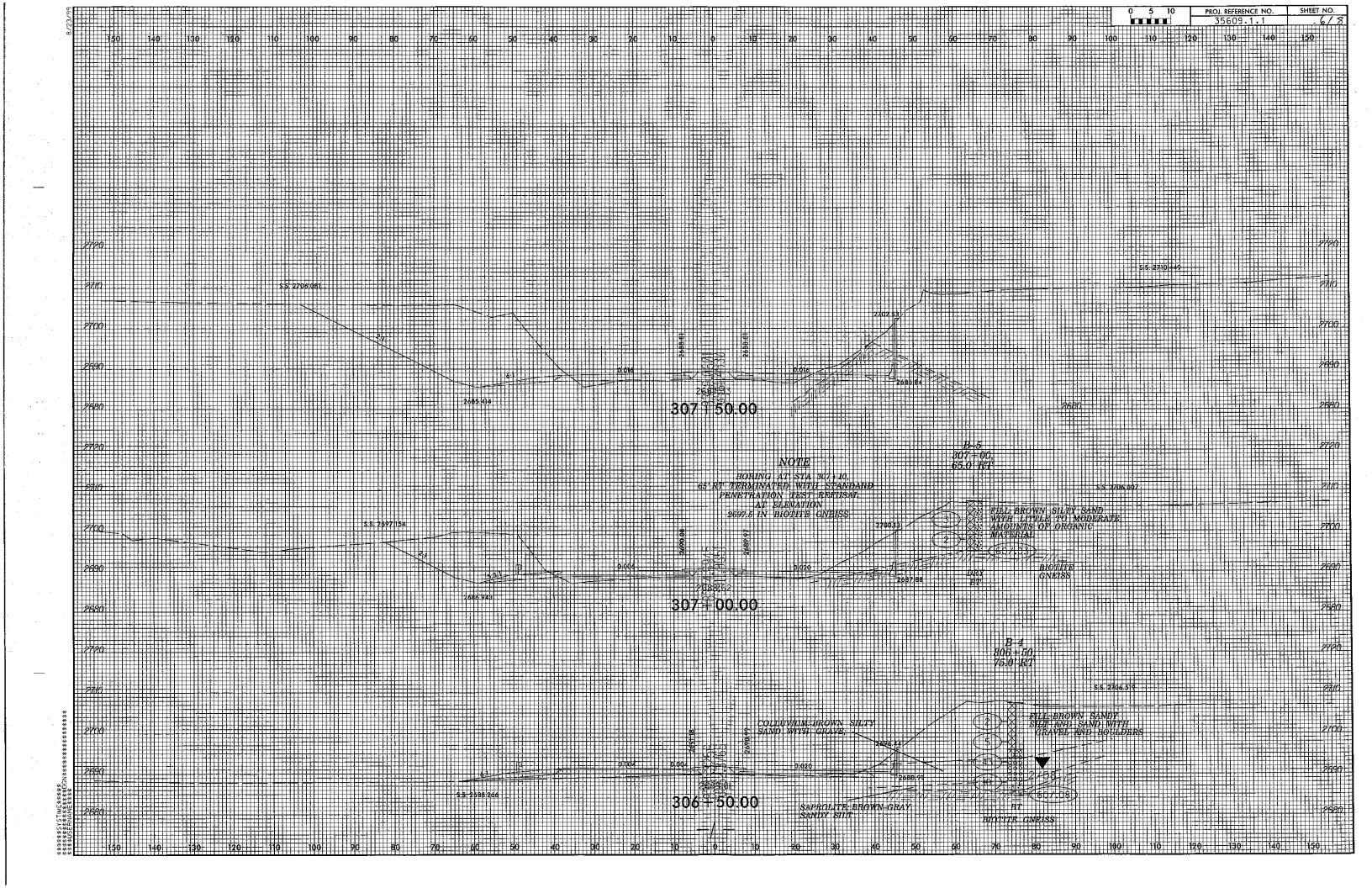
GEOTECHNICAL ENGINEERING UNIT

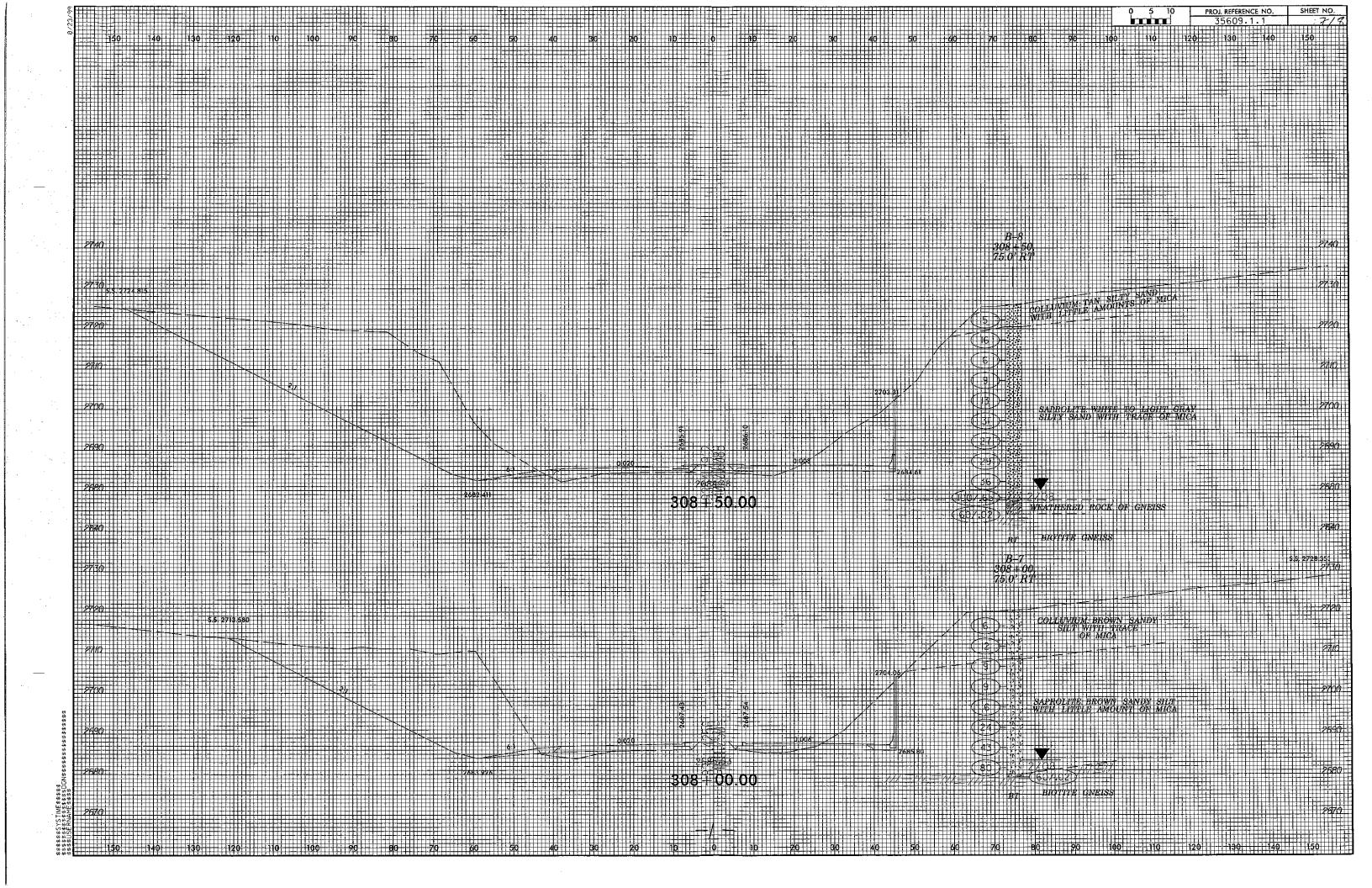
	SOIL AND ROCK I	LEGEND, TERMS, SYMBO	LS, AND ABBREVIATIONS		
SOIL DESCRIPTION	GRADATION		ROCK DESCRIPTION	-	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME S	NE TO COARSE. HARD ROCK I'S SIZE, (ALSO ROCK LINE I'	NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD OF	SPT REFUSAL, AN INFERRED OULD YIELD SPT REFUSAL,	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLICHT POWER AUGER, AND YIELD LESS THAN 188 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T286, ASTM D-1586). SOIL	POORLY GRADED: CAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZE	SPT REFUSAL	IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LES AL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK	SS THAN 0.1 FOOT PER 60 BLOWS.	ACUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	ANGULARITY OF GRAINS	OF WEATHERE	J ROCK.	10 0 10 10 10 10 10 10 10 10 10 10 10 10	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: A	ANGULAR, WEATHERED	NON-COASTAL PLAIN MATERIAL THAT WOULD	D VICE O COT N. NALLEC A 188	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY, SILTY CLAY, WOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR)	BLOWS PER FOOT IF TESTED.		ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC, ARE USED IN E	DESCRIPTIONS CRYSTALLINE	FINE TO COARSE GRAIN IGNEOUS AND METAN WOULD YIELD SPT REFUSAL IF TESTED. ROO	MONENIC MOCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL CRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) CRGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR)	GNEISS, GABBRO, SCHIST, ETC.		CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CROUP A-1 A-3 A-2 A-4 A-5 A-5 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLIN ROCK (NCR)	SEGMENTIAL ROCK THAT WOOLD TELLO SET	r REFUSAL IF TESTED. ROCK TYPE	COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-8 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS TH MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL T	FHAN 31 -	INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTS CEMENTED INTO		OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
SYMBOL 000000000000000000000000000000000000	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER				LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
(PASSING SILT MUCK,	PERCENTAGE OF MATERIAL.		WEATHERING		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
* 18 S8 MX S8 MX S5 MX S1 MN GRANULAR CLAY MUCK. * 48 38 MX S8 MX S1 MX S1 MN S0 ILS S0ILS S0ILS	ORGANIC MATERIAL SOILS SOILS DTHER N	MATERIAL FRESH R	OCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT ST		DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
* 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE		AMMER IF CRYSTALLINE.		HORIZONTAL,
10010 LINIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME	20 - 35% VERY SLIGHT R	ICK GENERALLY FRESH, JOINTS STAINED, 50ME JOINTS MAY SHOW RYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK R		DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
LASTIC INDEX 6 MX NP 18 MX 10 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN LITTLE OR HIGHLY			A CRYSTALLINE NATURE.	gridd dribery rawners bedrife a	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
AMOUNTS OF SOME	GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING		OCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXT INCH, OPEN: JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SO		SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
