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786 S REFERENCE

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STATE OF NORTH CAROLINA

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

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5 - 7	BORE LOGS
8	SOIL TEST RESULTS
9	SITE PHOTOGRAPHS

STRUCTURE SUBSURFACE INVESTIGATION

COUNTYROBESON
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-

STATE PROJECT REFERENCE NO. SHEETS **I-5987A** 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 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORGHOLE. THE LABORATORY SAMPLE DATA AND THE IN STIU (IM-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 NIDICATED 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 INTERRETATIONS 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.

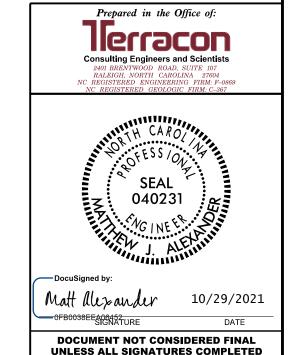
- NOTES:

 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.

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DATE	SEPTEMBER 2021



PROJECT REFERENCE NO. SHEET NO.

I—5987A

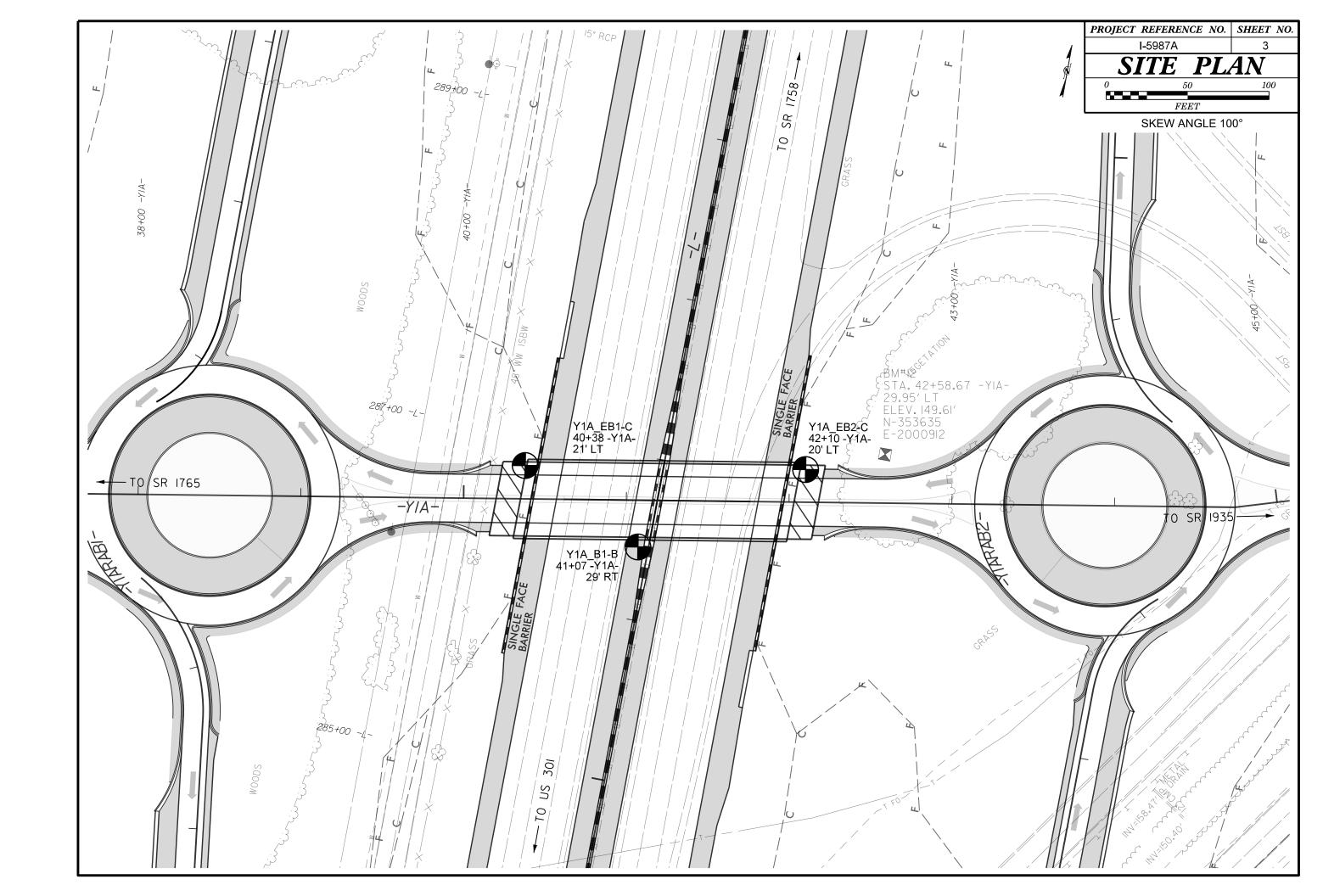
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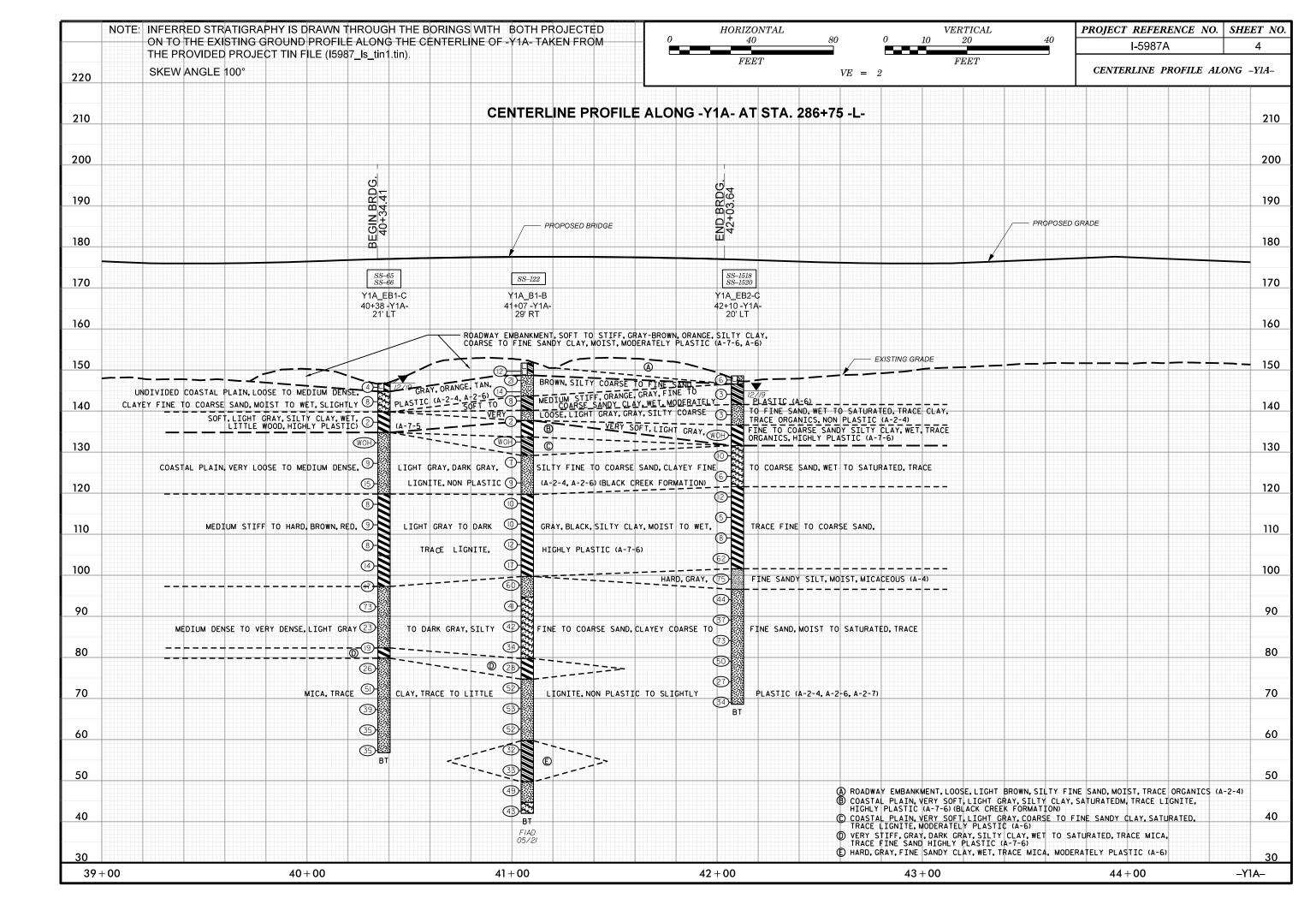
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

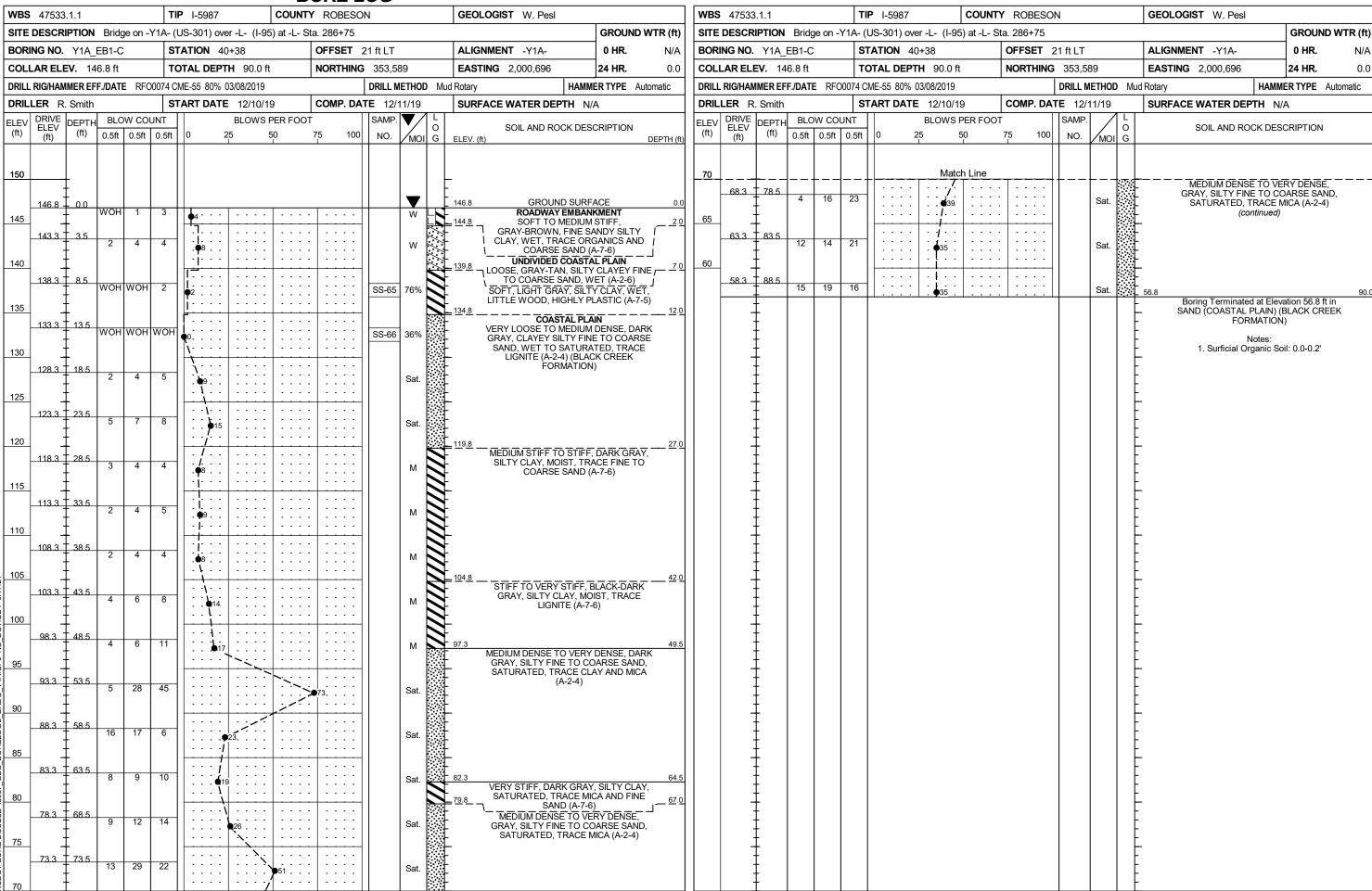
SUBSURFACE INVESTIGATION

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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
CLASS. (≤35% PASSING *200) (>35% PASSING *200) CRGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	LINE TO COASE CRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY PEAT SOILS CLAY PEAT	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
■200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE,	HORIZONTAL.
LL - 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 501L5 WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP IU MX IU MX II MN II MN IU MX II MN II MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W 4 MX 8 MX 12 MX 16 MX NU MX AMOUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAINE GRAVEL AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	▼ STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OF RANGE OF STANDARD RANGE OF UNCONFINED	□ 25,025	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) ROADWAY EMBANKMENT (RE) STORY OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LODGE	SPI — 0.005 WOLD TOO	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GENERALLY LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A	SOIL SYMBOL PPT DMT TEST BORING SLUFE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MAILHIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE 2 200		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	── INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	TEST BORING		
	INFERRED ROCK LINE MONITORING WELL WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
MATERIAL (COHESIVE) STIFF VERY STIFF 8 TO 15 1 TO 2 HARD > 30 2 TO 4 → 30 > 4	#INSTALLATION WELL WITH CORE ###################################	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
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MATERIAL (COHESIVE)	WITH CORE TIPE ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION PIEZOMETER INSTALLATION SPT N-VALUE WITH CORE WITH CO	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE. ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY ANDERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	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 ENCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
MATERIAL (COHESIVE)	### WITH CORE ###################################	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE. ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY 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 CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT, HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPPOLITE (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
MATERIAL (COHESIVE)	### ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION SYMBOLS ### RECOMMENDATION SYMBOLS ### UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL ### ALLOW UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK ### ALLOW UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL ### ALLOW UNDERCUT SHAPE DEGRADABLE ROCK ### ALLOW UNDERCUT SHAPE DEGRADABLE BOOK SHAPE DEGRADABLE BOO	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE. ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY ANDERATELY 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 CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	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
MATERIAL (COHESIVE)	### ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION **PIEZOMETER INSTALLATION	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE. ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT, HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	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.
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Con	sulting	Engineers a	and Scienti	sts			<u> </u>	ORE I	<u>_UG</u>						. —								_								
		33.1.2			IP 1-5987			Y ROBES	ON		GEOL	LOGIST DEGON, A. 1			WB	S 47533	3.1.2			TIF	P I-5987	Α	COUN	TY ROBESO	NC			GEOLOGIS	DEGON, A. N.		
SIT	DES	CRIPTION	Bridge o	n -Y1A-	(US-301) o\	er -L- (I-9	5) at -L- S	ta. 286+75					GROUND	WTR (ft)	SITI	E DESCR	IPTION	Bridg	e on -\	Y1A- (L	JS-301) ov	/er -L- (I-9	95) at -L-	Sta. 286+75						GROUND \	WTR (ft)
BOI	RING N	I O . Y1A_	B1-B	S	STATION 4	1+07		OFFSET	29 ft RT		ALIG	NMENT -Y1A-	0 HR.	N/A	BOF	RING NO.	Y1A_	B1-B		ST	ATION 4	1+07		OFFSET	29 ft RT	•		ALIGNMEN'	Γ -Y1A-	0 HR.	N/A
COI	LAR E	ELEV. 15	51.7 ft	Т	OTAL DEP	TH 109.7	ft	NORTHIN	G 353,5	52	EAST	TING 2,000,773	24 HR.	FIAD	COI	LLAR EL	EV . 15	1.7 ft		то	TAL DEP	TH 109.	7 ft	NORTHING	G 353,5	552		EASTING	2,000,773	24 HR.	FIAD
DRIL	L RIG/H	IAMMER EF	F./DATE	TER299 D	IEDRICH D-5	79% 12/31	1/2020		DRILL N	IETHOD	Mud Rotary	HA	AMMER TYPE AL	ıtomatic	DRIL	L RIG/HAI	MER EF	F./DATE	TER		DRICH D-5				DRILL I	METHO	DD Mu	ud Rotary	HAN	IMER TYPE Au	tomatic
DRI		TURNAC			TART DAT			COMP. DA			SURF	ACE WATER DEPTH	N/A		DRI	LLER T					ART DAT			COMP. DA		_	1	SURFACE V	VATER DEPTH	N/A	
ELE\ (ft)	/ DRIN ELE (ft)	V /f+\	0.5ft 0.		0		PER FOO	T 75 100	SAMP.	MOI G		SOIL AND ROCK [DESCRIPTION	DEPTH (ft)	ELE\ (ft)		DEPTH (ft)	0.5ft	W COL		0	BLOWS 25	50	OT 75 100	SAMP NO.	1/	O G	S	OIL AND ROCK DE	ESCRIPTION	
155		_									_				75	73.5	79.2					Ma	tch Line						DENSE, GRAY, SI	LTY COARSE T	<u></u>
	150	7 + 1.0			<u> </u>			.			151.7	GROUND SU		0.0		75.5	+ '0.2	17	24	28			52			М		- FIN	E SAND, MOIST TO CA AND LIGNITE, I) WET, TRACE NON PLASTIC	
150	-	5 + 3.2		5 7	12				-	М	3-	STIFF, BROWN, GI COARSE TO FINE SAN	RAY, ORANGE, NDY CLAY, MOIS	T, <u> </u>	70		T + 83.2								-			- -	(A-2-4)		
	145	‡	10 1	2 9] :::; /)21 				М	<u>:-</u>	MODERATELY P	ASTAL PLAIN	_ i			Ŧ	18	26	27			53			W		- -			
145	+	.7 + 6.0 - .5 + 8.2	5	7 7	14	1			SS-122	М	143.7	MEDIUM DENSE, G BROWN, SILTY COAR: MOIST, SLIGHTLY F	SE TO FINE SAN	D,	65	-	I 88.2								-			- -			
	140.	+	3 3	3 5] : • • • • • • • • • • • • • • • • • •			-		w	<u>}</u>	MEDIUM STIFF, GRAY, SANDY CLAY, WET	, COARSE TO FIN	NE 		00.0	+ "	17	26	26			52:			w		- -			
140	7				11						140.2	NERY LOOSE, LIGH	(A-6)	_ / 11.5	60		93.2					1 ,!			$\left\{ \left[\right] \right\}$			- <u></u> 59.7_ - HARI	O, GRAY, FINE SAN	IDY CLAY, WET	92.0
		+ 10.2	2	1 1	• i · · · ·					Sat.	137.7	COARSE TO FINE S SATURATED, NON	SAND, WET TO PLASTIC (A-2-4)	14.0		00.0	+ "	9	12	20		. € 32	: : : :			w		- TRA -	CE MICA, MODER. (A-6)	ATELY PLASTIC	
135	7								-		_ _ <u>133.7</u> _	COASTAL VERY SOFT, LIGHT G SATURATEDM, TRACE		Y, <u>18.0</u>	55		I - 98.2					1			-			- - -			
		+	WOH W	OH WOF	0::::					Sat.	*	PLASTIC (A-7-6) (E	DLACK CREEK	-			+	10	14	19		33	: : : :			W		- -			
130	7				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			- 	-		129.2	VERY SOFT, LIGHT G	55/35,505 =	O CE/— <u>22.5</u>	50		103.2								$\frac{1}{1}$			- <u></u> 49.7 - DENS	E, GRAY, SILTY C	OARSE TO FINI	1 <u>02</u> .0
	120.	+ 23.2	WOH :	3 4	 • † : :					Sat.	:-	LOOSE, DARK GRAY	TO LIGHT GRAY	<u>''</u>		40.0	+ 103.2	18	19	30			49			W			NĎ, WET, LITTLE PLASTIC (A	LIGNITE, NON	
125	7	5 + 28.2			- 1							SILTY COARSE TO SATURATED, NON			45		108.2						/		-			- <u></u> 44.7 DEN	ISE, GRAY, CLAYE	Y COARSE TO	107.0
	123.	7 20.2	5 6	3	9 : :					Sat.	∷ -					45.5	100.2	13	16	27			43			W	///	- _{42.0} F	INE SAND, WET, T SLIGHTLY PLAST	RACE MICA, IC (A-2-7)	109.7
120	7	± 5 + 33.2							-		119.7	STIFF, LIGHT GRAY T	O GRAY, BROW	32. <u>0</u>		-	‡											Borin COAS	ng Terminated at Ele STAL PLAIN CLAYE	Y SAND (BLAC	K
	110.	+ 33.2	3 4	4 6	10 i			: : : : :		w	}	RÉD, SILTY CLAY, PLASTIC (WET, HIGHLY	,			‡											- -	CREEK FORM	ATION)	
115	7	5 + 38 2							-		<u> </u>					-	<u> </u>											- -			
//21		+ 30.2	4 !	5 5	- · 10 ·			: : : : :		w	}						‡											- -			
110		† 5 † 43.2			1 1 1 1				-		<u> </u>					-	‡											- -			
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¥ 100 Z	7	_							1		99.7	VERY DENSE, LIGH	T GRAV SII TV	52.0		-	‡											- -			
TERRACON 56	98.	5 + 53.2	33 67	7.5				100/1.0	ullet	М		COARSE TO FINE SAN MICA AND CLAY, NON	ND, MOIST, TRAC				<u> </u>											- - -			
	-	_							1		94.7	DENSE, GRAY, CLAY	VEV COARSE TO	57.0		-	‡											- -			
BRDG_BH	93.3	5 + 58.2	11 1	3 28		•41				Sat.	\frac{1}{2}	FINE SAND, SATUR	RATED, TRACE				<u> </u>											- - -			
GEO BR		_ ‡							1	/,/,/,	-					-	‡											- -			
	88.	5 + 63.2	4 1	2 30		42	2			Sat.	\						Ī											- - -			
85 85	-	_				· · · / ·		·			•					-	‡											- -			
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30RE DOU		‡				·j · · ·					79.7	VERY STIFF, GRAY, (~~~~~~	72.0		-	‡											- 			
OT BO	78.	5 † 73.2	6 1	2 16	 	<i>I</i>		·		w	\$	SANDY CLAY, WET HIGHLY PLAS	Γ, TRACE MICA,	=			‡											- - -			
Ö 75		+						.			-	HIGHELLIEAG					+										1 -	=			

WDC 47500 4 4	TIP 1-5987 COUNTY ROBESON		WBS 47533.1.1 TIP I-5987	COUNTY PORTSON CEOLOGIST P. Deinter
WBS 47533.1.1		GEOLOGIST B. Painter		COUNTY ROBESON GEOLOGIST B. Painter
	'1A- (US-301) over -L- (I-95) at -L- Sta. 286+75	GROUND WTR		
BORING NO. Y1A_EB2-C	STATION 42+10 OFFSET 20 ft		_	OFFSET 20 ft LT ALIGNMENT -Y1A- 0 HR. N/A
COLLAR ELEV. 148.6 ft	TOTAL DEPTH 80.0 ft NORTHING 35	<u> </u>	COLLAR ELEV. 148.6 ft TOTAL DEPTH 80.0	
DRILL RIG/HAMMER EFF./DATE F&R3		LL METHOD Mud Rotary HAMMER TYPE Automat	DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 82% 03/01/2019	· · · · · · · · · · · · · · · · · · ·
DRILLER D. Tignor	START DATE 12/10/19 COMP. DATE		DRILLER D. Tignor START DATE 12/10/	
ELEV CHI		MP. C C SOIL AND ROCK DESCRIPTION DEP	(ft) ELEV (ft) 0.54 0.54 0.55	S PER FOOT SAMP. O SOIL AND ROCK DESCRIPTION NO. MOI G
155			75 12 11 16 • • • • • • • • • • • • • • • • •	atch Line Sat. DENSE TO VERY DENSE, GRAY, CLAYEY SILTY FINE TO COARSE SAND,
150		- 148.6 GROUND SURFACE	70 70.1 78.5 11 13 21	SATURATED, TRACE LIGNITE (A-2-4) (continued) Sat. 68.6
1 2 145 145.1 3.5 WOH 1	2 •3 · · · · · · · · · · · · · · · · · ·	M ROADWAY EMBANKMENT LOOSE, LIGHT BROWN, SILTY FINE SAND, MOIST, TRACE ORGANICS (A-2-4) UNDIVIDED COASTAL PLAIN SOFT, ORANGE-GRAY, FINE TO		Boring Terminated at Elevation 68.6 ft in SAND (COASTAL PLAIN) (BLACK CREEK FORMATION) Notes: 1. Surficial Organic Soil: 0.0-0.2'
140 140.1 8.5 3 2	1 • 3 · · · · · · · · · · · · · · · · · ·	COARSE SANDY CLAY, WET, MODERATELY PLASTIC (A-6) VERY LOOSE, GRAY, CLAYEY SILTY FINE SAND, SATURATED, TRACE ORGANICS (A-2-4)		1. Suricial Organic Soil. 0.0-0.2
135 135.1 13.5 WOH WOH		1520 20% VERY SOFT, LIGHT GRAY, FINE TO COARSE SANDY SILTY CLAY, WET, TRACE ORGANICS, HIGHLY PLASTIC (A-7-6)		
130 130.1 18.5 2 3	7	Sat. LOOSE TO MEDIUM DENSE, DARK GRAY TO LIGHT GRAY, CLAYEY FINE TO COARSE SAND, SATURATED (A-2-6)		
125 125.1 23.5 7 4	2	(BLACK CREEK FORMATION) Sat.		
120 120.1 28.5 3 5	7	W MEDIUM STIFF TO HARD, GRAY, FINE SANDY SILTY CLAY, WET TO SATURATED (A-7-6)		
115 115.1 33.5 WOH 2	3 4 5			
110 110.1 38.5 3 3	5	Sat.		
105 105.1 43.5	5			
9 100 100.1 48.5 17 20		HARD, GRAY, FINE SANDY SILT, MOIST, MICACEOUS (A-4)		
95 95.1 53.5 7 19	44	96.6 DENSE TO VERY DENSE, GRAY, CLAYEY SILTY FINE TO COARSE SAND, Sat. SATURATED, TRACE LIGNITE (A-2-4)		
90 90.1 58.5 9 15	22	Sat		
85 85.1 63.5 16 31	42	Sat.		
80 80.1 68.5 22 26		Sat.		
M				-

LABORATORY TESTING SUMMARY

PROJECT NUMBER:	47533.1.2	TIP:	I-5987A	COUNTY:	ROBESON	
DESCRIPTION:		BRIDGE ON -Y1		I-95) BETWEEN SR 1675 AND SR 1935	AT STA. 286+75 -L-	

Sample No	Station	Alianmont	Offset	Depth	AASHTO	1.1	P.I.		% by W	eight		%	% F	Passing (siev	% Moisture	%	
Sample No.	Station	Alignment	(feet)	Interval	Class.	L.L.	L. F.I.		Fine Sand	Silt	Clay	Retained	#10	#40	#200	% Worsture	Organic
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

Certified Lab Technician Signature Terracon

114-01-1203 Certification Number

Comple No	Ctation	Alianmont	Offset	Depth	AASHTO	L.L.	P.I.		% by V	/eight		%	% l	Passing (siev	/es)	% Moisture	%
Sample No.	Station	Alignment	(feet)	Interval	Class.	L.L.	r.i.	Coarse	Fine Sand	Silt	Clay	Retained	#10	#40	#200	% WOISTUTE	Organic
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

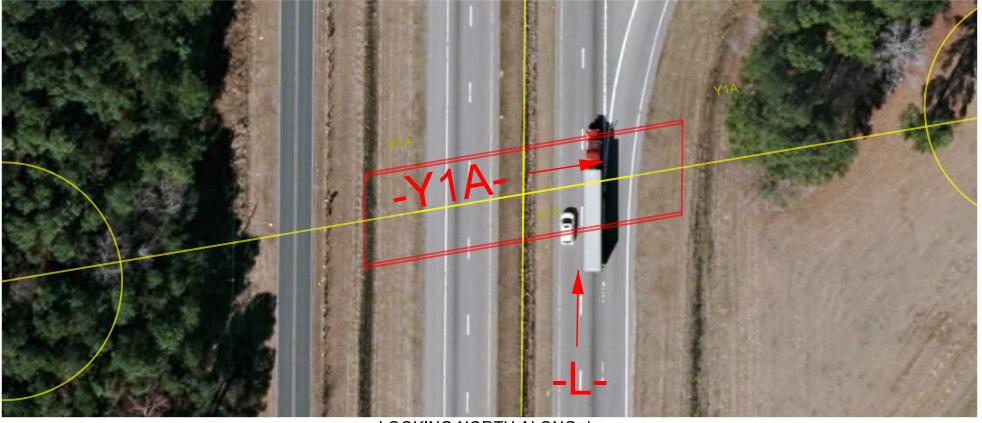
SITE PHOTOGRAPHS

PROJECT REFERENCE NO.SHEET NO.1-5987A9

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

59874 REFERENCE **CONTENTS**

DESCRIPTION

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

BORF LOGS SOIL TEST RESULTS SITE PHOTOGRAPHS

PROFILE

SHEET NO.

5 - 9

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

ROBESON COUNTY _ PROJECT DESCRIPTION <u>I-95 IMPROVEMENTS</u> 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

STATE PROJECT REFERENCE NO **I-5987A**

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 NDICATED 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 WARRANTE OR GLARANTEE 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.

