

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33727.1.1 (B-4490)	1	10

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

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

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PROJ. REFERENCE NO. 33727.1.1 (B-4490) F.A. PROJ. BRNHS-0024(24)

COUNTY CUMBERLAND

PROJECT DESCRIPTION BRIDGE NO. 116 OVER CSX RR, NORFOLK SOUTHERN RR, & HILLSBORO ST. ON NC 24-210

SITE DESCRIPTION BRIDGE ON -L- OVER NORFOLK SOUTHERN RR @ -L- STA. 35+23

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. 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
S&ME, INC.

J.R. SWARTLEY

O.B. OTI

H.R. CONLEY

J.R. MATULA

INVESTIGATED BY J.R. SWARTLEY

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

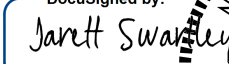
DATE JUNE 2014

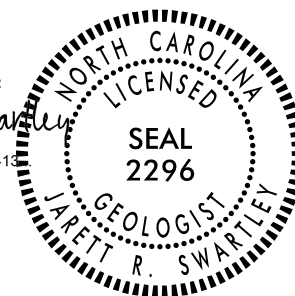
PROJECT: 33727.1.1 ID: B-4490

DRAWN BY: T.T. WALKER, J.R. SWARTLEY

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.

DocuSigned by:

 7F355C29F75A413



4/2/2015

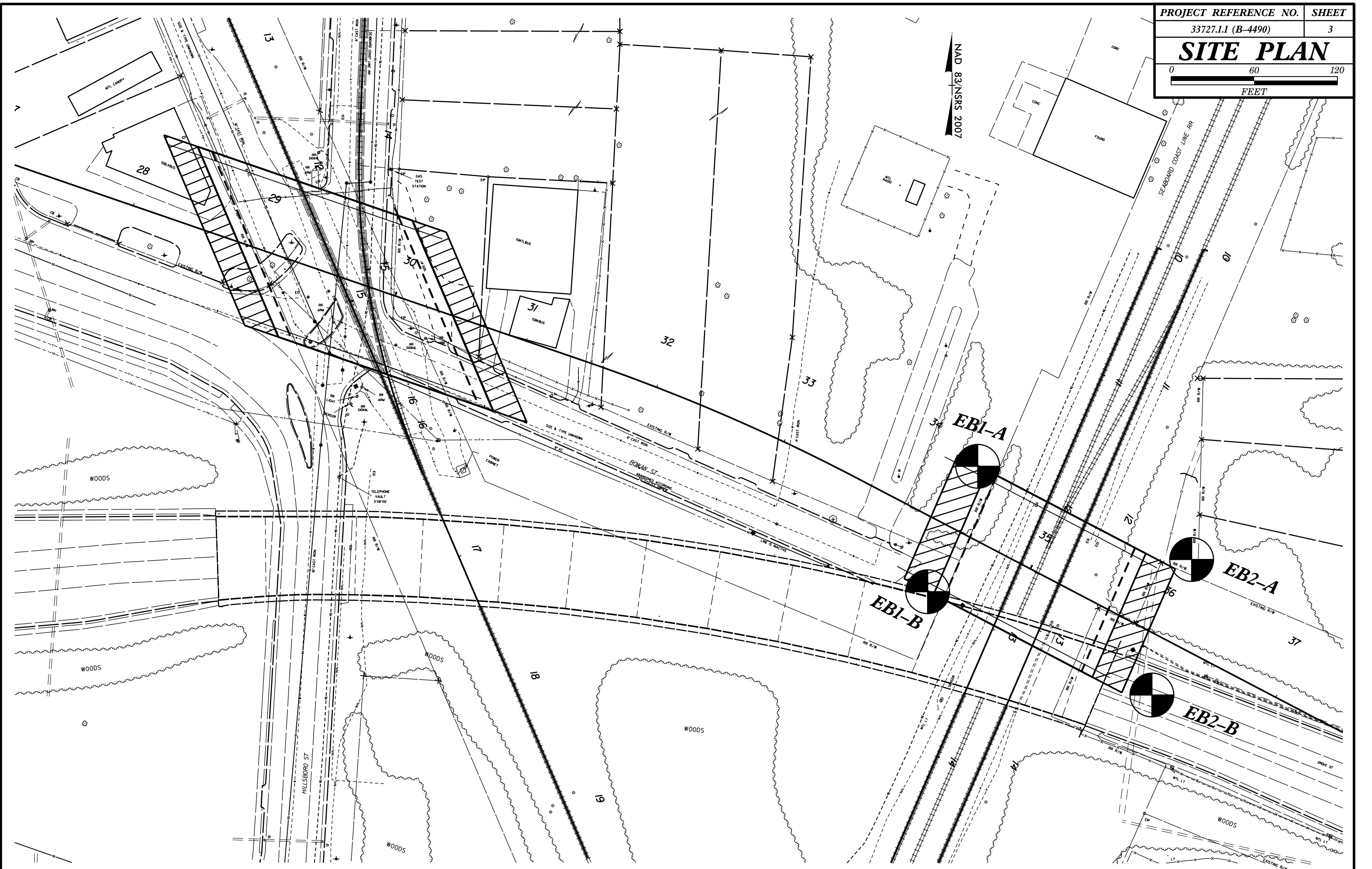
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