DE MAJOR CRAYEL AND GRAVEL AND SAND SOULS SOULS MATTER	l —	ig (SFI') [RYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING	UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SHIP STATE			IGNIFICANT PORTIONS OF ROCK SHOW OISCOLORATION AND WEATH RANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SO		FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	PERCHED WATER SATURATED ZONE OR WATER BEARING STRA	0	JLL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS	OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
SUBGRADE PI OF A-7-5 SUBGROUP IS SELL - 30; PI OF A-7-6 SUBGROUP IS >- LL - 30	SPRING OR SEEP		ITH FRESH ROCK.		THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE A	LL ROCK EXCEPT QUARTZ DISCOLOREO OR STAINED. IN GRANITOIC NO DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHO	HOWS SEVERE LOSS OF STRENGTH	FORMATION_IFM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PONDACTNIESE OR RANGE OF STANDARD RANGE OF UNCONFINED	ROADWAY EMBANKMENT (RE) PT OPT ONT TEST BORING	SAMPLE 11	NO CAN BE EXCAYATEO WITH A GEOLOGIST'S PICK, ROCK GIVES '' ' <u>TESTED, WOULD YIELD SPI REFUSAL</u>	3	THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONFIDENCE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT2)	WITH SOIL DESCRIPTION VST PHT	DESIGNATIONS	LL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC		LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLY VERY LOOSE 44	L sou symbol (1) Aliger Boring	(SEV.)	4 STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPA XTENT, SOME FRAGMENTS OF STACING ROCK USUALLY REMAIN.	ARS ARE KAOLINIZED TO SOME	ITS LATERAL EXTENT.
GRANULAR MEDIUM DENSE 10 TO 20 N/A	ARTIFICIAL FILL (AF) OTHER		F TESTED, YIELDS SPT N VALUES > 100 BPF	,	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL DENSE 30 TO 50 (NON-COHESIVE) VERY DENSE >50	M THAN BRADDAY EMPANEMENT - CORE BORING		L ROCK EXCEPT GUARTZ DISCOLORED OR STAINED. ROCK FABRIC	: ELEMENTS ARE DISCERNIBLE BUT	MOTILEO (MOTI.: PREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
	INFERRED SOIL BOUNDARY MW MONITORING WELL SO	R	HE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY EMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A	A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF A
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	INFERRED ROCK LINE A PIEZOMETER		STIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, YI</u>		INTERVENING IMPERVIOUS STRATUM.
Silt-clay MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY		OCK REDUCEO TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCE CATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RDD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	SLOPE INDICATOR		SO AN EXAMPLE.		ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN A
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES	RATIO SAMPLE	ROCK_HARDNESS		EXPRESSED AS A PERCENTAGE.
	SOUNDING ROD GEE SPT REFUSAL		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF	HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053			SEVERAL HARO BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. :	HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