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10/29/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

I-5987A

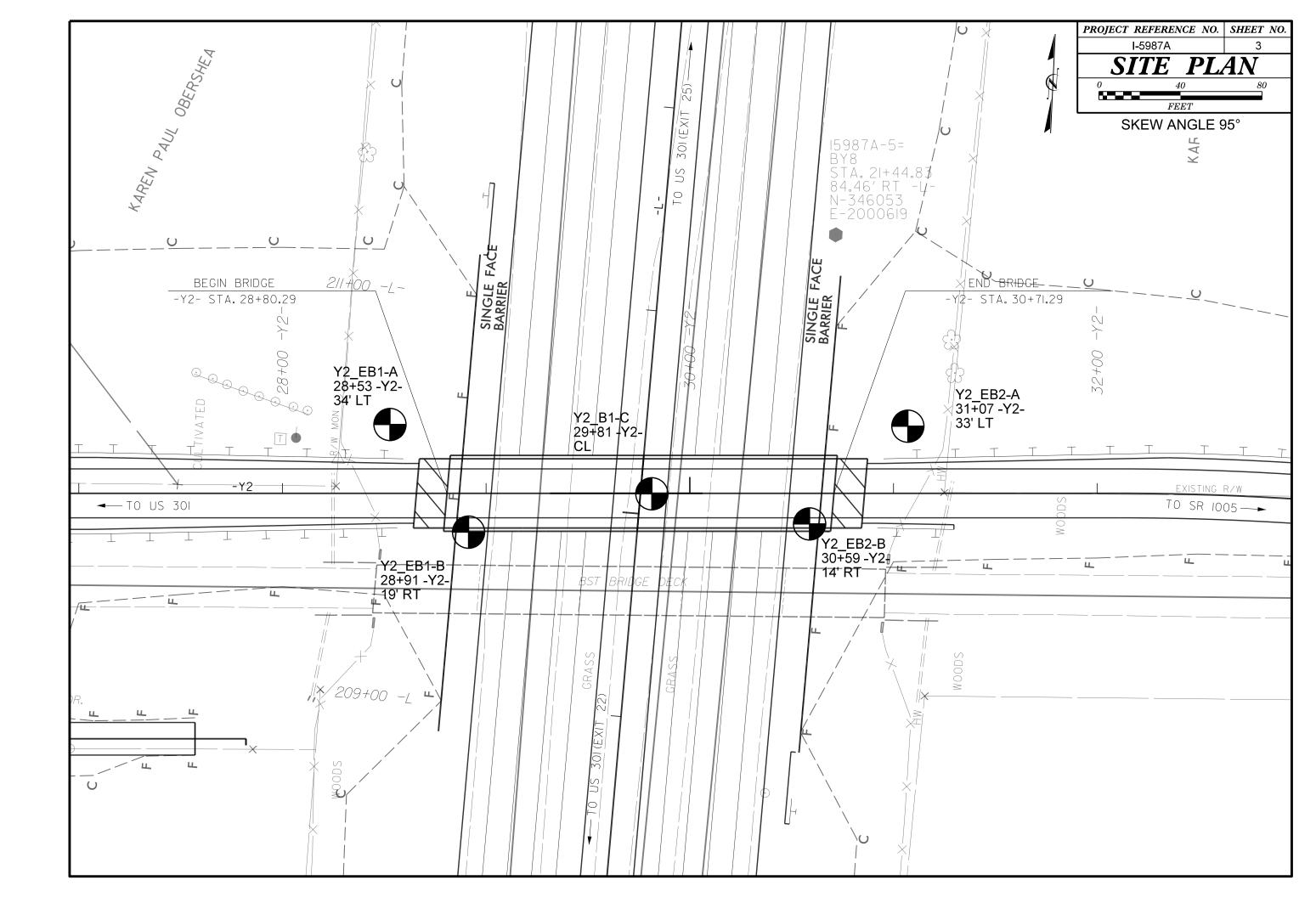
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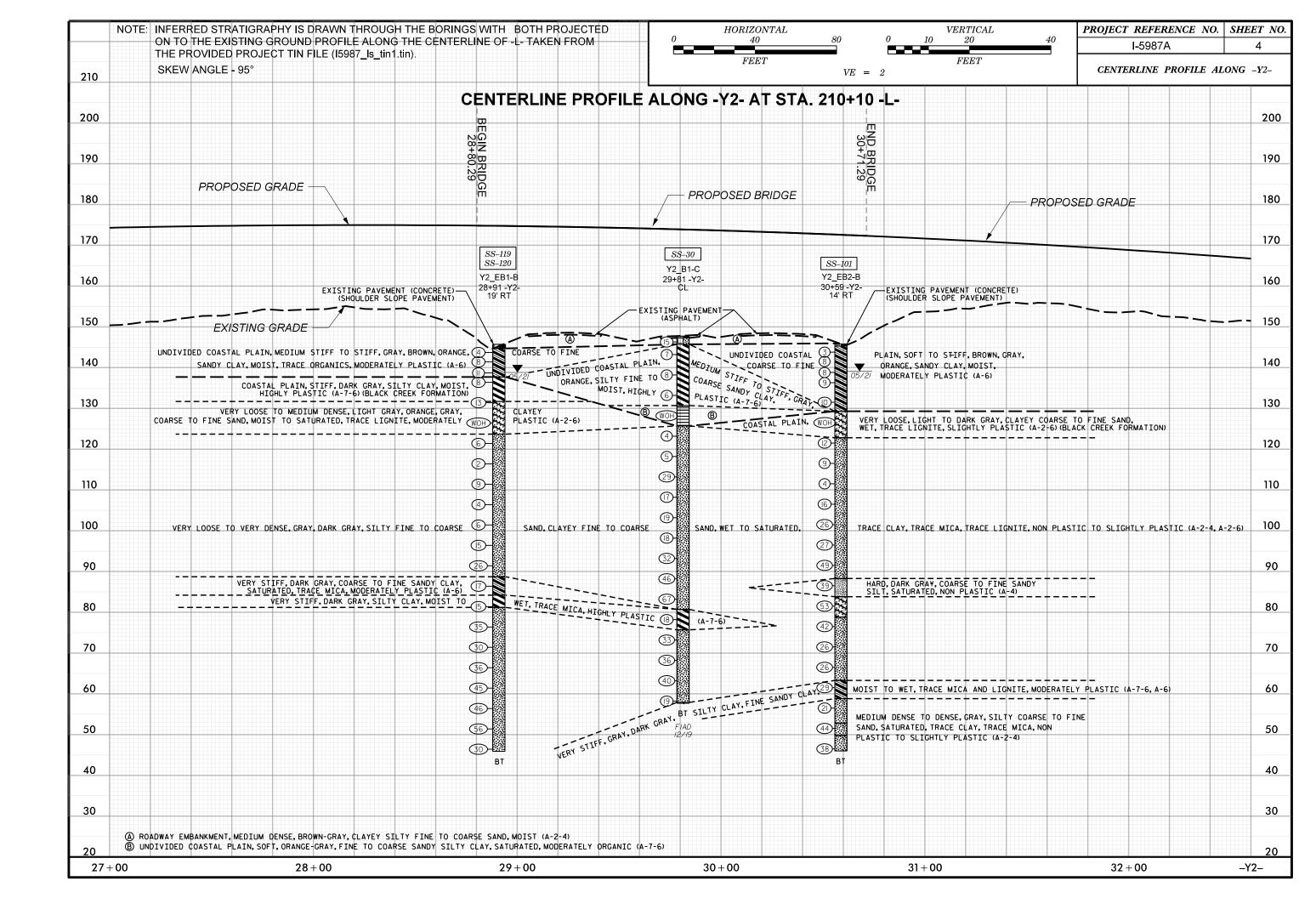
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

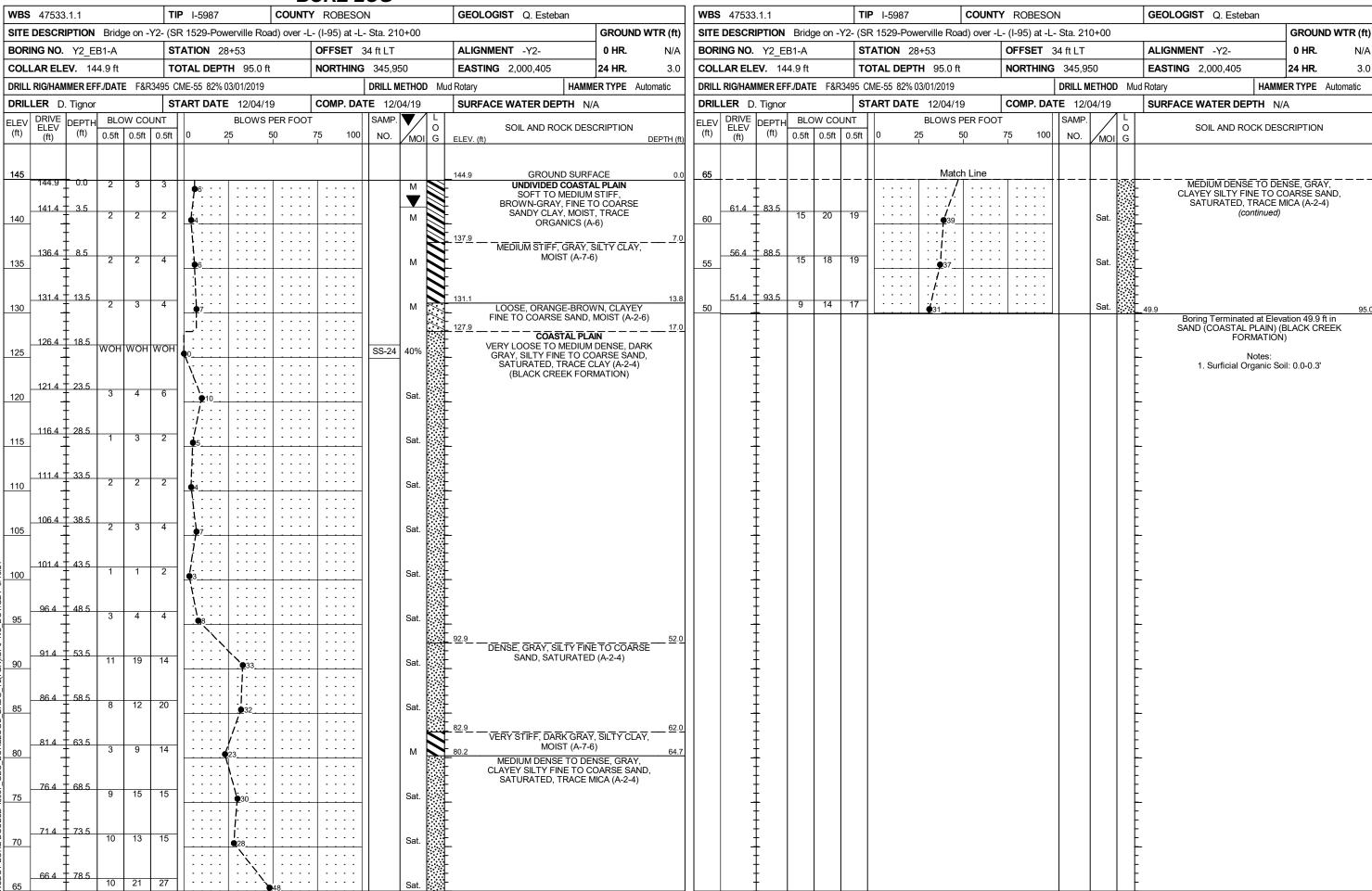
SUBSURFACE INVESTIGATION

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 PENETHATED WITH A CONTINUOUS FLIGHT POWER AUGEN AND VIELD 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:	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 PERETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN ØLFOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,MOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL SOURCES STATE OF THE STA	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
MATERIAL 15 MA 25 MA 18 MA 35 MA 35 MA 35 MA 35 MA 36 MN 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	<u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATERIALS SAND GRAVEL AND SAND SOILS SOILS	▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN.RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE OF THE POOR POOR POOR UNSUITABLE OF THE POOR POOR POOR POOR POOR POOR POOR POO		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	── SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	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
CONSISTENCY (N-VALUE) (TONS/FT ²)	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SPET DATE TEST BORING INSTALLATION INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGED PODING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT THOUSER BURING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	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	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - TATA UNCLASSIFIED EXCAVATION -	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK. <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL UNDERCUT UN	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	TRELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS.	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
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7, DRY UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SAND, SANDY SS - SPLIT SPOON f - FINE SL SILT, SILTY ST - SHELBY TUBE	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
LL _ LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
BANGE - WET - (W) SEMISULID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: I5987A-5=BY8: STA. 2I+44.83 -L-
(PI) PL PLASTIC LIMITATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	IERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	84.46' RIGHT
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE	BRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N: 346,053; E: 2,000,619 ELEVATION: N/A FEET
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CORE CLZE	VERY CLOSE LESS THAN Ø.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	CME-55	INDURATION	NOTE: ELEVATIONS OF BORINGS EBI-A, BI-C AND EB2-A
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	PERFORMED BY F&R Inc.OBTAINED FROM PROVIDED TIN FILE: i5987_Is_tinl.tin DATED: - 4-2019
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNGCARBIDE INSERTS HAND TOOLS:	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGHLY PLASTIC 26 OR MORE HIGH COLOR	PORTABLE HOIST X TRICONE 2% STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
	CME-55 TRICONE TUNG-CARB. SOUNDING ROD X 21/4" HOLLOW STEM AUGERS VANE SHEAR TEST	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.	
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.	DIEDRICH D-50 X 3½" HOLLOW STEM AUGERS VANE SHEAR TEST X (1ER299) -50 X 3½" HOLLOW STEM AUGERS	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

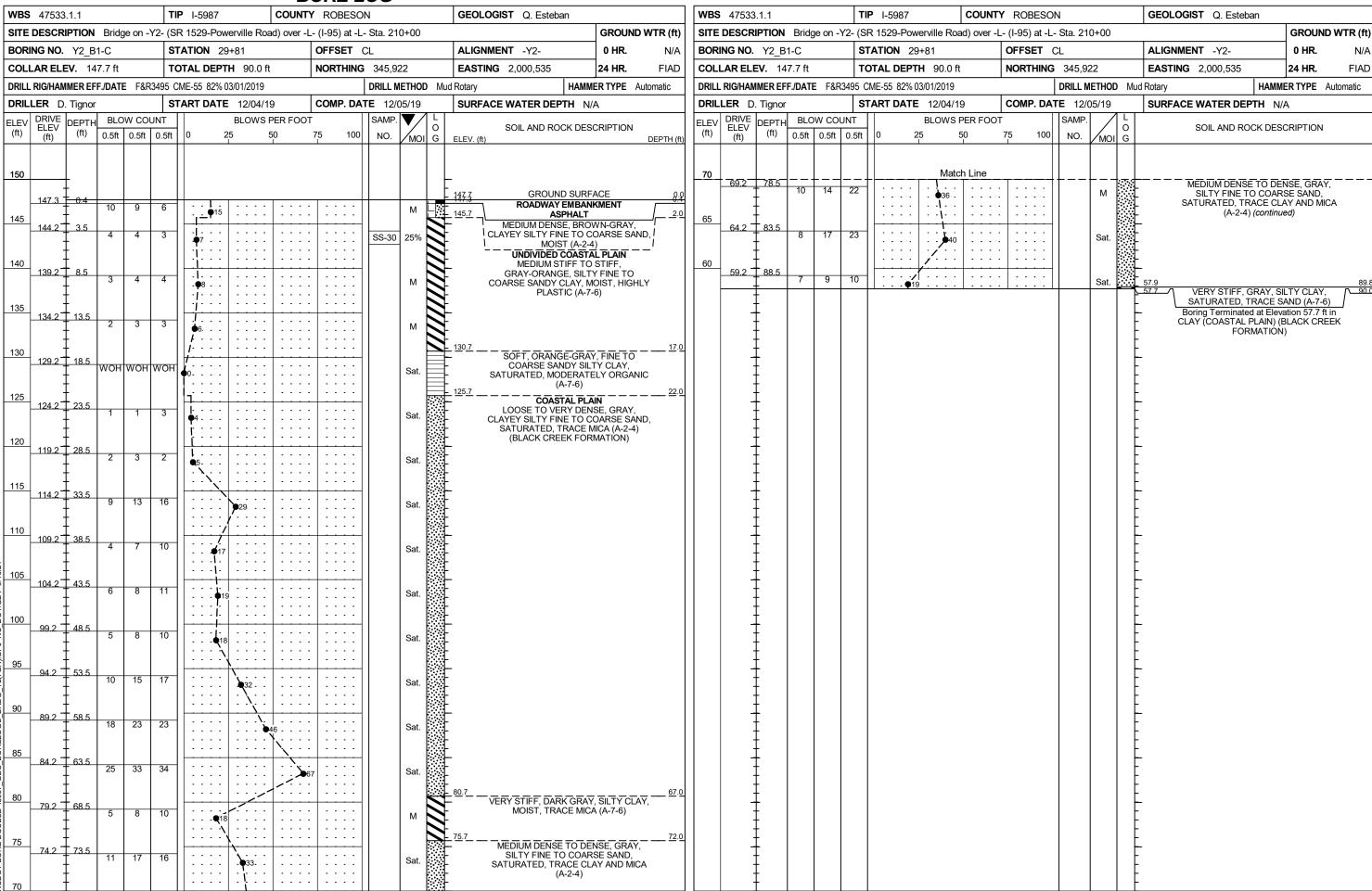


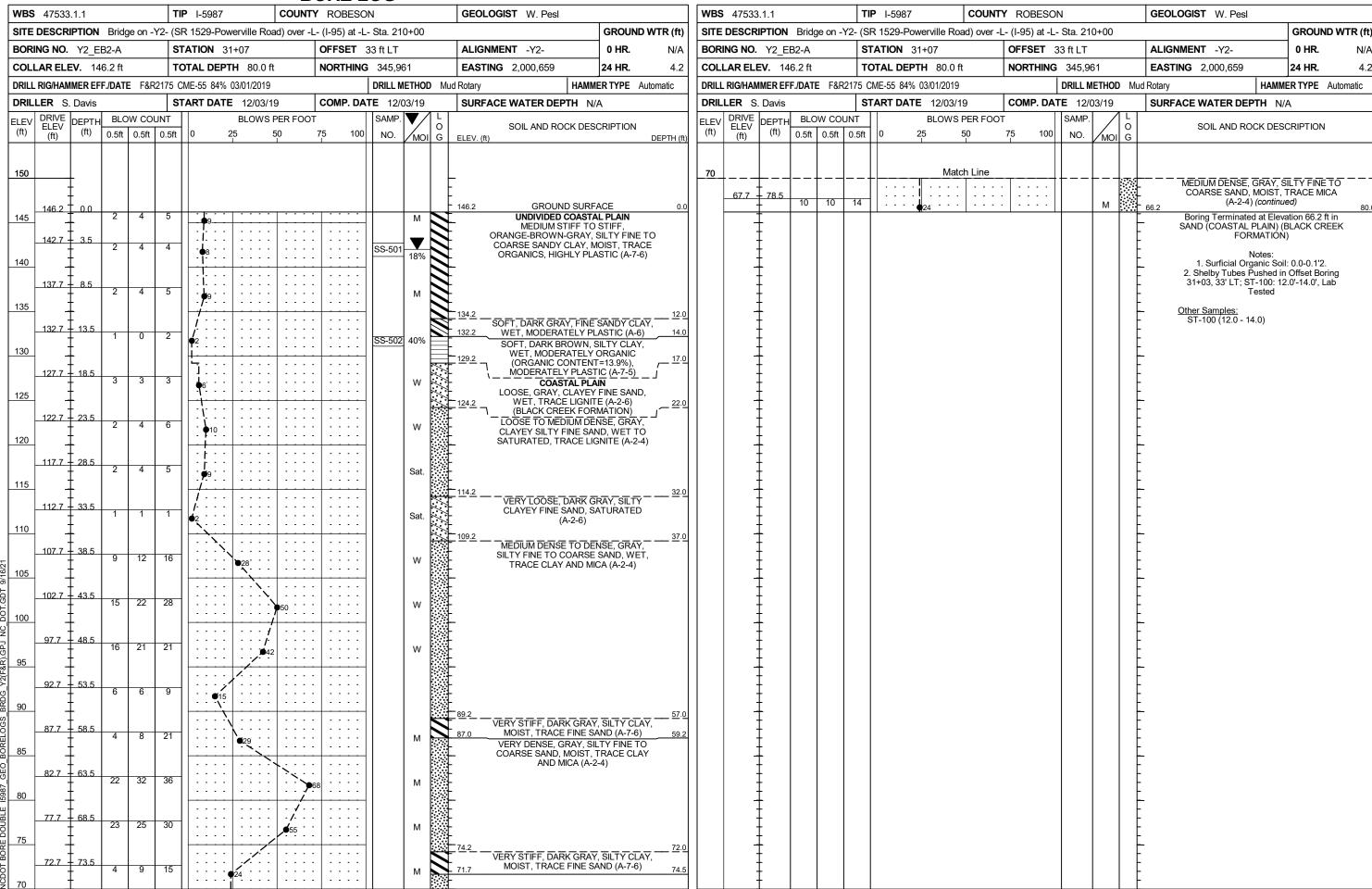






Consulting Engineers a	and Scientists				1	ORE I						, —											1	
WBS 47533.1.2			I-5987A		l	Y ROBES				EOLOGIST DEGON, A. N.	1	┥ ├─	IBS 4753				TIP I-598		NTY ROBESC				GEOLOGIST DEGON, A. N.	1
SITE DESCRIPTION	BRIDGE O	N -Y2-	(SR 1529-F	POWERS\	/ILLE RO	AD) OVER	-L- (I-95)	AT -L-	STA. 210-	+00	GROUND WTR (ft)	SI	ITE DESCR	RIPTION	BRIDGE	ON -Y	'2- (SR 152	9-POWERSVILLE F	ROAD) OVER -	-L- (I-95)	AT -L-	STA.	1	GROUND WTR (ft
BORING NO. Y2_E	B1-B	ST	ATION 28	3+91		OFFSET	19 ft RT		AL	LIGNMENT -Y2-	0 HR. N/A	В	ORING NO	Y2_EI	B1-B		STATION	28+91	OFFSET	19 ft RT	Γ		ALIGNMENT -Y2-	0 HR. N/A
COLLAR ELEV. 14	5.7 ft	то	TAL DEPT	TH 99.8 ft	t	NORTHIN	<u> </u>			ASTING 2,000,446	24 HR. 6.9	-	OLLAR EL					PTH 99.8 ft	NORTHING	G 345,8	899		EASTING 2,000,446	24 HR. 6.9
DRILL RIG/HAMMER EF	F./DATE TER	R299 DIE	DRICH D-50	79% 12/31	/2020				Mud Rota	ary HAMN	MER TYPE Automatic	DF	RILL RIG/HAI	MER EF	F./DATE			-50 79% 12/31/2020		DRILL	METHO	D Mu	id Rotary HAM	MER TYPE Automatic
DRILLER TURNAG			ART DATE			COMP. DA				JRFACE WATER DEPTH N	/A		RILLER T					TE 05/13/21	COMP. DA			/ 	SURFACE WATER DEPTH	N/A
ELEV DRIVE ELEV (ft) DEPTH (ft)	0.5ft 0.5ft	UNT 0.5ft	0 2		PER FOO ⁻ 50	Г 75 100			O ELE	SOIL AND ROCK DES	SCRIPTION DEPTH (fr	EL (f	EV DRIVE ELEV (ft)	DEPTH (ft)	0.5ft 0.	COUNT 5ft 0.5f	ft 0	BLOWS PER FC 25 50	75 100	SAMP NO.	1 /	O I G	SOIL AND ROCK DE	SCRIPTION
150												7	<u>'0</u>					Match Line		<u> </u>	<u> </u>		MEDIUM DENSE TO V	VEDV DENISE
145									145.	.7 GROUND SURF	FACE 0.0			† <u>78.3</u>	8 1	3 23					w		GRAY, SILTY COARSE WET, TRACE MICA AND PLASTIC (A-2-4) (TO FINE SAND, LIGNITE, NON
145 144.7 1.0	2 2	2	4				-	М	144.	7 ROADWAY EMBAN				‡						1		-	_ -	
142.4 3.3	3 4	4	. 8					М		UNDIVIDED COASTA MEDIUM STIFF TO ST BROWN, ORANGE, COA	TIFF, GRAY, ARSE TO FINE	6	62.4	+ 83.3 -	19 2	2 23					w		-	
+	3 4	7	111						137.	SANDY CLAY, MOIS ORGANICS, MODERATI			57.4	Ī l				: :::]			- -	
137.4	3 4	4	. • 8				SS-119	19%		(A-6) COASTAL PL STIFF, DARK GRAY, SILTY	AIN Y CLAY, MOIST,	5	57.4	+ 88.3 - -	18 2	2 24		46			w	_	- - -	
132.4 7 13.3			: ½::							HIGHLY PLASTIC (A-7-6) (FORMATION	(BLACK CREEK N)		52.4	+ + 93.3				: : : : : \ : :					- -	
130	3 6	7	13.					М	131.	.7VERY LOOSE TO MED LIGHT GRAY, ORANGE, O		1 1	50	+ 33.3	23 2	7 29		56			W		NO LIGNIT	E
107.4			<i>i</i> /····							COARSE TO FINE SANI SATURATED, MODERAT	D, MOIST TO		17.4	Ξ]			- - -	
127.4	WOH WOH	WOH	6				SS-120	Sat.		(A-2-6) TRACE LIGNI			47.4	98.3	13 1	3 17		30	<u></u>		w		TRACE LIGN	99.
T T			\				1		123.			1	-	‡									Boring Terminated at Ele COASTAL PLAIN SILTY CREEK FORM	SAND (BLACK
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112.4 33.3	4 5	4	./											Ī									- - -	
110			- 19				_	Sat.	<u>-</u>				-	‡									- -	
107.4 + 38.3			; : : : :											‡									- -	
105	3 2		• 4					Sat.	L					1								[- - 	
102.4 1 43.3			: : :						_					‡									- -	
105 1024 43.3 1024 43.3 100 974 48.3	4 3	3	Q 6					Sat.	-					‡									- -	
97.4 48.3			: \\ : :											Ī								[- - -	
3/4 40.3 3 05 T	5 6	9	15					Sat.	-					‡									- -	
7			<i>/</i> :										-	†									-	
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85 +			- T''				_		84.2	MICA, MODERATELY P	61.5	<u> </u>	-	‡									- -	
82.4 63.3	4 4	11] .					,,,	X	VERY STIFF, DARK GRAY WET, TRACE MICA, HIG				‡								[<u>.</u>	
82.4 63.3		''	•15				41	W	81.2	MEDIUM DENSE TO VE		1		‡									- -	
μ 	10 :-		`							GRAY, SILTY COARSE T WET, TRACE MICA AND	LIGNITE, NON			‡									. -	
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														‡								[- -	
72.4 773.3 70 70 7	10 12	18		♦ 30				w	_					‡									- -	







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		33.1.2			TIP I-5987A			Y ROBESC			GEOLOGIST	DEGON, A. N.	1	→	S 4753	3.1.2			TIP	I-5987A COUN	TY ROBESC	N		GEOLOGIST DEG	DN, A. N.	
SITE	DESC	RIPTION	BRIDG	SE ON -Y	2- (SR 1529-	POWERS	VILLE RO	AD) OVER -	L- (I-95) AT -L	- STA. 2	210+00		GROUND WTR (ft	SITE	E DESCF	RIPTION	BRID	GE ON -	-Y2- (SR 1529-POWERSVILLE R	OAD) OVER -	(I-95)	AT -L- STA	A. 210+00		GROUND WTR (ft)
BOR	ING N	O . Y2_E	B2-B		STATION 3	0+59		OFFSET	14 ft RT		ALIGNMENT	-Y2-	0 HR. N/A	BOF	RING NO	. Y2_E	B2-B		STA	ATION 30+59	OFFSET	14 ft RT		ALIGNMENT -Y2-		0 HR . N/A
COL	LAR E	LEV . 14	5.7 ft		TOTAL DEP	TH 99.81	ft	NORTHING	345.912		EASTING 2,0	00.613	24 HR. 6.7	COL	LAR EL	EV . 14	5.7 ft		тот	TAL DEPTH 99.8 ft	NORTHING	345.9	912	EASTING 2,000,61	3	24 HR. 6.7
					DIEDRICH D-50				DRILL METHO	n Mud	•		IMER TYPE Automatic					TED200		DRICH D-50 79% 12/31/2020			METHOD N			ER TYPE Automatic
								COMP DA	TE 05/04/21	iviuu	•								1		COMP. DA					
		TURNAG	•		START DAT			<u> </u>	SAMP. V	<i>/</i> / / /	SURFACE WA	IER DEPIH	N/A		LLER T					ART DATE 05/04/21				SURFACE WATER I	JEPIH N/	4
ELEV (ft)				0.5ft 0.5f			PER FOO		'/	0		L AND ROCK DE	SCRIPTION	ELEV (ft)	_ ⊏L⊏ V	DEPTH (ft)		W COUNT		BLOWS PER FOO 0 25 50		SAMP.	/ 0		ROCK DES	CRIPTION
(11)	(ft)	(11)	0.5π (J.5π U.51	1 0	25 	50	75 100	NO. MC	II G	ELEV. (ft)		DEPTH ((t) (1t)	(ft)	(11)	0.5π	0.5ft 0.	.5π	0 25 50	75 100	NO.	MOI G			
150										1 L				70	⊥	L	l L		-L	Match Line		LL	L_J_	L		
		+								1 +						+								MEDIUM DE	NSE TO DEI ARSE TO FII	
		Ŧ								1 -	445.7	CDOLIND CLIE	DEACE		67.4	† 78.3 †	11	13 1	13				Sat.	SATURATE), NON PLAS	STIC (A-2-4)
145	144.	7 1.0			++	ļ					<u>145:₹</u>	GROUND SUR		65	╛.	‡				$\sqrt{20}$				<u>-</u>	(continued)	
		+	3	2 1				.	M		\	PAVEMEN			00.4	<u> </u>				: : : : \: : : : : : :				63.2		82.5
	142.4	4 † 3.3 †	4	4 4	1			.			SOF1	NDIVIDED COAST T TO STIFF, BRO	OWN, GRAY,		62.4	† 83.3 †	9	13 1	16	1			М	VERY STIFF, I CLAY, MOI)ARK GRAY ST, TRACE	FINE SANDY MICA AND
140	139.	7 4 6.0			_ . . °	1						GE, COARSE TO MOIST, MODERA		60	╡.	‡				/				LIGNITE, MOD	ERATELY F	PLASTIC (A-6)
	407	1	3	4 4	:• 8 : :	: : : :					OL/17, N	(A-6)			57.4	+ + 88.3				::::: :::: ::::				58.7 MEDIUM DEN	SE, GRAY, C	LAYEY SILTY 87.0
	137.2	2 T 8.5	3	3 6	· · · ·				l M						57.4	± 00.3	9	10 1	11				Sat.	COARSE TO F	INE SAND,	SATURATED,
135	-	+				 	+	+						55	┦ .	+				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				TINACE IVIICA,	LIGHTLIF	_/.OTIO (A-2-0)
	132	+ 4 + 13.3			:::::			.							52.4	† + _{93.3}								5 <u>2</u> .7		93.0
	132.	1 10.5	3	4 6	. l				M						JZ.4	1 33.3	11	22 2	22				Sat.	DENSE, GRA		
130	-	+			<u> </u>	 -	+				129.2		16	50		+				<u> </u> -				<u></u> 49.7 NON	PLASTIC (A	-2-4) 96.0
	127	4 [†] 18.3								///	VERY	COASTAL PI OOSE, LIGHT T			47.4	98.3								DENSE, GRAY SAND, SATU	, SILTY CO <i>F</i> JRATED NO	RSE TO FINE ON PLASTIC
405		‡	WOH W	VOH WO	H •0::::				SS-101 W	*	CLAYEY	COARSE TO FI	INE SAND, WET,			1	14	17 2	21	38	·		Sat.	45.9	(A-2-4)	99.8
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	122.4	4 T 23.3			_ :\:`:::						122.7	•	23.	<u>o</u>		Ŧ									EK FORMAT	
120		‡	4	5 7	12				w		COAF	SE TO DENSE, (RSE TO FINE SA	AND, WET TO			‡								F		
120	1	†			 . 	 					SATU	JRATED, TRACE PLASTIC (A-			-	‡								<u> </u>		
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110		+	'		4				w							+								-		
- 110	1	‡			1											‡								F		
	107.4	4 ‡ 38.3	4	7 9	- ::`\;::						1.16	GHT GRAY, TRA	ACE MICA			‡										
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<u>ω</u> 90	-	Ŧ				ļ · · · · ,	/			<u> </u>						-								-		
001	87.4	58.3				: : :/:					88.2 <u></u>	DARK GRAY, CO	APSE TO EINE 57	5		‡								ļ.		
ORE	07.4	1	16	19 20	11::::	■39			Sat.		SANI	DY SILT, SATUR	RATED, NON			<u>†</u>								<u> </u>		
<u>м</u> 85	1	+				 					93 7	PLASTIC (A	∖- 4)			+								-		
GE	82.4	63.3				: : : :	\mathbb{N}	.			VERY DI	ENSE, GRAY, CI	LAYEY COARSE 62	Ĭ		Ŧ								F		
987A 3		‡	20	17 36		: : : :	53	-	Sat.	//		TO FINE SAND	(A-2-6)			‡								ļ.		
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LABORATORY TESTING SUMMARY

PROJECT NUMBER:	47533.1.2	TIP:	I-5987A	COUNTY:	ROBESON
DESCRIPTION:		BRID	GE ON -Y2- (SR 1529 - POWERSVILLE ROA	D) OVER -L- STA. 210+(

			Offset	Depth	AASHTO				% by V	Veight		%	%	Passing (siev	ves)		%
Sample No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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

Certified Lab Technician Signature Terracon

114-01-1203 Certification Number

			Offset	Depth	AASHTO				% by W	eight		%	% F	Passing (siev	ves)		%
Sample No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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

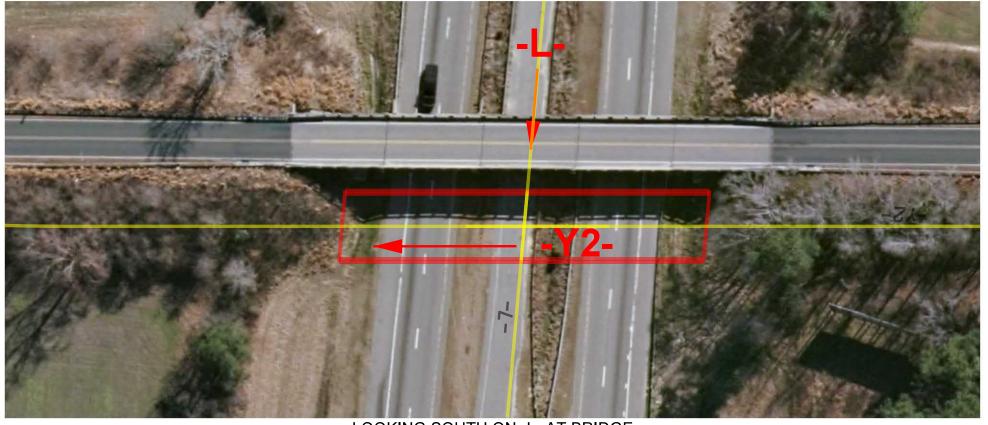
Certification Number

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)

9874 REFERENCE

4

STATE OF NORTH CAROLINA

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

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY	ROBESON
PROJECT DESCRIPTION	N_I-95 IMPROVEMENTS FROM
SOUTH OF US	301 (EXIT 22) TO NORTH OF
SR 1758 (Mc	DUFFIE CROSSING ROAD)
SITE DESCRIPTION SI	ITE 3 – BRIDGE ON SR 1758
(McDUFFIE C	ROSSING ROAD) OVER I–95
BETWEE	N SR 1763 AND US 301

STATE PROJECT REFERENCE NO. SHEETS **I-5987A**

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 SOLL 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 LABDRATORY SAMPLE DATA AND THE IN SITU INTERPLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS 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 INTERRETATIONS 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.

