

REFERENCE: SF-320067

PROJECT: 17BP.4.R.78

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY EDGECOMBE
PROJECT DESCRIPTION BRIDGE NO. 67 ON -L- (SR 1109)
OVER OTTER CREEK

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-320067	1	8

CAUTION NOTICE

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

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

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 THE 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.

- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

C.J. CORNETTE

S.N. ZIMARINO

R.E. SMITH

J.M. EDMONDSON

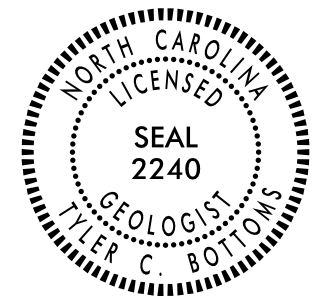
INVESTIGATED BY T.C. BOTTOMS

DRAWN BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE OCTOBER 2017



DocuSigned by:
Tyler Bottoms 10/5/2017

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SIGNATURE DATE

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (ASTM T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION
Table with columns for GENERAL CLASS., SILT-CLAY MATERIALS (<= 35% PASSING #200), ORGANIC MATERIALS, and SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER. Includes symbols for various soil types and their corresponding AASHTO group indices.

CONSISTENCY OR DENSENESS
Table with columns for PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), and RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TENS/FT^2). Categories include Generally Granular Material, Generally Silt-Clay Material, and Very Loose to Very Hard.

TEXTURE OR GRAIN SIZE
Table with columns for U.S. STD. SIEVE SIZE OPENING (MM) and corresponding grain size ranges for Boulder, Cobble, Gravel, Coarse Sand, Fine Sand, Silt, and Clay.

SOIL MOISTURE - CORRELATION OF TERMS
Table with columns for SOIL MOISTURE SCALE (Atterberg Limits), FIELD MOISTURE DESCRIPTION, and GUIDE FOR FIELD MOISTURE DESCRIPTION. Includes Liquid Limit (LL), Plastic Limit (PL), and Optimum Moisture Shrinkage Limit (OM).

PLASTICITY
Table with columns for PLASTICITY INDEX (PI) and DRY STRENGTH. Categories include Non Plastic, Slightly Plastic, Moderately Plastic, and Highly Plastic.

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.

GRADATION
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.
ANGULARITY OF GRAINS
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.
COMPRESSIBILITY
SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL
ORGANIC MATERIAL: TRACE OF ORGANIC MATTER (2-3%), LITTLE ORGANIC MATTER (3-5%), MODERATELY ORGANIC (5-10%), HIGHLY ORGANIC (>10%)
SILT-CLAY SOILS: 3-5%, 5-12%, 12-20%, >20%
OTHER MATERIAL: TRACE (1-10%), LITTLE (10-20%), SOME (20-35%), HIGHLY (35% AND ABOVE)

GROUND WATER
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
STATIC WATER LEVEL AFTER 24 HOURS
PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
SPRING OR SEEP

MISCELLANEOUS SYMBOLS
Includes symbols for ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION OF ROCK STRUCTURES, TEST BORING, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD, TEST BORING WITH CORE, and SPT N-VALUE.

RECOMMENDATION SYMBOLS
UNDERCUT, SHALLOW UNDERCUT, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK, UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS
AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, e - VOID RATIO, F - FINE, FOSS. - FOSSILIFEROUS, FRAC. - FRACTURED, FRACTURES, FRAGS. - FRAGMENTS, HI. - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLO. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, % - UNIT WEIGHT, %g - DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS: [X] CME-45C, [] CME-55, [X] CME-550, [] VANE SHEAR TEST, [] PORTABLE HOIST
ADVANCING TOOLS: [] CLAY BITS, [] 6" CONTINUOUS FLIGHT AUGER, [] 8" HOLLOW AUGERS, [] HARD FACED FINGER BITS, [] TUNG-CARBIDE INSERTS, [X] CASING w/ ADVANCER, [X] TRICONE 2 1/2" STEEL TEETH, [] TRICONE " TUNG-CARB., [] CORE BIT
HAMMER TYPE: [X] AUTOMATIC, [] MANUAL
CORE SIZE: [] -B, [] -H, [] -N
HAND TOOLS: [] POST HOLE DIGGER, [] HAND AUGER, [] SOUNDING ROD, [] VANE SHEAR TEST

ROCK DESCRIPTION
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), COASTAL PLAIN SEDIMENTARY ROCK (CPS)
Includes diagrams showing rock textures and descriptions for each type.

