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REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM SOUTH OF US 301 (EXIT 22) TO NORTH OF SR 1758 (McDUFFIE CROSSING ROAD)  
SITE DESCRIPTION SITE 2 - BRIDGE ON -YIA- (US 301) OVER -L- (I-95) BETWEEN SR 1765 AND SR 1935 AT STA. 286 + 75 -L-

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
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8	SOIL TEST RESULTS
9	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	9

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.

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DATE SEPTEMBER 2021

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NC REGISTERED ENGINEERING FIRM: F-0869  
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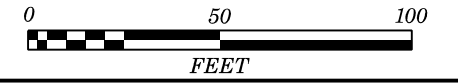
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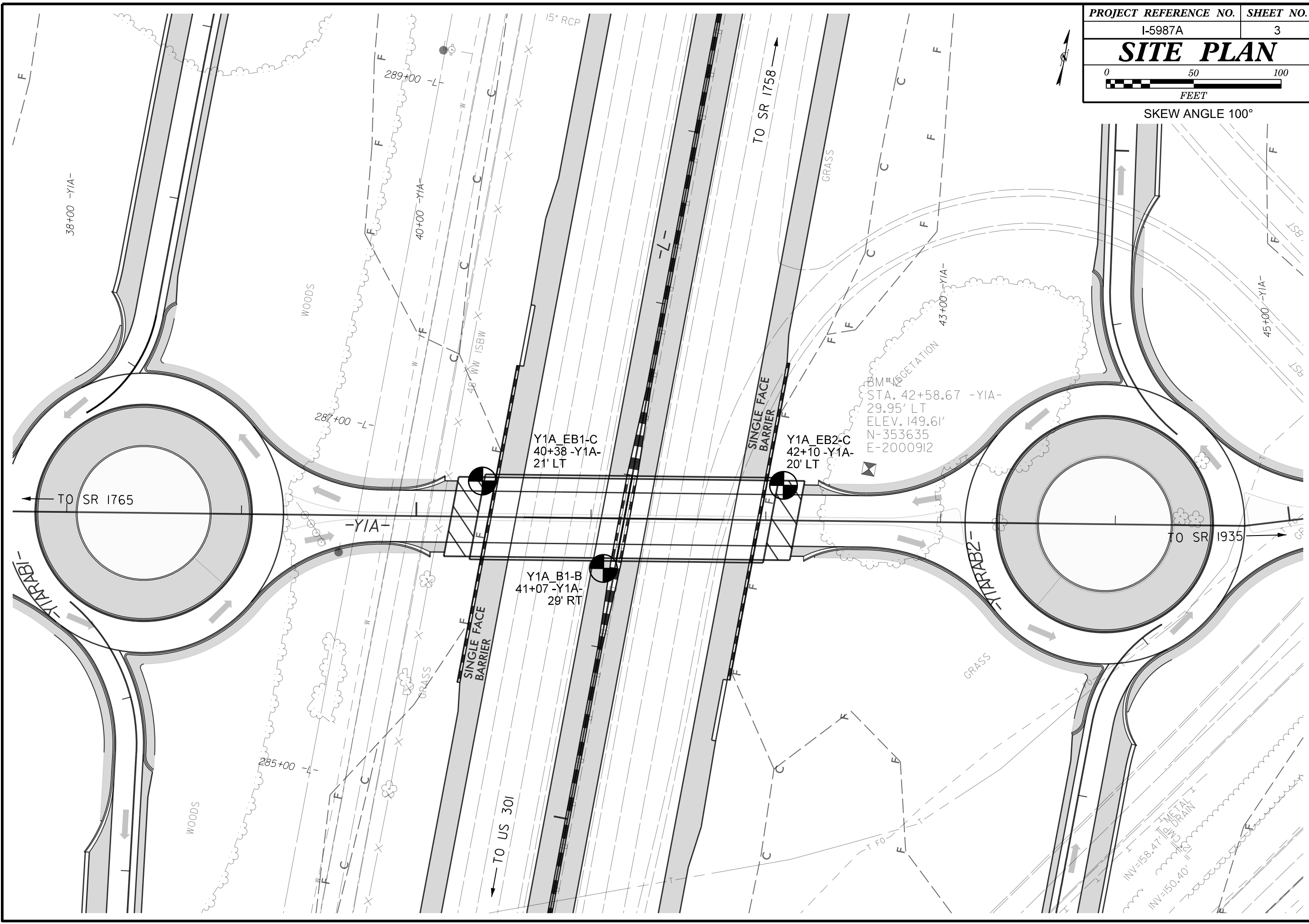
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
SOIL IS CONSIDERED 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF 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:										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 DISLODGED 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 (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.																													
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>MINERALOGICAL COMPOSITION</b>										<b>WEATHERING</b>																																							
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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. 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 (CPI) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																																							
<b>COMPRESSIBILITY</b>										<b>PERCENTAGE OF MATERIAL</b>										<b>GROUND WATER</b>																																							
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL 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										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																																							
<b>CONSISTENCY OR DENSENESS</b>										<b>MISCELLANEOUS SYMBOLS</b>										<b>ROCK HARDNESS</b>																																							
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY										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.										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.										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.																			
<b>TEXTURE OR GRAIN SIZE</b>										<b>RECOMMENDATION SYMBOLS</b>										<b>ABBREVIATIONS</b>																																							
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										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										VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO																													
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>										<b>EQUIPMENT USED ON SUBJECT PROJECT</b>										<b>FRACTURE SPACING</b>										<b>BEDDING</b>																													
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: CME-45C CME-55 (RF00074) CME-550 VANE SHEAR TEST PORTABLE HOIST CME-55 (F&R3495) DIEBICH D-50 (TE245)										TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET										TERM THICKNESS VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET										BENCH MARK: B.M. #12: BENCH NAIL SET IN BASE OF 18" PINE; 129.95' LEFT OF STA. 42+58.67 -YIA- N: 353,635; E: 2,000,912 ELEVATION: 149.61 FEET																			
<b>PLASTICITY</b>																				<b>INDURATION</b>										<b>NOTES:</b>																													
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2% * STEEL TEETH TRICONE * TUNG-CARB. 2 1/4" HOLLOW STEM AUGERS 3/4" HOLLOW STEM AUGERS										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.										NOTE: ELEVATIONS OF BORINGS YIA.EB1-C AND YIA.EB2-C PERFORMED BY F&R inc. OBTAINED FROM PROVIDED TIN FILE: I5987_Is_tin.tin DATED: 11-14-2019																													
<b>COLOR</b>																														FIAD - FILLED IMMEDIATELY AFTER DRILLING																													
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.																																																											

# SITE PLAN



SKEW ANGLE 100°



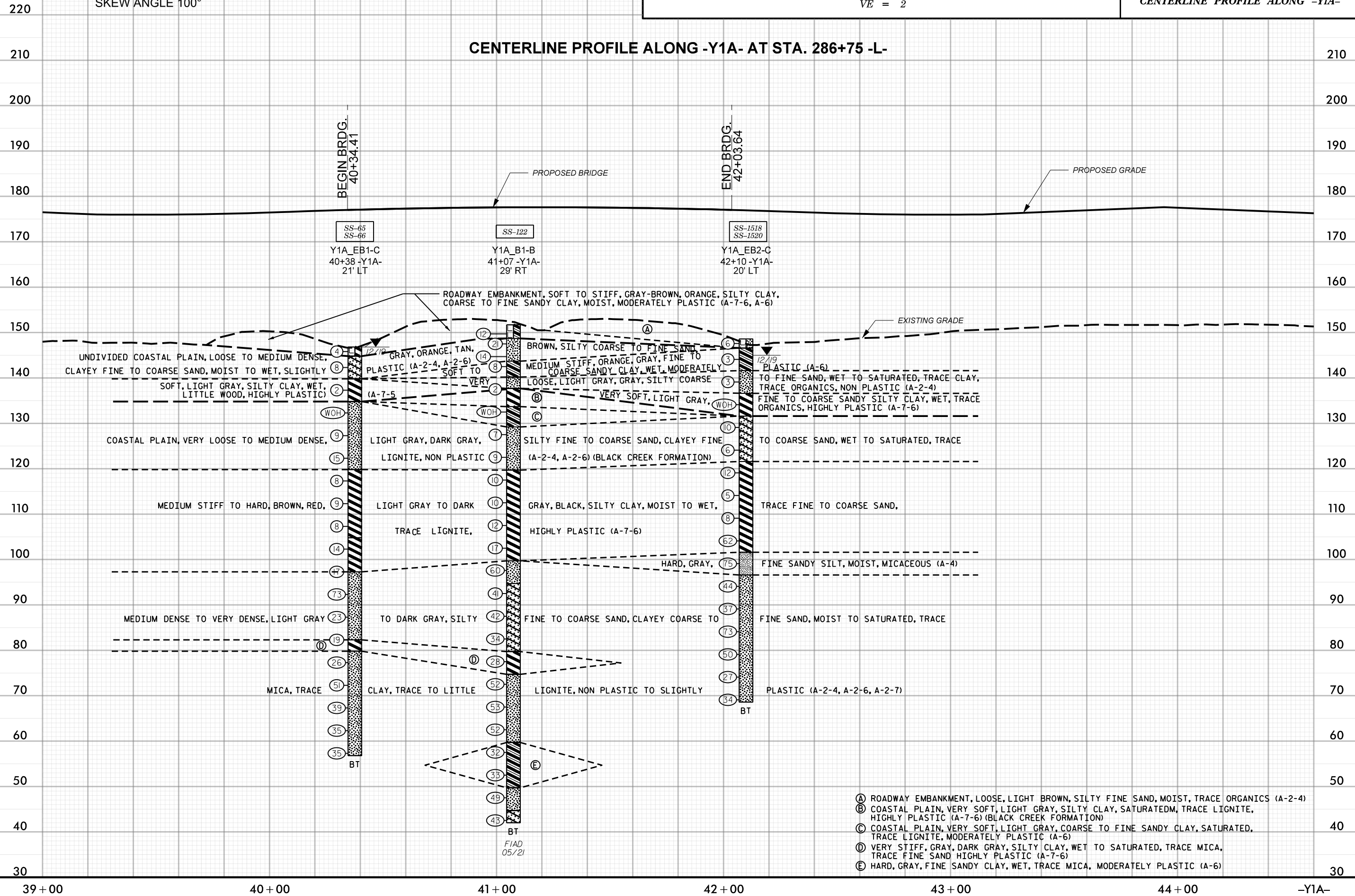


NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -Y1A- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987\_ls\_tin1.tin).

SKREW ANGLE 100°



PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4
CENTERLINE PROFILE ALONG -Y1A-	

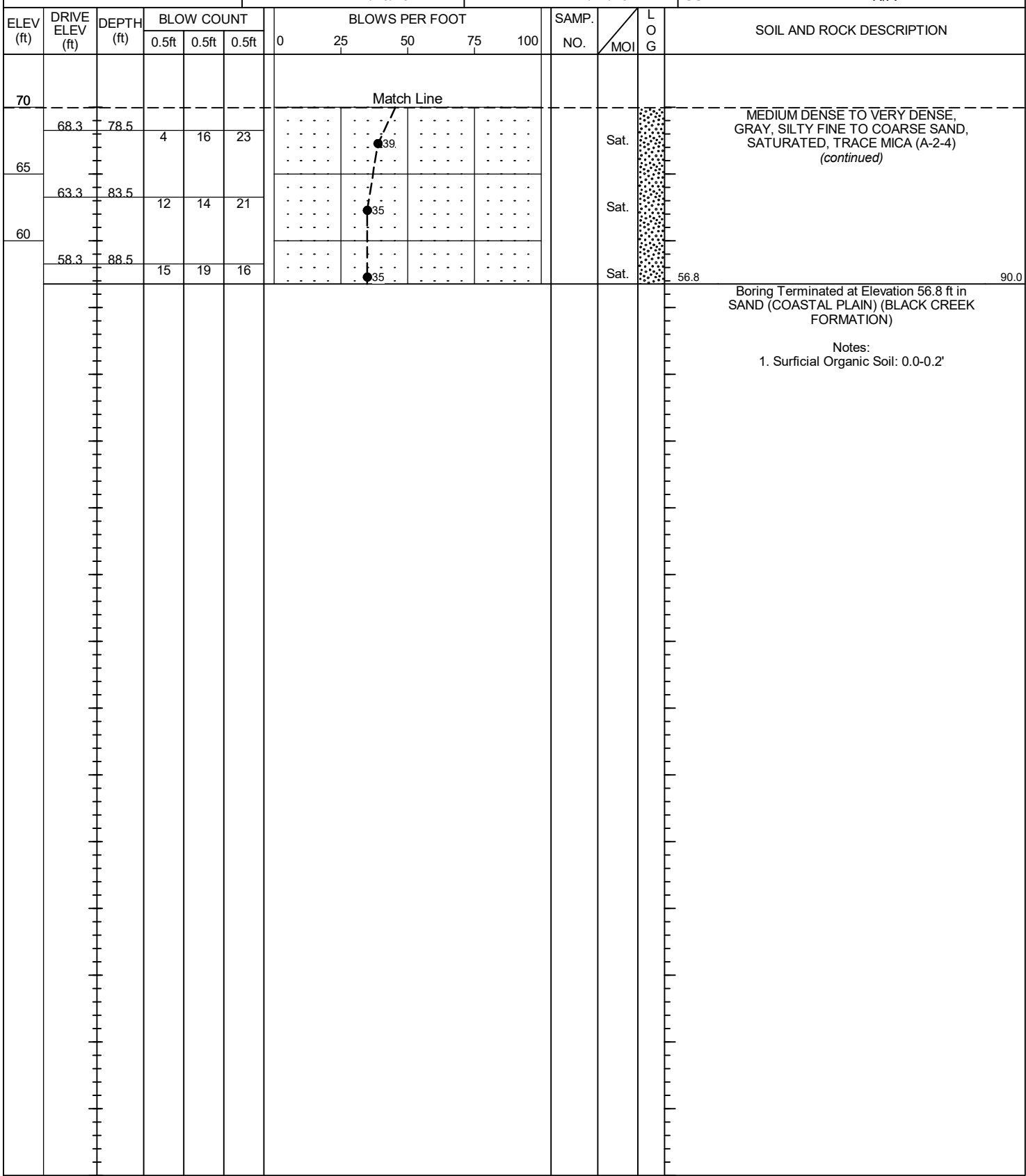
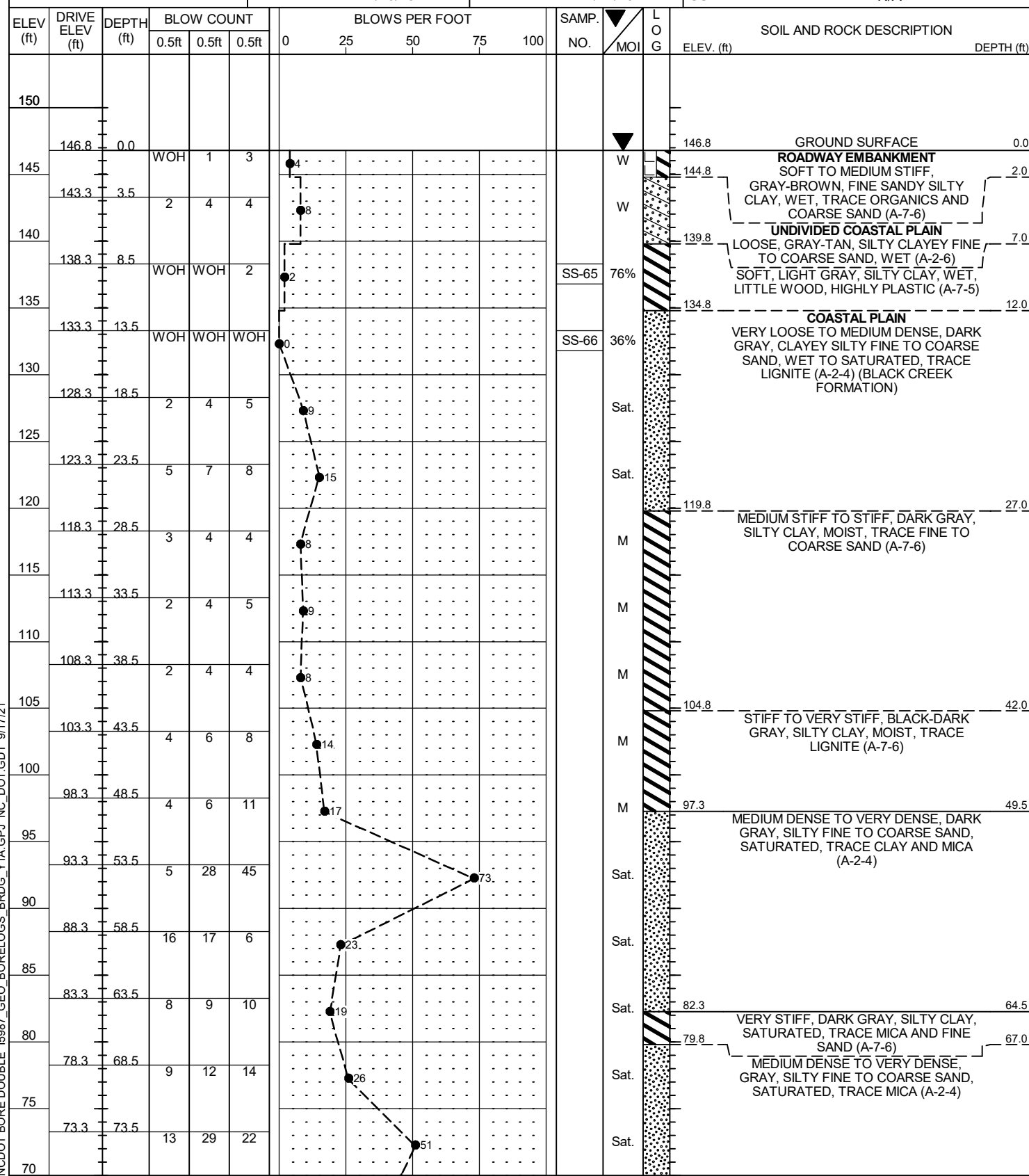


# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.1	TIP I-5987	COUNTY ROBESON	GEOLOGIST W. Pesi
SITE DESCRIPTION Bridge on -Y1A- (US-301) over -L- (I-95) at -L- Sta. 286+75			GROUND WTR (ft)
BORING NO. Y1A_EB1-C	STATION 40+38	OFFSET 21 ft LT	ALIGNMENT -Y1A-
COLLAR ELEV. 146.8 ft	TOTAL DEPTH 90.0 ft	NORTHING 353,589	EASTING 2,000,696
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 80% 03/08/2019		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER R. Smith		START DATE 12/10/19	COMP. DATE 12/11/19
		SURFACE WATER DEPTH N/A	

WBS 47533.1.1	TIP I-5987	COUNTY ROBESON	GEOLOGIST W. Pesi
SITE DESCRIPTION Bridge on -Y1A- (US-301) over -L- (I-95) at -L- Sta. 286+75			GROUND WTR (ft)
BORING NO. Y1A_EB1-C	STATION 40+38	OFFSET 21 ft LT	ALIGNMENT -Y1A-
COLLAR ELEV. 146.8 ft	TOTAL DEPTH 90.0 ft	NORTHING 353,589	EASTING 2,000,696
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 80% 03/08/2019		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER R. Smith		START DATE 12/10/19	COMP. DATE 12/11/19
		SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE I5987 GEO BORELOGS BRDG\_Y1A.GPJ NC\_DOT.GDT 9/17/21

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.											
SITE DESCRIPTION Bridge on -Y1A- (US-301) over -L- (I-95) at -L- Sta. 286+75							GROUND WTR (ft)										
BORING NO. Y1A_B1-B		STATION 41+07		OFFSET 29 ft RT		ALIGNMENT -Y1A-											
COLLAR ELEV. 151.7 ft		TOTAL DEPTH 109.7 ft		NORTHING 353,552		EASTING 2,000,773											
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 05/16/21		COMP. DATE 05/17/21		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
155																	
	150.7	1.0	3	5	7												
	148.5	3.2	10	12	9												
	145.7	6.0	5	7	7												
	143.5	8.2	3	3	5												
	140.2	13.2	2	1	1												
	138.5	13.2	2	1	1												
	137.7																
	133.5	18.2	WOH	WOH	WOH												
	133.7																
	128.5	23.2	WOH	3	4												
	129.2																
	123.5	28.2	5	6	3												
	123.7																
	118.5	33.2	3	4	6												
	119.7																
	113.5	38.2	4	5	5												
	113.7																
	108.5	43.2	4	5	7												
	109.7																
	103.5	48.2	5	7	10												
	103.7																
	98.5	53.2	33	67.5													
	99.7																
	93.5	58.2	11	13	28												
	94.7																
	88.5	63.2	4	12	30												
	89.7																
	83.5	68.2	7	12	22												
	84.7																
	78.5	73.2	6	12	16												
	79.7																
	78.5																

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.											
SITE DESCRIPTION Bridge on -Y1A- (US-301) over -L- (I-95) at -L- Sta. 286+75							GROUND WTR (ft)										
BORING NO. Y1A_B1-B		STATION 41+07		OFFSET 29 ft RT		ALIGNMENT -Y1A-											
COLLAR ELEV. 151.7 ft		TOTAL DEPTH 109.7 ft		NORTHING 353,552		EASTING 2,000,773											
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 05/16/21		COMP. DATE 05/17/21		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
75																	
	73.5	78.2	17	24	28												
	70.0																
	68.5	83.2	18	26	27												
	65.0																
	63.5	88.2	17	26	26												
	60.0																
	58.5	93.2	9	12	20												
	55.0																
	53.5	98.2	10	14	19												
	50.0																
	48.5	103.2	18	19	30												
	45.0																
	43.5	108.2	13	16	27												
	42.0																

NCDOT BORE DOUBLE I5987A\_GEO BRDG\_BH\_TERRACON\_Y1A.GPJ NC\_DOT.GDT 9/17/21

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter									
SITE DESCRIPTION Bridge on -Y1A- (US-301) over -L- (I-95) at -L- Sta. 286+75							GROUND WTR (ft)								
BORING NO. Y1A_EB2-C		STATION 42+10		OFFSET 20 ft LT		ALIGNMENT -Y1A-									
COLLAR ELEV. 148.6 ft		TOTAL DEPTH 80.0 ft		NORTHING 353,617		EASTING 2,000,866									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/10/19		COMP. DATE 12/10/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
155															
150	148.6	0.0	1	2	4										
145	145.1	3.5	WOH		1	2									
140	140.1	8.5	3	2	1										
135	135.1	13.5	WOH												
130	130.1	18.5	2	3	7										
125	125.1	23.5	7	4	2										
120	120.1	28.5	3	5	7										
115	115.1	33.5	WOH		2	3									
110	110.1	38.5	3	3	5										
105	105.1	43.5	3	4	5										
100	100.1	48.5	17	20	55										
95	95.1	53.5	7	19	25										
90	90.1	58.5	9	15	22										
85	85.1	63.5	16	31	42										
80	80.1	68.5	22	26	24										
75	75.1	73.5													

NCDOT BORE DOUBLE I5987 GEO BORELOGS BRDG Y1A.GPJ NC\_DOT.GDT 9/17/21

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter									
SITE DESCRIPTION Bridge on -Y1A- (US-301) over -L- (I-95) at -L- Sta. 286+75							GROUND WTR (ft)								
BORING NO. Y1A_EB2-C		STATION 42+10		OFFSET 20 ft LT		ALIGNMENT -Y1A-									
COLLAR ELEV. 148.6 ft		TOTAL DEPTH 80.0 ft		NORTHING 353,617		EASTING 2,000,866									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/10/19		COMP. DATE 12/10/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
75			12	11	16										
70	70.1	78.5	11	13	21										

Match Line

DENSE TO VERY DENSE, GRAY, CLAYEY SILTY FINE TO COARSE SAND, SATURATED, TRACE LIGNITE (A-2-4)  
(continued)

Boring Terminated at Elevation 68.6 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION)

Notes:  
1. Surficial Organic Soil: 0.0-0.2'

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: BRIDGE ON -Y1A- (US 301) OVER -L- (I-95) BETWEEN SR 1675 AND SR 1935 AT STA. 286+75 -L-

Sample No.	Station	Alignment	Offset (feet)	Depth Interval	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained	% Passing (sieves)			% Moisture	% Organic
								Coarse	Fine Sand	Silt	Clay		#10	#40	#200		
SS-122	41+07	-Y1A-	29 RT	6.0-7.5'	A-2-4(0)	27	10	31.3	47.5	4.8	16.4	0	100	85	23	-	-

NP - NON-PLASTIC

*Stephanie H. Huffman*

Certified Lab Technician Signature  
Terracon

114-01-1203  
Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained	% Passing (sieves)			% Moisture	% Organic
								Coarse	Fine Sand	Silt	Clay		#10	#40	#200		
SS-65	40+38	-Y1A-	21 LT	8.5-10.0'	A-7-5(53)	81	32	2.6	8.6	17.4	71.4	0.0	100	99	92	75.8	-
SS-66	40+38	-Y1A-	21 LT	13.5-15.0'	A-2-4(0)	NP	NP	59.2	24.3	7.5	9.0	0.0	98	69	17	-	-
SS-1518	42+10	-Y1A-	20 LT	3.5-5.0'	A-6(6)	40	17	24.0	29.9	8.1	38.0	0.0	100	87	48	21.0	-
SS-1520	42+10	-Y1A-	20 LT	13.5-15.0'	A-7-6(20)	54	24	11.6	22.2	14.6	51.6	0.0	100	95	69	19.8	-

NP - NON-PLASTIC

D. COUNCIL - F&R  
Certified Lab Technician Signature

101-02-0603  
Certification Number

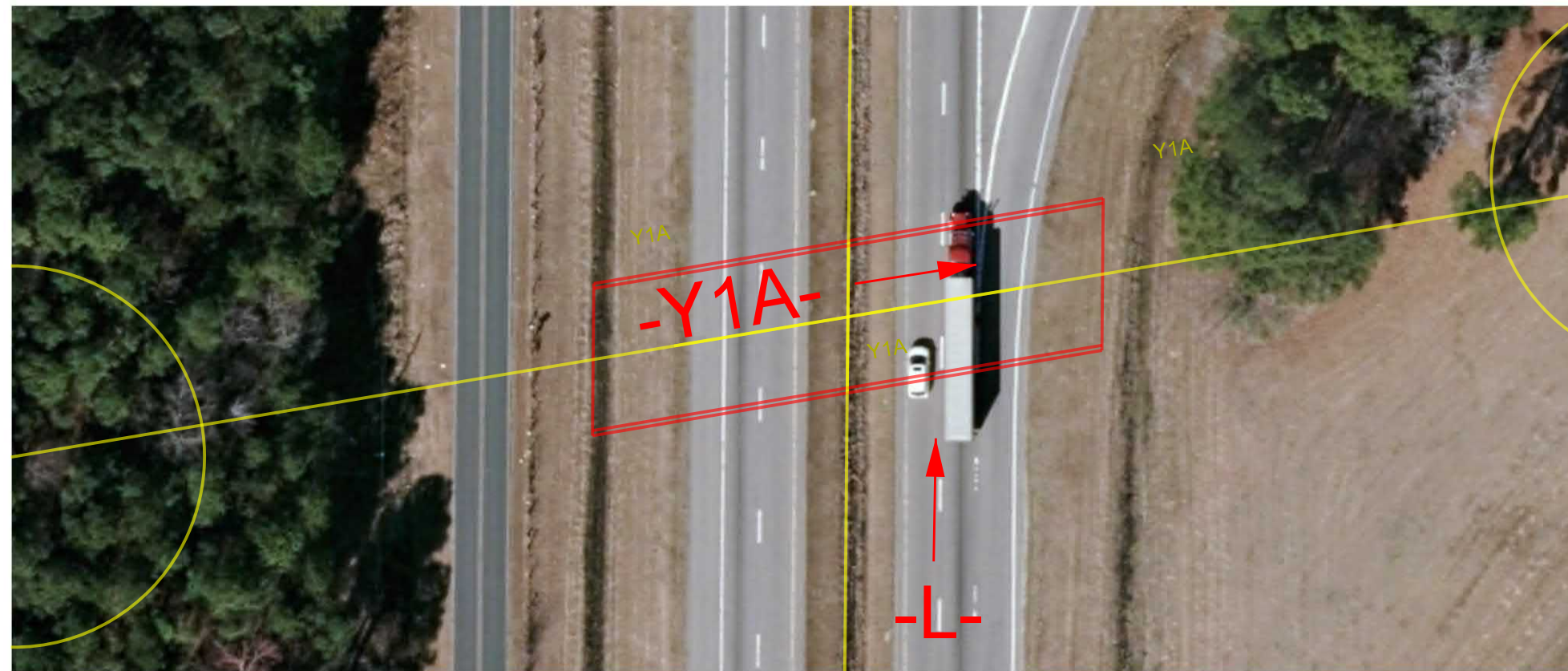


# SITE PHOTOGRAPHS

SITE 2 - BRIDGE ON -Y1A- OVER -L- AT STA. 286+75



LOOKING NORTH ALONG -L- AT PROPOSED BRIDGE LOCATION



LOOKING NORTH ALONG -L-  
AERIAL WITH PROPOSED BRIDGE LOCATION SHOWN



REFERENCE: I-5987A

PROJECT: 47533

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
 PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM  
SOUTH OF US 301 (EXIT 22) TO NORTH OF  
SR 1758 (McDUFFIE CROSSING ROAD)  
 SITE DESCRIPTION SITE 1 - BRIDGE ON -Y2-  
(SR 1529 - POWERSVILLE ROAD) OVER I-95 (-L-)  
AT STA. 210 + 00

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-9	BORE LOGS
10	SOIL TEST RESULTS
11	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	11

**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

<u>DEGON, A. N.</u>	<u>PAINTER, B. (F&amp;R, Inc.)</u>
<u>TURNAGE, J. R.</u>	<u>PESL, W. (F&amp;R Inc.)</u>
<u>KELLY, N. S.</u>	<u>TIGNOR, D. (F&amp;R Inc.)</u>
	<u>CLARKE, R. (F&amp;R Inc.)</u>

INVESTIGATED BY TERRACON CONSULTANTS  
F&R Inc.

DRAWN BY FIELDS, W. D.

CHECKED BY RIGGS, Jr., A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE SEPTEMBER 2021

Prepared in the Office of:  
  
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 NC REGISTERED ENGINEERING FIRM: F-0869  
 NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:  
Matt Alexander 10/29/2021  
 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL  
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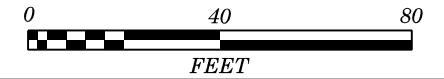
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

# SUBSURFACE INVESTIGATION

## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																												
<p>SOIL IS CONSIDERED 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>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:</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.  <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  <b>ARGILLACEOUS</b> - 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.  <b>ARTESIAN</b> - 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.  <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.  <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.  <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.  <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.  <b>SILL</b> - 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.  <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.  <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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.  <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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.  <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																												
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING										GROUND WATER																																																												
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# SITE PLAN



SKREW ANGLE 95°

KAF

KAREN PAUL OBER SHEA

I5987A-5=  
BY8  
STA. 21+44.83  
84.46' RT -L-  
N-346053  
E-2000619

BEGIN BRIDGE  
-Y2- STA. 28+80.29

END BRIDGE  
-Y2- STA. 30+71.29

Y2\_EB1-A  
28+53 -Y2-  
34' LT

Y2\_B1-C  
29+81 -Y2-  
CL

Y2\_EB2-A  
31+07 -Y2-  
33' LT

Y2\_EB1-B  
28+91 -Y2-  
19' RT

Y2\_EB2-B  
30+59 -Y2-  
14' RT

BST BRIDGE DECK

← TO US 301

EXISTING R/W  
TO SR 1005 →

GRASS

GRASS

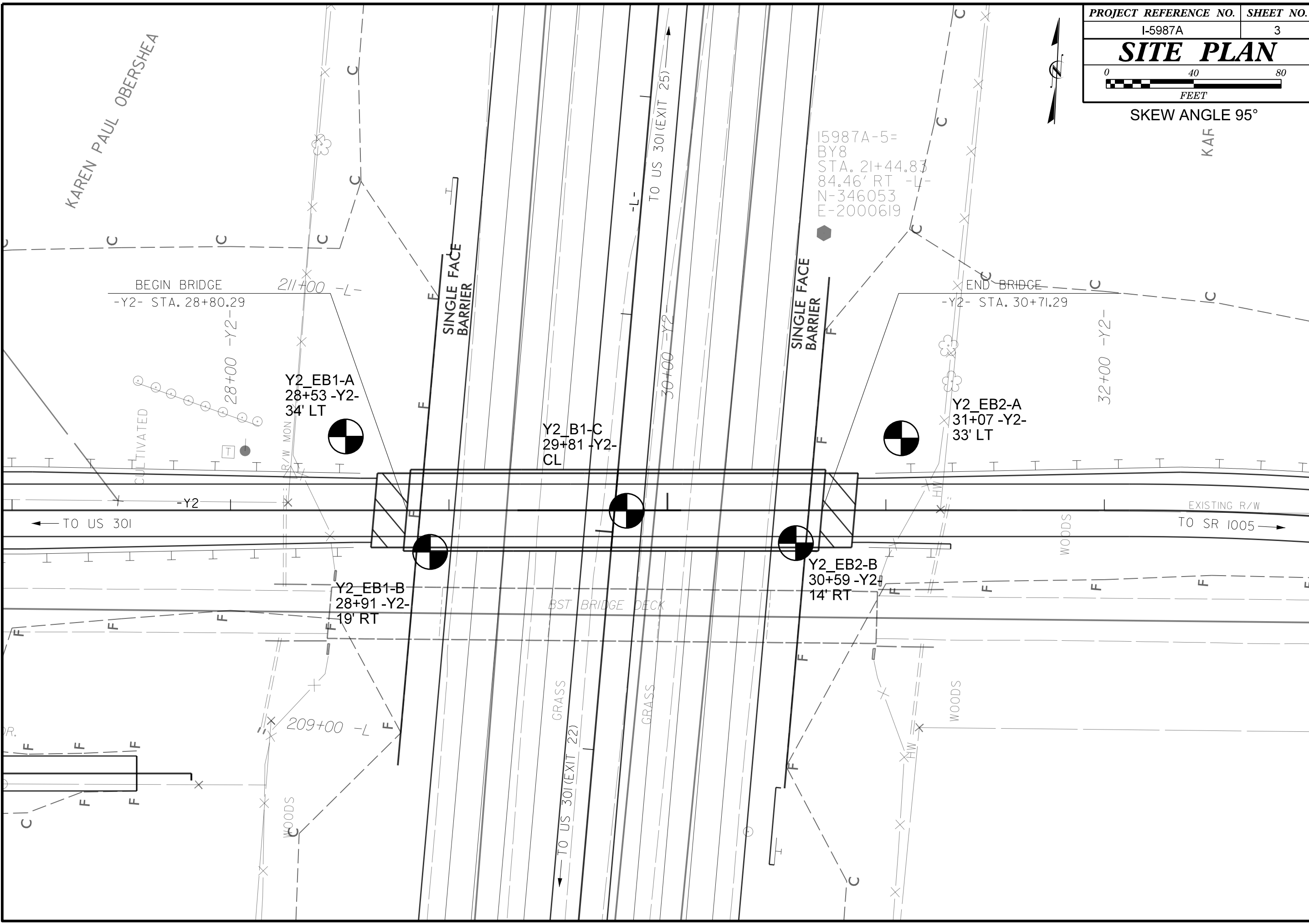
WOODS

WOODS

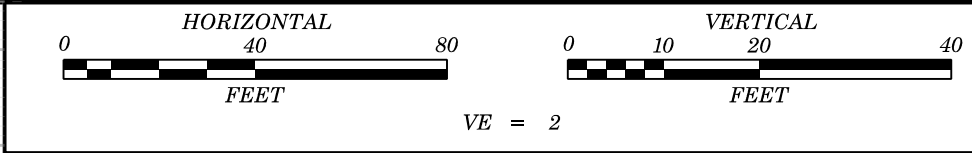
WOODS

← TO US 301 (EXIT 22)

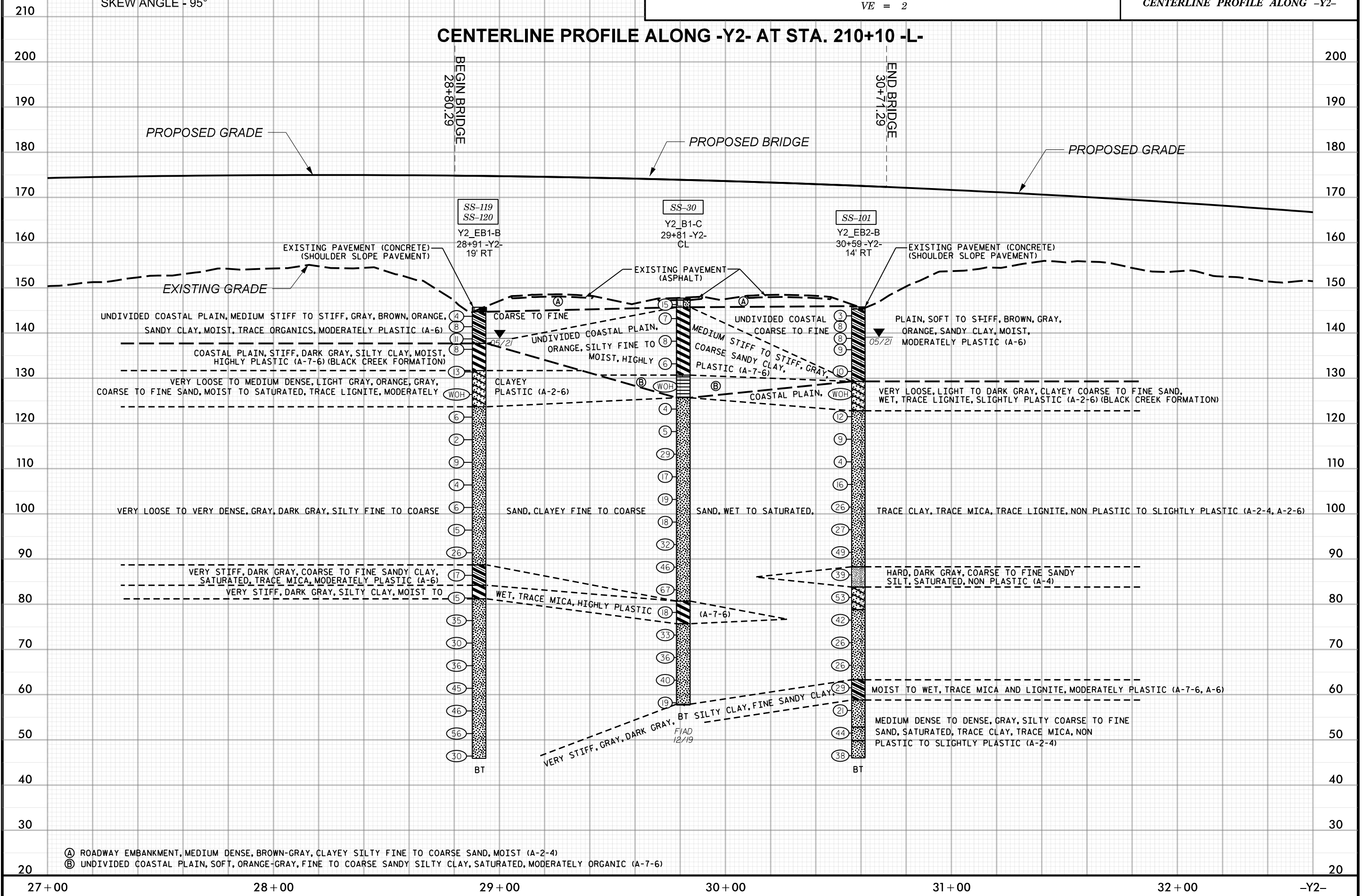
TO US 301 (EXIT 25)



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -L- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987\_ls\_tin1.tin).  
 SKEW ANGLE - 95°



PROJECT REFERENCE NO. I-5987A SHEET NO. 4  
 CENTERLINE PROFILE ALONG -Y2-



(A) ROADWAY EMBANKMENT, MEDIUM DENSE, BROWN-GRAY, CLAYEY SILTY FINE TO COARSE SAND, MOIST (A-2-4)  
 (B) UNDIVIDED COASTAL PLAIN, SOFT, ORANGE-GRAY, FINE TO COARSE SANDY SILTY CLAY, SATURATED, MODERATELY ORGANIC (A-7-6)

# GEOTECHNICAL BORING REPORT

## BORE LOG

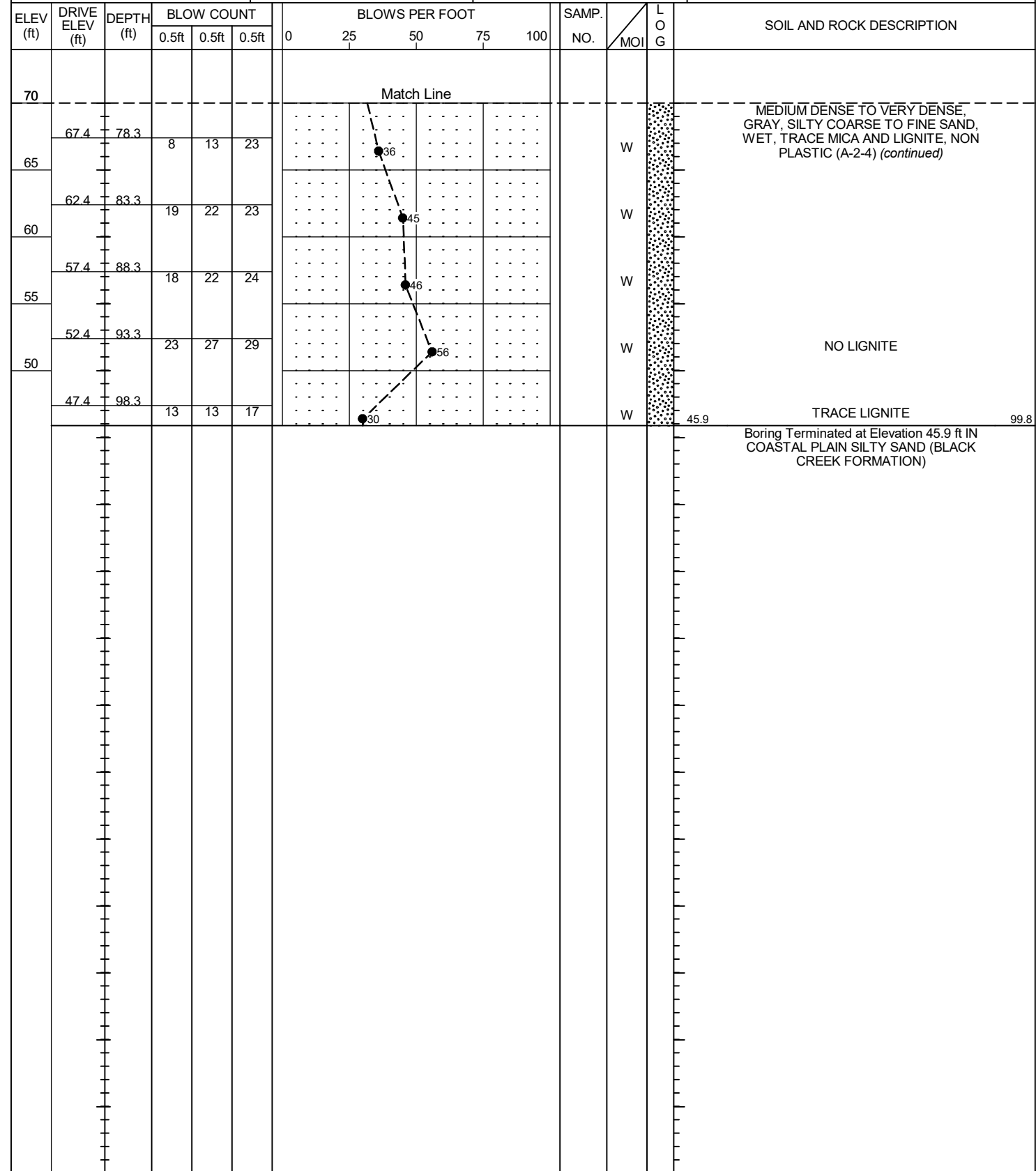
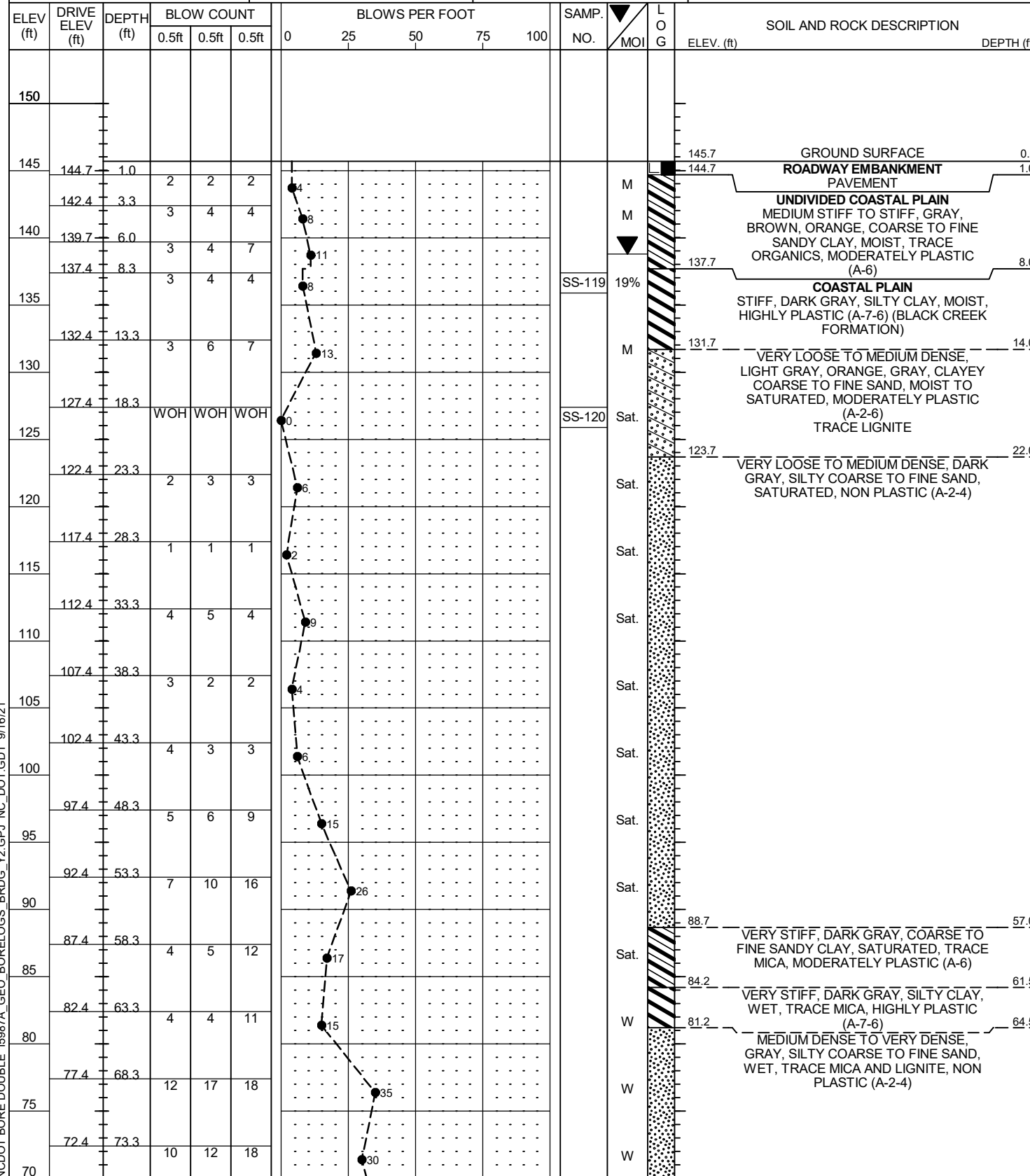
WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST Q. Esteban									
SITE DESCRIPTION Bridge on -Y2- (SR 1529-Powerville Road) over -L- (I-95) at -L- Sta. 210+00							GROUND WTR (ft)								
BORING NO. Y2_EB1-A		STATION 28+53		OFFSET 34 ft LT		ALIGNMENT -Y2-									
COLLAR ELEV. 144.9 ft		TOTAL DEPTH 95.0 ft		NORTHING 345,950		EASTING 2,000,405									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D. Tignor		START DATE 12/04/19		COMP. DATE 12/04/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
145	144.9	0.0	2	3	3								M	GROUND SURFACE	0.0
140	141.4	3.5	2	2	2								M	UNDIVIDED COASTAL PLAIN SOFT TO MEDIUM STIFF, BROWN-GRAY, FINE TO COARSE SANDY CLAY, MOIST, TRACE ORGANICS (A-6)	
135	136.4	8.5	2	2	4								M	MEDIUM STIFF, GRAY, SILTY CLAY, MOIST (A-7-6)	7.0
130	131.4	13.5	2	3	4								M	LOOSE, ORANGE-BROWN, CLAYEY FINE TO COARSE SAND, MOIST (A-2-6)	13.8
125	126.4	18.5	WOH	WOH	WOH								SS-24	COASTAL PLAIN VERY LOOSE TO MEDIUM DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, SATURATED, TRACE CLAY (A-2-4) (BLACK CREEK FORMATION)	17.0
120	121.4	23.5	3	4	6								Sat.		
115	116.4	28.5	1	3	2								Sat.		
110	111.4	33.5	2	2	2								Sat.		
105	106.4	38.5	2	3	4								Sat.		
100	101.4	43.5	1	1	2								Sat.		
95	96.4	48.5	3	4	4								Sat.		
90	91.4	53.5	11	19	14								Sat.	DENSE, GRAY, SILTY FINE TO COARSE SAND, SATURATED (A-2-4)	52.0
85	86.4	58.5	8	12	20								Sat.		
80	81.4	63.5	3	9	14								M	VERY STIFF, DARK GRAY, SILTY CLAY, MOIST (A-7-6)	62.0
75	76.4	68.5	9	15	15								Sat.	MEDIUM DENSE TO DENSE, GRAY, CLAYEY SILTY FINE TO COARSE SAND, SATURATED, TRACE MICA (A-2-4)	64.7
70	71.4	73.5	10	13	15								Sat.		
65	66.4	78.5	10	21	27								Sat.		