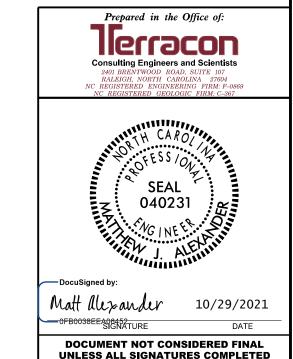
- NOTES:

 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.

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DATE	SEPT	EMBER 2021



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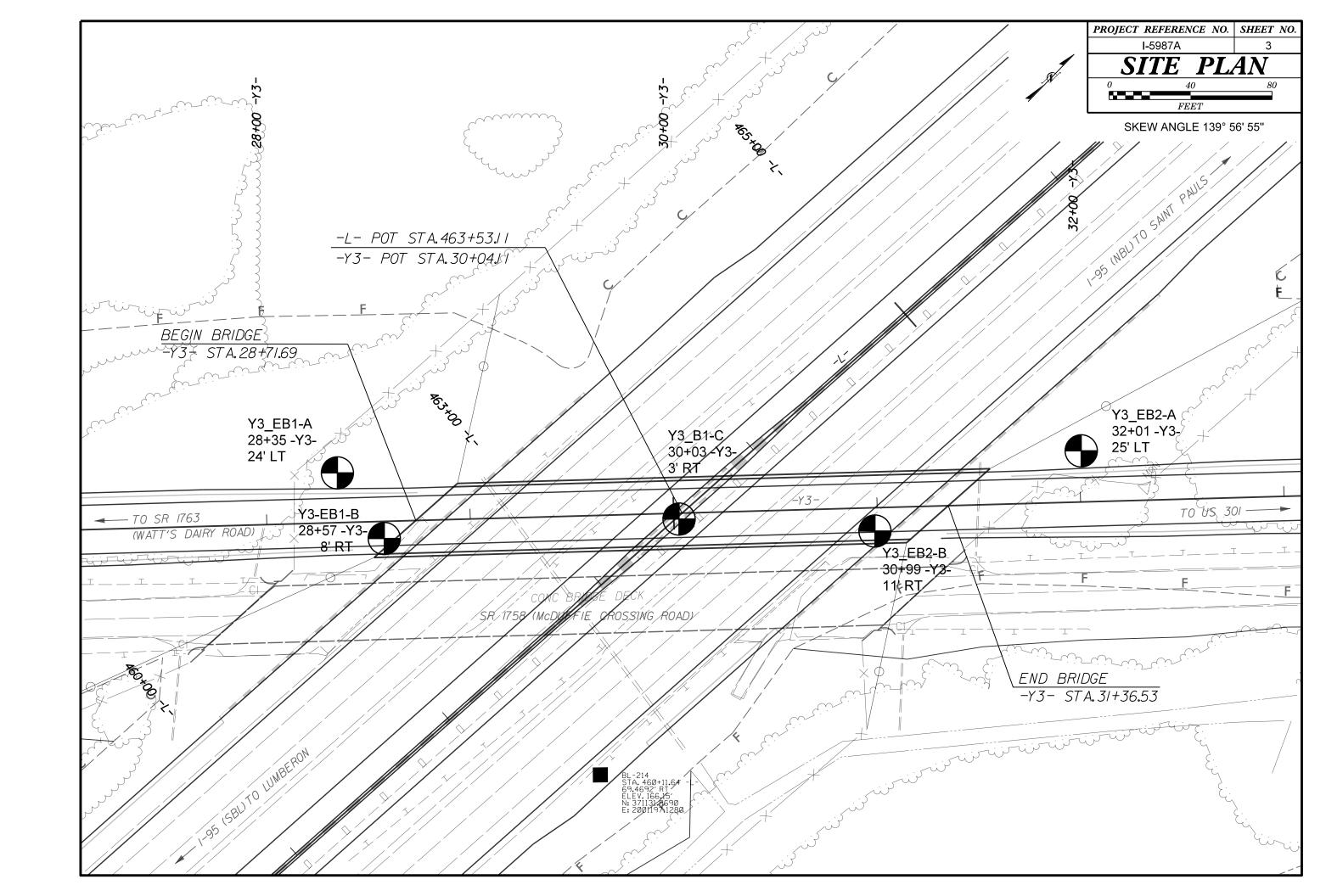
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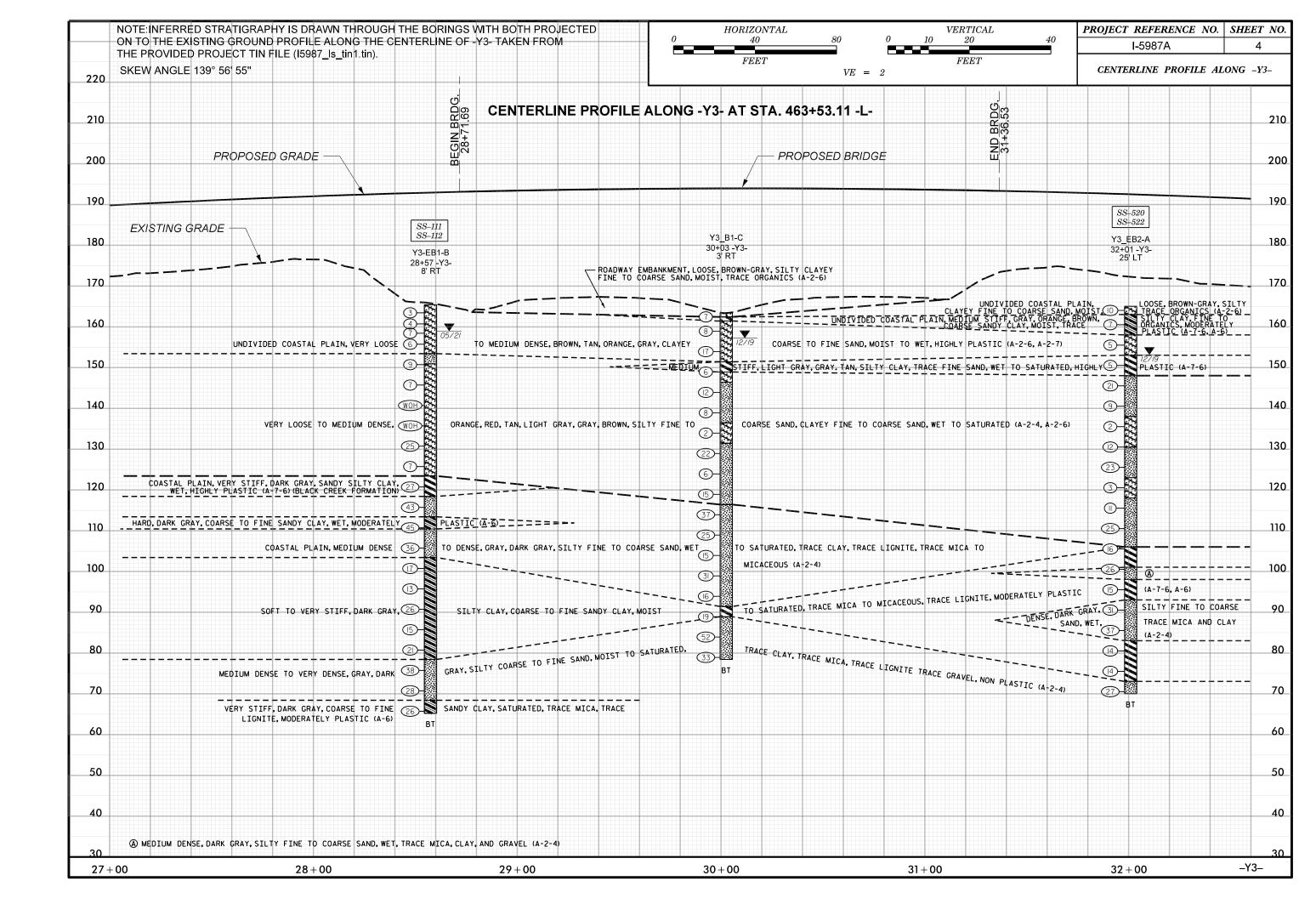
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

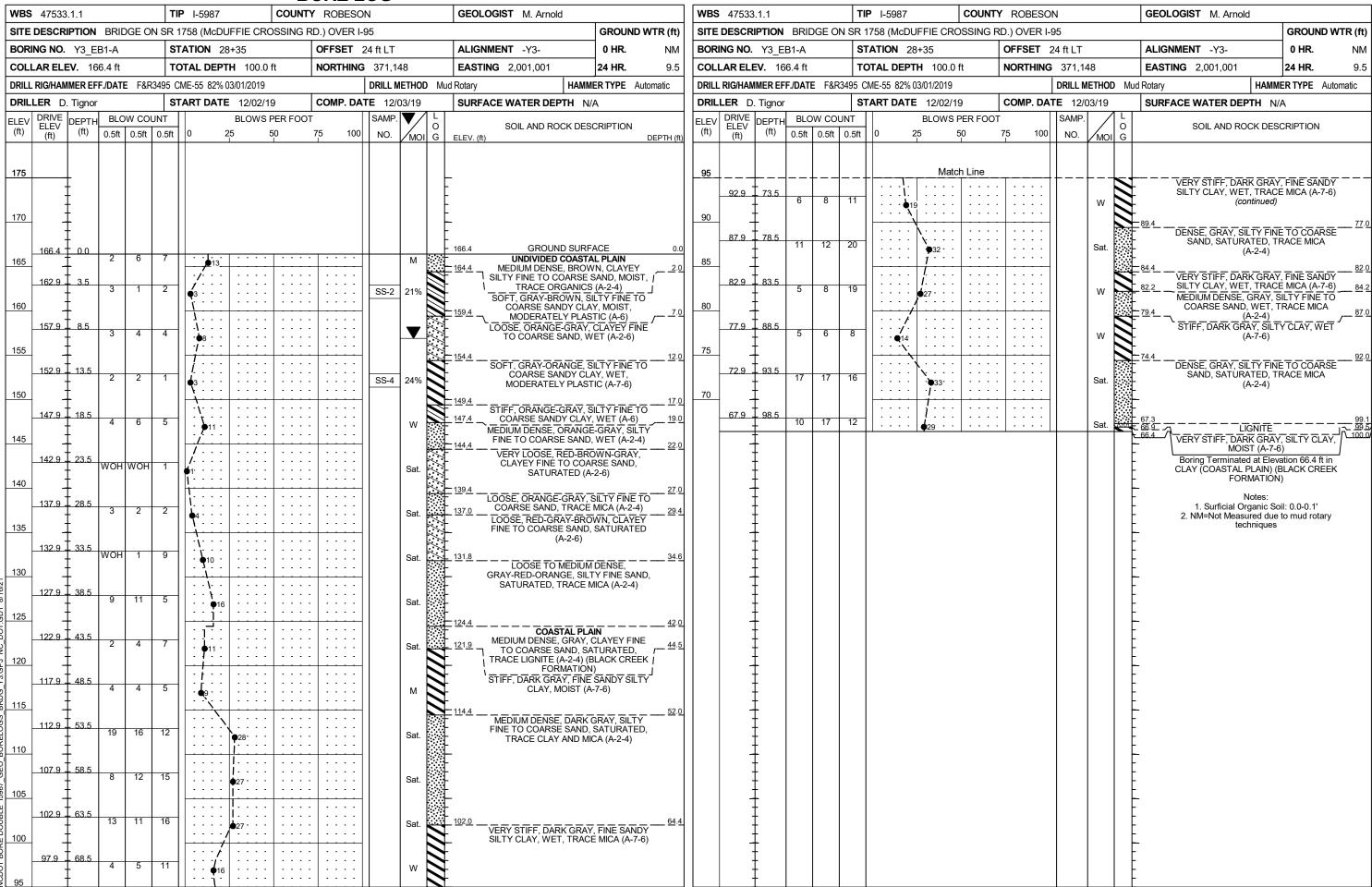
SUBSURFACE INVESTIGATION

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 VIELD 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;	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 PERITRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN ØLFOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN ICNEOUS AND METAMORPHIC POCK THAT	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1- A-1- A-1- A-2- A-2- A-2- A-2- A-2-	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-0 A-1-0 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-7 A-7-6 A-7 A-7-6 SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.	
7. PASSING SULT-	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SEDIMENTARY ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED CP. SHELL BEDS, ETC.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY MUCK, *40 30 MX 50 MX 51 MN SOILS COILS PEAT	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40	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	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. (V SLI.) CRYSTALLS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SOILS SOILS	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
MATERIALS SAND SHIP SHIPE SHIP	─────────────────────────────────────	GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORATION FIND WENTERING EFFECTS. IN HOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBGRADE PUUR	SPRING OR SEEP	WITH FRESH ROCK.	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
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNIESS OR RANGE OF STANDARD RANGE OF UNCONFINED	TT 25,425	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	<u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPRESSIVE STRENGTH (N-VALUE) COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) ROADWAY EMBANKMENT (RE) DIP & DIP DIRECTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	<u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE 4 TO 10	SOIL SYMBOL SPT SPT OMT TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER AUSED DODING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50	THAN ROADWAY EMBANKMENT I AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED SOIL BOUNDARY CORE BORING SOUNDING ROD	(V SEV.) 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 < 100 BPF</i>	OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER SPT N-VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - TATA UNCLASSIFIED EXCAVATION -	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK. <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAYEL SAND SAND SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBRINAMENT ON BHLAFTLE ABBRE VIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EDUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE SOIL MOISTURE SCALE (ATTERBERG LIMITS) OESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARS EPHETRATION TEST NP - NON PLASTIC 7 _d - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC DMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILTY ST - SHEBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING TERM SPACING TERM THICKNESS	BENCH MARK: BL-214 69.47' RIGHT OF STA. 460+11.64 -L-
- MOIST - (M) COLIDAT OR NEAR ORTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N: 371,131.969; E: 2,001,197.128 ELEVATION: 166.15 FEET
OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	e continuous el ICHT Alicen	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	X CMF-55	THINLY LAMINATED < 0.008 FEET INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	NOTE: ELEVATIONS OF BORINGS Y3_EBI-A, Y3_BI-C AND Y3_EB2-A PERFORMED BY F&R Inc.OBTAINED FROM PROVIDED
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	TIN FILE: 15987_Is_tinl.tin DATED: 11-14-2019
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS: POST HOLE DIGGER	CRAING CAN BE SERAPATED FROM CAMPUS MITH STEEL PROPE	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2% STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	CME-55 SOUNDING ROD TRICONE TUNG-CARB. SOUNDING ROD X 21/4" HOLLOW STEM AUGERS VANE SHEAR TEST	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
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.	X 2½" HOLLOW STEM AUGERS VANE SHEAR TEST VANE SHEAR TEST X 3½" HOLLOW STEM AUGERS VANE SHEAR TEST VANE SHE	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

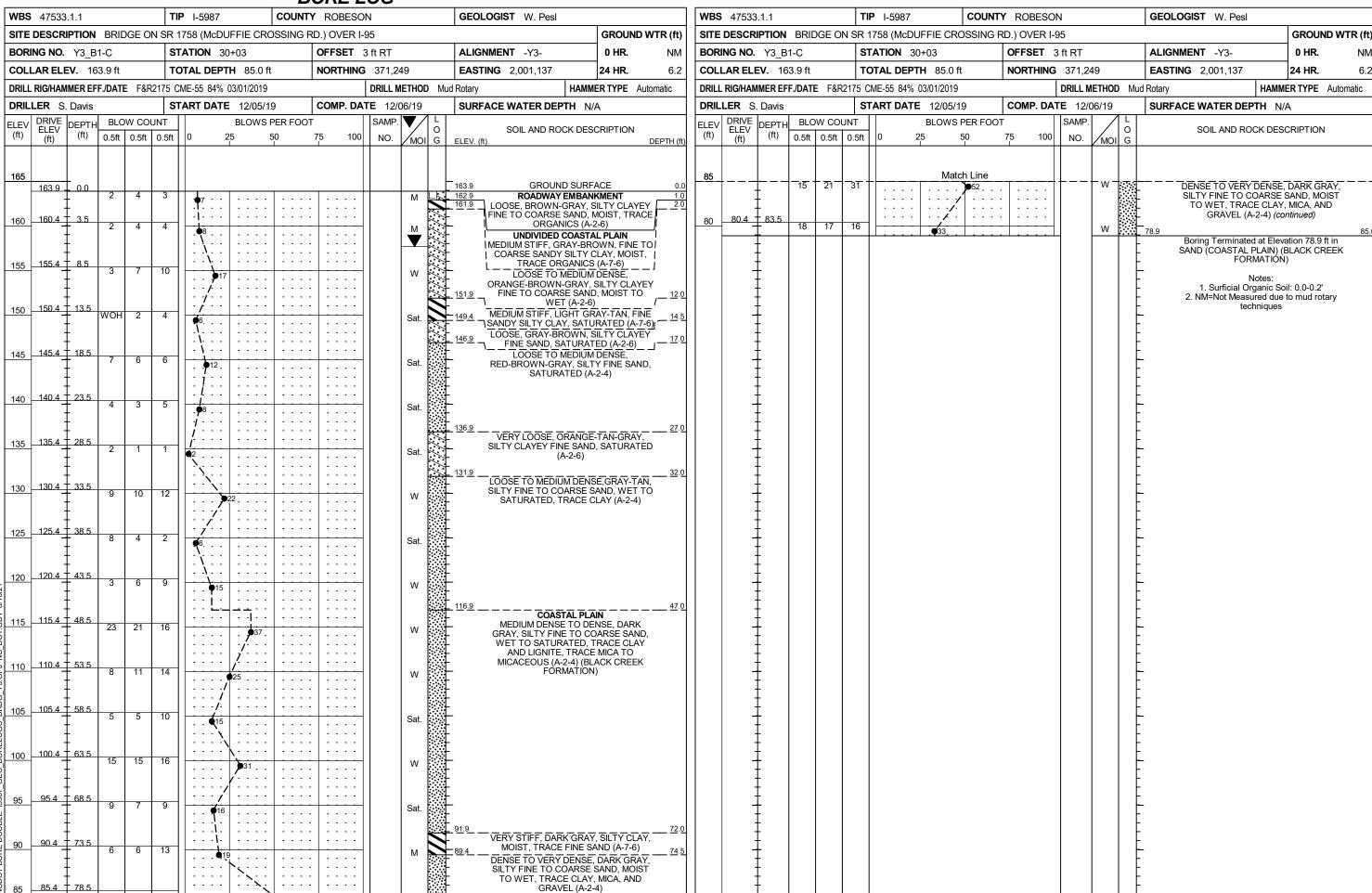








Con	sulting Eng	gineers an	d Scientist	s			<i>E</i>	<u> BORE</u>	<u>LOG</u>																						
WB	S 47533	.1.2		Т	IP I-5987	Α	COUN	TY ROBES	SON			GEOLOGIST DEGON, A. N.			WBS	47533	.1.2			TII	P I-5987/	A	COU	NTY ROBES	ON			GEOLOGIST	DEGON, A. N	١.	
SIT	E DESCRI	IPTION	BRIDGE	ON SR	1758 (McD	UFFIE CR	OSSING	RD.) OVEF	R I-95				GROUND	WTR (ft)	SITE	DESCR	IPTION	BRID	GE O	N SR 1	1758 (McD	UFFIE	CROSSIN	G RD.) OVER	I-95					GROUN	ND WTR (ft)
ВО	RING NO.	Y3-EB	1-B	s	TATION 2	28+57		OFFSET	8 ft RT			ALIGNMENT -Y3-	0 HR.	N/A	BOR	RING NO.	Y3-El	31-B		SI	TATION 2	28+57		OFFSET	8 ft RT			ALIGNMENT	-Y3-	0 HR.	N/A
CO	LAR ELE	EV . 165	5.9 ft	Т	OTAL DEP	TH 100.2	? ft	NORTHI	NG 371,1	141		EASTING 2,001,040	24 HR.	6.5	COL	LAR ELE	EV . 16	5.9 ft		TC	OTAL DEP	PTH 10	0.2 ft	NORTHIN	IG 371,	141		EASTING 2,	001,040	24 HR.	6.5
DRII	L RIG/HAM	IMER EFF	./DATE TE	ER299 D	EDRICH D-5	0 79% 12/3	1/2020		DRILL	METHOD	Mud F	Rotary HAMM	ER TYPE A	utomatic	DRIL	L RIG/HAM	IMER EF	F./DATE	TER	R299 DII	EDRICH D-5	0 79% 1	2/31/2020		DRILL	METH	DD Mud	Rotary	HA	MMER TYPE	Automatic
DRI	LLER TU		,	S	TART DAT	E 05/10/2	21	COMP. [DATE 05			SURFACE WATER DEPTH N/	A			LER TU		E, J. R	₹.	ST	TART DAT	E 05/	0/21	COMP. D			1	SURFACE WA	ATER DEPTH	N/A	
ELE'	/ DRIVE ELEV (ft)	DEPTH_ (ft)	0.5ft 0.5f		0		PER FOO		SAMP NO.	1 / 1	0	SOIL AND ROCK DESC	CRIPTION	DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		W COL		0	BLO\ 25	VS PER FO	OOT 75 10	SAMF NO.	_ _/	O G	SO	IL AND ROCK [DESCRIPTION	I
170															90							ľ	/latch Line								
	-										-					87.2	_ 78.7				:::/	<u>'</u> ::						CO	TO VERY STIF ARSE TO FINE TURATED, TRA	SÁNDY CLAY	, [']
165	164.9	1.0					—		+			165.9 GROUND SURF. UNDIVIDED COASTA	L PLAIN	0.0	85	-		5	6	9	15	5				Sat			E, MODERATE (continu	LY PLASTIC (A	
	162.2	37	3 2	1	3					M	////	VERY LOOSE TO LOOS ORANGE, GRAY, CLAYEY	COARSE T	O		82.2	927				/.										
160			2 3	1	4				:	M		FINE SAND, MOIST, HIGH (A-2-7)	HLY PLASTIC	C	80	- 02.2	- 03.7	6	7	14	::::	21				Sat					
100	-	- 1	2 4	3	7	T	1				////					-	-								1			78.9MED	UM DENSE TO	DENSE GRA	<u></u> <u>87</u> .0
	157.2	8.7	3 3	3					-	M						77.2	88.7	10	15	23			38.			Sat		SIL	TY COARSE TO RATED, TRAC	OFINE SAND,	,
155	-								_	ì		153.9		12.0	75	-						+ /			+		_		CLAY, NON P		
	152.2	13.7	9 6	3	:\: : :				1 1	Sat.	1	LOOSE, LIGHT GRAY, OR COARSE TO FINE SAND,	SATURATE			72.2	93.7	7	12	16						Cost					
150					- 1					Sal.		'- VERY LOOSE TO MEDI	UM ĎENSE,		70	-	-	'				● 28.	-		41	Sat	I .: L	68.9			97.0
	147.2	18.7] :¦: : :				-		 ///	ORANGE, RED, GRAY, C SAND, SATURATED, TI	RACE SILT,	Ī		67.2	98.7					: : :						VERY	STIFF, DARK GI NDY CLAY, SA		
145	_		2 2	5	4 7				1 100 11	2 Sat.	////	MODERATELY PLAST	IC (A-2-6)					6	13	13		2 6		<u> </u>		Sat		65.7 MICA	AND LIGNITE, PLASTIC	MODERATEL	Y 100.2
	-	<u> </u>			<i> </i>						\						[1 E		Terminated at E	levation 65.7	
140	142.2	23.7	WOH WO	H WOH	√ 0				· -	Sat.	////					-	_										-	COAS	CREEK FOR		HON
/8	-								:		///					-	-										-				
T.GDT	137.2	28.7	WOH WO	 HIWOH					-	Sat.	////					-	-										-				
2 135	-				1					Juli.	 					_	-										-				
Z Z	132.2	33.7							1 1		////																				
5 130	_		7 10	15		25			-]	Sat.	////					_											1 E				
IN 5-20	407.0				: : //:				· :		////					-															
ш	127.2	38.7	10 4	3	 : - / 7 : :				-	Sat.	////					-	-										-				
NO 125					 							123.9	IN I	42.0]	-	-										-				
N N	122.2	43.7	8 12	15	::::				:	l w		COASTAL PLA VERY STIFF, DARK GRAY,	SANDY SIL			-	-														
9 120						2/				"		CLAY, WET, HIGHLY PLA (BLACK CREEK FOR		9) 47 0		_	-										-				
JCTU	117.2	48.7							:			DENSE, DARK GRAY, DE COARSE TO FINE SAND			1																
전 5 115			19 20	23			13		-]	W		PLASTIC (A-2-		•		_											1 E				
N ON	-					.			· :			113.9 HARD, DARK GRAY, COA			1	-											-				
110 TERRA	112.2	53./	6 19	26	::::	: : :	 45		·	w		SANDY CLAY, WET, MC 110.9 PLASTIC (A-6	3)	<u> 55.0</u>		-	-														
핆	- -					 ,/ .	1		-			DENSE, DARK GRAY, DE COARSE TO FINE SAND,	SATURATE	D,		-	-										-				
- MOZ 105	107.2	58.7	11 16	20	::::				:	Sat.		TRACE MICA AND CLAY, I (A-2-4)	NON PLAST	IC		-	-														
2 105 0	-					- J 30 -	: : :			341.		103.9		62 0		-	-														
A GE	102.2	63.7				/			[SOFT TO VERY STIFF, I COARSE TO FINE SAN	NDY CLAY	<u></u>]		E										F				
100		<u> </u>	8 7	10	<u>•</u>	7			·]	Sat.		SATURATED, TRACE LIGNITE, MODERATELY F	MICA AND	6)		-	E										E				
BLE	07.0	<u> </u>			:::::				:			, —		•		-	-														
05	97.2	<u> </u>	3 5	8					-	Sat.						-	<u> </u>														
95 95	-	†			 \ ,	 	1		-							-	<u> </u>										-				
DOT	92.2	73.7	9 11	15	::::)			:	Sat.						-	<u> </u>														
징 90		<u>t </u>				Z ²⁰ · · ·				Juli.] []		<u> </u>														



