

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33820.1.1 (B-4657)	1	8

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33820.1.1 (B-4657) F.A. PROJ. BRSTP-1101(9)
COUNTY WAKE
PROJECT DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER
NORFOLK SOUTHERN RAILROAD AT STATION 17+64
SITE DESCRIPTION RETAINING WALL LEFT OF -L- AT STA. 13+00

RETAINING WALL

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. 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 NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE 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 REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

J. L. PEDRO

C. D. CZAJKA

H. R. CONLEY

J. R. TURNAGE

J. R. MATULA

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE AUGUST 2009



PROJECT: 33820.1.1 ID: B-4657

DRAWN BY: J. L. PEDRO

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

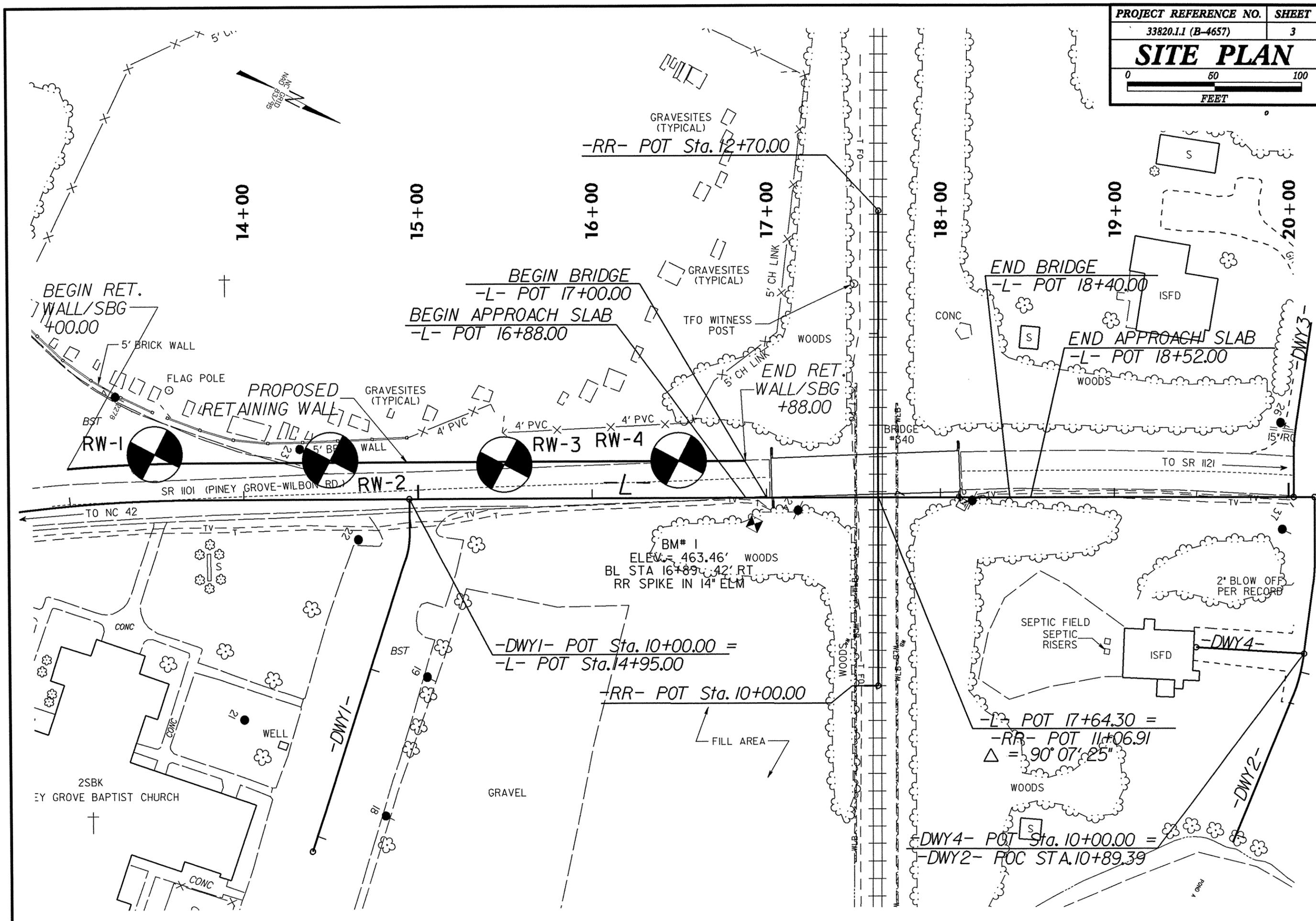
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

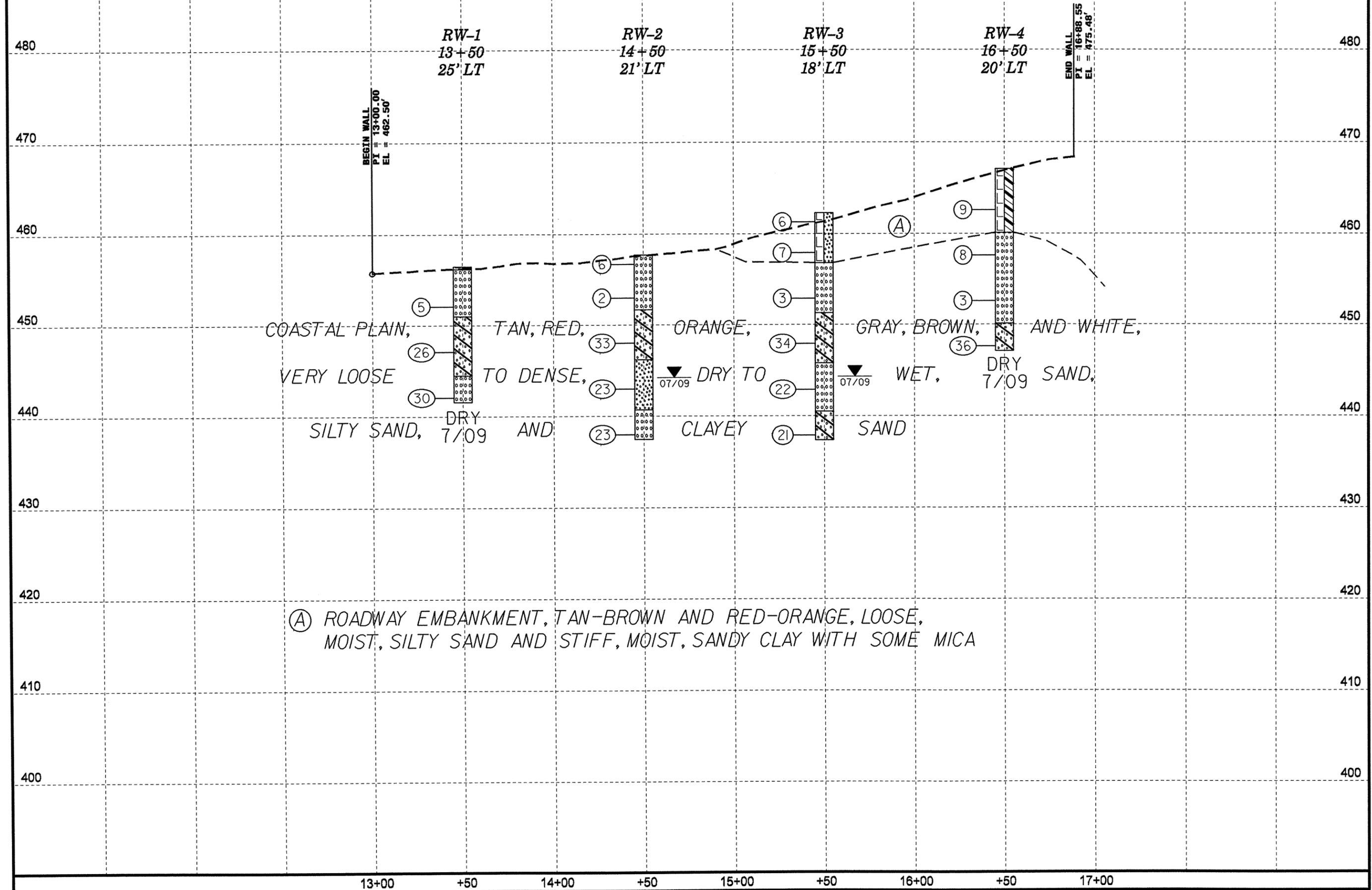
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 33820.II(B-4657) SHEET NO. 2