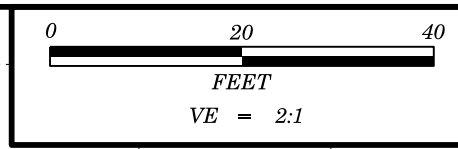
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION			GRADATION			ROCK DESCRIPTION			TERMS AND DEFINITIONS					
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: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>			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.			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:			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. FISSELE - 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 IMPERVIORUS STRATUM. 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 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 (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. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
SOIL LEGEND AND AASHTO CLASSIFICATION			MINERALOGICAL COMPOSITION			WEATHERING								
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 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.			NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.								
COMPRESSIONIBILITY			PERCENTAGE OF MATERIAL			WEATHERING								
SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE			LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50			FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.								
GROUND WATER			MISCELLANEOUS SYMBOLS			ROCK HARDNESS								
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING			ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION			VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.								
STATIC WATER LEVEL AFTER 24 HOURS			SOIL SYMBOL			HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.								
PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA			ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT			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.								
SPRING OR SEEP			INFERRED SOIL BOUNDARY			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.								
			INFERRED ROCK LINE			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 PIECES CAN BE BROKEN BY FINGER PRESSURE.								
			ALLUVIAL SOIL BOUNDARY			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.								
			DIP & DIP DIRECTION OF ROCK STRUCTURES											
			CONE PENETROMETER TEST											
			SOUNDING ROD											
CONSISTENCY OR DENSENESS			ABBREVIATIONS			FRACATURE SPACING			BEDDING					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²)			AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA - WEATHERED CL - CLAY MOD. - MODERATELY CL - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC DRY - DRY UNIT WEIGHT CSE - COARSE ORG. - ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST SAP. - SAPROLITIC e - VOID RATIO SD. - SAND, SANDY F - FINE SL. - SILT, SILTY FOSS. - FOSSILIFEROUS SLI. - SLIGHTLY FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT HI. - HIGHLY V - VERY			VERY HARD CANNOT BE SCRATCHED BY KNIFE OR 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 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 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.			TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET			BENCH MARK: BL-6, -L- STA., 33+08.21, 68.94' RT N: 476596.7086 E: 2034898.9756 ELEVATION: 98.90 FT.		
U.S. STD. SIEVE SIZE OPENING (MM)			25/025			INDURATION								
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)			DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:			FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.								
GRAIN MM COBLES 75 COARSE SAND (CSE, SD.) 2.0 FINE SAND (F SD.) 0.05 SILT (SL.) 0.005 CLAY (CL.)			MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST			AUTOMATIC MANUAL CORE SIZE: -B -N -H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST			FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.					
SOIL MOISTURE - CORRELATION OF TERMS			EQUIPMENT USED ON SUBJECT PROJECT											
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION			DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:											
- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE			CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG-CARB. CORE BIT											
- WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE			CME-45C CME-550 PORTABLE HOIST											
- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE														
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE														
PLASTICITY														
PLASTICITY INDEX (PI) DRY STRENGTH														
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH														
COLOR														
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.														