COARSE FINE	ABBREVIATIONS		TO DETACH HAND SPECIMEN.	THE PERSON DECEMBED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL. TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER (BLOR.) COBBLE (COB.) GRAVEL (GR.) SAND (CSE. SD.) SAND (F SD.) SILT (SL.) CLAY (CL.)	BT - BORING TERMINATED MED MEDIUM V		CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECI		SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.005 0.005	CPT - CONE PENETRATION TEST MOD MODERATELY W	WEAL - WEATHERED	BY MODERATE BLOWS. CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSI	SURE OF KNIEF OR DICK POINT	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3		7 DRY UNIT WEIGHT HARD	CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM		A 140 LB HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WI A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE CHARGE CONTROL MOISTURE OF COMMENTAL	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST F	FIAD - FILLED IMMEDIATELY	POINT OF A GEÖLOGIST'S PICK. CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE	E EXCAVATED IN EDACMENTS	THAN 8,1 FOOT PER 60 BLOWS.
OFFICE OFFICE CATERBERG LIMITS) OFFICE OFFICE OFFICE OFFICE ON STATE OF SCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO SAP SAPROLITIC F - FINE SD SAND, SANDY	AFTER DRILLING	CAN BE CHOVED OR GODGED HEADLEY BY KNIFE ON PICK. CAN BE FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS PIECES CAN BE BROKEN BY FINCER PRESSURE.		STRATA CORE RECOVERY ISREC TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENG OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FRAC, - FRACTURED, FRACTURES SL SLICHTLY FRACE - FRACTURED, FRACTURES SLI SLIGHTLY		PIECES CAN BE BRUKEN BY FINGER PRESSURE. CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH	POINT OF PICK, PIECES LINCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE LL LIQUID LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	SOFT	OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, C		TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM-EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
LASTIC SEMISOLID; REQUIRES DRYING TO	EQUIPMENT USED ON SUBJECT PROJE		FINGERNAIL. SCTURE SPACING B	BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE		75014	SPACING IERM	THICKNESS	BENCH MARK; _
	DRILL UNITS: REPARCING TODES:	MMER TYPE: 1EHM AUTOMATIC MANUAL VERY WIDE	MORE THAN 10 FEET YERY THICKLY BEDI	DED > 4 FEET	OCCUPATION _
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	MOBILE B CLAY BITS	AUTOMATIC MANUAL WIDE MODERATEL	CLOSE 1 TO 3 FEET THINLY BEDDED	0.16 - 1.5 FEET	ELEVATION:F
SL SHRINKAGE LIMIT	6 CONTINUOUS FLIGHT AUGER CORE	RE SIZE: CLOSE	. 0,16 TO LEGET VERY LAMINATES		NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 8'HOLLOW AUGERS]-B	THINLY LAMINATED		 -
PLASTICITY	-1 1 - 1 - 1 -	1_m	INDURATION	CONTROL OF THE PART OF THE	1
PLASTICITY INDEX (PI) DRY STRENGTH	TUNG "CARRIDE INSERTS	TO SECTION	Y ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY		
ONPLASTIC 8-5 VERY LOW OW PLASTICITY 6-15 SLIGHT	X CME-550]-H	BLE RUBBING WITH FINGER FREES NUME GENTLE BLOW BY HAMMER DISINTEC		
MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST	ND TOOLS: POST HOLE DIGGER MODE	RATELY INDURATED GRAINS CAN BE SEPARATED FROM S		
HIGH PLASTICITY 26 OR MORE HIGH		HAND AUGER MODE	BREAKS EASILY WHEN HIT WITH HA		
COLOR	TRICONE		RATED GRAINS ARE DIFFICULT TO SEPARA		
	CORE BLT	VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER	i,	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).		VANE SHEAR TEST	CHARD HANNED BY DUC OCCURDED T	'O DOTAK CAMBIT.	
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.		EXTE	EMELY INDURATEO SHARP HAMMER BLOWS REQUIRED T SAMPLE BREAKS ACROSS GRAINS.	TO BREAK SAMPLE:	