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																													
<p>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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, DARK SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</i></p>		<p>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 POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>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. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. 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PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. 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GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td>CLAYEY SOILS</td> <td>CLAYEY SOILS</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>HIGHLY ORGANIC SOILS</td> <td colspan="4"></td> </tr> <tr> <th>GENERATING AS A SUBGRADE</th> <td colspan="4">EXCELLENT TO GOOD</td> <td colspan="4">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSATISFACTORY</td> <td colspan="3"></td> </tr> </table>		GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				GROUP CLASS.	A-1	A-3	A-2	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7				SYMBOL															% PASSING	10	10	10	10	10	10	10	10	10	10	10				LIQUID LIMIT	6	NP	40	40	40	40	40	40	40	40	40				PLASTIC INDEX	0	0	0	0	0	0	0	0	0	0	0				USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p>		<p>LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50</p>		<p>ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL</p> <p>TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE</p>		<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL.</i></p> <p>SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF.</i></p> <p>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT 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 VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF.</i></p> <p>COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>		<p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. 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<p>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.</p>		<p>DRILL UNITS:</p> <p><input type="checkbox"/> MOBILE B-_____</p> <p><input type="checkbox"/> BK-51</p> <p><input type="checkbox"/> CME-45C</p> <p><input checked="" type="checkbox"/> CME-55B</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input checked="" type="checkbox"/> WATER TRUCK</p> <p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE _____ * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE _____ * TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> <p>HAMMER TYPE:</p> <p><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> -B-_____</p> <p><input type="checkbox"/> -N-_____</p> <p><input type="checkbox"/> -H-_____</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p>																																																																																																																																	





NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 33820.1.1		TIP B-4657		COUNTY Wake		GEOLOGIST Pedro, J. L.										
SITE DESCRIPTION RETAINING WALL AT BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)									
BORING NO. RW-1		STATION 13+50		OFFSET 25 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 456.5 ft		TOTAL DEPTH 14.9 ft		NORTHING 663,060		EASTING 2,046,640										
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Turnage, J. R.		START DATE 07/14/09		COMP. DATE 07/14/09		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
460																
455	453.1	3.4	2	2	3										456.5	GROUND SURFACE ASPHALT
450	448.1	8.4	6	11	15										451.0	COASTAL PLAIN Tan-brown, SAND
445	443.1	13.4	11	13	17										444.5	Red and gray, CLAYEY SAND
															441.6	Tan to white, SAND
																Boring Terminated at Elevation 441.6 ft IN COASTAL PLAIN (SAND)

WBS 33820.1.1		TIP B-4657		COUNTY Wake		GEOLOGIST Pedro, J. L.										
SITE DESCRIPTION RETAINING WALL AT BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)									
BORING NO. RW-2		STATION 14+50		OFFSET 21 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 457.7 ft		TOTAL DEPTH 20.2 ft		NORTHING 663,150		EASTING 2,046,597										
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Turnage, J. R.		START DATE 07/14/09		COMP. DATE 07/14/09		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
460																
455	457.7	0.0	2	2	4										457.7	GROUND SURFACE
450	454.0	3.7	1	1	1										451.7	COASTAL PLAIN Orange and brown, SAND
445	449.0	8.7	9	18	15										451.7	Red and gray, CLAYEY SAND
440	444.0	13.7	9	12	11										446.2	Tan, SILTY SAND
	439.0	18.7	9	11	12										440.7	White, SAND
															437.5	Boring Terminated at Elevation 437.5 ft IN COASTAL PLAIN (SAND)

NCDOT BORE DOUBLE B4657_GEO_BP.GPJ_NC_DOT.GDT 3/8/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 33820.1.1		TIP B-4657		COUNTY Wake		GEOLOGIST Pedro, J. L.										
SITE DESCRIPTION RETAINING WALL AT BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)									
BORING NO. RW-3		STATION 15+50		OFFSET 18 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 462.3 ft		TOTAL DEPTH 24.9 ft		NORTHING 663,240		EASTING 2,046,553										
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Turnage, J. R.		START DATE 07/14/09		COMP. DATE 07/14/09		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
465	462.3	0.0												462.3	0.0	
460	458.9	3.4	1	2	4								SS-5	M	GROUND SURFACE ROADWAY EMBANKMENT Tan-brown, SILTY SAND with asphalt pieces	
			2	2	5									M		456.8
455	453.9	8.4	1	1	2									D	COASTAL PLAIN Tan-brown, SAND	
			9	10	24										D	Orange and gray, CLAYEY SAND
450	448.9	13.4	6	10	12								SS-6	M	Tan, SAND	16.5
			6	10	12									W		445.8
445	443.9	18.4	6	10	12									W	White to light gray, CLAYEY SAND	21.8
			6	9	12									W		440.5
440	438.9	23.4	6	9	12											
			6	9	12											437.4
Boring Terminated at Elevation 437.4 ft IN COASTAL PLAIN (CLAYEY SAND)																

WBS 33820.1.1		TIP B-4657		COUNTY Wake		GEOLOGIST Pedro, J. L.										
SITE DESCRIPTION RETAINING WALL AT BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)									
BORING NO. RW-4		STATION 16+50		OFFSET 20 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 467.1 ft		TOTAL DEPTH 20.0 ft		NORTHING 663,328		EASTING 2,046,504										
DRILL RIG/HAMMER EFF./DATE CME-550X		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Turnage, J. R.		START DATE 07/14/09		COMP. DATE 07/14/09		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
470														467.1	0.0	
465	463.6	3.5	4	5	4								SS-8	M	ROADWAY EMBANKMENT Red-orange, SANDY CLAY with some mica	
			4	5	4									M		460.1
460	458.6	8.5	8	4	4									D	COASTAL PLAIN Tan-brown and orange, SAND	
			8	4	4									D		450.1
455	453.6	13.5	3	1	2									D	Gray and orange, CLAYEY SAND	17.0
			3	1	2									D		447.1
450	448.6	18.5	15	16	20									M		
			15	16	20										M	
Boring Terminated at Elevation 447.1 ft IN COASTAL PLAIN (CLAYEY SAND)																

RW-1

<i>SOIL TEST RESULTS</i>															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	25 LT	13+50	3.4-4.9	A-3(0)	15	NP	63.1	30.1	2.7	4.0	100	66	8	-	-
SS-2	25 LT	13+50	8.4-9.9	A-2-6(0)	29	11	39.4	30.7	1.6	28.3	100	87	31	-	-
SS-3	25 LT	13+50	13.4-14.9	A-3(0)	17	NP	66.8	25.9	4.3	3.0	100	58	10	-	-

RW-2

<i>SOIL TEST RESULTS</i>															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4	21 LT	14+50	13.7-15.2	A-2-4(0)	20	1	44.7	39.2	2.9	13.1	100	82	17	-	-

RW-3

<i>SOIL TEST RESULTS</i>															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-5	18 LT	15+50	0.0-1.5	A-2-4(0)	22	7	47.5	27.5	6.9	18.2	94	68	26	-	-
SS-6	18 LT	15+50	13.4-14.9	A-2-6(0)	30	13	38.0	33.3	4.4	24.2	100	82	31	-	-
SS-7	18 LT	15+50	23.4-24.9	A-2-6(0)	38	16	77.1	8.3	1.5	13.1	100	31	16	-	-

RW-4

<i>SOIL TEST RESULTS</i>															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-8	20 LT	16+50	3.5-5.0	A-6(6)	39	13	18.6	29.7	15.4	36.4	99	90	57	-	-

SITE PHOTOGRAPH

Bridge No. 340 on -L- (SR 1101) over Norfolk Southern Railroad



Looking Northwest along Retaining Wall location

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33820.1.1 (B-4657)	1	13

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33820.1.1 (B-4657) F.A. PROJ. BRSTP-1101(9)
COUNTY WAKE
PROJECT DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER
NORFOLK SOUTHERN RAILROAD AT STATION 17+64

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2	LEGEND
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7-II	BORE LOG(S)
12	SOIL TEST RESULTS
13	SITE PHOTOGRAPHS)

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. 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 NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE 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 REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

J. L. PEDRO

H. R. CONLEY

J. R. TURNAGE

J. R. MATULA

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE AUGUST 2009



8-14-09

PROJECT: 33820.1.1 ID: B-4657

DRAWN BY: J. L. PEDRO

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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.