NAD 83/NSRS 2007



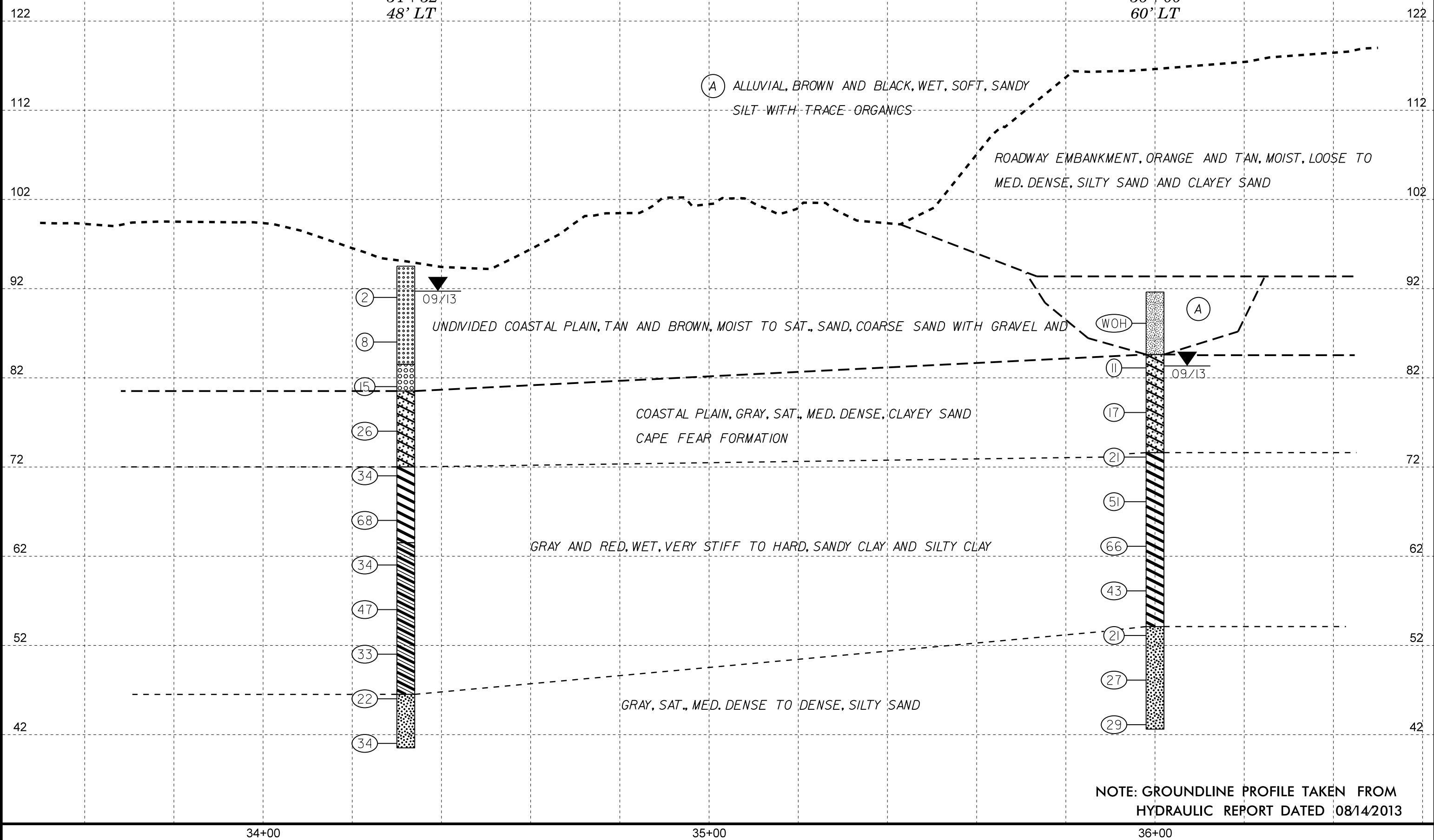
EB1-A
EB1-B
EB2-A
EB2-B



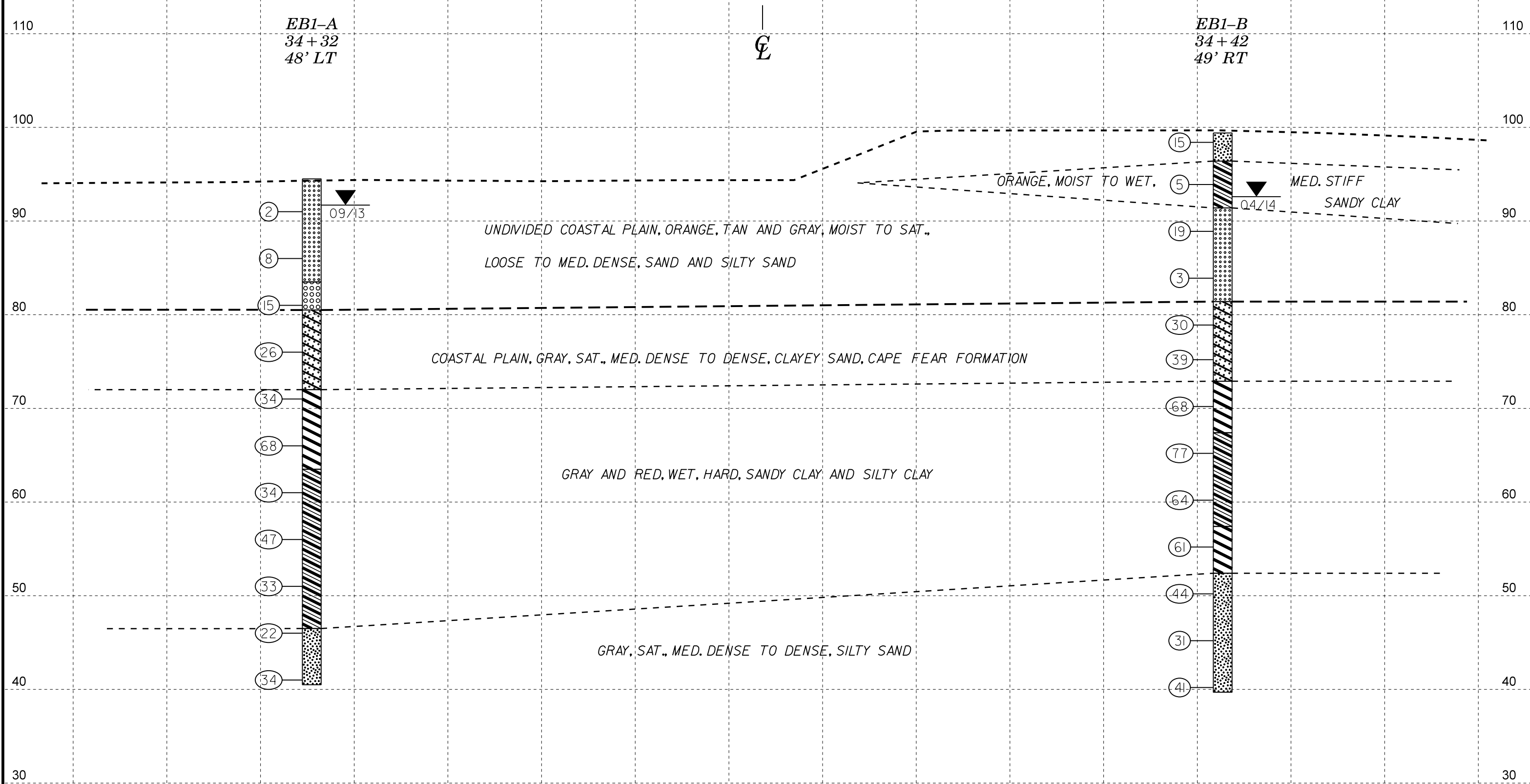
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33727.1.1 (B-4490)	4
PROFILE BORINGS PROJECTED ALONG -L-	