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST Q. Esteban									
SITE DESCRIPTION Bridge on -Y2- (SR 1529-Powerville Road) over -L- (I-95) at -L- Sta. 210+00							GROUND WTR (ft)								
BORING NO. Y2_EB1-A		STATION 28+53		OFFSET 34 ft LT		ALIGNMENT -Y2-									
COLLAR ELEV. 144.9 ft		TOTAL DEPTH 95.0 ft		NORTHING 345,950		EASTING 2,000,405									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D. Tignor		START DATE 12/04/19		COMP. DATE 12/04/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
65															
60	61.4	83.5	15	20	19								Sat.	MEDIUM DENSE TO DENSE, GRAY, CLAYEY SILTY FINE TO COARSE SAND, SATURATED, TRACE MICA (A-2-4) (continued)	
55	56.4	88.5	15	18	19								Sat.		
50	51.4	93.5	9	14	17								Sat.		
Match Line															
Boring Terminated at Elevation 49.9 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION)															
Notes: 1. Surficial Organic Soil: 0.0-0.3'															

NCDOT BORE DOUBLE I5987 GEO BORELOGS BRDG\_Y2(F&R)GPJ NC DOT.GDT 9/16/21

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> BRIDGE ON -Y2- (SR 1529-POWERSVILLE ROAD) OVER -L- (I-95) AT -L- STA. 210+00			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_EB1-B	<b>STATION</b> 28+91	<b>OFFSET</b> 19 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.7 ft	<b>TOTAL DEPTH</b> 99.8 ft	<b>NORTHING</b> 345,899	<b>EASTING</b> 2,000,446
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/13/21	<b>COMP. DATE</b> 05/14/21	<b>SURFACE WATER DEPTH</b> N/A

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> BRIDGE ON -Y2- (SR 1529-POWERSVILLE ROAD) OVER -L- (I-95) AT -L- STA. 210+00			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_EB1-B	<b>STATION</b> 28+91	<b>OFFSET</b> 19 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.7 ft	<b>TOTAL DEPTH</b> 99.8 ft	<b>NORTHING</b> 345,899	<b>EASTING</b> 2,000,446
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/13/21	<b>COMP. DATE</b> 05/14/21	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE DOUBLE I5987A\_GEO\_BORELOGS\_BRDG\_Y2\_GPJ\_NC\_DOT.GDT 9/16/21

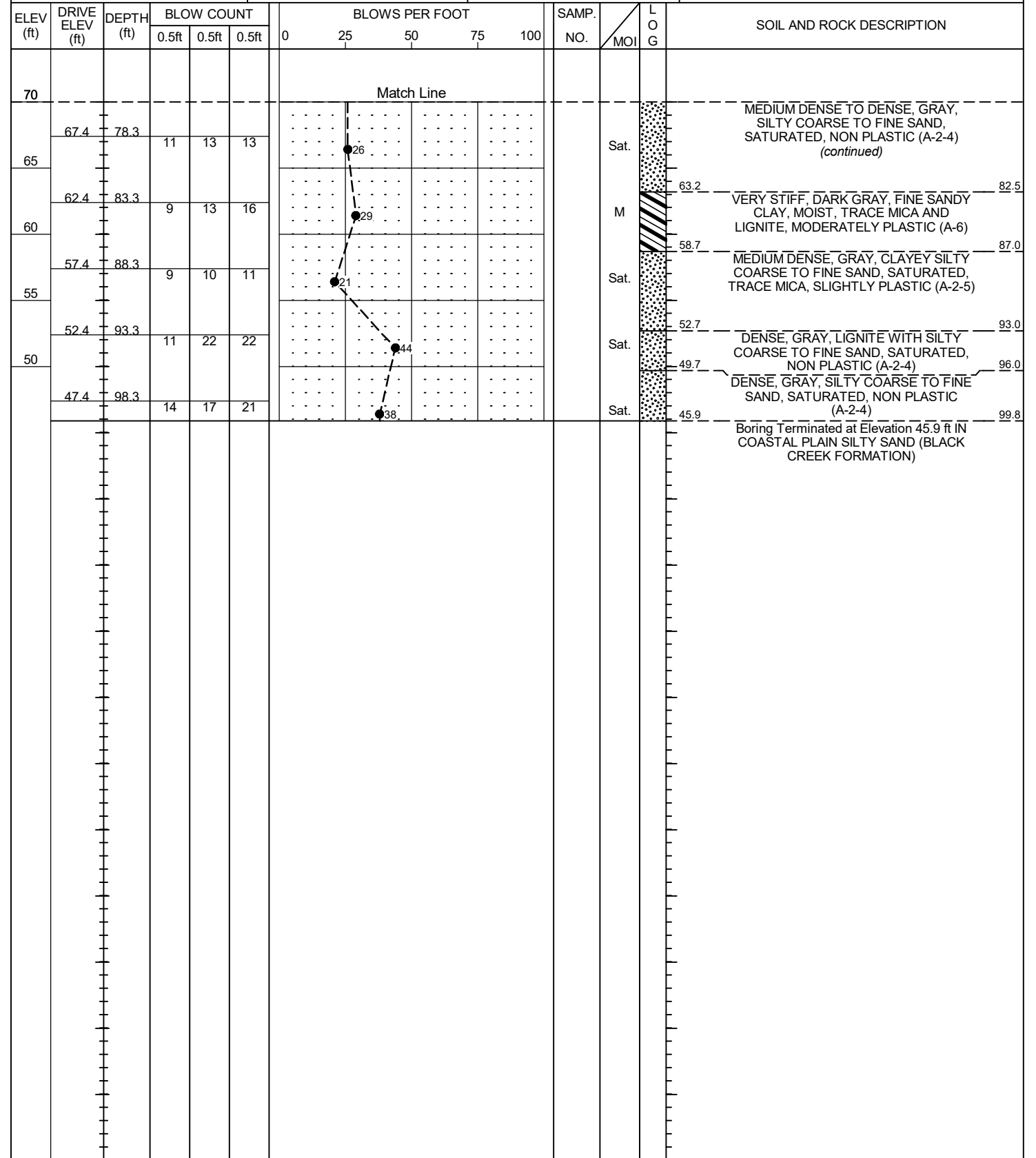
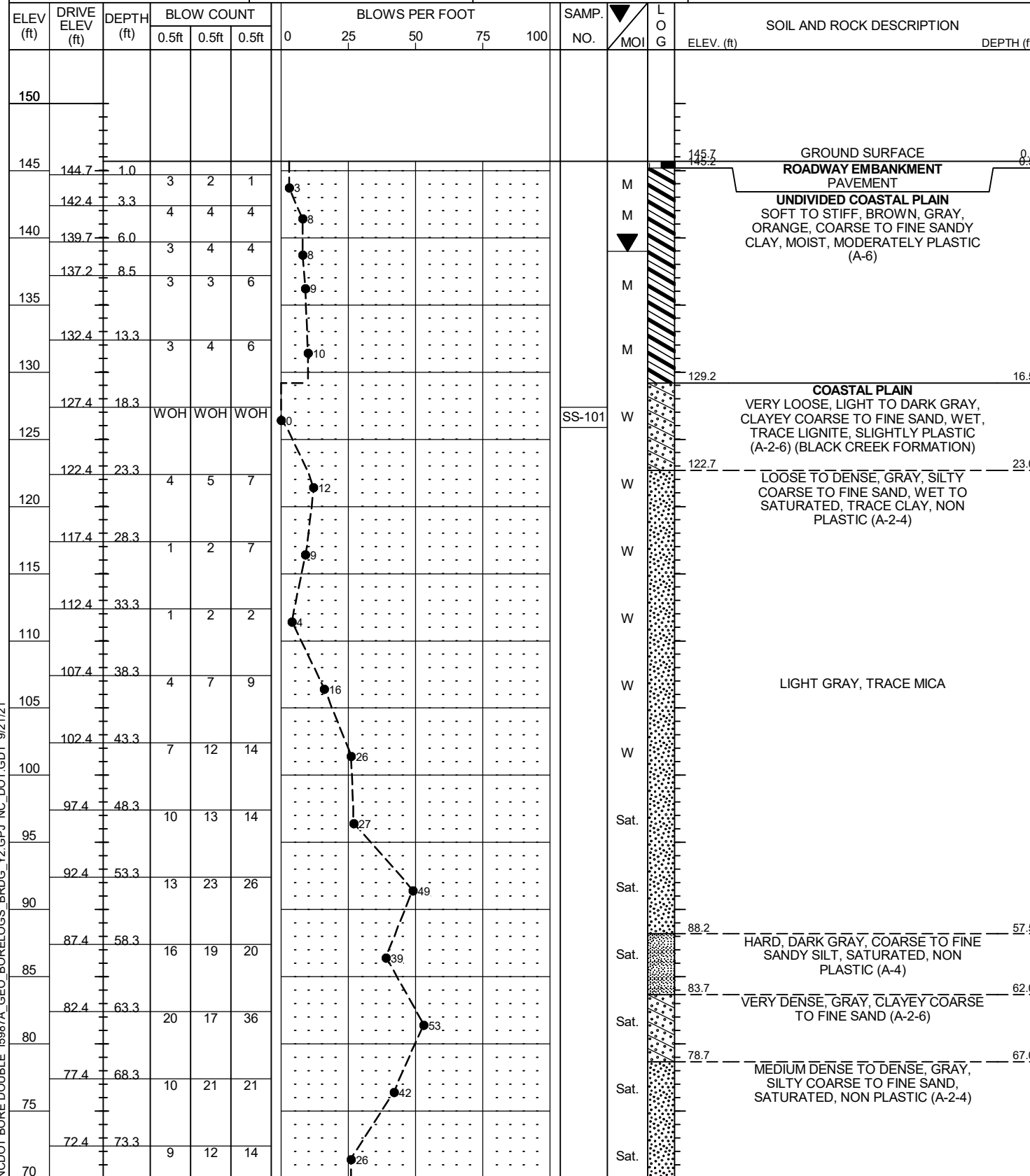






<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> BRIDGE ON -Y2- (SR 1529-POWERSVILLE ROAD) OVER -L- (I-95) AT -L- STA. 210+00			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_EB2-B	<b>STATION</b> 30+59	<b>OFFSET</b> 14 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.7 ft	<b>TOTAL DEPTH</b> 99.8 ft	<b>NORTHING</b> 345,912	<b>EASTING</b> 2,000,613
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/04/21	<b>COMP. DATE</b> 05/04/21	<b>SURFACE WATER DEPTH</b> N/A

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> BRIDGE ON -Y2- (SR 1529-POWERSVILLE ROAD) OVER -L- (I-95) AT -L- STA. 210+00			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_EB2-B	<b>STATION</b> 30+59	<b>OFFSET</b> 14 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.7 ft	<b>TOTAL DEPTH</b> 99.8 ft	<b>NORTHING</b> 345,912	<b>EASTING</b> 2,000,613
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/04/21	<b>COMP. DATE</b> 05/04/21	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE DOUBLE I5987A\_GEO BORELOGS BRDG\_Y2.GPJ NC\_DOT.GDT 9/21/21

**LABORATORY TESTING SUMMARY**

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: BRIDGE ON -Y2- (SR 1529 - POWERSVILLE ROAD) OVER -L- STA. 210+00

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-119	28+91	-Y2-	19 RT	8.3-9.8	A-7-6(13)	45	32	11.9	36.5	15.8	35.8	0	100	97	55	19.2	--
SS-120	28+91	-Y2-	19 RT	18.3-19.8	A-2-6(0)	32	16	8.4	64.5	6.0	21.1	0	100	98	29	--	--
SS-101	30+59	-Y2-	14 RT	18.3-19.8	A-2-6(0)	31	11	10.2	64.9	6.1	18.8	0	100	95	27	--	--

NP - NON-PLASTIC

*Stephanie H. Huffman*

Certified Lab Technician Signature  
Terracon

114-01-1203  
Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-24	28+53	-Y2-	34 LT	18.5-20.0	A-2-4(0)	NP	NP	16.3	62.7	8.5	12.5	0	100	95	23	--	--
SS-501	31+07	-Y2-	33 LT	3.5-5.0	A-7-6(14)	50	30	20.0	27.4	10.7	41.9	0	100	91	56	18.3	--
ST-100	31+03	-Y2-	33 LT	12.0-14.0	A-6 (11)	36	16	4.6	25.0	38.5	31.9	0	100	99	76	40.2	--
SS-502	31+07	-Y2-	33 LT	14.0-15.0	A-7-5(17)	54	21	9.4	21.4	36.8	32.4	0	100	96	74	40.0	13.9
SS-30	29+81	-Y2-	CL	3.5-5.0	A-7-6(14)	49	28	19.4	23.8	16.1	40.7	0	100	90	60	24.9	--

NP - NON-PLASTIC

D. COUNCIL - F&R  
Certified Lab Technician Signature

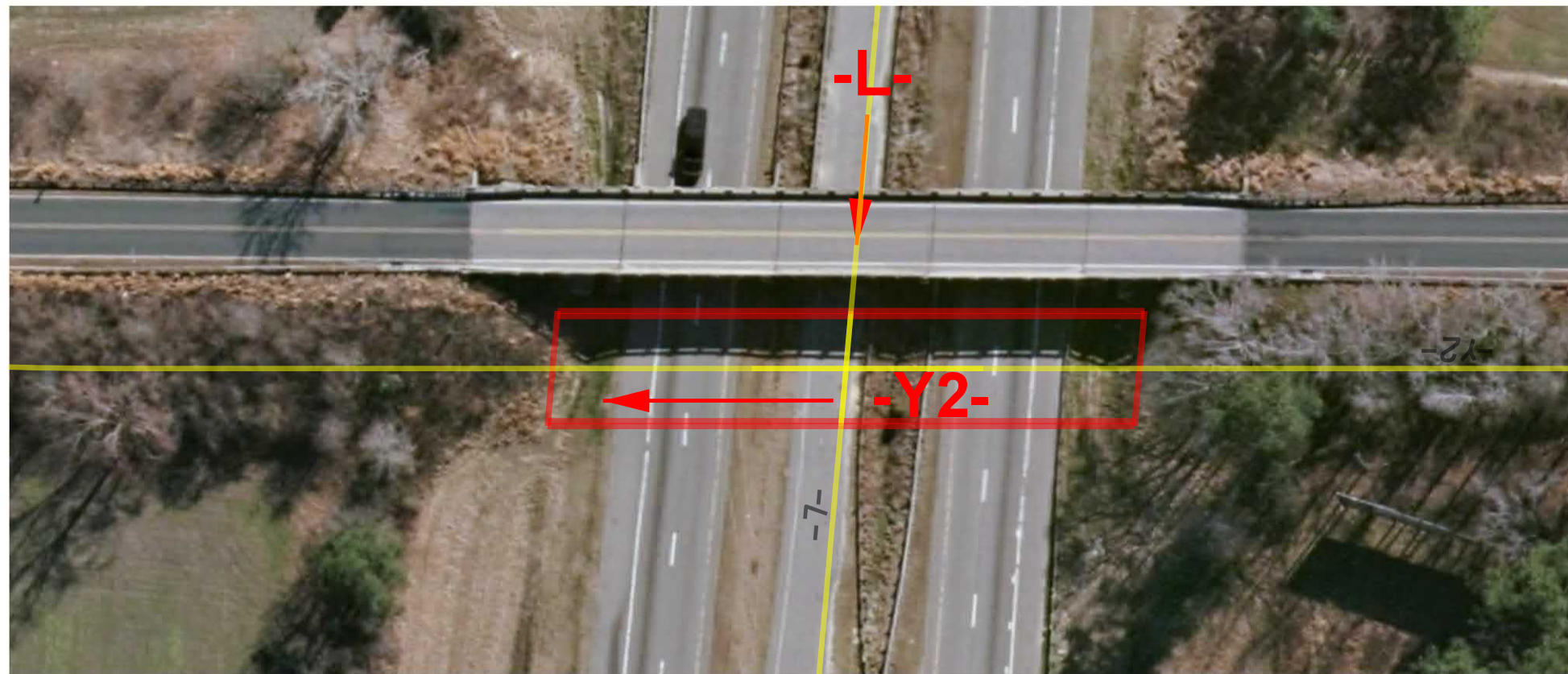
101-02-0603  
Certification Number

# SITE PHOTOGRAPHS

SITE 1 - BRIDGE ON -Y2- (SR 1529 - POWERSVILLE ROAD)  
OVER -L- (I-95) AT STA. 210+00



NORTH OF BRIDGE ON -L- LOOKING SOUTH  
FROM EB2 (LEFT) TOWARD EB1 (RIGHT)



LOOKING SOUTH ON -L- AT BRIDGE  
(EB2 ON LEFT EB1 ON RIGHT)



REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM  
SOUTH OF US 301 (EXIT 22) TO NORTH OF  
SR 1758 (McDUFFIE CROSSING ROAD)  
SITE DESCRIPTION SITE 3 - BRIDGE ON SR 1758  
(McDUFFIE CROSSING ROAD) OVER I-95  
BETWEEN SR 1763 AND US 301

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-9	BORE LOGS
10	SOIL TEST RESULTS
11	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	11

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

<u>PAINTER, B. (F&amp;R Inc.)</u>	<u>DEGON, A. N.</u>
<u>PESL, W. (F&amp;R Inc.)</u>	<u>TURNAGE, J. R.</u>
<u>TIGNOR, D. (F&amp;R Inc.)</u>	<u>KELLY, N. S.</u>
<u>CLARKE, R. (F&amp;R Inc.)</u>	<u>SMITH, R. (NCDOT)</u>

INVESTIGATED BY TERRACON CONSULTANTS  
F&R Inc.

DRAWN BY FIELDS, W. D.

CHECKED BY RIGGS, Jr., A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE SEPTEMBER 2021

Prepared in the Office of:



DocuSigned by:  
Matthew J. Alexander 10/29/2021

0FB0038EEA06152 SIGNATURE DATE

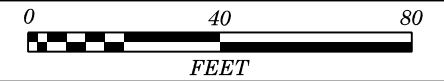
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



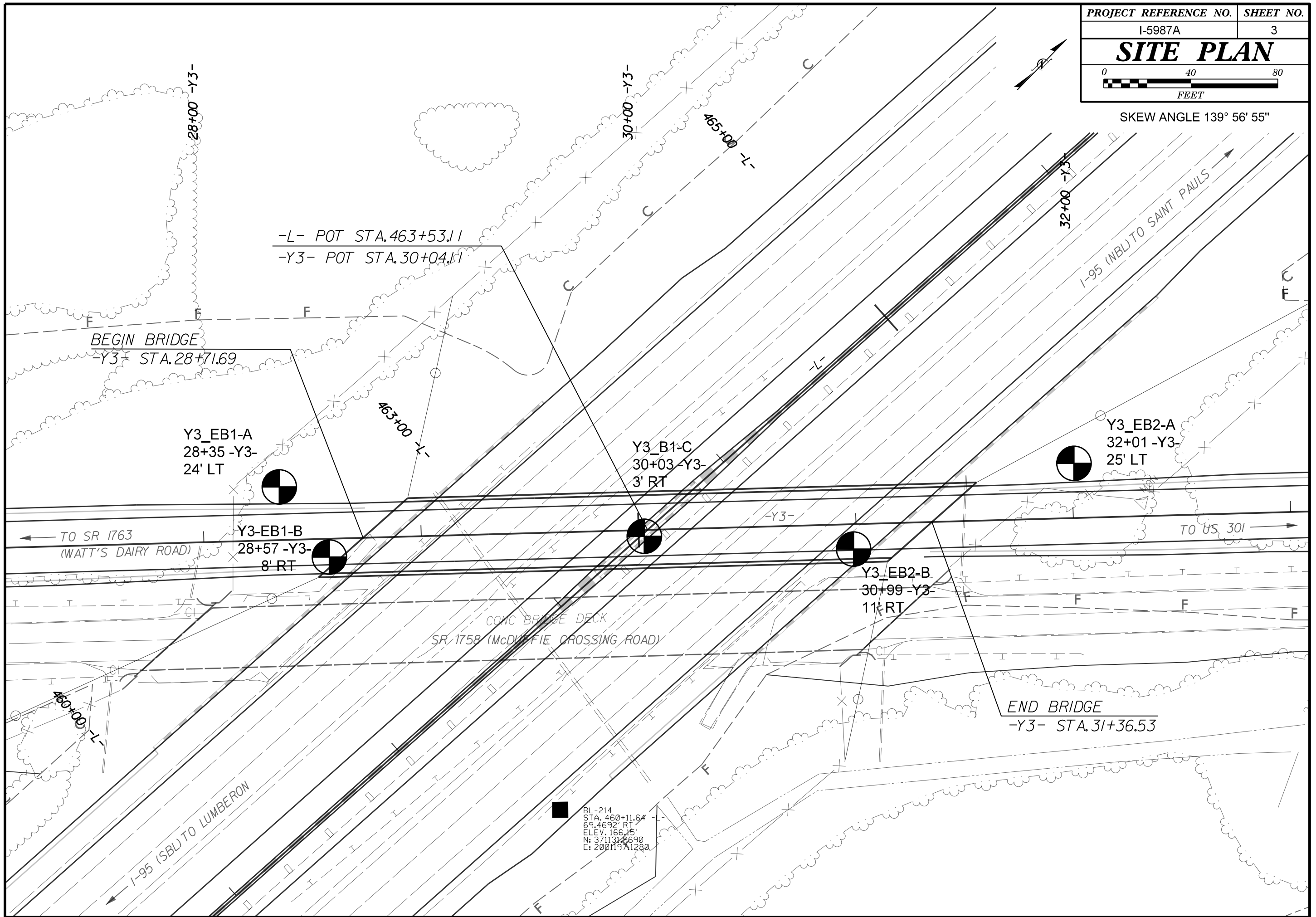
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, and INDURATION.

# SITE PLAN



SKEW ANGLE 139° 56' 55"



-L- POT STA. 463+53.11  
 -Y3- POT STA. 30+04.11

BEGIN BRIDGE  
 -Y3- STA. 28+71.69

Y3\_EB1-A  
 28+35 -Y3-  
 24' LT

Y3\_B1-C  
 30+03 -Y3-  
 3' RT

Y3\_EB2-A  
 32+01 -Y3-  
 25' LT

Y3\_EB1-B  
 28+57 -Y3-  
 8' RT

Y3\_EB2-B  
 30+99 -Y3-  
 11' RT

TO SR 1763  
 (WATT'S DAIRY ROAD)

TO US 301

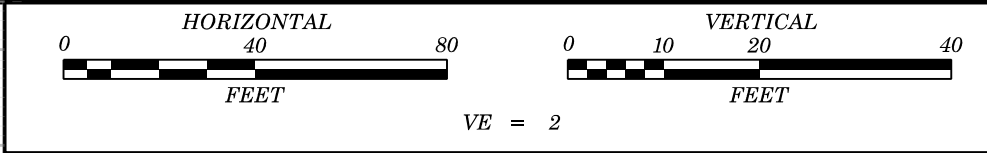
CONC BRIDGE DECK  
 SR 1758 (McDUFFIE CROSSING ROAD)

END BRIDGE  
 -Y3- STA. 31+36.53

BL-214  
 STA. 460+11.64  
 69.4692' RT  
 ELEV. 166.15'  
 N: 371131.2690  
 E: 200119.1280

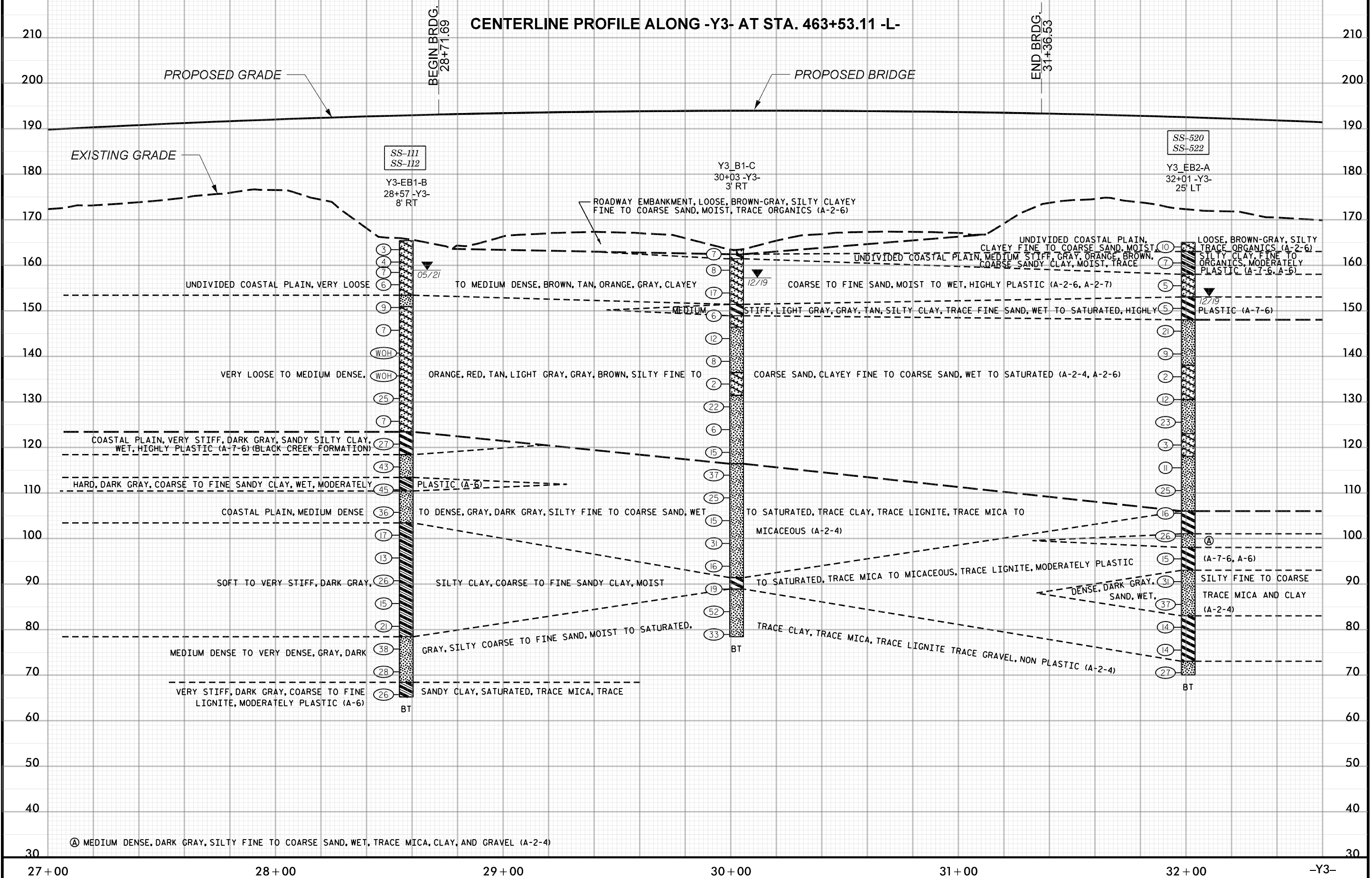
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -Y3- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987\_ls\_tin1.tin).

SKREW ANGLE 139° 56' 55"



PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4

CENTERLINE PROFILE ALONG -Y3-



27+00      28+00      29+00      30+00      31+00      32+00      -Y3-

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST M. Arnold										
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95							GROUND WTR (ft)									
BORING NO. Y3_EB1-A		STATION 28+35		OFFSET 24 ft LT		ALIGNMENT -Y3-										
COLLAR ELEV. 166.4 ft		TOTAL DEPTH 100.0 ft		NORTHING 371,148		EASTING 2,001,001										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/02/19		COMP. DATE 12/03/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
175																
170																
166.4	166.4	0.0	2	6	7										166.4	GROUND SURFACE
165	162.9	3.5	3	1	2										164.4	UNDIVIDED COASTAL PLAIN MEDIUM DENSE, BROWN, CLAYEY SILTY FINE TO COARSE SAND, MOIST, TRACE ORGANICS (A-2-4)
160	157.9	8.5	3	4	4										159.4	SOFT, GRAY-BROWN, SILTY FINE TO COARSE SANDY CLAY, MOIST, MODERATELY PLASTIC (A-6)
155	152.9	13.5	2	2	1										154.4	LOOSE, ORANGE-GRAY, CLAYEY FINE TO COARSE SAND, WET (A-2-6)
150	147.9	18.5	4	6	5										149.4	SOFT, GRAY-ORANGE, SILTY FINE TO COARSE SANDY CLAY, WET, MODERATELY PLASTIC (A-7-6)
145	142.9	23.5	WOH	WOH	1										147.4	STIFF, ORANGE-GRAY, SILTY FINE TO COARSE SANDY CLAY, WET (A-6)
140	137.9	28.5	3	2	2										144.4	MEDIUM DENSE, ORANGE-GRAY, SILTY FINE TO COARSE SAND, WET (A-2-4)
135	132.9	33.5	WOH	1	9										144.4	VERY LOOSE, RED-BROWN-GRAY, CLAYEY FINE TO COARSE SAND, SATURATED (A-2-6)
130	127.9	38.5	9	11	5										139.4	LOOSE, ORANGE-GRAY, SILTY FINE TO COARSE SAND, TRACE MICA (A-2-4)
125	122.9	43.5	2	4	7										137.0	LOOSE, RED-GRAY-BROWN, CLAYEY FINE TO COARSE SAND, SATURATED (A-2-6)
120	117.9	48.5	4	4	5										131.8	LOOSE TO MEDIUM DENSE, GRAY-RED-ORANGE, SILTY FINE SAND, SATURATED, TRACE MICA (A-2-4)
115	112.9	53.5	19	16	12										124.4	COASTAL PLAIN MEDIUM DENSE, GRAY, CLAYEY FINE TO COARSE SAND, SATURATED, TRACE LIGNITE (A-2-4) (BLACK CREEK FORMATION)
110	107.9	58.5	8	12	15										121.9	STIFF, DARK GRAY, FINE SANDY SILTY CLAY, MOIST (A-7-6)
105	102.9	63.5	13	11	16										114.4	MEDIUM DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, SATURATED, TRACE CLAY AND MICA (A-2-4)
100	97.9	68.5	4	5	11										102.0	VERY STIFF, DARK GRAY, FINE SANDY SILTY CLAY, WET, TRACE MICA (A-7-6)
95																

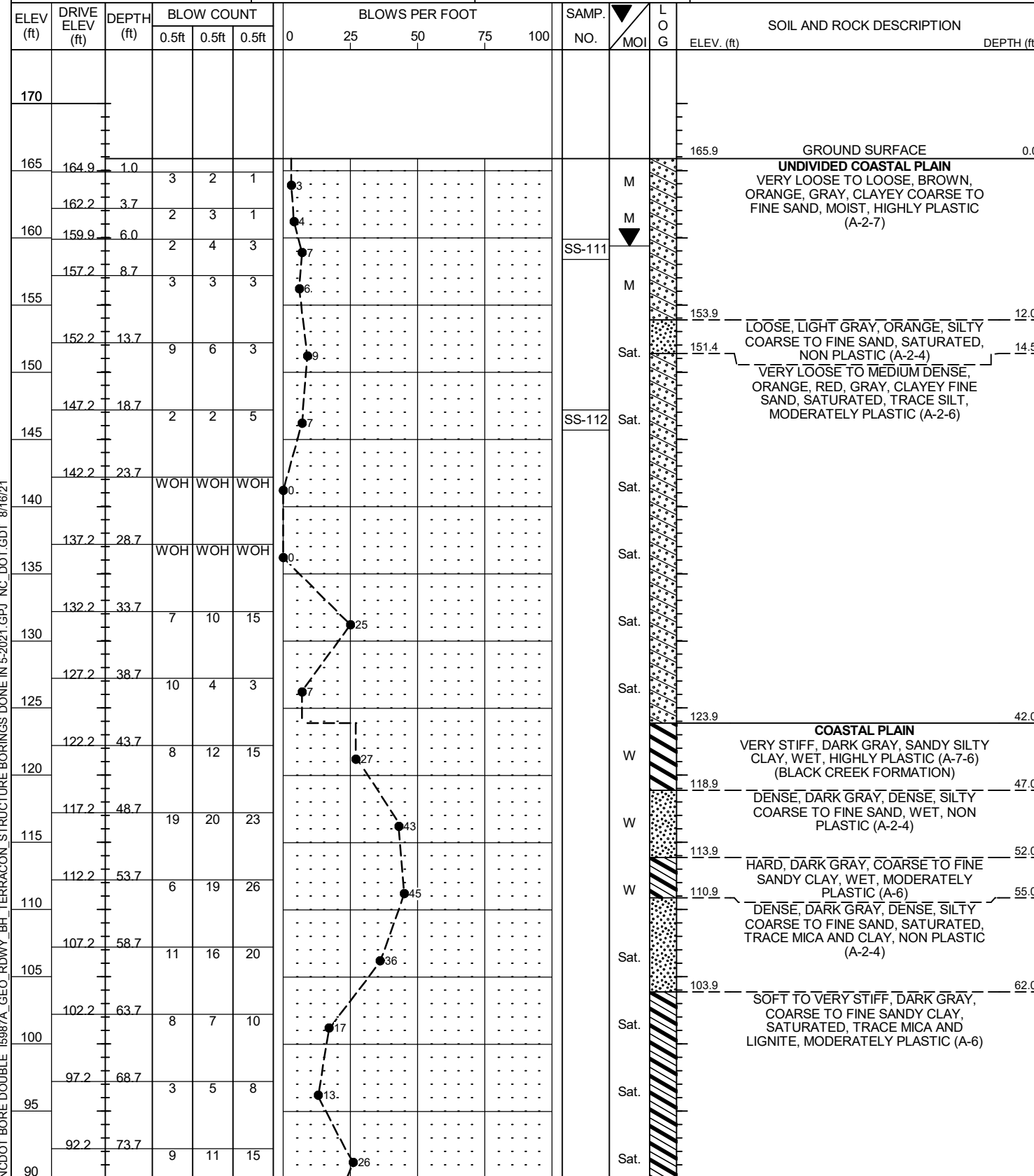
WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST M. Arnold										
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95							GROUND WTR (ft)									
BORING NO. Y3_EB1-A		STATION 28+35		OFFSET 24 ft LT		ALIGNMENT -Y3-										
COLLAR ELEV. 166.4 ft		TOTAL DEPTH 100.0 ft		NORTHING 371,148		EASTING 2,001,001										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 12/02/19		COMP. DATE 12/03/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
95																
90	92.9	73.5	6	8	11										89.4	Match Line
85	87.9	78.5	11	12	20										84.4	VERY STIFF, DARK GRAY, FINE SANDY SILTY CLAY, WET, TRACE MICA (A-7-6) (continued)
80	82.9	83.5	5	8	19										82.2	DENSE, GRAY, SILTY FINE TO COARSE SAND, SATURATED, TRACE MICA (A-2-4)
75	77.9	88.5	5	6	8										79.4	VERY STIFF, DARK GRAY, FINE SANDY SILTY CLAY, WET, TRACE MICA (A-7-6)
70	72.9	93.5	17	17	16										74.4	MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA (A-2-4)
	67.9	98.5	10	17	12										67.3	STIFF, DARK GRAY, SILTY CLAY, WET (A-7-6)
															66.9	DENSE, GRAY, SILTY FINE TO COARSE SAND, SATURATED, TRACE MICA (A-2-4)
															66.4	LIGNITE
															66.4	VERY STIFF, DARK GRAY, SILTY CLAY, MOIST (A-7-6)

NCDOT BORE DOUBLE I5987 GEO BORELOGS BRDG Y3.GPJ NC\_DOT.GDT 8/16/21

Notes:  
 1. Surficial Organic Soil: 0.0-0.1'  
 2. NM=Not Measured due to mud rotary techniques

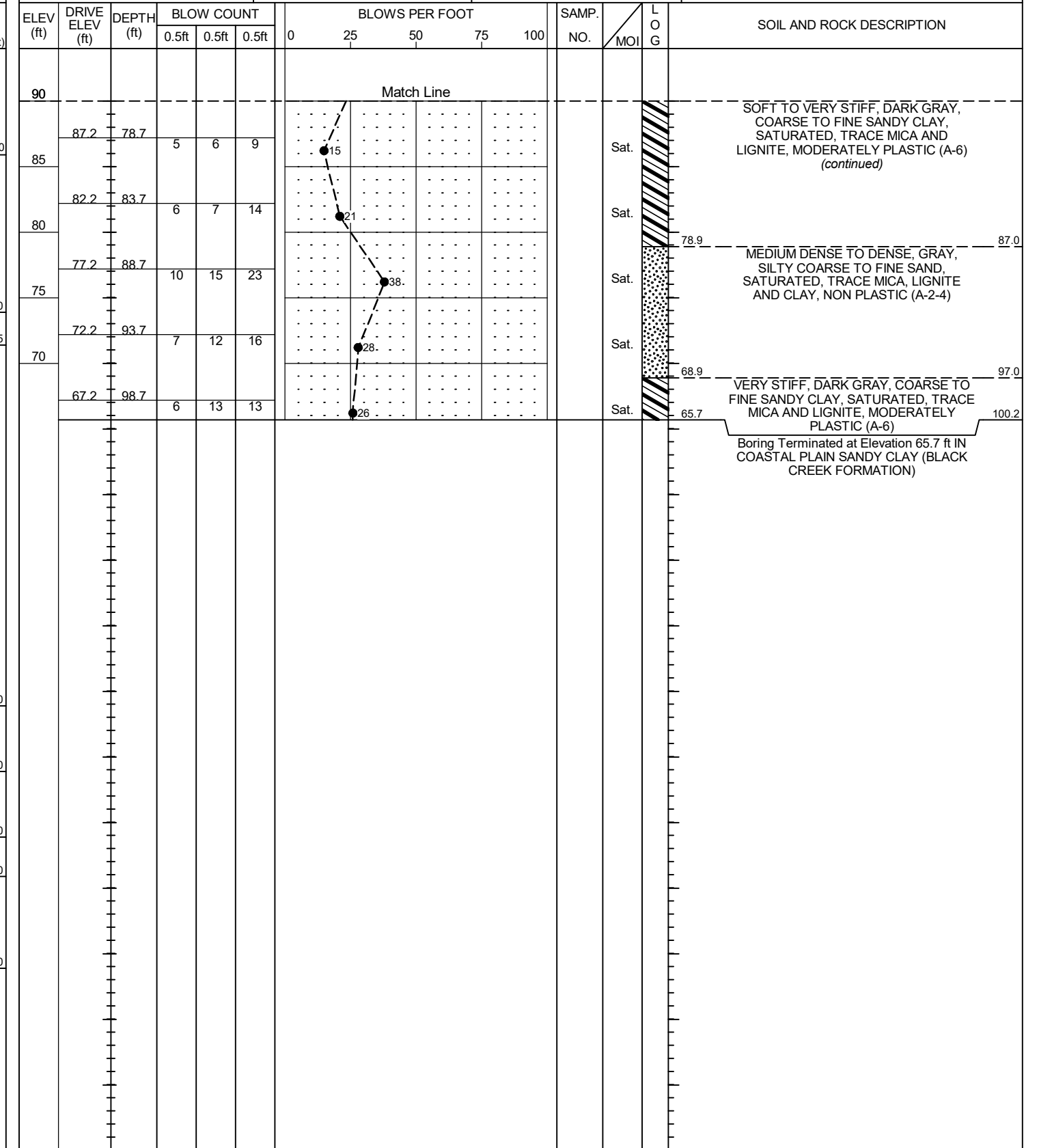
**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95			GROUND WTR (ft)
BORING NO. Y3-EB1-B	STATION 28+57	OFFSET 8 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 165.9 ft	TOTAL DEPTH 100.2 ft	NORTHING 371,141	EASTING 2,001,040
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/11/21	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE I5987A\_GEO\_RDWY\_BH\_TERRACON\_STRUCTURE BORINGS DONE IN 5-2021.GPJ NC\_DOT\_GDT 8/16/21

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95			GROUND WTR (ft)
BORING NO. Y3-EB1-B	STATION 28+57	OFFSET 8 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 165.9 ft	TOTAL DEPTH 100.2 ft	NORTHING 371,141	EASTING 2,001,040
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/11/21	SURFACE WATER DEPTH N/A



SOFT TO VERY STIFF, DARK GRAY, COARSE TO FINE SANDY CLAY, SATURATED, TRACE MICA AND LIGNITE, MODERATELY PLASTIC (A-6)  
(continued)

MEDIUM DENSE TO DENSE, GRAY, SILTY COARSE TO FINE SAND, SATURATED, TRACE MICA, LIGNITE AND CLAY, NON PLASTIC (A-2-4)

VERY STIFF, DARK GRAY, COARSE TO FINE SANDY CLAY, SATURATED, TRACE MICA AND LIGNITE, MODERATELY PLASTIC (A-6)

Boring Terminated at Elevation 65.7 ft IN COASTAL PLAIN SANDY CLAY (BLACK CREEK FORMATION)

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl									
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95							GROUND WTR (ft)								
BORING NO. Y3_B1-C		STATION 30+03		OFFSET 3 ft RT		ALIGNMENT -Y3-									
COLLAR ELEV. 163.9 ft		TOTAL DEPTH 85.0 ft		NORTHING 371,249		EASTING 2,001,137									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 12/05/19		COMP. DATE 12/06/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
165	163.9	0.0	2	4	3							M	163.9 GROUND SURFACE 0.0		
												M	162.9 ROADWAY EMBANKMENT 1.0		
160	160.4	3.5	2	4	4							W	161.9 LOOSE, BROWN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, MOIST, TRACE ORGANICS (A-2-6) 2.0		
												W	UNDIVIDED COASTAL PLAIN		
												W	MEDIUM STIFF, GRAY-BROWN, FINE TO COARSE SANDY SILTY CLAY, MOIST, TRACE ORGANICS (A-7-6)		
155	155.4	8.5	3	7	10							W	LOOSE TO MEDIUM DENSE, ORANGE-BROWN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, MOIST TO WET (A-2-6) 12.0		
												Sat.	151.9 MEDIUM STIFF, LIGHT GRAY-TAN, FINE SANDY SILTY CLAY, SATURATED (A-7-6) 14.5		
150	150.4	13.5	WOH	2	4							Sat.	149.4 LOOSE, GRAY-BROWN, SILTY CLAYEY FINE SAND, SATURATED (A-2-6) 17.0		
												Sat.	146.9 LOOSE TO MEDIUM DENSE, RED-BROWN-GRAY, SILTY FINE SAND, SATURATED (A-2-4)		
145	145.4	18.5	7	6	6							Sat.	136.9 VERY LOOSE, ORANGE-TAN-GRAY, SILTY CLAYEY FINE SAND, SATURATED (A-2-6) 27.0		
												W	131.9 LOOSE TO MEDIUM DENSE, GRAY-TAN, SILTY FINE TO COARSE SAND, WET TO SATURATED, TRACE CLAY (A-2-4) 32.0		
140	140.4	23.5	4	3	5							W	116.9 COASTAL PLAIN 47.0		
												W	MEDIUM DENSE TO DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET TO SATURATED, TRACE CLAY AND LIGNITE, TRACE MICA TO MICACEOUS (A-2-4) (BLACK CREEK FORMATION)		
135	135.4	28.5	2	1	1							W			
130	130.4	33.5	9	10	12							Sat.			
												W			
125	125.4	38.5	8	4	2							Sat.			
												W			
120	120.4	43.5	3	6	9							Sat.			
												W			
115	115.4	48.5	23	21	16							Sat.			
												W			
110	110.4	53.5	8	11	14							Sat.			
												W			
105	105.4	58.5	5	5	10							Sat.			
												W			
100	100.4	63.5	15	15	16							Sat.			
												W			
95	95.4	68.5	9	7	9							Sat.			
												W			
90	90.4	73.5	6	6	13							Sat.			
												W			
85	85.4	78.5										M	91.9 VERY STIFF, DARK GRAY, SILTY CLAY, MOIST, TRACE FINE SAND (A-7-6) 72.0		
												M	89.4 DENSE TO VERY DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, MOIST TO WET, TRACE CLAY, MICA, AND GRAVEL (A-2-4) 74.5		

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl									
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95							GROUND WTR (ft)								
BORING NO. Y3_B1-C		STATION 30+03		OFFSET 3 ft RT		ALIGNMENT -Y3-									
COLLAR ELEV. 163.9 ft		TOTAL DEPTH 85.0 ft		NORTHING 371,249		EASTING 2,001,137									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 12/05/19		COMP. DATE 12/06/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
85			15	21	31							W			
												W			
80	80.4	83.5	18	17	16							W	85.0	DENSE TO VERY DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, MOIST TO WET, TRACE CLAY, MICA, AND GRAVEL (A-2-4) (continued)	
														Boring Terminated at Elevation 78.9 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION)	
														Notes: 1. Surficial Organic Soil: 0.0-0.2' 2. NM=Not Measured due to mud rotary techniques	

NCDOT BORE DOUBLE I5987\_GEO\_BORELOGS\_BRDG\_Y3.GPJ\_NC\_DOT.GDT 8/16/21



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl										
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95							GROUND WTR (ft)									
BORING NO. Y3_EB2-A		STATION 32+01		OFFSET 25 ft LT		ALIGNMENT -Y3-										
COLLAR ELEV. 165.5 ft		TOTAL DEPTH 95.0 ft		NORTHING 371,411		EASTING 2,001,255										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER S. Davis		START DATE 12/05/19		COMP. DATE 12/05/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
170																
165	165.5	0.0	2	3	7											165.5 GROUND SURFACE 0.0
160	162.0	3.5	2	3	4											163.5 UNDIVIDED COASTAL PLAIN 2.9
155	157.0	8.5	2	2	3											158.5 LOOSE, BROWN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, MOIST, TRACE ORGANICS (A-2-6) 7.0
150	152.0	13.5	2	2	3											153.5 MEDIUM STIFF, GRAY-BROWN-ORANGE, SILTY FINE TO COARSE SANDY CLAY, MOIST, TRACE ORGANICS, MODERATELY PLASTIC (A-6) 12.0
145	147.0	18.5	9	8	13											148.5 LOOSE, GRAY-TAN, SILTY CLAYEY FINE TO COARSE SAND, WET (A-2-6) 17.0
140	142.0	23.5	5	4	5											148.5 LOOSE TO MEDIUM DENSE, RED-BROWN-GRAY, SILTY FINE SAND, WET TO SATURATED (A-2-4) 17.0
135	137.0	28.5	2	1	1											138.5 VERY LOOSE TO MEDIUM DENSE, ORANGE-TAN-GRAY, SILTY CLAYEY FINE SAND, SATURATED (A-2-6) 27.0
130	132.0	33.5	2	3	9											131.0 MEDIUM DENSE, BROWN-GRAY, SILTY FINE TO COARSE SAND, WET (A-2-4) 34.5
125	127.0	38.5	5	10	13											123.5 VERY LOOSE TO MEDIUM DENSE, ORANGE-TAN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, SATURATED (A-2-6) 42.0
120	122.0	43.5	2	2	1											118.5 MEDIUM DENSE, ORANGE-BROWN-GRAY, SILTY FINE TO COARSE SAND, WET, TRACE CLAY (A-2-4) 47.0
115	117.0	48.5	3	5	6											106.5 COASTAL PLAIN 59.0
110	112.0	53.5	5	9	16											101.5 VERY STIFF, DARK GRAY, SILTY CLAY, WET, TRACE MICA AND LIGNITE (A-7-6) (BLACK CREEK FORMATION) 64.0
105	107.0	58.5	12	7	9											98.5 MEDIUM DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA, CLAY, AND GRAVEL (A-2-4) 67.0
100	102.0	63.5	8	13	13											93.5 STIFF TO VERY STIFF, DARK GRAY, FINE SANDY SILTY CLAY, WET, MICACEOUS (A-7-6) 72.0
95	97.0	68.5	5	6	9											93.5 DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA AND CLAY (A-2-4) 95.0
90	92.0	73.5	9	13	18											

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl										
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95							GROUND WTR (ft)									
BORING NO. Y3_EB2-A		STATION 32+01		OFFSET 25 ft LT		ALIGNMENT -Y3-										
COLLAR ELEV. 165.5 ft		TOTAL DEPTH 95.0 ft		NORTHING 371,411		EASTING 2,001,255										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER S. Davis		START DATE 12/05/19		COMP. DATE 12/05/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
90																
85	87.0	78.5	11	21	16											83.5 DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA AND CLAY (A-2-4) (continued) 82.0
80	82.0	83.5	5	6	8											83.5 STIFF, DARK GRAY-GRAY, SILTY CLAY, MOIST, TRACE MICA (A-7-6) 82.0
75	77.0	88.5	4	6	8											73.5 MEDIUM DENSE, DARK GRAY-GRAY, SILTY FINE TO COARSE SAND, WET, TRACE CLAY (A-2-4) 92.0
	72.0	93.5	12	11	16											70.5 Boring Terminated at Elevation 70.5 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION) 95.0

NCDOT BORE DOUBLE I5987 GEO BORELOGS BRDG Y3.GPJ NC\_DOT.GDT 8/16/21

Notes:  
 1. Surficial Organic Soil: 0.0-0.2'  
 2. NM=Not Measured due to mud rotary techniques

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95			GROUND WTR (ft)
BORING NO. Y3_EB2-B	STATION 30+99	OFFSET 11 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 167.5 ft	TOTAL DEPTH 99.7 ft	NORTHING 371,312	EASTING 2,001,210
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/10/21	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
170														
166.5	166.5	1.0											GROUND SURFACE	0.0
165	164.3	3.2	27	8	6								ROADWAY EMBANKMENT	1.0
160	161.5	6.0	6	5	6								MEDIUM DENSE, WHITE, SILTY GRAVELLY COARSE TO FINE SAND, DRY, NON PLASTIC (A-2-4)	4.0
155	159.3	8.2	1	2	1								UNDIVIDED COASTAL PLAIN	8.0
150	154.3	13.2	2	2	3								MEDIUM DENSE, DARK GRAY, CLAYEY FINE SAND, DRY TO MOIST, NON PLASTIC (A-2-5)	8.0
145	149.3	18.2	2	2	2								SOFT TO STIFF, GRAY, ORANGE, COARSE TO FINE SANDY CLAY, MOIST, MODERATELY PLASTIC (A-6)	8.0
140	144.3	23.2	3	3	3								LOOSE, GRAY, ORANGE, LIGHT GRAY, CLAYEY COARSE TO FINE SAND, WET, MODERATELY PLASTIC (A-2-6)	8.0
135	139.3	28.2	11	11	6									22.0
130	134.3	33.2	5	6	3								LOOSE TO MEDIUM DENSE, LIGHT GRAY, WHITE, ORANGE, SILTY COARSE TO FINE SAND, SATURATED, TRACE CLAY, SLIGHTLY PLASTIC (A-2-4)	22.0
125	129.3	38.2	3	3	3									34.0
120	124.3	43.2	10	9	8								LOOSE, LIGHT GRAY, ORANGE, CLAYEY COARSE TO FINE SAND, SATURATED, SLIGHTLY PLASTIC (A-2-7)	34.0
115	119.3	48.2	7	11	14									38.0
110	114.3	53.2	3	5	6								MEDIUM DENSE, WHITE, LIGHT GRAY, ORANGE, SILTY FINE SAND, SATURATED, NON PLASTIC (A-2-4)	38.0
105	109.3	58.2	4	9	21									47.0
100	104.3	63.2	3	5	6								COASTAL PLAIN	47.0
95	99.3	68.2	7	8	13								MEDIUM DENSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, NON PLASTIC (A-2-4) (BLACK CREEK FORMATION)	47.0
90	94.3	73.2	12	20	26									53.5
			4	9	21								VERY STIFF, DARK GRAY, COARSE TO FINE SANDY CLAY, SATURATED, TRACE MICA, MODERATELY PLASTIC (A-7)	53.5
			6	11	21									57.0
			7	8	13								DENSE, DARK GRAY, SILTY COARSE TO FINE SAND, TRACE MICA, NON PLASTIC (A-2-4)	57.0
			8	12	14									62.0
													DENSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, TRACE MICA AND LIGNITE, SLIGHTLY PLASTIC (A-2-7)	62.0
														67.0
													VERY STIFF, DARK GRAY, SILTY FINE SANDY CLAY, WET, TRACE MICA AND LIGNITE, HIGHLY PLASTIC (A-7-6)	67.0
														72.0
													MEDIUM DENSE TO DENSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, WET TO SATURATED, TRACE MICA, SLIGHTLY PLASTIC (A-2-7)	72.0