WD0 47500 4 4		BURE LUG	0501 0010T W D	WD0 47500 4 4	TID 1 5007	TV DODESON	OFOLOGIOT W. D. J.
WBS 47533.1.1		TY ROBESON	GEOLOGIST W. Pesl	WBS 47533.1.1		TY ROBESON	GEOLOGIST W. Pesl
SITE DESCRIPTION BRIDGE ON	,	, '	GROUND WTR (ft)	SITE DESCRIPTION BRIDGE ON	`	<u> </u>	GROUND WTR (ft)
BORING NO. Y3_EB2-A	STATION 32+01	OFFSET 25 ft LT	ALIGNMENT -Y3- 0 HR. NM	BORING NO. Y3_EB2-A	STATION 32+01	OFFSET 25 ft LT	ALIGNMENT -Y3- 0 HR. NM
COLLAR ELEV. 165.5 ft	TOTAL DEPTH 95.0 ft	NORTHING 371,411	EASTING 2,001,255 24 HR. 11.9	COLLAR ELEV. 165.5 ft	TOTAL DEPTH 95.0 ft	NORTHING 371,411	EASTING 2,001,255 24 HR. 11.9
DRILL RIG/HAMMER EFF./DATE F&R21	75 CME-55 84% 03/01/2019	DRILL METHOD Mu	d Rotary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE F&R2	175 CME-55 84% 03/01/2019	DRILL METHOD M	lud Rotary HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 12/05/19	COMP. DATE 12/05/19	SURFACE WATER DEPTH N/A	DRILLER S. Davis	START DATE 12/05/19	COMP. DATE 12/05/19	SURFACE WATER DEPTH N/A
ELEV (ft) DRIVE ELEV (ft) DEPTH BLOW COUN (ft) 0.5ft 0.5ft 0		75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	ELEV CHI DEPTH BLOW COUNTY (ft) CHI DEPTH BLOW COUNTY (ft) 0.5ft 0.5ft (ft)		75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION
160	7	SS-520 16%	GROUND SURFACE 0.0 - 165.5 GROUND SURFACE 0.0 - UNDIVIDED COASTAL PLAIN - 163.5 LOOSE, BROWN-GRAY, SILTY CLAYEY 2.0 - FINE TO COARSE SAND, MOIST, TRACE / ORGANICS (A-2-6)	85 82.0 83.5 5 6	Match Line	w w	DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE MICA AND CLAY (A-2-4) (continued) 83.5 STIFF, DARK GRAY-GRAY, SILTY CLAY, MOIST, TRACE MICA (A-7-6)
152.0 13.5 2 2	3	W ₩ SS-522 25%	ORGANICS, MODERATELY PLASTIC (A-6) LOOSE, GRAY-TAN, SILTY CLAYEY FINE TO COARSE SAND, WET (A-2-6) MEDIUM STIFF, GRAY-TAN, SILTY FINE TO COARSE SANDY CLAY, WET,	75 72.0 1 93.5	8		73.5
145	13	w w	HIGHLY PLASTIC (A-7-6) - 148.5 - LOOSE TO MEDIUM DENSE, - RED-BROWN-GRAY, SILTY FINE SAND, - WET TO SATURATED (A-2-4)			30.33	Boring Terminated at Elevation 70.5 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
140 140 137.0 28.5 135	1	Sat.	- 138.5				techniques techniques techniques
127.0 38.5	9	Sat					- - - - - - -
122.0 43.5 2 2 100 100 100 100 100 100 100 100 100	1	Sat	- 123.5				- - - - - -
2 115 T	16	w w	ORANGE-BROWN-GRAY, SILTY FINE TO COARSE SAND, WET, TRACE CLAY (A-2-4)				- - - - - - -
107.0 58.5 12 7 107.0 63.5 8 13	9		- 106.5 59.0 - COASTAL PLAIN - VERY STIFF, DARK GRAY, SILTY CLAY, - WET, TRACE MICA AND LIGNITE (A-7-6) - (BLACK CREEK FORMATION) - 101.5 64.0				- - - - - -
97.0 68.5	9	- · · · · · ·	MEDIUM DENSE, DARK GRAY, SILTY FINE TO COARSE SAND, WET, TRACE 98.5 MICA, CLAY, AND GRAVEL (A-2-4) STIFF TO VERY STIFF, DARK GRAY, FINE SANDY SILTY CLAY, WET, MICACEOUS (A-7-6)				- - - - -
92.0 73.5 9 13	18 31	· · · · · ·	- 93.5				-



Jonsu	illig Eng	gineers a	inu Sci	entists				<u>ORE L</u>	UG				
VBS	47533	.1.2			TII	P I-5987A	COUNT	robeso	N			GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	BRII	OGE O	N SR 1	1758 (McDUFFIE CF	ROSSING F	D.) OVER I-	95				GROUND WTR (ft)
BORIN	IG NO.	Y3_E	B2-B		ST	TATION 30+99		OFFSET	11 ft RT			ALIGNMENT -Y3-	0 HR. N/A
OLL	AR ELE	EV . 16	7.5 ft		тс	OTAL DEPTH 99.7	ft	NORTHING	371,31	2		EASTING 2,001,210	24 HR. 8.2
RILL	RIG/HAN	IMER EF	F./DAT	E TER	299 DIE	EDRICH D-50 79% 12/3	31/2020		DRILL M	ETHOD) Muc	d Rotary HAMM	ER TYPE Automatic
		JRNAG				ART DATE 05/10/		COMP. DA				SURFACE WATER DEPTH N	
	DRIVE	DEPTH		W COL		1	PER FOOT		SAMP.	V /	1 L T	CONTACT WATER DET TIT 19	
LEV (ft)	ELEV (ft)	(ft)	0.5ft			0 25	50	75 100	NO.	MOI	O G	SOIL AND ROCK DES	CRIPTION DEPTH (ft)
	()							-		/ IVIOI		ELEV. (II)	DEPTH (II)
70	_	Ļ										_	
	-	ļ.										167.5 GROUND SURF	ACE 0.0
	166.5	1.0	27	8	6					D	나는	166.5 ROADWAY EMBAN MEDIUM DENSE, WH	
65	164.3	3.2				14		 		D	-	 GRAVELLY COARSE TO 	FINE SAND,
	-	F	6	5	6	11 1 1 1 1 1 1 1 1 1	.			М		DRY, NON PLASTIC	
60	161.5	6.0	1	2	1		.					MEDIUM DENSE, DARK G	RAY, CLAYEY I
00	159.3	8.2	2	2	3	\		+ · · · · ·		V		FINE SAND, DRY TO M PLASTIC (A-2	
	-	_	2		٦	∳ 5			SS-110	W	<i>/</i> //	SOFT TO STIFF, GRAY	
55	-	F				{ : : : : : :					\sim	MODERATELY PLAS	TIC (A-6)
_	154.3	13.2	2	2	2	İ				W	$\frac{1}{2}$	LOOSE, GRAY, ORANGE, CLAYEY COARSE TO FIN	
	-	‡	-			♥ ⁴ · · · · · · ·	.			VV		MODERATELY PLAST	
50	-	<u> </u>				1:::					\	_	
_	149.3	18.2	3	3	3					W	///	_	
	-	ļ				1. 1	.				\sim		
45	144.3	22.2										145.5 LOOSE TO MEDIUM DE	NSF LIGHT 22.0
	144.3	23.2	11	11	6	17	.			Sat.		GRAY, WHITE, ORANGE,	SILTÝ COARSE
	-	F					.				F	TO FINE SAND, SATURA CLAY, SLIGHTLY PLAS	
40	139.3	28.2				/		1				· -	` ,
	108.0	20.2	5	6	3	. /	· · · · · ·			Sat.			
	-	}				-	.				-		
35	134.3	33.2				11		1			 	-	
	-	ļ	3	3	3	6	.			Sat.	$\overline{\mathbf{x}}$	LOOSE, LIGHT GRAY, OR	ANGE. CLAYEY 34.0
_	-	<u> </u>				: '; : : : : :	.				\sim	COARSE TO FINE SAND, SLIGHTLY PLASTIC	SATURATED,
30	129.3	38.2				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	 	 				129.5 MEDIUM DENSE, WHITE.	` 38.0
	-	F	10	9	8	•17	.			Sat.	F	ORANGE, ŚILTY FIŃ	IE SAND,
25	-	ļ.				/	.					SATURATED, NON PLA	STIC (A-2-4)
25	124.3	43.2	7	11	14	· · · · · · · · · · · · · · · · · · ·				0.4		_	
	-	t	′	''	'	•25	.			Sat.			
20	-	Ł				<u> </u>						120.5	47.0
\neg	119.3	48.2	3	5	6	. 1				Sat.	l:::F	- COASTAL PLA MEDIUM DENSE, DARK	GRAY, SILTY
	-	ļ					: : : : :					COARSE TO FINE SAND, NON PLASTIC (A-2-4) (B	
15	114.0	F2.0					<u> </u>					FORMATION	1)
	114.3	53.2	4	9	21	30	.			Sat.	H	VERY STIFF, DARK GRAY	
	-	-					. : : : :				V	FINE SANDY CLAY, SATUR	RATED, TRACE
10	109.3	58.2					4					DENSE, DARK GRAY, SILT	
	-	ļ	12	20	26		046			Sat.		FINE SAND, TRACE MICA, (A-2-4)	NON PLASTIC
	-	ţ				:::: :::2	.				<u> </u>	· 105.5	62.0
05	104.3	63.2				- - -	+					- DENSE, DARK GRAY, CLA	YEY COARSE
	-	[6	11	21	32.	: : : : :			Sat.	\mathbb{N}	TO FINE SAND, SATURA MICA AND LIGNITE, SLIGH	
	-	ţ .				:::: /:::	.					(A-2-7)	67.0
00	99.3	68.2	<u> </u>				+	+			S	- VERY STIFF, DARK GRA	Y, SILTY FINE
	-	-	7	8	13	•21				W	S	SANDY CLAY, WET, TRA LIGNITE, HIGHLY PLAS	
).E	-	‡				: : : : :	: : : : :					95.5	72.0
95	94.3	73.2		10	44	· · · · · · · · · · · · · · · · · · ·	 	+				MEDIUM DENSE TO DE	NSE, DARK
	-	+	8	12	14	26	.			W		WET TO SATURATED, 1	TRACE MICA,
- 1	-	Γ	I	1			.	1	1		\mathbb{N}^{+}	SLIGHTLY PLASTIC	C (A-2-7)

WBS	47533	3.1.2			TI	IP	I-5987A	COUNT	Y ROBESOI	N			GEOLOGIST DEGON, A. N.		
SITE	DESCR	IPTION	BRID	GE O	N SR	17	58 (McDUFFIE CRO	DSSING F	RD.) OVER I-9	95				GROUND WT	ΓR (ft)
	ING NO.				-		ATION 30+99		OFFSET 1				ALIGNMENT -Y3-	0 HR.	N/A
	LAR ELI						TAL DEPTH 99.7 ft		NORTHING				EASTING 2,001,210	24 HR.	8.2
							DRICH D-50 79% 12/31			DRILL N) Mud		MER TYPE Auton	natic
	LER T					TA □□	ART DATE 05/10/2		COMP. DAT			1 L T	SURFACE WATER DEPTH	I/A	
(ft)	DRIVE ELEV (ft)	DEPTH (ft)		0.5ft		-		PER FOOT 50	75 100	SAMP. NO.	MOI	0	SOIL AND ROCK DE	SCRIPTION	
90_	89.3	78.2					Matc	h Line			L 	*	MEDIUM DENSE TO D	ENSE. DARK	
85	84.3		11	18	23		41				Sat.	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	GRAY, CLAYEY COARSE WET TO SATURATED, SLIGHTLY PLASTIC (A-	TO FINE SAND, TRACE MICA,	
80	- 64.5	63.2	16	21	20						Sat.		80.5		87.
00	79.3 <u>-</u>	88.2	10	13	21						Sat.		HARD, DARK GRAY, FIN SATURATED, TRACI LIGNITE, MODERATELY	E MICA AND	00
75	74.3	93.2	12	11	11		/ 				Sat.		75.5 MEDIUM DENSE, GRAY, TO FINE SAND, SATUR CLAY AND MICA, SLIGH (A-2-5)	ATED, TRACE	<u>92</u> .9
70	69.3	98.2	13	14	16		30				Sat.		67.8 Boring Terminated at Ele	vation 67.8 ft IN	99.

LABORATORY TESTING SUMMARY

PROJECT NUMBER:	47533.1.2	TIP:	I-5987A	COUNTY:	ROBESON	
DESCRIPTION:		BRIDGE ON SR		SING ROAD) OVER I-95 BETWEEN SR 1763		

Sample No. Station A		Alignment	Offset	Depth	AASHTO		L.L. P.I.	% by Weight			%	% Passing (sieves)			0/ Maintona	%	
Sample No. Station	Alignment	(feet)	Interval	Class.	Class.	Coarse		Fine Sand	Silt	Clay	Retained	#10		% Moisture	Organic		
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	-	-
															25. 100	Man 1 420	
NP - NON-PL	ASTIC													Stepha	inie H.	Huffma	\sim

Certified Lab Technician Signature Terracon

114-01-1203 Certification Number

% by Weight AASHTO % % Passing (sieves) Offset Depth Sample No. Station **Alignment** L.L. P.I. % Moisture Fine Sand Silt #200 Interval Class. Coarse Clay Retained #10 #40 Organic (feet) 35 SS-2 28+35 -Y3-24 LT 3.5-5.0 A-6(5) 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 A-7-6(10) SS-522 32+01 -Y3-25 LT 13.5-15.0 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

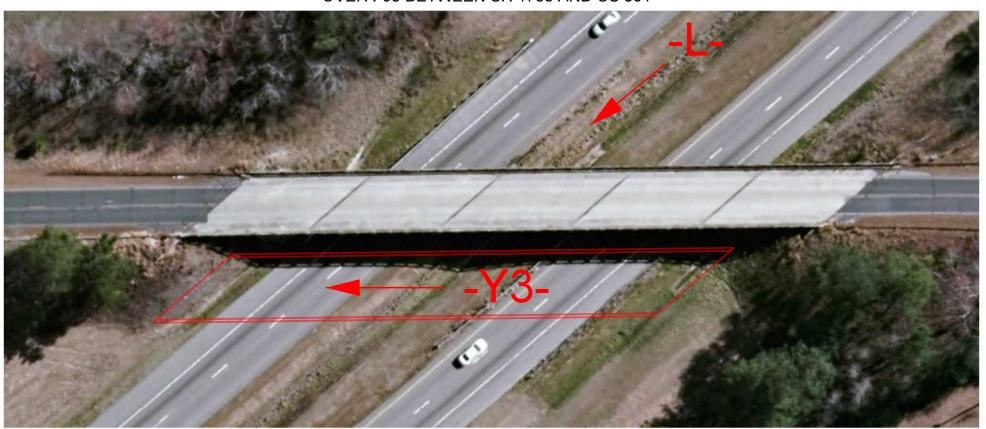
101-02-0603

Certification Number

PROJECT REFERENCE NO. SHEET NO. 1-5987A 11

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)

5987 REFERENCE

4

STATE OF NORTH CAROLINA

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

CONTENTS SHEET NO. DESCRIPTION

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY_	ROBESON					
PROJECT	DESCRIPTION					
	ROM SOUTH OF US 301 (EXIT 22) TO					
NORTI	H OF SR 1758 (McDUFFIE CROSSING RD.)					
SITE DESCRIPTION SITE 20 - CULVERT AT STA. 242+85						
L OV	TER UNNAMED TRIBUTARY TO TENMILE					
SWAMP						

STATE PROJECT REFERENCE NO. I-5987A

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 1991 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 METHOL. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NIDICATED 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 SATISTY 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 BY 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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SEPTEMBER 2021 DATE



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PROJECT REFERENCE NO. SHEET NO.

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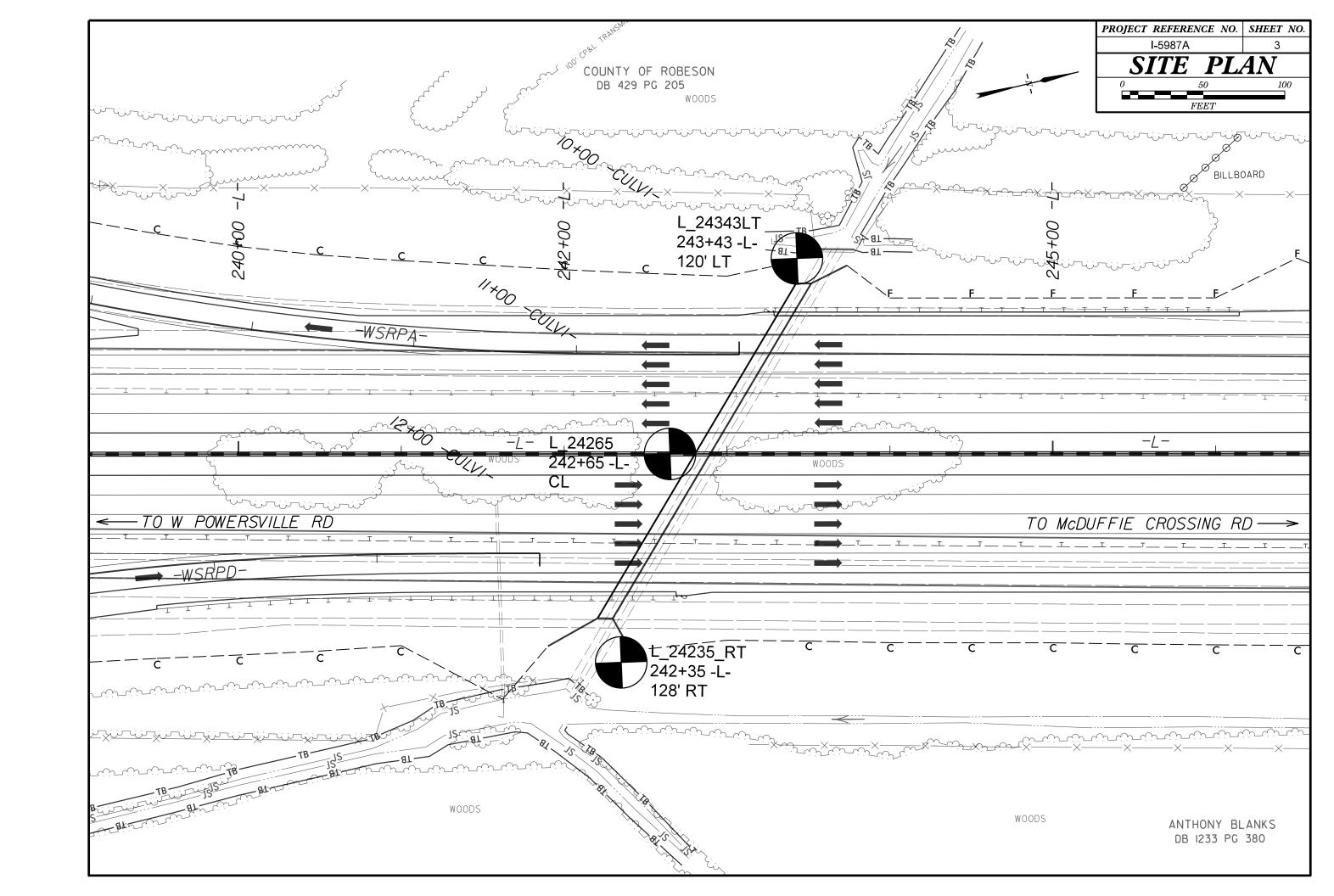
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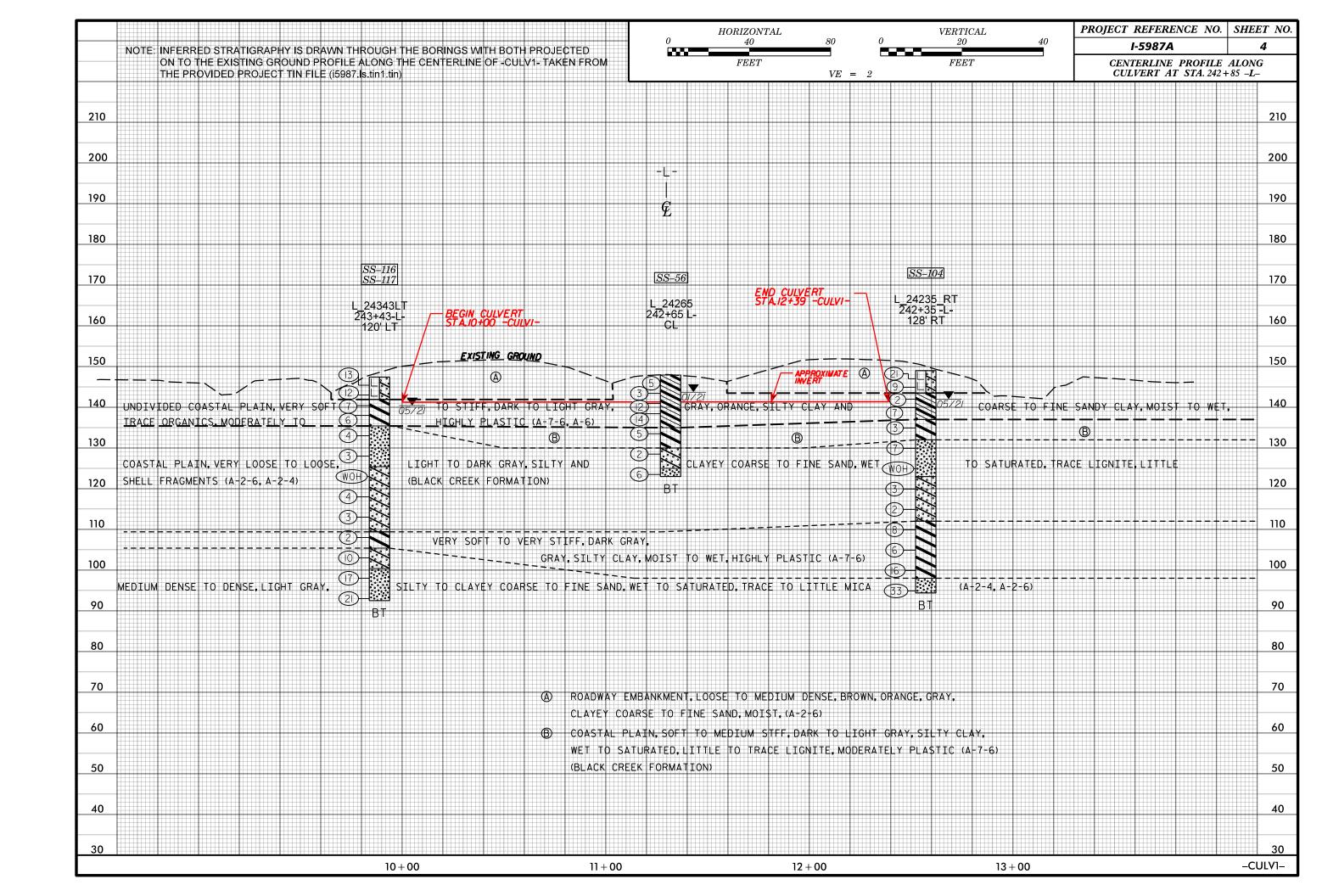
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

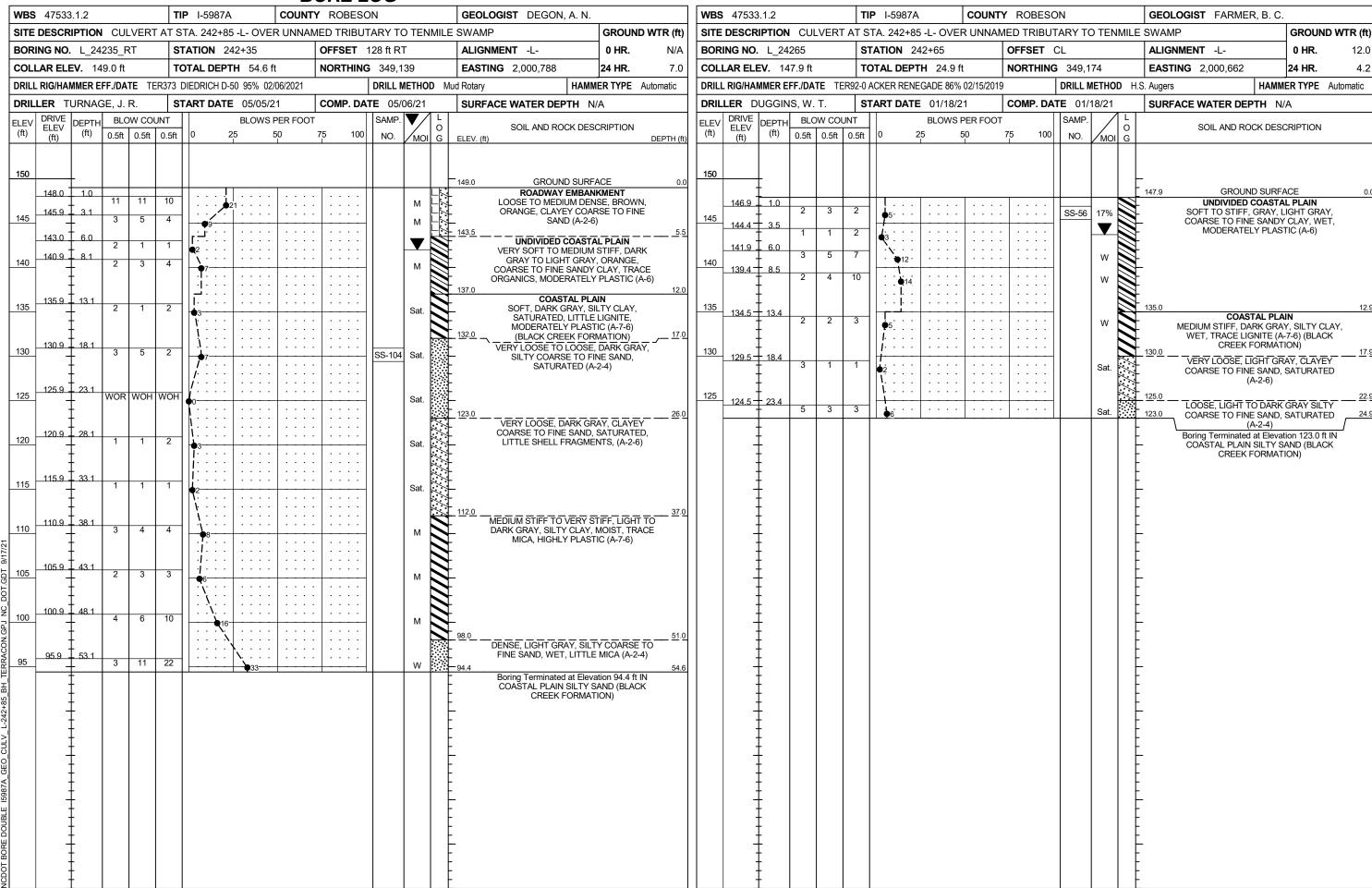
SUBSURFACE INVESTIGATION

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	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.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.		
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.		
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.		
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	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	51//61//A	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.		
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED VILLY NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT		
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE CRYSTA	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND		
LLASS. (\$\(\sigma\) 50% PASSING *200) (> 30% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE.		
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 B-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.		
000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.		
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED		
7. PASSING SINT SILT- GRANULAR SILT- MUCK,	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.		
*40 30 MX 50 MX 51 MN CLAY SOILS SOILS SOILS		- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.		
-200 15 MX 25 MX BI MX 25 MX 25 MX 25 MX 25 MX 35 MX 36 MX 36 MX 36 MX 36 MX	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE		
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.		
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50115 WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE		
PI 6 MX NP 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE		
GROUP INDEX W W 4 MX 8 MX 12 MX 16 MX NU MX AMUUNIS UF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.		
USUAL TYPES STUNE HARUS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.		
MATERIALS SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM		
GEN, RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	∇ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.		
AS SUBURHUE PUUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.		
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.		
PANCE OF STANDARD PANCE OF LINCONFINED	MISCELLHINEUUS STIMBULS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.		
PRIMARY SOIL TYPE COMPACINESS UP PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO		
IN-VALUE) (TUNS/FT-)	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.		
GENERALLY VERY LOOSE < 4 CONTROL LOOSE	SOIL SYMBOL SOIL SYMBOL SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.		
GRANULAR MEDIUM DENSE 10 TO 30 N/A MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING COME PENETROMETER THAN ROADWAY EMBANKMENT TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.		
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50	THAN ROADWAY EMBANKMENT THAN ROADWAY EMBANKMENT THAN ROADWAY EMBANKMENT THAN ROADWAY EMBANKMENT THAN ROADWAY EMBANKMENT	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE		
VERY SOFT < 2 < 0.25	──── INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.		
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MN MONITORING WELL TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BFF</u> COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.		
MATERIAL STIFF 8 TO 15 1 TO 2	WITH CORE	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	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		
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	→ PIEZOMETER INSTALLATION → SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.		
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT		
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK,		
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNSUITABLE WASTE UNSUITABLE WASTE UNSUITABLE WASTE USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO		
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNDE	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.		
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.		
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF		
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL		
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY γ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{\rm d}$ - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.		
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR EIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY		
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.		
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY		
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.		
PLASTIC CEMISOLID, REQUIRES ORVING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.		
(P) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATION		
"" PL L PLASTIC LIMIT	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tinl.tin)		
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	■ WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	DATED 5/6/2I ELEVATION: N/A FEET		
SL SHRINKAGE LIMIT	CME-45C CLAY BITS TAUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:		
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6. CONTINUOUS ELICHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING		
	CME-55	THINLY LAMINATED < 0.008 FEET INDURATION	1		
PLASTICITY		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1		
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	1 □	DURRING WITH FINGED EDEES NUMEROUS CRAINS.			
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNGCARBIDE INSERTS HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.			
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;			
	PORTABLE HOIST X TRICONE 215/16 STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.			
COLOR	X DIEDRICH D-50 TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	CHARP HAMMER BLOWS REGULDED TO RREAK SAMPLE.			
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X ACKER RENEGADE X 2½* HOLLOW STEM AUGERS	EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1		
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BOR	RING	3 NO.	. L_24	343L	Γ	S	TATIO	N 24	13+43		OFFS	ET	120 ft LT			ALIGNME	NT -L-		0 HR.	N/A
COL	LA	R ELI	EV . 14	17.4 ft		T	OTAL	DEPT	H 54.9 ft		NORT	HING	349,2	57		EASTING	2,000,545		24 HR.	7.0
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DRIL	LLE	R T	URNA	ЭЕ, J.	R.	S	TART	DATE	05/13/2	1	СОМІ	P. DA	TE 05/	13/21		SURFACE	WATER DEF	TH N	/A	
ELEV		RIVE	DEPTH	BLO	ow co	UNT			BLOWS F	PER FOOT	-		SAMP.				SOIL AND RO	CK DES	CRIPTION	
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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

			0" 1	Depth	A A OU IT O				% by V	Veight		%	%	Passing (sie	ves)		0/
Sample No.	Station	Alignment	Offset (feet)	Interval (feet)	AASHTO Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
SS-56 SS-104	242+65	-L-	CL	1.0 - 2.5	A-6 (7) A-2-4 (0)	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		
ND NON D																	

NP - NON-PLASTIC

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

59874 REFERENCE

4

STATE OF NORTH CAROLINA

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

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY_				R	OBE	SON			
PROJECT	DESCF	RIPTIC	ON		<i>I</i> –95	<i>IMP</i>	ROV.	EME	VTS
	ROM								
NORTH	H OF	SR	1758	(Mo	DU	FFIE	CRC	SSIN	(G RD.)
SITE DES	CRIPTION	NC	SI	TE 2	21 –	CULV	ERT	AT	
									TARY
		T	O T	ENN	<i>IILE</i>	SWA	4MP		

STATE PROJECT REFERENCE NO. I-5987A 6

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 1991 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED 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 SATISTY 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 KELLY, N. S. TURNAGE, J. R. DEGON, A. N.