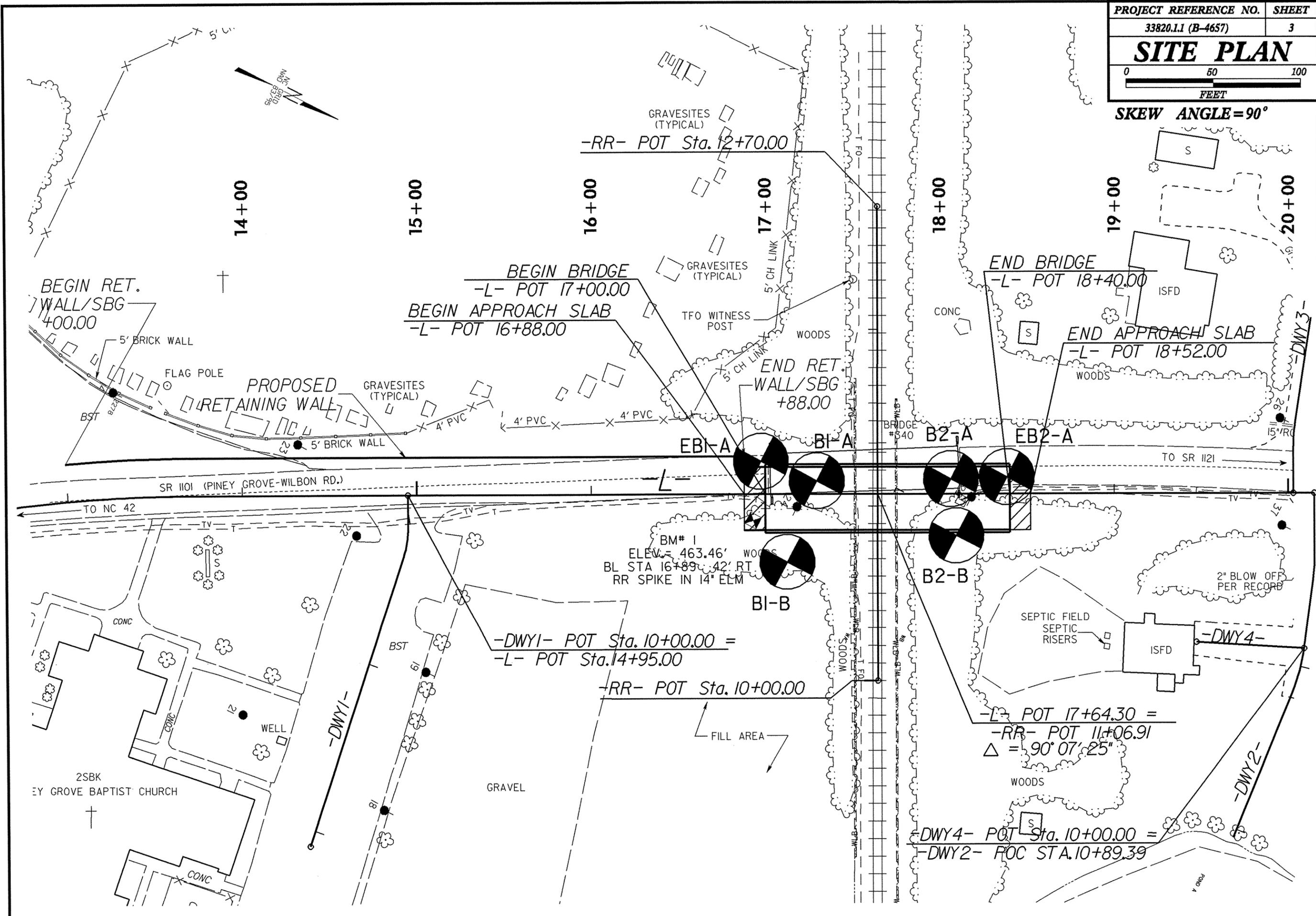
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

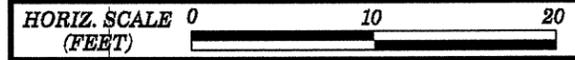
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																																																	
<p>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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, DARK SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>	<p>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 POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>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. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS, IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p>WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																																	
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="4">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th>A-1, A-2</th> <th>A-3</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> </tr> <tr> <td>SYMBOL</td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10</td> <td>40</td> <td>200</td> <td>50</td> <td>10</td> <td>40</td> <td>200</td> <td>50</td> <td>10</td> <td>40</td> <td>200</td> <td>50</td> <td>10</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6</td> <td>NP</td> <td>10</td> <td>10</td> <td>11</td> <td>11</td> <td>10</td> <td>10</td> <td>11</td> <td>11</td> <td>10</td> <td>11</td> <td>11</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>4</td> <td>8</td> <td>8</td> <td>12</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> <td>16</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LIQUID LIMIT LESS THAN 31</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td>LIQUID LIMIT EQUAL TO 31-50</td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td>LIQUID LIMIT GREATER THAN 50</td> </tr> </table> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </tbody> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> <p style="text-align: center;">MISCELLANEOUS SYMBOLS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> </tr> </table> <p style="text-align: center;">ABBREVIATIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>BT - BORING TERMINATED</td> <td>CL - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>o - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HL - HIGHLY</td> <td>MD - MEDIUM</td> <td>MICA. - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILT, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>v - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>w - UNIT WEIGHT</td> <td>w - DRY UNIT WEIGHT</td> </tr> </table>	SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31	MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50	HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50	ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY																	AR - AUGER REFUSAL	BT - BORING TERMINATED	CL - CLAY	CPT - CONE PENETRATION TEST	CSE - COARSE	DMT - DILATOMETER TEST	DPT - DYNAMIC PENETRATION TEST	o - VOID RATIO	F - FINE	FOSS. - FOSSILIFEROUS	FRAC. - FRACTURED, FRACTURES	FRAGS. - FRAGMENTS	HL - HIGHLY	MD - MEDIUM	MICA. - MICACEOUS	MOD. - MODERATELY	NP - NON PLASTIC	ORG. - ORGANIC	PMT - PRESSUREMETER TEST	SAP. - SAPROLITIC	SD. - SAND, SANDY	SL. - SILT, SILTY	SLI. - SLIGHTLY	TCR - TRICONE REFUSAL	w - MOISTURE CONTENT	v - VERY	VST - VANE SHEAR TEST	WEA. - WEATHERED	w - UNIT WEIGHT	w - DRY UNIT WEIGHT	<p style="text-align: center;">ROCK HARDNESS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>VERY HARD</td> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. 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VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																																																																																																																																																																																																																																																			
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																																																																																																																																																																																																																																																			
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.																																																																																																																																																																																																																																																			
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																																																																																																																																																																																																																																																			
SOFT	CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																																																																																																																																																																																																																																																			
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																																																																																																																																																																																																																																																			
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<p style="text-align: center;">FRAC. SPACING</p> <p>VERY WIDE MORE THAN 10 FEET</p> <p>WIDE 3 TO 10 FEET</p> <p>MODERATELY CLOSE 1 TO 3 FEET</p> <p>CLOSE 0.16 TO 1 FEET</p> <p>VERY CLOSE LESS THAN 0.16 FEET</p>	<p style="text-align: center;">BEDDING</p> <p>VERY THICKLY BEDDED > 4 FEET</p> <p>THICKLY BEDDED 1.5 - 4 FEET</p> <p>THINLY BEDDED 0.16 - 1.5 FEET</p> <p>VERY THINLY BEDDED 0.03 - 0.16 FEET</p> <p>THICKLY LAMINATED 0.008 - 0.03 FEET</p> <p>THINLY LAMINATED < 0.008 FEET</p>																																																																																																																																																																																																																																																			
<p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>	<p style="text-align: center;">TERMS AND DEFINITIONS</p> <p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> <p style="text-align: center;">BENCH MARK: BM#1 - Railroad spike in Oak tree at -L- 16+93, 14.8' Rt</p> <p style="text-align: right;">ELEVATION: 463.46 FT.</p> <p>NOTES:</p>																																																																																																																																																																																																																																																			