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION BRIDGE ON SR 1758 (McDUFFIE CROSSING RD.) OVER I-95			GROUND WTR (ft)
BORING NO. Y3_EB2-B	STATION 30+99	OFFSET 11 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 167.5 ft	TOTAL DEPTH 99.7 ft	NORTHING 371,312	EASTING 2,001,210
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/10/21	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
90														
89.3	89.3	78.2												
85	84.3	83.2	11	18	23								MEDIUM DENSE TO DENSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, WET TO SATURATED, TRACE MICA, SLIGHTLY PLASTIC (A-2-7) (continued)	
80	79.3	88.2	16	21	20									80.5
75	74.3	93.2	10	13	21								HARD, DARK GRAY, FINE SANDY CLAY, SATURATED, TRACE MICA AND LIGNITE, MODERATELY PLASTIC (A-6)	87.0
70	69.3	98.2	12	11	11									75.5
			13	14	16								MEDIUM DENSE, GRAY, SILTY COARSE TO FINE SAND, SATURATED, TRACE CLAY AND MICA, SLIGHTLY PLASTIC (A-2-5)	92.0
														99.7
													Boring Terminated at Elevation 67.8 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)	

NCDOT BORE DOUBLE I5987A\_GEO\_RDWY\_BH\_TERRACON\_STRUCTURE BORINGS DONE IN 5-2021.GPJ NC\_DOT.GDT 8/16/21

**LABORATORY TESTING SUMMARY**

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: BRIDGE ON SR 1758 (McDUFFIE CROSSING ROAD) OVER I-95 BETWEEN SR 1763 AND US 301

Sample No.	Station	Alignment	Offset (feet)	Depth Interval	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained	% Passing (sieves)			% Moisture	% Organic
								Coarse	Fine Sand	Silt	Clay		#10	#40	#200		
SS-110	30+99	-Y3-	11 RT	8.2 - 9.7	A-2-6 (0)	34	21	51.9	24.3	5.2	18.6	0	100	69	26	-	-
SS-111	28+57	-Y3-	8 RT	6.0 - 7.5	A-2-7 (4)	52	32	48.2	19.7	4.4	27.7	0	100	69	34	-	-
SS-112	28+57	-Y3-	8 RT	18.7 - 20.2	A-2-6 (1)	33	19	13.8	56.8	7.0	22.4	0	99	94	33	-	-

NP - NON-PLASTIC

*Stephanie H. Huffman*

Certified Lab Technician Signature  
Terracon

114-01-1203

Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained	% Passing (sieves)			% Moisture	% Organic
								Coarse	Fine Sand	Silt	Clay		#10	#40	#200		
SS-2	28+35	-Y3-	24 LT	3.5-5.0	A-6(5)	35	21	35.2	21.7	8.6	34.5	0.0	100	78	47	21.2	-
SS-4	28+35	-Y3-	24 LT	13.5-15.0	A-7-6(9)	47	32	29.7	30.7	8.3	31.3	0.0	100	84	44	23.9	-
SS-520	32+01	-Y3-	25 LT	3.5-5.0	A-6(2)	31	17	39.1	24.9	9.2	26.8	0.0	100	78	40	15.7	-
SS-522	32+01	-Y3-	25 LT	13.5-15.0	A-7-6(10)	49	32	28.0	28.5	8.0	35.5	0.0	100	85	48	24.5	-

NP - NON-PLASTIC

D. COUNCIL - F&R  
Certified Lab Technician Signature

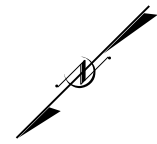
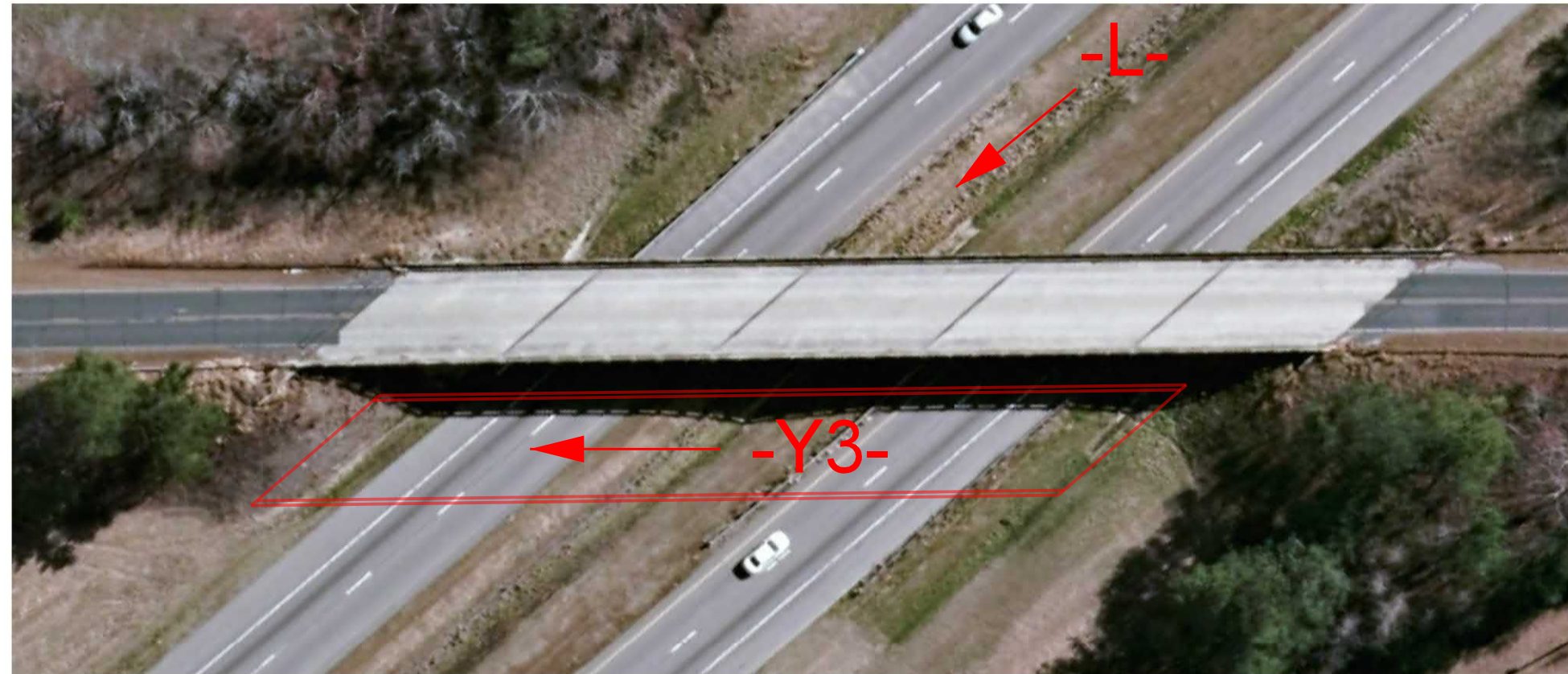
101-02-0603

Certification Number



# SITE PHOTOGRAPHS

BRIDGE ON SR 1758 (McDUFFIE CROSSING ROAD)  
OVER I-95 BETWEEN SR 1763 AND US 301



LOOKING SOUTH ALONG I-95  
PROPOSED BRIDGE NORTH OF EXISTING BRIDGE, EB2 (LEFT) EB1 (RIGHT)



LOOKING SOUTH ON I-95 TOWARD  
PROPOSED BRIDGE NORTH OF EXISTING BRIDGE, EB2 (LEFT) EB1 (RIGHT)

REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD.)  
SITE DESCRIPTION SITE 20 - CULVERT AT STA. 242+85  
-L- OVER UNNAMED TRIBUTARY TO TENMILE  
SWAMP

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS
7	LABRATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	7

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  - 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

- FARMER, B. C.
- DEGON, A. N.
- TURNAGE, J. R.
- DUGGINS, W. T.
- KELLY, N. S.

INVESTIGATED BY TERRACON CONSULTANTS

DRAWN BY KENNEDY, E. J.

CHECKED BY RIGGS, JR., A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE SEPTEMBER 2021

**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:  
Matthew J. Alexander 10/19/2021  
0FB0038EEA00452  
SIGNATURE DATE

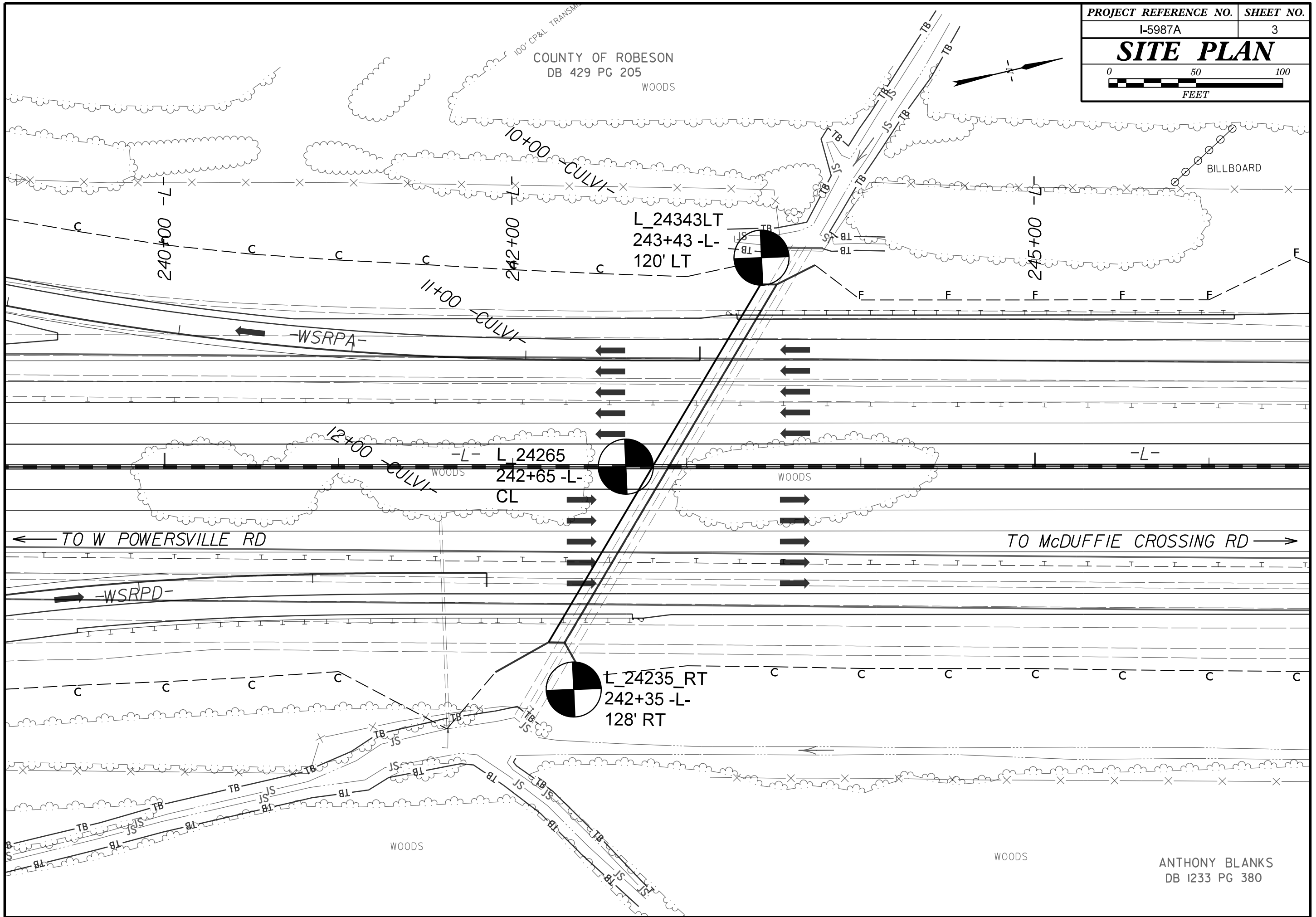
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UNLESS ALL SIGNATURES COMPLETED



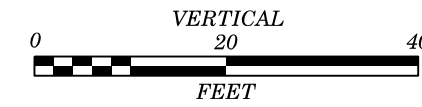
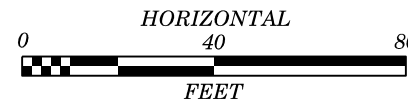
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table containing sections: SOIL DESCRIPTION, SOIL LEGEND AND AASHTO CLASSIFICATION, GRADATION, MINERALOGICAL COMPOSITION, COMPRESSION, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, ROCK DESCRIPTION, WEATHERING, ROCK HARDNESS, FRACTURE SPACING, BEDDING, INDURATION, TERMS AND DEFINITIONS, and COLOR.

COUNTY OF ROBESON  
DB 429 PG 205  
WOODS



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV1- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987.ls.tin1.tin)

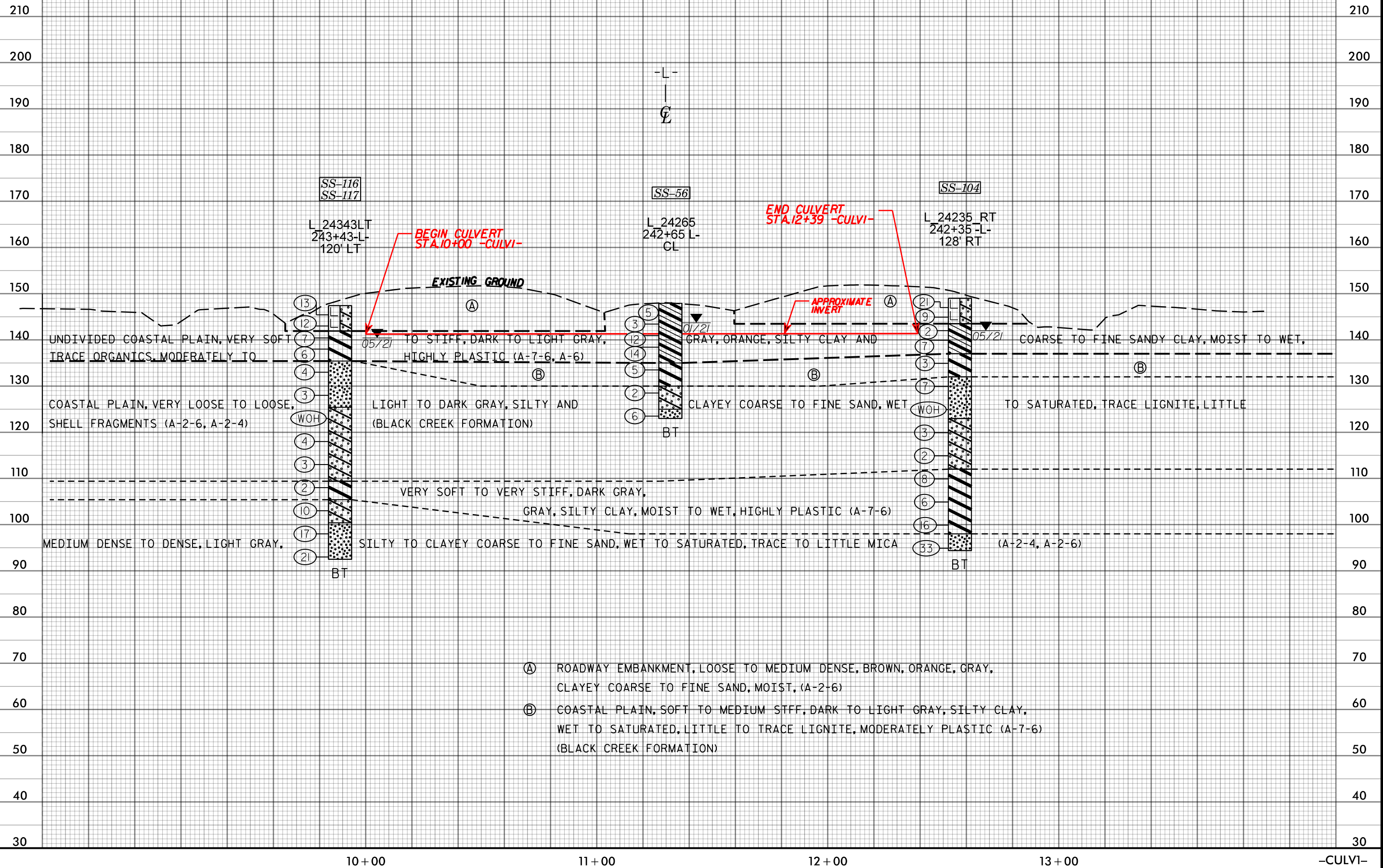


VE = 2

PROJECT REFERENCE NO. SHEET NO.

I-5987A 4

CENTERLINE PROFILE ALONG  
CULVERT AT STA. 242+85 -L-



# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> CULVERT AT STA. 242+85 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> L_24235_RT	<b>STATION</b> 242+35	<b>OFFSET</b> 128 ft RT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 149.0 ft	<b>TOTAL DEPTH</b> 54.6 ft	<b>NORTHING</b> 349,139	<b>EASTING</b> 2,000,788
<b>DRILL RIG/HAMMER EFF./DATE</b> TER373 DIETRICH D-50 95% 02/06/2021		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/05/21	<b>COMP. DATE</b> 05/06/21	<b>SURFACE WATER DEPTH</b> 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				
150														149.0 GROUND SURFACE 0.0
	148.0	1.0	11	11	10									ROADWAY EMBANKMENT
	145.9	3.1	3	5	4									LOOSE TO MEDIUM DENSE, BROWN, ORANGE, CLAYEY COARSE TO FINE SAND (A-2-6)
145														143.5 UNDIVIDED COASTAL PLAIN 5.5
	143.0	6.0	2	1	1									VERY SOFT TO MEDIUM STIFF, DARK GRAY TO LIGHT GRAY, ORANGE, COARSE TO FINE SANDY CLAY, TRACE ORGANICS, MODERATELY PLASTIC (A-6)
140														137.0 COASTAL PLAIN 12.0
	140.9	8.1	2	3	4									SOFT, DARK GRAY, SILTY CLAY, SATURATED, LITTLE LIGNITE, MODERATELY PLASTIC (A-7-6) (BLACK CREEK FORMATION)
135														132.0 COASTAL PLAIN 17.0
	135.9	13.1	2	1	2									VERY LOOSE TO LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4)
130														123.0 COASTAL PLAIN 26.0
	130.9	18.1	3	5	2									VERY LOOSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, LITTLE SHELL FRAGMENTS, (A-2-6)
125														123.0 COASTAL PLAIN 26.0
	125.9	23.1	WOR	WOH	WOH									VERY LOOSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, LITTLE SHELL FRAGMENTS, (A-2-6)
120														112.0 COASTAL PLAIN 37.0
	120.9	28.1	1	1	2									MEDIUM STIFF TO VERY STIFF, LIGHT TO DARK GRAY, SILTY CLAY, MOIST, TRACE MICA, HIGHLY PLASTIC (A-7-6)
115														98.0 DENSE, LIGHT GRAY, SILTY COARSE TO FINE SAND, WET, LITTLE MICA (A-2-4) 51.0
	115.9	33.1	1	1	1									
110														94.4 Boring Terminated at Elevation 94.4 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION) 54.6
	110.9	38.1	3	4	4									
105														
	105.9	43.1	2	3	3									
100														
	100.9	48.1	4	6	10									
95														
	95.9	53.1	3	11	22									

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> FARMER, B. C.
<b>SITE DESCRIPTION</b> CULVERT AT STA. 242+85 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> L_24265	<b>STATION</b> 242+65	<b>OFFSET</b> CL	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 147.9 ft	<b>TOTAL DEPTH</b> 24.9 ft	<b>NORTHING</b> 349,174	<b>EASTING</b> 2,000,662
<b>DRILL RIG/HAMMER EFF./DATE</b> TER92-0 ACKER RENEGADE 86% 02/15/2019		<b>DRILL METHOD</b> H.S. Augers	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> DUGGINS, W. T.	<b>START DATE</b> 01/18/21	<b>COMP. DATE</b> 01/18/21	<b>SURFACE WATER DEPTH</b> 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				
150														147.9 GROUND SURFACE 0.0
	146.9	1.0	2	3	2									UNDIVIDED COASTAL PLAIN
145														SOFT TO STIFF, GRAY, LIGHT GRAY, COARSE TO FINE SANDY CLAY, WET, MODERATELY PLASTIC (A-6)
	144.4	3.5	1	1	2									135.0 COASTAL PLAIN 12.9
	141.9	6.0	3	5	7									MEDIUM STIFF, DARK GRAY, SILTY CLAY, WET, TRACE LIGNITE (A-7-6) (BLACK CREEK FORMATION)
140														130.0 COASTAL PLAIN 17.9
	139.4	8.5	2	4	10									VERY LOOSE, LIGHT GRAY, CLAYEY COARSE TO FINE SAND, SATURATED (A-2-6)
135														125.0 COASTAL PLAIN 22.9
	134.5	13.4	2	2	3									LOOSE, LIGHT TO DARK GRAY SILTY COARSE TO FINE SAND, SATURATED (A-2-4)
130														Boring Terminated at Elevation 123.0 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)
	129.5	18.4	3	1	1									
125														
	124.5	23.4	5	3	3									

NCDOT BORE DOUBLE I5987A\_GEO\_CULV\_L-242+85\_BH\_TERRACON.GPJ NC\_DOT\_GDT 9/17/21

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.										
SITE DESCRIPTION CULVERT AT STA. 242+85 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP							GROUND WTR (ft)									
BORING NO. L_24343LT		STATION 243+43		OFFSET 120 ft LT		ALIGNMENT -L-		0 HR. N/A								
COLLAR ELEV. 147.4 ft		TOTAL DEPTH 54.9 ft		NORTHING 349,257		EASTING 2,000,545		24 HR. 7.0								
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER TURNAGE, J. R.		START DATE 05/13/21		COMP. DATE 05/13/21		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						
150														147.4	GROUND SURFACE	0.0
	146.4	1.0														
145	144.0	3.4	5	7	6											
	141.4	6.0	6	6	6											
140	139.0	8.4	3	3	4									141.9	UNDIVIDED COASTAL PLAIN	5.5
			3	3	3											
135	134.0	13.4	4	2	2									135.4	COASTAL PLAIN	12.0
			1	2	1											
130	129.0	18.4	WOH	WOH	WOH											
			2	2	2											
125	124.0	23.4	3	2	1											
			2	2	2											
120	119.0	28.4	WOH	WOH	2											
			3	2	1											
115	114.0	33.4	WOH	WOH	2											
			3	2	1											
110	109.0	38.4	3	6	4									109.4	VERY SOFT, GRAY, SILTY CLAY, WET,	38.0
			6	7	10											
105	104.0	43.4	7	8	13									105.4	MEDIUM DENSE, LIGHT GRAY, CLAYEY	42.0
			6	7	10											
100	99.0	48.4												100.4	MEDIUM DENSE, LIGHT GRAY, SILTY	47.0
			7	8	13											
95	94.0	53.4														
														92.5	Boring Terminated at Elevation 92.5 ft IN	54.9
															COASTAL PLAIN SILTY SAND (BLACK	
															CREEK FORMATION)	



### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: CULVERT AT STA. 242+85 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-56	242+65	-L-	CL	1.0 - 2.5	A-6 (7)	35	21	32.5	19.3	13.9	34.3	0	100	80	51	17.3	--
SS-104	242+35	-L-	128 RT	18.1 - 19.6	A-2-4 (0)	NP	NP	66.4	22.1	0.9	10.6	0	100	59	12	--	--
SS-116	243+43	-L-	120 LT	6.0 - 7.5	A-7-6 (8)	41	27	35.7	18.4	14.2	31.7	0	100	79	48	15.4	--
SS-117	243+43	-L-	120 LT	18.4 - 19.9	A-2-4 (0)	27	7	32.4	51.1	3.3	13.2	0	100	87	18	--	--

NP - NON-PLASTIC

*Stephanie H. Huffman*  
\_\_\_\_\_  
Certified Lab Technician Signature  
114-01-1203  
\_\_\_\_\_  
Certification Number

REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD.)  
SITE DESCRIPTION SITE 21 - CULVERT AT  
STA. 354+06 -L- OVER UNNAMED TRIBUTARY  
TO TENMILE SWAMP

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	BORELOGS
6	LABORATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	6

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PERSONNEL

KELLY, N. S.

TURNAGE, J. R.

DEGON, A. N.

INVESTIGATED BY TERRACON CONSULTANTS

DRAWN BY KENNEDY, E. J.

CHECKED BY RIGGS, JR., A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE SEPTEMBER 2021

**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367

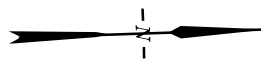


DocuSigned by:  
Matt Alexander 10/19/2021  
0FB0038EEA06462 SIGNATURE DATE

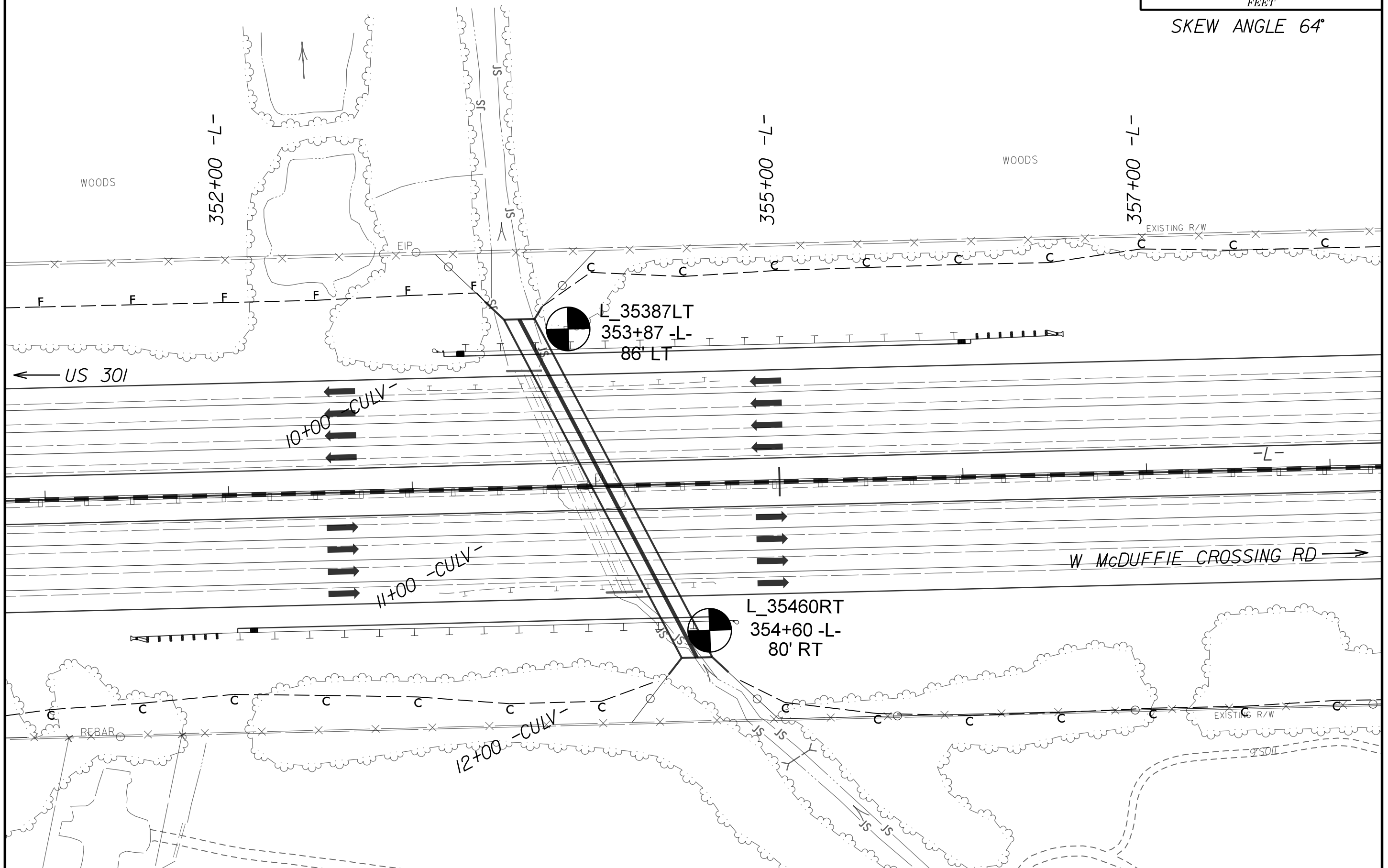
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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SUBSURFACE INVESTIGATION  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

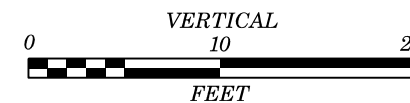
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																									
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>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:</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (ROD)</b> - 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. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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. <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																									
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<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</p>										<p>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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>																																																																																																																																									
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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>										<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>SPACING</th> </tr> </thead> <tbody> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </tbody> </table>										TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> </thead> <tbody> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </tbody> </table>										TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET	<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED</p>										<p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																																																					
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<b>BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATION</b>										<b>ESTIMATED USING PROVIDED PROJECT TIN FILE (I5987_ls_tin.tin)</b>										<b>DATED 5/6/2021</b>										<b>ELEVATION: N/A FEET</b>																																																																																																																																									
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SKEW ANGLE 64°



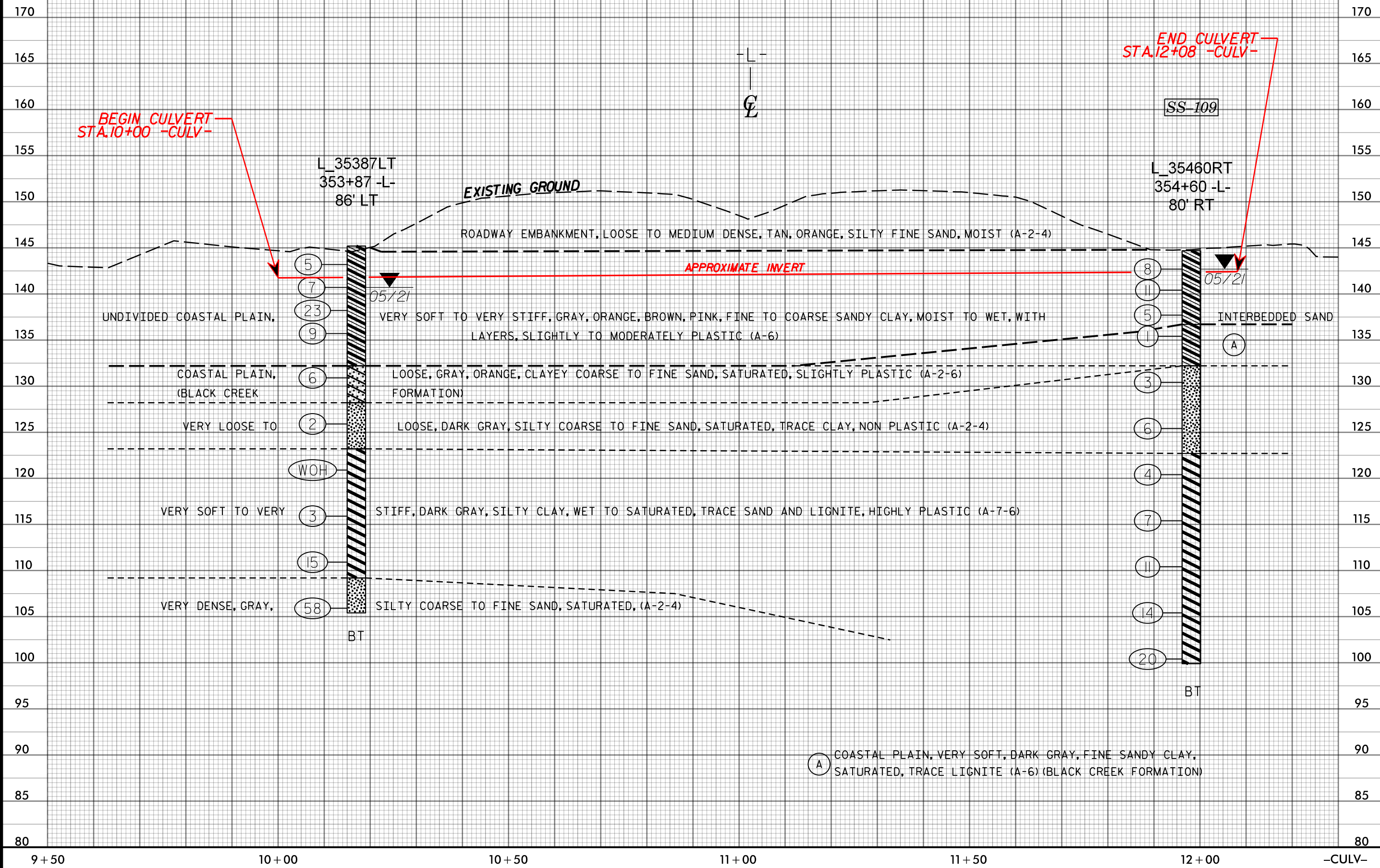
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987.ls.tin1.tin)



VE = 2

PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4
CENTERLINE PROFILE ALONG CULVERT AT STA. 354+06 -L-	

SKREW ANGLE 64°



(A) COASTAL PLAIN, VERY SOFT, DARK GRAY, FINE SANDY CLAY, SATURATED, TRACE LIGNITE (A-6) (BLACK CREEK FORMATION)

9 + 50      10 + 00      10 + 50      11 + 00      11 + 50      12 + 00      -CULV-



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.								
SITE DESCRIPTION CULVERT AT STA. 354+06 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP							GROUND WTR (ft)							
BORING NO. L_35387LT		STATION 353+87		OFFSET 86 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 145.2 ft		TOTAL DEPTH 39.8 ft		NORTHING 360,295		EASTING 2,000,752								
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic								
DRILLER TURNAGE, J. R.		START DATE 01/07/21		COMP. DATE 05/11/21		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				
150														
145	144.2	1.0												145.2 GROUND SURFACE 0.0
140	141.7	3.5	2	2	3	5							W	UNDIVIDED COASTAL PLAIN MEDIUM STIFF TO VERY STIFF, GRAY, ORANGE, PINK, FINE TO COARSE SANDY CLAY, WET, SLIGHTLY PLASTIC (A-6)
135	136.7	8.5	4	5	4								W	INTERBEDDED SAND LAYERS
130	131.9	13.3	3	3	3								W	
125	126.9	18.3	1	1	1								Sat.	COASTAL PLAIN LOOSE, GRAY, ORANGE, CLAYEY COARSE TO FINE SAND, SATURATED, SLIGHTLY PLASTIC (A-2-6) (BLACK CREEK FORMATION)
120	121.9	23.3	WOH	WOH	WOH								Sat.	VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, TRACE CLAY, NON PLASTIC (A-2-4)
115	116.9	28.3	WOH	WOH	3								Sat.	VERY SOFT TO STIFF, DARK GRAY, SILTY CLAY, SATURATED, TRACE SAND AND LIGNITE, HIGHLY PLASTIC (A-7-6)
110	111.9	33.3	4	7	8								Sat.	
	106.9	38.3	11	23	35								Sat.	VERY DENSE, GRAY, SILTY COARSE TO FINE SAND, SATURATED, NON PLASTIC (A-2-4)
														105.4 Boring Terminated at Elevation 105.4 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)

NOTE:  
DRILLED 1/7/21 TO DEPTH OF 10 FT. WITH DIEDRICH D-50 (TER299). BORING EXTENDED ON 5/11/21 TO DEPTH OF 39.8 FT. WITH DIEDRICH D-50 (TER373).

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.								
SITE DESCRIPTION CULVERT AT STA. 354+06 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP							GROUND WTR (ft)							
BORING NO. L_35460RT		STATION 354+60		OFFSET 80 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 144.7 ft		TOTAL DEPTH 44.8 ft		NORTHING 360,366		EASTING 2,000,920								
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic								
DRILLER TURNAGE, J. R.		START DATE 05/06/21		COMP. DATE 05/06/21		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				
145														144.7 GROUND SURFACE 0.0
140	143.7	1.0	3	4	4								SS-109 21%	UNDIVIDED COASTAL PLAIN VERY SOFT TO STIFF, GRAY, BROWN, ORANGE, COARSE TO FINE SANDY CLAY, MOIST TO SATURATED, MODERATELY PLASTIC (A-6)
135	136.4	8.3	1	0	1								M	COASTAL PLAIN VERY SOFT, DARK GRAY, FINE SANDY CLAY, SATURATED, TRACE LIGNITE (A-6) (BLACK CREEK FORMATION)
130	131.4	13.3	1	1	2								Sat.	VERY LOOSE TO LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, NON PLASTIC (A-2-4)
125	126.4	18.3	4	3	3								Sat.	
120	121.4	23.3	2	2	2								Sat.	SOFT TO VERY STIFF, DARK GRAY, SILTY CLAY, WET TO SATURATED, HIGHLY PLASTIC (A-7-6)
115	116.4	28.3	2	3	4								Sat.	
110	111.4	33.3	4	5	6								W	
105	106.4	38.3	4	6	8								W	
100	101.4	43.3	6	10	10								W	99.9 Boring Terminated at Elevation 99.9 ft IN COASTAL PLAIN SILTY CLAY (BLACK CREEK FORMATION)

NCDOT BORE DOUBLE I5987A\_GEO\_CULV\_L-354+06\_BH\_TERRACON.GPJ NC\_DOT.GDT 9/22/21

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: CULVERT AT STA. 354+06 -L- OVER UNNAMED TRIBUTARY TO TENMILE SWAMP

Table with 17 columns: Sample No., Station, Alignment, Offset (feet), Depth Interval (feet), AASHTO Class., L.L., P.I., % by Weight (Coarse Sand, Fine Sand, Silt, Clay), % Retained #4 Sieve, % Passing (sieves) (#10, #40, #200), % Moisture, % Organic. Row 1 contains data for sample SS-109.

NP - NON-PLASTIC

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD.)  
SITE DESCRIPTION SITE 13 - CULVERT AT  
STA. 454+90 -L- OVER COWPEN BRANCH

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-7	BORELOGS
8	LABORATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	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 1919 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

<u>KELLY, N. S.</u>	<u>DEGON, A. N.</u>
<u>PRESTON, T. (TRIGON)</u>	<u>TURNAGE, J. R.</u>
<u>ESTEP, E. (TRIGON)</u>	<u>DAVIS, S. (F&amp;R, Inc.)</u>
	<u>PESL, W. (F&amp;R, Inc.)</u>
	<u>PAINTER, B. (F&amp;R, Inc.)</u>
	<u>CLARKE, R. (F&amp;R, Inc.)</u>
	<u>TIGNOR, D. (F&amp;R, Inc.)</u>

INVESTIGATED BY: TERRACON CONSULTANTS  
F&R, Inc. & TRIGON

DRAWN BY KENNEDY, E. J.  
CHECKED BY RIGGS, JR., A. F.  
SUBMITTED BY ALEXANDER, M. J.  
DATE AUGUST 2021

Prepared in the Office of:

**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: E-0869  
NC REGISTERED GEOLOGIC FIRM: G-367



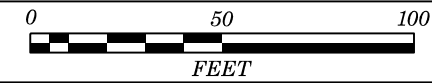
DocuSigned by:  
Matthew J. Alexander 8/30/2021  
OFB0038EEA06452 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, 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										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF 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:										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 DISLOADED 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 (IN 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.																													
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>ANGULARITY OF GRAINS</b>										<b>WEATHERED ROCK (WR)</b>										<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																													
<b>MINERALOGICAL COMPOSITION</b>										<b>CRYSTALLINE ROCK (CR)</b>										<b>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</b>										<b>NON-CRYSTALLINE ROCK (NCR)</b>										<b>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.</b>																			
<b>COMPRESSION</b>										<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>										<b>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</b>																																							
<b>PERCENTAGE OF MATERIAL</b>										<b>WEATHERING</b>										<b>FRESH</b>										<b>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</b>																													
<b>GROUND WATER</b>										<b>VERY SLIGHT (IV SLI.)</b>										<b>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.</b>										<b>SLIGHT (SLI.)</b>										<b>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.</b>																			
<b>MISCELLANEOUS SYMBOLS</b>										<b>MODERATE (MOD.)</b>										<b>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.</b>										<b>MODERATELY SEVERE (MOD. SEV.)</b>										<b>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</b>																			
<b>RECOMMENDATION SYMBOLS</b>										<b>SEVERE (SEV.)</b>										<b>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 &gt; 100 BPF</b>										<b>VERY SEVERE (IV SEV.)</b>										<b>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 &lt; 100 BPF</b>																			
<b>ABBREVIATIONS</b>										<b>COMPLETE</b>										<b>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.</b>										<b>ROCK HARDNESS</b>										<b>VERY HARD</b>										<b>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</b>									
<b>TEXTURE OR GRAIN SIZE</b>										<b>HARD</b>										<b>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</b>										<b>MODERATELY HARD</b>										<b>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.</b>																			
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>										<b>MEDIUM HARD</b>										<b>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.</b>										<b>SOFT</b>										<b>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.</b>																			
<b>PLASTICITY</b>										<b>VERY SOFT</b>										<b>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.</b>										<b>FRACTURE SPACING</b>										<b>BEDDING</b>																			
<b>EQUIPMENT USED ON SUBJECT PROJECT</b>										<b>VERY CLOSE</b>										<b>MORE THAN 10 FEET</b>										<b>VERY THICKLY BEDDED</b>										<b>4 FEET</b>																			
<b>INDURATION</b>										<b>MODERATELY CLOSE</b>										<b>1 TO 3 FEET</b>										<b>THICKLY BEDDED</b>										<b>1.5 - 4 FEET</b>																			
<b>DRILL UNITS:</b>										<b>CLOSE</b>										<b>0.16 TO 1 FOOT</b>										<b>VERY THINLY BEDDED</b>										<b>0.03 - 0.16 FEET</b>																			
<b>ADVANCING TOOLS:</b>										<b>VERY CLOSE</b>										<b>LESS THAN 0.16 FEET</b>										<b>THICKLY LAMINATED</b>										<b>0.008 - 0.03 FEET</b>																			
<b>HAMMER TYPE:</b>										<b>INDURATED</b>										<b>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</b>										<b>EXTREMELY INDURATED</b>																													
<b>CORE SIZE:</b>										<b>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</b>																																																	
<b>HAND TOOLS:</b>																																																											
<b>FRAGMENTS:</b>																																																											
<b>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.</b>																																																											

# SITE PLAN



SKEW ANGLE 130°



K.M. BIGGS, INC.  
MB 12 PG 100  
MB 48 PG 98

452+00 -L-

455+00 -L-

458+00 -L-

WOODS

WOODS

C5-1

455+42 -L-  
78' LT

10+00 -CULV-

←--- TO US 301 (EXIT 25)

TO SR 1758 (McDUFFIE CROSSING ROAD) →

C5-2

454+53 -L-  
CL

11+00 -CULV-

-L-

C5-5

455+07 -L-  
19' RT

12+00 -CULV-

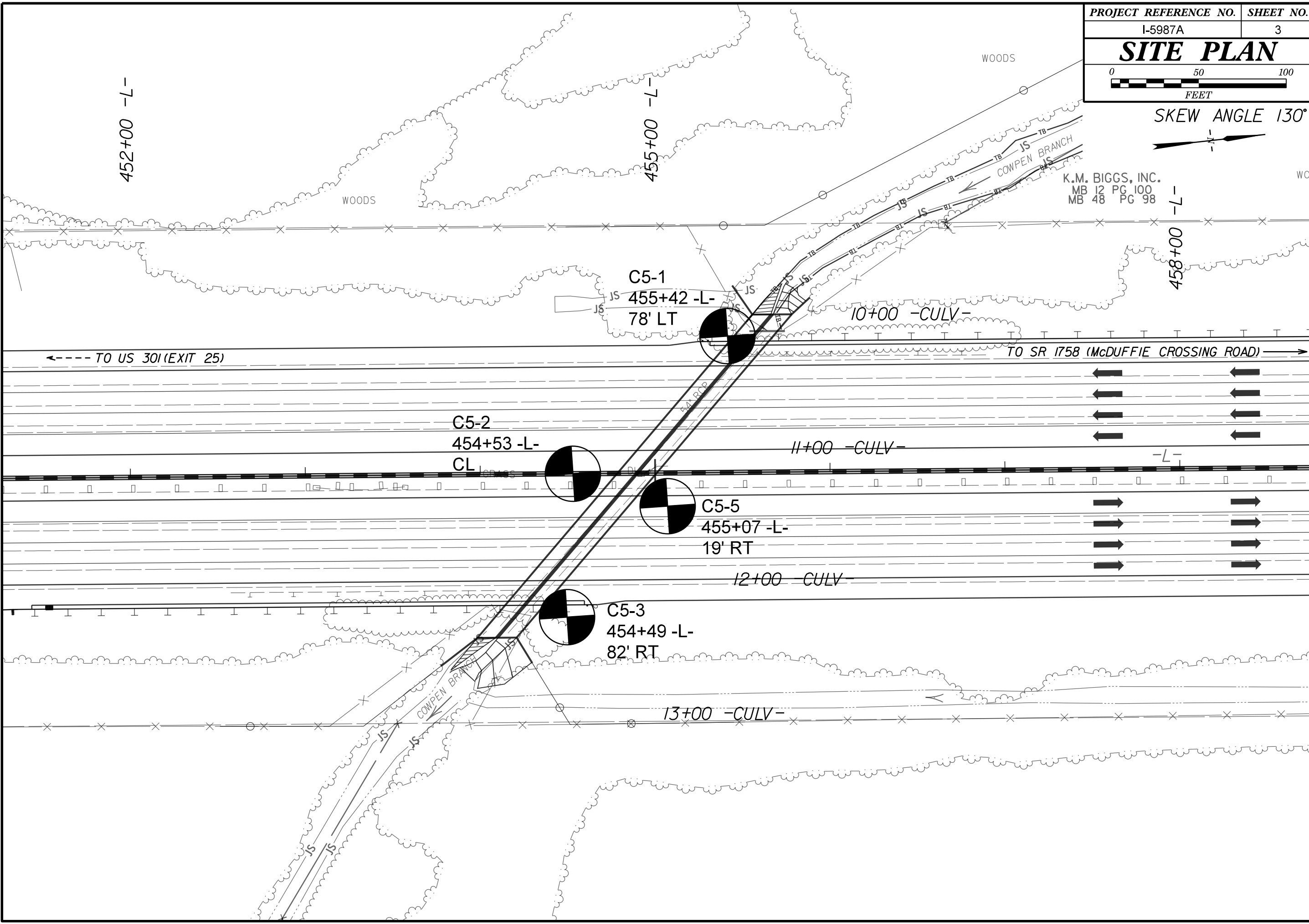
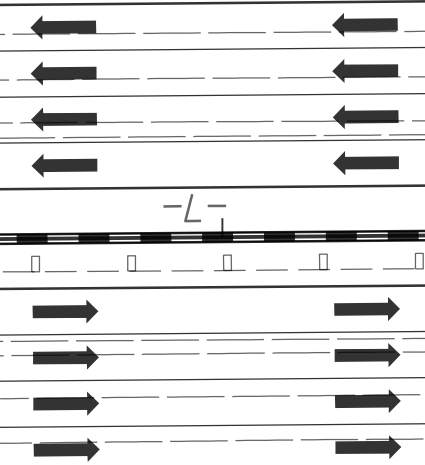
C5-3

454+49 -L-  
82' RT

13+00 -CULV-

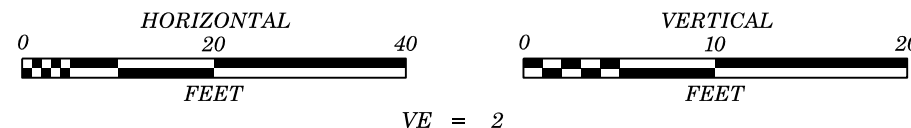
COMPEN BRANCH

COMPEN BRANCH

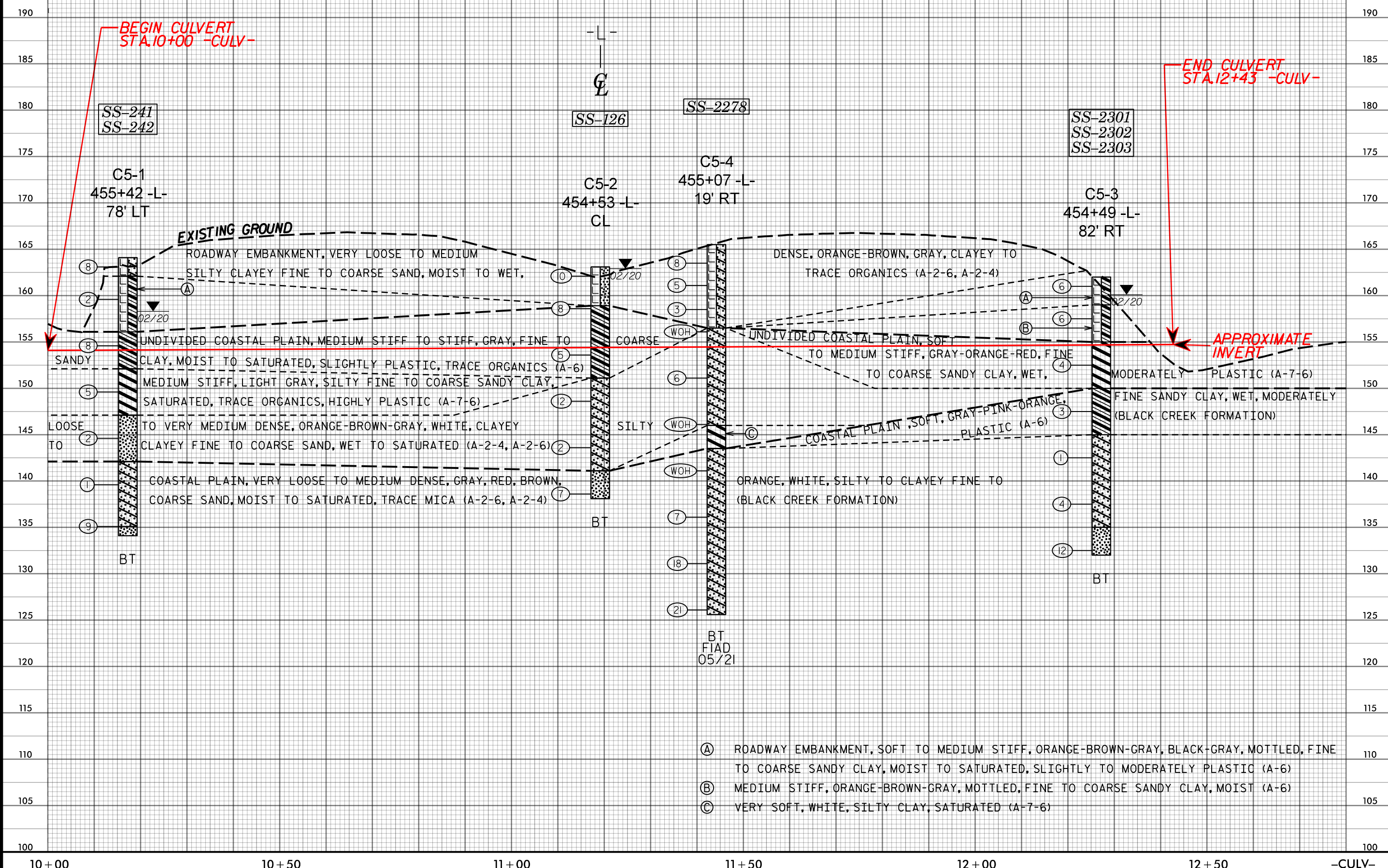




NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987.ls.tin1.tin)