INVESTIGATED BY <u>TERRACON</u> CONSULTANTS

DRAWN BY

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SUBMITTED BY __ALEXANDER, M. J.

SEPTEMBER 2021

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



10/19/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

1–5987A

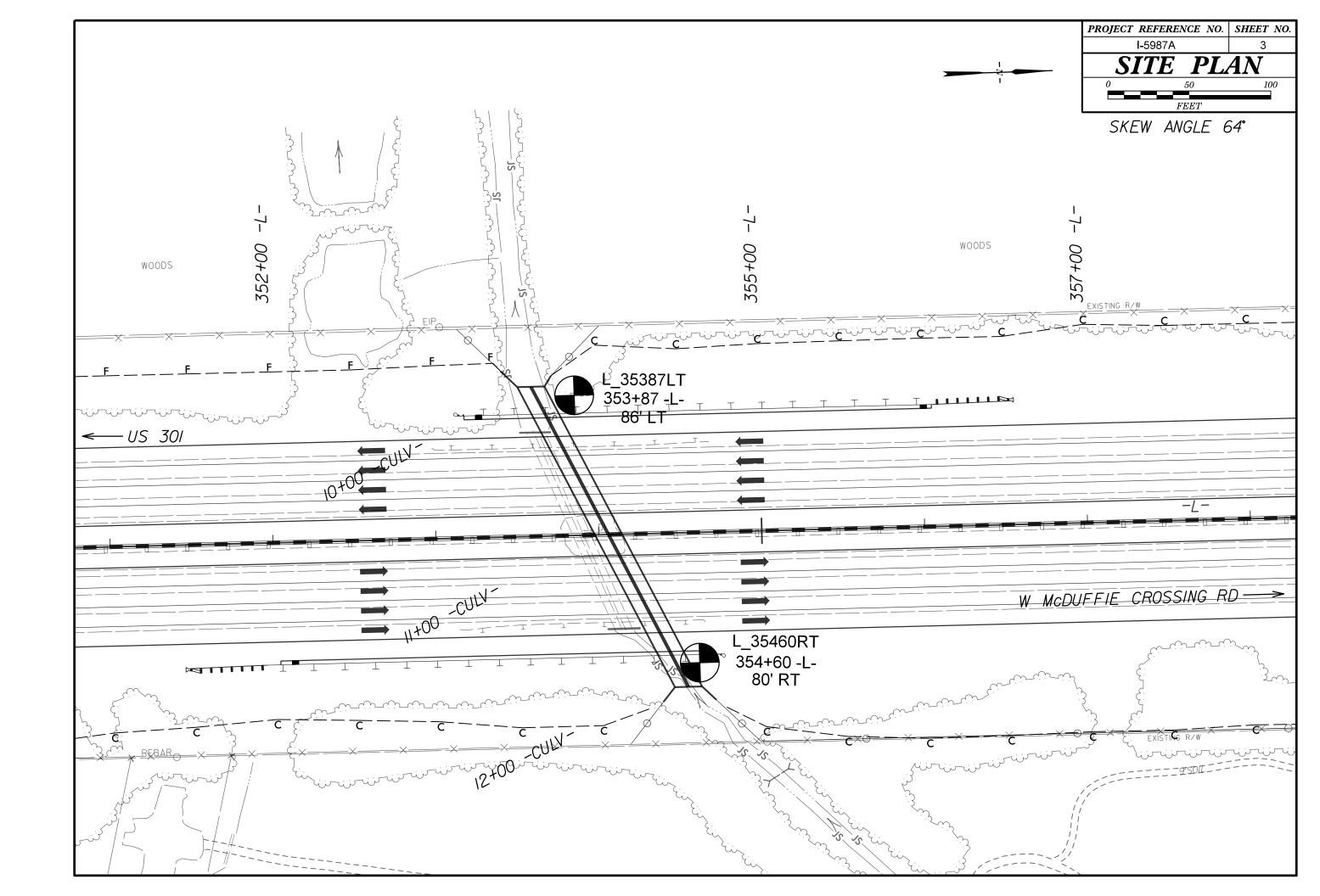
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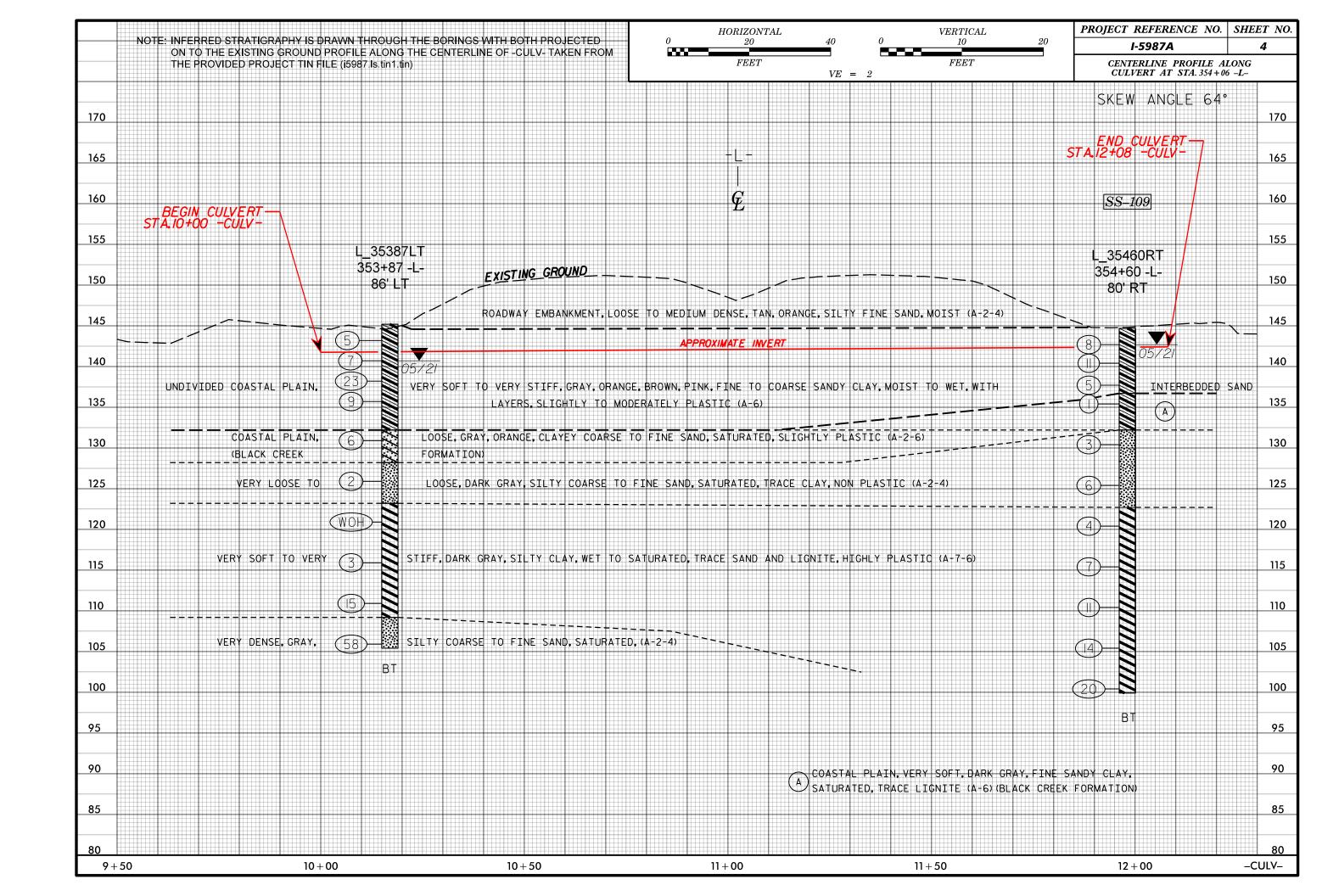
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

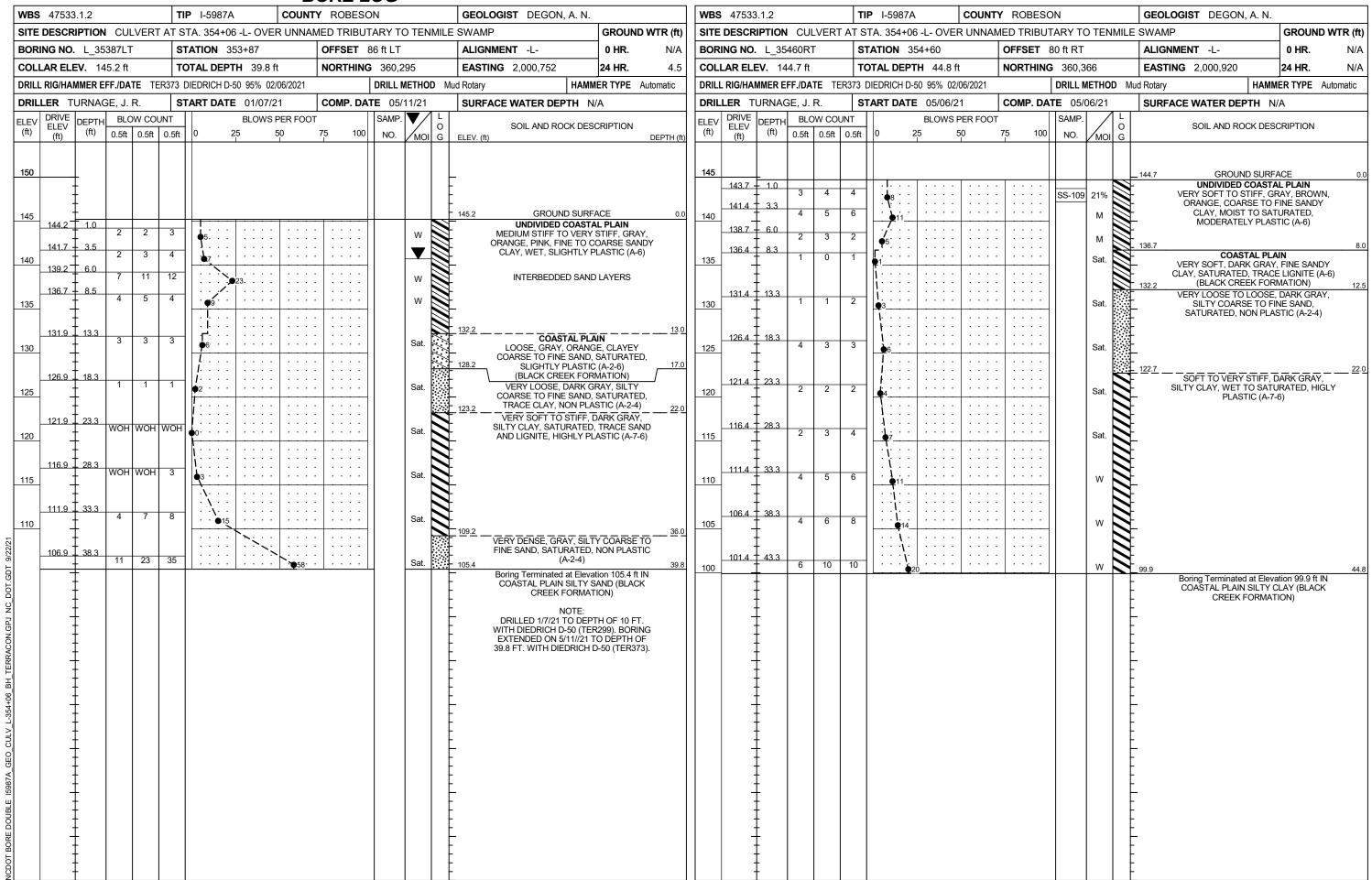
SUBSURFACE INVESTIGATION

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,MOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6 SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	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
CENERAL CRANIII AR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL FINE TO COARSE GRAIN METAMORPHIC AND NOT FINE TO COARSE GRAIN METAMORPHIC AND NOT FINE TO COARSE GRAIN METAMORPHIC AND NOT FINE TO COARSE GRAIN METAMORPHIC AND NOT FINE TO COARSE GRAIN METAMORPHIC AND NOT FINE TO COARSE GRAIN METAMORPHIC AND NOT FINE TO COARSE GRAIN METAMORPHIC FINE TO COARSE GRAIN FINE TO COARSE GRAIN FINE TO COARSE GRAIN FINE TO COARSE GRAIN FINE TO COARSE GRAIN FINE TO COARSE G	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 0000d00000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY PEAT GRANULAR SOILS SOIL	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
■200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
LL - 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 1111 F OR	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP IW MX IW MX II MN II MN IW MX II MN II MN II MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH, FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W A AMX 8 MX 12 MX 16 MX NU MX AMUUN 15 UF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STUNE FRANCE. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBUKADE PUUK	SPRING OR SEEP	WITH FRESH ROCK.	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
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
DANCE OF CTANDARD DANCE OF UNICONSTITUT	PIZSCEERINEOUS STRIBUES	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (IN-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE < 4	SPT C SLOPE INDICATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GRANIII AR LOOSE 4 TO 10	SOIL SYMBOL OPT ONT TEST BORING INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN RUADWAY EMBANKMENT \$\frac{1}{2}\$	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A DIEZOMETED	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	TTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	USED IN THE TOP 2 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - SEED IN THE TOP 3 FEET OF ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION OUTPER OUTPE	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT,) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	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.
LL LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC SEMISOLID: REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATION ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tini,tin)
- MOIST - (M) COLID-AT OR NEAR ORTIMIN MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	DATED 5/6/2021 ELEVATION: N/A FEET
OM OPTIMUM MOISTURE SLSUCIDIFIED ON NEAR OFTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTEC:
PEOLIPES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	CME-55 G'CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8* HOLLOW AUGERS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS: POST HOLE DIGGER	CRAINE CAN BE CERABATED FROM CAMBLE WITH CTEEL BRODE.	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 215/16 STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	DIEDRICH D-50 TRICONE TUNGCARB. SOLINDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X (TER373) CORE BIT VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X DIEDRICH 0-50 X 2½* HOLLOW STEM AUGERS	EXTREMELY INDURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1
		SHUIFLE DICENS HURUSS URBINS.	DATE: 8-15-14







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

			0111	Depth	AAGUTO				% by V	Veight		%	%	Passing (sie	ves)		0/
Sample No.	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
SS-109	354+60	-L-	80 RT	1.0 - 2.5	A-6 (3)	30	16	32.4	26.2	13.7	27.7	0	100	80	43	20.6	
																	
																	
																	
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NP - NON-PLASTIC

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

59874 REFERENCE

S 4

STATE OF NORTH CAROLINA

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

CONTENTS

SHEET NO.	<u>DESCRIPTION</u>
I	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-7	BORELOGS
8	LABRATORY TESTING SUMMARY

STRUCTURE SUBSURFACE INVESTIGATION

COUNTYROBESON
PROJECT DESCRIPTION
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

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.

CENERAL 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 (INP-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 NIDICATED 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 SATISTY 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 FOOD THE PROJECT OF THE 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.

 PERSONNE! PERSONNEL

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DATE	AUGUST 2021
2401 BREN RALEIGH, NC REGISTER	I Engineers and Scientists VTWOOD ROAD, SUITE 107 NORTH CAROLINA 27694 ED ENGINEERING FIRM: F-0869 ERED GEOLOGIC FIRM: C-367
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Matt Alexan	8/30/2021

FB0038EEA06452 SIGNATURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

1–5987A

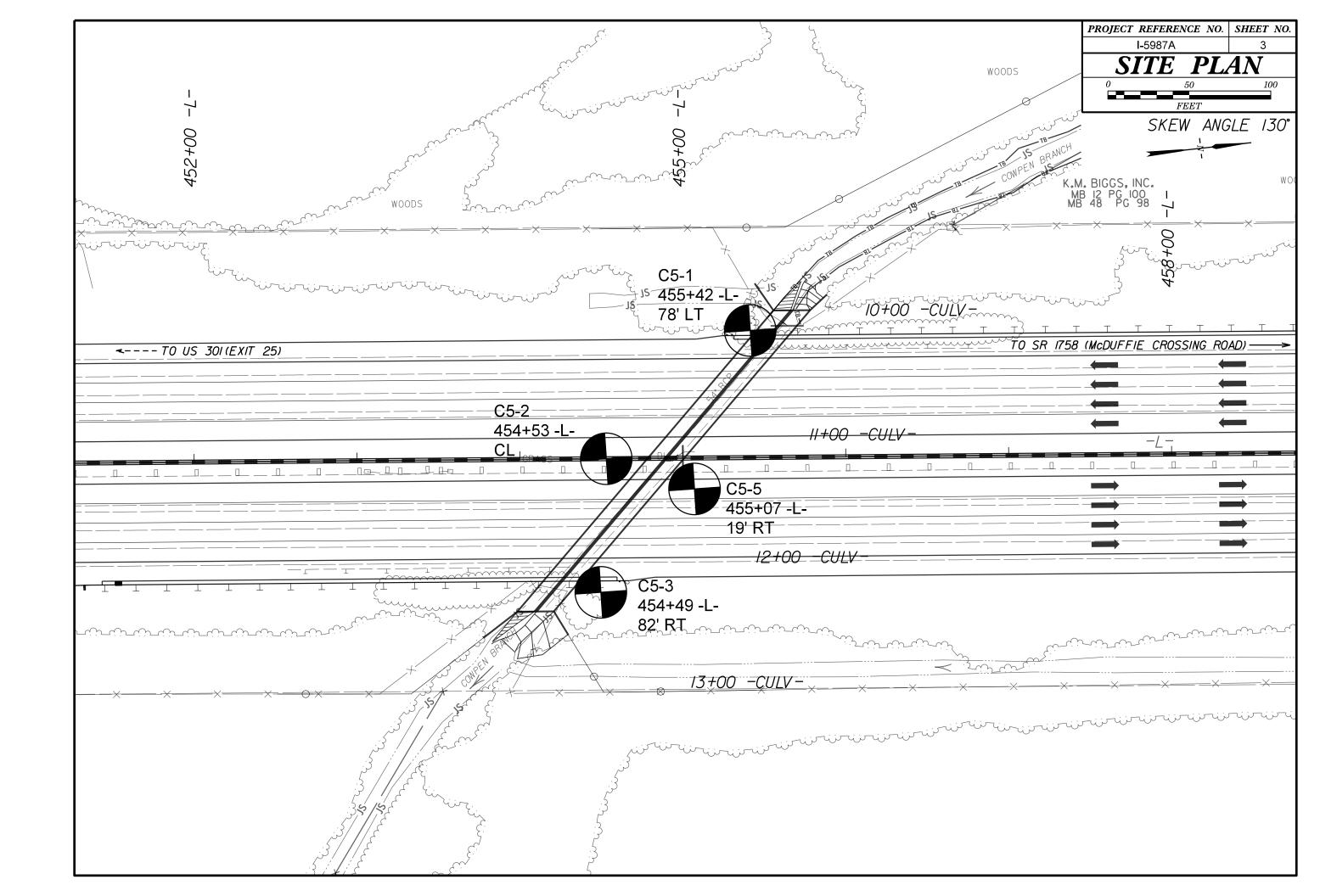
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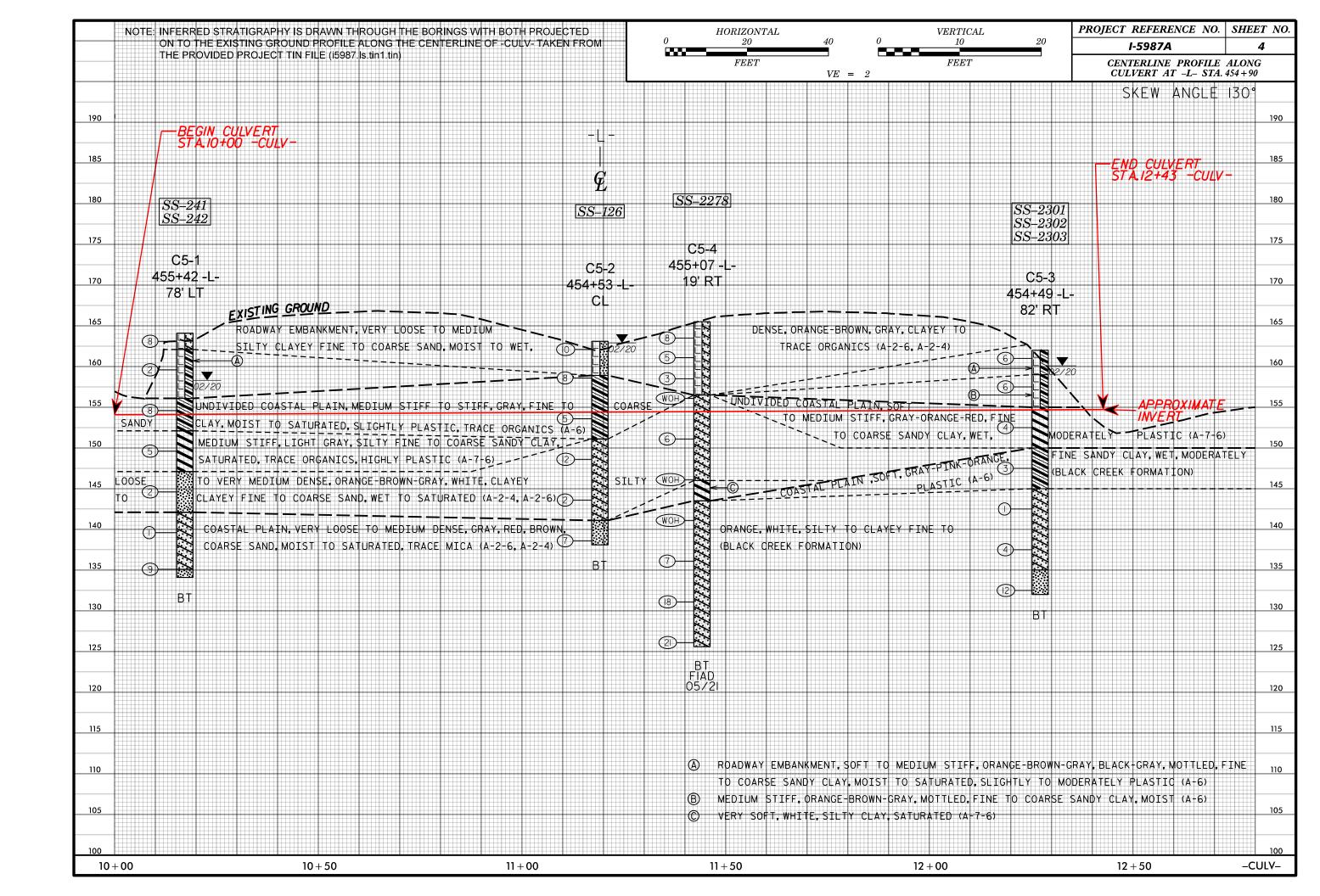
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

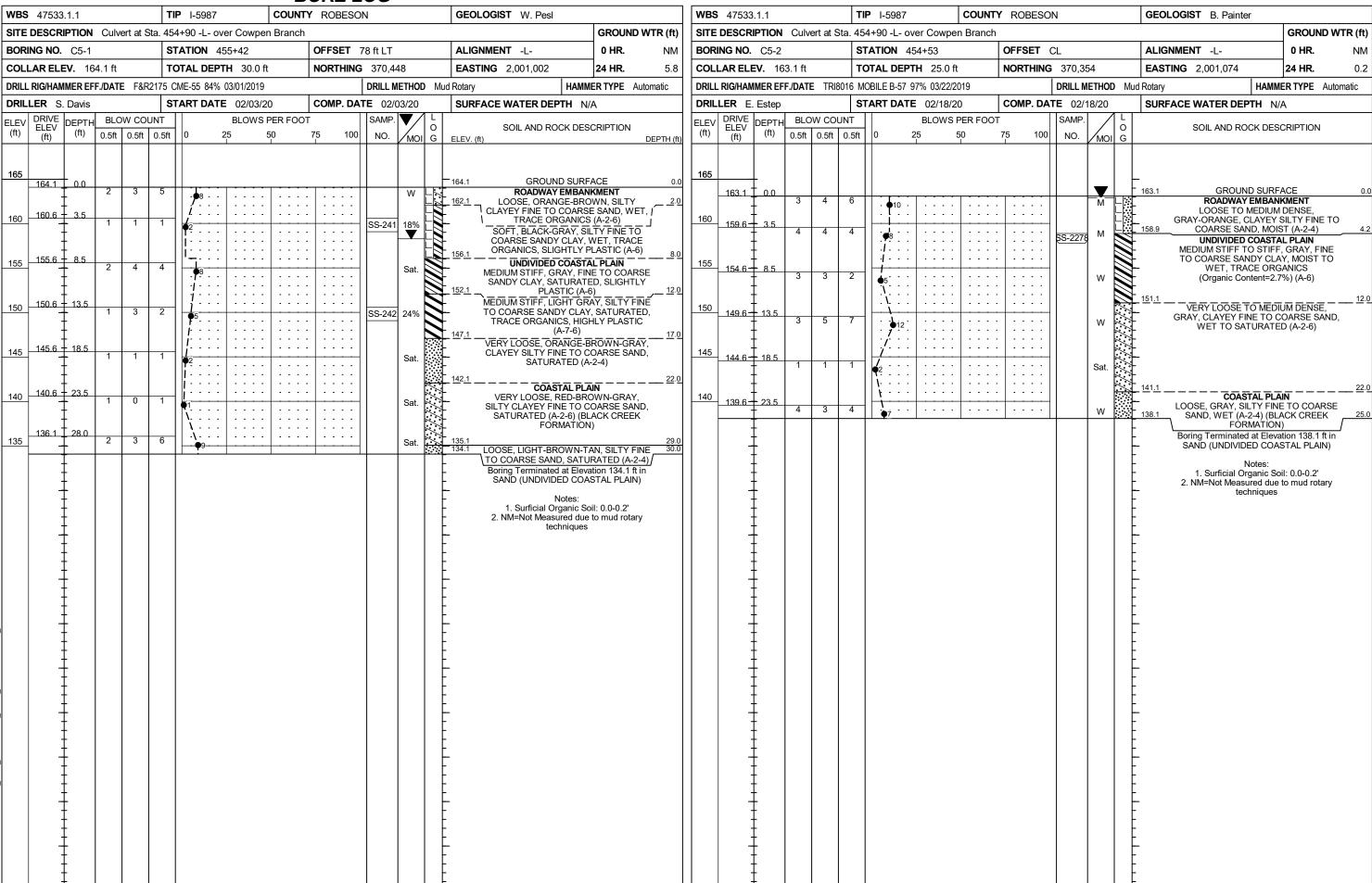
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

CON DECCRIPTION	CDADATION	DOOK DECORPORATION	TEDMS AND DEFINITIONS
SOIL DESCRIPTION SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN	GRADATION WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	TERMS AND DEFINITIONS
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 DI586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	UNCLISS, OMBBRU, SULTISI, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SAMDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING GRANULAR SILT - MUCK,	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN SOILS SOILS PEAT		- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
אויז פל אויז פייז פייז פל אויז פויז פל אויז פייז פייז פייז פייז פויז פל אויז פייז פייז פויז פייז פייז פייז פייז פ	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS TRACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40 COLIC MATERIAL	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR LITTLE OR HIGHLY	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH,
CERTIE INTEX A A A A A WY A MY 12 MY 16 MY NO MY AMPLIANTS OF	GROUND WATER	OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
UISIAL TYPES STONE EPACS ORGANIC SUILS		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GAND SOLIS SOLIS	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS, MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
CEN DATING	→ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VALUE) (TUNS/FT-)	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE 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	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4 TO 10 GRANULAR LOOSE 4 TO 10 TO 20	SOIL SYMBOL OPT DAT TEST BORING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT TEST	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	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
MATERIAL STIFF 8 TO 15 1 TO 2	A ALLUMIAL SOIL BOUNDARY A PIEZOMETER COST N. VALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 → 4	INSTALLATION	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	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
LUDARSE FINE	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER	ABBRE VIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC LIQUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) SEMISOLID; REGULRES DATING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATIONS
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tinl.tin)
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	DATED 5/6/2021 ELEVATION: N/A FEET
SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: X MOBILE 57 (TRI8016)	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CL CONTINUOUS FLICHT AUGED	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDATELY AFTER DRILLING
ATTAIN OPTIMUM MOISTURE	X CME-55 (F&R2175)	THINLY LAMINATED < 0.008 FEET INDURATION	1
PLASTICITY		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	CME-550 HARD FACED FINGER BITS TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:	GENILE BLUW BY HAMMER DISINIEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TOTAL TOTAL	CRAING ARE DIFFICULT TO SEPARATE WITH STEEL PROPE.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X DIEDRICH D-50 (TER99) CORE BIT SOUNDING ROD VANE SHEAR TEST	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	THE STEPH TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1
		SHITLE DREHKS AUKUSS UKAINS.	DATE: 8-15-1