WEATHERING
FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.): ROCK GENERALLY FRESH, JOINTS STAINED. SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.): ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.): SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED. SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.
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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF.
VERY SEVERE (V SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF.
COMPLETE: ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS
VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD: CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD: CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT: CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT: CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.

FRACTURE SPACING and BEDDING
Tables with columns for TERM, SPACING, THICKNESS, and descriptions for fracture spacing (Very Wide to Very Close) and bedding (Very Thickly Bedded to Thinly Laminated).

INDURATION
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.
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.

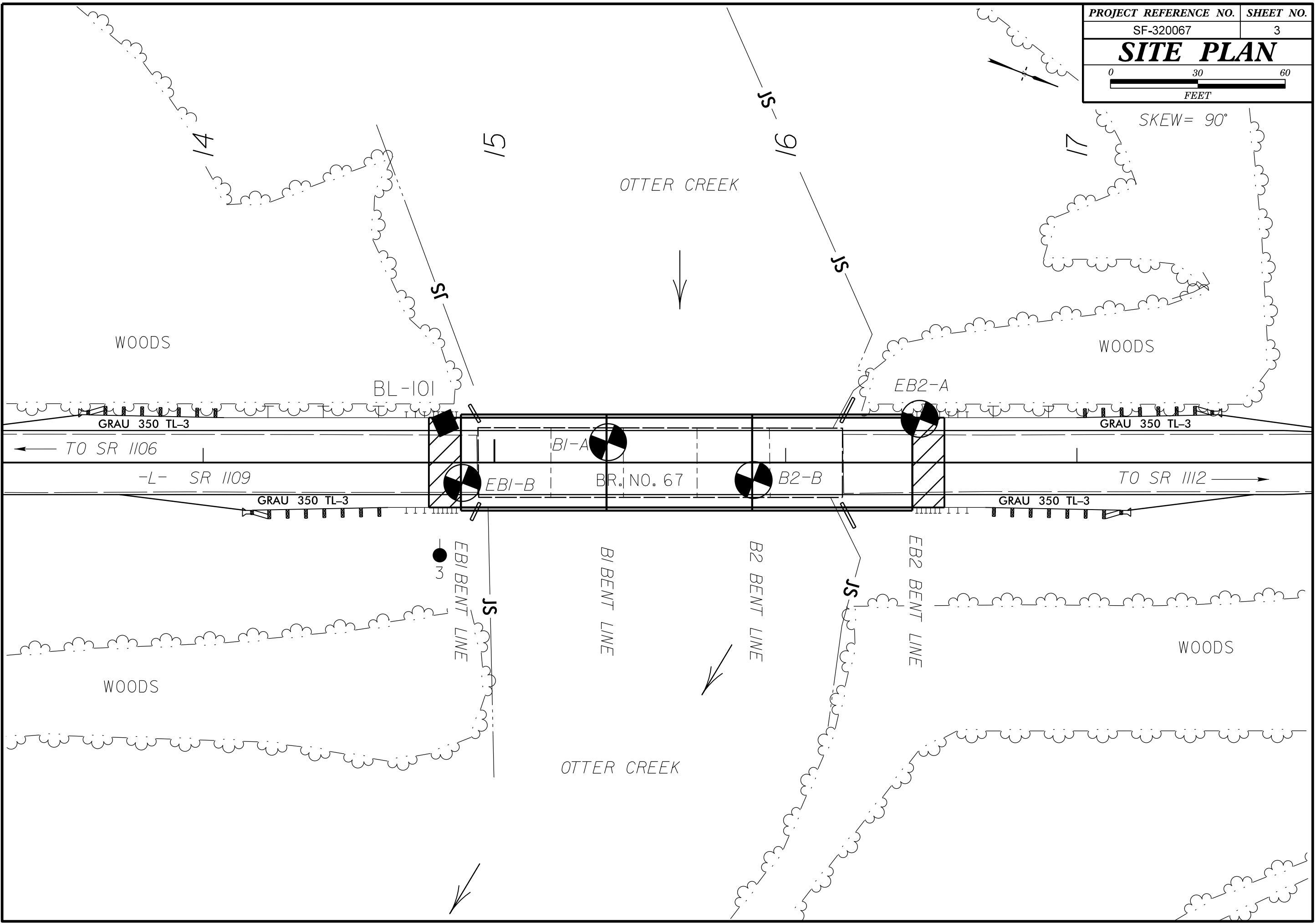
TERMS AND DEFINITIONS
ALLUVIUM (ALLUV.): SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
AQUIFER - A WATER BEARING FORMATION OR STRATA.
ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH 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 (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.