SKREW ANGLE 130°



- (A) ROADWAY EMBANKMENT, SOFT TO MEDIUM STIFF, ORANGE-BROWN-GRAY, BLACK-GRAY, MOTTLED, FINE TO COARSE SANDY CLAY, MOIST TO SATURATED, SLIGHTLY TO MODERATELY PLASTIC (A-6)
- (B) MEDIUM STIFF, ORANGE-BROWN-GRAY, MOTTLED, FINE TO COARSE SANDY CLAY, MOIST (A-6)
- (C) VERY SOFT, WHITE, SILTY CLAY, SATURATED (A-7-6)

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesi									
SITE DESCRIPTION Culvert at Sta. 454+90 -L- over Cowpen Branch							GROUND WTR (ft)								
BORING NO. C5-1		STATION 455+42		OFFSET 78 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 164.1 ft		TOTAL DEPTH 30.0 ft		NORTHING 370,448		EASTING 2,001,002									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER S. Davis		START DATE 02/03/20		COMP. DATE 02/03/20		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
165	164.1	0.0	2	3	5							W	164.1	GROUND SURFACE	0.0
160	160.6	3.5	1	1	1							SS-241 18%	162.1	ROADWAY EMBANKMENT LOOSE, ORANGE-BROWN, SILTY CLAYEY FINE TO COARSE SAND, WET, TRACE ORGANICS (A-2-6)	2.9
155	155.6	8.5	2	4	4							Sat.	156.1	SOFT, BLACK-GRAY, SILTY FINE TO COARSE SANDY CLAY, WET, TRACE ORGANICS, SLIGHTLY PLASTIC (A-6)	8.0
150	150.6	13.5	1	3	2							SS-242 24%	152.1	UNDIVIDED COASTAL PLAIN MEDIUM STIFF, GRAY, FINE TO COARSE SANDY CLAY, SATURATED, SLIGHTLY PLASTIC (A-6)	12.0
145	145.6	18.5	1	1	1							Sat.	147.1	MEDIUM STIFF, LIGHT GRAY, SILTY FINE TO COARSE SANDY CLAY, SATURATED, TRACE ORGANICS, HIGHLY PLASTIC (A-7-6)	17.0
140	140.6	23.5	1	0	1							Sat.	142.1	VERY LOOSE, ORANGE-BROWN-GRAY, CLAYEY SILTY FINE TO COARSE SAND, SATURATED (A-2-4)	22.0
135	136.1	28.0	2	3	6							Sat.	135.1	COASTAL PLAIN VERY LOOSE, RED-BROWN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, SATURATED (A-2-6) (BLACK CREEK FORMATION)	29.0
													134.1	LOOSE, LIGHT-BROWN-TAN, SILTY FINE TO COARSE SAND, SATURATED (A-2-4) Boring Terminated at Elevation 134.1 ft in SAND (UNDIVIDED COASTAL PLAIN)	30.0

Notes:  
1. Surficial Organic Soil: 0.0-0.2'  
2. NM=Not Measured due to mud rotary techniques

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter									
SITE DESCRIPTION Culvert at Sta. 454+90 -L- over Cowpen Branch							GROUND WTR (ft)								
BORING NO. C5-2		STATION 454+53		OFFSET CL		ALIGNMENT -L-									
COLLAR ELEV. 163.1 ft		TOTAL DEPTH 25.0 ft		NORTHING 370,354		EASTING 2,001,074									
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 97% 03/22/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER E. Estep		START DATE 02/18/20		COMP. DATE 02/18/20		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
165	163.1	0.0	3	4	6							M	163.1	GROUND SURFACE	0.0
160	159.6	3.5	4	4	4							SS-2278 M	158.9	ROADWAY EMBANKMENT LOOSE TO MEDIUM DENSE, GRAY-ORANGE, CLAYEY SILTY FINE TO COARSE SAND, MOIST (A-2-4)	4.2
155	154.6	8.5	3	3	2							W	151.1	UNDIVIDED COASTAL PLAIN MEDIUM STIFF TO STIFF, GRAY, FINE TO COARSE SANDY CLAY, MOIST TO WET, TRACE ORGANICS (Organic Content=2.7%) (A-6)	12.0
150	149.6	13.5	3	5	7							W	151.1	VERY LOOSE TO MEDIUM DENSE, GRAY, CLAYEY FINE TO COARSE SAND, WET TO SATURATED (A-2-6)	12.0
145	144.6	18.5	1	1	1							Sat.	141.1	COASTAL PLAIN LOOSE, GRAY, SILTY FINE TO COARSE SAND, WET (A-2-4) (BLACK CREEK FORMATION)	22.0
140	139.6	23.5	4	3	4							W	138.1	COASTAL PLAIN LOOSE, GRAY, SILTY FINE TO COARSE SAND, WET (A-2-4) (BLACK CREEK FORMATION)	25.0

Notes:  
1. Surficial Organic Soil: 0.0-0.2'  
2. NM=Not Measured due to mud rotary techniques

NCDOT BORE DOUBLE I5987\_GEO\_BORELOGS\_CULV\_L45505.GPJ NC\_DOT.GDT 8/5/21

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter								
SITE DESCRIPTION Culvert at Sta. 454+90 -L- over Cowpen Branch							GROUND WTR (ft)							
BORING NO. C5-3		STATION 454+49		OFFSET 82 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 162.0 ft		TOTAL DEPTH 30.0 ft		NORTHING 370,344		EASTING 2,001,156								
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 86% 02/07/2020				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER D. Tignor		START DATE 02/26/20		COMP. DATE 02/26/20		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				
165														
	162.0	0.0												162.0 GROUND SURFACE 0.0
160	158.5	3.5	1	3	3	6					SS-2301	14%	159.0 ROADWAY EMBANKMENT MEDIUM STIFF, ORANGE-BROWN-GRAY, MOTTLED, FINE TO COARSE SANDY CLAY, MOIST, MODERATELY PLASTIC (A-6) 3.0	
155	153.5	8.5	3	3	3	6						M	155.0 ROADWAY EMBANKMENT MEDIUM STIFF, ORANGE-BROWN-GRAY, MOTTLED, FINE TO COARSE SANDY CLAY, MOIST (A-6) 7.0	
150	148.5	13.5	2	2	2	4					SS-2302	17%	150.0 UNDIVIDED COASTAL PLAIN SOFT TO MEDIUM STIFF, GRAY-ORANGE-RED, FINE TO COARSE SANDY CLAY, WET, MODERATELY PLASTIC (A-7-6) 12.0	
145	143.5	18.5	1	1	2	3					SS-2303	33%	145.0 COASTAL PLAIN SOFT, GRAY-PINK-ORANGE, FINE SANDY CLAY, WET, MODERATELY PLASTIC (A-6) (BLACK CREEK FORMATION) 17.0	
140	138.5	23.5	WOH	WOH	1	1						Sat.	140.0 VERY LOOSE TO LOOSE, GRAY, SILTY CLAYEY FINE TO COARSE SAND, WET TO SATURATED (A-2-6) 27.0	
135	133.5	28.5	2	2	2	4						W	135.0 MEDIUM DENSE, ORANGE-GRAY, CLAYEY SILTY FINE TO COARSE SAND, MOIST, TRACE MICA (A-2-4) 27.0	
			4	4	8	12						M	132.0 Boring Terminated at Elevation 132.0 ft in SAND (UNDIVIDED COASTAL PLAIN) 30.0	
<p>Notes:</p> <ol style="list-style-type: none"> <li>Surficial Organic Soil: 0.0-0.2'</li> <li>NM=Not Measured due to mud rotary techniques</li> </ol>														

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.										
SITE DESCRIPTION Culvert at Sta. 454+90 -L- over Cowpen Branch							GROUND WTR (ft)									
BORING NO. C5-4		STATION 455+07		OFFSET 19 ft RT		ALIGNMENT -LA2-										
COLLAR ELEV. 165.5 ft		TOTAL DEPTH 39.9 ft		NORTHING 370,407		EASTING 2,001,095										
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 05/18/21		COMP. DATE 05/18/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
170																
165	164.5	1.0	5	5	3	8									165.5	GROUND SURFACE
160	162.1	3.4	2	2	3	5										ROADWAY EMBANKMENT VERY LOOSE TO LOOSE, LIGHT BROWN, ORANGE, CLAYEY COARSE TO FINE SAND (A-2-6)
	159.5	6.0	1	2	1	3										
155	157.1	8.4	WOH	WOH	WOH	0									156.5	UNDIVIDED COASTAL PLAIN LOOSE TO VERY LOOSE, BROWN, WHITE, ORANGE, CLAYEY COARSE TO FINE SAND (A-2-6)
	152.1	13.4	WOH	3	3	6										
150																
145	147.1	18.4	WOH	WOH	WOH	0									146.0	VERY SOFT, WHITE, SILTY CLAY (A-7-6)
	142.1	23.4	WOH	WOH	WOH	0									143.5	COASTAL PLAIN VERY LOOSE TO MEDIUM DENSE, DARK GRAY TO ORANGE TO WHITE, ORANGE, CLAYEY COARSE TO FINE SAND (A-2-6) (BLACK CREEK FORMATION)
140																
135	137.1	28.4	WOH	3	4	7										
	132.1	33.4	1	7	11	18										
130																
	127.1	38.4	9	10	11	21									125.6	Boring Terminated at Elevation 125.6 ft IN COASTAL PLAIN CLAYEY SAND (BLACK CREEK FORMATION)

NCDOT BORE SINGLE I5987A\_GEO\_CULV\_L-454+90\_BH\_TERRACON.GPJ NC\_DOT\_GDT\_8/17/21

## LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2TIP: I-5987ACOUNTY: ROBESONDESCRIPTION: Culvert at Sta. 454+90 -L- over Cowpen Branch

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-126	455+07	-L-	19 RT	18.4 - 19.5	A-2-6 (0)	28	12	26.0	47.8	6.1	20.1	0	99	83	27	35.5	--

*Stephanie H. Huffman*

Certified Lab Technician Signature

114-01-1203

Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-241	455+42	-L-	78' LT	3.5 - 5.0	A--6(0)	23	11	43.3	23.9	8.4	24.4	0	100	74	36	17.6	--
SS-242	455+42	-L-	78' LT	13.5 - 15.0	A-7-6(11)	49	34	20.6	36.6	10.8	32.0	0	99	90	48	23.9	--
SS-2278	454+53	-L-	CL	4.2 - 5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	2.7
SS-2301	454+49	-L-	82' RT	0.2 - 1.5	A--6(3)	31	17	37.1	22.7	8.8	31.4	0	100	77	44	13.8	--
SS-2302	454+49	-L-	82' RT	8.5 - 10.0	A--7(64)	42	25	38.6	28.8	7.7	24.9	0	100	75	37	16.6	--
SS-2303	454+49	-L-	82' RT	13.5 - 15.0	A-6(2)	36	18	4.7	62.7	7.4	25.2	0	100	100	37	32.9	--

TESTED BY: D. COUNCIL - F&R  
CERTIFICATION NO.: 101-02-0603

REFERENCE: I-5987A

PROJECT: 47533

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD)  
SITE DESCRIPTION SITE 19 - CULVERT AT  
STA. 111 + 25 -L- OVER UNNAMED TRIBUTARY  
TO SADDLETREE SWAMP

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-7	BORE LOGS
8	LABORATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	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**

FARMER, B. C.

DEGON, A. N.

TURNAGE, J. R.

SWAIN, K. (CATLIN)

EDMONDSON, J. (CATLIN)

INVESTIGATED BY: TERRACON CONSULTANTS

INVESTIGATED BY: CATLIN ENGINEERS AND SCIENTISTS

DRAWN BY KENNEDY, E. J.

CHECKED BY RIGGS, JR., A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE AUGUST 2021

**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:  
Matt Alexander 8/30/2021  
0FB0038EEA06452  
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

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Contains detailed legends for soil classification, gradation, rock types, and symbols for field use.

PROJECT REFERENCE NO.	SHEET NO.
I-5987A	3
<b>SITE PLAN</b>	
FEET	

SKEW ANGLE 58°

ROBESON COUNTY BOARD OF EDUCATION  
DB 181 PG 224  
DB 17R PG 126-127

115+00 -L-

108+00 -L-

110+00

112+00 -L-

10+00 -CULV-

11+00 -CULV-

12+50 -CULV-

L\_11100LT  
111+00 -L-  
95' LT

L\_11118LT  
111+18 -L-  
78' LT

L\_11129  
111+29 -L-  
11' RT

L\_11200\_RT  
111+93 -L-  
70' RT

L\_11200\_HA  
112+00 -L-  
100' RT

FAYETTEVILLE RD.

W POWERVILLE RD.

DOHERTY HOLDING'S LLC  
DB 1630 PG 697

POND

WOODS

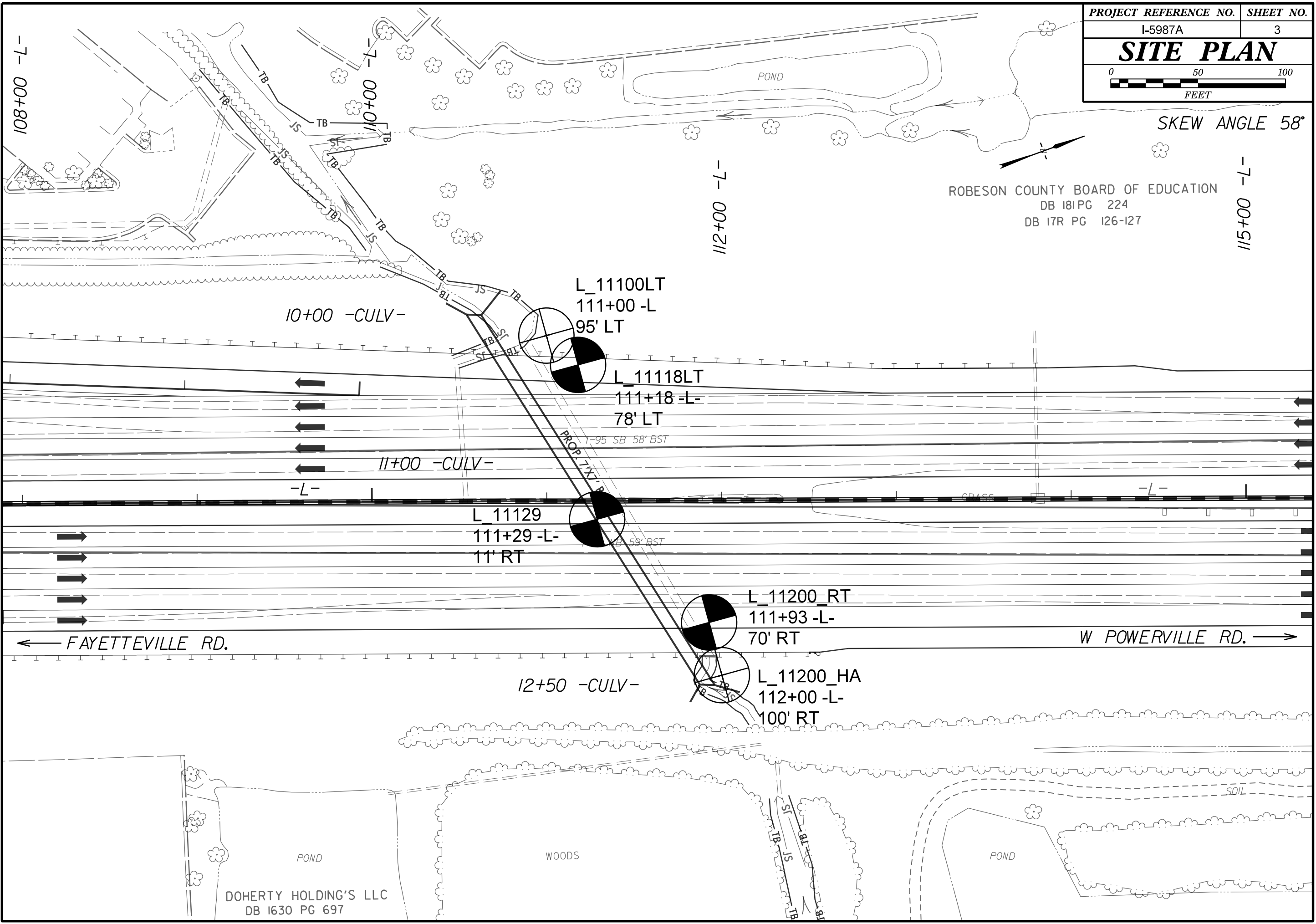
POND

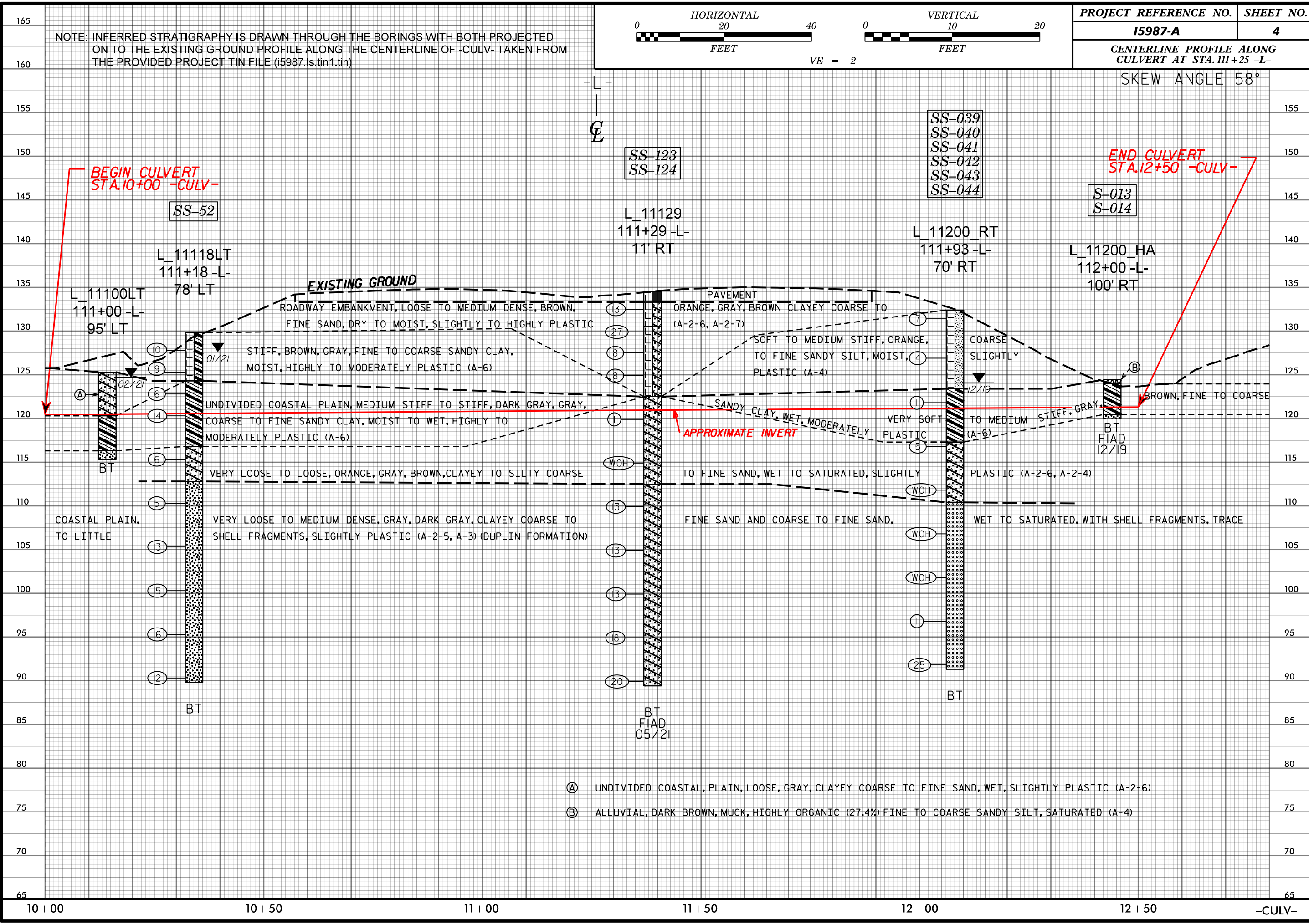
SOIL

PROP. 74' RT

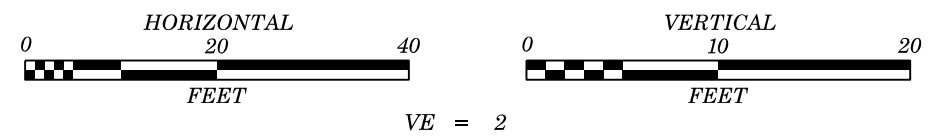
59' BST

95 SB 58' BST



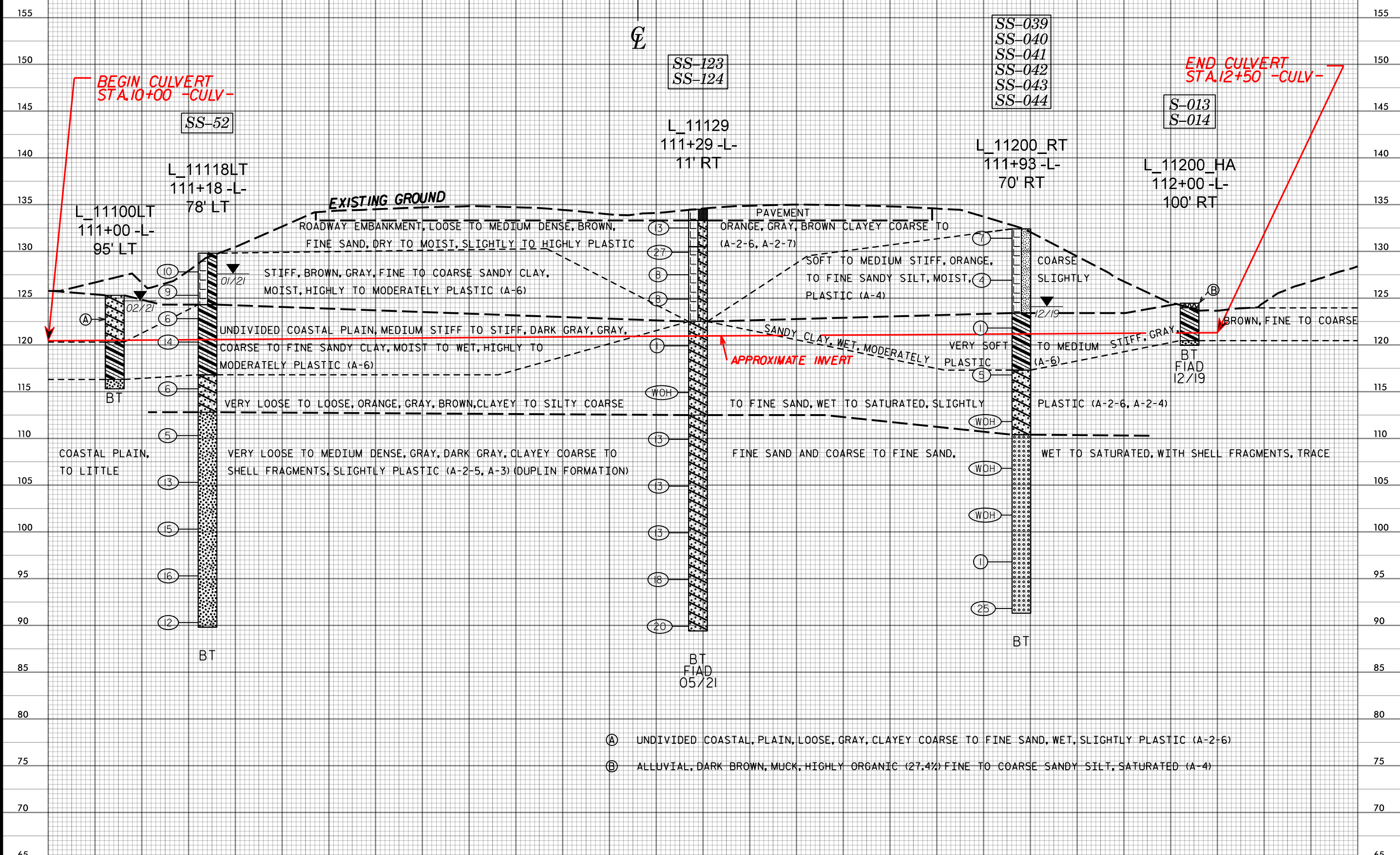


NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987.ls.tin1.tin)



PROJECT REFERENCE NO.	SHEET NO.
15987-A	4
CENTERLINE PROFILE ALONG CULVERT AT STA. 111+25 -L-	

SKEW ANGLE 58°



- (A) UNDIVIDED COASTAL, PLAIN, LOOSE, GRAY, CLAYEY COARSE TO FINE SAND, WET, SLIGHTLY PLASTIC (A-2-6)
- (B) ALLUVIAL, DARK BROWN, MUCK, HIGHLY ORGANIC (27.4%) FINE TO COARSE SANDY SILT, SATURATED (A-4)

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST FARMER, B. C.										
SITE DESCRIPTION CULVERT AT STA. 111+25 -L- UNNAMED TRIBUTARY TO SADDLETREE SWAMP							GROUND WTR (ft)									
BORING NO. L_11100LT		STATION 111+00		OFFSET 95 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 125.3 ft		TOTAL DEPTH 10.0 ft		NORTHING 336,277		EASTING 1,998,484										
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD Hand Auger		HAMMER TYPE N/A												
DRILLER N/A		START DATE 02/08/21		COMP. DATE 02/08/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
130																
125															125.3	0.0
120															120.3	5.0
															116.3	9.0
															115.3	10.0
Boring Terminated at Elevation 115.3 ft IN UNDIVIDED COASTAL PLAIN SILTY SAND																

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.										
SITE DESCRIPTION CULVERT AT STA. 111+25 -L- UNNAMED TRIBUTARY TO SADDLETREE SWAMP							GROUND WTR (ft)									
BORING NO. L_11118LT		STATION 111+18		OFFSET 78 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 129.8 ft		TOTAL DEPTH 40.0 ft		NORTHING 336,290		EASTING 1,998,505										
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 01/12/21		COMP. DATE 05/18/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
130																
		128.8	1.0	2	4	6									129.8	0.0
		126.3	3.5	4	5	4										
125		123.8	6.0	3	3	3									124.3	5.5
		121.3	8.5	6	7	7										
120		116.3	13.5	3	3	3									116.8	13.0
		111.3	18.5	2	2	3									112.8	17.0
		106.3	23.5	3	5	8										
105		101.3	28.5	7	7	8										
		96.3	33.5	7	8	8										
		91.3	38.5	6	6	6										
90															89.8	40.0
Boring Terminated at Elevation 89.8 ft IN COASTAL PLAIN SILTY SAND (DUPLIN FORMATION)																

NCDOT BORE DOUBLE I5987A\_GEO\_CULV\_L-111+25\_BH\_TERRACON.GPJ NC\_DOT.GDT 8/26/21

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.								
SITE DESCRIPTION CULVERT AT STA. 111+25 -L- UNNAMED TRIBUTARY TO SADDLETREE SWAMP							GROUND WTR (ft)							
BORING NO. L_11129		STATION 111+29		OFFSET 11 ft RT		ALIGNMENT -L-		0 HR. N/A						
COLLAR ELEV. 134.5 ft		TOTAL DEPTH 45.1 ft		NORTHING 336,277		EASTING 1,998,593		24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020						DRILL METHOD Mud Rotary		HAMMER TYPE Automatic						
DRILLER TURNAGE, J. R.		START DATE 05/17/21		COMP. DATE 05/17/21		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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
135														134.5 GROUND SURFACE 0.0
	133.5	1.0	7	6	7									133.3 ASPHALT 1.2
130	130.9	3.6	10	12	15									130.5 ROADWAY EMBANKMENT 4.0
	128.5	6.0	3	3	5									MEDIUM DENSE, BROWN, ORANGE, GRAY, CLAYEY COARSE TO FINE SAND, DRY, SLIGHTLY PLASTIC (A-2-6)
125	125.9	8.6	2	3	5									LOOSE TO MEDIUM DENSE, GRAY, BROWN, ORANGE, CLAYEY COARSE TO FINE SAND, DRY TO MOIST, HIGHLY PLASTIC (A-2-7)
	120.9	13.6	WOH	WOH	1									122.5 UNDIVIDED COASTAL PLAIN 12.0
120	115.9	18.6	WOH	WOH	WOH									VERY LOOSE, ORANGE, CLAYEY COARSE TO FINE SAND, SATURATED, SLIGHTLY PLASTIC (A-2-6)
115	110.9	23.6	6	6	7									112.5 COASTAL PLAIN 22.0
110	105.9	28.6	7	6	7									MEDIUM DENSE, GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, TRACE SHELL FRAGMENTS, SLIGHTLY PLASTIC (A-2-7) (DUPLIN FORMATION)
105	100.9	33.6	6	6	7									
100	95.9	38.6	7	8	10									
95	90.9	43.6	9	8	12									
90														89.4 Boring Terminated at Elevation 89.4 ft IN COASTAL PLAIN CLAYEY SAND (DUPLIN FORMATION) 45.1

### GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON/CUMBERLAND		GEOLOGIST K. SWAIN									
SITE DESCRIPTION CULVERT AT STA. 111+25 -L- UNNAMED TRIBUTARY TO SADDLETREE SWAMP						GROUND WTR (ft)									
BORING NO. L_11200_HA		STATION 112+00		OFFSET 100 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 124.5 ft		TOTAL DEPTH 4.5 ft		NORTHING 336,322		EASTING 1,998,698									
DRILL RIG/HAMMER EFF./DATE HAND AUGER				DRILL METHOD Hand Auger		HAMMER TYPE N/A									
DRILLER K. SWAIN		START DATE 12/27/19		COMP. DATE 12/27/19		SURFACE WATER DEPTH 0.5ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					DEPTH (ft)
125															
120											S-013 S-014	Sat.	21% W	124.5 124.0 120.5 120.0	GROUND SURFACE 0.0 ALLUVIAL DARK BROWN, MUCK, HIGHLY ORGANIC (27.4%) FINE TO COARSE SANDY SILT, SATURATED (A-4) UNDIVIDED COASTAL PLAIN GRAY, FINE TO COARSE SANDY CLAY, WET, MODERATELY PLASTIC (A-6) BROWN, SILTY FINE SAND, WET (A-2-4) Boring Terminated at Elevation 120.0 ft IN UNDIVIDED COASTAL PLAIN SILTY SAND

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON/CUMBERLAND		GEOLOGIST K. SWAIN									
SITE DESCRIPTION CULVERT AT STA. 111+25 -L- UNNAMED TRIBUTARY TO SADDLETREE SWAMP						GROUND WTR (ft)									
BORING NO. L_11200_RT		STATION 111+93		OFFSET 70 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 132.4 ft		TOTAL DEPTH 41.1 ft		NORTHING 336,323		EASTING 1,998,667									
DRILL RIG/HAMMER EFF./DATE CAT4425 CME-55 87% 01/16/2019				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. EDMONDSON		START DATE 12/18/19		COMP. DATE 12/18/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					DEPTH (ft)
135															
130	132.4	0.0	3	3	4	3									132.4
125	127.9	4.5	2	2	2	2									123.4
120	122.8	9.6	WOH	WOH	1	1									9.0
115	117.8	14.6	2	2	3	3									15.1
110	112.8	19.6	WOH	WOH	WOH	3									22.0
105	107.8	24.6	WOH	WOH	WOH	1									
100	102.8	29.6	WOH	WOH	WOH	1									
95	97.8	34.6	WOH	WOH	1	1									
	92.8	39.6	5	11	14	25									41.1
															91.3

NCDOT BORE DOUBLE I5987\_GEO\_CULV L11125\_BH\_CATLIN.GPJ NC\_DOT.GDT 8/26/21



### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: CULVERT AT STA. 111+25 -L- OVER UNNAMED TRIBUTARY TO SADDLETREE SWAMP

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-52	111+18	-L-	78' LT	6.0 - 7.5	A-6 (6)	33	23	21.0	36.2	11.0	31.8	0	100	93	45	16.8	--
SS-123	111+29	-L-	11' RT	8.6 - 10.1	A-2-7 (5)	53	40	34.9	33.2	2.4	29.5	0	100	89	33	21.1	--
SS-124	111+29	-L-	11' RT	18.6 - 20.1	A-2-6 (0)	31	12	65.3	21.3	1.9	11.5	0	99	69	13	31.4	--

*Stephanie H. Huffman*

Certified Lab Technician Signature

114-01-1203

Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
S-013	112+00	-L-	100' RT	0.0 - 0.5	A-4(0)	NP	NP	7.4	10.7	78.5	3.4	14	82	95	84	--	27.4
S-014	112+00	-L-	100' RT	0.5 - 1.5	A-6(3)	27	16	20.8	40.0	12.9	26.3	0	100	94	42	21.0	--
SS-039	111+93	-L-	70' RT	0.0 - 1.5	A-4(3)	23	9	25.1	13.2	53.8	7.9	0	99	84	63	--	--
SS-040	111+93	-L-	70' RT	14.6 - 15.1	A-6(8)	30	17	17.2	17.7	53.0	12.1	0	100	93	66	--	--
SS-041	111+93	-L-	70' RT	19.6 - 21.1	A-2-6(0)	30	14	54.4	23.9	3.5	18.2	0	100	75	22	28.0	--
SS-042	111+93	-L-	70' RT	24.6 - 26.1	A-3(0)	NP	NP	56.1	39.4	2.5	2.0	0	100	80	5	--	--
SS-043	111+93	-L-	70' RT	34.6 - 36.1	A-3(0)	NP	NP	52.5	44.4	2.1	1.0	0	100	81	3	--	--
SS-044	111+93	-L-	70' RT	39.6 - 41.1	A-3(0)	NP	NP	34.5	58.5	4.1	2.9	0	98	88	8	--	--

NP - NON-PLASTIC

*Michael D. Pason*

Certified Lab Technician Signature

Unknown - Catlin Engineers and Scientists

Certification Number

REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD.)  
SITE DESCRIPTION SITE II - CULVERT AT  
STA. 310 + 73 -L- OVER TENMILE SWAMP

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-8	BORE LOGS
9	LABORATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	9

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 1919 T07-6850. 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.

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DATE AUGUST 2021

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NC REGISTERED GEOLOGIC FIRM: C-367



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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

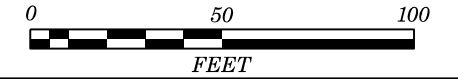
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

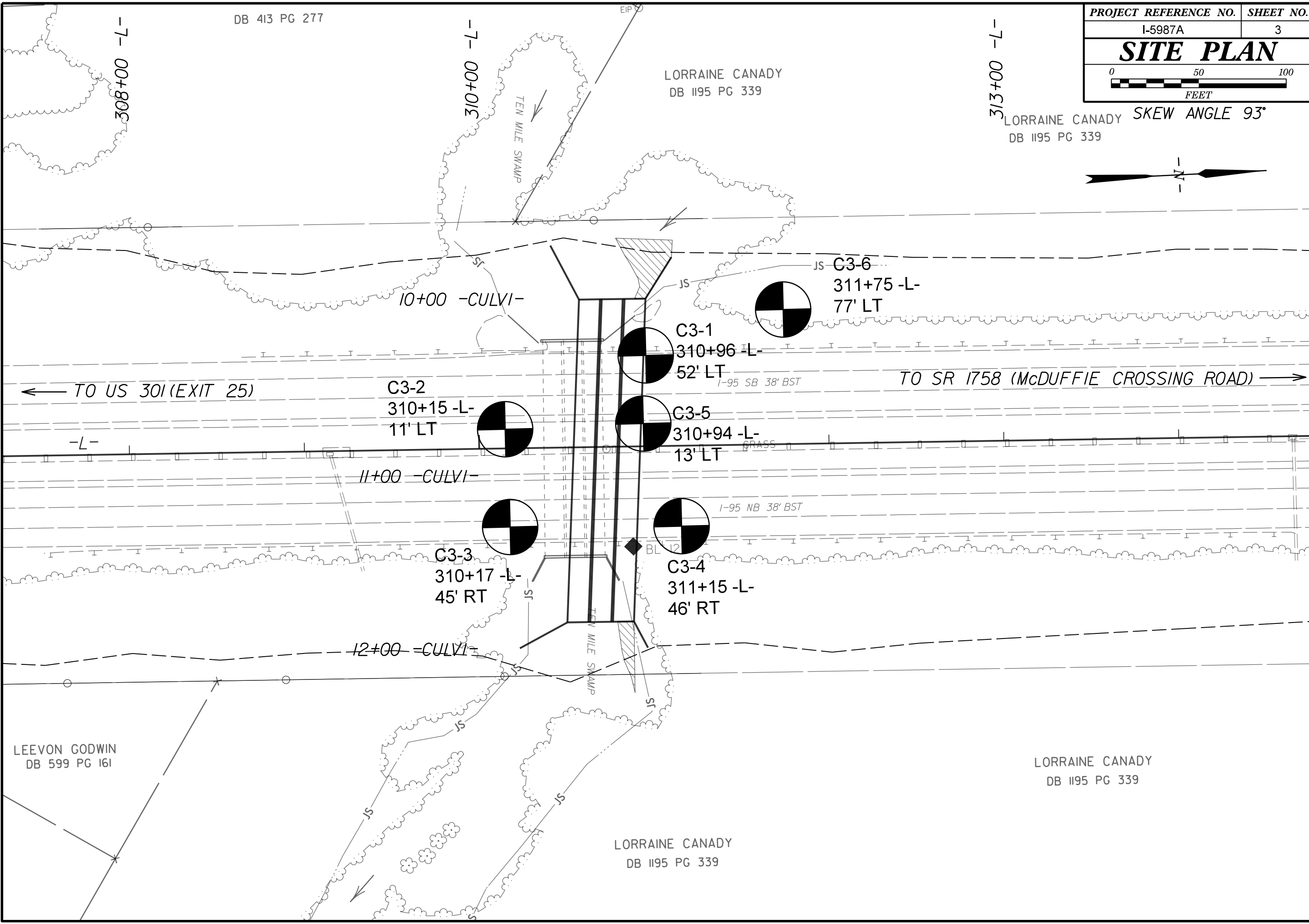
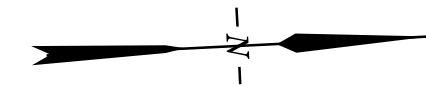
SOIL DESCRIPTION							GRADATION							ROCK DESCRIPTION							TERMS AND DEFINITIONS						
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAVEL, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6							WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.							HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF 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:							<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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. <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.						
SOIL LEGEND AND AASHTO CLASSIFICATION							ANGULARITY OF GRAINS							WEATHERING							MISCELLANEOUS SYMBOLS						
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.							MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.							<b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. <b>VERY SLIGHT (V SLI.)</b> - 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. <b>SLIGHT (SLI.)</b> - 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. <b>MODERATE (MOD.)</b> - 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. <b>MODERATELY SEVERE (MOD. SEV.)</b> - 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> <b>SEVERE (SEV.)</b> - 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, WOULD YIELD SPT N VALUES &gt; 100 BPF</i> <b>VERY SEVERE (V SEV.)</b> - 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. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i> <b>COMPLETE</b> - 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.							<b>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</b> <b>SOIL SYMBOL</b> <b>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</b> <b>INFERRED SOIL BOUNDARY</b> <b>INFERRED ROCK LINE</b> <b>ALLUVIAL SOIL BOUNDARY</b>						
MINERALOGICAL COMPOSITION							COMPRESSIONIBILITY							ROCK HARDNESS							RECOMMENDATION SYMBOLS						
COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50							<b>UNDERCUT</b> <b>SHALLOW UNDERCUT</b> <b>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</b> <b>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</b> <b>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</b>																				
PERCENTAGE OF MATERIAL							GROUND WATER							ABBREVIATIONS							EQUIPMENT USED ON SUBJECT PROJECT						
ORGANIC MATERIAL TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10%							GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL 2 - 3% 3 - 5% TRACE 1 - 10% 3 - 5% 5 - 12% LITTLE 10 - 20% 5 - 10% 12 - 20% SOME 20 - 35% > 10% > 20% HIGHLY 35% AND ABOVE							<b>AR - AUGER REFUSAL</b> <b>BT - BORING TERMINATED</b> <b>CL - CLAY</b> <b>CPT - CONE PENETRATION TEST</b> <b>CSE. - COARSE</b> <b>DMT - DILATOMETER TEST</b> <b>DPT - DYNAMIC PENETRATION TEST</b> <b>e - VOID RATIO</b> <b>F - FINE</b> <b>FOSS. - FOSSILIFEROUS</b> <b>FRAC. - FRACTURED, FRACTURES</b> <b>FRAGS. - FRAGMENTS</b> <b>HI. - HIGHLY</b> <b>MED. - MEDIUM</b> <b>MICA. - MICACEOUS</b> <b>MOD. - MODERATELY</b> <b>NP - NON PLASTIC</b> <b>ORG. - ORGANIC</b> <b>PMT - PRESSUREMETER TEST</b> <b>SAP. - SAPROLITIC</b> <b>SD. - SAND, SANDY</b> <b>SL. - SILT, SILTY</b> <b>SLI. - SLIGHTLY</b> <b>TCR - TRICONE REFUSAL</b> <b>v - MOISTURE CONTENT</b> <b>v - VERY</b> <b>VST - VANE SHEAR TEST</b> <b>WEA. - WEATHERED</b> <b>MOD. - MODERATELY</b> <b>UNIT WEIGHT</b> <b>DRY UNIT WEIGHT</b> <b>SAMPLE ABBREVIATIONS</b> <b>S - BULK</b> <b>SS - SPLIT SPOON</b> <b>ST - SHELBY TUBE</b> <b>RS - ROCK</b> <b>RT - RECOMPACTED TRIAXIAL</b> <b>CBR - CALIFORNIA BEARING RATIO</b>							<b>DRILL UNITS:</b> <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 (F&R3495) <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> ADKER RENEGADE (11ER92-0)						
TEXTURE OR GRAIN SIZE							SOIL MOISTURE - CORRELATION OF TERMS							FRACTURE SPACING							BEDDING						
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 0.075 0.25 0.075 0.053							<b>LIQUID LIMIT</b> - SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE <b>PLASTIC LIMIT</b> - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE <b>OPTIMUM MOISTURE SHRINKAGE LIMIT</b> - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE <b>DRY - (D)</b> REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE							<b>VERY WIDE</b> MORE THAN 10 FEET <b>WIDE</b> 3 TO 10 FEET <b>MODERATELY CLOSE</b> 1 TO 3 FEET <b>CLOSE</b> 0.16 TO 1 FOOT <b>VERY CLOSE</b> LESS THAN 0.16 FEET							<b>VERY THICKLY BEDDED</b> 4 FEET <b>THICKLY BEDDED</b> 1.5 - 4 FEET <b>THINLY BEDDED</b> 0.16 - 1.5 FEET <b>VERY THINLY BEDDED</b> 0.03 - 0.16 FEET <b>THICKLY LAMINATED</b> 0.008 - 0.03 FEET <b>THINLY LAMINATED</b> < 0.008 FEET						
PLASTICITY							EQUIPMENT USED ON SUBJECT PROJECT							INDURATION							BENCH MARK; EXISTING GROUND AND TOP OF BORING ELEVATIONS						
<b>PLASTICITY INDEX (PI)</b> NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH							<b>ADVANCING TOOLS:</b> <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6' CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> w/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 1/4" STEEL TEETH <input type="checkbox"/> TRICONE _____ TUNG-CARB. <input type="checkbox"/> CORE BIT <input type="checkbox"/> _____							<b>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</b> <b>FRIABLE</b> RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. <b>MODERATELY INDURATED</b> GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. <b>INDURATED</b> GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. <b>EXTREMELY INDURATED</b> SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.							<b>ESTIMATED USING PROVIDED PROJECT TIN FILE (I5987_is_tin.tin)</b> <b>DATED 5/6/2021</b> ELEVATION: N/A FEET						
COLOR							EQUIPMENT USED ON SUBJECT PROJECT							INDURATION							BENCH MARK; EXISTING GROUND AND TOP OF BORING ELEVATIONS						
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.							<b>DRILL UNITS:</b> <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55 (F&R3495) <input type="checkbox"/> CME-550 <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> ADKER RENEGADE (11ER92-0)							<b>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</b> <b>FRIABLE</b> RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. <b>MODERATELY INDURATED</b> GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. <b>INDURATED</b> GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. <b>EXTREMELY INDURATED</b> SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.							<b>ESTIMATED USING PROVIDED PROJECT TIN FILE (I5987_is_tin.tin)</b> <b>DATED 5/6/2021</b> ELEVATION: N/A FEET						
PLASTICITY							EQUIPMENT USED ON SUBJECT PROJECT							INDURATION							BENCH MARK; EXISTING GROUND AND TOP OF BORING ELEVATIONS						
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# SITE PLAN

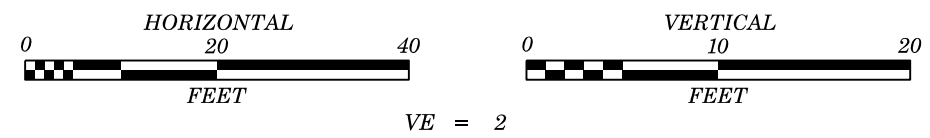


313+00 -L-

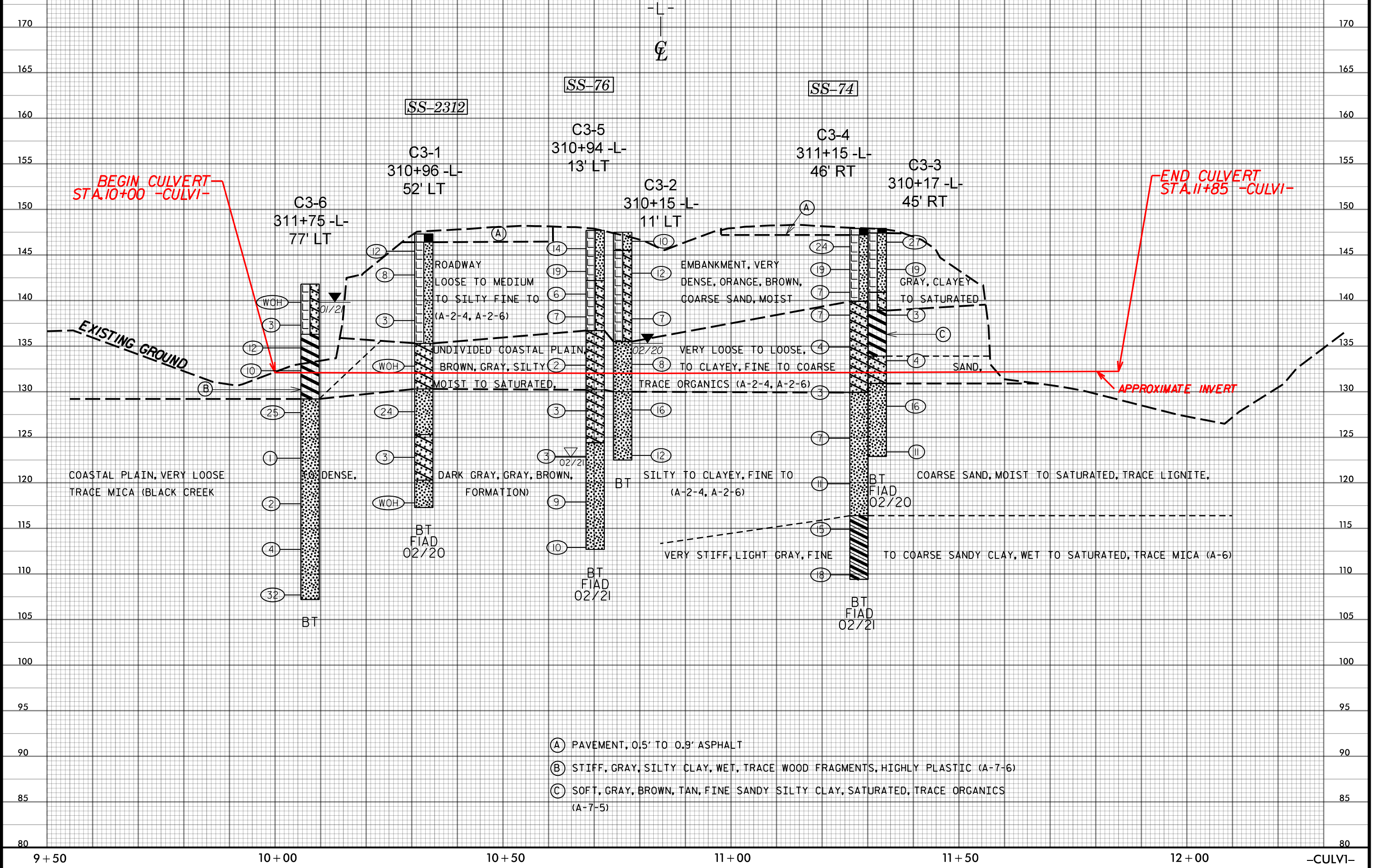
LORRAINE CANADY SKEW ANGLE 93°  
DB 1195 PG 339



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV1- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987.ls.tin1.tin)



SKEW ANGLE 93°



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter										
SITE DESCRIPTION CULVERT AT STA. 310+73 -L- OVER TENMILE SWAMP							GROUND WTR (ft)									
BORING NO. C3-1		STATION 310+96		OFFSET 52 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 147.3 ft		TOTAL DEPTH 30.0 ft		NORTHING 356,004		EASTING 2,000,750										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 86% 02/07/2020			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 02/26/20		COMP. DATE 02/26/20		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150															147.3	0.0
	146.4	0.9	6	5	7										146.4	0.9
145																
	143.8	3.5	5	3	5											
140																
	138.8	8.5	1	1	2											
135																
	133.8	13.5	WOH	WOH	WOH											
130																
	128.8	18.5	5	11	13											
125																
	123.8	23.5	2	2	1											
120																
	118.8	28.5	WOH	1	WOH											

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter										
SITE DESCRIPTION CULVERT AT STA. 310+73 -L- OVER TENMILE SWAMP							GROUND WTR (ft)									
BORING NO. C3-2		STATION 310+15		OFFSET 11 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 147.5 ft		TOTAL DEPTH 25.0 ft		NORTHING 355,922		EASTING 2,000,790										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 02/26/20		COMP. DATE 02/26/20		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150															147.5	0.0
	147.5	0.0	2	3	7										147.5	0.0
145																
	144.0	3.5	8	6	6											
140																
	139.0	8.5	2	3	4											
135																
	134.0	13.5	3	5	3											
130																
	129.0	18.5	6	8	8											
125																
	124.0	23.5	3	5	7											

NCDOT BORE DOUBLE I5987\_GEO\_BORELOGS\_CULV\_L31095.GPJ\_NC\_DOT.GDT 6/22/21

Notes:  
 1. NM=Not Measured due to mud rotary techniques  
 2. FIAD=Filled Immediately After Drilling due to boring location in roadway

Notes:  
 1. Surficial Organic Soil: 0.0-0.2'  
 2. NM=Not Measured due to mud rotary techniques



WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl								
SITE DESCRIPTION CULVERT AT STA. 310+73 -L- OVER TENMILE SWAMP							GROUND WTR (ft)							
BORING NO. C3-3		STATION 310+17		OFFSET 45 ft RT		ALIGNMENT -L-	0 HR. NM							
COLLAR ELEV. 147.9 ft		TOTAL DEPTH 25.0 ft		NORTHING 355,924		EASTING 2,000,846	24 HR. FIAD							
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER D. Tignor		START DATE 02/19/20		COMP. DATE 02/19/20		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				
150														
	147.4	0.5	13	13	14									GROUND SURFACE 0.0 147.4
145	144.4	3.5	9	9	10									ROADWAY EMBANKMENT ASPHALT 6.5 MEDIUM DENSE, BROWN-TAN-GRAY, SILTY FINE TO COARSE SAND, MOIST (A-2-4)
														140.9
140	139.4	8.5	2	2	1									7.0
														138.9
135	134.4	13.5	WOH	3	1									9.0
														133.9
130	129.4	18.5												14.0
														130.9
125	124.4	23.5	3	5	6									17.0
														122.9
														25.0
<p>Boring Terminated at Elevation 122.9 ft in SAND (COASTAL PLAIN)</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>NM=Not Measured due to mud rotary techniques</li> <li>FIAD=Filled Immediately After Drilling due to boring location in roadway</li> </ol>														

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST FARMER, B. C.								
SITE DESCRIPTION CULVERT AT STA. 310+73 -L- OVER TENMILE SWAMP							GROUND WTR (ft)							
BORING NO. C3-4		STATION 311+15		OFFSET 46 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 147.9 ft		TOTAL DEPTH 38.5 ft		NORTHING 356,022		EASTING 2,000,847								
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 02/15/2019			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER DUGGINS, W. T.		START DATE 02/02/21		COMP. DATE 02/02/21		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				
150														147.9 GROUND SURFACE 0.0
146.9	146.9	1.0	9	15	9									147.2 PAVEMENT 0.7
145	144.4	3.5	8	9	10									ROADWAY EMBANKMENT
	141.9	6.0	4	4	3									LOOSE TO MEDIUM DENSE, GRAY, ORANGE, SILTY COARSE TO FINE SAND, WET (A-2-4)
140	139.4	8.5	3	3	4									UNDIVIDED COASTAL PLAIN
	135.9	12.0	WOH	1	3									VERY LOOSE TO LOOSE, GRAY, CLAYEY FINE TO COARSE SAND, WET, MODERATELY PLASTIC (A-2-6)
135	130.9	17.0	WOH	1	2									
130	125.9	22.0	3	4	3									COASTAL PLAIN
	120.9	27.0	4	7	4									VERY LOOSE TO MEDIUM DENSE, DARK GRAY, GRAY, SILTY COARSE TO FINE SAND, WET TO SATURATED, TRACE LIGNITE (A-2-4) (BLACK CREEK FORMATION)
125	115.9	32.0	4	5	10									
120	110.9	37.0	4	8	10									
115														VERY STIFF, LIGHT GRAY, FINE TO COARSE SANDY CLAY, WET TO SATURATED, TRACE MICA (A-6)
110														Boring Terminated at Elevation 109.4 ft IN COASTAL PLAIN SANDY CLAY (BLACK CREEK FORMATION)

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST FARMER, B. C.								
SITE DESCRIPTION CULVERT AT STA. 310+73 -L- OVER TENMILE SWAMP							GROUND WTR (ft)							
BORING NO. C3-5		STATION 310+94		OFFSET 13 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 147.7 ft		TOTAL DEPTH 35.3 ft		NORTHING 356,001		EASTING 2,000,788								
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 02/15/2019			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER DUGGINS, W. T.		START DATE 02/04/21		COMP. DATE 02/04/21		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				
150														147.7 GROUND SURFACE 0.0
145	146.7	1.0	4	6	8									ROADWAY EMBANKMENT
	144.2	3.5	3	8	11									MEDIUM DENSE, ORANGE, BROWN, GRAY, SILTY COARSE TO FINE SAND, WET (A-2-4)
140	141.7	6.0	3	3	3									5.5
	139.2	8.5	1	2	5									LOOSE, BROWN, GRAY, CLAYEY FINE TO COARSE SAND, WET, MODERATELY PLASTIC (A-2-6)
135	133.9	13.8	3	1	1									UNDIVIDED COASTAL PLAIN
	129.9	18.8	1	1	2									VERY LOOSE, BROWN, GRAY, CLAYEY FINE TO COARSE SAND, MODERATELY PLASTIC (A-2-6)
130	128.9	18.8	1	1	2									COASTAL PLAIN
	123.9	23.8	1	1	2									VERY LOOSE, BROWN, GRAY, CLAYEY FINE TO COARSE SAND, MODERATELY PLASTIC (A-2-6) (BLACK CREEK FORMATION)
125	118.9	28.8	3	3	6									23.3
	113.9	33.8	4	4	6									VERY LOOSE TO LOOSE, GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4)
115														112.7
														Boring Terminated at Elevation 112.4 ft IN COASTAL PLAIN SILTY CLAY (BLACK CREEK FORMATION)



### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: CULVERT AT STA. 310+73 -L- OVER TENMILE SWAMP

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-74	311+15	-L-	46' RT	3.5 - 5.0	A-2-4 (0)	18	2	25.0	52.4	5.3	17.3	0	100	89	25	--	--
SS-76	310+94	-L-	13' LT	8.5 - 10.0	A-2-6 (2)	37	21	41.8	25.7	7.0	25.5	0	100	74	35	--	--

*Stephanie H. Huffman*

\_\_\_\_\_  
Certified Lab Technician Signature

114-01-1203  
\_\_\_\_\_  
Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-2312	310+96	-L-	52' LT	13.5 - 15.0	A-2-6(2)	36	18	28.6	37.7	6.4	27.3	0	100	85	35	26.5	--

TESTED BY: D. COUNCIL - F&R  
CERTIFICATION NO.: 101-02-0603

REFERENCE: I-5987A

PROJECT: 45733

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD.)  
SITE DESCRIPTION SITE 12 - CULVERT AT  
STA. 366 + 29 -L- OVER COWPEN BRANCH

**CONTENTS**

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS
7	LABRATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	7

**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 1919 T07-6850. 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

<u>KELLY, N. S.</u>	<u>DEGON, A. N.</u>
	<u>TURNAGE, J. R.</u>
	<u>DAVIS, S. (F&amp;R, Inc.)</u>
	<u>TIGNOR, D. (F&amp;R, Inc.)</u>
	<u>PESL, W. (F&amp;R, Inc.)</u>
	<u>PAINTER, B. (F&amp;R, Inc.)</u>

INVESTIGATED BY: TERRACON CONSULTANTS  
F&R, Inc.