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SHEET 6 OF 8

WBS	47533	.1.1			TI	I-5987 COUNTY ROBESO	N	GEOLOGIST B. Painter	
SITE	DESCR	PTION	Culv	ert at S	ita. 45	90 -L- over Cowpen Branch		1	GROUND WTR (ft)
BORI	NG NO.	C5-3			S	TION 454+49 OFFSET	32 ft RT	ALIGNMENT -L-	0 HR. NM
COLL	AR ELE	V . 16	2.0 ft		т	AL DEPTH 30.0 ft NORTHING	370,344	EASTING 2,001,156	24 HR. 1.9
DRILL	RIG/HAM	MER EF	F./DATI	E F&R	3495 C	E-55 86% 02/07/2020	DRILL METHOD Muc	Rotary HAMMI	R TYPE Automatic
DRIL	LER D.	Tignor			S	RT DATE 02/26/20 COMP. DA	TE 02/26/20	SURFACE WATER DEPTH N//	4
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	W COU	JNT 0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. L O NO. MOI G	SOIL AND ROCK DESC	CRIPTION
	(11)		0.010	0.010	0.010		NO. MOI G		
165									
103	_	-						-	
	162.0	0.0	1	3	3		14%	162.0 GROUND SURFA	
160	-	-	'		J	•6	SS-2301	MEDIUM STIFI 159.0 ORANGE-BROWN-GRAY	=,
	158.5	- 3.5 -	3	3	3	6	M	FINE TO COARSE SANDY	CLAY, MOIST, I
155	-	-						MODERATELY PLAS	
100	153.5	- - 8.5				<u> </u>		FINE TO COARSE SANDY	, MOTTLED,
	-	-	2	2	2	∳ 4	SS-2302 17%	(A-6) UNDIVIDED COASTA	L PLAIN
150	-	-				<u> </u>		SOFT TO MEDIUM GRAY-ORANGE-RED, FINE	STIFF, 12.0
	148.5	13.5 -	1	1	2	<u> </u>	SS-2303 33%	SANDY CLAY, WET, MO PLASTIC (A-7-	DERATELY
145	-	-						COASTAL PLA	iN
140	 143.5 -	- - 18.5						SANDY CLAY, WET, MO	DERATELY /
	-	-	WOH	WOH	1	1	Sat.	PLASTIC (A-6) (BLACI FORMATION) i l
140	-	-				\		VERY LOOSE TO LOOSE, CLAYEY FINE TO COARSE	
	138.5	- 23.5 -	2	2	2			TO SATURATED (A	
135	-	-				7:::: ::::: ::::: :::::		135.0	27.0
100	133.5	- - 28.5				.\		MEDIUM DENSE, ORAN	GE-GRAY,
			4	4	8	12	M	CLAYEY SILTY FINE TO CO	(A-2-4) 30.0
	-	-						Boring Terminated at Eleva SAND (UNDIVIDED COAS	
	-	-						Notes:	
	-	-						Surficial Organic Soi NM=Not Measured due	il: 0.0-0.2' to mud rotary
	-	-						techniques	
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GEOTECHNICAL BORING REPORT

SHEET 7 OF 8

WBS	47533	3.1.2			ТІ	IP	I-5987A			ORE Y ROBE				GEOLOGIST DEGON	I, A. N.		
			l Cul	vert at				over Cowp						1		GROUN	ID WTR (ft
30R	NG NO.	. C5-4	1		S	TA ⁻	TION 4	55+07		OFFSET	19 ft R	RT		ALIGNMENT -LA2-	ALIGNMENT -LA2- 0 HR.		
OLI	AR ELE	EV. 16	35.5 ft		TO	ОТ	AL DEPT	H 39.9 f	t	NORTHI	NG 370	,407		EASTING 2,001,095		24 HR.	FIAD
RILL	RIG/HAI	MMER E	FF./DA	TE TI	 ER299 I	DIE	DRICH D-	50 79% 12/	31/2020		DRILI	METH	HOD I	Mud Rotary	HAMN	J MER TYPE	Automatic
RIL	LER T	URNA	GE, J.	R.	s	TA	RT DATE	05/18/2	1	COMP. I	DATE 0	5/18/2		SURFACE WATER DE	PTH N	/A	
LEV	DRIVE	DEPTH		ow co	UNT			BLOWS	PER FOOT		SAM	P. V	7				
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft		0 2	25 5	50	75 1	00 NO	. / _M	OI G	SOIL AND RO	OCK DES	CRIPTION	DEPTH (
170																	
	-	F												F			
	-	Ŧ												405.5	ום כו וםר	ACE	,
165	164.5	1.0				₩	-1			-	#	-		ROADWAY		IKMENT	0
	- 162.1	3.4	5	5	3		. ∳ 8				:	N		VERY LOOSE TO ORANGE, CLAY			
60	102.1	3.4	2	2	3		 ∮ 5				:	N			ND (A-2-6		
bU_	159.5	6.0	1	2	1	{	1				-	l w	, [-			
	157.1	8.4				'	? 3				:	"		156.5			g
55	_	Ł	WOH	WOH	WOH	•	0					Sa	t.	UNDIVIDED LOOSE TO VE			
	-	ł				\	\				.		·//.	WHITE, ORANGE	, CLAYE	Y COARSE	
	152.1	13.4	WOH	3	3	1	\				.	Sa	t 🔆	FINE S	SAND (A-	2-6)	
50	_	F				┞	/ · · · ·			+		"		, -			
	- 147.1	18.4				H	<u>/</u> :::::				.		/ //	<u>{</u>			
45	-	- 10	WOH	WOH	WOH	•	0				SS-1	26 Sa	t. 🔯	146.0	TE SII T	V CI AV 7A	7-6) 19
10_	-	‡				lt				1 : : :	.			143.5			22
	142.1	23.4	WOH	WOH	WOH	4					:		, %	VERY LOOSE TO	TAL PLA MEDIUM		ARK
40	_	‡	VVOIT	WOIT	Won	1	0			1:::		Sa	I. ***	GRAY TO ORANG CLAYEY COARSE	E TO W	HITE, ORAN	NGE,
	-	‡				Ш,	\ \				:		*	(BLACK CRI			2-0)
	137.1	28.4	WOH	3	4	1	7				:	l v	,	<u>.</u>			
35	-	ł				┢	<u> </u>	 	<u> </u>	+:::			<i>***</i>	<u>.</u> -			
	132.1	33.4					\				.		·/·	,			
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	-	F									-		///	F			
	127.1	38.4	9	10	11	$\ \cdot \ $::: }				:	Sa	, //	125.6			0.5
		<u> </u>				Н	· · · •	21_ · · · ·			-	- 06		 Boring Terminate 	at Eleva	tion 125.6 f	t IN
	-	ļ												- COASTAL PLAIN - CREEK	CLAYEY FORMA	SAND (BLA TION)	ACK
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LABORATORY TESTING SUMMARY

 PROJECT NUMBER:
 47533.1.2
 TIP:
 I-5987A
 COUNTY:
 ROBESON

DESCRIPTION: Culvert at Sta. 454+90 -L- over Cowpen Branch

Sample			Offset	Depth	AASHTO				% by V	Veight		%	% Pa	ssing (si	eves)	0/	%
No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	Moisture	Organic
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	

Certified Lab Technician Signature

114-01-1203

Certification Number

Sample			Offset	Depth	AASHTO				% by \	Neight		%	% Pa	ssing (si	eves)	%	%
No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	Moisture	Organic
SS-241	455+42	-L-	78' LT	3.5 - 5.0	A6(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	A6(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	A7(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

59874 REFERENCE

4

STATE OF NORTH CAROLINA

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

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY _		ROBESON	
PROJECT	DESCRIPTION	<i>I</i> –95 <i>IMPR</i> (OVEMENTS
	OM SOUTH O		
NORTH	H OF SR 1758	(McDUFFIE C	ROSSING RD)
SITE DESC	CRIPTION	SITE 19 – CUI	LVERT AT
	111 + 25 <i>-L</i> - <i>OVE</i>		
	TO SADD	LETREE SWA	MP

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 1991 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 METHOL. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NIDICATED 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 SATISTY 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 BY 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)

TERRACON CONSULTANTS

INVESTIGATED BY: CATLIN ENGINEERS AND SCIENTISTS

KENNEDY, E. J. DRAWN BY

RIGGS, JR., A. F. CHECKED BY

SUBMITTED BY __ALEXANDER, M. J.

AUGUST 2021

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



Matt Mexander -0FB0038EEA06452

SIGNATURE

8/30/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

1–5987A

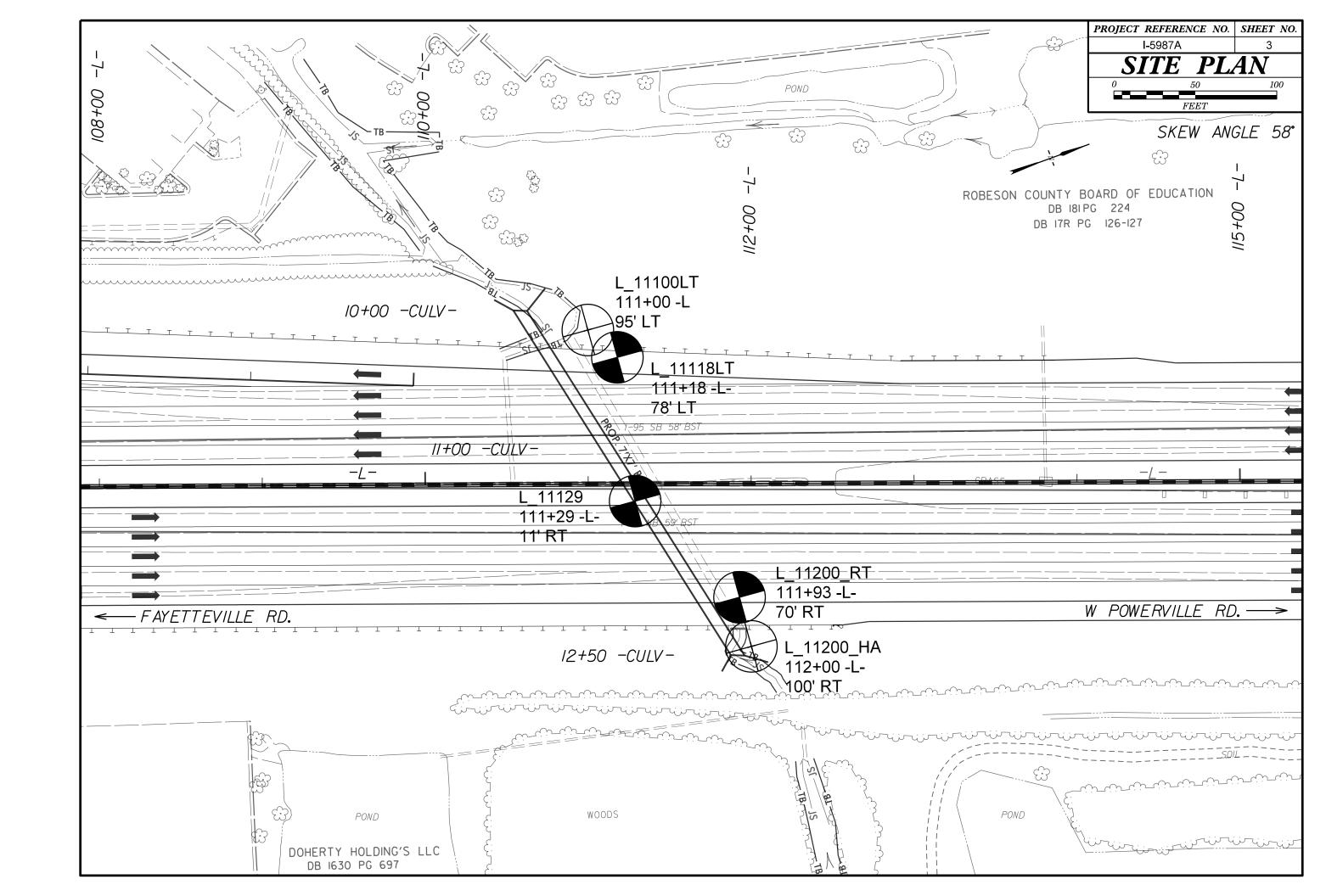
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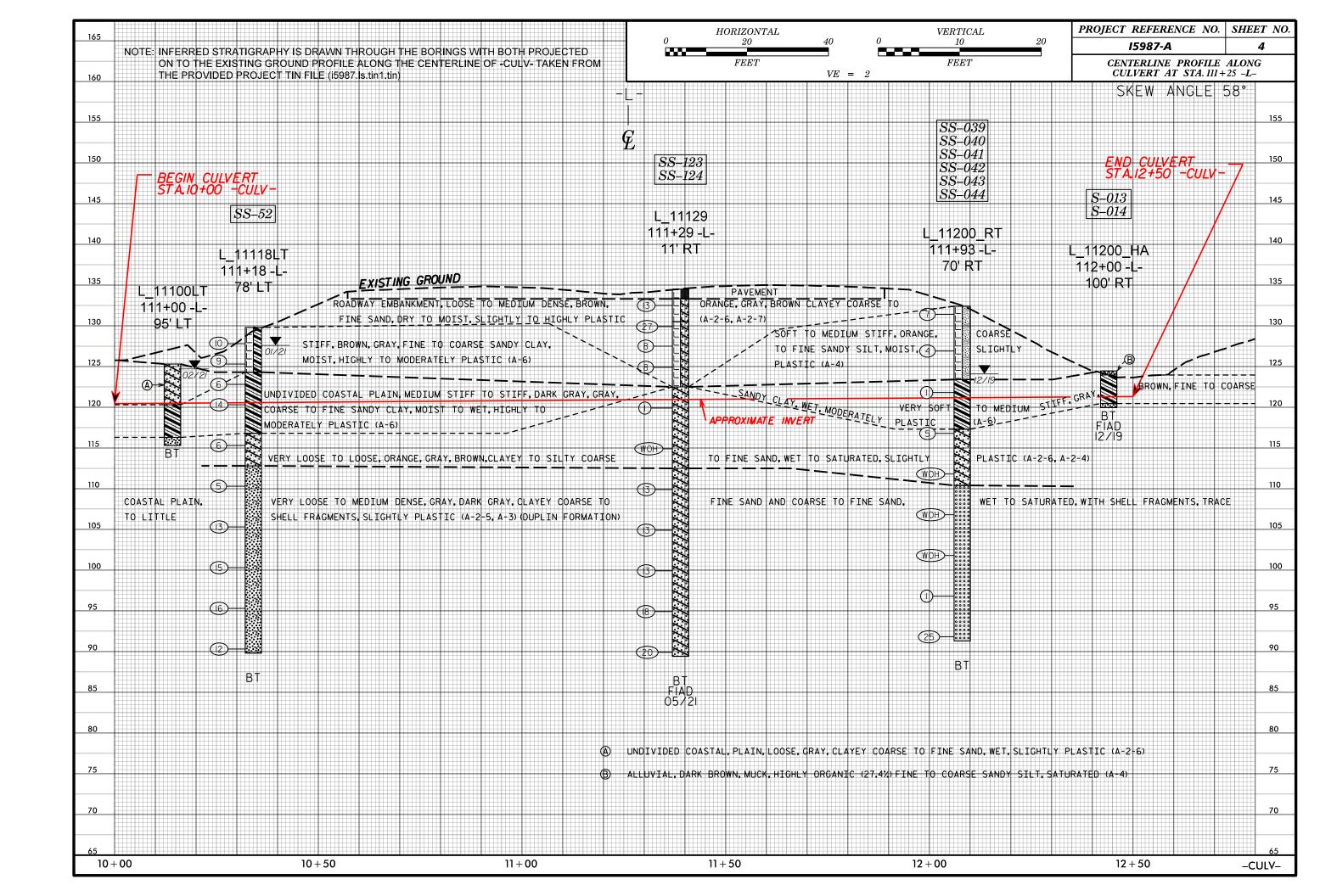
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

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	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAID LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
LLASS. (\$ 35% PASSING "200) (> 35% PASSING "200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4 A-5 A-6, A-7 A-6, A-7	COMPRESSIBILITY	NON CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE,
000000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT- MUCK.	PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN SOILS SOILS SOILS	GRANULAR SILT - CLAY	WEATHERING	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
"2000 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50115 WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PI 6 MX NP I W MX II MN II MN II MN II MN II MN II I MN II MN MODERATE OPCANIC	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W 4 MX 8 MX 12 MX 16 MX NU MX AMUUNIS UF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STUNE FRAUS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK.	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
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
PANCE OF STANDARD PANCE OF LINCONFINED	ET	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES CLUNK SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION WITH SOIL DESCRIPTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE 44	1 ¹	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SUPPLIMITED THE STRING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING COME PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	I HAN RUADWAY EMBANKMENT	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT	── INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) 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 < 100 BPF</i>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MW MONITORING WELL TEST BORING	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	WITH CORE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	11050 N. T. S. TOD O SEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7d - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
<u>'</u>	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	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.
LL LIQUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC SEMISOLID: REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATION ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tinl.tin)
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	DATED 5/6/2021 ELEVATION: N/A FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
DECILIDES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	6° CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.008 FEET THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	X CME-55 (CAT4425)	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGHLY PLASTIC 26 OR MORE HIGH	POSTABLE HOLES	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNGCARB.	CRAING ARE DIFFICULT TO SEPARATE WITH STEEL BRODE.	
DECCRIPTIONS MAY INCLUDE COLOR OR COLOR COMPRIATIONS (TAN DED. VELLOU DROVER COLOR	X DIEDRICH D-50 (TER299)	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
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.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
	N HOULLOW SIEM HOUSEKS	SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14





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WBS 4	7533.1.	2		Т	IP I-59	87A		CC	DUNT	YR	ROBE	SON					GEO	LOGI	ST F	FARN	ΛER, Ι	B. C.				'	WBS	S 47	533.1	1.2			T	TIP	I-598	37A		C	COUNT	TY I	ROBES	ON			(GEOL	.OGIST	DE	GON,	A. N.				
SITE DE	SCRIP	TION C	ULVE	RT AT	STA. 11	+25 -	L- UNI	NAME	ED TF	RIBU	TARY	′ TO	SADI	DLE.	TRE	E SV	VAMF	<u> </u>					GRO	DUND	WTR	(ft)	SITE	E DES	CRIF	MOIT	CUL	_VER	T AT	STA	A. 111·	+25 -	L- UN	NAN	1ED T	RIBL	JTARY	TO SA	DDL	ETRE	EE SW	/AMP					GRO	'DUND	WTR	(ft)
BORING	NO. I	11100	LT	s	TATION	111	+00			OF	FSET	95	ft LT				ALIG	NME	NT -	-L-			0 H	IR.	(0.8	BOF	RING	NO.	L_11	118LT	•	8	STA	TION	111	+18			OF	FSET	78 ft L	Т		/	ALIGN	MENT	-L-			0 H	R.	Cav	ved
COLLA	R ELEV	125.3	ft	Т	OTAL D	EPTH	10.0	ft		NO	RTHII							TING	1,99	98,48	4		24 H	IR.	-	0.6	COL	LAR	ELE\	/ . 12	9.8 ft		1	тот	TAL DE	PTH	40.	0 ft		NC	ORTHIN	I G 336	,290)	I	EASTI	ING 1	,998,5	505		24 H	R.		2.2
DRILL RI	G/HAMM	ER EFF./I	DATE	N/A								D	RILL I	METH	HOD	Han	d Auge	er			Н	HAMM	ER TY	PE N	V/A	!	DRIL	L RIG/	HAMI	IER EF	F./DA	TE T	ER299	DIE	EDRICH	D-50	79%	12/31	/2020			DRILI	ME1	THOD	Mud F	Rotary				HAMI	IER TY	PE Au	ıtomat	tic
DRILLE					TART D	ATE	02/08/	/21		СО	MP. C	ATE	02/	08/2	21	\perp	SUR	FACE	WAT	TER D	EPTH	H N/	/Α			'	DRII			RNAG				STA	RT DA	TE	01/1	2/21		CC	OMP. D	ATE 0	5/18/	/21	_ {	SURF	ACE W	ATER	R DEP	TH N	/A			
[/ft] E		"'''	SLOW C	OUNT ft 0.5ft	0	25	BLOWS	S PER 50	FOOT	- 75 	10		NO.	17	′ C		ELEV. (SOIL	. AND	ROCK	DESC	CRIPT	ION	DEPT		ELEV (ft)	/ DRI' ELE (ft	≣V Ľ	EPTH (ft)		0.5ft	O.5ft	it (0	25		VS PEI 50	R FOO	T 75	10	SAM NO		MOI	C G			OIL AN	ND ROO	CK DES	CRIPTI	ON		
		(ft) 0.8	5ft 0.5	ft 0.5ft							10		NO.				ELEV. (LOO SAI	UNE DIVIN S SAND MOI OSE, (GRODIVIDE FRAY, /ET, S STIFF DY CL DERA GRAY SAN ermina	DUND SED CO. CLAYELIGHTI , GRAY, WI TELY I , SILTY ID, WE ted at I	SURFA ASTA EY CO LY PL Y, COA ET, H PLAS Y COA ET (A-2	ACE IL PLA DARSE ASTIC ARSE IGHLY TIC (A ARSE 2-4) tion 11	TO FIN (TO FIN (TO FIN (TO FIN	NE 6)		130 125 120 115 110 105 95 90	128 126 123 121 116	3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -	1.0 3.5 6.0 8.5 13.5	2 4 3 6 3 7 7 6 6	0.5ft 4 5 3 7 5 6	0.5ft		0						100	SS-5	S S S	MOI MM MM MM MM MM MM MM MM MM MM MM MM MM	12 12 12 12 12 12 12 12 12 12 12 12 12 1		STIFF, SAND MEDII GRAY WE LOOSI ORANG WE FI	GF ROAD BROWN BROWN WINDIVI UM ST (, FINE IT, MOI SE TO YEY FINE TO: CEY FOR TO: E TO MGE, GR GE, GR GE, GR GE, GR GE, GR	ROUNE DWAY I WN, GR Y, MOI IDED C IFF TO CO DERAT MEDIL NE TO O SATUR COAST UR ENTS, FORM G	D SURREMBATE OF SURFINE ST. HILL ST. HI	ACE IKMENT ISE TO C GHLY P ALPLA , DARK , SANDY , ASTIC ISE, BF E SANI A-2-6) TO FIN MITH S CE SHE ((DUPL)	TCOARSILASTIC IN GRAY, CLAY, (A-6) ROWN, D, WET DWNISH E SANI HELL ELL ELL	 	0.c
JOOI BORE DOUBLE 1998/A GEO CULV L-111+25 BH TERKACON.GF																																																						

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SHEET 5 OF 8

WBS	47533	3.1.2			Т	IP I-5987A	COUNTY	' ROBESC)N			GEOLOGIST DEGO	N, A. N.		
SITE	DESCR	IPTION	ı CU	LVER	TATS	STA. 111+25 -L- UNNA	MED TR	IBUTARY T	O SADI	DLETF	REE S	SWAMP		GROUN	ID WTR (ft)
BOR	ING NO.	L 11	1129		S	TATION 111+29		OFFSET	11 ft RT			ALIGNMENT -L-		0 HR.	N/A
COLI	LAR ELI	 EV. 13	34.5 ft		T	OTAL DEPTH 45.1 ft		NORTHING	336,2	.77		EASTING 1,998,593		24 HR.	FIAD
DRILL	RIG/HAI	MMER E	FF./DA	TE TI	 ER299	DIEDRICH D-50 79% 12/	31/2020		DRILL N	ЛЕТНО	D M	ud Rotary	HAMN		Automatic
DRIL	LER T	URNA	GE, J.	R.	S	TART DATE 05/17/2	1	COMP. DA				SURFACE WATER DE	PTH N	/A	
ELEV	DRIVE	DEPTH	BL	ow co	UNT	BLOWS F	ER FOOT		SAMP.		1 [
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25 5	io .	75 100	NO.	МОІ	0 I G	SOIL AND R	OCK DES	CRIPTION	
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	133.5	1.0	-		-							133.3 A	SPHALT		0.0
	130.9	3.6	7	6	7	13.				D		ROADWA MEDIUM DENS			E,
130	_	<u> </u>	10	12	15	27				D		GRAY, CLAYEY (DRY, SLIGH	COARSE 1	O FINE SA	
	128.5	6.0	3	3	5					М		LOOSE TO ME	DIUM DE	NSE, GRAY	
125	125.9	8.6	2	3	5							BROWN, ORANG FINE SAND, DF	RY TO MO	IST, HIGHL	
120	-	<u> </u>	4	3)	8		1	SS-123	21%		– PLA ·	STIC (A-2-	7)	
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120	120.9	13.6	WOH	WOH	1	<u> </u>				Sat.		VERY LOOSE COARSE TO FIN	, ORANG	E, CLAYEY	
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	115.9 -	18.6													
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	90.9	43.6				::::{ :::::						•			
90	90.9	43.6	9	8	12	20				Sat.		- 89.4			45.1
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	BORE LOG					_
WBS 47533.1.1 TIP 1-5987 COUNT	TY ROBESON/CUMBERLAND GEOLO	GIST K. SWAIN	WBS 47533.1.1 TIP	P I-5987 COUNTY ROB	BESON/CUMBERLAND	GEOLOGIST K. SWAIN
SITE DESCRIPTION CULVERT AT STA. 111+25 -L- UNNAMED TE	RIBUTARY TO SADDLETREE SWAMP	GROUND WTR (ft)	SITE DESCRIPTION CULVERT AT STA	TA. 111+25 -L- UNNAMED TRIBUTA	ARY TO SADDLETREE SI	WAMP GROUND WTR (ft)
BORING NO. L_11200_HA STATION 112+00	OFFSET 100 ft RT ALIGNN	ENT -L- 0 HR. N/A	BORING NO. L_11200_RT STA	TATION 111+93 OFFSE	SET 70 ft RT	ALIGNMENT -L- 0 HR. 12.3
COLLAR ELEV. 124.5 ft TOTAL DEPTH 4.5 ft	NORTHING 336,322 EASTIN	3 1,998,698 24 HR. FIAD	COLLAR ELEV. 132.4 ft TOT	DTAL DEPTH 41.1 ft NORTH	THING 336,323	EASTING 1,998,667 24 HR. 8.3
DRILL RIG/HAMMER EFF./DATE HAND AUGER	DRILL METHOD Hand Auger	HAMMER TYPE N/A	DRILL RIG/HAMMER EFF./DATE CAT4425 CM	CME-55 87% 01/16/2019	DRILL METHOD H.S	S. Augers HAMMER TYPE Automatic
DRILLER K. SWAIN START DATE 12/27/19	COMP. DATE 12/27/19 SURFAG	E WATER DEPTH 0.5ft	DRILLER J. EDMONDSON STA	COMP	P. DATE 12/18/19	SURFACE WATER DEPTH N/A
ELEV (ft)	T SAMP.	SOIL AND ROCK DESCRIPTION DEPTH (ft)	ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP	BLOWS PER FOOT 0 25 50 75	100 NO. MOI G	SOIL AND ROCK DESCRIPTION
120 120	S-014 21% W 120.5 W 120.0	ALLUVIAL ARK BROWN, MUCK, HIGHLY ORGANIC 27.4%) FINE TO COARSE SANDY SILT, SATURATED (A-4) UNDIVIDED COASTAL PLAIN RAY, FINE TO COARSE SANDY CLAY, WET, MODERATELY PLASTIC (A-6) ROWN, SILTY FINE SAND, WET (A-2-4) oring Terminated at Elevation 120.0 ft IN IDIVIDED COASTAL PLAIN SILTY SAND	135	0°	SS-040 W SS-041 28% SS-042 Sat. SS-042 Sat.	132.4 GROUND SURFACE ROADWAY EMBANKMENT SOFT TO MEDIUM STIFF, ORANGE, COARSE TO FINE SANDY SILT, MOIST, SLIGHTLY PLASTIC (A-4) 123.4 UNDIVIDED COASTAL PLAIN VERY SOFT TO MEDIUM STIFF, GRAY, BROWN, FINE TO COARSE SANDY CLAY, WET, MODERATELY PLASTIC (A-6) 117.3 VERY LOOSE TO LOOSE, GRAY, BROWN, CLAYEY COARSE TO FINE SAND, WET, SLIGHTLY PLASTIC (A-2-6) 110.4 COASTAL PLAIN VERY LOOSE TO MEDIUM DENSE, DARK GRAY, GRAY, SAND, SATURATED TO WET, TRACE TO LITLLE SHELL FRAGMENTS (A-3) (DUPLIN FORMATION) 91.3 Boring Terminated at Elevation 91.3 ft IN COASTAL PLAIN SAND (DUPLIN FORMATION) 41.1

LABORATORY TESTING SUMMARY

COUNTY: ROBESON PROJECT NUMBER: 47533.1.2 **TIP:** I-5987A

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

Sample			Offset	Depth	AASHTO				% by V	Veight		%	% Pa	ssing (si	eves)		%
Sample No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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	

Certified Lab Technician Signature

114-01-1203 Certification Number

Sample			Offset	Depth	AASHTO				% by \	Veight		%	% Pa	ssing (si	eves)		%
No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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

Certified Lab Technician Signature

Unknown - Catlin Engineers and Scientists Certification Number

5987 REFERENCE

4

STATE OF NORTH CAROLINA

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

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY	ROBESON
PROJECT DESCRIPTION	<i>I–95 IMPROVEMENTS</i>
FROM SOUTH	OF US 301 (EXIT 22) TO
NORTH OF SR 1758	(McDUFFIE CROSSING RD.)
SITE DESCRIPTION	SITE 11 – CULVERT AT
STA. 310 + 73 - L - O	OVER TENMILE SWAMP

STATE PROJECT REFERENCE NO. 9 I-5987A

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 1991 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 SUBSUFFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORCHOLE. 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 METHOL. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE OR 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 SATISTY 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 BY 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. B. PAINTER (F&R, Inc.)

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DATE

AUGUST 2021

Prepared in the Office of: llerracon **Consulting Engineers and Scientists**



Matt Alexander

8/30/2021

-0FB0038EEA06452 SIGNATURE

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PROJECT REFERENCE NO. SHEET NO.