JCS NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R	-2519B			·				
	· · · · · · · · · · · · · · · · · · ·							
REPORT ON SAMPL	ES OF: So	ils for Quality	1		 .	·		
PROJECT:	35609.1.1	C	OUNTY: M	litchell	Ov	vner: NCD	OT	
DATE SAMPLED:	2.14.08		RECEIVED:			E REPORT		ng
SAMPLED FROM:	Retaining V				C. A. Dunnag		2.23.	00
SUBMITTED BY:	W. D. Frye	,	DAM		2002		SPECIFIC.	ATION
LABORATORY:	Asheville		- · · · · · · · · · · · · · · · · · · ·		2002	SIANDARI	J SI ECIFIC	ATION
			TECT D					
Project Sample No.	SS-1	SS-2	TEST RI	SS-4	SS-5	SS-6	 	
Lab Sample No. A	157063	157064	157065	157066	157067	057068	·	ļ. " <u> </u>
HiCAMS Sample #	137003	15/004	13/003	137066	13/00/	037008	 	
Retained #4 Sieve %	4.0	0.0	0.0	10.0	16.7	0.0	+	
Passing #10 Sieve %	79	81	78	77	67	97	 	
Passing #40 Sieve %	66	67	67	57	48	85	 	
Passing #200 Sieve %	36	44	42	23	21	44	 	
		<u> </u>	<u> </u>		.l			<u> </u>
		M	INUS #10	FRACTIO	N		•	
Soil Mortar - 100%				1			T	
Coarse Sand -Ret. #60	29	27	25	44	45	26		-
Fine Sand - Ret. #270	- 31	23	25	31	31	34	1	
Silt 0.05-0.005 mm %	18	19	22	15	18	22		1
Clay < 0.005 mm %	22	31	28	10	6	18		
Passing # 40 Sieve %								
Passing # 200 Sieve %						•-		
						-		
Liquid Limit	48	35	36	40	34	41	1	
Plastic Index	NP	11	NP	NP	NP	NP		 -
AASHTO Classification	A-5 (0)	A-6 (2)	A-4 (1)	A-2-4 (0)	A-1-b (0)	A-5 (2)		
Quantity	1		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				1.	
Texture			<u></u>				 	
Station	305+00	305+50	306+00	306+00	306+00	306+50		
Hole No.							<u> </u>	
Depth (ft) From:	9.8	14.3	4.4	24.4	34.4	19.4	 	
To:	10.8	15.3	5.4	25.4	35.4	20.2		
			i	<u> </u>				
Remarks:				•				
A-157063 - 157068				,				
CC:								
C. A. Dunnagan			· · · · · · · · · · · · · · · · · · ·	<u> </u>			· · · · · · · · · · · · · · · · · · ·	
File							 -	
·						 		
SOILS ENGINEER:	<u> </u>							
•								
4			•	•				