BENCH MARK: BL-101
N=720629.6830 E=2396977.0150
ELEVATION: 76.03 FEET

NOTES:
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

SKEW = 90°

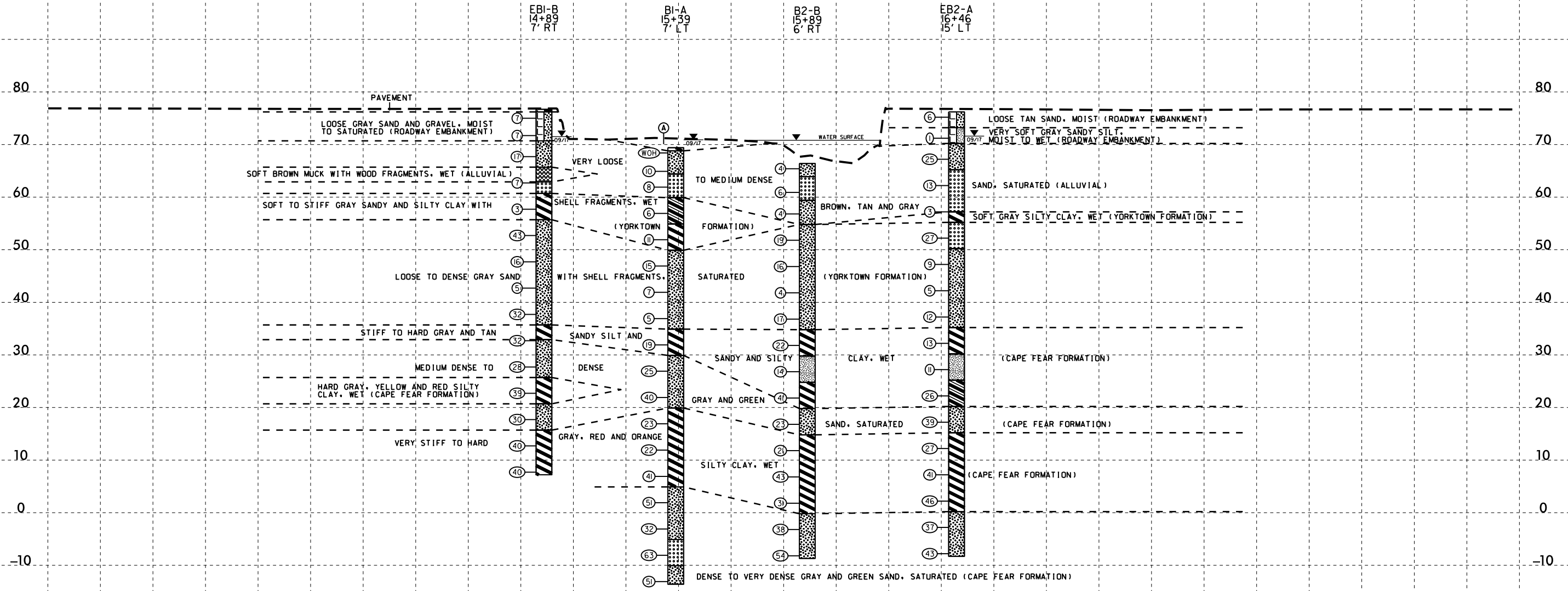


5/14/99

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO. SF-320067	SHEET NO. 4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

VE-2



Ⓐ VERY SOFT BROWN SILTY CLAY, WET (ALLUVIAL)