1–5987A

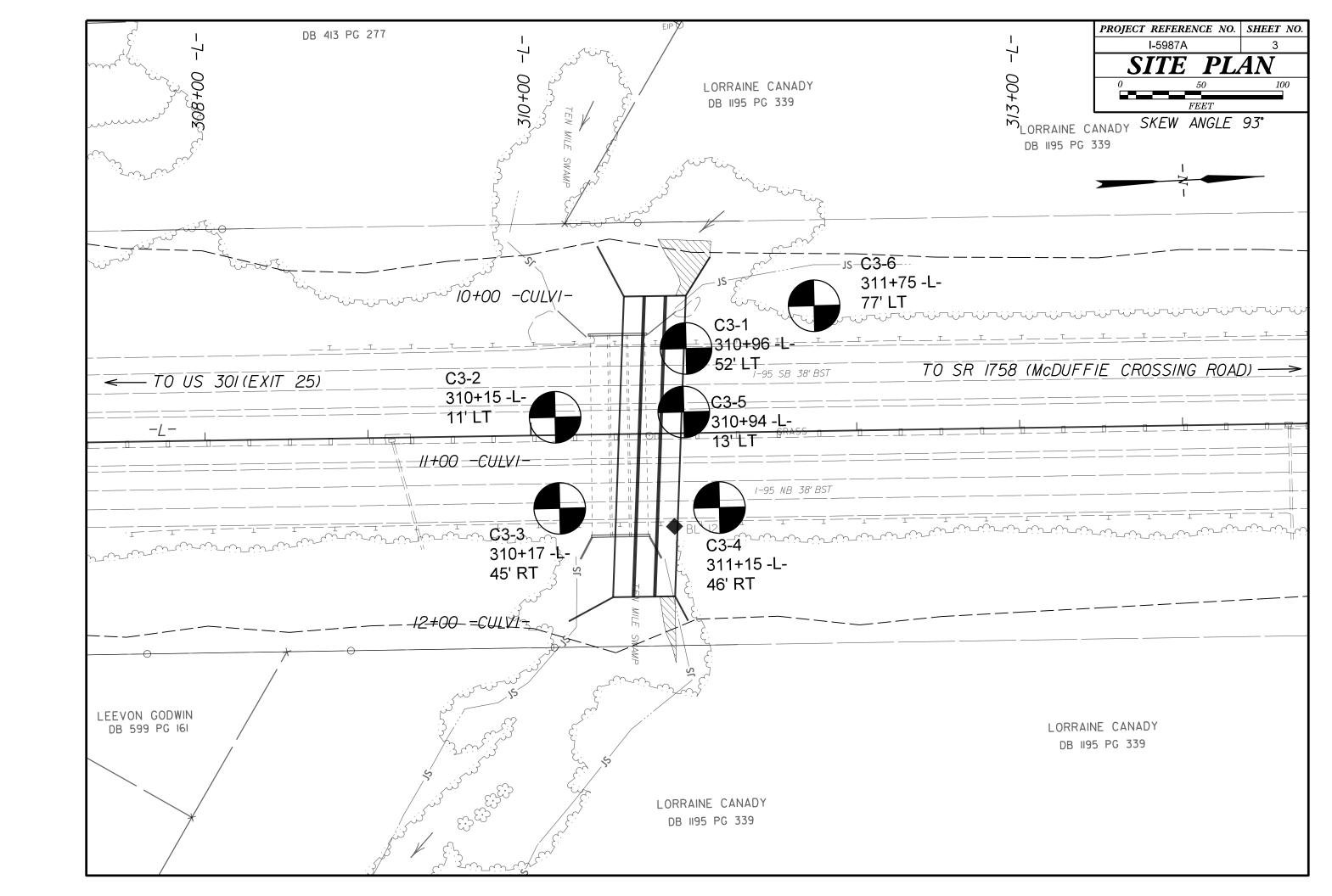
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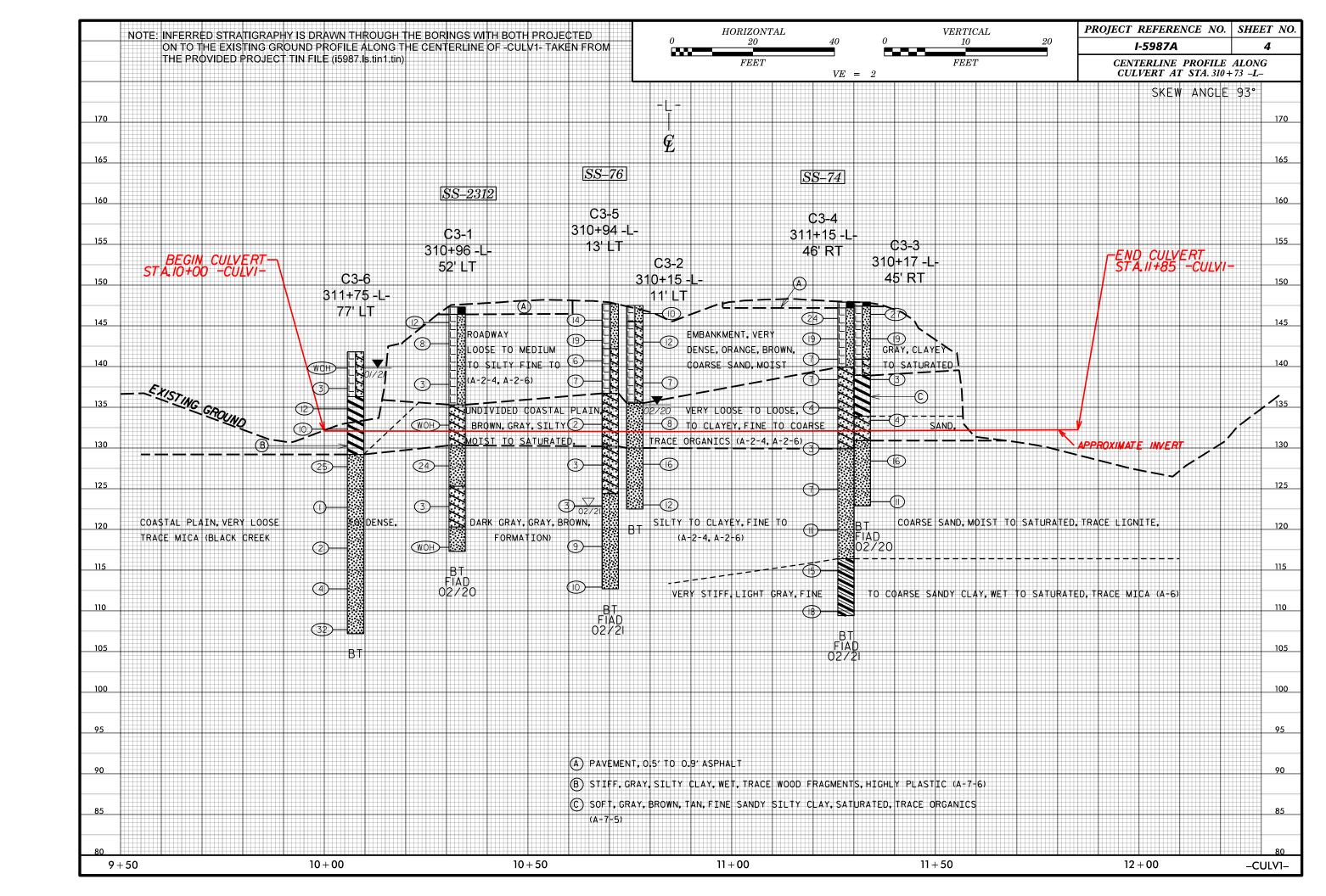
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

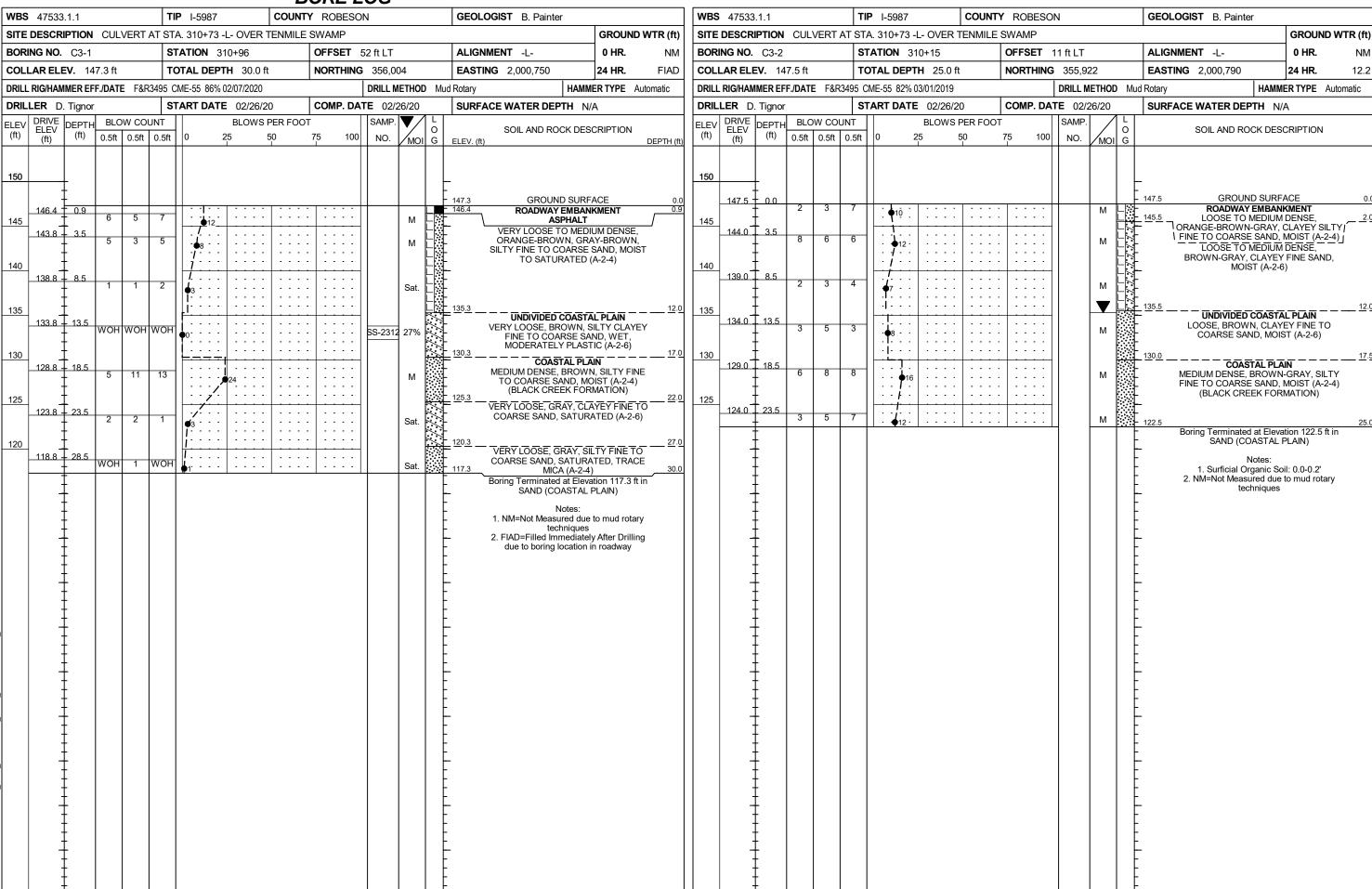
SUBSURFACE INVESTIGATION

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION		ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
LLASS. (\$\(\Sigma\) 75% PASSING *2000) (> 35% PASSING *2000)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4-3-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
000000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
% PASSING GRANULAR SILT- MUCK,	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 38 MX 58 MX 51 MN SILS SOILS SOILS SOILS	GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
"200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL DISSIPA A CO	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
PASSING *40	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI,) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAYEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
CEN PATING	\to \frac{-\documents}{\sqrt{PW}} \to PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	□ 25,425	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION WITH SOIL DESCRIPTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE 4 4	┫ ╚ᆛ	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL OPT ONT TEST BORING SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	
MATERIAL MEDIUM DENSE 10 TO 30 N/A MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT THOUGH BURING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	TINFERRED SOIL BOUNDARY - CORE BORING ■ SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	INFERRED ROCK LINE MONITORING WELL WITH CORE	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	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	FIEZOMETER → SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
HARD > 30 > 4		ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW STELL EYCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA, - MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC γ - ONLY WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTORE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TARLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID. PEOLITICE DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WEI - (W) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATIONS
""PLL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tinl.tin)
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	DATED 5/6/2021 ELEVATION: N/A FEET
SL _ SHRINKAGE LIMIT		MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDATELY AFTER DRILLING
ATTAIN OPTIMUM MOISTURE	X CME-55 (F&R3495) 6° CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8* HOLLOW AUGERSBH	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITSN	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
	TUNGCARRIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
NON PLASTIC 0-5 VERY LOW		SERVED SEGRED I HAMMEN DISTRICTORATES SAMELES.	
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:	CDAING CAN DE CEDADATED EDOM CANDIE MATERIALE	
SLIGHTLY PLASTIC 6-15 SLIGHT	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	ZASING WY ADVANCER POST HOLE DIGGER TRICONE 215/6 STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH COLOR	ACASING W/ ADVANCER POST HOLE DIGGER		
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING W ADVANCER POST HOLE DIGGER	BREAKS EASILY WHEN HIT WITH HAMMER. INDUBATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	DATF: 8-15-14

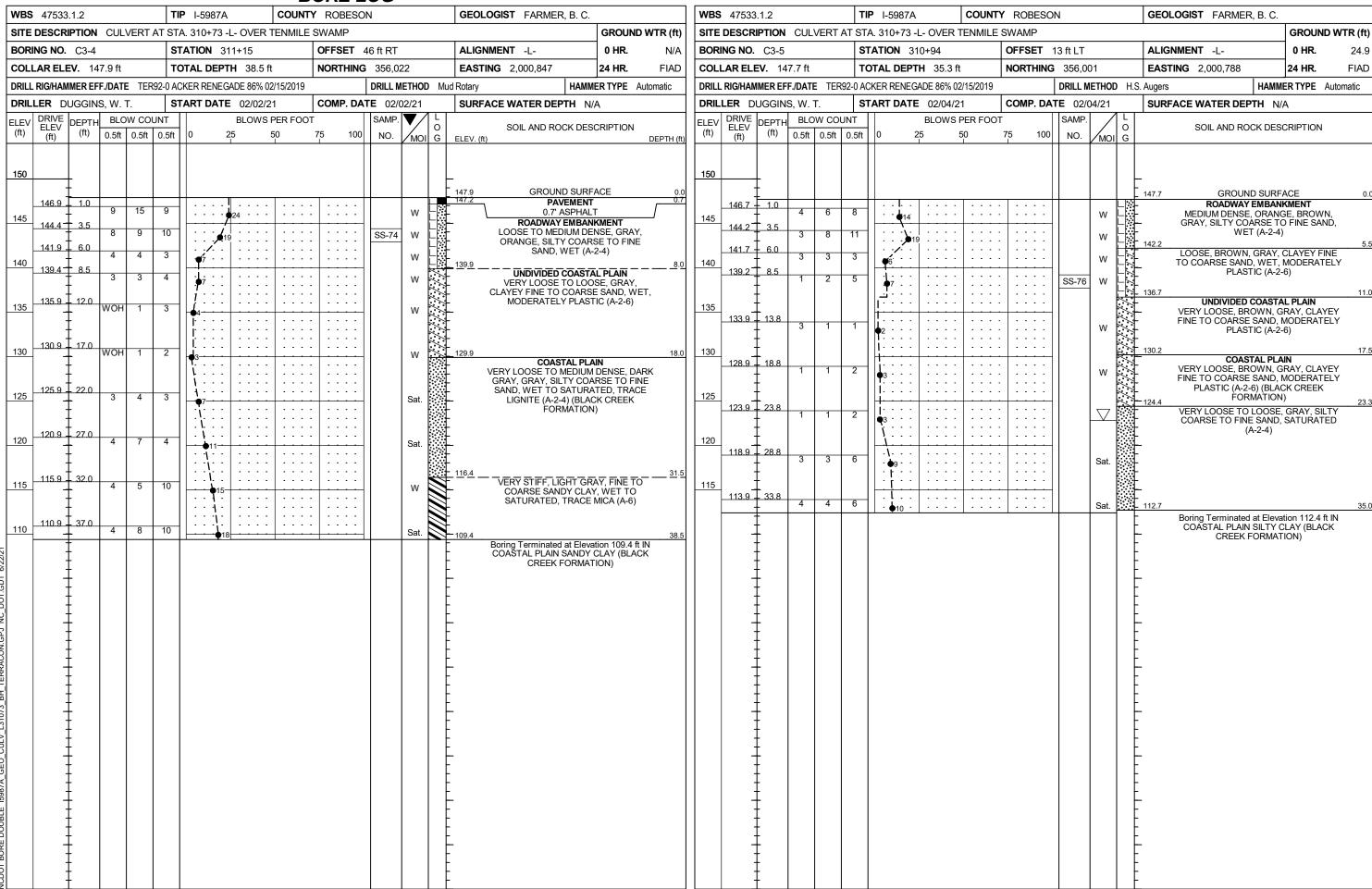






SHEET 6 OF 9

WBS	47533	3 1 1			ТІ	P I-5987		COUNTY	' ROBESC	N			GEOLOGIS	ST W. Pesl			
			CUL	VERT		A. 310+73 -L-				· ·			1			GROUN	ID WTR (ft)
	NG NO.					TATION 310			OFFSET	45 ft RT			ALIGNMEI	NT -L-		0 HR.	NM
	AR ELI		17.9 ft			OTAL DEPTH			NORTHING		24			2,000,846		24 HR.	FIAD
DRILL	. RIG/HAN	MER EF	F./DAT	E F&F	I R3495 C	CME-55 82% 03/	/01/2019			DRILL M) Mu	 d Rotarv		НАММ	R TYPE	Automatic
	LER D					TART DATE)	COMP. DA				 	WATER DEF			
ELEV	DRIVE	DEPTH	T	W CO	UNT		BLOWS F	ER FOOT		SAMP.			-1	COIL AND DO		CDIDTION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	5	0	75 100	NO.	моі	O G		SOIL AND RO	CK DES	JRIPTION	
150													_				
	1474												- 147.9		D SURF		0.0
	147.4	0.5	13	13	14		27				М		. 147.4	ROADWAY AS	EMBANI PHALT	KMENT	0.5
145	144.4	3.5	9	9	10	/			<u> </u>		١.,			DIUM DENSE, TY FINE TO C			
		‡			10	• 19					M				A-2-4)	,,	
140	139.4	8.5				-							<u>140.9</u> <u>M</u> EI	DIUM DENSE,	GRAY BI	ROWN, S	LTY 7.0
	153.4	- 0.5	2	2	1	<u></u> -					Sat.			LAYEY FINE S UNDIVIDED			6) 9.0
405		‡											. 9	SOFT, GRAY, I SANDY SILTY (BROWN,	TAN, FIN	E
135	134.4	13.5	WOH	3	1						Sat.		133.9	TRACE OR	GANICS	(A-7-5)	14.0
		‡	""			•4 ·\					Sal.		. F	OSE, GRAY-BE FINE SAND, SA	TURATE	D, TRAC	E
130	120.4	18.5				. \							<u>_ 130.9</u>		NCS (A-2 TAL PLA		<i></i> <u>17.0</u>
	123.4	10.5	5	7	9	16					Sat.			OIUM DENSE, T AND, SATURA	AN-GRA	Y, SILTY	
405		‡				::/::							•	CREEK			
125	124.4	23.5	3	5	6						Sat.		<u>-</u> ·				
		‡	+ -	ļ -		<u> . •</u> 11 .		l	1	+	Sat.		122.9 Bor	ing Terminated			25.0 ft in
	-	‡											- -	SAND (CC		PLAIN)	
		‡											· 1.	۱ NM=Not Meası	lotes: ired due	to mud ro	ary
		‡											· 2. I	tec FIAD=Filled Im	hniques mediatelv	After Dril	lina
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SHEET 8 OF 9

WBS	47533.	.1.2			TI	I P I-5987A		COUNTY	' ROBESO	DN			GEOLOGIST FARMER, B. C.		
			CUL	VERT.	_	A. 310+73 -L-							,	GROUND W	TR (ft)
BORI	NG NO.	C3-6			s	TATION 311-	+75		OFFSET	77 ft LT			ALIGNMENT -L-	0 HR.	N/A
	AR ELE		1.8 ft		-	OTAL DEPTH			NORTHING		83		EASTING 2,000,725	24 HR.	2.0
				F TFR		CKER RENEGAD		I 15/2019		DRILL METHOD H.S			·	ER TYPE Autor	
	LER DI					TART DATE			COMP. DA			7 11.0.	SURFACE WATER DEPTH N//		11000
	DDI\/E	DEPTH	I	W COI				ER FOOT		SAMP.	7	1 L T	SON ACE WATER DEFITT 14//	<u> </u>	
(ft)	ELEV (ft)	(ft)	0.5ft		0.5ft	0 25	50		75 100	11	MOI	O G	SOIL AND ROCK DESC	CRIPTION	
145		-										<u> </u>			
	1	-										Ŀ	141.8 GROUND SURFA	ACE	0.0
140	140.8	- 1.0	WOH	1	WOH								ROADWAY EMBANI VERY LOOSE, ORANGE, T	KMENT	
	138.3	3.5] [1				1	_		COARSE TO FINE SAI	ND, WET,	
	1	-	WOH	1	2	3					W		SLIGHTLY PLASTIC 136.3	(A-2-6)	5.5
135	135.8	- 6.0 -	3	5	7	 				41	w		UNDIVIDED COASTA STIFF, GRAY, SILTY CLAY,		
	133.3	8.5	1	5	5	: [::					\ ,,,		WOOD FRAGMENTS, HIG	HLY PLASTIC	
	1	-				. •10 .	 				W	1	(A-7-6)		
130	128.7	- - 13.1							+	1			129.2		12.6
	120.7	- 13.1	8	10	15		5				w	III.	COASTAL PLA VERY LOOSE TO DENSE		
125		-				::://			: : : :				DARK GRAY, SILTY COAF SAND, WET TO SATU	RSE TO FINE	
120	123.7	- - 18.1] /			1	1			INTERBEDDED CLAY LAY	YERS (A-2-4)	
	1	-	1	1	0	1: : : :					Sat.		(BLACK CREEK FORI	MATION)	
120	1	-										-			
	118.7	- 23.1	1	1	1]		F			
	1	-	'	'	'	• · · · ·					Sat.				
115		-				1			1	11		_			
	113.7	- 28.1 -	2	2	2		· · · ·				Sat.				
	1	-					: : : :				Jun				
110	100.7	-							ļ	-		<u> </u>			
	108.7	- 33.1 -	10	14	18	:::::`\	•32 · ·				Sat.		107.2		34.6
							♥ 32 · · ·				Sal.		Boring Terminated at Elevat COASTAL PLAIN SILTY S CREEK FORMAT	AND (BLACK	34.6

LABORATORY TESTING SUMMARY

 PROJECT NUMBER:
 47533.1.2
 TIP:
 I-5987A
 COUNTY:
 ROBESON

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

			Offset	Depth	AASHTO				% by \	Neight		%	% Pa	ssing (si	eves)	0/_	%
Sample No.	Station	Alignment	(feet)	Interval	Class.	L.L.	P.I.	Coarse	Fine	Silt	Clay	Retained	#10	#40	#200	Moisturo	
			(ieet)	(feet)	Class.			Sand	Sand	Silt	Clay	#4 Sieve	#10	#40	#200	Moisture	Organic
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		

Certified Lab Technician Signature

114-01-1203 Certification Number

			Offset	Depth	AASHTO				% by \	Neight		%	% Pa	ssing (si	eves)	0/	0/2
Sample No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	Moisture	Organic
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

59874 REFERENCE

S 4

STATE OF NORTH CAROLINA

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

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

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

STATE PROJECT REFERENCE NO. TOTAL SHEETS I-5987A

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 1991 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS INTO COLLIBATIC 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 SATISTY 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

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	TIGNOR, D. (F&R, Inc.)
	PESL, W. (F&R, Inc.)
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DATE	SEPTEMBER 2021

Prepared in the Office of: Consulting Engineers and Scientists

RALEIGH, NORTH CARÓLINA 27604 C REGISTERED ENGINEERING FIRM: F-0868 NC REGISTERED GEOLOGIC FIRM: C-367



Matt Alexander

10/19/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

1–5987A

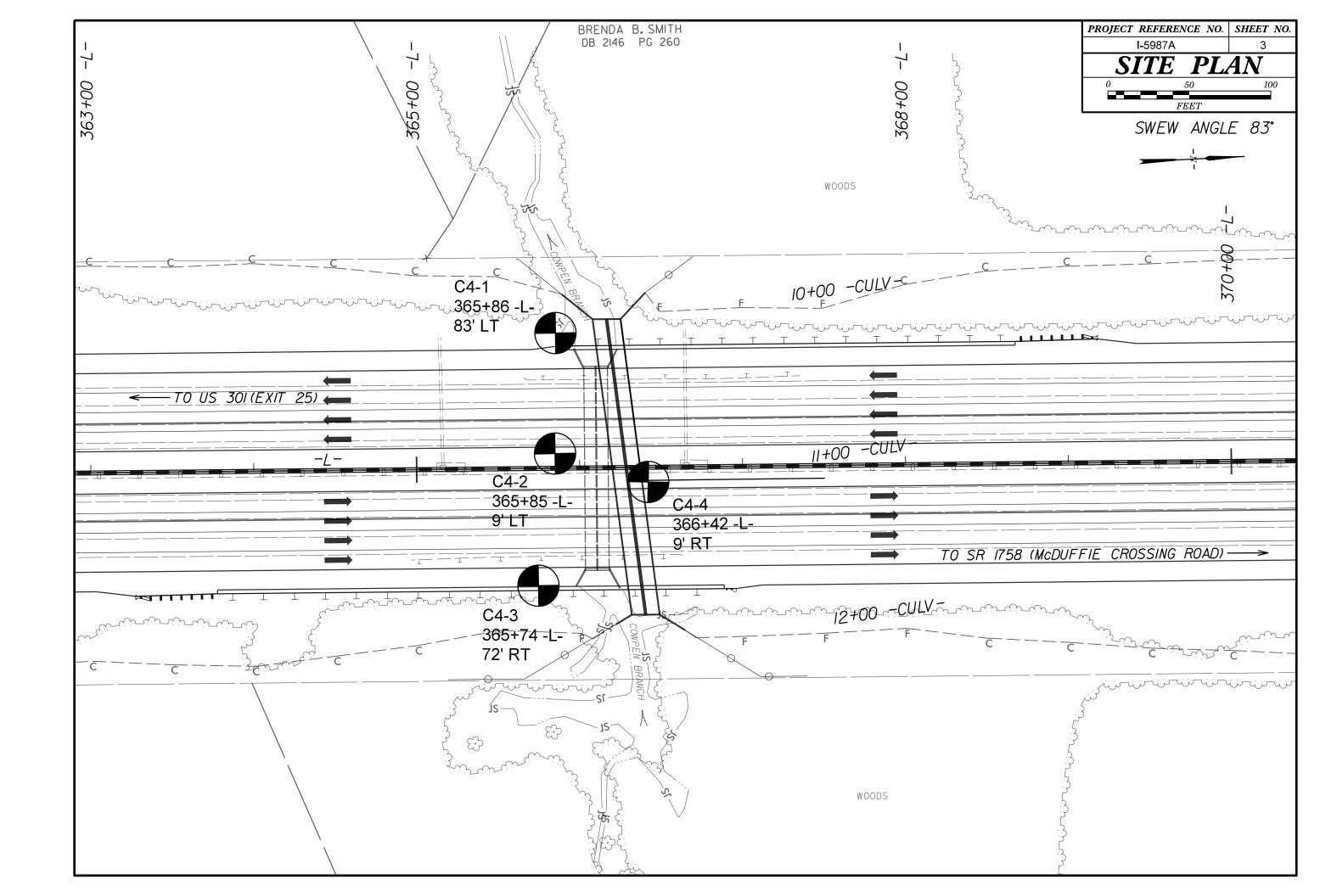
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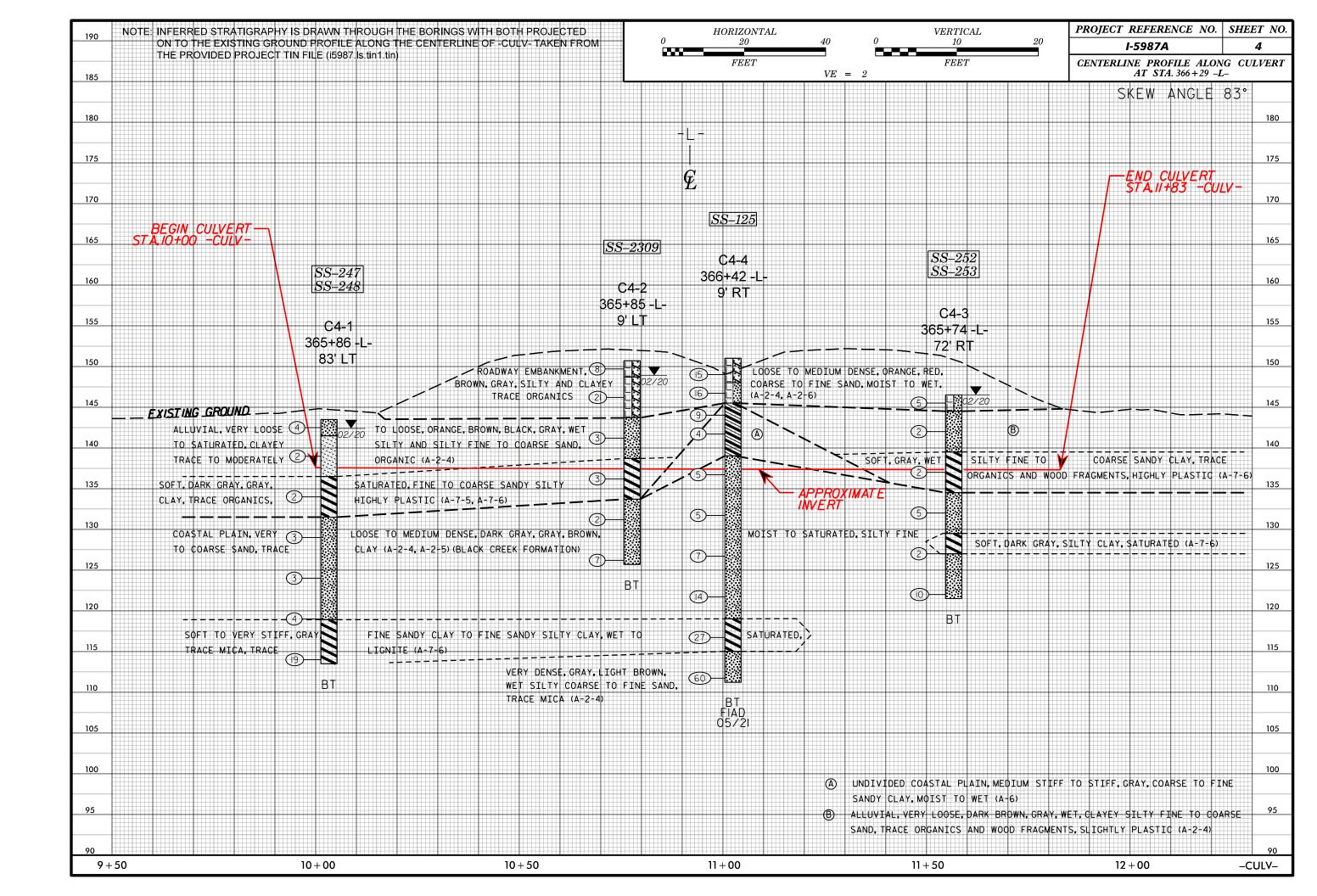
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