DRAWN BY KENNEDY, E. J.

CHECKED BY RIGGS, A. F.

SUBMITTED BY ALEXANDER, M. J.

DATE SEPTEMBER 2021

Prepared in the Office of:



**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:  
Matt Alexander 10/19/2021  
0FB0038EEA06462 SIGNATURE DATE

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





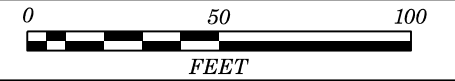
BRENDA B. SMITH  
DB 2146 PG 260

PROJECT REFERENCE NO. SHEET NO.

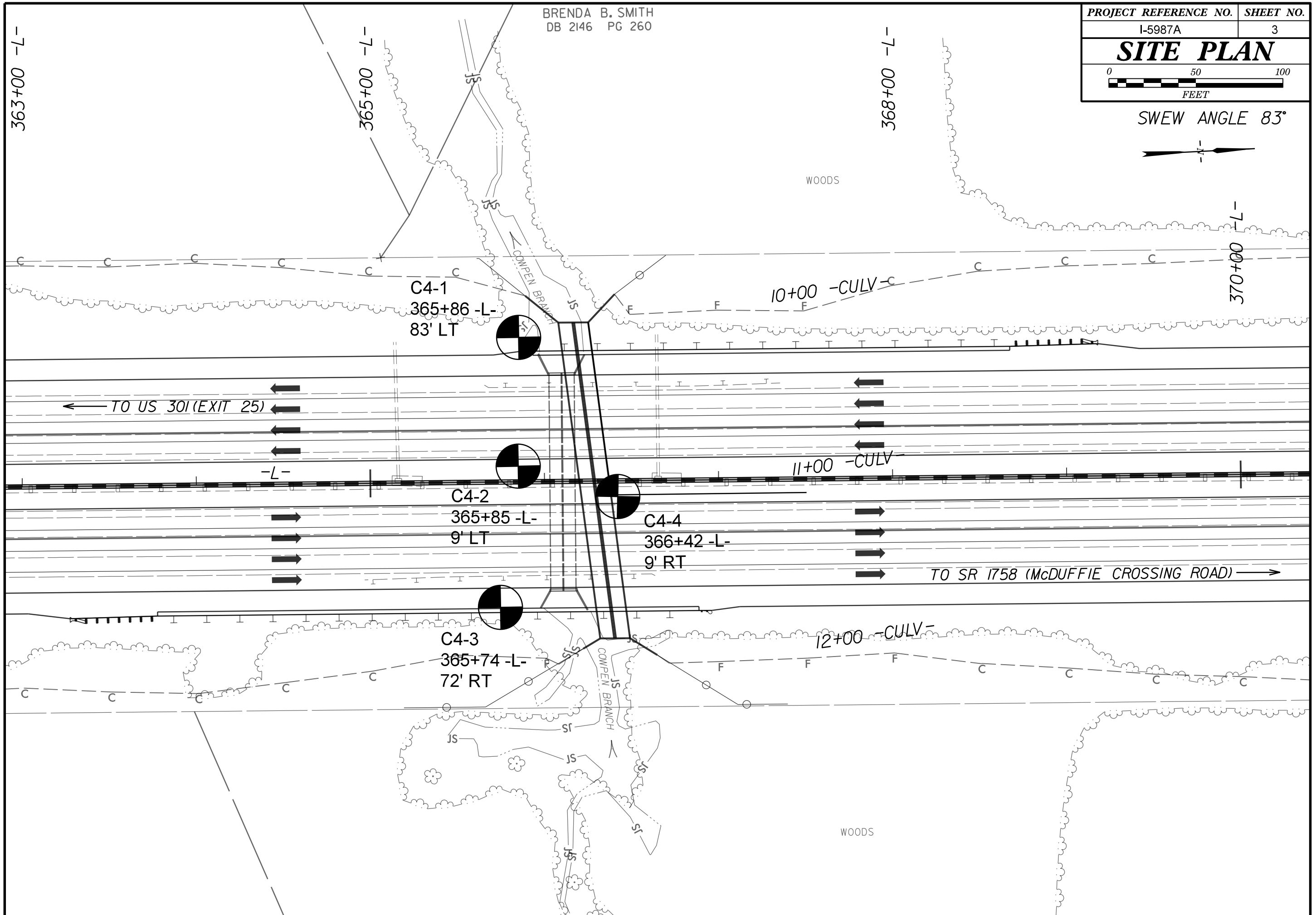
I-5987A

3

# SITE PLAN



SWEW ANGLE 83°



363+00 -L-

365+00 -L-

368+00 -L-

370+00 -L-

C4-1  
365+86 -L-  
83' LT

10+00 -CULV-

← TO US 301 (EXIT 25)

11+00 -CULV-

C4-2  
365+85 -L-  
9' LT

C4-4  
366+42 -L-  
9' RT

TO SR 1758 (McDUFFIE CROSSING ROAD) →

C4-3  
365+74 -L-  
72' RT

12+00 -CULV-

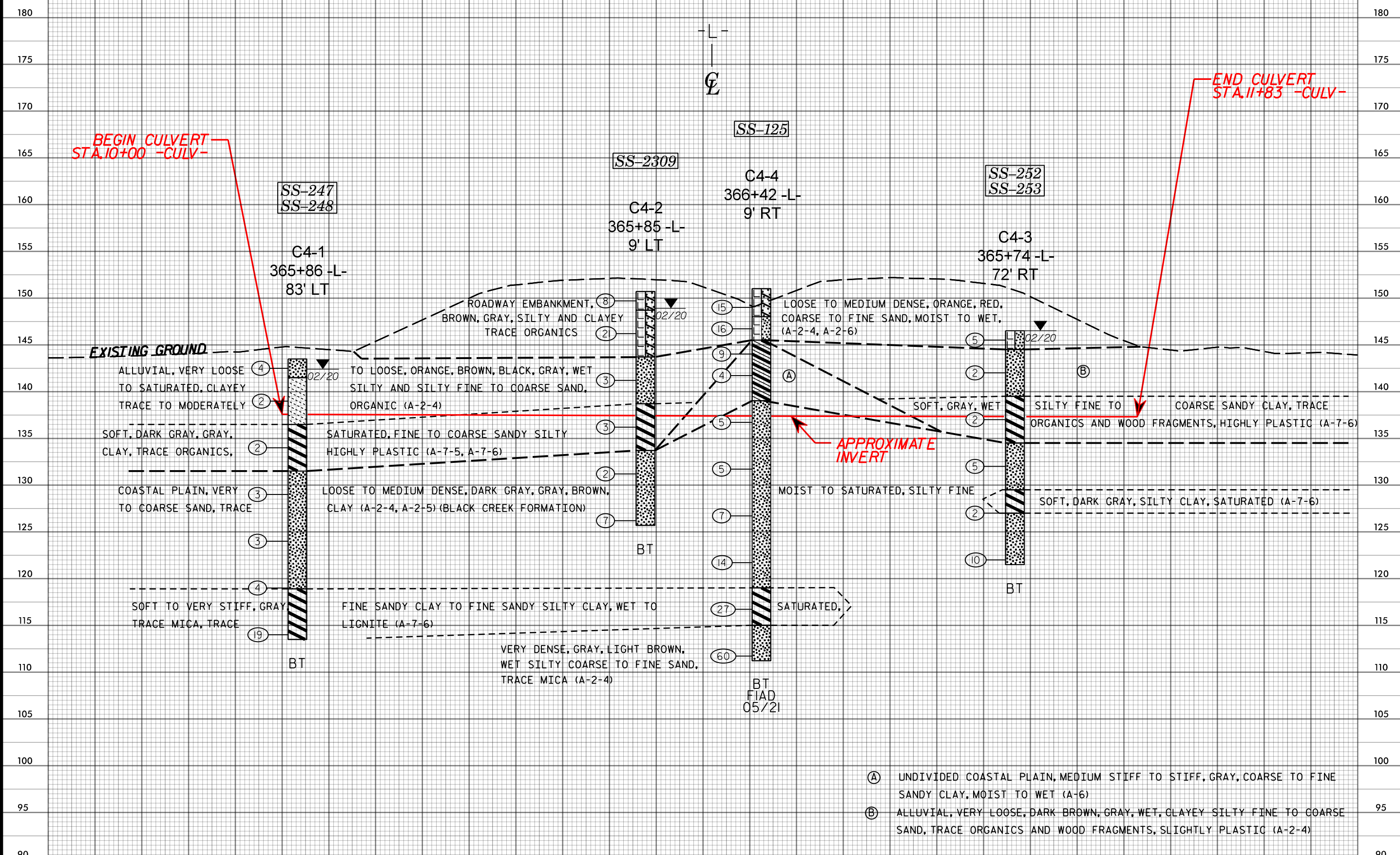
WOODS

WOODS

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987.ls.tin1.tin)



SKREW ANGLE 83°



BEGIN CULVERT STA. 10+00 -CULV-

END CULVERT STA. 11+83 -CULV-

APPROXIMATE INVERT

- (A) UNDIVIDED COASTAL PLAIN, MEDIUM STIFF TO STIFF, GRAY, COARSE TO FINE SANDY CLAY, MOIST TO WET (A-6)
- (B) ALLUVIAL, VERY LOOSE, DARK BROWN, GRAY, WET, CLAYEY SILTY FINE TO COARSE SAND, TRACE ORGANICS AND WOOD FRAGMENTS, SLIGHTLY PLASTIC (A-2-4)

## GEOTECHNICAL BORING REPORT BORE LOG

## GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl												
SITE DESCRIPTION CULVERT AT STA. 366+29 -L- OVER COWPEN BRANCH							GROUND WTR (ft)											
BORING NO. C4-1		STATION 365+86		OFFSET 83 ft LT		ALIGNMENT -L-												
COLLAR ELEV. 143.5 ft		TOTAL DEPTH 30.0 ft		NORTHING 361,494		EASTING 2,000,766												
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic														
DRILLER S. Davis		START DATE 02/03/20		COMP. DATE 02/03/20		SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
145																		
	143.5	0.0	1	2	2										143.5	GROUND SURFACE	0.0	
140	140.0	3.5													141.5	ALLUVIAL LOOSE, ORANGE-BROWN, CLAYEY SILTY FINE TO COARSE SAND, WET, TRACE ORGANICS (A-2-4)	2.0	
135	135.0	8.5	1	1	1										136.5	VERY LOOSE, BLACK-GRAY, CLAYEY SILTY FINE TO COARSE SAND, SATURATED, MODERATELY ORGANIC (ORGANIC CONTENT=6.1%) (A-2-4)	7.0	
130	130.0	13.5	WOH	1	1										131.5	SOFT, DARK GRAY, FINE TO COARSE SANDY SILTY CLAY, SATURATED, HIGHLY PLASTIC (A-7-5)	12.0	
125	125.0	18.5													131.5	COASTAL PLAIN VERY LOOSE, DARK GRAY, SILTY FINE TO COARSE SAND, SATURATED, TRACE CLAY (A-2-4) (BLACK CREEK FORMATION)		
120	120.0	23.5													118.9	SOFT TO VERY STIFF, GRAY, FINE SANDY SILTY CLAY, SATURATED (A-7-6)	24.6	
115	115.0	28.5	4	7	12										113.5	Boring Terminated at Elevation 113.5 ft in CLAY (COASTAL PLAIN)	30.0	
Notes: 1. Surficial Organic Soil: 0.0-0.2'																		

NCDOT BORE SINGLE I5987\_GEO\_BORELOGS\_CULV\_L36620.GPJ\_NC\_DOT.GDT 9/22/21

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter												
SITE DESCRIPTION CULVERT AT STA. 366+29 -L- OVER COWPEN BRANCH							GROUND WTR (ft)											
BORING NO. C4-2		STATION 365+85		OFFSET 9 ft LT		ALIGNMENT -L-												
COLLAR ELEV. 150.7 ft		TOTAL DEPTH 25.0 ft		NORTHING 361,492		EASTING 2,000,840												
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 86% 02/07/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic														
DRILLER D. Tignor		START DATE 02/26/20		COMP. DATE 02/26/20		SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
155																		
150	150.7	0.0	1	4	4										150.7	GROUND SURFACE	0.0	
145	147.2	3.5	6	7	14										148.7	ROADWAY EMBANKMENT LOOSE, ORANGE-RED-BROWN, SILTY CLAYEY FINE TO COARSE SAND, MOIST (A-2-6)	2.0	
140	142.2	8.5	1	1	2										143.7	MEDIUM DENSE, GRAY, CLAYEY FINE SAND, WET, TRACE ORGANICS (A-2-6)	7.0	
135	137.2	13.5	WOH	2	1										138.7	ALLUVIAL VERY LOOSE, BROWN, SILTY FINE SAND, WET (A-2-4)	12.0	
130	132.2	18.5													133.7	SOFT, GRAY, SILTY CLAY, SATURATED, TRACE ORGANICS, HIGHLY PLASTIC (A-7-6)	17.0	
	127.2	23.5	2	3	4										125.7	COASTAL PLAIN VERY LOOSE TO LOOSE, GRAY, SILTY FINE SAND, MOIST TO WET (A-2-4) (BLACK CREEK FORMATION)	25.0	
Boring Terminated at Elevation 125.7 ft in SAND (COASTAL PLAIN)																		
Notes: 1. Surficial Organic Soil: 0.0-0.2'																		

NCDOT BORE SINGLE I5987\_GEO\_BORELOGS\_CULV\_L36620.GPJ\_NC\_DOT.GDT 9/22/21

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST W. Pesl									
SITE DESCRIPTION CULVERT AT STA. 366+29 -L- OVER COWPEN BRANCH							GROUND WTR (ft)								
BORING NO. C4-3		STATION 365+74		OFFSET 72 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 146.5 ft		TOTAL DEPTH 25.0 ft		NORTHING 361,480		EASTING 2,000,921									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER S. Davis		START DATE 02/03/20		COMP. DATE 02/03/20		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
150															
	146.5	0.0												146.5	0.0
145														144.5	2.0
	143.0	3.5												139.5	7.0
140			WOH	1	1									134.5	12.0
	138.0	8.5												129.5	17.0
135			WOH	1	1									127.0	19.5
	133.0	13.5		2	2	3								121.5	25.0
130															
	128.0	18.5	WOH	WOH	2										
125															
	123.0	23.5		2	5	5									

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.									
SITE DESCRIPTION CULVERT AT STA. 366+29 -L- OVER COWPEN BRANCH							GROUND WTR (ft)								
BORING NO. C4-4		STATION 366+42		OFFSET 9 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 151.0 ft		TOTAL DEPTH 39.8 ft		NORTHING 361,549		EASTING 2,000,857									
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 05/17/21		COMP. DATE 05/18/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
155															
	151.0	0.0												151.0	0.0
150	150.0	1.0												148.0	3.0
	147.7	3.3												145.5	5.5
145	145.0	6.0												139.0	12.0
	142.7	8.3													
140															
	137.7	13.3													
135															
	132.7	18.3													
130															
	127.7	23.3	WOH	3	4										
125															
	122.7	28.3		5	7	7									
120															
	117.7	33.3		7	11	16									
115															
	112.7	38.3		17	27	33									

NCDOT BORE SINGLE I5987\_GEO\_BORELOGS\_CULV\_L36620.GPJ\_NC\_DOT.GDT 9/22/21

NCDOT BORE SINGLE I5987A\_GEO\_CULV\_L-366+29\_BH\_TERRACON.GPJ\_NC\_DOT.GDT 9/22/21

**LABORATORY TESTING SUMMARY**

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: CULVERT AT STA. 366+29 -L- OVER COWPEN BRANCH

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-125	366+42	-L-	9 RT	8.3 - 9.8	A-6 (3)	28	16	21.6	37.9	12.9	27.6	0	100	90	44	16.8	--

*Stephanie H. Huffman*

Certified Lab Technician Signature

114-01-1203

Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-247	365+86	-L-	83 LT	3.5 - 5.0	A-2-4 (0)	NP	NP	39.1	33.7	11.8	15.4	0	100	82	29	--	6.1
SS-248	365+86	-L-	83 LT	8.5 - 10.0	A-7-5 (30)	68	32	11.7	9.4	20.7	58.2	0	100	93	81	84.1	--
SS-2309	365+85	-L-	9 LT	13.5 - 15.0	A-7-6 (18)	55	35	24.9	16.8	13.0	45.3	0	100	91	61	79.8	--
SS-252	365+74	-L-	72 RT	3.5 - 5.0	A-2-4 (0)	26	8	26.7	41.4	18.2	13.7	0	100	90	35	--	--
SS-253	365+74	-L-	72 RT	8.5 - 10.0	A-7-6 (12)	49	30	28.7	20.1	8.1	43.1	0	97	82	52	46.7	--

NP - NON-PLASTIC

TESTED BY D. COUNCIL - F&R  
Certified Lab Technician Signature

101-02-0603

Certification Number

REFERENCE: I-5987A

PROJECT: 47533

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
 PROJECT DESCRIPTION I-95 IMPROVEMENTS  
FROM SOUTH OF US 301 (EXIT 22) TO  
NORTH OF SR 1758 (McDUFFIE CROSSING RD.)  
 SITE DESCRIPTION SITE 14 - CULVERT AT  
STA. 24 + 79 -Y3- OVER COWPEN BRANCH

**CONTENTS**

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS
7	LABORATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	7

**CAUTION NOTICE**

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- 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**

FARMER, B. C.  
DUGGINS, W. T.  
KELLY, N. S.

INVESTIGATED BY TERRACON CONSULTANTS  
 DRAWN BY KENNEDY, E. J.  
 CHECKED BY RIGGS, JR., A. F.  
 SUBMITTED BY ALEXANDER, M. J.  
 DATE AUGUST 2021

Prepared in the Office of:  
  
**Terracon**  
 Consulting Engineers and Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 NC REGISTERED ENGINEERING FIRM: F-0869  
 NC REGISTERED GEOLOGIC FIRM: G-367



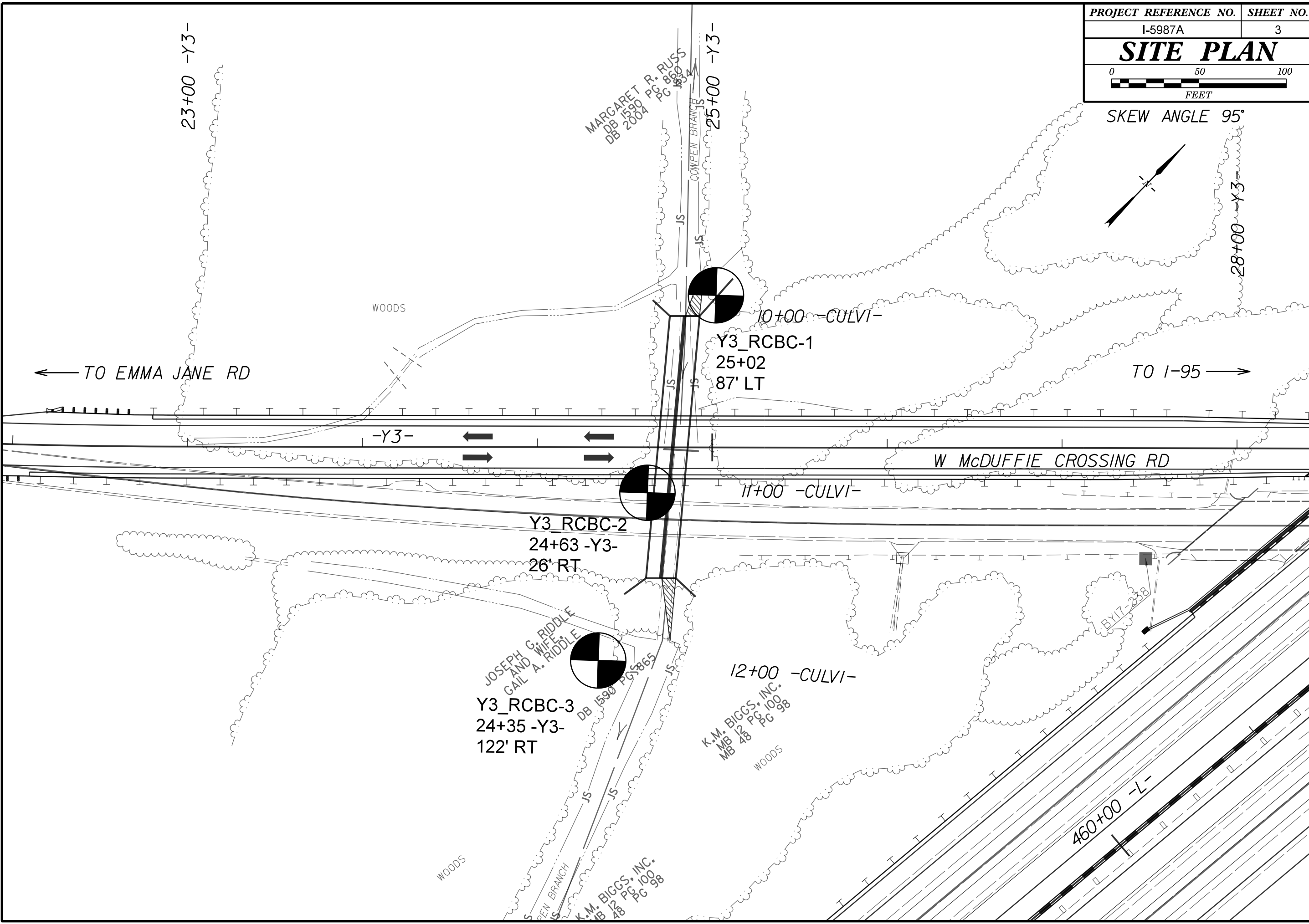
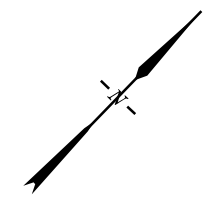
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Matthew J. Alexander 8/30/2021  
 OFB0038EEA06452  
 SIGNATURE DATE

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





SKEW ANGLE 95°



← TO EMMA JANE RD

TO I-95 →

23+00 -Y3-

25+00 -Y3-

28+00 -Y3-

WOODS

-Y3-

W McDUFFIE CROSSING RD

Y3\_RCBC-2  
24+63 -Y3-  
26' RT

Y3\_RCBC-3  
24+35 -Y3-  
122' RT

Y3\_RCBC-1  
25+02  
87' LT

10+00 -CULVI-

11+00 -CULVI-

12+00 -CULVI-

JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 5865

K.M. BIGGS, INC.  
MB 48 PG 100 98

K.M. BIGGS, INC.  
MB 48 PG 100 98

WOODS

WOODS

460+00 -L-

MARGARET R. RUSSELL  
DB 1590 PG 860 JS

COMPEN BRANCH

JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 5865

K.M. BIGGS, INC.  
MB 48 PG 100 98

K.M. BIGGS, INC.  
MB 48 PG 100 98

WOODS

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K.M. BIGGS, INC.  
MB 48 PG 100 98

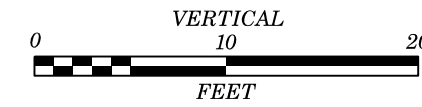
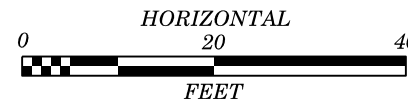
K.M. BIGGS, INC.  
MB 48 PG 100 98

WOODS

WOODS

460+00 -L-

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -CULV1- TAKEN FROM THE PROVIDED PROJECT TIN FILE (I5987.ls.tin1.tin)



VE = 2

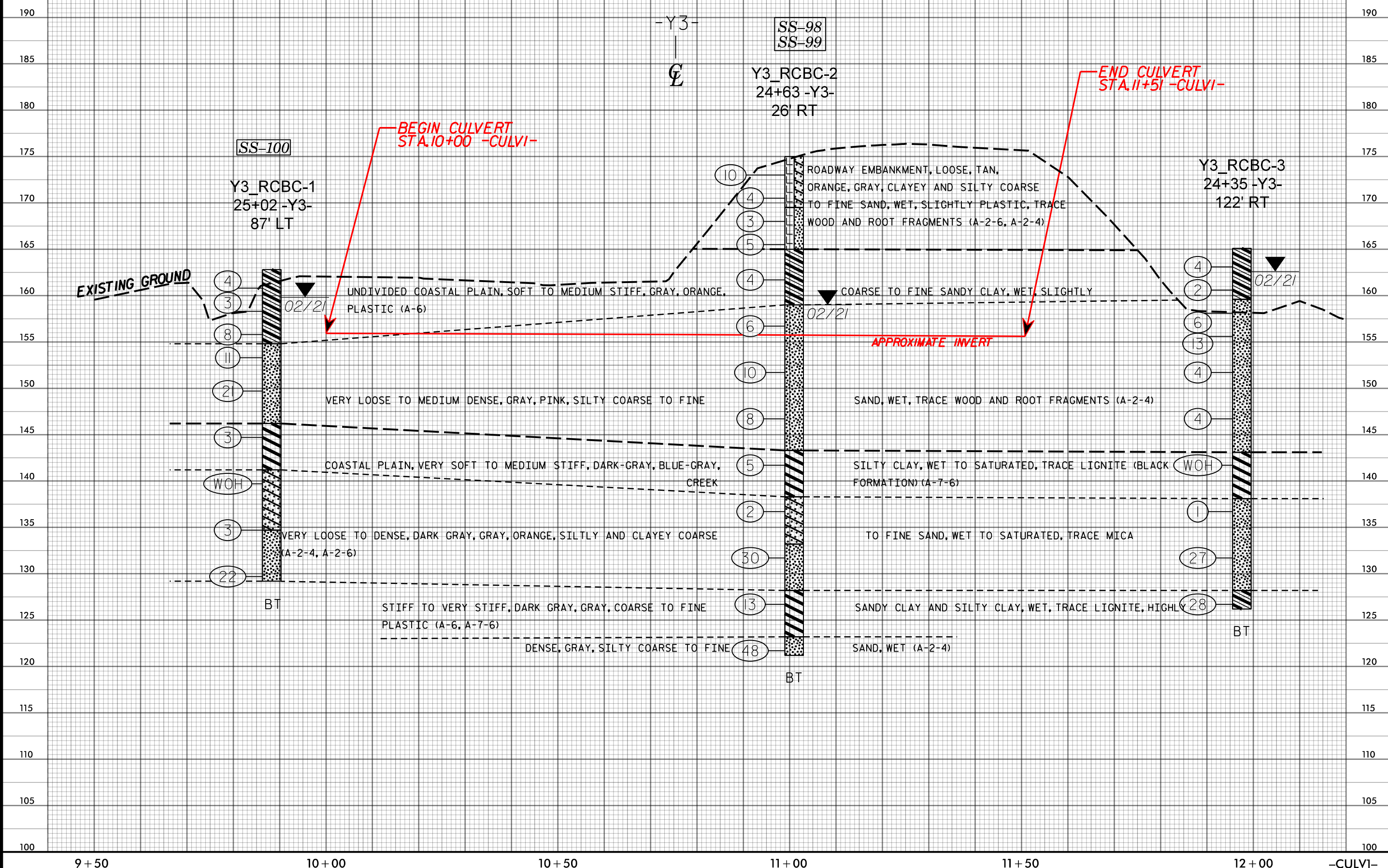
PROJECT REFERENCE NO. SHEET NO.

I-5987A

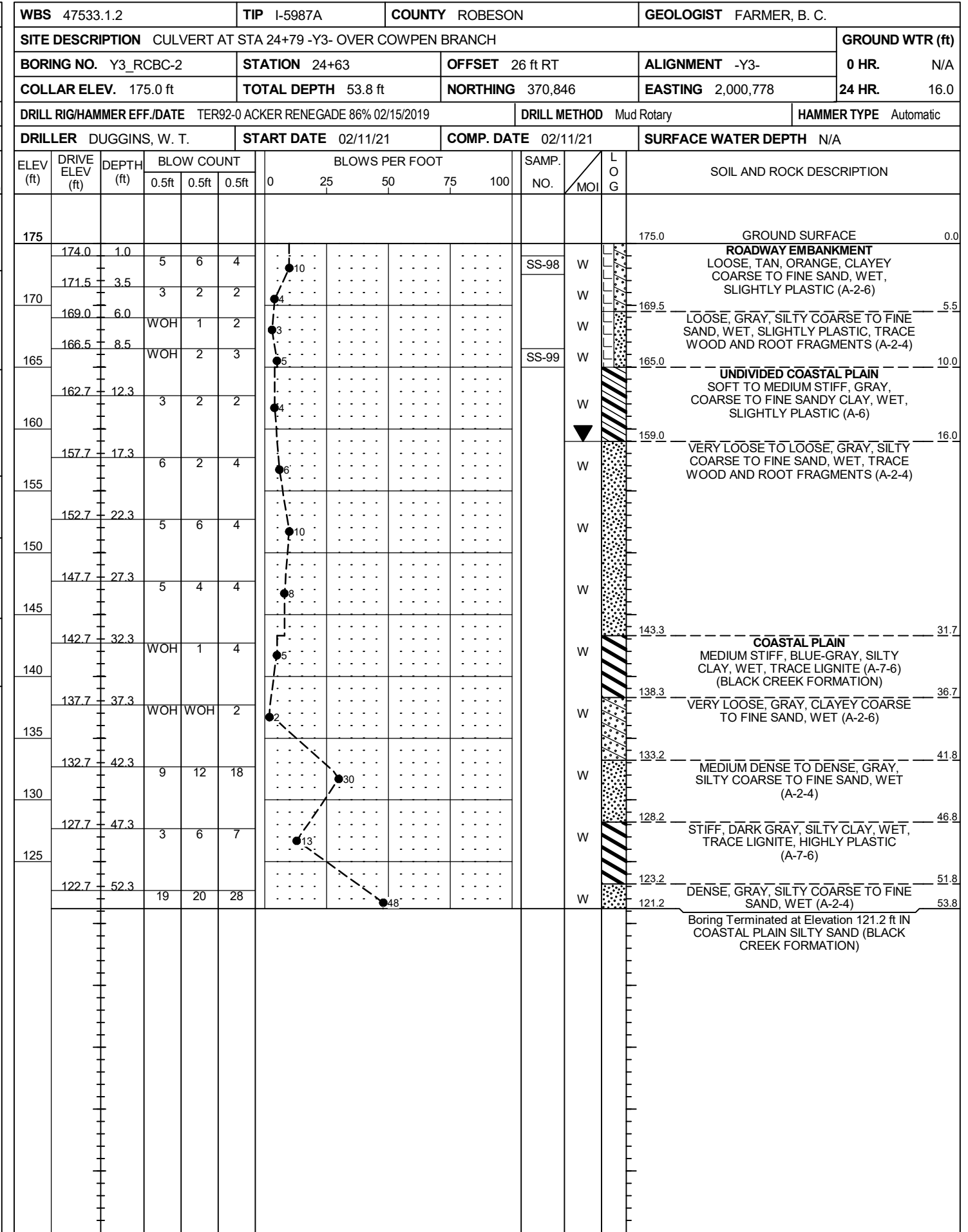
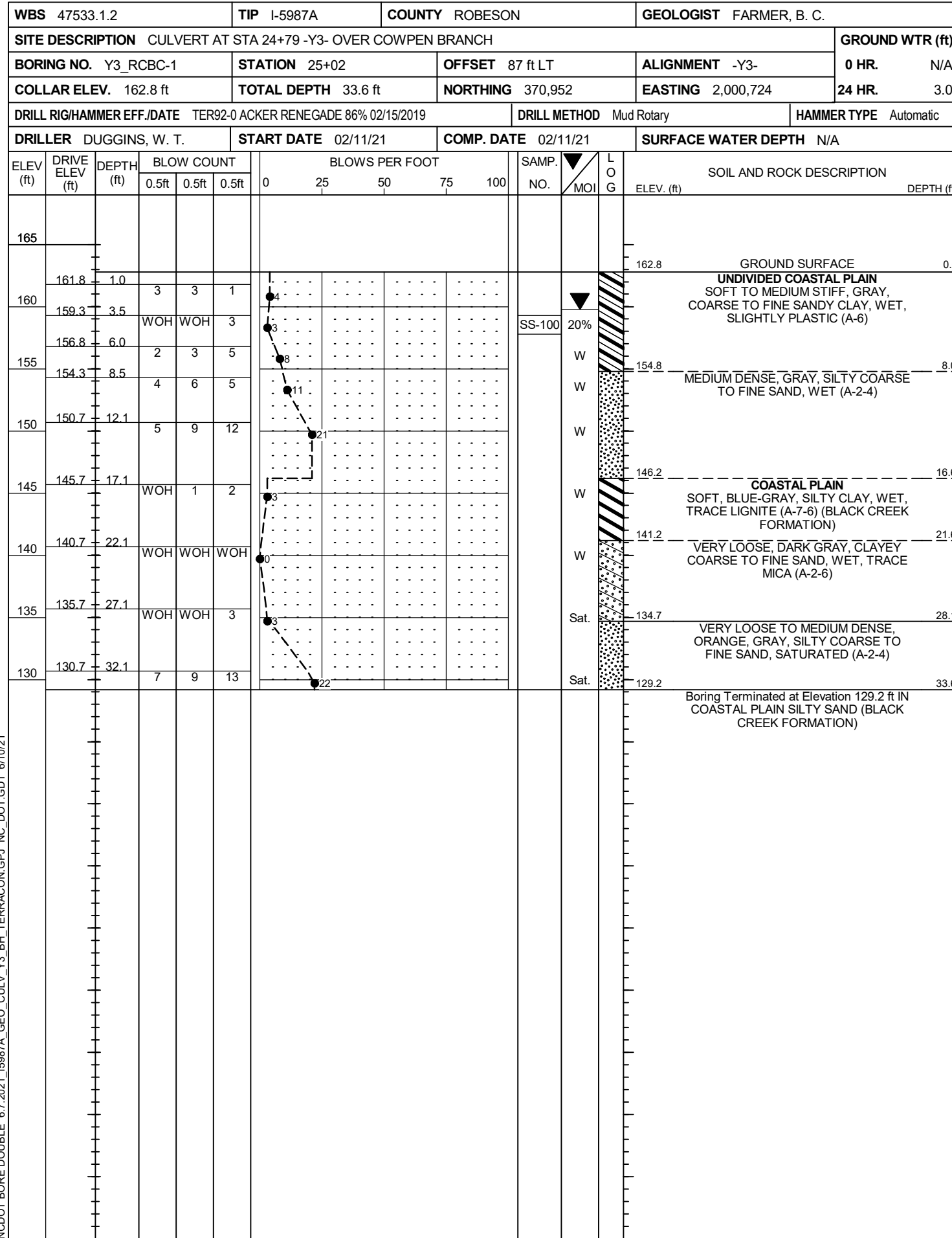
4

CENTERLINE PROFILE ALONG  
CULVERT AT STA. 24+79 -Y3-

SKREW ANGLE 95°



# GEOTECHNICAL BORING REPORT BORE LOG



NCDOT BORE DOUBLE 6.7.2021 15987A\_GEO\_CULV\_Y3\_BH\_TERRACON.GPJ\_NC\_DOT.GDT 6/10/21

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST FARMER, B. C.								
SITE DESCRIPTION CULVERT AT STA 24+79 -Y3- OVER COWPEN BRANCH							GROUND WTR (ft)							
BORING NO. Y3_RCBC-3		STATION 24+35		OFFSET 122 ft RT		ALIGNMENT -Y3-								
COLLAR ELEV. 165.1 ft		TOTAL DEPTH 38.9 ft		NORTHING 370,759		EASTING 2,000,828								
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 95% 02/06/2021				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic								
DRILLER DUGGINS, W. T.		START DATE 02/11/21		COMP. DATE 02/15/21		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				
170														
165														165.1 GROUND SURFACE 0.0
	164.1	1.0	1	2	2	4							W	UNDIVIDED COASTAL PLAIN SOFT, GRAY, ORANGE, COARSE TO FINE SANDY CLAY, WET (A-6)
	161.6	3.5	WOH	1	1	2							W	
160	159.1	6.0	2	3	3	6							W	159.6 VERY LOOSE TO MEDIUM DENSE, GRAY, PINK, SILTY COARSE TO FINE SAND, WET (A-2-4) 5.5
	156.6	8.5	3	6	7	13							W	
155	152.7	12.4	2	2	2	4							W	
150	147.7	17.4	4	3	1	4							W	
145	142.7	22.4	WOH	WOH	WOH	0							Sat.	143.1 COASTAL PLAIN 22.0 VERY SOFT, DARK-GRAY, SILTY CLAY, SATURATED (A-7-6) (BLACK CREEK FORMATION)
140	137.7	27.4	WOH	WOH	1	1							Sat.	138.1 MEDIUM DENSE, GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4) 27.0
135	132.7	32.4	6	12	15	27							Sat.	
130	127.7	37.4	4	8	20	28							W	128.2 VERY STIFF, GRAY, COARSE TO FINE SANDY CLAY, WET (A-6) 36.9 126.2 Boring Terminated at Elevation 126.2 ft IN COASTAL PLAIN SANDY CLAY (BLACK CREEK FORMATION) 38.9

## LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2TIP: I-5987ACOUNTY: ROBESONDESCRIPTION: CULVERT AT STA 24+79 -Y3- OVER COWPEN BRANCH

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-98	22+48	-Y3-	21' RT	1.0 - 2.5	A-2-6 (0)	29	14	67.2	16.0	4.2	12.6	0	99	55	18	--	--
SS-99	22+48	-Y3-	21' RT	8.5 - 10.0	A-2-4 (0)	21	9	47.6	26.7	16.4	9.3	0	100	72	28	--	--
SS-100	22+87	-Y3-	91' LT	3.5 - 5.0	A-6 (2)	24	13	37.5	22.4	19.8	20.3	0	100	77	43	20.4	--

*Stephanie H. Huffman*

\_\_\_\_\_  
Certified Lab Technician Signature

114-01-1203

\_\_\_\_\_  
Certification Number



REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM  
SOUTH OF US 301 (EXIT 22) TO NORTH OF  
SR 1758 (McDUFFIE CROSSING ROAD)  
SITE DESCRIPTION SITE 1 - ABUTMENT RETAINING  
WALLS AT END BENT 1 AND END BENT 2 OF  
BRIDGE ON -Y2- (SR 1529 - POWERSVILLE ROAD)  
OVER -L- (I-95) AT -Y2- STA. 29+75.79

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - 5	PROFILES
6 - 10	BORE LOGS
11	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	11

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PERSONNEL  
DEGON, A. N.  
TURNAGE, J. R.  
KELLY, N. S.