NOTE: GRONDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 8/14/17

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

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GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.4.R.78		TIP SF-320067		COUNTY EDGEcombe		GEOLOGIST Zimarino, S. N.										
SITE DESCRIPTION BRIDGE NUMBER 67 ON -L- (SR 1109) OVER OTTER CREEK							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 14+89		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 76.7 ft		TOTAL DEPTH 69.5 ft		NORTHING 720,643		EASTING 2,396,994										
DRILL RIG/HAMMER EFF./DATE GFO0057 CME-550X 76% 06/13/2017				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Smith, R. E.		START DATE 09/26/17		COMP. DATE 09/26/17		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			ELEV. (ft)	DEPTH (ft)		
80																
	76.0	0.7												76.7	0.0	GROUND SURFACE
			3	4	3									76.2	0.2	PAVEMENT
	72.7	4.0														ROADWAY EMBANKMENT
			1	3	4											GRAY SAND AND GRAVEL, MOIST TO SATURATED
	68.7	8.0												70.7	6.0	ALLUVIAL
			4	7	10											GRAY SAND, SATURATED
	63.7	13.0												65.7	11.0	ALLUVIAL
			1	2	5											BROWN MUCK WITH WOOD FRAGMENTS, WET
	58.7	18.0												62.9	13.8	ALLUVIAL
			2	1	2									60.7	16.0	GRAY SAND, SATURATED
	53.7	23.0														COASTAL PLAIN
			7	10	33											GRAY SILTY CLAY, WET (YORKTOWN FORMATION)
	48.7	28.0												55.7	21.0	COASTAL PLAIN
			5	9	7											GRAY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION)
	43.7	33.0														
			2	2	3											
	38.7	38.0														
			10	15	17											
	33.7	43.0												35.7	41.0	COASTAL PLAIN
			8	11	21											GRAY AND GREEN SILTY CLAY, WET (CAPE FEAR FORMATION)
	28.7	48.0												32.9	43.8	COASTAL PLAIN
			8	11	17											GRAY AND GREEN SAND, SATURATED (CAPE FEAR FORMATION)
	23.7	53.0												25.7	51.0	COASTAL PLAIN
			10	17	22											GRAY, YELLOW AND RED SILTY CLAY, WET (CAPE FEAR FORMATION)
	18.7	58.0												20.7	56.0	COASTAL PLAIN
			12	15	15											GRAY SAND, SATURATED (CAPE FEAR FORMATION)
	13.7	63.0												15.7	61.0	COASTAL PLAIN
			11	16	24											GRAY AND RED SILTY CLAY, WET (CAPE FEAR FORMATION)
	8.7	68.0														
			12	18	22											
														7.2	69.5	Boring Terminated at Elevation 7.2 ft in Hard Silty Clay