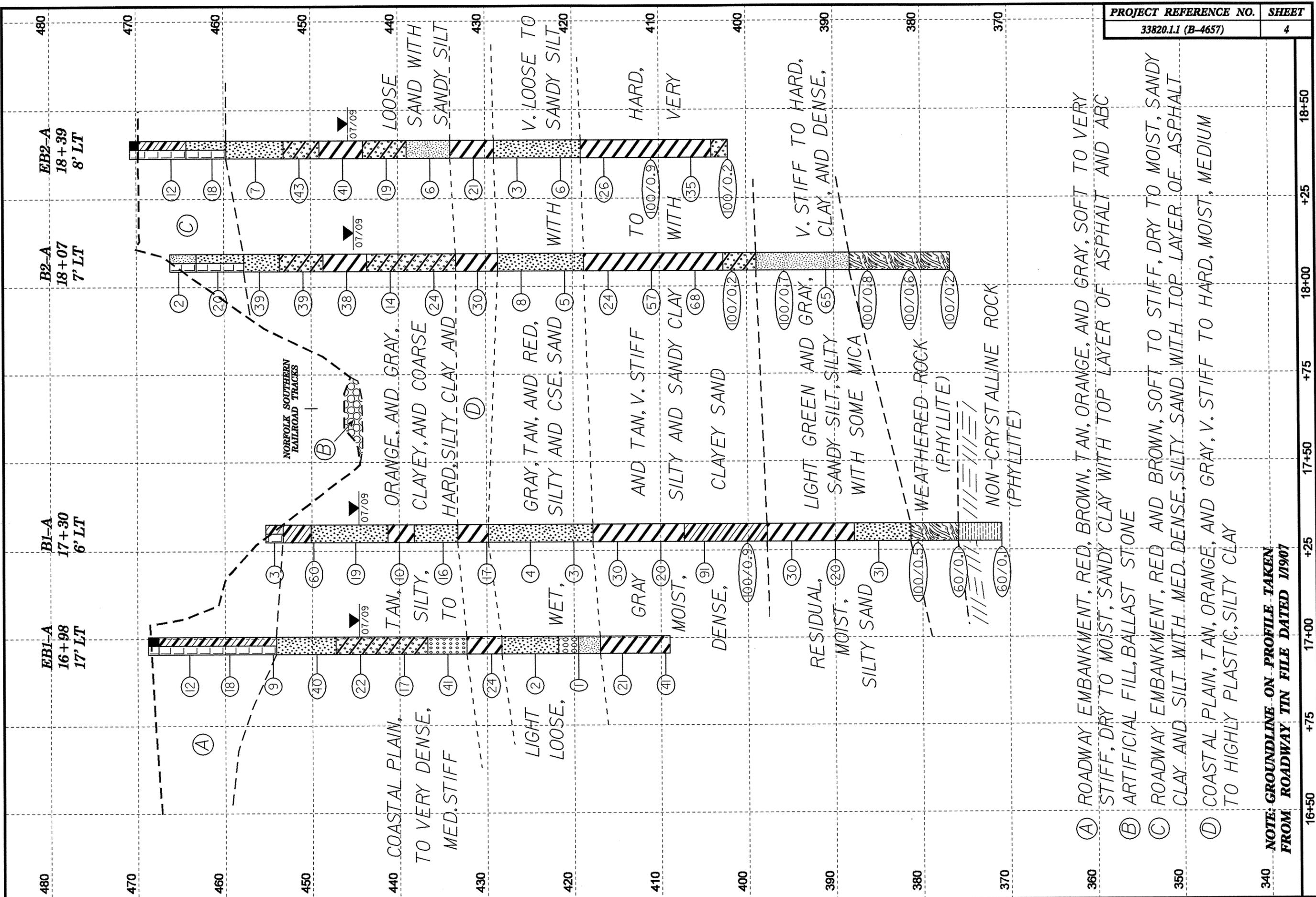
SKREW ANGLE = 90°





VE = 5:1

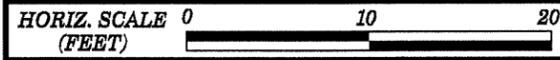
FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-



- 360 (A) ROADWAY EMBANKMENT, RED, BROWN, TAN, ORANGE, AND GRAY, SOFT TO VERY STIFF, DRY TO MOIST, SANDY CLAY WITH TOP LAYER OF ASPHALT AND ABC
- 350 (B) ARTIFICIAL FILL, BALLAST STONE
- (C) ROADWAY EMBANKMENT, RED AND BROWN, SOFT TO STIFF, DRY TO MOIST, SANDY CLAY AND SILT WITH MED. DENSE, SILTY SAND WITH TOP LAYER OF ASPHALT
- (D) COASTAL PLAIN, TAN, ORANGE, AND GRAY, V. STIFF TO HARD, MOIST, MEDIUM TO HIGHLY PLASTIC, SILTY CLAY