JCS NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT

	SO	ILS TEST	REPORT-	SOILS LA	ABORATO	RY	
T.I.P. ID#:	R-2519B						
7.	K-2317D						
REPORT ON SAMP	LES OF: Soi	ls for Quality	,				
		is for Quanty				<u>.</u>	· · · · · · · · · · · · · · · · · · ·
PROJECT:	35609.1.1	C	DUNTY: N	litchell	10	wner: NCDOT	
DATE SAMPLED:	2.22.08		RECEIVED:			TE REPORTED:	2.28.08
SAMPLED FROM:	Retaining W			PLED BY:	C. A. Dunna		2.20.00
SUBMITTED BY:	W. D. Frye				2002	STANDARD SPE	CIFICATION
LABORATORY:	Asheville			 		1 DIM DIM DI	, cirron
		-					
	. ,		TEST RI	ZTIIIZS			
Project Sample No.	SS-7	SS-8	SS-9	I	1		""
Lab Sample No. A	157094	157095	157096		<u> </u>		
HiCAMS Sample #							
Retained #4 Sieve %	0.0	0.0	0.0				
Passing #10 Sieve %	100	- 100	100				
Passing #40 Sieve %	92	99	98		_		
Passing #200 Sieve %	54	51	41	<u></u>			
		М	INUS #10	FD A ርጥነብ	NN)		
Soil Mortar - 100%	Ţ- <u></u>	171	11105 #10	INACIIO	1	· · · · · · · · · · · · · · · · · · ·	
Coarse Sand -Ret. #60	19	9	14				
Fine Sand - Ret. #270	34	52	59		~ 	 	
Silt 0.05-0.005 mm %	11	11	11				
Clay < 0.005 mm %	36	28	16				
Passing # 40 Sieve %							
Passing # 200 Sieve %							
Liquid Limit	53	47	47				
Plastic Index	NP	NP	NP				
AASHTO Classification Quantity	A-5 (5)	A-5 (4)	A-5 (1)				· · · · · · · · · · · · · · · · · · ·
Texture	-		<u>_</u>		—	<u> </u>	
Station	308+00	308+00	308+00			 	
Hole No.	500.00	. 508100	308100			-	· ·
Depth (ft) From:	3.3	8.3	13.3		<u> </u>		
To:	4.3	9.3	14.3			 	
					 	 	
Remarks:					· ·		
A-157094 -157096				· .			
CC:			· · · · · ·		· · · · · · · · · · · · · · · · · · ·		
C. A. Dunnagan			· · · · · · · · · · · · · · · · · · ·				<u> </u>
File				 			
		-	······································				
		·					
	······································			ļ		·	

SHEET T

.2519B

CONTENTS

DESCRIPTION

I TITLE SHEET
2 LEGEND

3 SITE PLAN

4 PROFILE

5 SAMPLE RESULTS

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO	35609.1.1	F.A. PROJ
COUNTY	YANCEY-MITCHELL	
PROJECT DESCRIPTION		TO THE MULTI-LANE
_	SECTION WEST OF S	
SITE DESCRIPTION	RETAINING WALL RIGH	HT OF -L- STATION
	INTERVAL 360+50 T	

ATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL
r.C.	35609.1.1 (R-2519B)	1	5

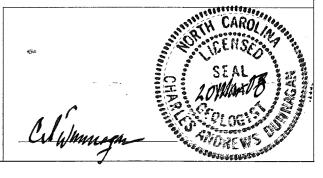
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANTING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORNG LOGS, ROCK CORES, AND SOLL TEST DATA AVAILABLE MAY WE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL EMONRERING UNIT AT (1919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNG LOGS, ROCK CORES, OR SOLL TEST DATA ARE PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL MITERPRETATION OF ALL AVAILABLE SUBSUBFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUBFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMELED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU 6N-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSUBFACE RIVESTICATIONS ARE AS RECORDED AT THE TIME OF THE INVESTICATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS WIGHLIES AND RECORDED TO CLIMATE CONDITIONS TO CLIMATE CONDITIONS TO CLIMATE CONDITIONS TO CLIMATE CONDITIONS NICLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REPER TO THE CONSTRUCTION PLANS AND DOCLMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT, THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, OR OPHIND. OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE CHOOLUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS HECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPRISATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

T B DANIEL
C J COFFEY
R D CHILDERS
<u> </u>
·
· ·
INVESTIGATED BY C A DUNNAGAN
CHECKED BY W D FRYE, Jr
SUBMITTED BY $oldsymbol{W}$ $oldsymbol{D}$ $oldsymbol{FRYE}, oldsymbol{Jr}$
DATE