INVESTIGATED BY TERRACON CONSULTANTS  
DRAWN BY FIELDS, W. D.  
CHECKED BY RIGGS, Jr., A. F.  
SUBMITTED BY ALEXANDER, M. J.  
DATE JANUARY 2021

Prepared in the Office of:  
**Terracon**  
Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:  
Matthew J. Alexander 01/28/2022  
0FB0038EEA06452  
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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

# SUBSURFACE INVESTIGATION

## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																														
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>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.</p>										<p>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:</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, 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 (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 (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.</p>																																																																																																																																														
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<p style="text-align: center;"><b>PLASTICITY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NON PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td></td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td></td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td></td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>										NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH		0-5	VERY LOW		6-15	SLIGHT		16-25	MEDIUM		26 OR MORE	HIGH	<p style="text-align: center;"><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <p>DRILL UNITS:</p> <p><input type="checkbox"/> CME-45C</p> <p><input type="checkbox"/> CME-55</p> <p><input type="checkbox"/> CME-550</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input checked="" type="checkbox"/> DIETRICH D-50 (1ER29)</p> <p><input type="checkbox"/></p> <p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input 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 checked="" type="checkbox"/> TRICONE 2% * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE * TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> <p><input checked="" type="checkbox"/> 3/4" HOLLOW STEM AUGERS</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 <input type="checkbox"/> -H</p> <p><input type="checkbox"/> -N</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>																																																																																																																																																			
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<p style="text-align: center;"><b>FRACATURE SPACING</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FOOT</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table>										TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	<p style="text-align: center;"><b>BEDDING</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>&lt; 0.008 FEET</td> </tr> </table>										TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET																																																																																																																															
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<p style="text-align: center;"><b>INDURATION</b></p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF 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;"><b>NOTES:</b></p> <p>BENCH MARK: I5987A-5=B; STA. 21+44.83 -L- 84.46' RIGHT</p> <p>N: 346,053; E: 2,000,619 ELEVATION: 146.05 FEET</p>																																																																																																																																																																		

KAREN PAUL OBERSHEA

BEGIN MSE RETAINING WALL 1  
 STA. 10+00 -S1\_W1- =  
 STA. 209+01.10 -L- OFFSET 88.5' LT

-Y2- POT Sta. 29+75.79  
 -L- POT Sta. 210+10.00

END MSE RETAINING WALL 1  
 STA. 12+00 -S1\_W1- =  
 STA. 211+01.10 -L- OFFSET 88.5' LT

Y2 RWAL1  
 208+85 -L-  
 94' LT =  
 28+71 -Y2-  
 116' RT

Y2 EB1-B  
 209+84 -L-  
 83' LT =  
 28+91 -Y2-  
 19' RT

Y2 RWAL2  
 210+89 -L-  
 89' LT =  
 28+94 -Y2-  
 86' LT

← TO LUMBERTON  
 I-95 SOUTHBOUND

I-95 NORTHBOUND  
 → TO US 301

END MSE RETAINING WALL 2  
 STA. 11+84.81 -S1\_W2- =  
 STA. 209+24.91 -L- OFFSET 88.5' RT

BEGIN MSE RETAINING WALL 2  
 STA. 10+00 -S1\_W2- =  
 STA. 211+09.91 -L- OFFSET 88.5' LT

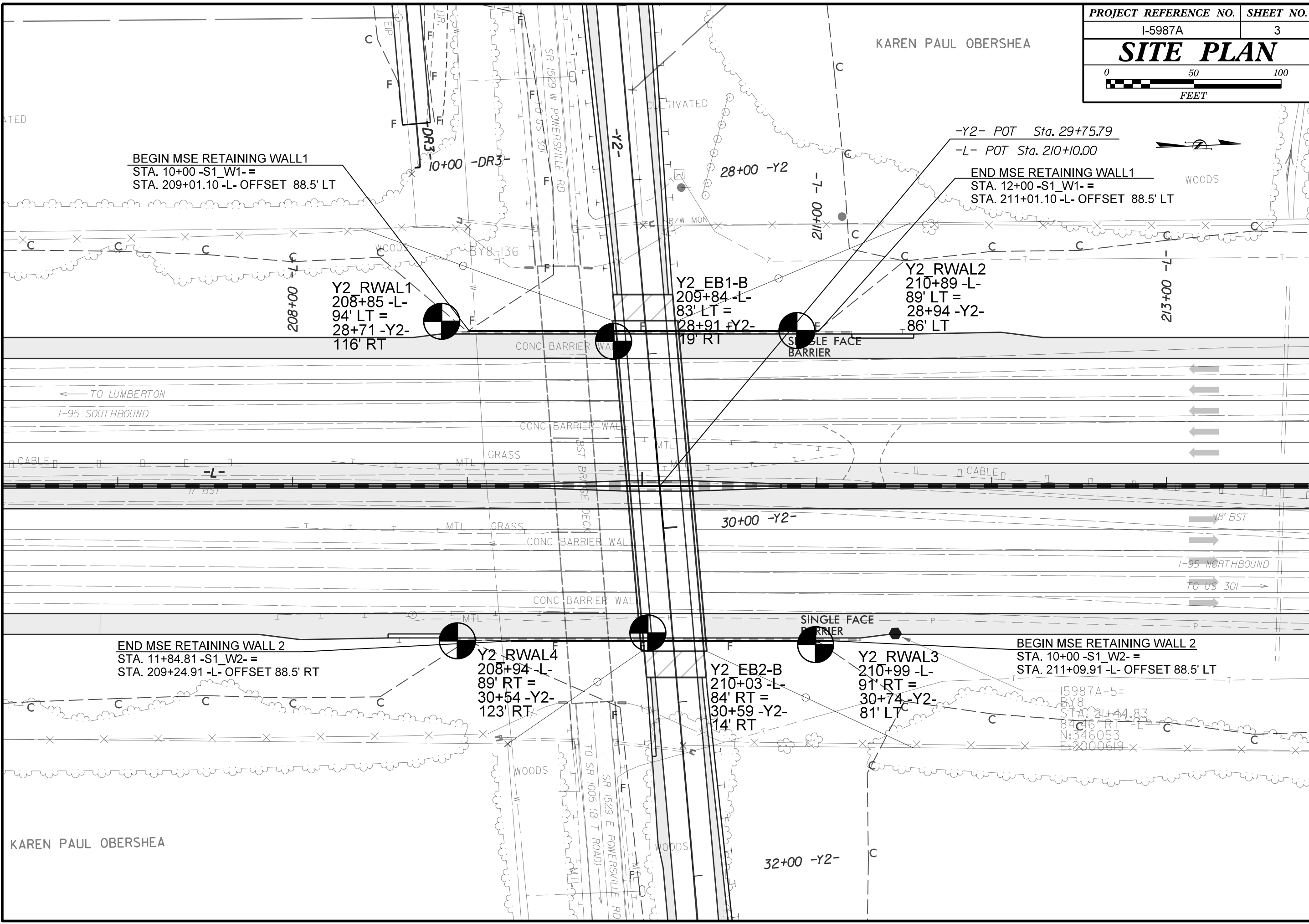
Y2 RWAL4  
 208+94 -L-  
 89' RT =  
 30+54 -Y2-  
 123' RT

Y2 EB2-B  
 210+03 -L-  
 84' RT =  
 30+59 -Y2-  
 14' RT

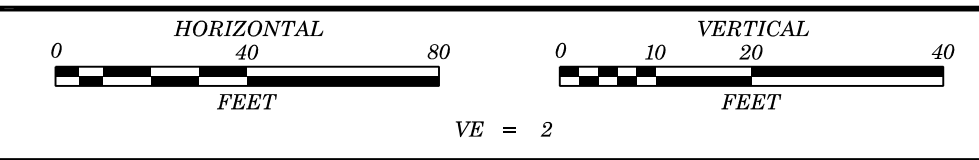
Y2 RWAL3  
 210+99 -L-  
 91' RT =  
 30+74 -Y2-  
 81' LT

I5987A-5=  
 BY8  
 STA. 21+44.83  
 84' RT -L-  
 N:346053  
 E:2000619

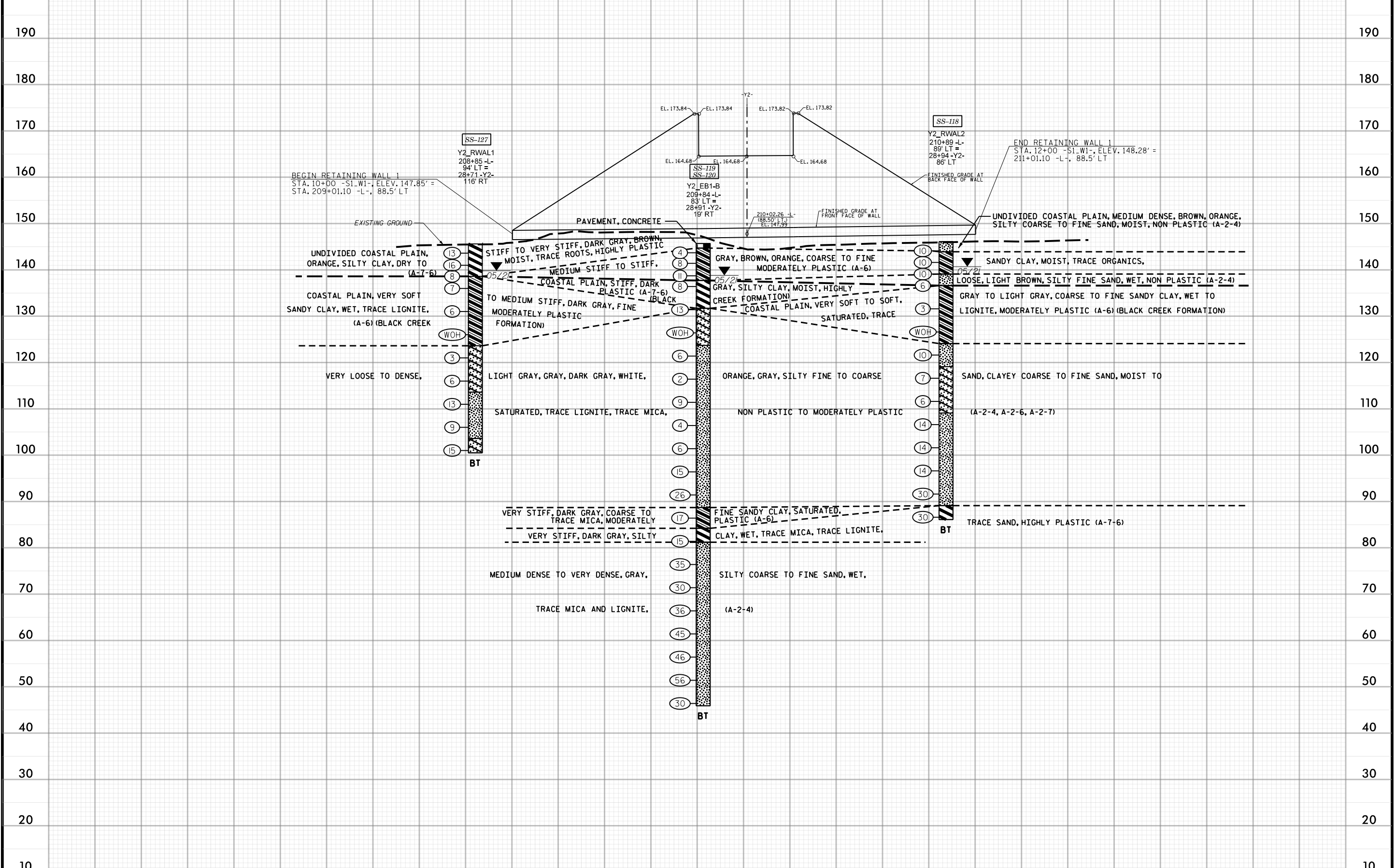
KAREN PAUL OBERSHEA



210 NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -S1\_W1- TAKEN FROM THE PROVIDED PROJECT TIN FILE: i5987\_ls\_tin1.tin

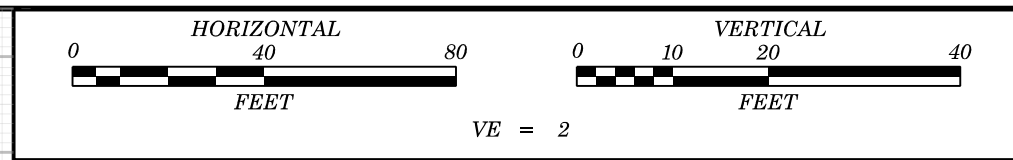


PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4
PROFILE ALONG S1_EB1_WALL	

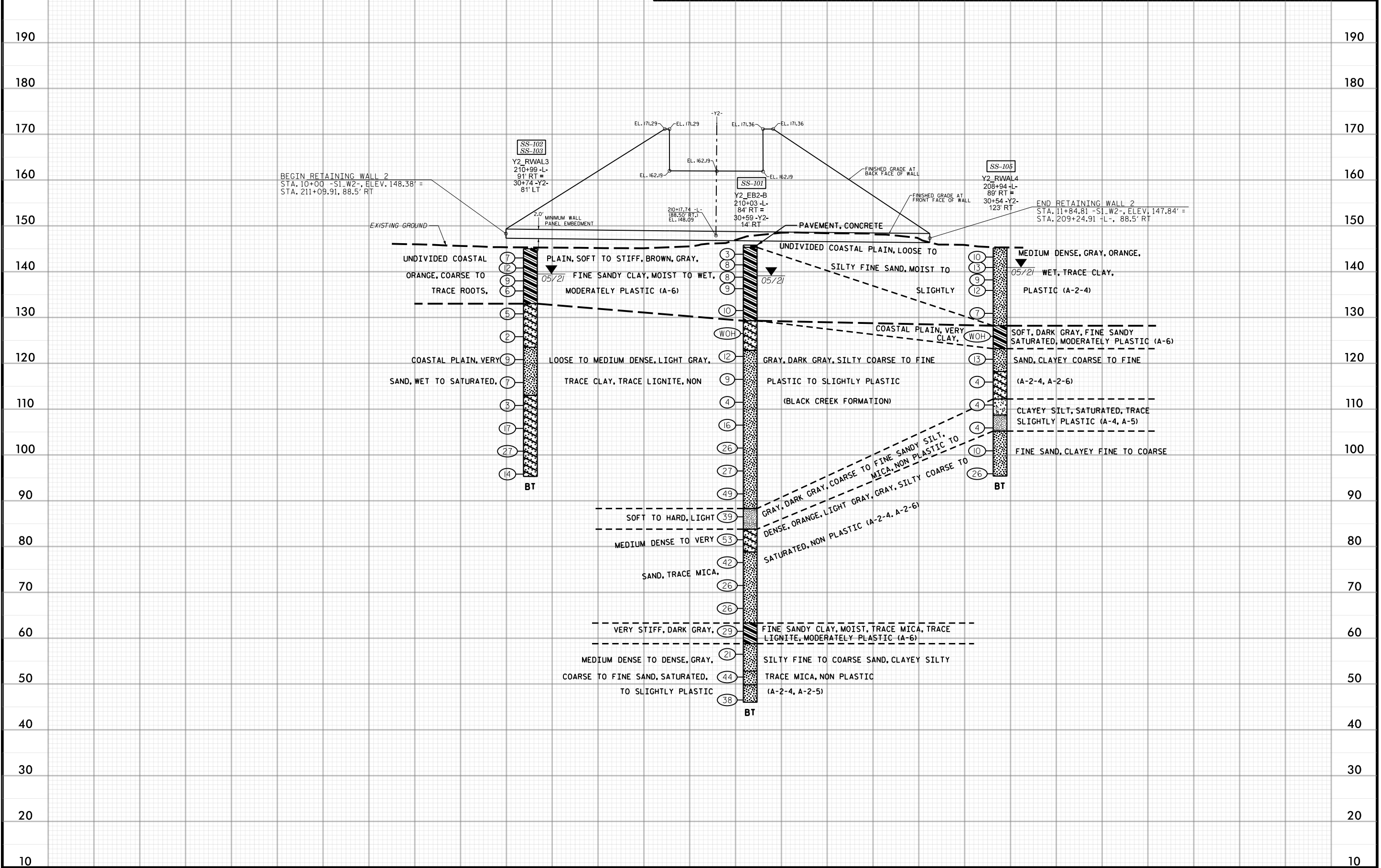


9+00 10+00 11+00 12+00 13+00 -S1\_W1-

210 NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED  
 ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -S1\_W2- TAKEN FROM  
 THE PROVIDED PROJECT TIN FILE: i5987\_ls\_tin1.tin



PROJECT REFERENCE NO. I-5987A SHEET NO. 5  
 PROFILE ALONG S1\_EB2\_WALL



9 + 00 10 + 00 11 + 00 12 + 00 13 + 00 -S1\_W2-

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_RWAL1	<b>STATION</b> 28+71	<b>OFFSET</b> 116 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.6 ft	<b>TOTAL DEPTH</b> 45.1 ft	<b>NORTHING</b> 345,801	<b>EASTING</b> 2,000,430
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/18/21	<b>COMP. DATE</b> 05/18/21	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
150															
145	144.6	1.0	6	8	5										145.6
140	142.0	3.6	5	8	8										145.6
135	139.6	6.0	3	4	4										138.6
130	137.0	8.6	3	3	4										138.6
125	132.0	13.6	3	3	3										138.6
120	127.0	18.6	WOH	WOH	WOH										138.6
115	122.0	23.6	1	1	2										123.6
110	117.0	28.6	2	3	3										123.6
105	112.0	33.6	5	6	7										113.6
100	107.0	38.6	2	4	5										113.6
95	102.0	43.6	4	7	8										103.6
															100.5
															100.5

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22



**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.										
SITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79							GROUND WTR (ft)									
BORING NO. Y2_EB1-B		STATION 28+91		OFFSET 19 ft RT		ALIGNMENT -Y2-										
COLLAR ELEV. 145.7 ft		TOTAL DEPTH 99.8 ft		NORTHING 345,899		EASTING 2,000,446										
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 05/13/21		COMP. DATE 05/14/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150																
145	144.7	1.0	2	2	2											
	142.4	3.3	3	4	4											
140	139.7	6.0	3	4	7											
	137.4	8.3	3	4	4											
135	132.4	13.3	3	6	7											
130	127.4	18.3	WOH	WOH	WOH											
125	122.4	23.3	2	3	3											
120	117.4	28.3	1	1	1											
115	112.4	33.3	4	5	4											
110	107.4	38.3	3	2	2											
105	102.4	43.3	4	3	3											
100	97.4	48.3	5	6	9											
95	92.4	53.3	7	10	16											
90	87.4	58.3	4	5	12											
85	82.4	63.3	4	4	11											
80	77.4	68.3	12	17	18											
75	72.4	73.3	10	12	18											
70																

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.										
SITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79							GROUND WTR (ft)									
BORING NO. Y2_EB1-B		STATION 28+91		OFFSET 19 ft RT		ALIGNMENT -Y2-										
COLLAR ELEV. 145.7 ft		TOTAL DEPTH 99.8 ft		NORTHING 345,899		EASTING 2,000,446										
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 05/13/21		COMP. DATE 05/14/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
70																
	67.4	78.3	8	13	23											
65	62.4	83.3	19	22	23											
60	57.4	88.3	18	22	24											
55	52.4	93.3	23	27	29											
50	47.4	98.3	13	13	17											

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

Match Line

MEDIUM DENSE TO VERY DENSE, GRAY, SILTY COARSE TO FINE SAND, WET, TRACE MICA AND LIGNITE (A-2-4) (continued)

NO LIGNITE

TRACE LIGNITE

Boring Terminated at Elevation 45.9 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)

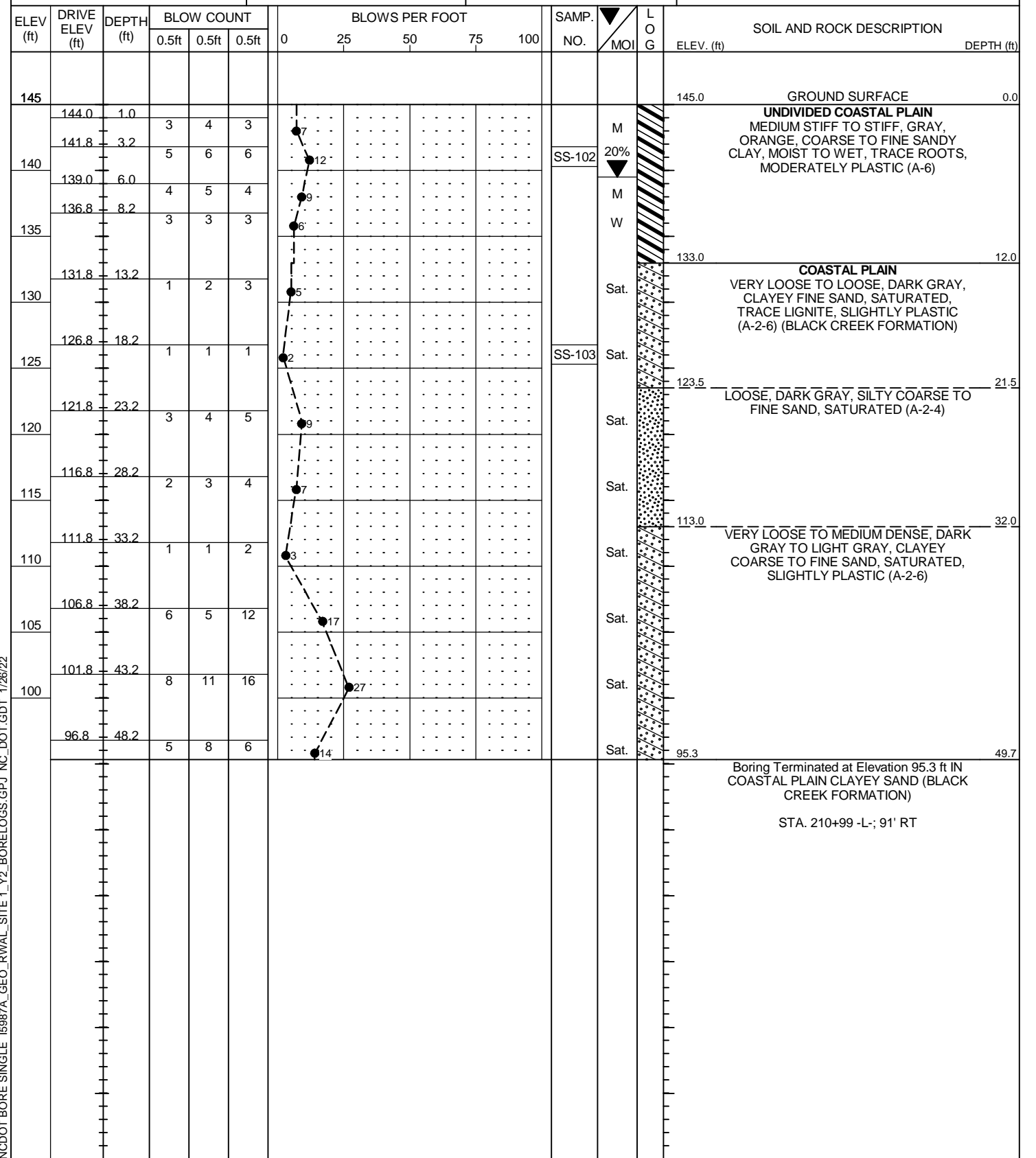
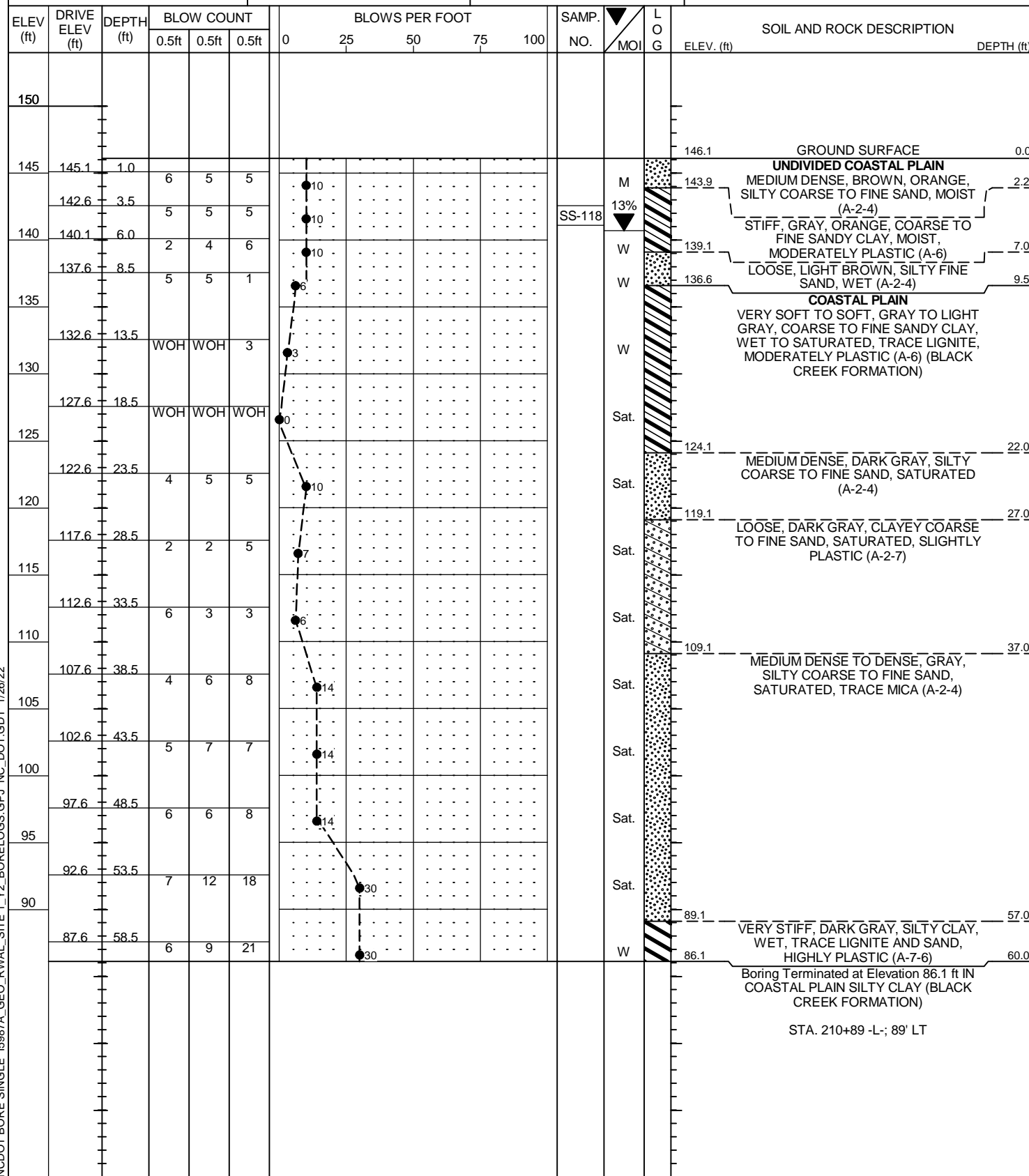
STA. 209+84 -L-; 83' LT

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79			GROUND WTR (ft)
BORING NO. Y2_RWAL2	STATION 28+94	OFFSET 86 ft LT	ALIGNMENT -Y2-
COLLAR ELEV. 146.1 ft	TOTAL DEPTH 60.0 ft	NORTHING 346,019	EASTING 2,000,634
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/13/21	COMP. DATE 05/13/21	SURFACE WATER DEPTH N/A

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79			GROUND WTR (ft)
BORING NO. Y2_RWAL3	STATION 30+74	OFFSET 81 ft LT	ALIGNMENT -Y2-
COLLAR ELEV. 145.0 ft	TOTAL DEPTH 49.7 ft	NORTHING 346,007	EASTING 2,000,624
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/05/21	COMP. DATE 05/05/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

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WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.									
SITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79							GROUND WTR (ft)								
BORING NO. Y2_EB2-B		STATION 30+59		OFFSET 14 ft RT		ALIGNMENT -Y2-									
COLLAR ELEV. 145.8 ft		TOTAL DEPTH 99.8 ft		NORTHING 345,912		EASTING 2,000,613									
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 05/04/21		COMP. DATE 05/04/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
150															
145	144.8	1.0	3	2	1										
	142.5	3.3	4	4	4										
140	139.8	6.0	3	4	4										
	137.3	8.5	3	3	6										
135															
	132.5	13.3	3	4	6										
130															
	127.5	18.3	WOH	WOH	WOH										
125															
	122.5	23.3	4	5	7										
120															
	117.5	28.3	1	2	7										
115															
	112.5	33.3	1	2	2										
110															
	107.5	38.3	4	7	9										
105															
	102.5	43.3	7	12	14										
100															
	97.5	48.3	10	13	14										
95															
	92.5	53.3	13	23	26										
90															
	87.5	58.3	16	19	20										
85															
	82.5	63.3	20	17	36										
80															
	77.5	68.3	10	21	21										
75															
	72.5	73.3	9	12	14										
70															

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A. N.									
SITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79							GROUND WTR (ft)								
BORING NO. Y2_EB2-B		STATION 30+59		OFFSET 14 ft RT		ALIGNMENT -Y2-									
COLLAR ELEV. 145.8 ft		TOTAL DEPTH 99.8 ft		NORTHING 345,912		EASTING 2,000,613									
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 05/04/21		COMP. DATE 05/04/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
70															
	67.5	78.3	11	13	13										
65															
	62.5	83.3	9	13	16										
60															
	57.5	88.3	9	10	11										
55															
	52.5	93.3	11	22	22										
50															
	47.5	98.3	14	17	21										

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> SITE 1 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y2- OVER -L- (I-95) AT -Y2- STA. 29+75.79			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y2_RWAL4	<b>STATION</b> 30+54	<b>OFFSET</b> 123 ft RT	<b>ALIGNMENT</b> -Y2-
<b>COLLAR ELEV.</b> 145.2 ft	<b>TOTAL DEPTH</b> 49.8 ft	<b>NORTHING</b> 345,803	<b>EASTING</b> 2,000,613
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/05/21	<b>COMP. DATE</b> 05/05/21	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150																
145															145.2	GROUND SURFACE
144.2	144.2	1.0	6	5	5	10								M		<b>UNDIVIDED COASTAL PLAIN</b> LOOSE TO MEDIUM DENSE, GRAY, ORANGE, SILTY FINE SAND, MOIST TO WET, TRACE ORGANICS (A-2-4)
141.9	141.9	3.3	5	7	6	13								M		
139.2	139.2	6.0	3	4	5	9								M		
136.9	136.9	8.3	10	7	5	12								W		
135																
131.9	131.9	13.3	4	4	3	7								W		
130																
126.9	126.9	18.3	WOH	WOH	WOH	10								Sat.		<b>COASTAL PLAIN</b> VERY SOFT, DARK GRAY, FINE SANDY CLAY, SATURATED, MODERATELY PLASTIC (A-6)
125																
123.2	121.9	23.3	4	5	8	13								Sat.		MEDIUM DENSE, GRAY, SILTY COARSE TO FINE SAND, SATURATED, NON PLASTIC (A-2-4)
120																
118.2	116.9	28.3	1	2	2	4								Sat.		LOOSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, SLIGHTLY PLASTIC (A-2-6)
115																
112.2	111.9	33.3	3	2	2	4								Sat.		MEDIUM STIFF, LIGHT GRAY, CLAYEY SILT, SLIGHTLY PLASTIC (A-5)
110																
108.7	106.9	38.3	2	2	2	4								Sat.		SOFT, LIGHT GRAY, FINE SANDY SILT, SATURATED, TRACE MICA (A-4)
105																
105.2	101.9	43.3	3	4	6	10								Sat.		MEDIUM DENSE, LIGHT GRAY, ORANGE, SILTY COARSE TO FINE SAND, SATURATED, TRACE MICA, NON PLASTIC (A-2-4)
100																
96.9	96.9	48.3	6	11	15	26								Sat.		
															95.4	49.8
Boring Terminated at Elevation 95.4 ft IN UNDIVIDED COASTAL PLAIN SILTY SAND																
STA. 208+94 -L-; 89' RT																

NCDOT BORE SINGLE I5987A\_GEO\_RWAL\_SITE 1\_Y2\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

**LABORATORY TESTING SUMMARY**

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: SITE 1 - ABUTMENT RETAINING WALLS AT END BENT 1 AND END BENT 2 OF BRIDGE ON -Y2- (SR 1529 POWERSVILLE ROAD) OVER -L- (I-95) AT -Y2- STA. 29+75.79

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-101	30+59	-Y2-	14 RT	18.3 - 19.8	A-2-6 (0)	31	11	10.2	64.9	6.1	18.8	0	100	95	27	--	--
SS-102	30+74	-Y2-	81 LT	3.2 - 4.7	A-6 (6)	40	24	30.0	29.2	7.5	33.3	0	100	85	43	19.5	--
SS-103	30+74	-Y2-	81 LT	18.2 - 19.7	A-2-6 (0)	32	14	7.2	66.4	10.3	16.1	0	100	97	29	--	--
SS-105	30+54	-Y2-	123 RT	8.3 - 9.8	A-2-4 (0)	26	10	28.4	49.0	5.2	17.4	0	100	91	25	--	--
SS-118	28+94	-Y2-	86 LT	3.5 - 5.0	A-6 (4)	31	18	24.6	35.9	13.1	26.4	0	100	88	43	12.8	--
SS-119	28+91	-Y2-	19 RT	8.3 - 9.8	A-7-6 (13)	45	32	11.9	36.5	15.8	35.8	0	100	97	55	19.2	--
SS-120	28+91	-Y2-	19 RT	18.3 - 19.8	A-2-6 (0)	32	16	8.4	64.5	6.0	21.1	0	100	98	29	--	--
SS-127	28+71	-Y2-	116 RT	3.6 - 5.1	A-7-6 (13)	45	29	21.6	23.7	16.7	38.0	0	100	88	58	19.0	--

*Stephanie H. Huffman*  
 Certified Lab Technician Signature

114-01-1203  
 Certification Number

REFERENCE: I-5987A

PROJECT: 47533

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM  
SOUTH OF US 301 (EXIT 22) TO NORTH OF  
SR 1758 (McDUFFIE CROSSING ROAD)  
SITE DESCRIPTION SITE 2 - ABUTMENT RETAINING  
WALLS AT END BENT 1 AND END BENT 2 OF  
BRIDGE ON -YIA- (US 301) OVER -L- (I-95) AT  
-YIA- STA. 41 +19.02

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - 5	PROFILES
6 - 10	BORE LOGS
11	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	11

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

- DEGON, A. N.
- PESL, W. (F&R)
- PAINTER, B. (F&R)
- TURNAGE, J. R.
- KELLY, N. S.
- SMITH, R. (NCDOT)
- TIGNOR, D. (F&R)

INVESTIGATED BY TERRACON CONSULTANTS  
 DRAWN BY FIELDS, W. D.  
 CHECKED BY RIGGS, Jr., A. F.  
 SUBMITTED BY ALEXANDER, M. J.  
 DATE JANUARY, 2022

Prepared in the Office of:



DocuSigned by:  
Matt Alexander 01/28/2022  
 0FB0038EEA06452  
 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

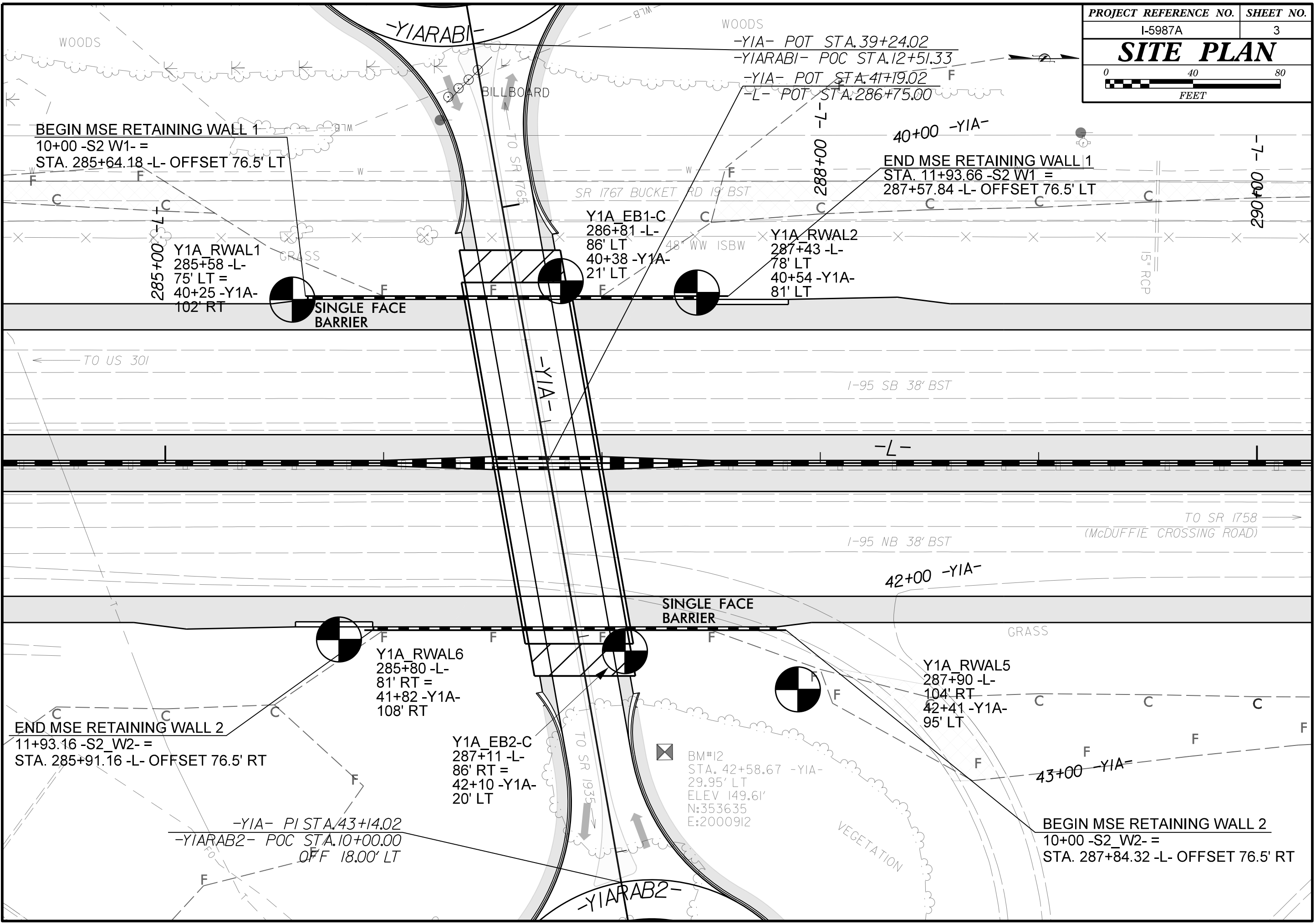


**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT**

# SUBSURFACE INVESTIGATION

## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>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.</p>										<p>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:</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, 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 DISLODGED 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 (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.</p>									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
<p>GENERAL CLASS. GRANULAR MATERIALS (&lt;= 35% PASSING #200) SILT-CLAY MATERIALS (&gt; 35% PASSING #200) ORGANIC MATERIALS</p>										<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>																			
<p>GROUP CLASS. A-1-a, A-1-b, A-3, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7</p>										<p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</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>SYMBOL</p>										<p>PERCENTAGE OF MATERIAL</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>% PASSING #10, #40, #200</p>										<p>ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL</p>										<p>COASTAL PLAIN SEDIMENTARY ROCK (CPS) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>																			
<p>MATERIAL PASSING #40 LL, PI</p>										<p>GROUND WATER</p>										<p>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.</p>																			
<p>GROUP INDEX</p>										<p>MISCELLANEOUS SYMBOLS</p>										<p>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.</p>																			
<p>USUAL TYPES OF MAJOR MATERIALS</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</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>GEN. RATING AS SUBGRADE</p>										<p>SOIL SYMBOL</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. IF TESTED, WOULD YIELD SPT REFUSAL</p>																			
<p>CONSISTENCY OR DENSENESS</p>										<p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</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. IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</p>																			
<p>TEXTURE OR GRAIN SIZE</p>										<p>INFERRED SOIL BOUNDARY</p>										<p>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 &lt; 100 BPF</p>																			
<p>SOIL MOISTURE - CORRELATION OF TERMS</p>										<p>INFERRED ROCK LINE</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>PLASTICITY</p>										<p>ALLUVIAL SOIL BOUNDARY</p>										<p>ROCK HARDNESS</p>																			
<p>COLOR</p>										<p>RECOMMENDATION SYMBOLS</p>										<p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>																			
<p>ABBREVIATIONS</p>										<p>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p>										<p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>																			
<p>EQUIPMENT USED ON SUBJECT PROJECT</p>										<p>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>										<p>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.</p>																			
<p>FRACATURE SPACING</p>										<p>ADVANCING TOOLS</p>										<p>MEDIUM HARD CAN BE GROUDED 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.</p>																			
<p>BEDDING</p>										<p>DRILL UNITS</p>										<p>SOFT CAN BE GROUDED 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.</p>																			
<p>INDURATION</p>										<p>PORTABLE HOIST</p>										<p>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.</p>																			
<p>NOTES:</p>										<p>DIETRICH D-50 (TER299)</p>										<p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p>FIAD - FILLED IMMEDIATELY AFTER DRILLING NOTE: ELEVATIONS OF BORINGS YIA FBI-C AND YIA EB2-C PERFORMED BY F&amp;R INC. OBTAINED FROM PROVIDE TIN FILE: 15987_Is_tin.tin DATED: 11-14-2019</p>									



**BEGIN MSE RETAINING WALL 1**  
 10+00 -S2 W1- =  
 STA. 285+64.18 -L- OFFSET 76.5' LT

**END MSE RETAINING WALL 1**  
 STA. 11+93.66 -S2 W1 =  
 287+57.84 -L- OFFSET 76.5' LT

Y1A\_RWAL1  
 285+58 -L-  
 75' LT =  
 40+25 -Y1A-  
 102' RT

Y1A\_EB1-C  
 286+81 -L-  
 86' LT  
 40+38 -Y1A-  
 21' LT

Y1A\_RWAL2  
 287+43 -L-  
 78' LT  
 40+54 -Y1A-  
 81' LT

SINGLE FACE  
 BARRIER

SINGLE FACE  
 BARRIER

**END MSE RETAINING WALL 2**  
 11+93.16 -S2 W2- =  
 STA. 285+91.16 -L- OFFSET 76.5' RT

Y1A\_RWAL6  
 285+80 -L-  
 81' RT =  
 41+82 -Y1A-  
 108' RT

Y1A\_EB2-C  
 287+11 -L-  
 86' RT =  
 42+10 -Y1A-  
 20' LT

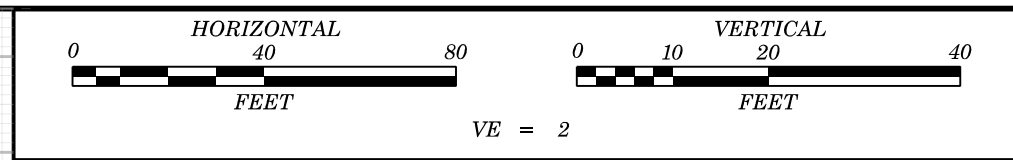
Y1A\_RWAL5  
 287+90 -L-  
 104' RT  
 42+41 -Y1A-  
 95' LT

BM#12  
 STA. 42+58.67 -YIA-  
 29.95' LT  
 ELEV 149.61'  
 N:353635  
 E:2000912

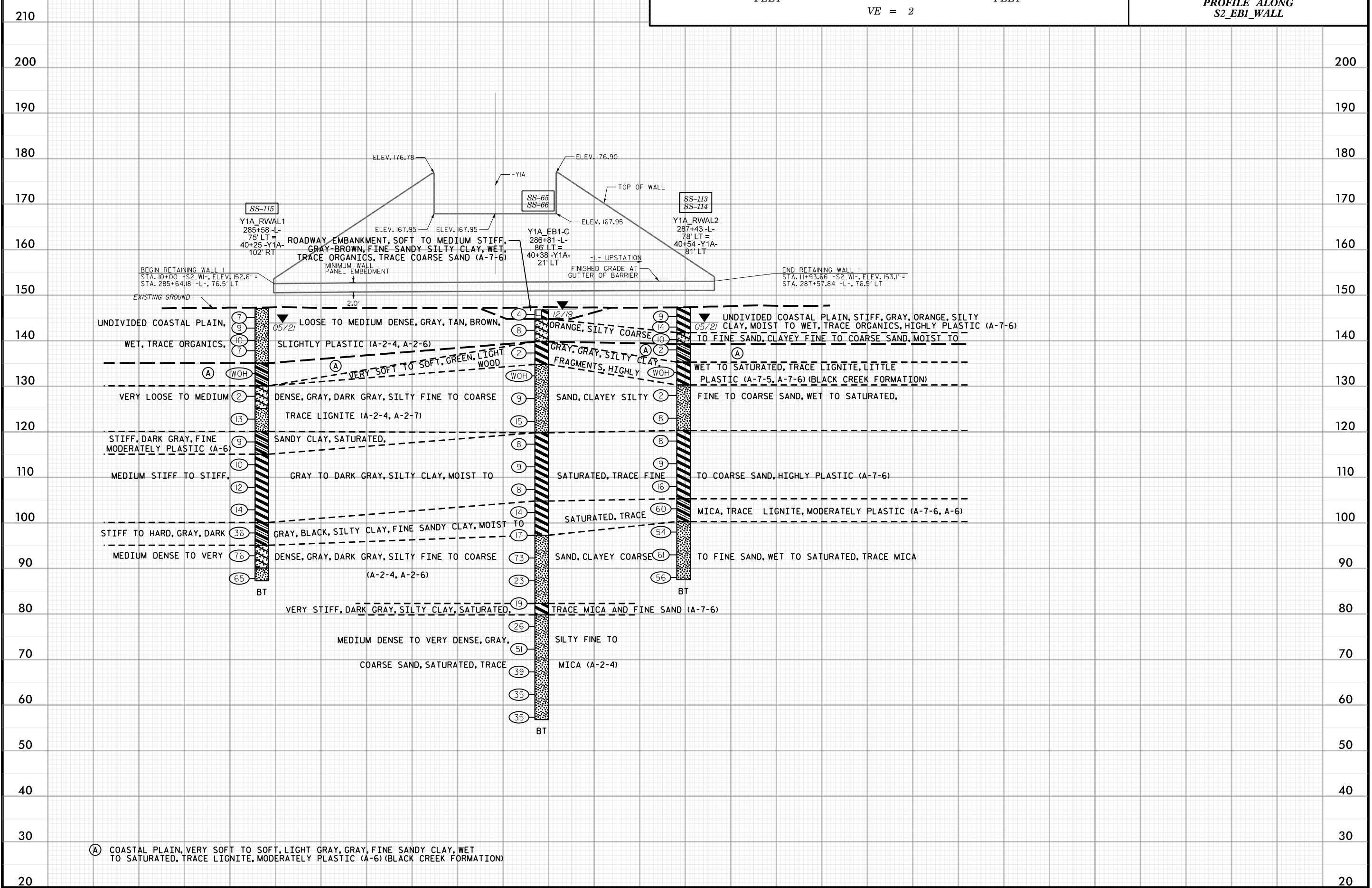
**BEGIN MSE RETAINING WALL 2**  
 10+00 -S2 W2- =  
 STA. 287+84.32 -L- OFFSET 76.5' RT

-YIA- PI STA. 43+14.02  
 -YIARAB2- POC STA. 10+00.00  
 OFF 18.00' LT

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -S2\_W1- TAKEN FROM THE PROVIDED PROJECT TIN FILE: i5987\_ls\_tin.tin

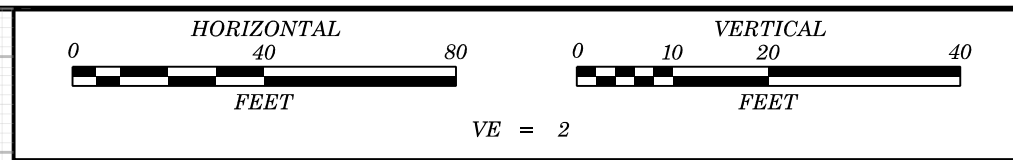


PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4
PROFILE ALONG S2_EBI_WALL	

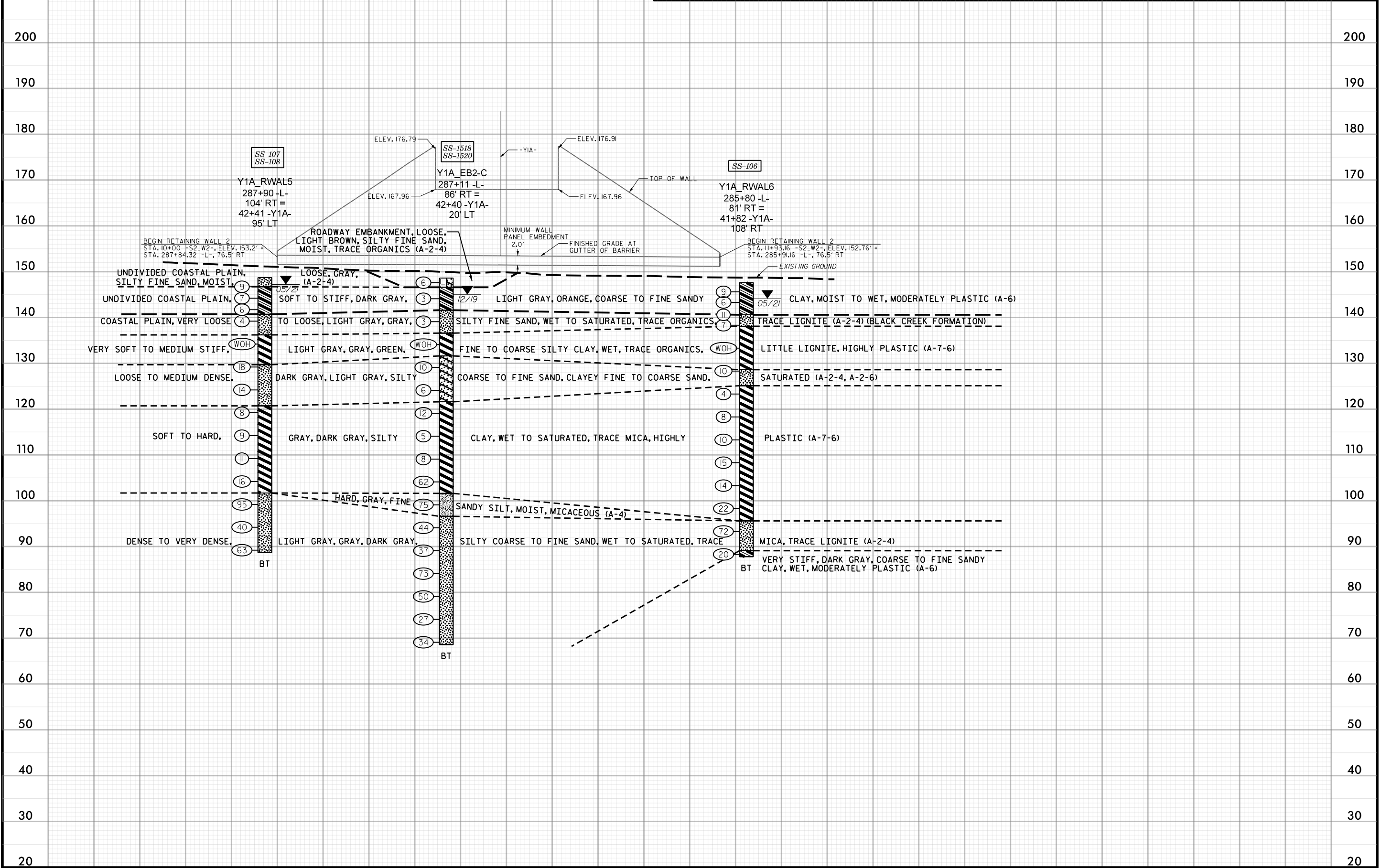


(A) COASTAL PLAIN, VERY SOFT TO SOFT, LIGHT GRAY, GRAY, FINE SANDY CLAY, WET TO SATURATED, TRACE LIGNITE, MODERATELY PLASTIC (A-6) (BLACK CREEK FORMATION)

220 NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -S2\_W2- TAKEN FROM THE PROVIDED PROJECT TIN FILE: (i5987\_ls\_tin.tin)



PROJECT REFERENCE NO. I-5987A SHEET NO. 5  
 PROFILE ALONG S2\_EB2\_WALL



<b>WBS</b> 47533.1.1	<b>TIP</b> I-5987	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> SITE 2 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y1A- OVER -L- AT -Y1A- STA. 14+92.02			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y1A_RWAL1	<b>STATION</b> 40+25	<b>OFFSET</b> 102 ft RT	<b>ALIGNMENT</b> -Y1A-
<b>COLLAR ELEV.</b> 147.1 ft	<b>TOTAL DEPTH</b> 59.8 ft	<b>NORTHING</b> 353,466	<b>EASTING</b> 2,000,704
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/11/21	<b>COMP. DATE</b> 05/13/21	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150																
														147.1	GROUND SURFACE	0.0
145	146.1	1.0	2	4	3	7									UNDIVIDED COASTAL PLAIN LOOSE TO MEDIUM DENSE, GRAY, BROWN, ORANGE, SILTY COARSE TO FINE SAND, MOIST TO WET, TRACE ORGANICS, SLIGHTLY PLASTIC (A-2-4)	
	143.8	3.3	4	5	4	9										
140	141.1	6.0	2	4	6	10										
	138.8	8.3	3	2	5	7										
135															NO ORGANICS	
	133.8	13.3	WOH	WOH	WOH	10								135.1	COASTAL PLAIN	12.0
130															VERY SOFT, LIGHT GRAY, FINE SANDY CLAY, SATURATED, TRACE LIGNITE, MODERATELY PLASTIC (A-6) (BLACK CREEK FORMATION)	
	128.8	18.3	WOH	WOH	2	2								130.1	VERY LOOSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, SLIGHTLY PLASTIC (A-2-7)	17.0
125																
	123.8	23.3	3	7	6	13								125.1	MEDIUM DENSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, NON PLASTIC (A-2-4)	22.0
120																
	118.8	28.3	3	4	5	9								120.1	STIFF, DARK GRAY, FINE SANDY CLAY, SATURATED, MODERATELY PLASTIC (A-6)	27.0
115																
	113.8	33.3	4	4	6	10								115.1	STIFF, DARK GRAY, SILTY CLAY, WET, HIGHLY PLASTIC (A-7-6)	32.0
110																
	108.8	38.3	4	5	7	12										
105																
	103.8	43.3	4	6	8	14										
100																
	98.8	48.3	8	15	21	36								100.1	HARD, DARK GRAY, FINE SANDY CLAY, WET, TRACE MICA AND LIGNITE, MODERATELY PLASTIC (A-6)	47.0
95																
	93.8	53.3	20	32	44	76								95.1	VERY DENSE, GRAY, CLAYEY COARSE TO FINE SAND, WET, TRACE MICA, SLIGHTLY PLASTIC (A-2-6)	52.0
90																
	88.8	58.3	20	30	35	65								90.1	VERY DENSE, GRAY, SILTY COARSE TO FINE SAND, WET, TRACE MICA AND CLAY (A-2-4)	57.0
														87.3	Boring Terminated at Elevation 87.3 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)	59.8
															STA. 285+58 -L-; 75' LT	

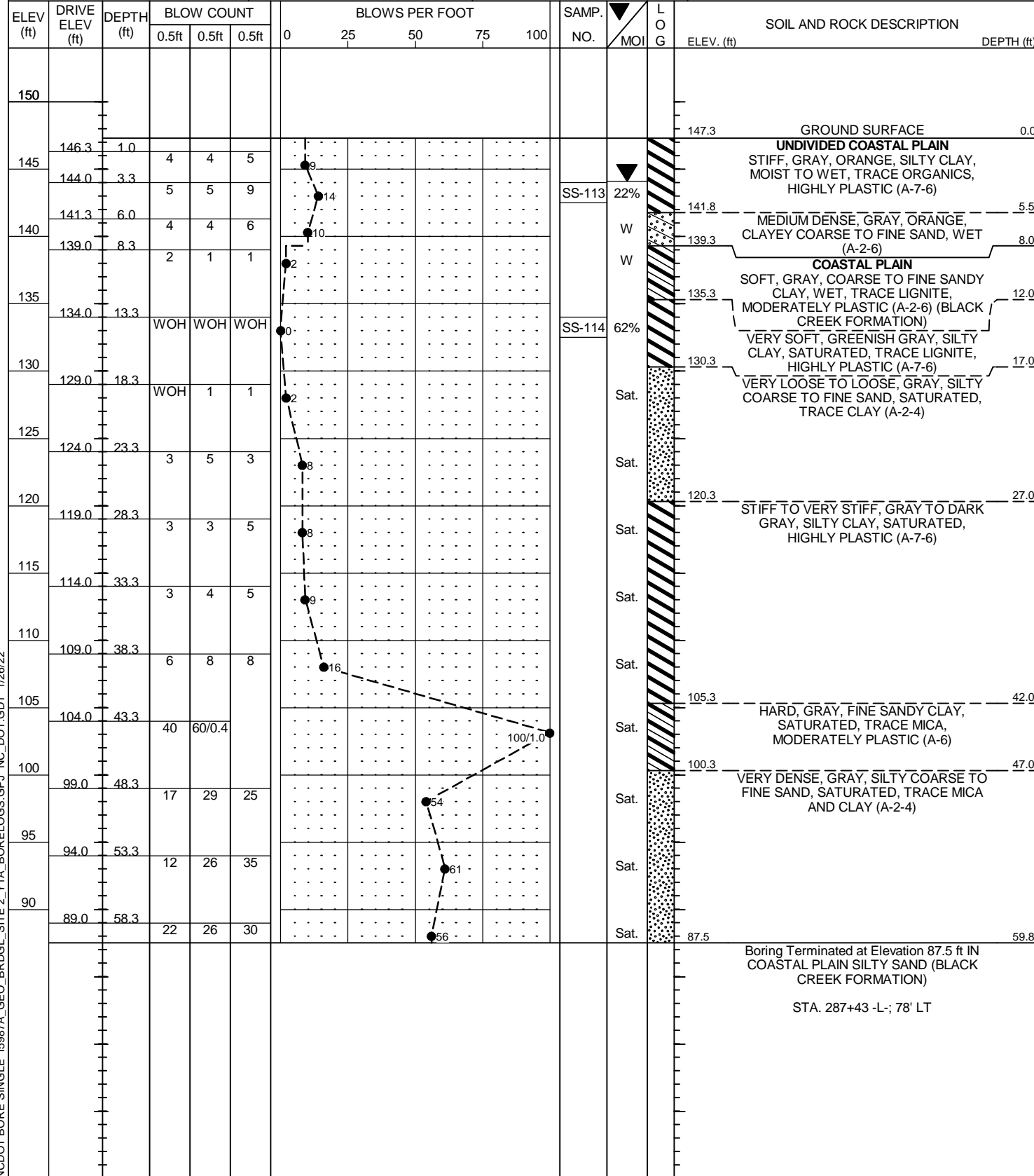
NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 2\_Y1A\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22