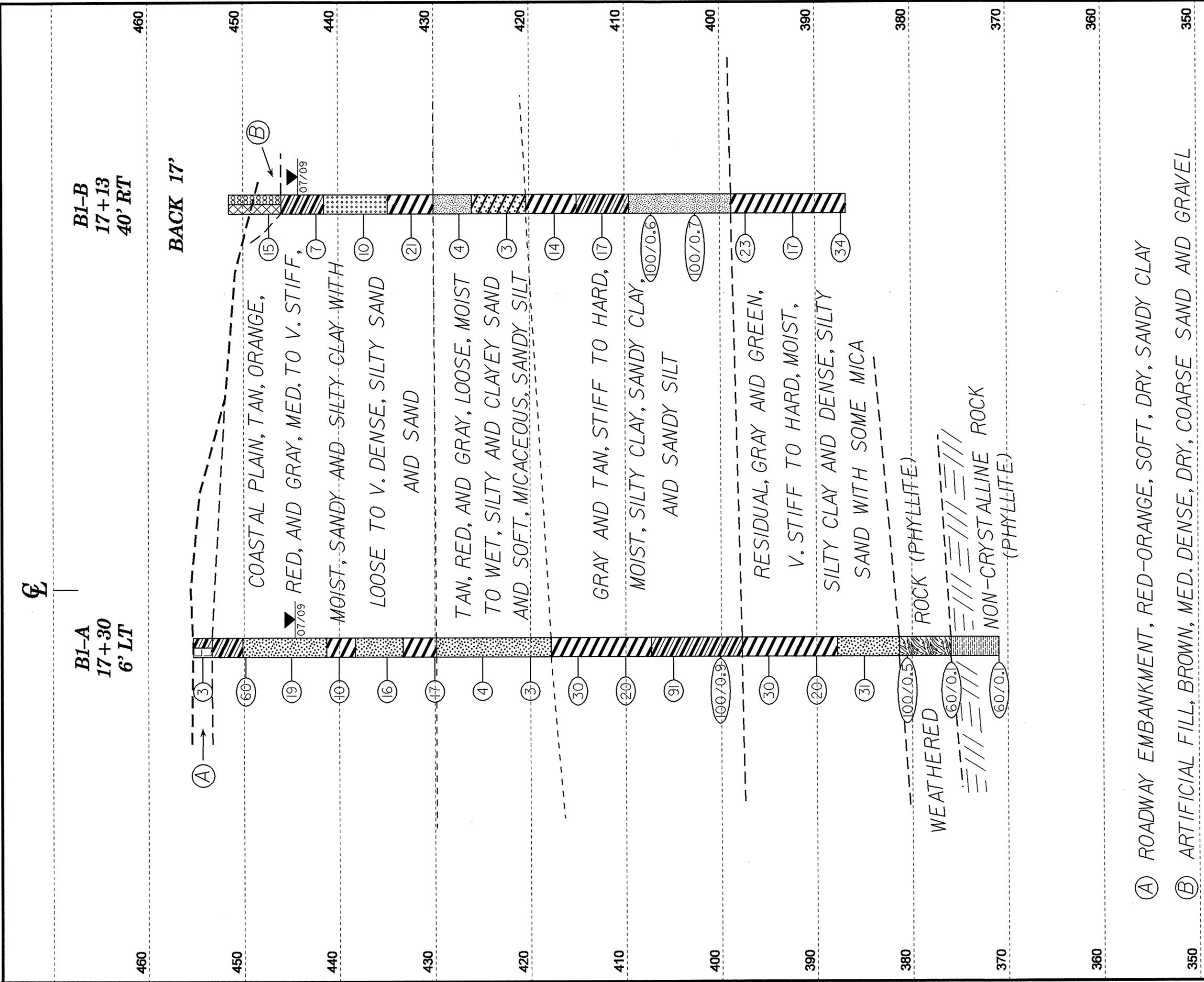
340 NOTE: GROUNDLINE ON PROFILE TAKEN FROM ROADWAY TIN FILE DATED 1/1907

16+50 +75 17+00 17+50 +25 +75 18+00 +25 18+50



VE = 1:1

CROSS SECTION THROUGH BENT 1



- Ⓐ ROADWAY EMBANKMENT, RED-ORANGE, SOFT, DRY, SANDY CLAY
- Ⓑ ARTIFICIAL FILL, BROWN, MED. DENSE, DRY, COARSE SAND AND GRAVEL

PROJECT REFERENCE NO.	SHEET
33820.1.1 (B-4657)	5

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33820.1.1	ID. B-4657	COUNTY Wake	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-A	STATION 17+30	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 455.3 ft	TOTAL DEPTH 84.4 ft	NORTHING 663,405	EASTING 2,046,479
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/20/09	COMP. DATE 07/21/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 79.4 ft

PROJECT NO. 33820.1.1	ID. B-4657	COUNTY Wake	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-A	STATION 17+30	OFFSET 6ft LT	ALIGNMENT -L-
COLLAR ELEV. 455.3 ft	TOTAL DEPTH 84.4 ft	NORTHING 663,405	EASTING 2,046,479
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/20/09	COMP. DATE 07/21/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 79.4 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
460															
455	455.3	0.0												GROUND SURFACE	0.0
			1	1	2						SS-32	D		ROADWAY EMBANKMENT Red-orange, SANDY CLAY	2.0
														COASTAL PLAIN Tan, orange, and gray, SANDY CLAY	5.2
450	450.8	4.5	17	29	31							M		Tan and red, SILTY SAND	
			8	9	10										
445	446.0	9.3													
			4	4	6						SS-33	M		Tan and gray, highly plastic, SILTY CLAY	14.0
440	441.0	14.3												Tan and white, SILTY SAND	17.0
			12	9	7							M			
435	436.0	19.3												Gray, highly plastic, SILTY CLAY	22.0
			4	7	10							M		Tan and light gray, SILTY SAND with some coarse sand	25.5
430	431.0	24.3													
			2	2	2						SS-34	W			
425	426.0	29.3													
			3	1	2							W		Gray, SILTY CLAY	37.5
420	421.0	34.3													
			6	12	18							M			
415	416.0	39.3													
			7	9	11							M			
410	411.0	44.3													
			29	38	53						SS-35	M		Gray-tan, SANDY CLAY	48.0
405	406.0	49.3													
			25	75/0.4								M			
400	401.0	54.3													
			14	15	15						SS-36	M		RESIDUAL Light green and gray, micaceous, SILTY CLAY	57.5
395	396.0	59.3													
			5	8	12							M			
390	391.0	64.3													
			10	14	17						SS-37	M		Green, SILTY SAND with some mica	67.5
385	386.0	69.3													
			95	5/0.0											
380	381.0	74.3													