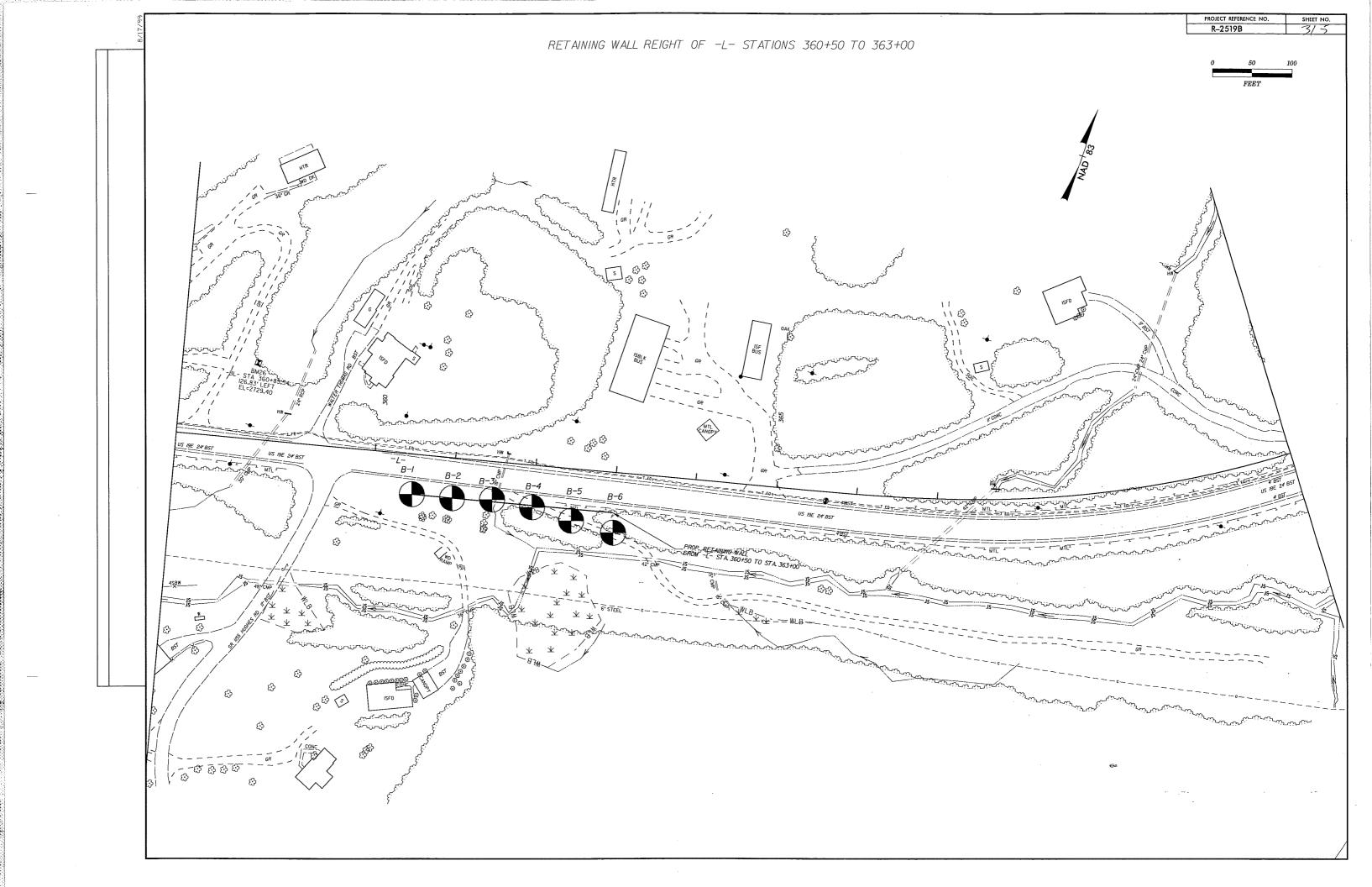
SHEET NO.