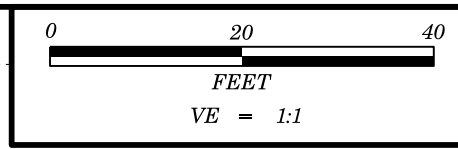
EB1-A
34 + 32
48' LT

EB2-A
36 + 00
60' LT

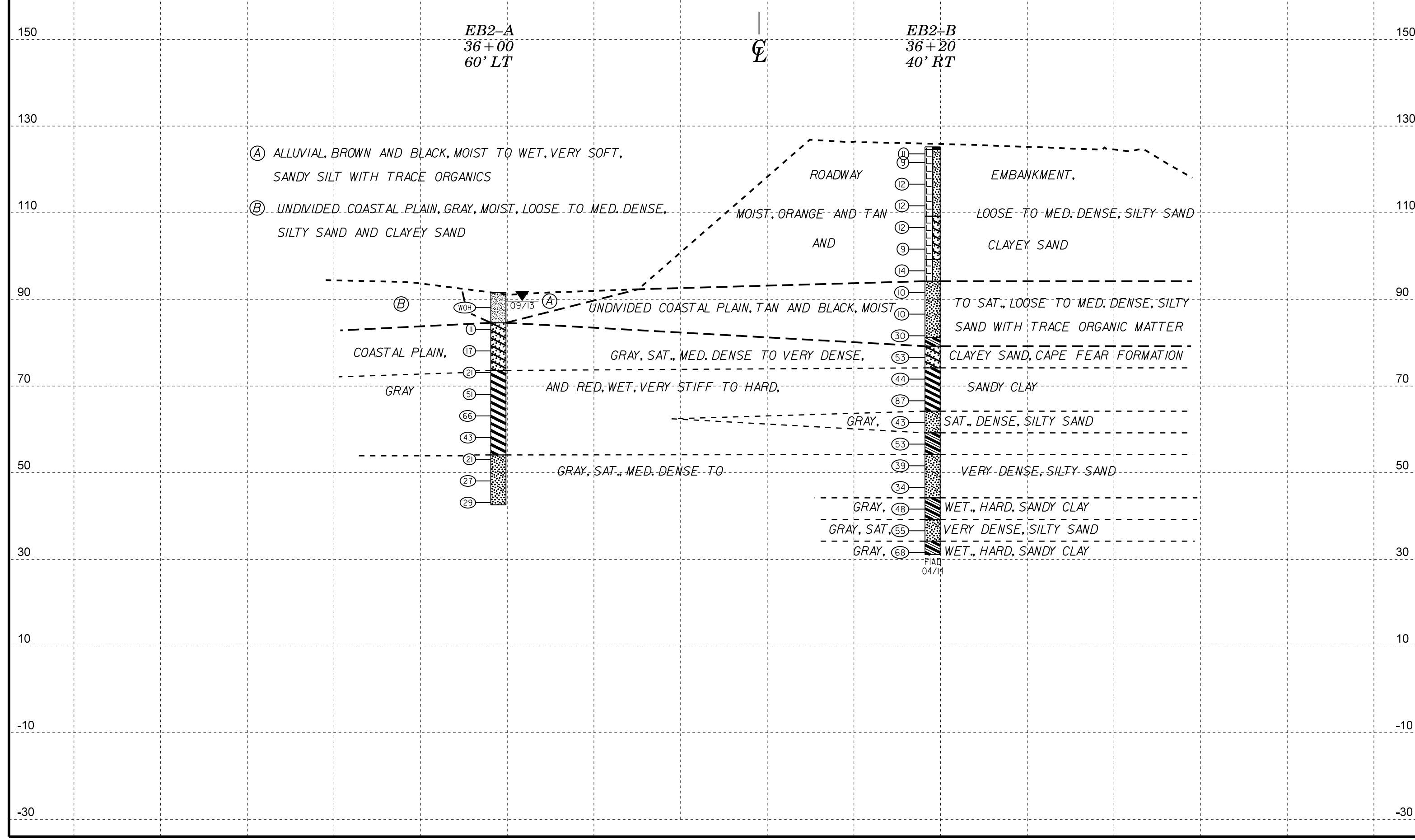


NOTE: GROUNDLINE PROFILE TAKEN FROM
HYDRAULIC REPORT DATED 08/14/2013





PROJECT REFERENCE NO.	SHEET
33727.1.1 (B-4490)	6
CROSS SECTION THROUGH -L- STA 36+00	



WBS 33727.1.1		TIP B-4490		COUNTY CUMBERLAND		GEOLOGIST Oti, O. B.								
SITE DESCRIPTION BR. ON -L- OVER NORFOLK SOUTHERN RR @ -L- STA. 35+23							GROUND WTR (ft)							
BORING NO. EB2-A		STATION 36+00		OFFSET 60 ft LT		ALIGNMENT -L-		0 HR. N/A						
COLLAR ELEV. 91.6 ft		TOTAL DEPTH 49.0 ft		NORTHING 476,577		EASTING 2,035,215		24 HR. 2.0						
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011						DRILL METHOD Mud Rotary		HAMMER TYPE Automatic						
DRILLER Conley, H. R.		START DATE 09/12/13		COMP. DATE 09/12/13		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
95														
90	89.1	2.5	WOH	WOH	WOH								▼	91.6 GROUND SURFACE 0.0
85	84.1	7.5	3	6	5									84.6 UNDIVIDED COASTAL PLAIN BLACK AND GRAY, SANDY SILT WITH TRACE ORGANICS 7.0
80	79.1	12.5	4	6	11									COASTAL PLAIN GRAY, CLAYEY SAND (CAPE FEAR FORMATION)
75	74.1	17.5	7	10	11									73.6 GRAY, SILTY CLAY 18.0
70	69.1	22.5	11	21	30									
65	64.1	27.5	14	25	41									
60	59.1	32.5	10	18	25									
55	54.1	37.5	7	10	11									54.1 GRAY, SILTY SAND 37.5
50	49.1	42.5	11	13	14									