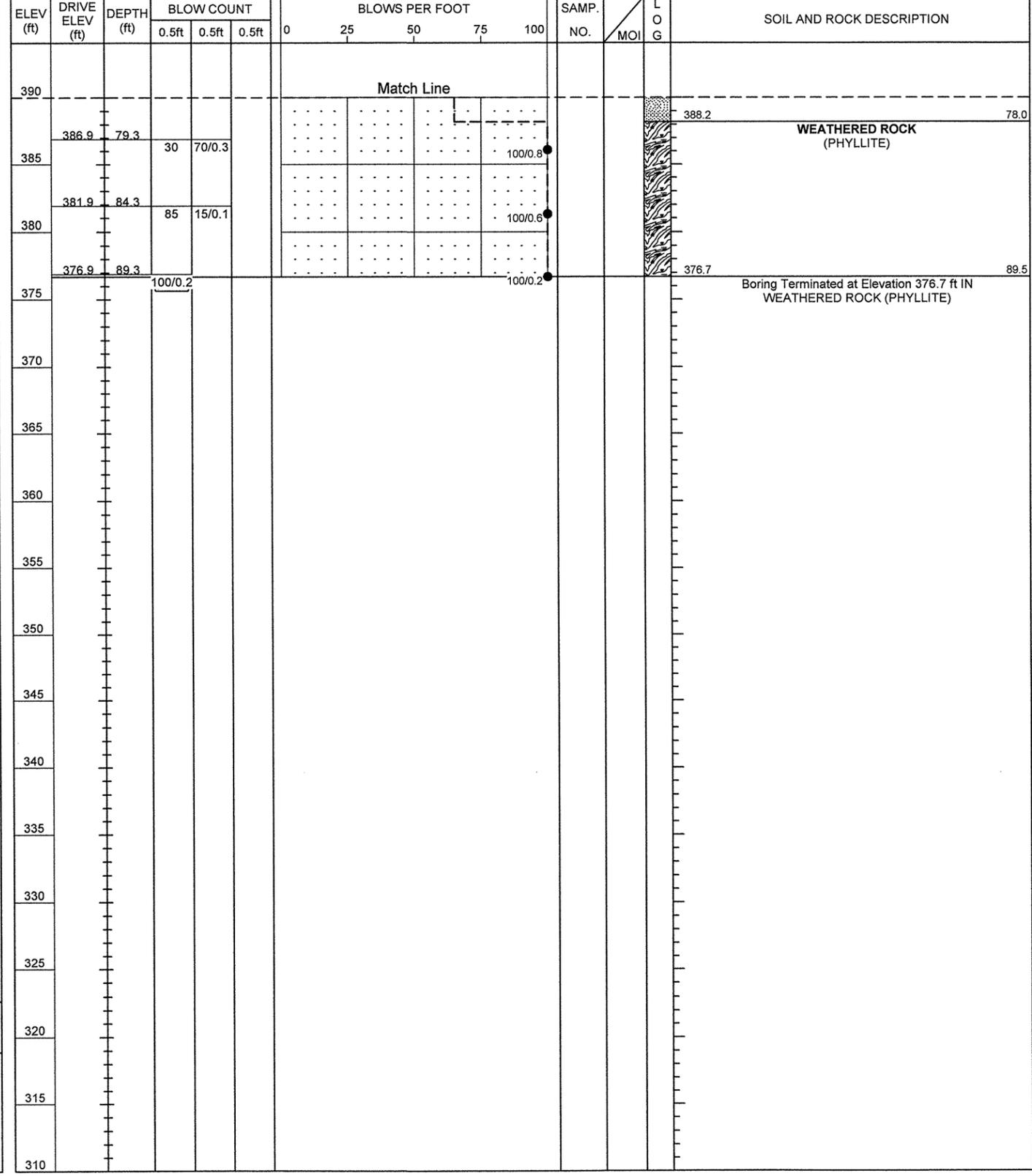
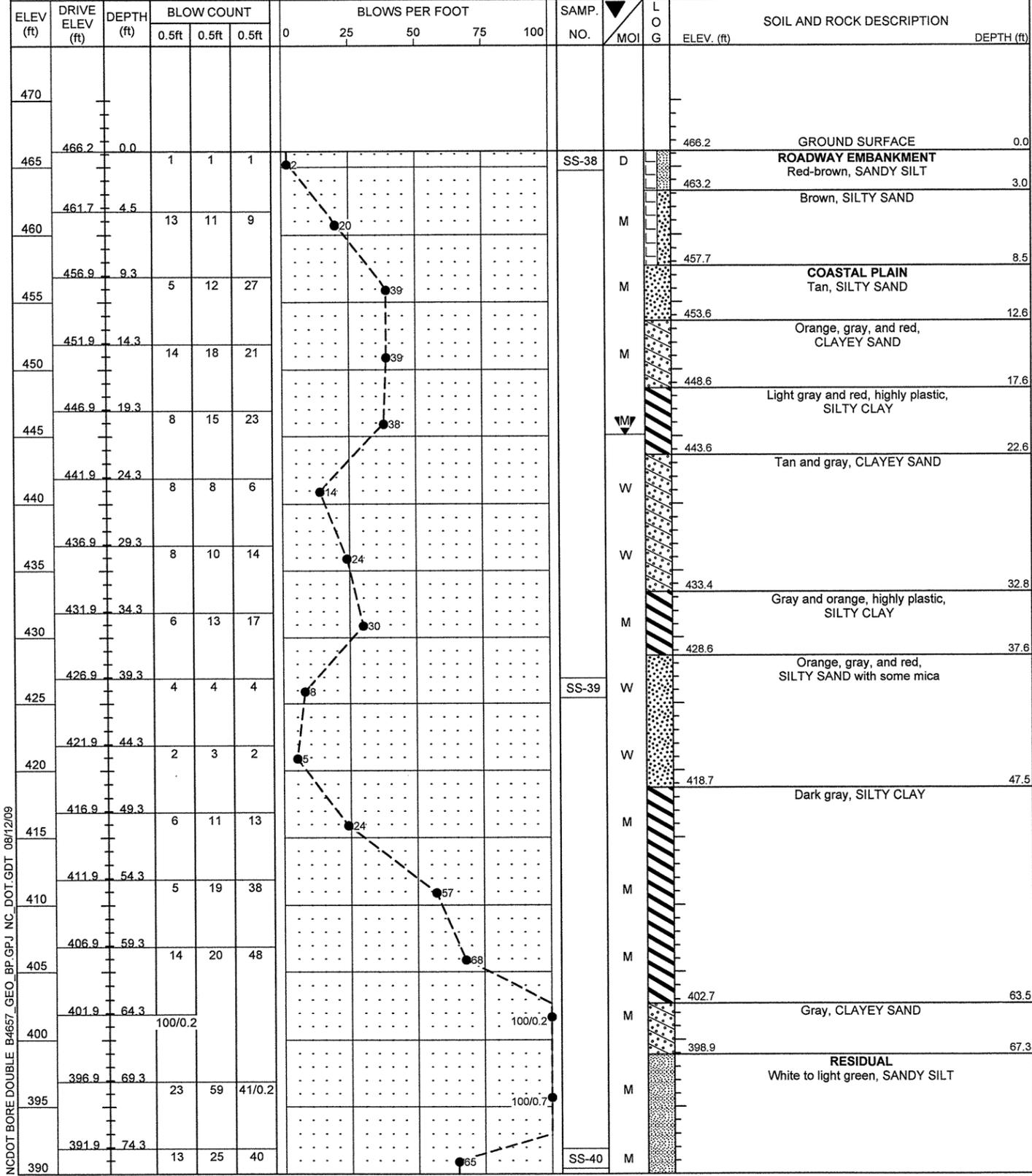
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
380															
														WEATHERED ROCK (PHYLLITE) (continued)	79.4
375	376.0	79.3												NON-CRYSTALLINE ROCK (PHYLLITE)	79.4
370	371.0	84.3												Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 370.9 ft IN NON-CRYSTALLINE ROCK (PHYLLITE)	84.4
365															
360															
355															
350															
345															
340															
335															
330															
325															
320															
315															
310															
305															
300															

NCDOT BORE DOUBLE B4657_GEO_BP.GPJ NC_DOT_GDT_08/12/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33820.1.1	ID. B-4657	COUNTY Wake	GEOLOGIST Czajka, C. D.
SITE DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-A	STATION 18+07	OFFSET 7ft LT	ALIGNMENT -L-
COLLAR ELEV. 466.2 ft	TOTAL DEPTH 89.5 ft	NORTHING 663,473	EASTING 2,046,442
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/22/09	COMP. DATE 07/22/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

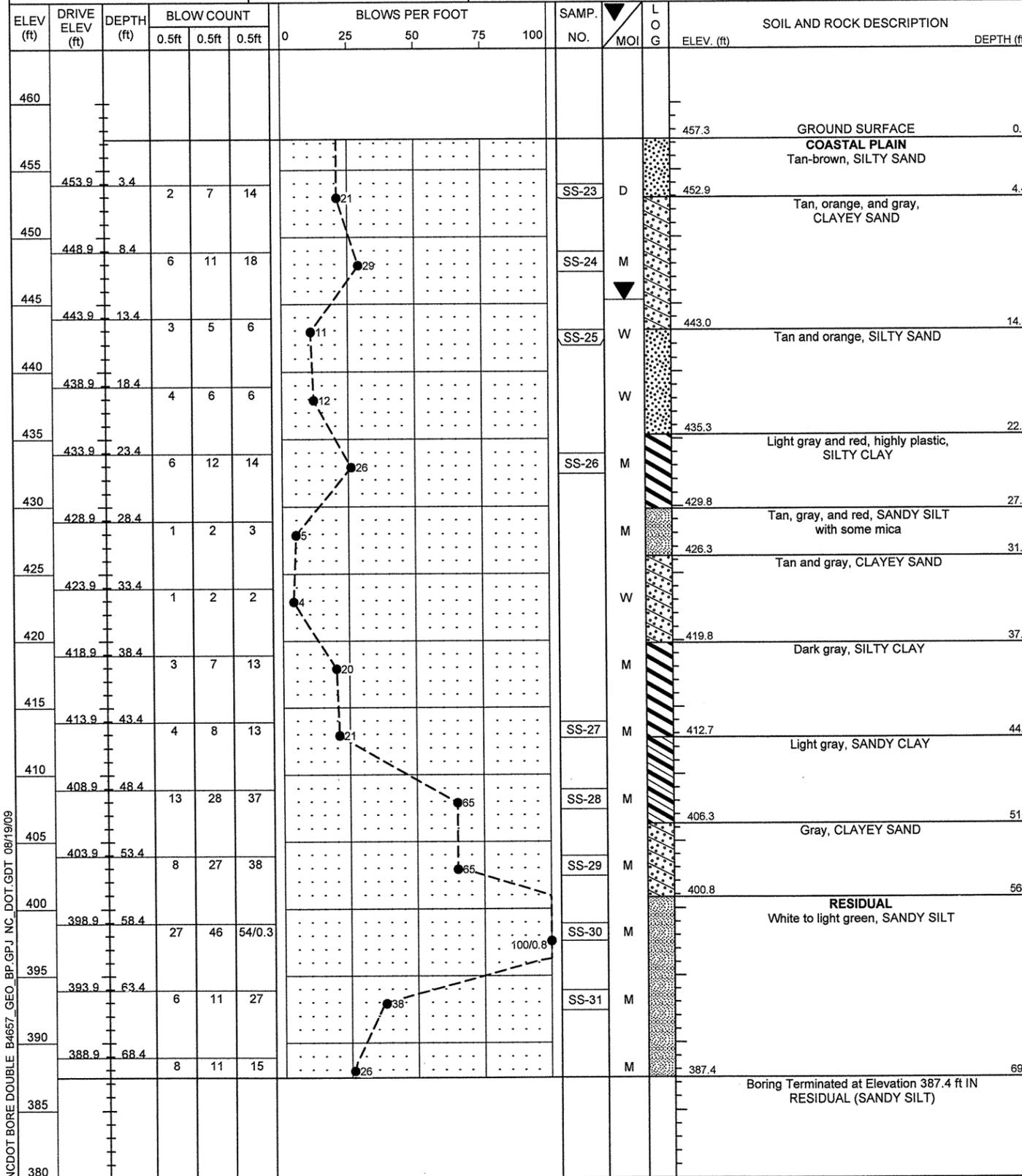
PROJECT NO. 33820.1.1	ID. B-4657	COUNTY Wake	GEOLOGIST Czajka, C. D.
SITE DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-A	STATION 18+07	OFFSET 7ft LT	ALIGNMENT -L-
COLLAR ELEV. 466.2 ft	TOTAL DEPTH 89.5 ft	NORTHING 663,473	EASTING 2,046,442
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/22/09	COMP. DATE 07/22/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