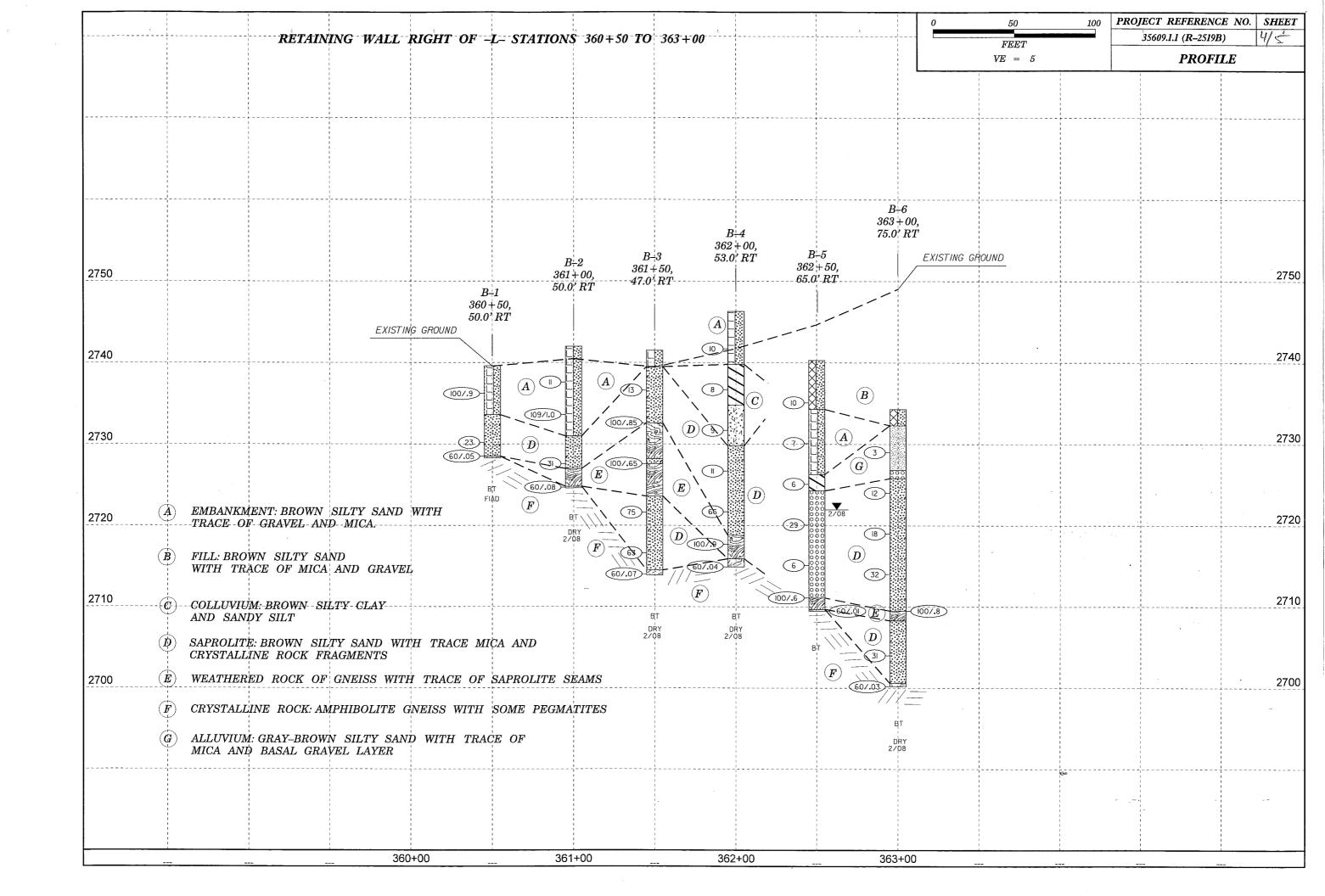
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