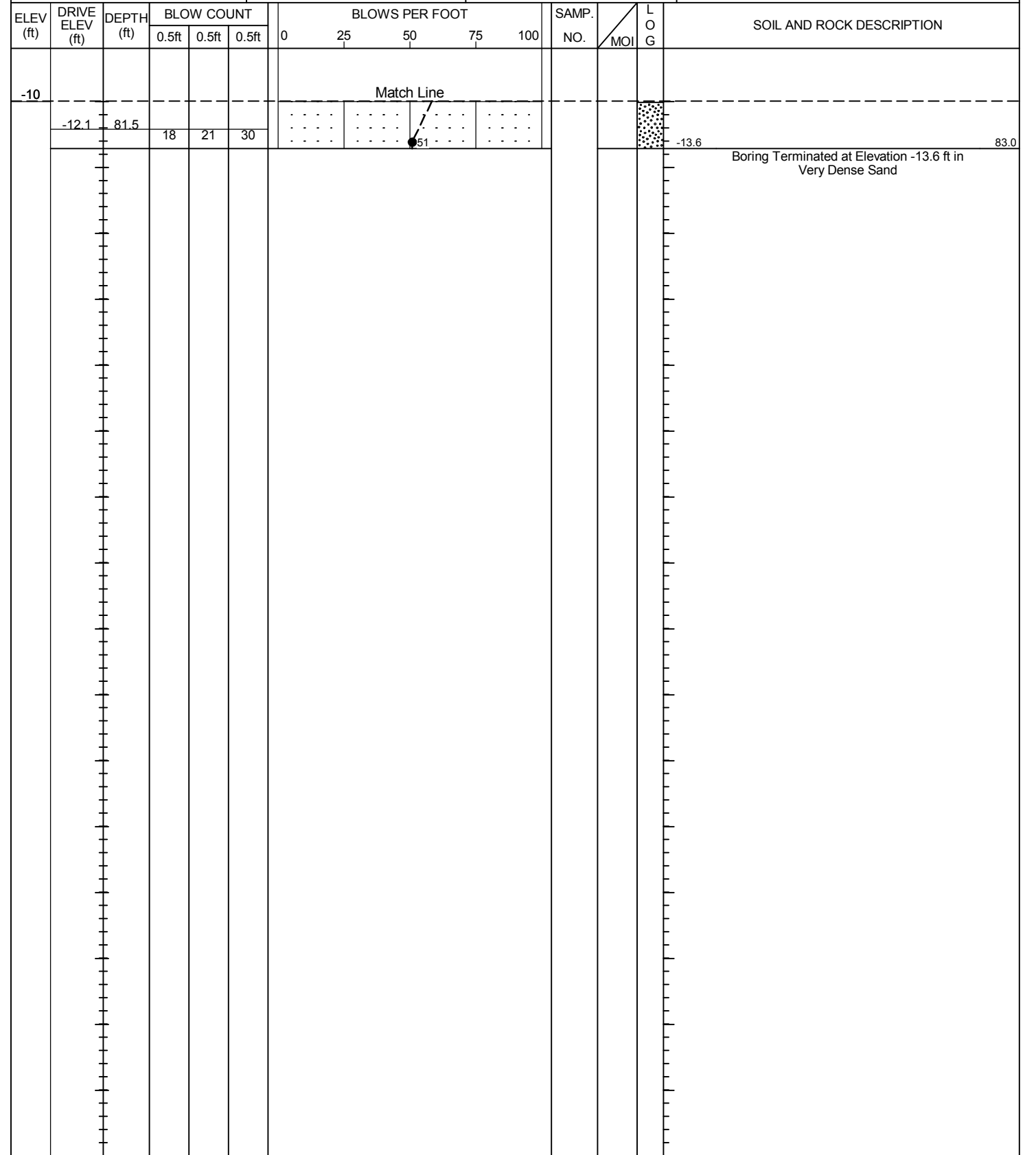
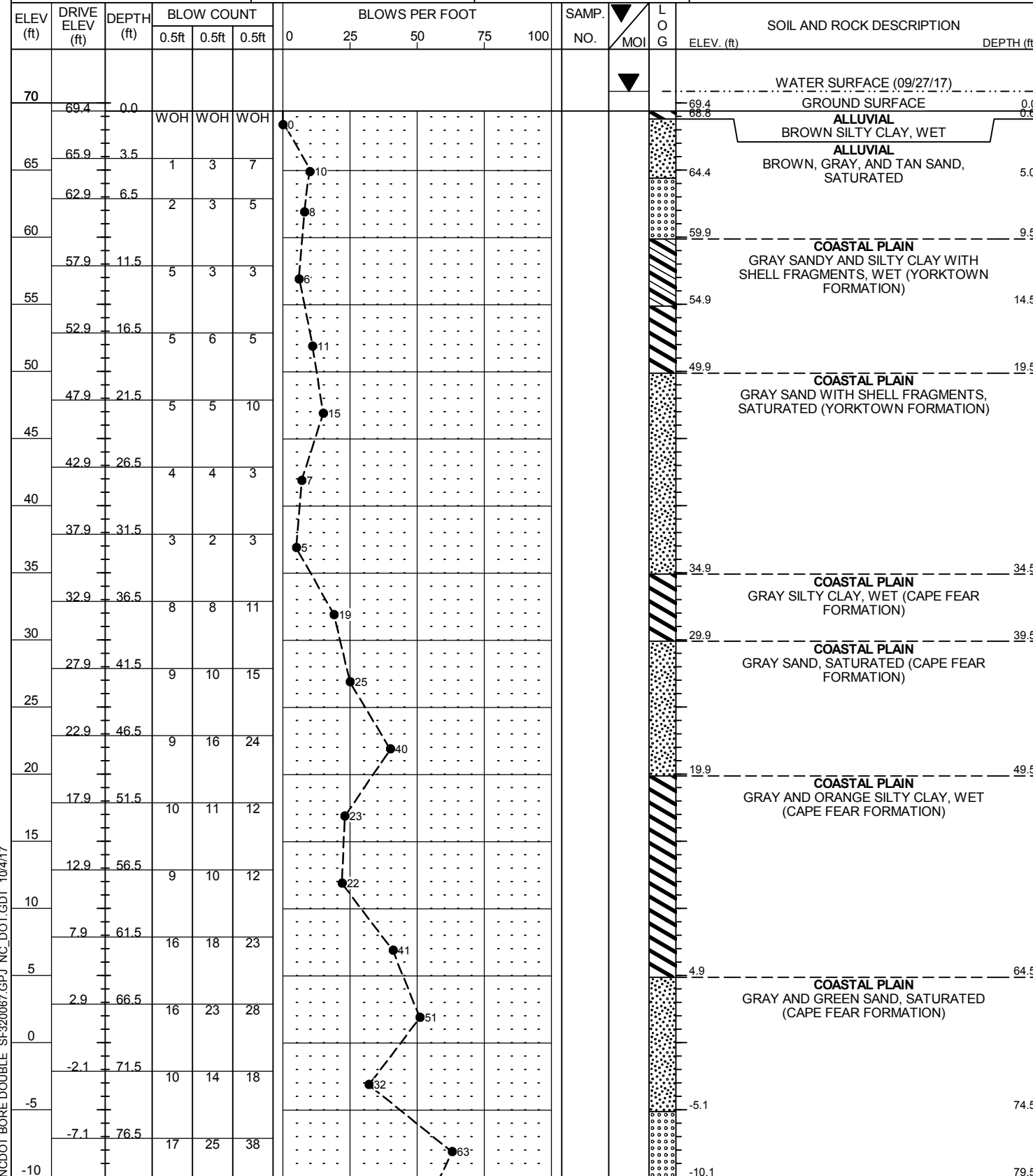
NCDOT BORE DOUBLE_SF320067.GPJ_NC_DOT.GDT 10/4/17