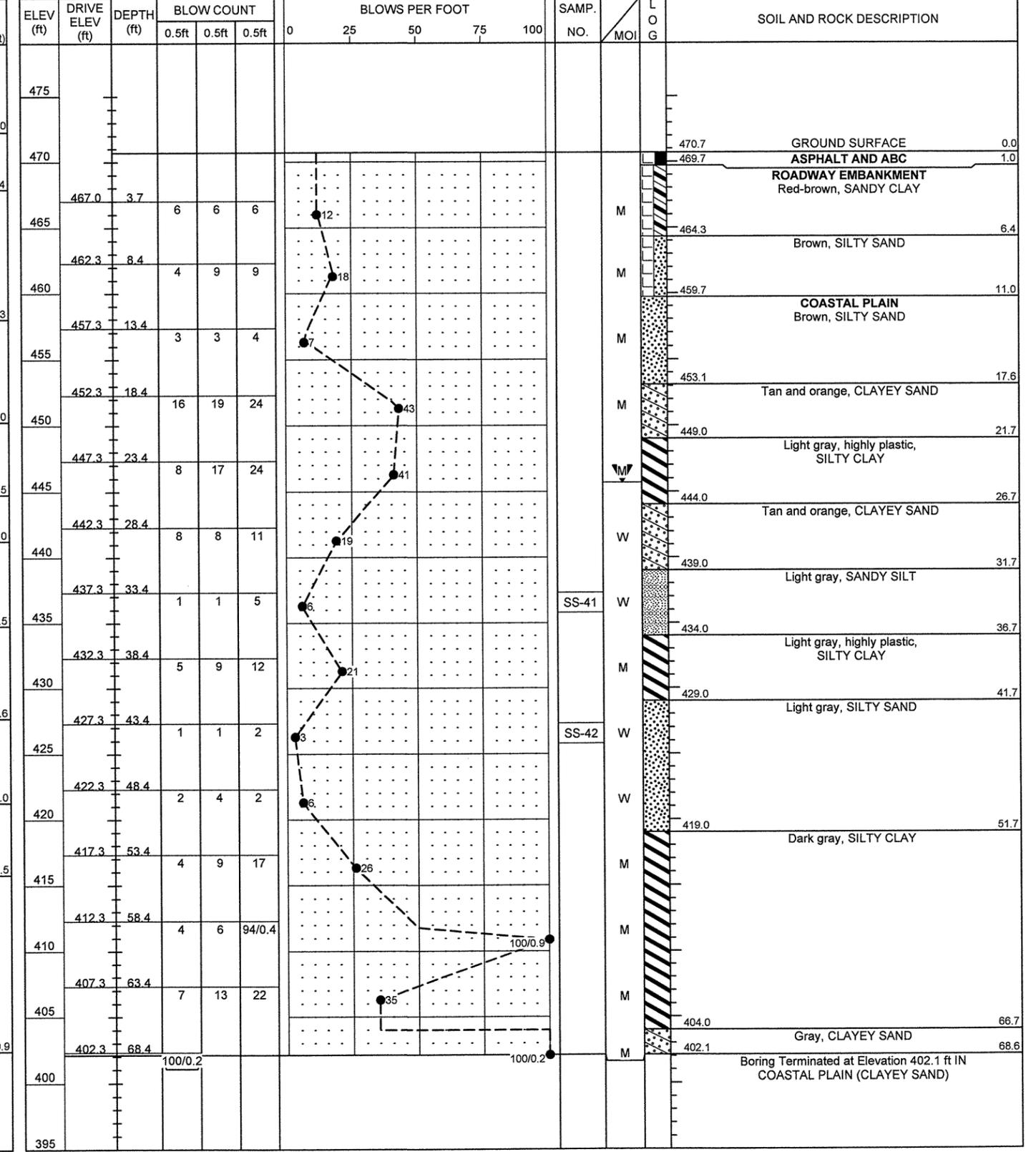
NCDOT BORE DOUBLE GEO. BP. GPJ NC_DOT_GDT_08/12/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33820.1.1	ID. B-4657	COUNTY Wake	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-B	STATION 18+10	OFFSET 25ft RT	ALIGNMENT -L-
COLLAR ELEV. 457.3 ft	TOTAL DEPTH 69.9 ft	NORTHING 663,490	EASTING 2,046,469
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/17/09	COMP. DATE 07/17/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 33820.1.1	ID. B-4657	COUNTY Wake	GEOLOGIST Czajka, C. D.
SITE DESCRIPTION BRIDGE NO. 340 ON -L- (SR 1101) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB2-A	STATION 18+39	OFFSET 8ft LT	ALIGNMENT -L-
COLLAR ELEV. 470.7 ft	TOTAL DEPTH 68.6 ft	NORTHING 663,500	EASTING 2,046,426
DRILL MACHINE CME-550X	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
START DATE 07/23/09	COMP. DATE 07/23/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE B4657 GEO BP.GPJ NC DOT.GDT 08/19/09

E1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	17 LT	16+98	18.3-19.8	A-2-4(0)	26	8	35.7	40.8	2.3	21.2	100	84	27	-	-
SS-10	17 LT	16+98	33.3-34.8	A-3(0)	20	NP	75.9	15.5	2.6	6.1	100	63	10	-	-
SS-11	17 LT	16+98	38.3-39.8	A-7-6(20)	46	25	1.4	27.5	20.6	50.5	100	99	80	-	-
SS-12	17 LT	16+98	43.3-44.8	A-2-4(0)	25	4	54.7	26.1	3.0	16.2	100	90	19	-	-
SS-13	17 LT	16+98	49.3-49.8	A-4(1)	23	8	19.6	42.0	14.1	24.2	100	91	45	-	-
SS-14	17 LT	16+98	53.3-54.8	A-7-6(23)	43	25	2.6	10.1	40.8	46.5	100	99	91	-	-