	SOIL AND ROCK LEGEND, TERMS	S, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION FILL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS UN	INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO OGRLY GRADED)	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL, SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA.
	AP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS; ANGULAR,	OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
	THE ANGULARITY OR HOUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS! ANGULAR, SUBROUNDED, OR ROUNDED.	MEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 1000	OR HAYING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WRI BLOWS PER FOOT IF TESTED. CRYCTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK 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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS MIN	INERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS HENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK (CR) FINE 10 CORROS GRAIN TORGOSS AND METAMORPHIC MOCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GREISS, GABBRO, SCHIST, ETC.	GROUND SURFACE.
CLASS. (\$\leq 35% PASSING #200) (\$\leq 35% PASSING #200) """	COMPRESSIBILITY	MON-COVETALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE,
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-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-2-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR) SEDIMENTANT NUCK THAT WOULD TELLD SPIT REFUSAL IF TESTED, NOCK TIPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAYITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIQUID LIMIT EDUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
Z PASSING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	TENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
= 10 58 MX	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL	WEATHERING	ROCKS OR CUTS MASSIVE ROCK.
# 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN	RACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE,	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
1001D LINIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 50ILS WITH MD	ITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% IDDERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
HIUHLY L	IGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
HIGHAL TYPES STONE SPACE SOILS	GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOLLS MATTER	STATIC WATER LEVEL AFTER 24 HOURS	(SLI,) 1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELOSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
CEN BATING	——————————————————————————————————————	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE SUBGRADE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELOSPARS DULL	THE STREAM,
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD RANGE OF UNCONFINED COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPAGES THE STRENGTH	ROADWAY EMBANKMENT (RE) OPT DAT TEST BORING DESIGNATIONS SAMPLE OPT DAT TEST BORING DESIGNATIONS	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK, IF TESTED, WOULD YIELD SPT REFUSAL,	THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
(M-VHLDE) (TOM3/FI-)	S - BULK SAMPLE	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING SS - SPLIT SPOON	(SEV.) IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MEDIUM DENSE	ARTIFICIAL FILL (AF) OTHER SAMPLE THAN ROADWAY EMBANKMENT	IF TESTED, YIELDS SPT N VALUES > 100 BPF	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
VERY DENSE >50	ST - SHELBY TUBE SAMPLE SAMPLE	(V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE,
VERY SOFT <2 <0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.50 =77.	MONITORING WELL BS - BOLK SAMPLE	REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN, IF TESTED, YIELDS SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE	COMPLETE ROCK REDUCED TO SDIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY SAMPLE SAMPLE SLOPE INDICATOR	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
	5/025 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARING RATIO SAMPLE	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO DR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD REF SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEDLOGIST'S PICK.	PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
COARSE FINE	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS,
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	AR - AUGER REFUSAL HI HIGHLY \$\omega\$ - MOISTURE CONTENT BT - BORING TERMINATED MED MEDIUM V - VERY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
CDATE NW 285 75 2.0 0.05 0.05 0.05	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLIP PLANE.
SIZE IN, 12 3	CSE COARSE NP - NON PLASTIC γ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH
SOLE HOLD TOTAL CONNECENTION OF TENING	DMT - DILATOMETER TEST ORG ORGANIC 7d - DRY UNIT WEIGHT DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0,1 FOOT PER 60 BLOWS.
	e - VOID RATIO SAP SAPROLITIC FIAD - FILLED IMMEDIATELY F - FINE SD SAND, SANDY AFTER DRILLING	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA_CORE_RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIQUID: VERY WET USUALLY	FOSS FOSSILIFEROUS SL SILT, SILTY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE 1	FRAC, - FRACTURED, FRACTURES SLI SLIGHTLY FRAGS, - FRAGMENTS TCR - TRICONE REFUSAL	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC SEMISON ID PROVIDES DRVING TO		FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANGE < - WET - (W) ATTAIN OPTIMUM MOISTURE (PI) PL PLASTIC LIMIT - WET	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET VERY THICKLY BEDDED > 4 FEET VERY THICKLY BEDDED > 1	BENCH MARK: _
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: - FT.
SL _ SHRINKAGE LIMIT	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE TO SEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X B* HOLLOW AUGERS -B	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	NOTES:
PLASTICITY	X CME-45C	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	TUNG - CARRIDE INSERTS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT	X CME-550	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	*
MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST TRICONE 'STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	€at
HIGH PLASTICITY 26 OR MORE HIGH L	TRICONE TUNG,-CARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER,	
L.	CORE BIT SOUNDING ROD .	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER,	er jest
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.	VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	•
		SAMPLE BREAKS ACROSS GRAINS.	





DOTTEL DED

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

JCS

T.I.P. ID#:	-2519B							
DEDODE ON CAMPA	no on lo							
REPORT ON SAMPL	LES OF: Soi	is for Quality	y					
DDO IECT.	25(00.1.1		OLINITAL D		· · · · · · · · · · · · · · · · · · ·		<u> </u>	
PROJECT:	35609.1.1			itchell		wner: NCD		
DATE SAMPLED:	2.29.08		RECEIVED:			TE REPORT	ED: 3.11	.08
SAMPLED FROM:	Retaining W	all	SAMI	PLED BY:	C. A. Dunn			
SUBMITTED BY:	W. D. Frye				2002	STANDARI	D SPECIFIC	ATION
LABORATORY:	Asheville				·			
			TEST RI	ESULTS				
Project Sample No.	SS-1	SS-2	SS-3	SS-4		T		T
Lab Sample No. A	157104	157105	157106	157107		 	+	
HiCAMS Sample #					1		1	
Retained #4 Sieve %	0.0	0.0	0.0	0.0		1	 	
Passing #10 Sieve %	96	84	91	94			 	
Passing #40 Sieve %	85	50	- 76	67				
Passing #200 Sieve %	55	12	53	32			 	
Soil Mortar - 100%	T	M	INUS #10 I	FRACTIO	ON T	-	T	T
Coarse Sand -Ret. #60	19	61	26	45			+	
Fine Sand - Ret. #270	29	29	19	23				
Silt 0.05-0.005 mm %	10	2	15	2			 	
Clay < 0.005 mm %	42	8	40	30				
Passing # 40 Sieve %							 -	+
Passing # 200 Sieve %							····	
			<u> </u>		 -		·I	1
Liquid Limit	49	45	41.	43	1 1 1 11 11	- A FARAL AVA.		- substituting the second
Plastic Index	21	NP	17	NP	-			
AASHTO Classification	A-7-6 (10)	A-1-b (0)	A-7-6 (7)	A-5 (0)		<u> </u>	<u> </u>	
Quantity								
Texture							1	+
Station	362+50	362+50	362+00	362+00			1	
Hole No.					1		1	1
Depth (ft) From:	14.7	24.7	9.1	14.1		<u> </u>	† · · · · · · · ·	
To:	15.7	25.7	10.1	15.1				
Remarks:			<u> </u>			<u> </u>		<u> </u>
A-157104 - 157107								
CC:								-
C. A. Dunnagan	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·					
File				·				
I IIC								
							*	
COIL C ENGINEER	T							
SOILS ENGINEER:			· · · · · · · · · · · · · · · · · · ·					