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.4.R.78	TIP SF-320067	COUNTY EDGECOMBE	GEOLOGIST Zimarino, S. N.
SITE DESCRIPTION BRIDGE NUMBER 67 ON -L- (SR 1109) OVER OTTER CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 15+39	OFFSET 7 ft LT	ALIGNMENT -L-
COLLAR ELEV. 69.4 ft	TOTAL DEPTH 83.0 ft	NORTHING 720,684	EASTING 2,396,963
DRILL RIG/HAMMER EFF./DATE GFO0057 CME-550X 76% 06/13/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Edmondson, J. M.	START DATE 09/27/17	COMP. DATE 09/27/17	SURFACE WATER DEPTH 1.5ft

WBS 17BP.4.R.78	TIP SF-320067	COUNTY EDGECOMBE	GEOLOGIST Zimarino, S. N.
SITE DESCRIPTION BRIDGE NUMBER 67 ON -L- (SR 1109) OVER OTTER CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 15+39	OFFSET 7 ft LT	ALIGNMENT -L-
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DRILL RIG/HAMMER EFF./DATE GFO0057 CME-550X 76% 06/13/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Edmondson, J. M.	START DATE 09/27/17	COMP. DATE 09/27/17	SURFACE WATER DEPTH 1.5ft

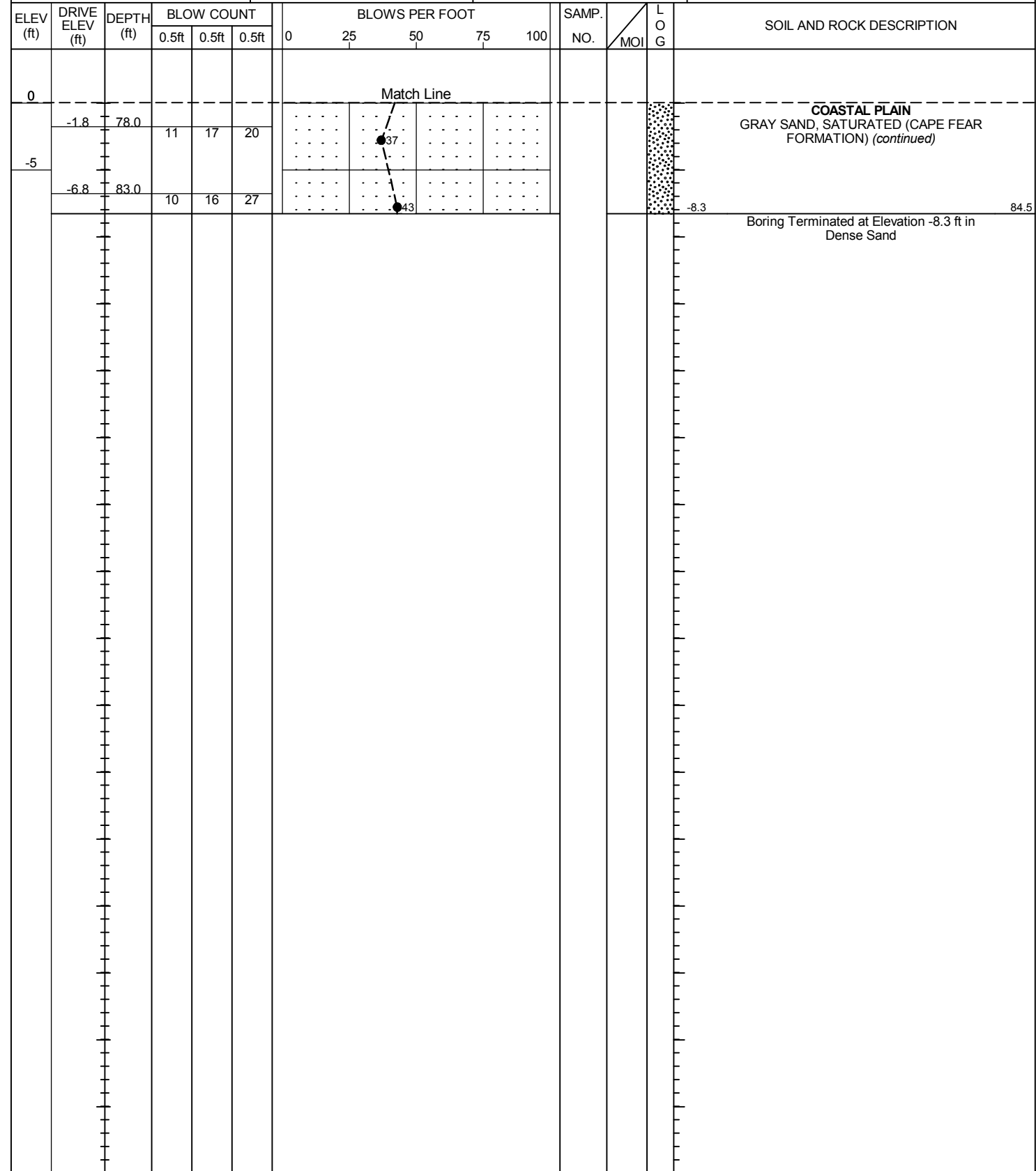
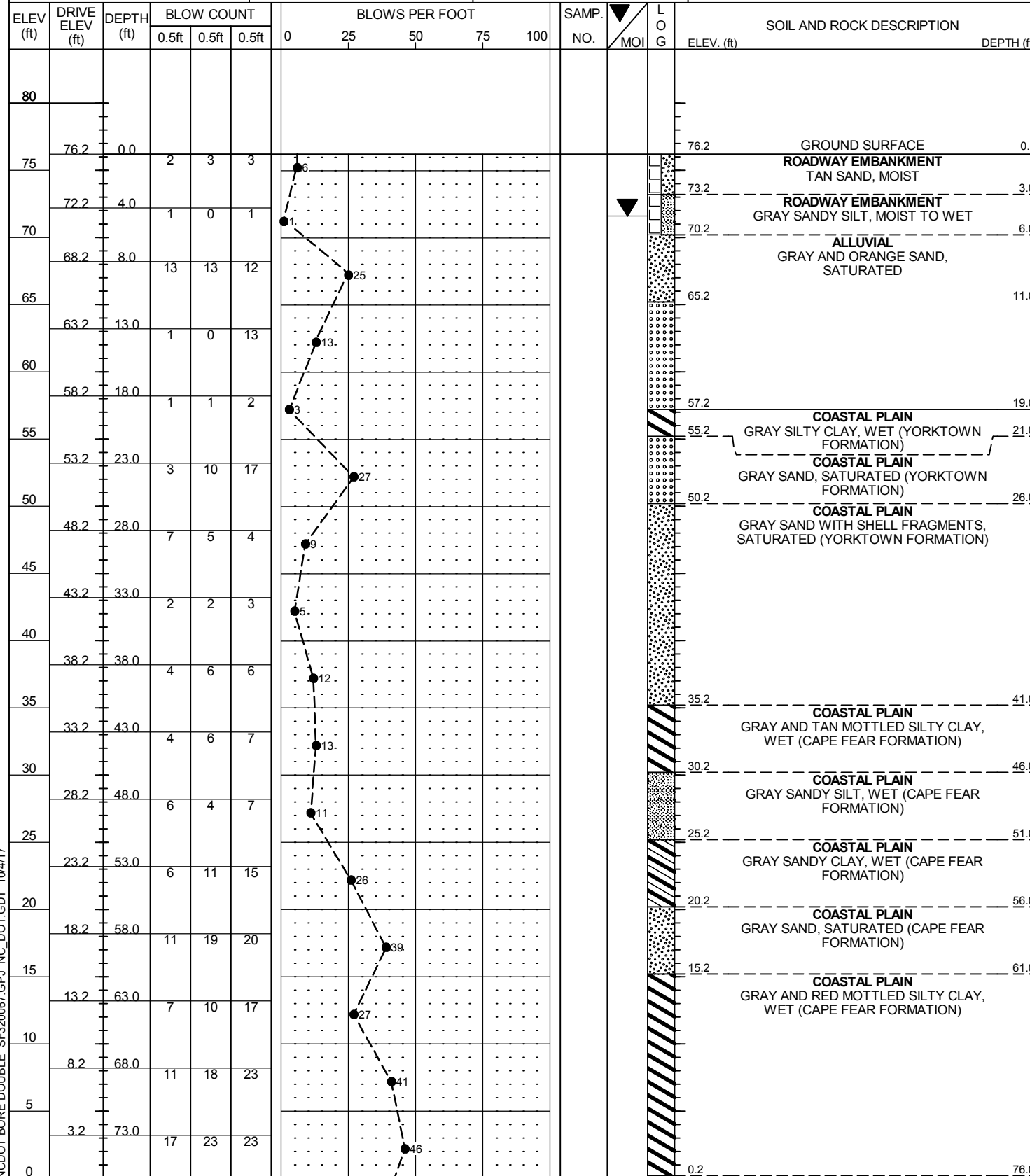