**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

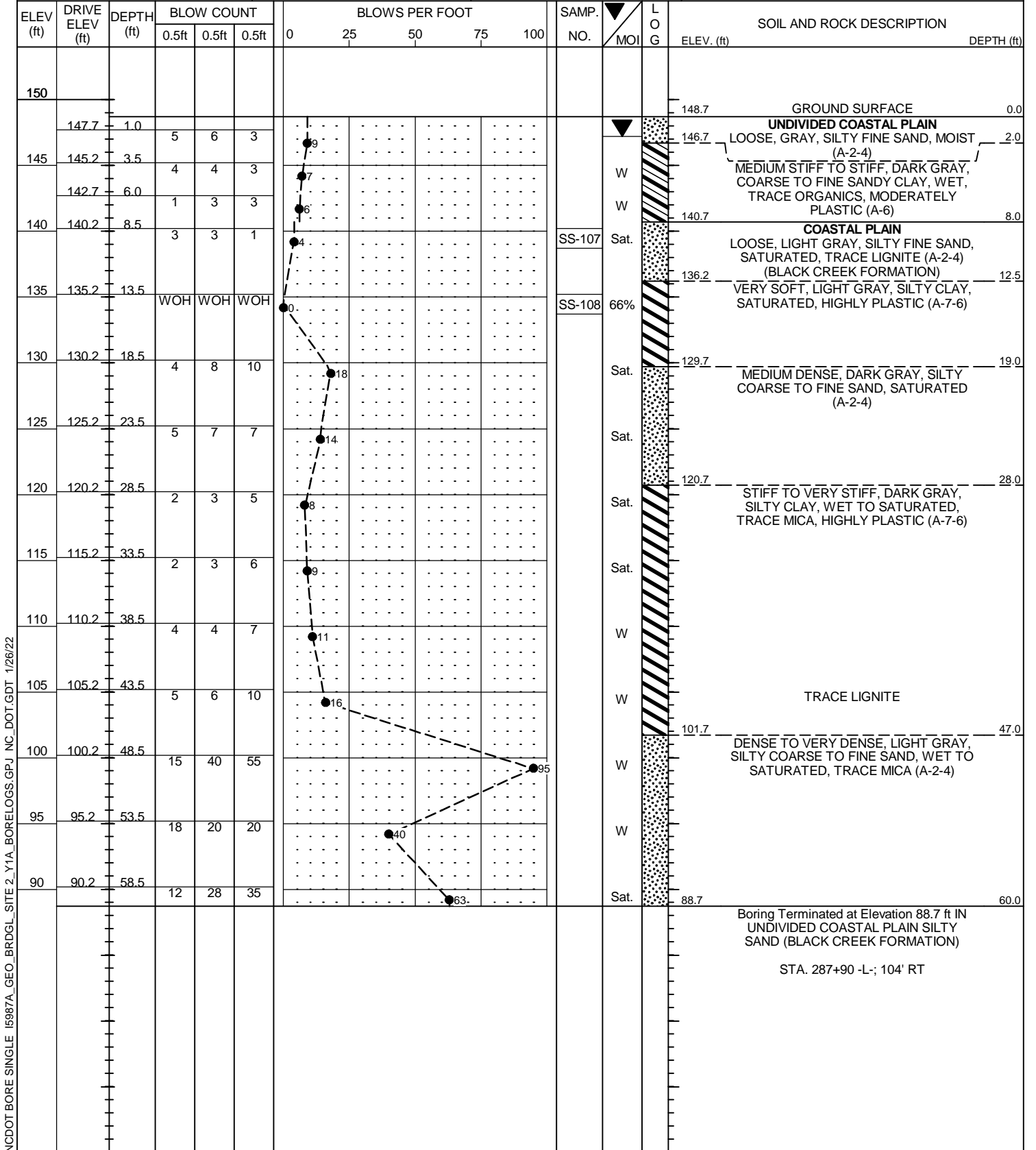
WBS 47533.1.1	TIP I-5987	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 2 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y1A- OVER -L- AT -Y1A- STA. 14+92.02			GROUND WTR (ft)
BORING NO. Y1A_RWAL2	STATION 40+54	OFFSET 81 ft LT	ALIGNMENT -Y1A-
COLLAR ELEV. 147.3 ft	TOTAL DEPTH 59.8 ft	NORTHING 353,651	EASTING 2,000,702
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/11/21	COMP. DATE 05/11/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 2\_Y1A\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

WBS 47533.1.1	TIP I-5987	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 2 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y1A- OVER -L- AT -Y1A- STA. 14+92.02			GROUND WTR (ft)
BORING NO. Y1A_RWAL5	STATION 42+41	OFFSET 95 ft LT	ALIGNMENT -Y1A-
COLLAR ELEV. 148.7 ft	TOTAL DEPTH 60.0 ft	NORTHING 353,696	EASTING 2,000,884
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/06/21	COMP. DATE 05/06/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 2\_Y1A\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter									
SITE DESCRIPTION SITE 2 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y1A- OVER -L- AT -Y1A- STA. 14+92.02							GROUND WTR (ft)								
BORING NO. Y1A_EB2-C		STATION 42+10		OFFSET 20 ft LT		ALIGNMENT -Y1A-									
COLLAR ELEV. 148.6 ft		TOTAL DEPTH 80.0 ft		NORTHING 353,617		EASTING 2,000,866									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 12/10/19		COMP. DATE 12/10/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
155															
150	148.6	0.0	1	2	4										
145	145.1	3.5	WOH	1	2										
140	140.1	8.5		3	2	1									
135	135.1	13.5	WOH	WOH	WOH										
130	130.1	18.5		2	3	7									
125	125.1	23.5		7	4	2									
120	120.1	28.5		3	5	7									
115	115.1	33.5	WOH	2	3										
110	110.1	38.5		3	3	5									
105	105.1	43.5		3	4	58									
100	100.1	48.5		17	20	55									
95	95.1	53.5		7	19	25									
90	90.1	58.5		9	15	22									
85	85.1	63.5		16	31	42									
80	80.1	68.5		22	26	24									
75	75.1	73.5													

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 2\_Y1A\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.1		TIP I-5987		COUNTY ROBESON		GEOLOGIST B. Painter									
SITE DESCRIPTION SITE 2 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y1A- OVER -L- AT -Y1A- STA. 14+92.02							GROUND WTR (ft)								
BORING NO. Y1A_EB2-C		STATION 42+10		OFFSET 20 ft LT		ALIGNMENT -Y1A-									
COLLAR ELEV. 148.6 ft		TOTAL DEPTH 80.0 ft		NORTHING 353,617		EASTING 2,000,866									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 12/10/19		COMP. DATE 12/10/19		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
75															
70	70.1	78.5	11	13	21										

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 2\_Y1A\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

Match Line

DENSE TO VERY DENSE, GRAY, CLAYEY SILTY FINE TO COARSE SAND, SATURATED, TRACE LIGNITE (A-2-4) (continued)

Boring Terminated at Elevation 68.6 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION)  
1. SURFICIAL ORGANIC SOIL: 0.0 - 0.2' STA. 287+11 -L-; 86' RT

<b>WBS</b> 47533.1.1	<b>TIP</b> I-5987	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> DEGON, A. N.
<b>SITE DESCRIPTION</b> SITE 2 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y1A- OVER -L- AT -Y1A- STA. 14+92.02			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y1A_RWAL6	<b>STATION</b> 41+82	<b>OFFSET</b> 108 ft RT	<b>ALIGNMENT</b> -Y1A-
<b>COLLAR ELEV.</b> 147.6 ft	<b>TOTAL DEPTH</b> 59.8 ft	<b>NORTHING</b> 353,486	<b>EASTING</b> 2,000,860
<b>DRILL RIG/HAMMER EFF./DATE</b> TER299 DIEDRICH D-50 79% 12/31/2020		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> TURNAGE, J. R.	<b>START DATE</b> 05/05/21	<b>COMP. DATE</b> 05/06/21	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
150															
	146.6	1.0													
145	144.3	3.3	5	5	4										
	141.6	6.0	3	3	3										
140	139.3	8.3	3	4	7										
			3	5	2										
135	134.3	13.3	WOH	WOH	WOH										
130	129.3	18.3													
			2	4	6										
125	124.3	23.3													
			2	2	2										
120	119.3	28.3													
			3	3	5										
115	114.3	33.3													
			4	4	6										
110	109.3	38.3													
			6	6	9										
105	104.3	43.3													
			4	5	9										
100	99.3	48.3													
			7	10	12										
95	94.3	53.3													
			27	32	40										
90	89.3	58.3													
			9	11	9										

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 2\_Y1A\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

Boring Terminated at Elevation 87.8 ft IN UNDIVIDED COASTAL PLAIN SANDY CLAY (BLACK CREEK FORMATION)  
STA. 285+80 -L-; 81' RT

**LABORATORY TESTING SUMMARY**

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: SITE 2 - ABUTMENT RETAINING WALLS AT END BENT 1 AND END BENT 2 OF BRIDGE ON -Y1A- (US 301) OVER -L- (I-95) AT -Y1A- STA. 41+19.02

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-106	41+82	-Y1A-	108 RT	13.3 - 14.8	A-7-6 (29)	57	36	1.9	26.3	25.5	46.3	0	100	99	78	87.1	--
SS-107	42+41	-Y1A-	95 LT	8.5 - 10.0	A-2-4 (0)	24	3	4.5	76.2	2.0	17.3	0	100	98	21	--	--
SS-108	42+41	-Y1A-	95 LT	13.5 - 15.0	A-7-6 (44)	66	43	1.2	8.0	21.2	69.6	0	100	100	92	65.5	--
SS-113	40+54	-Y1A-	81 LT	3.3 - 4.8	A-7-6 (9)	44	28	28.3	23.0	23.4	25.3	0	100	85	49	21.7	--
SS-114	40+54	-Y1A-	81 LT	13.3 - 14.8	A-7-6 (46)	72	54	1.5	20.9	17.6	60.0	0	100	100	81	61.9	--
SS-115	40+25	-Y1A-	102 RT	8.3 - 9.8	A-2-4 (0)	25	8	20.6	61.6	2.1	15.7	0	100	88	18	--	--

*Stephanie H. Huffman*  
 Certified Lab Technician Signature

114-01-1203  
 Certification Number

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-65	40+38	-Y1A-	21 LT	8.5-10.0'	A-7-5(53)	81	32	2.6	8.6	17.4	71.4	0.0	100	99	92	75.8	-
SS-66	40+38	-Y1A-	21 LT	13.5-15.0'	A-2-4(0)	NP	NP	59.2	24.3	7.5	9.0	0.0	98	69	17	-	-
SS-1518	42+40	-Y1A-	20 LT	3.5-5.0'	A-6(6)	40	17	24.0	29.9	8.1	38.0	0.0	100	87	48	21.0	-
SS-1520	42+40	-Y1A-	20 LT	13.5-15.0'	A-7-6(20)	54	24	11.6	22.2	14.6	51.6	0.0	100	95	69	19.8	-

D. COUNCIL - F&R  
 Certified Lab Technician Signature

101-02-0603  
 Certification Number

NP - NON-PLASTIC

REFERENCE: I-5987A

PROJECT: 47533

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
 PROJECT DESCRIPTION I-95 IMPROVEMENTS FROM SOUTH OF US 301 (EXIT 22) TO NORTH OF SR 1758 (McDUFFIE CROSSING ROAD)  
 SITE DESCRIPTION SITE 3 - ABUTMENT RETAINING WALLS AT END BENT 1 AND END BENT 2 OF BRIDGE ON -Y3- (SR 1758 McDUFFIE CROSSING ROAD) OVER -L- (I-95) AT -Y3- STA. 30+04.11

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - 5	PROFILES
6 - 12	BORE LOGS
13	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	13

**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

<u>DEGON, A. N.</u>	<u>FARMER, B. C.</u>
<u>DUGGINS, W. T.</u>	<u>TURNAGE, J. R.</u>
<u>TANNER, M. L.</u>	<u>KELLY, N. S.</u>
<u>PESI, W. (F&amp;R)</u>	<u>DAVIS, S. (F&amp;R)</u>

INVESTIGATED BY TERRACON CONSULTANTS  
 DRAWN BY FIELDS, W. D.  
 CHECKED BY RIGGS, Jr., A. F.  
 SUBMITTED BY ALEXANDER, M. J.  
 DATE JANUARY 2022





Prepared in the Office of:



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 01/28/2022  
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

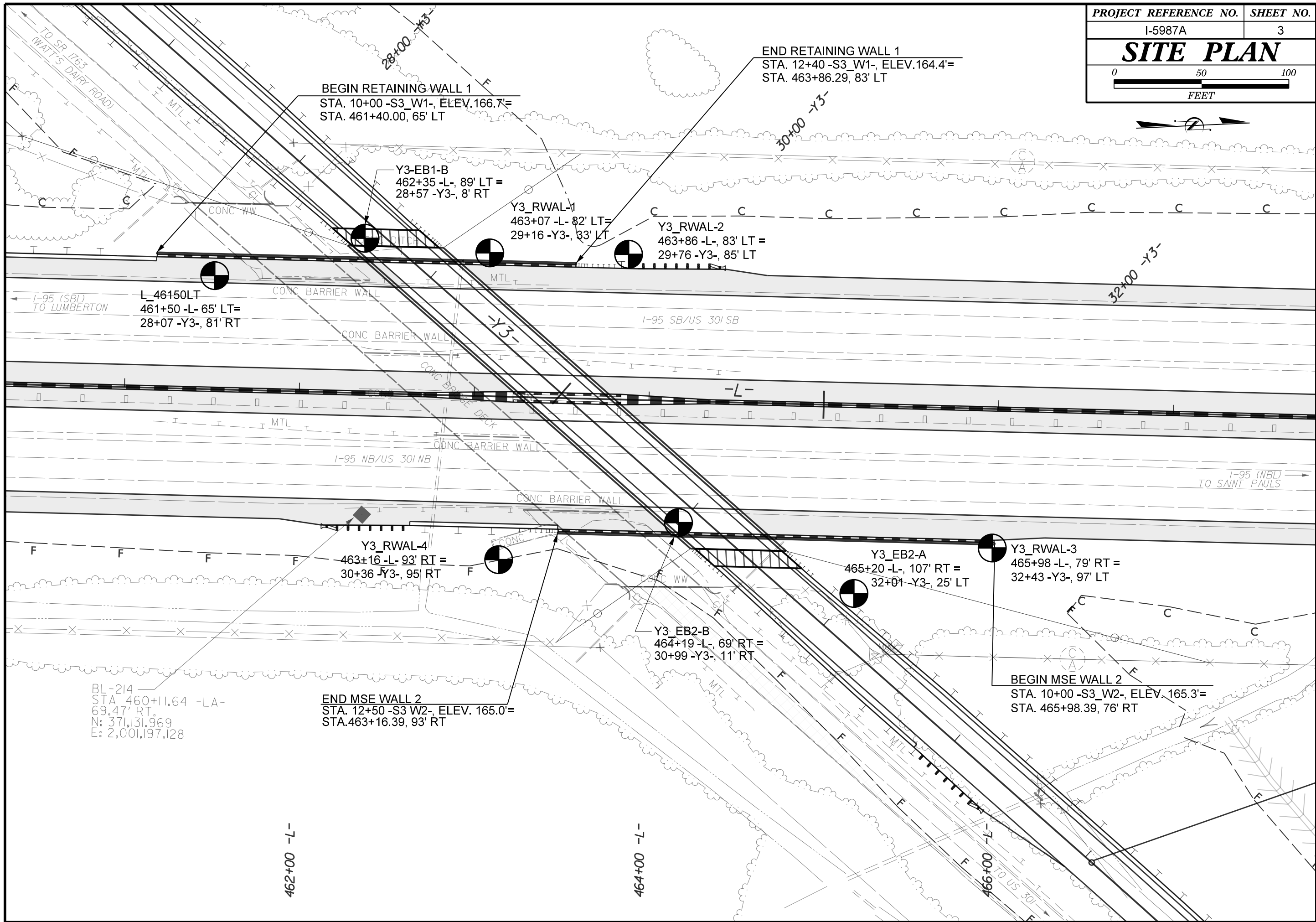
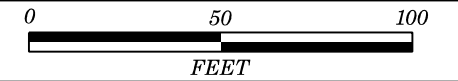
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (ASTM D1586). 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF 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)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  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.  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.  COASTAL PLAIN SEDIMENTARY ROCK (CPS)  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	<b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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. <b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>	<b>ANGULARITY OF GRAINS</b> THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .	<b>WEATHERING</b>				
<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	<b>COMPRESSIONIBILITY</b>	<b>FRESH</b> ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.				
<b>COMPRESSIBILITY</b>	<b>PERCENTAGE OF MATERIAL</b>	<b>VERY SLIGHT (V SLI.)</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>	<b>GROUND WATER</b>	<b>SLIGHT (SLI.)</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>	<b>MISCELLANEOUS SYMBOLS</b>	<b>MODERATE (MOD.)</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>	<b>RECOMMENDATION SYMBOLS</b>	<b>MODERATELY SEVERE (MOD. SEV.)</b> 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>				
<b>PERCENTAGE OF MATERIAL</b>	<b>ABBREVIATIONS</b>	<b>SEVERE (SEV.)</b> 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, WOULD YIELD SPT N VALUES &gt; 100 BPF</i>				
<b>PERCENTAGE OF MATERIAL</b>	<b>EQUIPMENT USED ON SUBJECT PROJECT</b>	<b>VERY SEVERE (V SEV.)</b> 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. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>				
<b>PERCENTAGE OF MATERIAL</b>		<b>COMPLETE</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>		<b>ROCK HARDNESS</b>				
<b>PERCENTAGE OF MATERIAL</b>		<b>VERY HARD</b> CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.				
<b>PERCENTAGE OF MATERIAL</b>		<b>HARD</b> CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.				
<b>PERCENTAGE OF MATERIAL</b>		<b>MODERATELY HARD</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>		<b>MEDIUM HARD</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>		<b>SOFT</b> 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.				
<b>PERCENTAGE OF MATERIAL</b>		<b>VERY SOFT</b> 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 FINGERNAIL.				
<b>PERCENTAGE OF MATERIAL</b>		<b>FRACTURE SPACING</b>	<b>BEDDING</b>			
<b>PERCENTAGE OF MATERIAL</b>		<b>VERY WIDE</b> MORE THAN 10 FEET	<b>VERY THICKLY BEDDED</b> 4 FEET			
<b>PERCENTAGE OF MATERIAL</b>		<b>WIDE</b> 3 TO 10 FEET	<b>THICKLY BEDDED</b> 1.5 - 4 FEET			
<b>PERCENTAGE OF MATERIAL</b>		<b>MODERATELY CLOSE</b> 1 TO 3 FEET	<b>THINLY BEDDED</b> 0.16 - 1.5 FEET			
<b>PERCENTAGE OF MATERIAL</b>		<b>CLOSE</b> 0.16 TO 1 FOOT	<b>VERY THINLY BEDDED</b> 0.03 - 0.16 FEET			
<b>PERCENTAGE OF MATERIAL</b>		<b>VERY CLOSE</b> LESS THAN 0.16 FEET	<b>THICKLY LAMINATED</b> 0.008 - 0.03 FEET			
<b>PERCENTAGE OF MATERIAL</b>			<b>THINLY LAMINATED</b> < 0.008 FEET			
<b>PERCENTAGE OF MATERIAL</b>		<b>INDURATION</b>				
<b>PERCENTAGE OF MATERIAL</b>		<b>FRIABLE</b> RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
<b>PERCENTAGE OF MATERIAL</b>		<b>MODERATELY INDURATED</b> GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.				
<b>PERCENTAGE OF MATERIAL</b>		<b>INDURATED</b> GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				
<b>PERCENTAGE OF MATERIAL</b>		<b>EXTREMELY INDURATED</b> SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				
<b>TEXTURE OR GRAIN SIZE</b>						
U.S. STD. SIEVE SIZE OPENING (MM)	4 4.76	10 2.00	40 0.42	60 0.25	200 0.075	270 0.053
<b>BOULDER (BLD.)</b>	<b>COBBLE (COB.)</b>	<b>GRAVEL (GR.)</b>	<b>COARSE SAND (CSE. SD.)</b>	<b>FINE SAND (F SD.)</b>	<b>SILT (SL.)</b>	<b>CLAY (CL.)</b>
GRAIN SIZE MM 305 12	75 3	2.0	0.25	0.05	0.005	
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>						
<b>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</b>	<b>FIELD MOISTURE DESCRIPTION</b>	<b>GUIDE FOR FIELD MOISTURE DESCRIPTION</b>				
LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT	- SATURATED - (SAT.)  - WET - (W)  - MOIST - (M)  - DRY - (D)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE  SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE  SOLID; AT OR NEAR OPTIMUM MOISTURE  REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE				
<b>PLASTICITY</b>						
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC	PLASTICITY INDEX (PI) 0-5 6-15 16-25 26 OR MORE	DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH				
<b>COLOR</b>						
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.						

**NOTES:**  
 NOTE: ELEVATIONS OF BORING Y3-EB2-A PERFORMED BY F&R Inc. OBTAINED FROM PROVIDED TIN FILE: 15987\_Is.tin.tin DATED: 11/14/2019

**BENCH MARK: BL-214**  
 69.74' RIGHT OF STA. 460+11.64 -L-  
 N: 371,31,969; E: 2,001,97,128 ELEVATION: 166.15 FEET



# SITE PLAN



**BEGIN RETAINING WALL 1**  
 STA. 10+00 -S3\_W1-, ELEV. 166.7'=  
 STA. 461+40.00, 65' LT

**END RETAINING WALL 1**  
 STA. 12+40 -S3\_W1-, ELEV. 164.4'=  
 STA. 463+86.29, 83' LT

Y3\_EB1-B  
 462+35 -L-, 89' LT =  
 28+57 -Y3-, 8' RT

Y3\_RWAL-1  
 463+07 -L- 82' LT =  
 29+16 -Y3-, 33' LT

Y3\_RWAL-2  
 463+86 -L-, 83' LT =  
 29+76 -Y3-, 85' LT

L\_46150LT  
 461+50 -L- 65' LT =  
 28+07 -Y3-, 81' RT

Y3\_RWAL-4  
 463+16 -L- 93' RT =  
 30+36 -Y3-, 95' RT

Y3\_EB2-A  
 465+20 -L-, 107' RT =  
 32+01 -Y3-, 25' LT

Y3\_RWAL-3  
 465+98 -L-, 79' RT =  
 32+43 -Y3-, 97' LT

Y3\_EB2-B  
 464+19 -L- 69' RT =  
 30+99 -Y3-, 11' RT

BL-214  
 STA. 460+11.64 -LA-  
 69.47' RT.  
 N: 371,131,969  
 E: 2,001,197.128

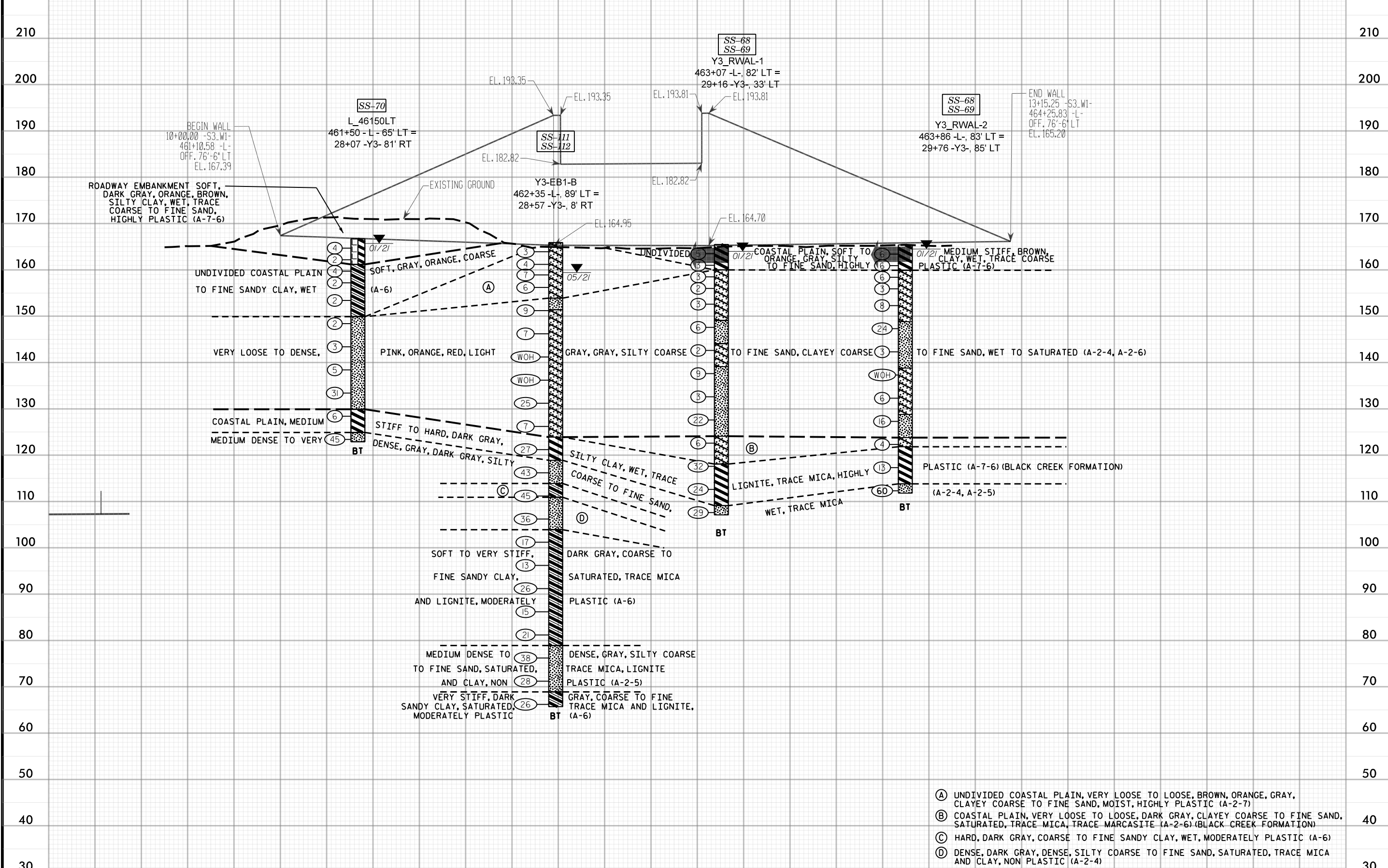
**END MSE WALL 2**  
 STA. 12+50 -S3\_W2-, ELEV. 165.0'=  
 STA. 463+16.39, 93' RT

**BEGIN MSE WALL 2**  
 STA. 10+00 -S3\_W2-, ELEV. 165.3'=  
 STA. 465+98.39, 76' RT

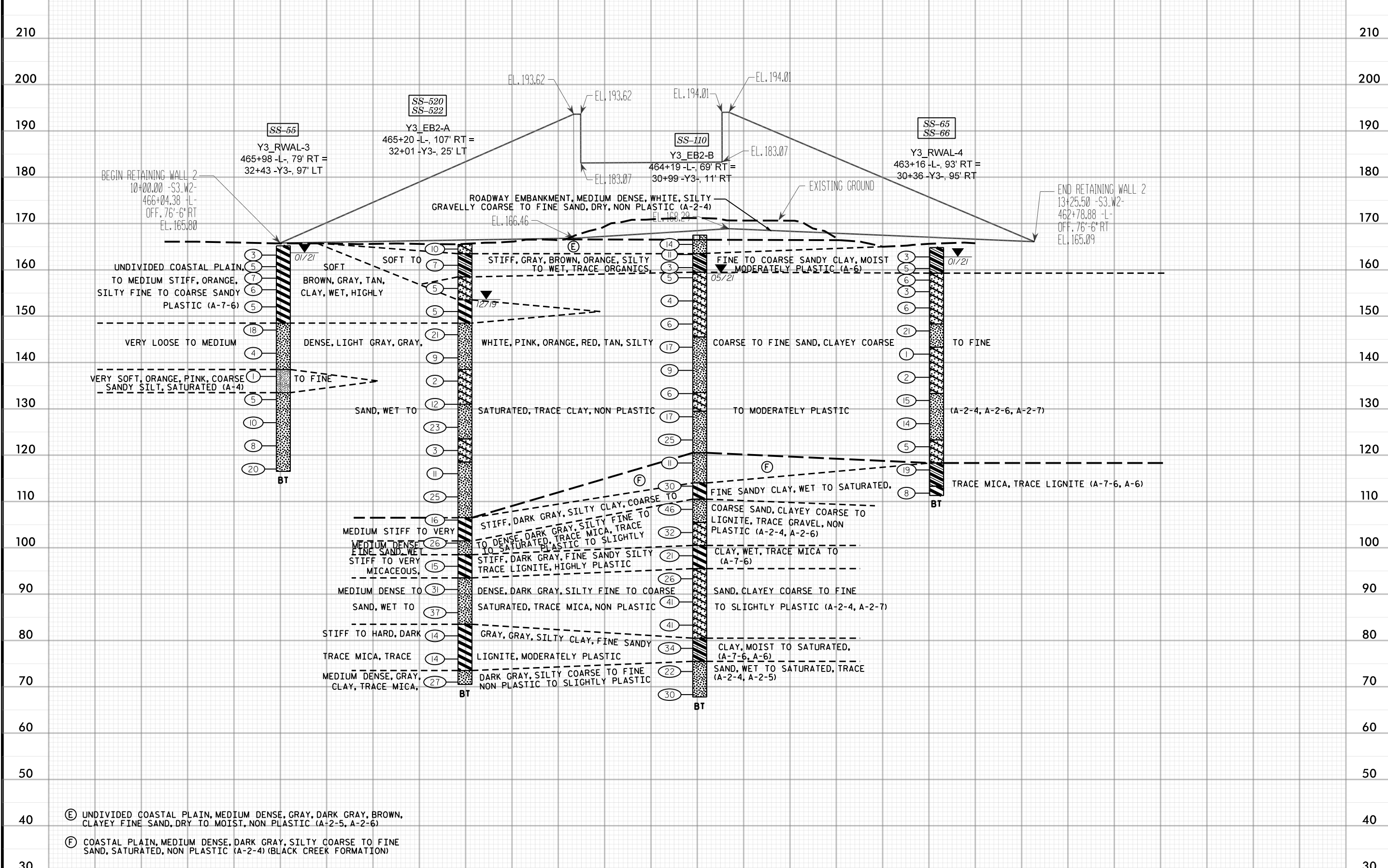
462+00 -L-

464+00 -L-

466+00 -L-



- (A) UNDIVIDED COASTAL PLAIN, VERY LOOSE TO LOOSE, BROWN, ORANGE, GRAY, CLAYEY COARSE TO FINE SAND, MOIST, HIGHLY PLASTIC (A-2-7)
- (B) COASTAL PLAIN, VERY LOOSE TO LOOSE, DARK GRAY, CLAYEY COARSE TO FINE SAND, SATURATED, TRACE MICA, TRACE MARCASITE (A-2-6) (BLACK CREEK FORMATION)
- (C) HARD, DARK GRAY, COARSE TO FINE SANDY CLAY, WET, MODERATELY PLASTIC (A-6)
- (D) DENSE, DARK GRAY, DENSE, SILTY COARSE TO FINE SAND, SATURATED, TRACE MICA AND CLAY, NON PLASTIC (A-2-4)



Ⓔ UNDIVIDED COASTAL PLAIN, MEDIUM DENSE, GRAY, DARK GRAY, BROWN, CLAYEY FINE SAND, DRY TO MOIST, NON PLASTIC (A-2-5, A-2-6)

Ⓕ COASTAL PLAIN, MEDIUM DENSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, NON PLASTIC (A-2-4) (BLACK CREEK FORMATION)

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> FARMER, B. C.
<b>SITE DESCRIPTION</b> SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> L_46150LT	<b>STATION</b> 461+50	<b>OFFSET</b> 65 ft LT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 166.7 ft	<b>TOTAL DEPTH</b> 43.8 ft	<b>NORTHING</b> 371,055	<b>EASTING</b> 2,001,044
<b>DRILL RIG/HAMMER EFF./DATE</b> TER92-0 ACKER RENEGADE 86% 02/15/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> DUGGINS, W. T.	<b>START DATE</b> 01/22/21	<b>COMP. DATE</b> 01/22/21	<b>SURFACE WATER DEPTH</b> N/A

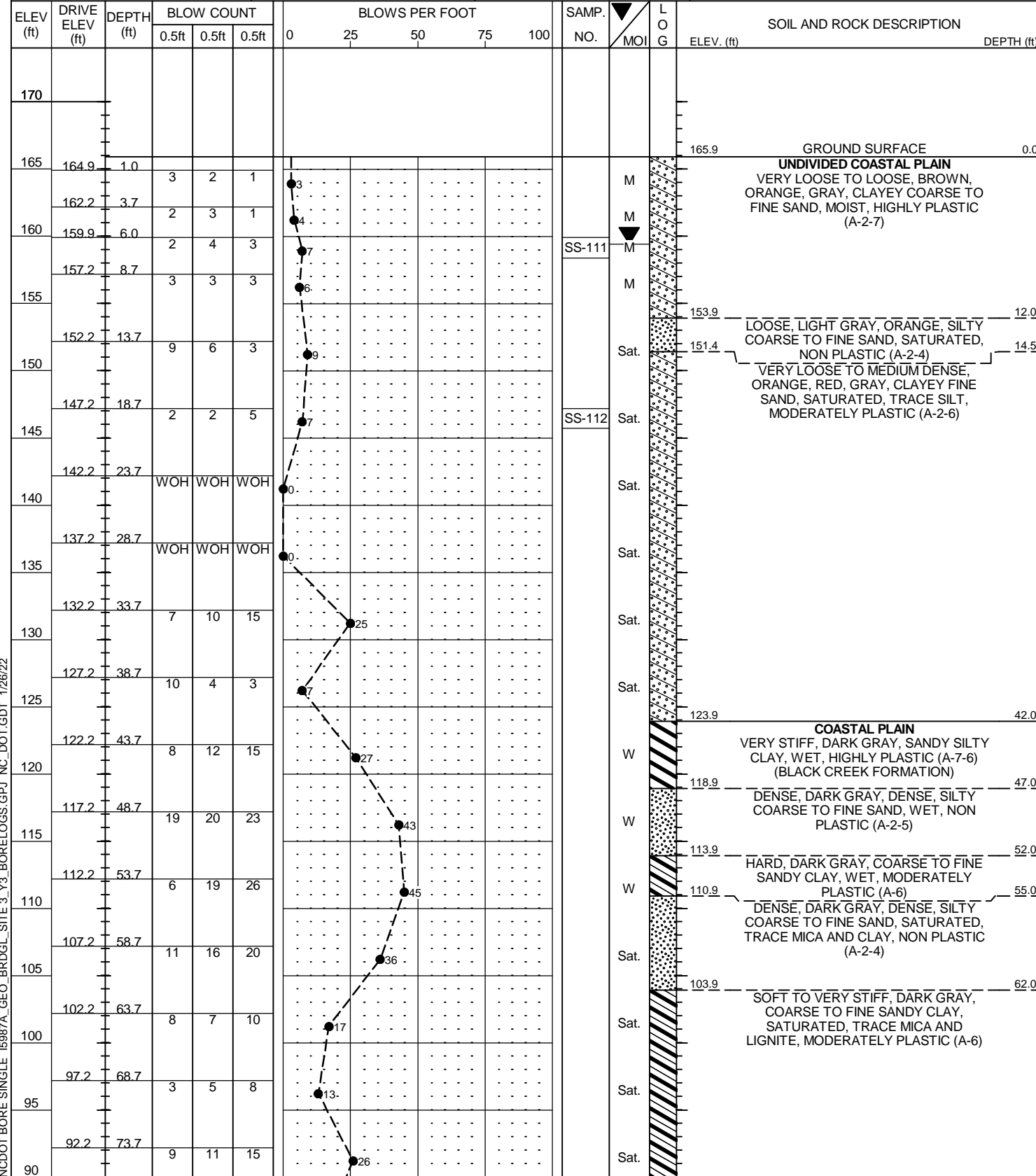
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
170															
														166.7	0.0
165	165.7	1.0				1	2	2							
	163.2	3.5				WOH	WOH	2							
160	160.7	6.0				2	3	1						161.2	5.5
	158.2	8.5				1	1	1							
155	154.4	12.3				1	1	1							
150	149.4	17.3												149.9	16.8
	144.4	22.3				WOH	1	1							
145	144.4	22.3				2	2	1							
140	139.4	27.3				4	3	2							
135	134.4	32.3				9	16	15							
130	129.4	37.3				2	2	4						129.9	36.8
125	124.4	42.3				12	19	26						124.9	41.8
														122.9	43.8

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

Boring Terminated at Elevation 122.9 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)  
STA. 28+07 -Y3-; 81' RT

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

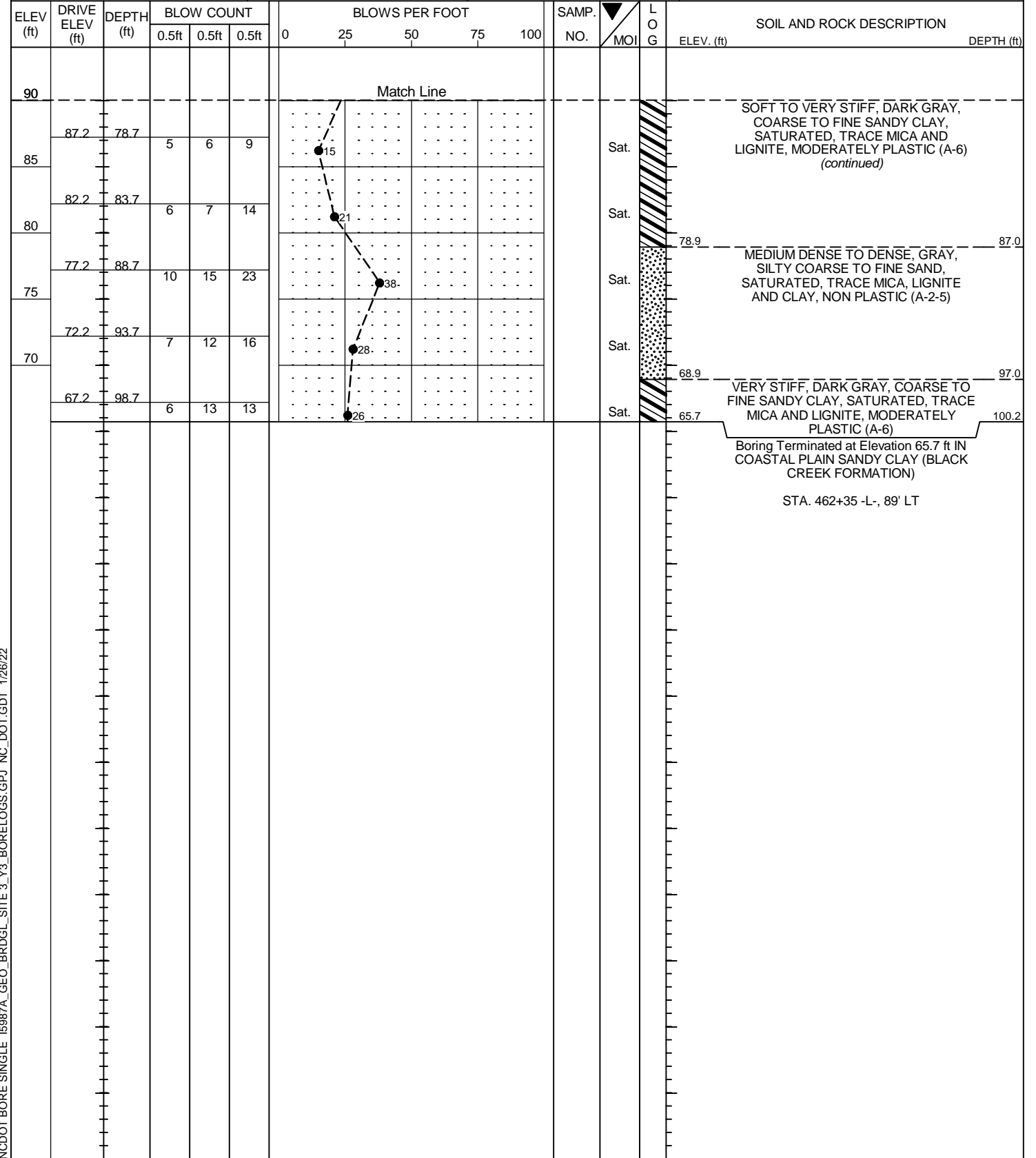
WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			GROUND WTR (ft)
BORING NO. Y3-EB1-B	STATION 28+57	OFFSET 8 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 165.9 ft	TOTAL DEPTH 100.2 ft	NORTHING 371,141	EASTING 2,001,040
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/11/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

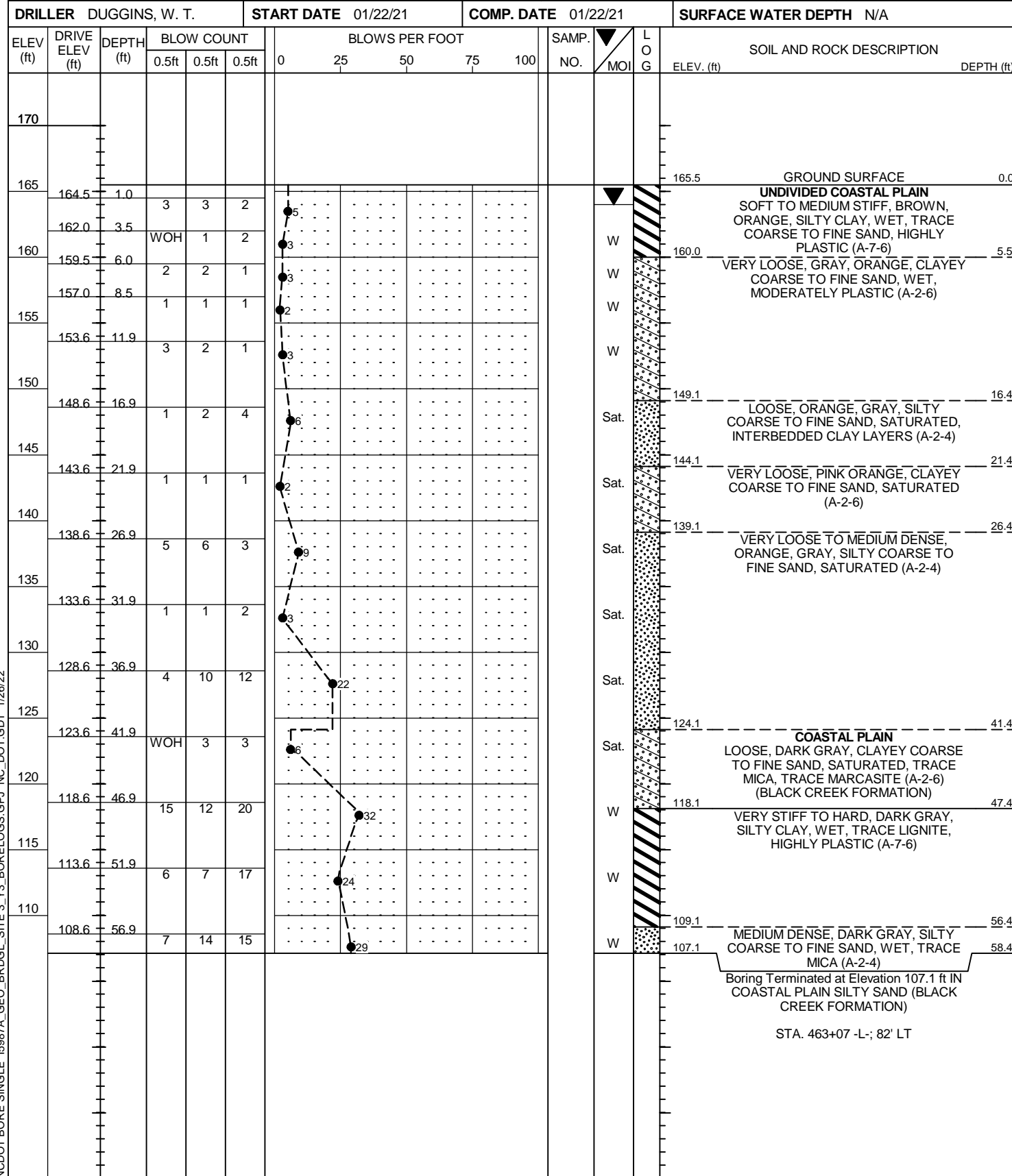
WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			GROUND WTR (ft)
BORING NO. Y3-EB1-B	STATION 28+57	OFFSET 8 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 165.9 ft	TOTAL DEPTH 100.2 ft	NORTHING 371,141	EASTING 2,001,040
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/11/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

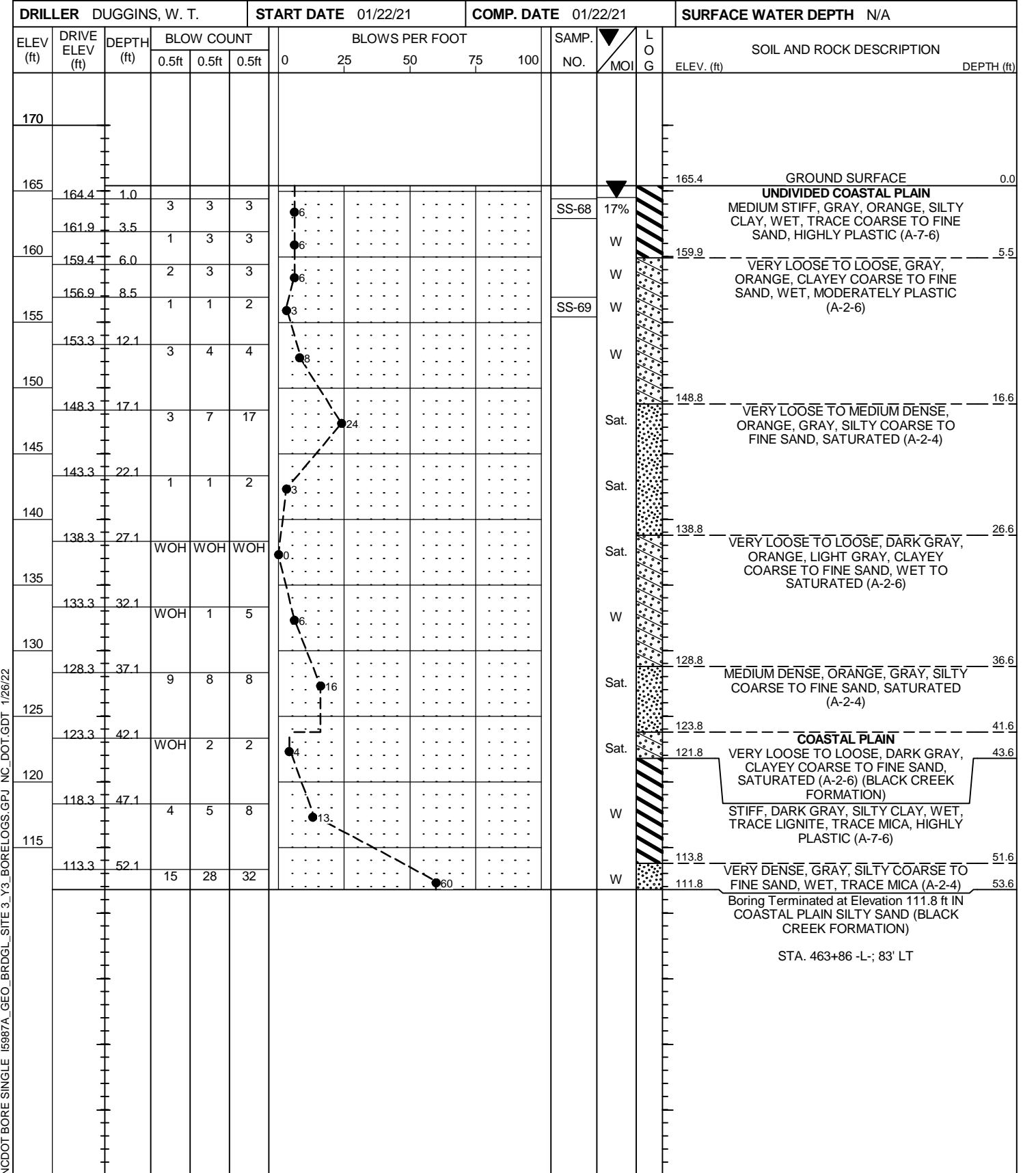
WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST FARMER, B. C.
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			GROUND WTR (ft)
BORING NO. Y3_RWAL-1	STATION 29+16	OFFSET 33 ft LT	ALIGNMENT -Y3-
COLLAR ELEV. 165.5 ft	TOTAL DEPTH 58.4 ft	NORTHING 371,212	EASTING 2,001,051
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 02/15/2019		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER DUGGINS, W. T.	START DATE 01/22/21	COMP. DATE 01/22/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/21

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST FARMER, B. C.
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			GROUND WTR (ft)
BORING NO. Y3_RWAL-2	STATION 29+76	OFFSET 85 ft LT	ALIGNMENT -Y3-
COLLAR ELEV. 165.4 ft	TOTAL DEPTH 53.6 ft	NORTHING 371,291	EASTING 2,001,055
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 02/15/2019		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER DUGGINS, W. T.	START DATE 01/22/21	COMP. DATE 01/22/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/21