45	44.1	47.5	7	12	17									42.6 Boring Terminated at Elevation 42.6 ft IN MED. DENSE SILTY SAND 49.0



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 33727.1.1		TIP B-4490		COUNTY CUMBERLAND		GEOLOGIST Swartley, J. R.									
SITE DESCRIPTION BR. ON -L- OVER NORFOLK SOUTHERN RR @ -L- STA. 35+23							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 36+20		OFFSET 40 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 125.2 ft		TOTAL DEPTH 94.1 ft		NORTHING 476,480		EASTING 2,035,187									
DRILL RIG/HAMMER EFF./DATE SME R-2 DIEDRICH D-50 84% 11/01/2009			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 04/28/14		COMP. DATE 04/28/14		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					
130															
125	124.6	0.6	4	6	5										
	122.6	2.6	4	5	4										
120															
	117.6	7.6	4	6	6										
115															
	112.6	12.6	5	6	6										
110															
	107.6	17.6	2	5	7										
105															
	102.6	22.6	2	3	6										
100															
	97.6	27.6	6	6	8										
95															
	92.6	32.6	3	4	6										
90															
	87.6	37.6	5	5	5										
85															
	82.6	42.6	10	10	20										
80															
	77.6	47.6	12	19	34										
75															
	72.6	52.6	14	15	29										
70															
	67.6	57.6	21	37	50										
65															
	62.6	62.6	9	17	26										
60															
	57.6	67.6	12	18	35										
55															
	52.6	72.6	8	13	26										
50															