NCDOT BORE DOUBLE SF320067.GPJ NC_DOT.GDT 10/4/17

GEOTECHNICAL BORING REPORT BORE LOG

WBS 17BP.4.R.78	TIP SF-320067	COUNTY EDGECOMBE	GEOLOGIST Zimarino, S. N.
SITE DESCRIPTION BRIDGE NUMBER 67 ON -L- (SR 1109) OVER OTTER CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+46	OFFSET 15 ft LT	ALIGNMENT -L-
COLLAR ELEV. 76.2 ft	TOTAL DEPTH 84.5 ft	NORTHING 720,781	EASTING 2,396,917
DRILL RIG/HAMMER EFF./DATE GFO0075 CME-45C 84% 08/21/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 09/13/17	COMP. DATE 09/13/17	SURFACE WATER DEPTH N/A

WBS 17BP.4.R.78	TIP SF-320067	COUNTY EDGECOMBE	GEOLOGIST Zimarino, S. N.
SITE DESCRIPTION BRIDGE NUMBER 67 ON -L- (SR 1109) OVER OTTER CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+46	OFFSET 15 ft LT	ALIGNMENT -L-
COLLAR ELEV. 76.2 ft	TOTAL DEPTH 84.5 ft	NORTHING 720,781	EASTING 2,396,917
DRILL RIG/HAMMER EFF./DATE GFO0075 CME-45C 84% 08/21/2017		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Smith, R. E.	START DATE 09/13/17	COMP. DATE 09/13/17	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE SF320067.GPJ_NC_DOT.GDT 10/4/17