<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> FARMER, B. C.
<b>SITE DESCRIPTION</b> SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y3_RWAL-3	<b>STATION</b> 32+43	<b>OFFSET</b> 97 ft LT	<b>ALIGNMENT</b> -Y3-
<b>COLLAR ELEV.</b> 165.2 ft	<b>TOTAL DEPTH</b> 48.7 ft	<b>NORTHING</b> 371,491	<b>EASTING</b> 2,001,233
<b>DRILL RIG/HAMMER EFF./DATE</b> TER92-0 ACKER RENEGADE 86% 02/15/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> DUGGINS, W. T.	<b>START DATE</b> 01/21/21	<b>COMP. DATE</b> 01/21/21	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
170																
165	164.2	1.0													165.2	0.0
160	161.7	3.5	2	2	1	3										
	159.2	6.0	2	3	4											
155	156.7	8.5	2	3	3											
	153.0	12.2	1	2	3											
150																
	148.0	17.2	3	8	10										148.5	16.7
145																
	143.0	22.2	1	1	3											
140																
	138.0	27.2	1	0	1										138.5	26.7
135																
	133.0	32.2	1	2	3										133.5	31.7
130																
	128.0	37.2	2	2	8											
125																
	123.0	42.2	3	4	4											
120																
	118.0	47.2	6	8	12										116.5	48.7

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ NC\_DOT.GDT 1/26/22

Boring Terminated at Elevation 116.5 ft IN UNDIVIDED COASTAL PLAIN SANDY CLAY  
STA. 465+98 -L-; 79' RT

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST W. Pesl										
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11							GROUND WTR (ft)									
BORING NO. Y3_EB2-A		STATION 32+01		OFFSET 25 ft LT		ALIGNMENT -Y3-										
COLLAR ELEV. 165.5 ft		TOTAL DEPTH 95.0 ft		NORTHING 371,411		EASTING 2,001,255										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER S. Davis		START DATE 12/05/19		COMP. DATE 12/05/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
170																
165	165.5	0.0	2	3	7										165.5	GROUND SURFACE
163.5															163.5	UNDIVIDED COASTAL PLAIN LOOSE, BROWN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, MOIST, TRACE ORGANICS (A-2-6)
160	162.0	3.5	2	3	4										158.5	MEDIUM STIFF, GRAY-BROWN-ORANGE, SILTY FINE TO COARSE SANDY CLAY, MOIST, TRACE ORGANICS, MODERATELY PLASTIC (A-6)
155	157.0	8.5	2	2	3										153.5	LOOSE, GRAY-TAN, SILTY CLAYEY FINE TO COARSE SAND, WET (A-2-6) MEDIUM STIFF, GRAY-TAN, SILTY FINE TO COARSE SANDY CLAY, WET, HIGHLY PLASTIC (A-7-6)
150	152.0	13.5	2	2	3										148.5	LOOSE TO MEDIUM DENSE, RED-BROWN-GRAY, SILTY FINE SAND, WET TO SATURATED (A-2-4)
145	147.0	18.5	9	8	13										138.5	VERY LOOSE TO MEDIUM DENSE, ORANGE-TAN-GRAY, SILTY CLAYEY FINE SAND, SATURATED (A-2-6)
140	142.0	23.5	5	4	5										131.0	MEDIUM DENSE, BROWN-GRAY, SILTY FINE TO COARSE SAND, WET (A-2-4)
135	137.0	28.5	2	1	1										123.5	VERY LOOSE, ORANGE-TAN-GRAY, SILTY CLAYEY FINE TO COARSE SAND, SATURATED (A-2-6)
130	132.0	33.5	2	3	9										118.5	MEDIUM DENSE, ORANGE-BROWN-GRAY, SILTY FINE TO COARSE SAND, WET, TRACE CLAY (A-2-4)
125	127.0	38.5	5	10	13										106.5	COASTAL PLAIN VERY STIFF, DARK GRAY, SILTY CLAY, WET, TRACE MICA AND LIGNITE (A-7-6) (BLACK CREEK FORMATION)
120	122.0	43.5	2	2	1										101.5	MEDIUM DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA, CLAY, AND GRAVEL (A-2-4)
115	117.0	48.5	3	5	6										98.5	STIFF TO VERY STIFF, DARK GRAY, FINE SANDY SILTY CLAY, WET, MICACEOUS (A-7-6)
110	112.0	53.5	5	9	16										93.5	DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA AND CLAY (A-2-4)
105	107.0	58.5	12	7	9											
100	102.0	63.5	8	13	13											
95	97.0	68.5	5	6	9											
90	92.0	73.5	9	13	18											

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

# GEOTECHNICAL BORING REPORT BORE LOG

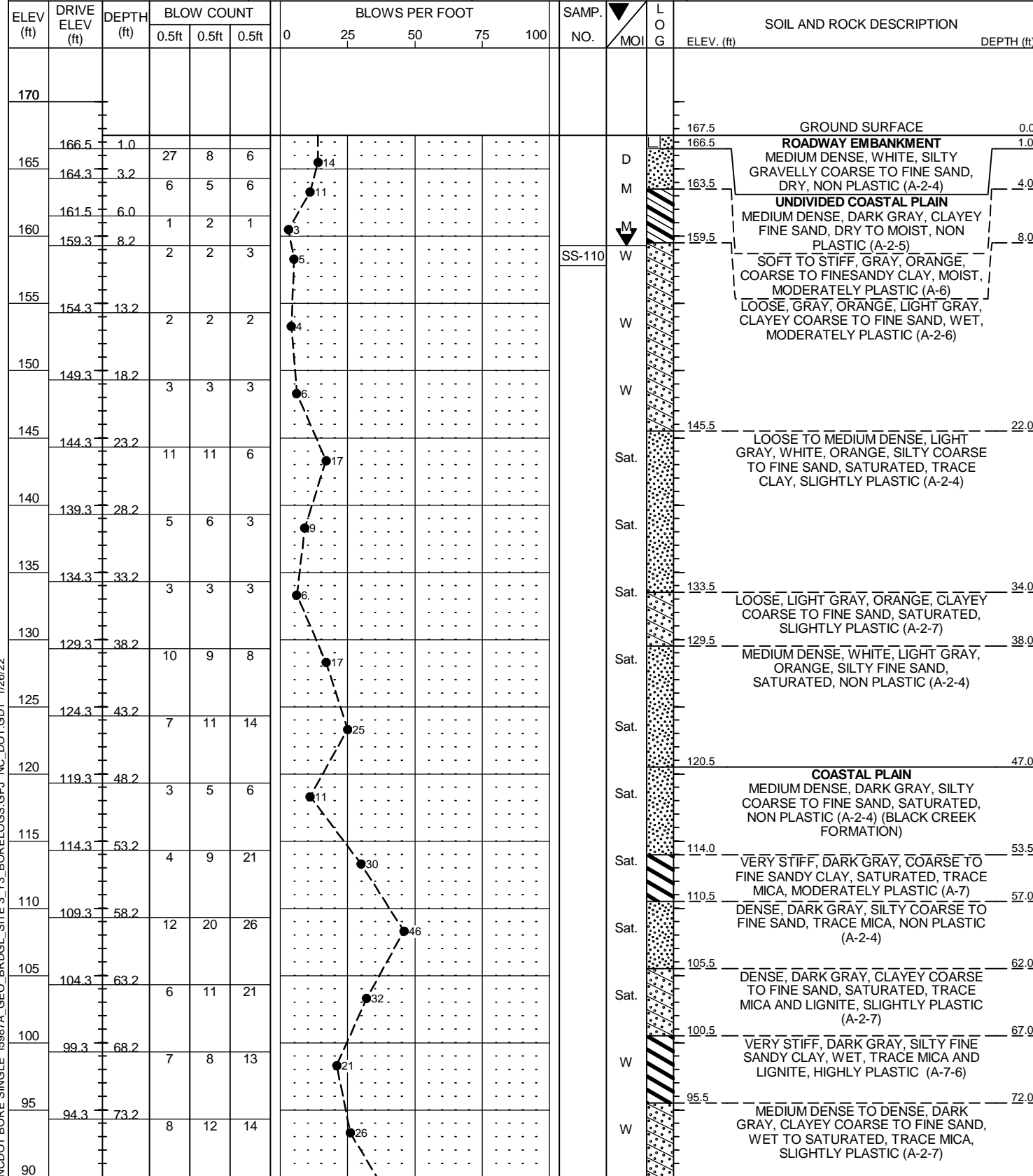
WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST W. Pesl										
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11							GROUND WTR (ft)									
BORING NO. Y3_EB2-A		STATION 32+01		OFFSET 25 ft LT		ALIGNMENT -Y3-										
COLLAR ELEV. 165.5 ft		TOTAL DEPTH 95.0 ft		NORTHING 371,411		EASTING 2,001,255										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 84% 03/01/2019		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER S. Davis		START DATE 12/05/19		COMP. DATE 12/05/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
90																
85	87.0	78.5	11	21	16										83.5	DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA AND CLAY (A-2-4) (continued)
80	82.0	83.5	5	6	8										73.5	STIFF, DARK GRAY-GRAY, SILTY CLAY, MOIST, TRACE MICA (A-7-6)
75	77.0	88.5	4	6	8										70.5	MEDIUM DENSE, DARK GRAY-GRAY, SILTY FINE TO COARSE SAND, WET, TRACE CLAY (A-2-4)
	72.0	93.5	12	11	16										70.5	Boring Terminated at Elevation 70.5 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION)

NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

Notes:  
1. Surficial Organic Soil: 0.0-0.2'  
STA. 465+20 -L-; 107' RT

**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

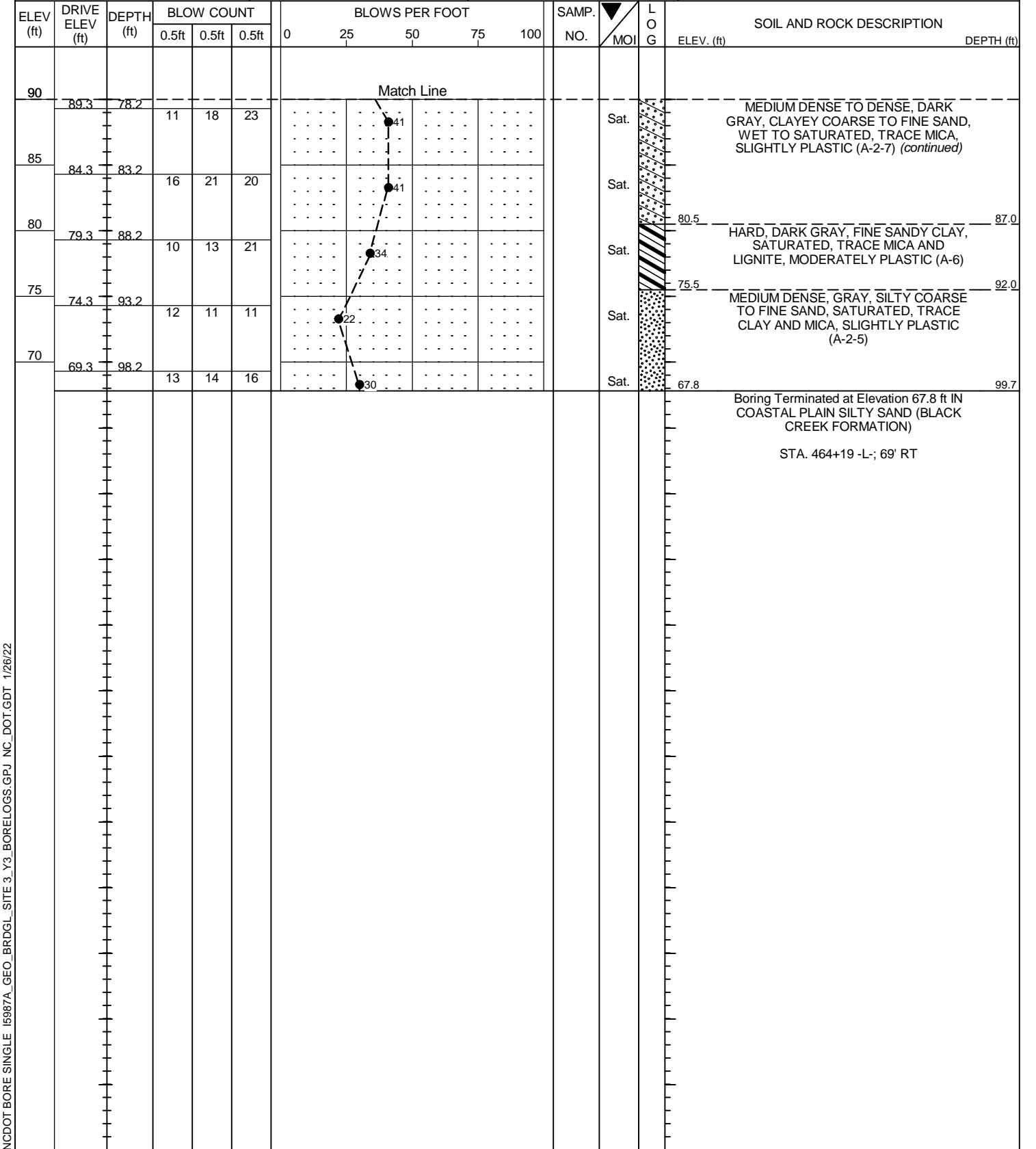
WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			GROUND WTR (ft)
BORING NO. Y3_EB2-B	STATION 30+99	OFFSET 11 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 167.5 ft	TOTAL DEPTH 99.7 ft	NORTHING 371,312	EASTING 2,001,210
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/10/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

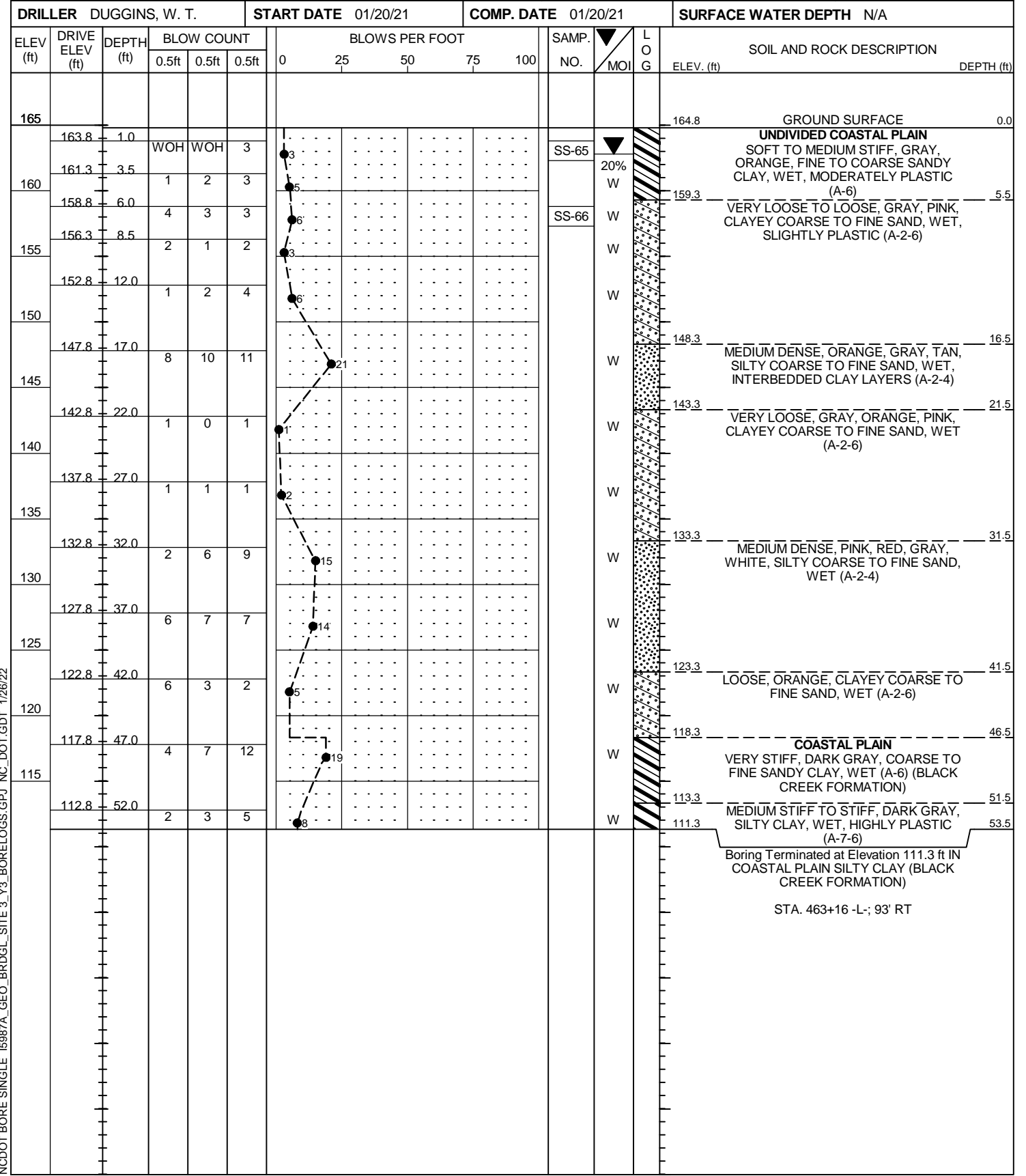
**GEOTECHNICAL BORING REPORT**  
**BORE LOG**

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A. N.
SITE DESCRIPTION SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			GROUND WTR (ft)
BORING NO. Y3_EB2-B	STATION 30+99	OFFSET 11 ft RT	ALIGNMENT -Y3-
COLLAR ELEV. 167.5 ft	TOTAL DEPTH 99.7 ft	NORTHING 371,312	EASTING 2,001,210
DRILL RIG/HAMMER EFF./DATE TER299 DIEDRICH D-50 79% 12/31/2020		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 05/10/21	COMP. DATE 05/10/21	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/26/22

<b>WBS</b> 47533.1.2	<b>TIP</b> I-5987A	<b>COUNTY</b> ROBESON	<b>GEOLOGIST</b> FARMER, B. C.
<b>SITE DESCRIPTION</b> SITE 3 - ABUTMENT RET. WALLS AT EB1 AND EB2 OF BRIDGE ON -Y3- OVER -L- AT -Y3- STA. 30+40.11			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> Y3_RWAL-4	<b>STATION</b> 30+36	<b>OFFSET</b> 95 ft RT	<b>ALIGNMENT</b> -Y3-
<b>COLLAR ELEV.</b> 164.8 ft	<b>TOTAL DEPTH</b> 53.5 ft	<b>NORTHING</b> 371,208	<b>EASTING</b> 2,001,226
<b>DRILL RIG/HAMMER EFF./DATE</b> TER92-0 ACKER RENEGADE 86% 02/15/2019		<b>DRILL METHOD</b> Mud Rotary	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> DUGGINS, W. T.	<b>START DATE</b> 01/20/21	<b>COMP. DATE</b> 01/20/21	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE SINGLE I5987A\_GEO\_BRDGL\_SITE 3\_Y3\_BORELOGS.GPJ\_NC\_DOT.GDT 1/28/22

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2

TIP: I-5987A

COUNTY: ROBESON

DESCRIPTION: SITE 3 - ABUTMENT RETAINING WALLS AT END BENT 1 AND END BENT 2 OF BRIDGE ON -Y3- (SR 1758 McDUFFIE CROSSING RD.) OVER -L- (I-95) AT -Y3- STA. 30+04.11

Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-70	461+50	-L-	65 LT	1.0 - 2.5	A-7-6 (6)	43	28	40.4	20.2	6.8	32.6	0	99	72	42	17.5	--
SS-65	30+36	-Y3-	95 RT	1.0 - 2.5	A-6 (7)	38	25	34.6	19.5	11.7	34.2	0	100	78	48	20.3	--
SS-66	30+36	-Y3-	95 RT	6.0 - 7.5	A-2-6 (0)	28	13	54.3	26.7	2.0	17.0	0	99	68	21	--	--
SS-55	32+43	-Y3-	97 LT	3.5 - 5.0	A-7-6 (7)	48	30	34.8	25.9	5.5	33.8	0	100	81	42	24.0	--
SS-111	28+57	-Y3-	8 RT	6.0 - 7.5	A-2-7 (4)	52	32	48.2	19.7	4.4	27.7	0	100	69	34	22.5	--
SS-112	28+57	-Y3-	8 RT	18.7 - 20.2	A-2-6 (1)	33	19	13.8	56.8	7.0	22.4	0	99	94	33	--	--
SS-68	29+76	-Y3-	85 LT	1.0 - 2.5	A-7-6 (8)	43	26	34.0	22.1	8.7	35.2	0	99	78	47	17.3	--
SS-69	29+76	-Y3-	85 LT	8.5 - 10.0	A-2-6 (0)	40	25	53.2	23.5	1.5	21.8	0	99	69	25	--	--
SS-520	32+01	-Y3-	25 LT	3.5 - 5.0	A-6 (2)	31	17	39.1	24.9	9.2	26.8	0	100	78	40	15.7	--
SS-522	32+01	-Y3-	25 LT	13.5 - 15.0	A-7-6 (10)	49	32	28.0	28.5	8.0	35.5	0	100	85	48	24.5	--

  
 Certified Lab Technician Signature

114-01-1203  
 Certification Number

REFERENCE: I-5987A

PROJECT: 47533

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ROBESON  
PROJECT DESCRIPTION I-95 FROM SOUTH OF US 301  
TO SOUTH OF NC 20. WIDEN TO EIGHT LANES.  
SITE DESCRIPTION NOISE WALL 8 RIGHT OF -YIRPA-

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - 6	PROFILE
7 - 10	BORE LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5987A	1	10

**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 1919 T07-6850. 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:
1. 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.
  2. 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

TURNAGE, J. R.

FORTSON, M. L.

DEGON, A. N.

DEGON, A. N.

INVESTIGATED BY DEGON, A. N.

DRAWN BY ALEXANDER, M. J.

CHECKED BY NASH, A. A.

SUBMITTED BY ALEXANDER, M. J.

DATE NOVEMBER 2021

Prepared in the Office of:

**Terracon**

Consulting Engineers and Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367

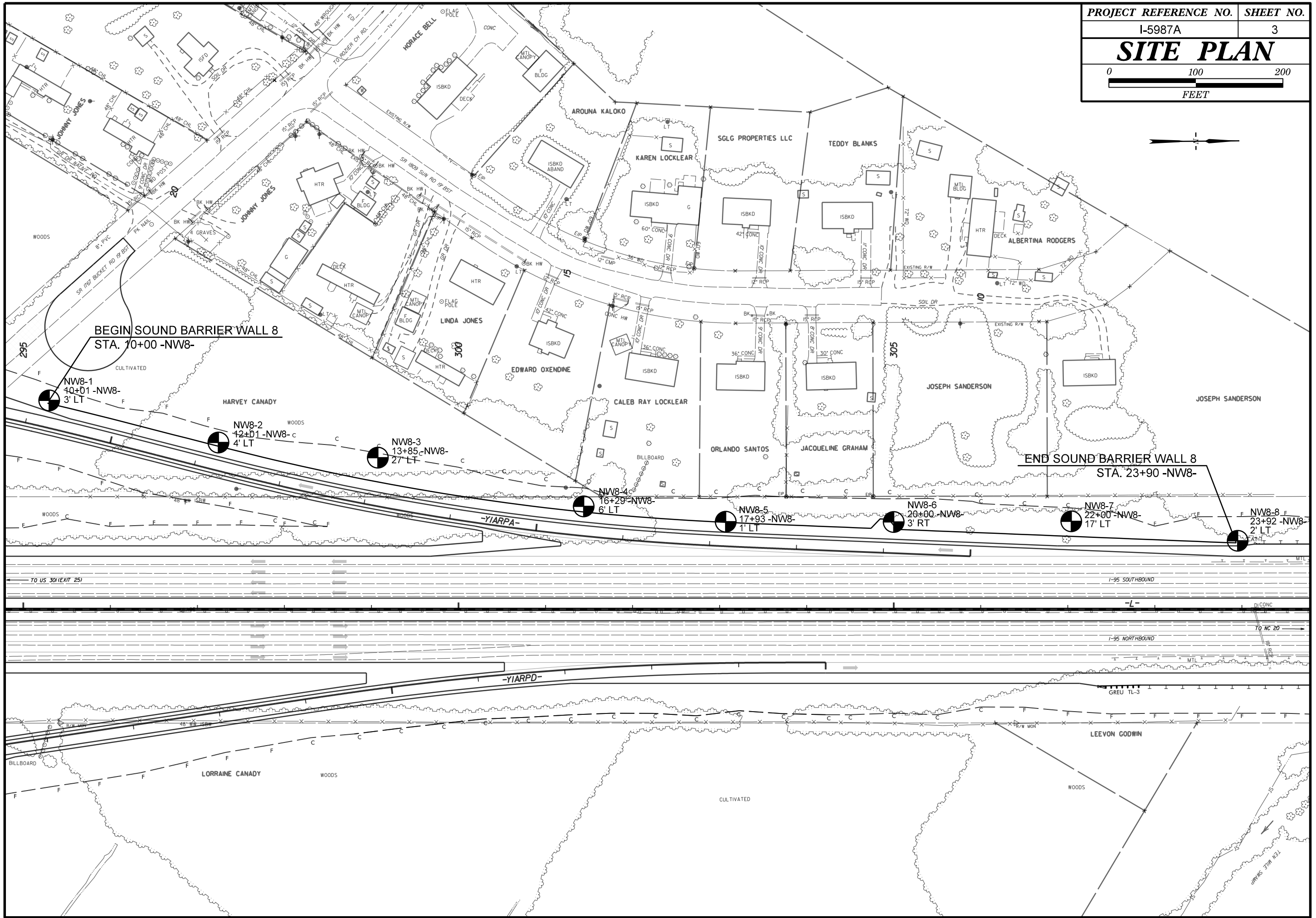
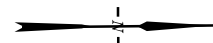


DocuSigned by:  
Matthew J. Alexander 11/22/2021  
AC113DDE6101413...  
SIGNATURE DATE

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







**BEGIN SOUND BARRIER WALL 8**  
STA. 10+00 -NW8-

**END SOUND BARRIER WALL 8**  
STA. 23+90 -NW8-

NW8-1  
40+01 -NW8-  
3' LT

NW8-2  
42+01 -NW8- c  
4' LT

NW8-3  
13+85 -NW8-  
27' LT

NW8-4  
16+29 -NW8-  
6' LT

NW8-5  
17+93 -NW8-  
1' LT

NW8-6  
20+00 -NW8-  
3' RT

NW8-7  
22+00 -NW8-  
17' LT

NW8-8  
23+92 -NW8-  
2' LT

TO US 301 (EXIT 25)

I-95 SOUTHBOUND

I-95 NORTHBOUND

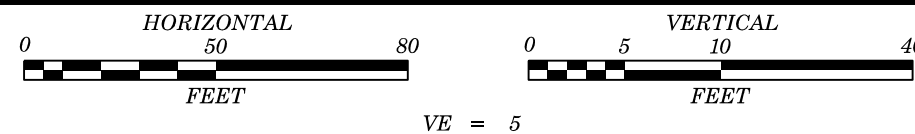
-YIARPA-

GREU TL-3

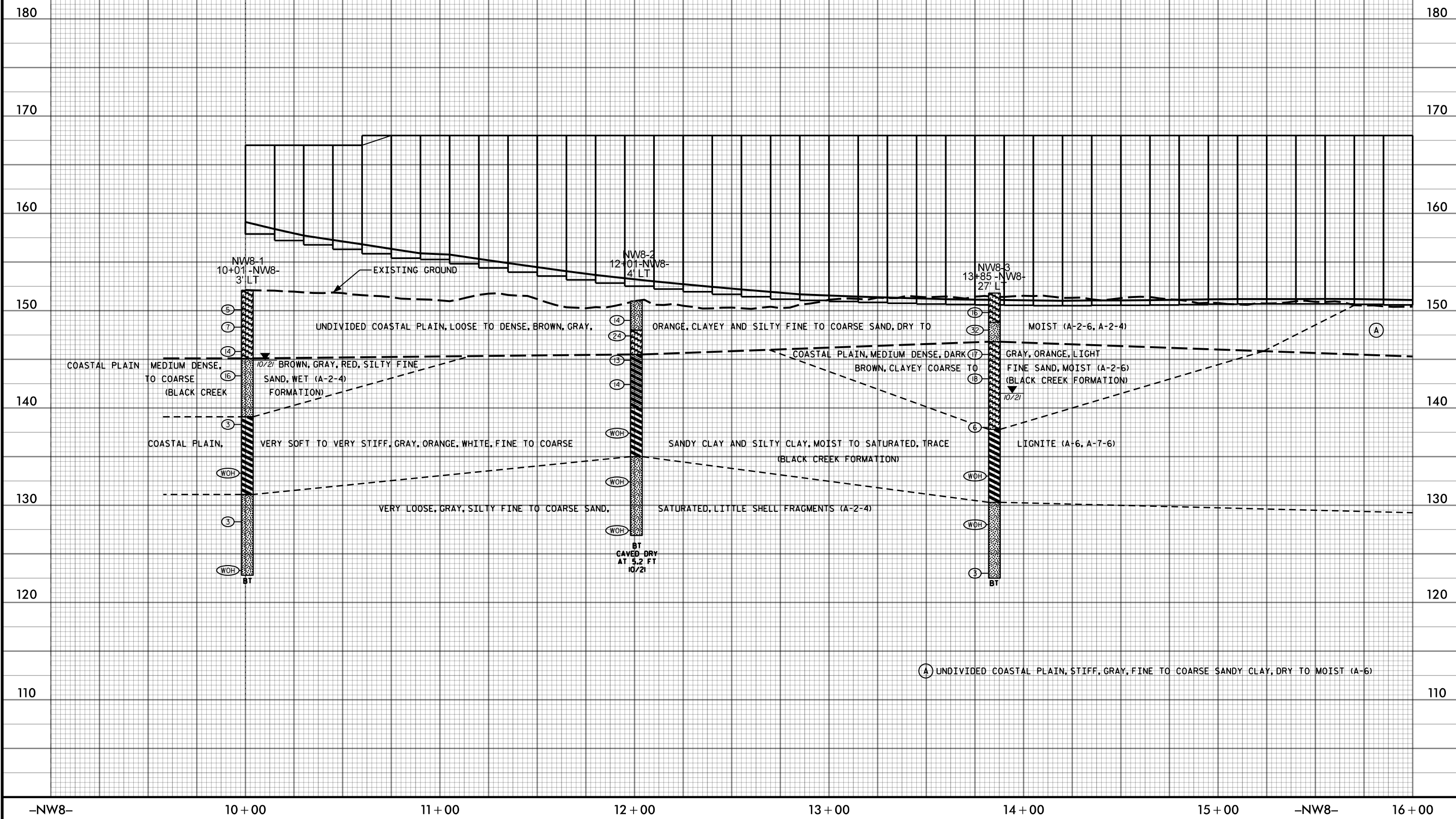
LORRAINE CANADY

LEEYON GODWIN

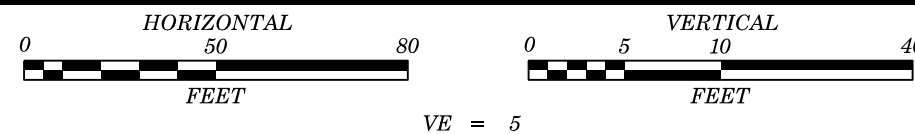
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW8- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987\_s\_tin1.tin) DATED JUNE 16, 2021.



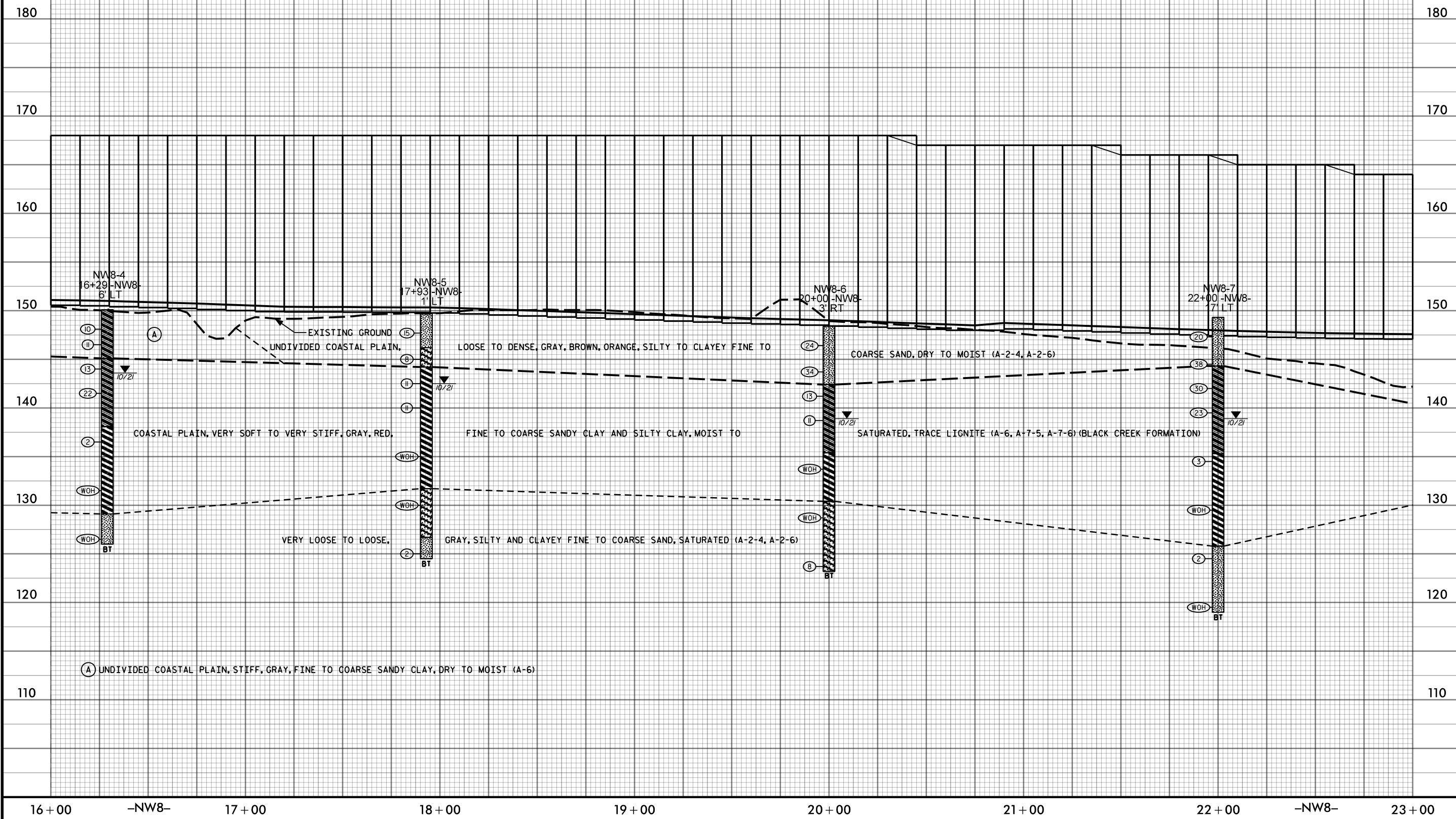
PROJECT REFERENCE NO.	SHEET NO.
I-5987A	4
CENTERLINE PROFILE ALONG NOISE WALL 8	



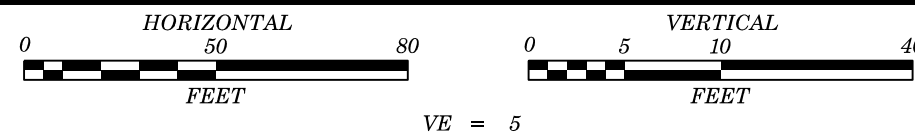
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW8- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987\_ls\_tin1.tin) DATED JUNE 16, 2021.



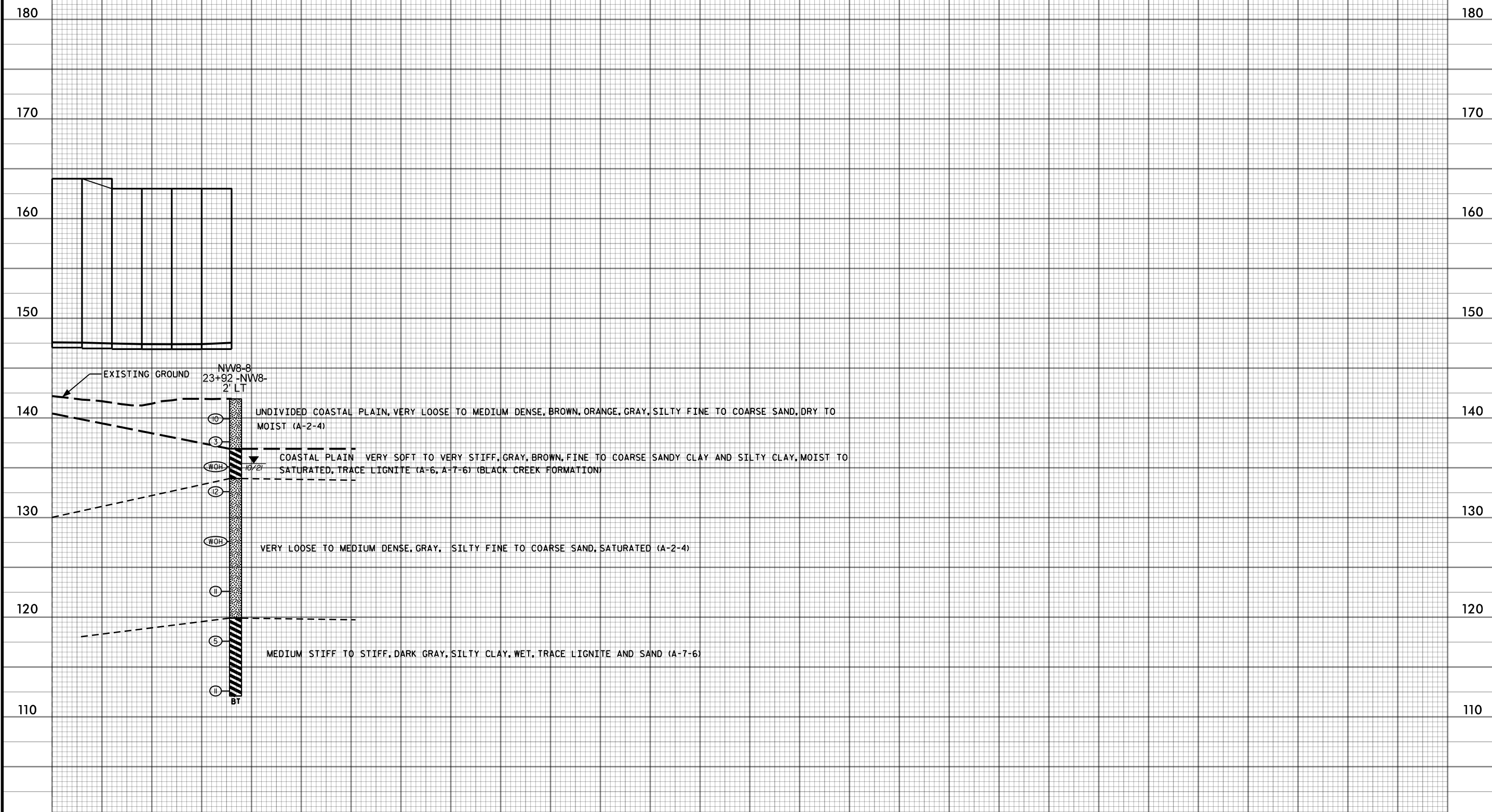
PROJECT REFERENCE NO.	SHEET NO.
I-5987A	5
CENTERLINE PROFILE ALONG NOISE WALL 8	



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW8- TAKEN FROM THE PROVIDED PROJECT TIN FILE (i5987\_ls\_tin1.tin) DATED JUNE 16, 2021.



PROJECT REFERENCE NO.	SHEET NO.
I-5987A	6
CENTERLINE PROFILE ALONG NOISE WALL 8	



WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A.										
SITE DESCRIPTION I-5987A NOISE WALL 8							GROUND WTR (ft)									
BORING NO. NW8-1		STATION 10+01		OFFSET 3 ft LT		ALIGNMENT NW8										
COLLAR ELEV. 152.1 ft		TOTAL DEPTH 29.3 ft		NORTHING 354,439		EASTING 2,000,547										
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 10/21/21		COMP. DATE 10/21/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
155																
	151.1	1.0														
150	149.3	2.8	3	3	2											
	146.8	5.3	3	3	4											
145	144.3	7.8	4	6	8											
	144.3	7.8	8	8	8											
140	139.3	12.8	8	8	8											
	139.3	12.8	1	1	2											
135	134.3	17.8	1	1	2											
	134.3	17.8	WOH	WOH	WOH											
130	129.3	22.8	1	2	1											
	129.3	22.8	1	2	1											
125	124.3	27.8	WOH	WOH	WOH											
	124.3	27.8	WOH	WOH	WOH											

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A.										
SITE DESCRIPTION I-5987A NOISE WALL 8							GROUND WTR (ft)									
BORING NO. NW8-2		STATION 12+01		OFFSET 4 ft LT		ALIGNMENT NW8										
COLLAR ELEV. 151.0 ft		TOTAL DEPTH 24.1 ft		NORTHING 354,633		EASTING 2,000,597										
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 10/21/21		COMP. DATE 10/21/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
155																
	151.0															
150	150.0	1.0	6	7	7											
	148.4	2.6	11	11	13											
145	145.9	5.1	6	6	7											
	143.4	7.6	5	6	8											
140	138.4	12.6	WOH	WOH	WOH											
	138.4	12.6	WOH	WOH	WOH											
135	133.4	17.6	WOH	WOH	WOH											
	133.4	17.6	WOH	WOH	WOH											
130	128.4	22.6	WOH	WOH	WOH											
	128.4	22.6	WOH	WOH	WOH											

NCDOT BORE DOUBLE I5987A\_GEO\_SBW\_NW8.GPJ NC\_DOT.GDT 11/8/21



WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A.
SITE DESCRIPTION I-5987A NOISE WALL 8			GROUND WTR (ft)
BORING NO. NW8-3	STATION 13+85	OFFSET 27 ft LT	ALIGNMENT NW8
COLLAR ELEV. 151.8 ft	TOTAL DEPTH 29.3 ft	NORTHING 354,816	EASTING 2,000,616
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 10/21/21	COMP. DATE 10/21/21	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
155															
150	150.8	1.0	3	6	10									151.8	GROUND SURFACE
	149.0	2.8	11	12	20									148.8	UNDIVIDED COASTAL PLAIN MEDIUM DENSE, BROWN, GRAY, ORANGE, CLAYEY COARSE TO FINE SAND, DRY (A-2-6)
	146.5	5.3	6	8	9									146.8	DENSE, WHITE, LIGHT BROWN, ORANGE, SILTY FINE TO COARSE SAND, DRY (A-2-4)
145	144.0	7.8	7	8	10									140.0	COASTAL PLAIN MEDIUM DENSE, DARK GRAY, ORANGE, LIGHT BROWN, CLAYEY COARSE TO FINE SAND, MOIST (A-2-6) (BLACK CREEK FORMATION)
140	139.0	12.8	4	3	3									137.8	VERY SOFT TO MEDIUM STIFF, GREEN-GRAY, SILTY CLAY, WET TO SATURATED, TRACE LIGNITE, HIGHLY PLASTIC (A-7-6)
135	134.0	17.8	WOH	WOH	WOH									130.3	VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4)
130	129.0	22.8	WOH	WOH	WOH									122.5	Boring Terminated at Elevation 122.5 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)
125	124.0	27.8	1	2	1										

WBS 47533.1.2	TIP I-5987A	COUNTY ROBESON	GEOLOGIST DEGON, A.
SITE DESCRIPTION I-5987A NOISE WALL 8			GROUND WTR (ft)
BORING NO. NW8-4	STATION 16+29	OFFSET 6 ft LT	ALIGNMENT NW8
COLLAR ELEV. 150.1 ft	TOTAL DEPTH 24.1 ft	NORTHING 355,052	EASTING 2,000,674
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	START DATE 10/21/21	COMP. DATE 10/21/21	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
155															
150	149.1	1.0	6	6	4									150.1	GROUND SURFACE
	147.5	2.6	2	4	7									145.1	UNDIVIDED COASTAL PLAIN STIFF, GRAY, FINE TO COARSE SANDY CLAY, DRY TO MOIST (A-6)
145	145.0	5.1	3	5	8									140.0	COASTAL PLAIN STIFF TO VERY STIFF, GRAY, FINE TO COARSE SANDY CLAY, MOIST (A-6) (BLACK CREEK FORMATION)
140	142.5	7.6	8	11	11									138.1	VERY SOFT, LIGHT TO DARK GRAY, SILTY CLAY, SATURATED, HIGHLY PLASTIC (A-7-5)
135	137.5	12.6	2	1	1									129.1	VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4)
130	132.5	17.6	WOH	WOH	WOH									126.0	Boring Terminated at Elevation 126.0 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)
	127.5	22.6	WOH	WOH	WOH										

NCDOT BORE DOUBLE I5987A\_GEO\_SBW\_NW8.GPJ NC\_DOT.GDT 11/8/21

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A.										
SITE DESCRIPTION I-5987A NOISE WALL 8							GROUND WTR (ft)									
BORING NO. NW8-5		STATION 17+93		OFFSET 1 ft LT		ALIGNMENT NW8										
COLLAR ELEV. 149.7 ft		TOTAL DEPTH 25.2 ft		NORTHING 355,215		EASTING 2,000,693										
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 10/20/21		COMP. DATE 10/20/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150	148.7	1.0	12	8	7									149.7	0.0	GROUND SURFACE
	146.0	3.7	5	4	4									146.2	3.5	UNDIVIDED COASTAL PLAIN MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND, MOIST (A-2-4)
145	143.5	6.2	4	6	5									144.2	5.5	LOOSE, GRAY, CLAYEY FINE TO COARSE SAND, MOIST (A-2-6)
140	141.0	8.7	4	5	6									131.7	18.0	COASTAL PLAIN VERY SOFT TO STIFF, GRAY, SILTY CLAY, MOIST TO WET, TRACE TO LITTLE SAND, TRACE LIGNITE, HIGHLY PLASTIC (A-7-6) (BLACK CREEK FORMATION)
135	136.0	13.7	WOH	WOH	WOH									126.7	23.0	VERY LOOSE, DARK GRAY, CLAYEY FINE TO COARSE SAND, SATURATED, TRACE LIGNITE (A-2-7)
130	131.0	18.7	WOH	WOH	WOH									124.5	25.2	VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, LITTLE SHELLS, TRACE LIGNITE (A-2-4)
125	126.0	23.7	1	1	1											Boring Terminated at Elevation 124.5 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A.										
SITE DESCRIPTION I-5987A NOISE WALL 8							GROUND WTR (ft)									
BORING NO. NW8-6		STATION 20+00		OFFSET 3 ft RT		ALIGNMENT NW8										
COLLAR ELEV. 148.4 ft		TOTAL DEPTH 25.2 ft		NORTHING 355,408		EASTING 2,000,695										
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 10/20/21		COMP. DATE 10/20/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150	147.4	1.0	12	13	11									148.4	0.0	GROUND SURFACE
145	144.7	3.7	17	22	12									142.4	6.0	UNDIVIDED COASTAL PLAIN MEDIUM DENSE TO DENSE, BROWN, ORANGE, SILTY FINE TO COARSE SAND, DRY TO MOIST (A-2-4)
140	142.2	6.2	5	5	8									135.4	13.0	COASTAL PLAIN STIFF, GRAY, RED, COARSE TO FINE SANDY CLAY, MOIST (A-6) (BLACK CREEK FORMATION)
135	134.7	13.7	WOH	WOH	WOH									130.4	18.0	VERY SOFT, DARK GRAY, SILTY CLAY, WET, TRACE LIGNITE, HIGHLY PLASTIC (A-7-6)
130	129.7	18.7	WOH	WOH	WOH									123.2	25.2	VERY LOOSE TO LOOSE, GRAY, CLAYEY COARSE TO FINE SAND, SATURATED (A-2-6)
125	124.7	23.7	3	3	5											Boring Terminated at Elevation 123.2 ft IN COASTAL PLAIN CLAYEY SAND (BLACK CREEK FORMATION)

NCDOT BORE DOUBLE I5987A\_GEO\_SBW\_NW8.GPJ NC\_DOT.GDT 11/8/21

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A.										
SITE DESCRIPTION I-5987A NOISE WALL 8							GROUND WTR (ft)									
BORING NO. NW8-7		STATION 22+00		OFFSET 17 ft LT		ALIGNMENT NW8										
COLLAR ELEV. 149.3 ft		TOTAL DEPTH 30.3 ft		NORTHING 355,612		EASTING 2,000,696										
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 10/20/21		COMP. DATE 10/20/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
150														149.3	GROUND SURFACE	0.0
	148.3	1.0	10	11	9											
145	145.5	3.8	17	20	18									144.3	UNDIVIDED COASTAL PLAIN MEDIUM DENSE TO DENSE, BROWN, RED-BROWN, SILTY FINE TO COARSE SAND, DRY TO MOIST (A-2-4)	5.0
	143.0	6.3	10	15	15											
140	140.5	8.8	10	12	11										COASTAL PLAIN VERY STIFF, GRAY, BROWN, FINE TO COARSE SANDY CLAY, MOIST (A-6) (BLACK CREEK FORMATION)	
	135.5	13.8	2	2	1									135.3	VERY SOFT TO SOFT, GRAY TO DARK GRAY, SILTY CLAY, WET TO SATURATED, TRACE LIGNITE AND SAND, HIGHLY PLASTIC (A-7-6)	14.0
130	130.5	18.8	WOH	WOH	WOH											
	125.5	23.8	WOH	1	1									125.8	VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4)	23.5
120	120.5	28.8	WOH	WOH	WOH									119.0	Boring Terminated at Elevation 119.0 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)	30.3

WBS 47533.1.2		TIP I-5987A		COUNTY ROBESON		GEOLOGIST DEGON, A.										
SITE DESCRIPTION I-5987A NOISE WALL 8							GROUND WTR (ft)									
BORING NO. NW8-8		STATION 23+92		OFFSET 2 ft LT		ALIGNMENT NW8										
COLLAR ELEV. 141.9 ft		TOTAL DEPTH 29.8 ft		NORTHING 355,803		EASTING 2,000,720										
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 95% 02/06/2021			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER TURNAGE, J. R.		START DATE 10/20/21		COMP. DATE 10/20/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
145														141.9	GROUND SURFACE	0.0
	140.9	1.0	7	6	4											
140	138.6	3.3	4	2	1										UNDIVIDED COASTAL PLAIN VERY LOOSE TO LOOSE, BROWN, ORANGE, GRAY, SILTY FINE TO COARSE SAND, DRY TO MOIST (A-2-4)	5.0
	136.1	5.8	WOH	WOH	WOH											
135	133.6	8.3	3	5	7									133.9	COASTAL PLAIN VERY SOFT, DARK GRAY, SILTY CLAY, WET, HIGHLY PLASTIC (A-7-6) (BLACK CREEK FORMATION)	8.0
	128.6	13.3	WOH	WOH	WOH										VERY LOOSE TO MEDIUM DENSE, GRAY TO DARK GRAY, SILTY FINE TO COARSE SAND, SATURATED (A-2-4)	
125	123.6	18.3	4	6	5											
	118.6	23.3	1	2	3									119.9	MEDIUM STIFF TO STIFF, DARK GRAY, SILTY CLAY, WET, TRACE LIGNITE AND SAND, HIGHLY PLASTIC (A-7-6)	22.0
120	113.6	28.3	4	5	6											
115														112.1	Boring Terminated at Elevation 112.1 ft IN COASTAL PLAIN SILTY CLAY (BLACK CREEK FORMATION)	29.8

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