B1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-32	6 LT	17+30	0.0-1.5	A-6(6)	35	14	12.7	33.9	17.0	36.4	100	96	58	-	-
SS-33	6 LT	17+30	14.3-15.8	A-7-5(47)	73	41	2.4	2.6	22.2	72.7	100	98	96	-	-
SS-34	6 LT	17+30	29.3-30.8	A-2-4(0)	25	8	64.9	16.2	1.7	17.2	99	77	19	-	-
SS-35	6 LT	17+30	49.3-50.8	A-6(4)	35	12	6.9	47.9	19.0	26.3	100	98	53	-	-
SS-36	6 LT	17+30	59.3-60.8	A-7-5(3)	61	11	26.7	34.9	22.2	16.2	100	84	45	-	-
SS-37	6 LT	17+30	69.3-70.8	A-2-4(0)	39	3	29.5	49.3	19.1	2.0	100	84	30	-	-

B1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-15	40 RT	17+13	3.2-4.7	A-1-b(0)	19	NP	61.8	24.4	7.7	6.1	63	38	10	-	-
SS-16	40 RT	17+13	8.2-9.7	A-6(5)	35	18	18.6	36.0	13.1	32.3	99	87	49	-	-
SS-17	40 RT	17+13	13.2-14.7	A-3(0)	24	NP	68.7	26.1	2.2	3.0	100	71	6	-	-
SS-18	40 RT	17+13	23.2-24.7	A-4(0)	30	9	2.4	61.8	7.5	28.3	100	100	37	-	-
SS-19	40 RT	17+13	28.2-29.7	A-2-6(0)	27	13	72.5	8.9	4.4	14.1	99	53	19	-	-
SS-20	40 RT	17+13	38.2-39.7	A-6(6)	32	15	1.2	47.1	15.4	36.4	100	99	58	-	-
SS-21	40 RT	17+13	43.2-44.3	A-4(0)	31	8	7.1	58.0	16.8	18.2	100	96	40	-	-
SS-22	40 RT	17+13	53.2-54.7	A-7-5(11)	55	24	16.4	40.8	10.5	32.3	100	89	55	-	-

B2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-38	7 LT	18+07	0.0-1.5	A-4(1)	40	6	14.3	38.3	25.1	22.4	84	77	47	-	-
SS-39	7 LT	18+07	39.3-40.8	A-2-4(0)	25	5	20.8	53.2	5.7	20.4	100	96	27	-	-
SS-40	7 LT	18+07	74.3-75.8	A-4(0)	31	0	24.4	46.4	25.1	4.1	100	86	38	-	-

B2-B

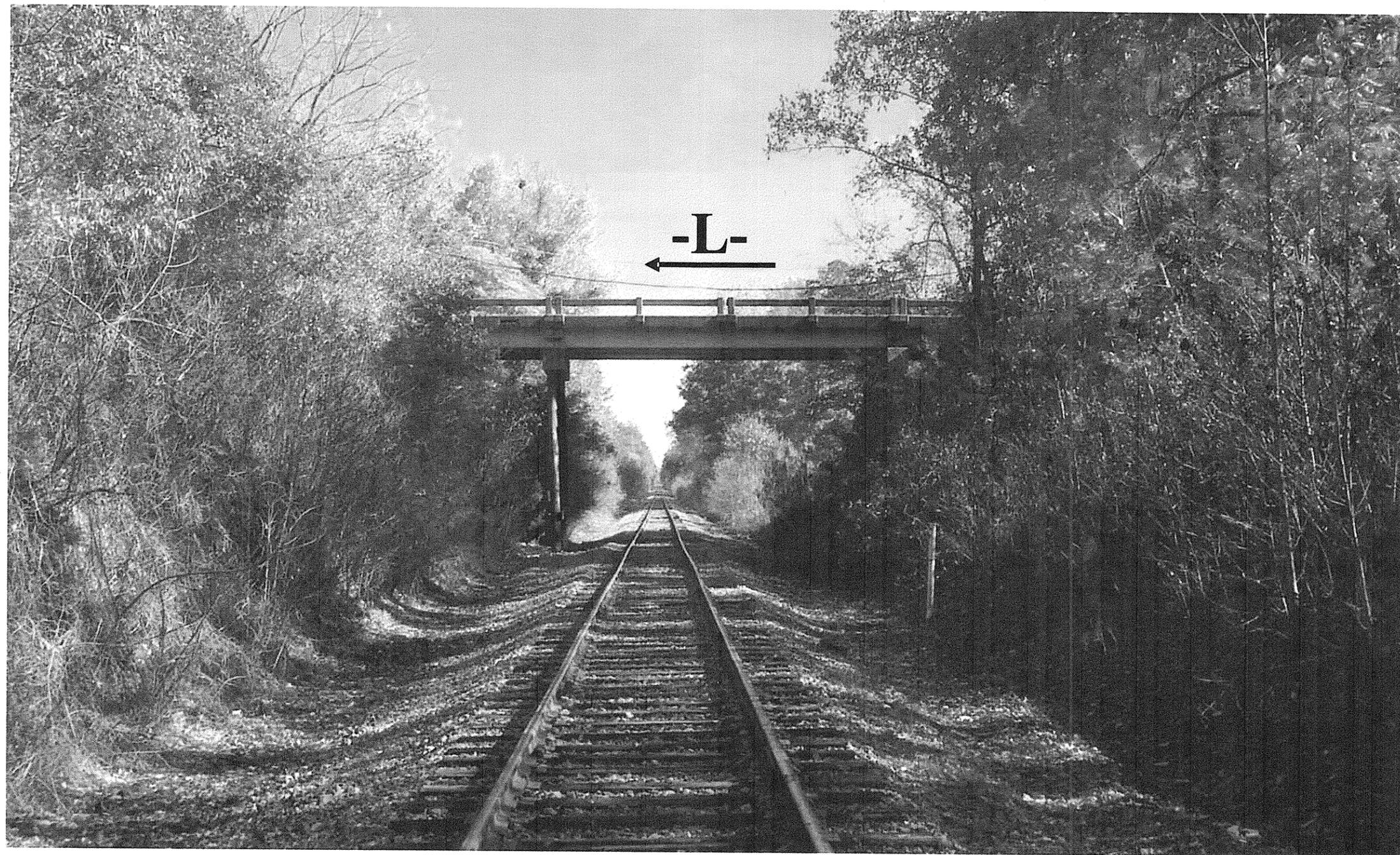
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-23	25 RT	18+10	3.4-4.4	A-2-4(0)	17	2	53.8	27.0	5.1	14.1	100	69	21	-	-
SS-24	25 RT	18+10	8.4-9.9	A-2-7(2)	42	22	51.1	15.6	5.1	28.3	98	63	34	-	-
SS-25	25 RT	18+10	14.3-14.9	A-2-4(0)	22	NP	56.7	32.7	3.5	7.1	100	80	12	-	-
SS-26	25 RT	18+10	23.4-24.9	A-7-6(24)	49	27	2.8	18.6	22.0	56.6	100	98	85	-	-
SS-27	25 RT	18+10	43.4-44.6	A-7-6(21)	41	25	4.6	13.7	39.2	42.4	99	96	86	-	-
SS-28	25 RT	18+10	48.4-49.9	A-6(6)	36	13	8.5	39.0	24.2	28.3	99	92	61	-	-
SS-29	25 RT	18+10	53.4-54.9	A-2-6(0)	31	12	50.1	25.9	7.9	16.2	99	77	25	-	-
SS-30	25 RT	18+10	58.4-59.7	A-4(0)	31	3	5.7	57.8	28.5	8.1	100	97	52	-	-
SS-31	25 RT	18+10	63.4-64.9	A-4(0)	36	6	19.2	49.3	27.5	4.0	100	90	42	-	-

EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-41	8 LT	18+39	33.4-34.9	A-4(0)	24	7	38.1	26.1	19.6	16.3	98	73	42	-	-
SS-42	7 LT	18+39	43.4-44.9	A-2-4(0)	25	7	12.0	62.7	4.9	20.4	100	98	26	-	-

SITE PHOTOGRAPH

Bridge No. 340 on -L- (SR 1101) over Norfolk Southern Railroad



Looking Northeast along Norfolk Southern tracks