WBS 33727.1.1		TIP B-4490		COUNTY CUMBERLAND		GEOLOGIST Swartley, J. R.									
SITE DESCRIPTION BR. ON -L- OVER NORFOLK SOUTHERN RR @ -L- STA. 35+23							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 36+20		OFFSET 40 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 125.2 ft		TOTAL DEPTH 94.1 ft		NORTHING 476,480		EASTING 2,035,187									
DRILL RIG/HAMMER EFF./DATE SME R-2 DIEDRICH D-50 84% 11/01/2009			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 04/28/14		COMP. DATE 04/28/14		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					
50															
	47.6	77.6	11	14	20										
45															
	42.6	82.6	12	18	30										
40															
	37.6	87.6	15	25	30										
35															
	32.6	92.6	17	30	38										

NCDOT BORE DOUBLE B4490_GEO_BRDG_0116_SPT_BORINGS.GPJ NC_DOT.GDT 7/15/14

EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATDN	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSNG (SEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-18	48LT	34+32	17.5-19.0	A-2-6(0)	40	13	51.8	24.1	18.1	6.1	96	63	28	-	-
SS-19	48LT	34+32	22.5-24.0	A-7-6(5)	43	15	20.7	39.8	31.4	8.1	100	89	49	-	-
SS-20	48LT	34+32	32.5-34.0	A-6(2)	40	13	25.8	42.0	24.1	8.1	100	90	39	-	-
SS-21	48LT	34+32	48.0-49.0	A-2-4(0)	33	NP	66.0	23.7	8.3	2.0	97	62	13	-	-

EB1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATDN	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSNG (SEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-13	49RT	34+42	19.5-21.0	A-2-6(1)	40	15	43.3	26.4	19.3	11.0	93	71	32	-	-
SS-14	49RT	34+42	28.2-29.7	A-7-6(7)	43	15	20.9	28.9	36.2	14.0	100	89	57	-	-
SS-15	49RT	34+42	43.2-44.7	A-7-6(9)	44	15	8.8	36.5	38.6	16.0	100	96	66	-	-
SS-16	49RT	34+42	53.2-54.7	A-2-4(0)	40	NP	56.3	30.4	9.3	4.0	99	72	16	-	-

EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATDN	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSNG (SEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-22	60LT	36+00	2.5-4.0	A-4(2)	25	9	23.6	29.8	28.3	18.3	100	87	52	-	3.8
SS-23	60LT	36+00	7.5-9.0	A-2-6(0)	35	13	47.3	28.8	15.7	8.1	85	58	24	-	-
SS-24	60LT	36+00	18.0-19.0	A-7-5(10)	46	16	7.5	39.4	45.0	8.1	100	97	64	-	-
SS-25	60LT	36+00	27.5-29.0	A-7-6(4)	46	20	44.8	16.4	25.6	13.2	97	64	40	-	-
SS-26	60LT	36+00	37.5-39.0	A-2-4(0)	31	9	32.9	41.2	18.8	7.1	100	92	32	-	-

EB2-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATDN	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSNG (SEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-50	40RT	36+20	17.6-19.1	A-2-7(2)	45	23	34.0	36.0	1.5	28.5	99	79	32	-	-
SS-51	40RT	36+20	47.6-49.1	A-2-6(1)	37	15	51.0	22.4	16.5	10.2	97	72	29	-	-
SS-52	40RT	36+20	72.6-74.1	A-2-4(0)	32	8	28.9	48.2	16.8	6.1	100	88	29	-	-