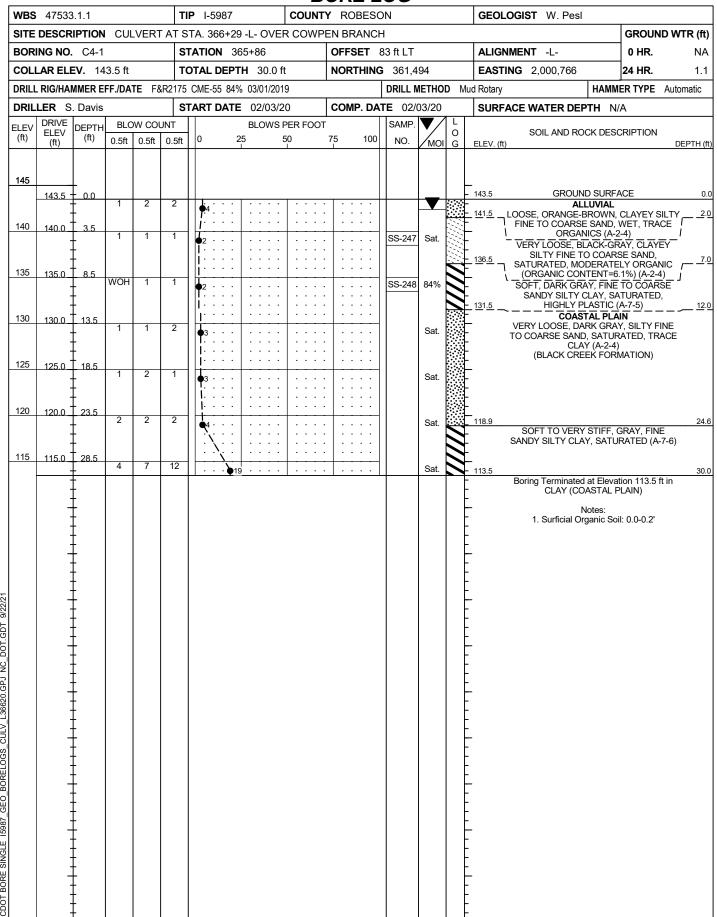
SUBSURFACE INVESTIGATION

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	UNCISS, UNBERU, SURISI, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY	NON-LAYSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	0F SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK STYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
■ 10 50 MX GRANULAR SIL1- MUCK,	PERCENTAGE OF MATERIAL	CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
#40 30 MX 50 MX 51 MN SOILS	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL — — 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR LITCHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
CROUP INDEX A A A MY 8 MY 12 MY 16 MY MO MY AMOUNTS OF ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USIAL TYPES STONE FRACS ORGANIC SUILS	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND CAMP SOUR SOUR SOUR SOUR	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	<u> </u>	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN, RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNIESS OF RANGE OF STANDARD RANGE OF UNCONFINED	ET	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) STORES DIP & DIP DIRECTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE 4	- 1 '	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GRANIII AR LOOSE 4 TO 10	SOIL SYMBOL SIDE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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
MATERIAL DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN PRADUALY EMBANGMENT AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN ROADWAY EMBANKMENT THAN ROADWAY EMBANKMENT	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	───── INFERRED SOIL BOUNDARY ————————————————————————————————————	(V SEV.) 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 < 100 BPF</i>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	A DIEZOMETED	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK,
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCOI WASUITABLE WASTE	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND (SL.) (CL.) (BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.)		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
	ABBREVIATIONS AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC LIQUID LIMIT COUNTY COUNT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) SEMISULIDI REDUIRES DRYING TO	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATIONS
(PI) PL _ PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tinl.tin)
- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	DATED 5/6/2021 ELEVATION: N/A FEET
OM _ OPTIMUM MOISTURE SL _ SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES:
REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
- DRY - (D) ATTAIN OPTIMUM MOISTURE	X CME-55 (F&R3495, 2175) G*CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	THE THELE INVINIEDIATELY AFTEN DINIELING
PLASTICITY	8* HOLLOW AUGERS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:		
HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG-CARB.	CRAINS ARE DISCIPLET TO SERARATE WITH STEEL PROPE.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMPLIATIONS (TAY OF DESCRIPTION OF DESCRIPTIONS)	X DIEDRICH D-50 (TER373)	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
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.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14







GEOTECHNICAL BORING REPORT BORE LOG

SHEET 5 OF 7

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WBS	47533	3.1.1			TI	P I-5987		C	OUNT	r ROB	ESC	N			GEOLOGIST B. Painter	
SITE	DESCR	IPTION	I CUI	_VER	ΓATS	TA. 366+	29 -L- C	OVER C	OWPE	EN BRA	NCH	ł				GROUND WTR (ft)
BOR	ING NO.	C4-2			S	TATION	365+85	5		OFFSE	T 9	ft LT			ALIGNMENT -L-	0 HR. NA
COL	LAR ELI	EV. 15	0.7 ft		TO	OTAL DE	PTH 2	5.0 ft		NORTH	IING	361,4	92		EASTING 2,000,840	24 HR. 1.8
DRILL	- RIG/HAI	MMER E	FF./DA	TE F8	R3495	CME-55 8	5% 02/07	7/2020				DRILL N	IETHO	D Mu	ud Rotary HAMM	ER TYPE Automatic
DRIL	LER D	. Tigno	r		S	TART DA	E 02/	26/20		COMP	DA	ΓE 02/2	26/20		SURFACE WATER DEPTH N/	A
ELEV	DRIVE	DEPTH	BLC	W CO	UNT		BLO	WS PER	FOOT			SAMP.	▼/	L	COUL AND DOOK DEGG	DIDTION
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50		75	100	NO.	/моі	O G	SOIL AND ROCK DESC	DEPTH (ft)
155																
	-	ļ.													-	
	-	‡													450.7 CROUND CLIDE	ACE AA
150	150.7 -	0.0	1	4	4	8-				—	=		_		150.7 GROUND SURFA ROADWAY EMBANI	
		35											_		_ <u>148.7</u>	
	147.2	3.5	6	7	14		 21	: : :					М		\ (A-2-6)	/
145	-	-				l				+					MEDIUM DENSE, GRAY, C SAND, WET, TRACE ORGA	
	142.2	8.5				i <u></u> -		:: :		: : :					ALLUVIAL	
140	-		1	1	2	4 3							W		VERY LOOSE, BROWN, SIL [*] WET (A-2-4)	IY FINE SAND,
140	-	ţ								<u> </u>					_ _ 138.7	12.0
	137.2	13.5	14/011			::::		:: :							SOFT, GRAY, SILTY CLAY, TRACE ORGANICS, HIGH	
135	-	+	WOH	2	1	Q 3	.	.			.	SS-2309	80%		(A-7-6)	22.66
	-	F				j									133.7	17.0
	132.2	18.5	1	1	1								W		COASTAL PLA VERY LOOSE TO LOOSE,	GRAY, SILTY
130	-	ţ	'	'	'	Q 2 · ·		· : :					VV		FINE SAND, MOIST TO V - (BLACK CREEK FORM	VET (A-2-4) MATION)
	-	t				$ \cdot ' $: : :							(22.10.1.0.1.22.1.1.0.1.1	
	127.2	23.5	2	3	4	.\ ♠7 .					.		М	Ŀ	125.7	25.0
	_	F				4 , .		, .		,					 Boring Terminated at Elevat 	ion 125.7 ft in
	-	‡													SAND (COASTAL F	'LAIN)
	:	ţ													Notes: 1. Surficial Organic Soi	l· 0 0-0 2'
	-	t												lE	-	0.0 0.2
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		BOKE LO	J		
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 (ff
BORING NO. C4-3	STATION 365+74	OFFSET 72 ft	RT	ALIGNMENT -L-	0 HR. N.
COLLAR ELEV. 146.5 ft	TOTAL DEPTH 25.0 ft	NORTHING 36	61,480	EASTING 2,000,921	24 HR . 0.
DRILL RIG/HAMMER EFF./DATE F&R	2175 CME-55 84% 03/01/2019		LL METHOD Mu	d Rotary HAM	MER TYPE Automatic
DRILLER S. Davis	START DATE 02/03/20	COMP. DATE	02/03/20	SURFACE WATER DEPTH	N/A
DRIVE DEPTH BLOW COUN	'		MP. L		
(#) ELEV (#)	0 25 50	75 100 N	O. MOI G	SOIL AND ROCK DE ELEV. (ft)	SCRIPTION DEPTH
150					
146.5 0.0	3 1 1		V	146.5 GROUND SUR ROADWAY EMBA	
145	φ ₅		W L	: <u>144.5</u> _ LOOSE, BROWN, CLA	YEY FINE TO
143.0 3.5 WOH 1	1	<u></u>	252 W	COARSE SAND, WET, TR	/
40 +	Y ²			ALLUVIAI VERY LOOSE, DARK B	
138.0 1 8.5				CLAYEY SILTY FINE TO WET, TRACE ORGANIC	COARSE SAIND, I
WOH 1	1 2		253 47%	FRAGMENTS, SLIGHTLY SOFT, GRAY, SILTY FIN	PLASTIC (A-2-4)
35				134.5 SANDY CLAY, WET TO	SATURATED, _ 1
133.0 7 13.5 2 2	3		Sat.	TRACE ORGANICS A	PLASTIC (A-7-6)
30	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		J Gar.	LOOSE, DARK GRAY, S	SII TY FINE TO
128.0 18.5	<u> </u>			COARSE SAND, TRACE (BLACK CREEK FO	
WOH WOH	2 2		Sat.	127.0 SOFT, DARK GRAY,	SILTY CLAY,
25	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			SATURATED (A VERY LOOSE TO MEDIUM	M DENSE, GRAY,
123.0 23.5 2 5	5		Sat.	SILTY FINE TO COA SATURATED (A-2-4)
+	10 . • 10		Sal	Boring Terminated at Elev	
				SAND (COASTAL	_ PLAIN)
				Notes: 1. Surficial Organic S	Soil: 0.0-0.1'
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GEOTECHNICAL BORING REPORT BORE LOG

SHEET 6 OF 7

			ORE LOG		
WBS 47533.1.2	2	TIP I-5987A COUNT	Y ROBESON	GEOLOGIST DEGON, A. N.	
SITE DESCRIPT	ION CULVERTA	AT STA. 366+29 -L- OVER COWF	EN BRANCH		GROUND WTR (ft)
BORING NO. C	4-4	STATION 366+42	OFFSET 9 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV.	151.0 ft	TOTAL DEPTH 39.8 ft	NORTHING 361,549	EASTING 2,000,857	24 HR. FIAD
DRILL RIG/HAMME	R EFF./DATE TER	373 DIEDRICH D-50 95% 02/06/2021	DRILL METHOD Mu	d Rotary HAMM	ER TYPE Automatic
DRILLER TURN	NAGE, J. R.	START DATE 05/17/21	COMP. DATE 05/18/21	SURFACE WATER DEPTH N	′A
ELEV DRIVE ELEV (ft) (ft)		BLOWS PER FOO 0.5ft 0 25 50	75 100 100 7 0	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)
155					
150 150.0 1	0			151.0 GROUND SURFA	
147.7 - 3.	3 4 7	9	M	MEDIUM DENSE, ORANG 148.0 GRAY, CLAYEY COARSE T MOIST (A-2-6	GE, BROWN, O FINE SAND,3.0
145 145.0 6	4 5	4		MEDIUM DENSE, ORAN BROWN, SILTY COARSE T MOIST (A-2-4	O FINE SAND, 1
142.7 + 8	3 2 2	2 4	SS-125 Sat.	UNDIVIDED COASTA MEDIUM STIFF TO ST COARSE TO FINE SANDY	IL PLAIN IFF, GRAY, CLAY, MOIST
137.7 + 13	4 2	3	Sat.	139.0 TO WET (A-6 COASTAL PLA LOOSE, BROWN, GRAY, S TO FINE SAND, SATURE (PLACE OFFER FORE	IN ILTY COARSE TED (A-2-4)
132.7 + 18	4 2	3	Sat.	· (BLACK CREEK FOR	WATION)
127.7 = 23	1.3 WOH 3	4	Sat		
125	13				
120	5 7	7	Sat	119.0	32.
117.7 + 33		16		VERY STFF, GRAY, SILTY TRACE MICA, TRACE LIG	SNITE (A-7-6) 36.
112.7 - 38	17 27	33	w	VERY DENSE, GRAY, LIG SILTY COARSE TO FII SATURATED, TRACE M Boring Terminated at Eleva	NE SAND, IICA (A-2-4)
				COĂSTAL PLAIN SILTY S CREEK FORMAT	AND (BLACK

LABORATORY TESTING SUMMARY

PROJECT NUMBER:	47533.1.2	TIP:	I-5987A	COUNTY:	ROBESON
•		-		-	

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

	Station	Alignment	Offset (feet)	Depth	AASHTO		P.I.		% by \	Veight		%	% Passing (sieves)				0/
Sample No.				Interval (feet)	Class.	L.L.		Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture O	% Organic
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	

Certified Lab Technician Signature

114-01-1203 Certification Number

			Offset (feet)	Depth	AASHTO Class.				% by W	/eight		%	% Passing (sieves)				%
	Station	Alignment		Interval (feet)		L.L.		Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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

59874 REFERENCE

4

STATE OF NORTH CAROLINA

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

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY	
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	

STATE PROJECT REFERENCE NO. I-5987A

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 1991 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED 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 SATISTY 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.

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

INVESTIGATED BY <u>TERRACON</u> CONSULTANTS

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AUGUST 2021

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8/30/2021

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

1–5987A

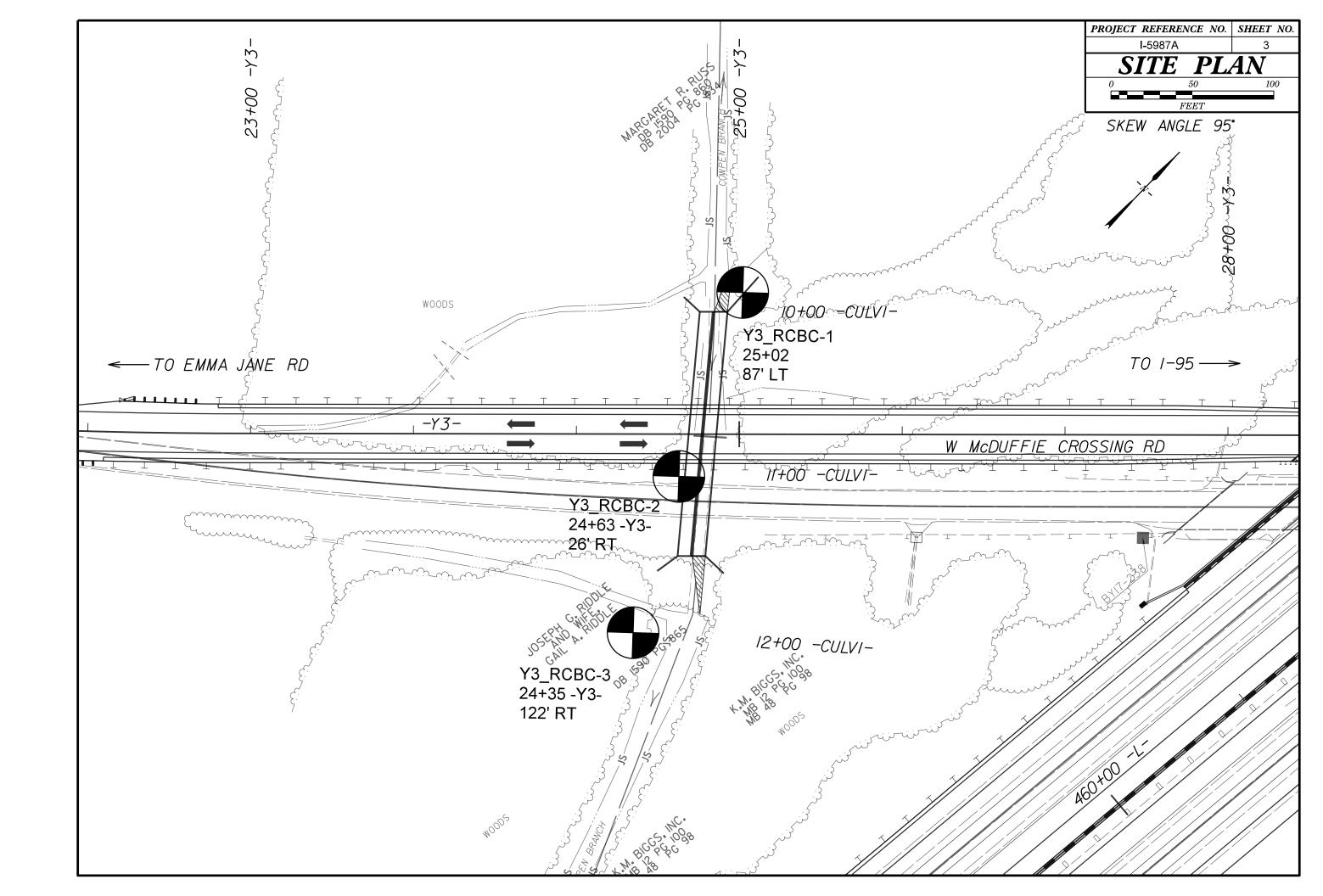
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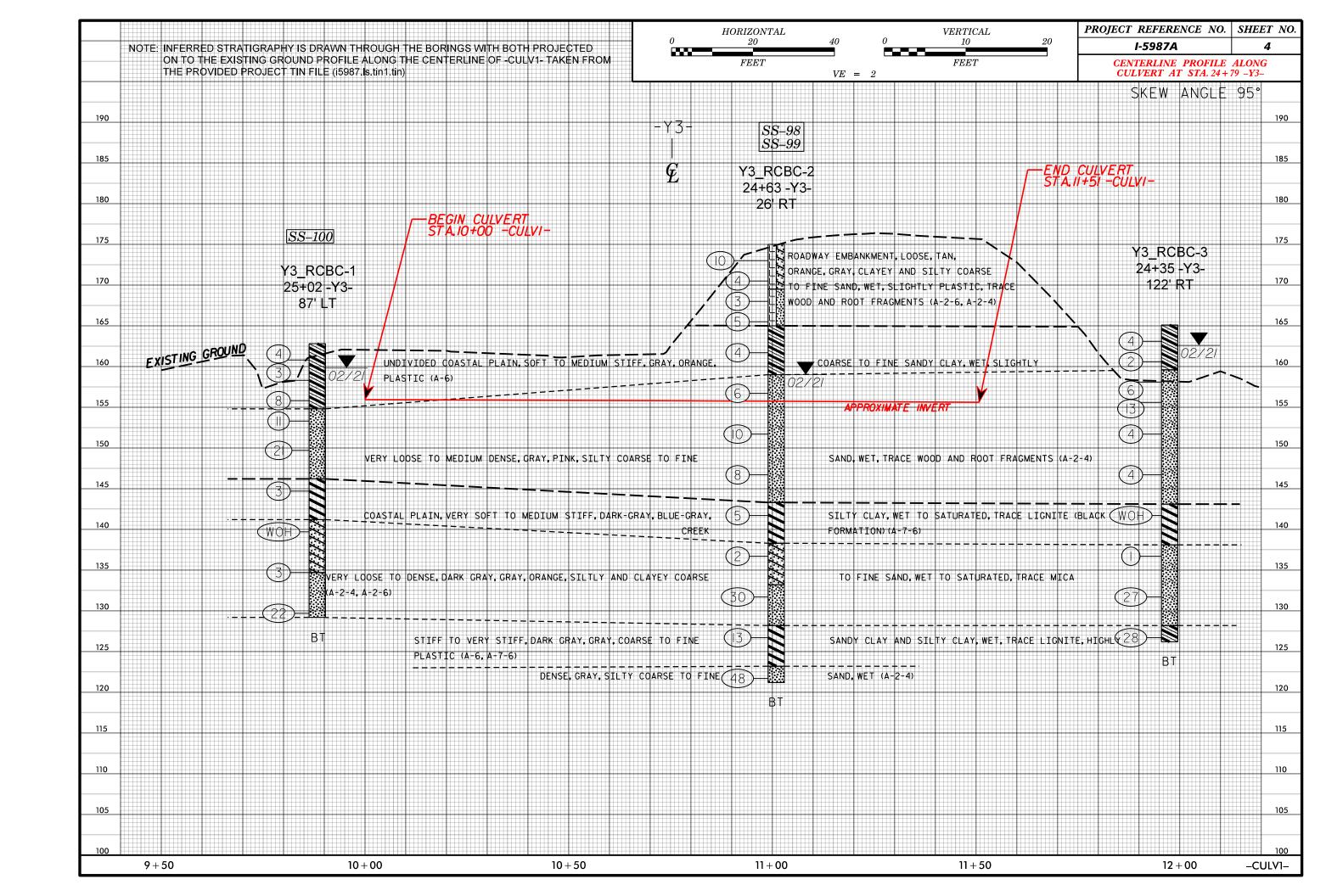
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

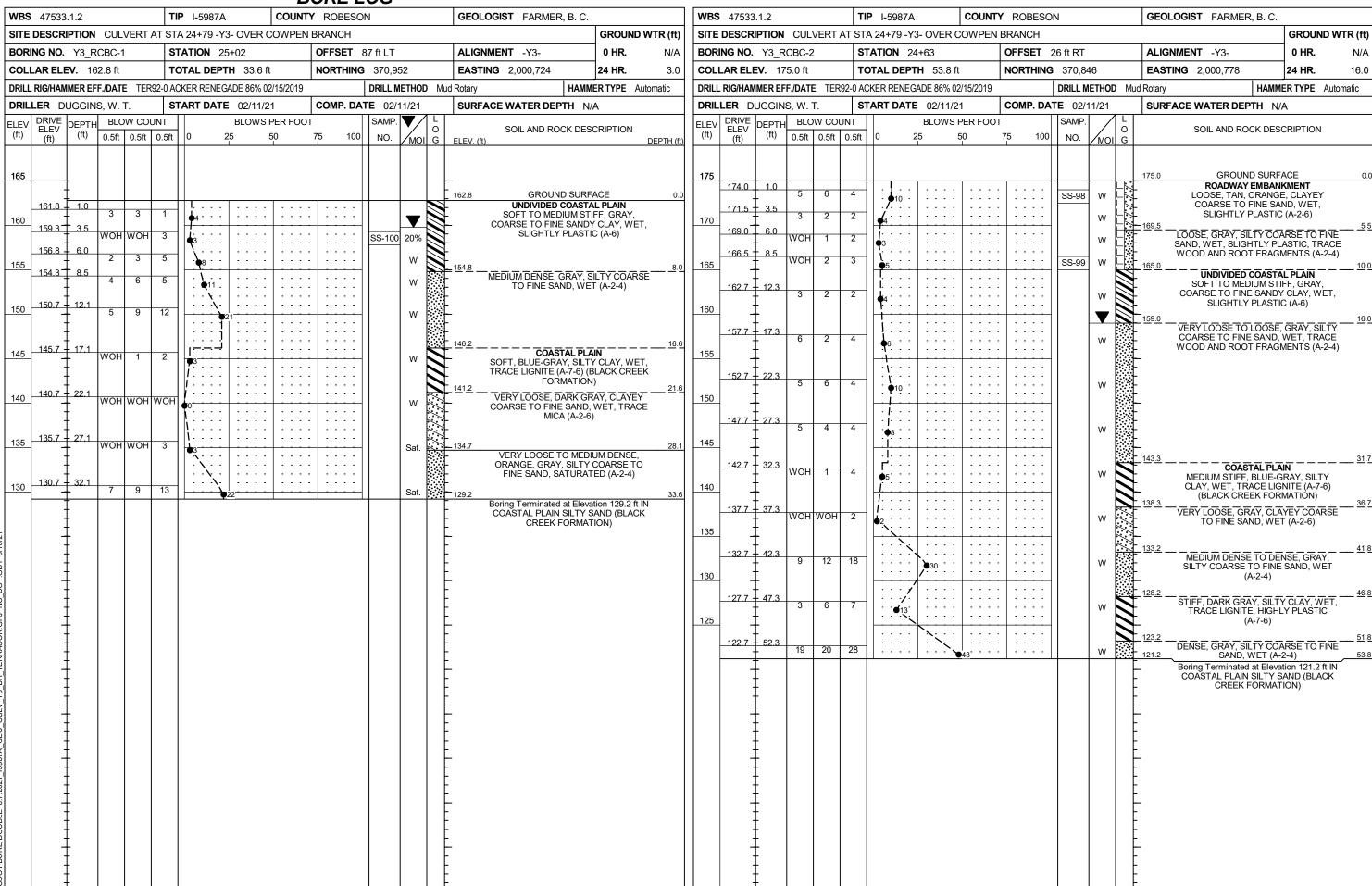
SUBSURFACE INVESTIGATION

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	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.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	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
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDOED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	WEATHERED WON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
LLASS. (\$\(\sigma\) 35/. PASSING "200) (> 35/. PASSING "200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOOLD FIELD SPI REFUSAL IF TESTED, ROCK TIPE INCLUDES GRANTE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
% PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
■10 50 MX GRANULAR SIL1- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN PEAT *200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 36 MN 36	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 LL 48 MX 41 MN 48 MX 41 M	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOLIS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND MATERIALS SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN.RATING EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE	∇ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBURHUE PUUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTINESS OF PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCT	SPT CLORE INDICATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL OPT DAT TEST BORING INSTALLATION SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	THAN RUADWAY EMBANKMENT C	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MN MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	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
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	→ → → → → ALLUVIAL SOIL BOUNDARY \(\triangle \) INSTALLATION \(\triangle \) SPT N-VALUE	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	UNDERCOT LCC HOLE DEGRADABLE NOCK	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(USE, SU.) (F SU.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB, HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOUR MOISTURE SCALE FIELD MOISTURE	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 _d - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC CEMICOLID. PEGUIDES ORVING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) SEMISULIS REGULARS DATING TO ATTAIN OPTIMUM MOISTURE (PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: EXISTING GROUND AND TOP OF BORING ELEVATION
	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ESTIMATED USING PROVIDED PROJECT TIN FILE (15987_Is_tinl.tin)
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL _ SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
PLASTICITY	CME-55 8* HOLLOW AUGERS CORE SIZE:	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS N-N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	L L TUNG -CARRIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS: POST HOLE DIGGER	CDAING CAN BE CERARATED FROM CAMPLE WITH CIFEL BRORE.	
HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER POST HOLE DIGGER POST HOLE DI	MODERATELY INDURATED ORANGE CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE 'TUNGCARB. SQUADING POD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X ACKER RENEGADE (1ER92-8) CORE BIT SOUNDING NO.	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1
			5.01.01.0







SHEET 6 OF 7

WBS	47533	.1.2			ТІ	IP I-5987A	COUNTY	robesoi	N		GEOLOGI	ST FARME	R, B. C.		
SITE	DESCR	IPTION	CUL	VERT	AT ST	A 24+79 -Y3- OVI	ER COWPEN	BRANCH			-1		·	ROUND	NTR (ft)
BORI	NG NO.	Y3_R	CBC-3	3	S	TATION 24+35		OFFSET 1	22 ft RT		ALIGNME	NT -Y3-		HR.	N/A
COLI	LAR ELE	EV . 16	5.1 ft		т	OTAL DEPTH 38	3.9 ft	NORTHING	370,759	9	EASTING	2,000,828	24	HR.	2.5
DRILL	. RIG/HAM	IMER EF	F./DAT	E TER	R92-0 A0	CKER RENEGADE 9	5% 02/06/2021		DRILL ME	THOD M	ud Rotary		HAMMER	TYPE Au	tomatic
DRIL	LER D	UGGIN	S, W.	T.	S	TART DATE 02/	11/21	COMP. DAT	Γ E 02/15	5/21	SURFACE	WATER DE	PTH N/A		
ELEV (ft)						BLO 0 25	WS PER FOOT	75 100	SAMP. NO.	MOI G		SOIL AND RO	OCK DESCR	IPTION	
170	- - -	- - -									 - - - -				
165	164.1	1.0				 					165.1		ND SURFACI		0.0
160	161.6 - -	3.5	1 WOH	2	2	4			_	▼ w	S0 - - - - 159.6	OFT, GRAY, C FINE SANDY	RANGE, CO	ARSE TO	5.
	159.1	6.0	2	3	3					w	F '	PAY, PINK, SIL			
155	156.6 - - -	- 8.5 -	3	6	7	13				W	- - - -		WET (A-2-4		
150	152.7 - - -	- 12.4 - -	2	2	2	4				W	- - - -				
145	147.7 - - -	17.4 -	4	3	1	•4::::::::::::::::::::::::::::::::::::				W	- - - - -				
140	142.7 - - -	- - 22.4 -	WOH	WOH	WOH	•0° · · · · · · · · · · · · · · · · · · ·				Sat.					<u>22</u> .9
135	137.7 - -	- 27.4 -	WOH	WOH	1	1				Sat.	138.1ME		RMAŤIÒN) GRAY, SILT	Y COARS	<u>27</u> .
	132.7 -	- - 32.4	6	12	15	27				Sat.	- - -				
130	127.7 -	- - 37.4	4	8	20					v	128.2 VE	RY STIFF, GR SANDY C	RAY, COARS		<u>36</u> .
											Bor CC	ing Terminate ASTAL PLAIN CREEK	d at Elevation I SANDY CLA FORMATION	AY (BLACK	

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 47533.1.2 **TIP:** I-5987A COUNTY: ROBESON

DESCRIPTION: CULVERT AT STA 24+79 -Y3- OVER COWPEN BRANCH

Sample			Offset	Depth	AASHTO			% by Weight				% Passing (sieves)		eves)		%	
No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	Moisture	Organic
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	

Certified Lab Technician Signature

114-01-1203 Certification Number

9874 REFERENCE

STATE OF NORTH CAROLINA

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

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY	ROBESON
PROJECT DE	SCRIPTION <u>I-95 IMPROVEMENTS FROM</u>
	OF US 301 (EXIT 22) TO NORTH OF
	1758 (McDUFFIE CROSSING ROAD)
SITE DESCRI	PTION 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

STATE PROJECT REFERENCE NO. I-5987A

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.

CENERAL 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 BORGHOLE. THE LABORATORY SAMPLE DATA AND THE IN STIU (IM-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 NIDICATED 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 WARRANTE OF GLARANTEE 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.

DEGON, A. N. TURNAGE, J. R. KELLY, N. S. INVESTIGATED BY TERRACON CONSULTANTS FIELDS, W. D. DRAWN BY RIGGS, Jr., A. F. CHECKED BY ALEXANDER, M. J. SUBMITTED BY JANUARY 2021

PERSONNEL



Prepared in the Office of:

01/28/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

I—5987A

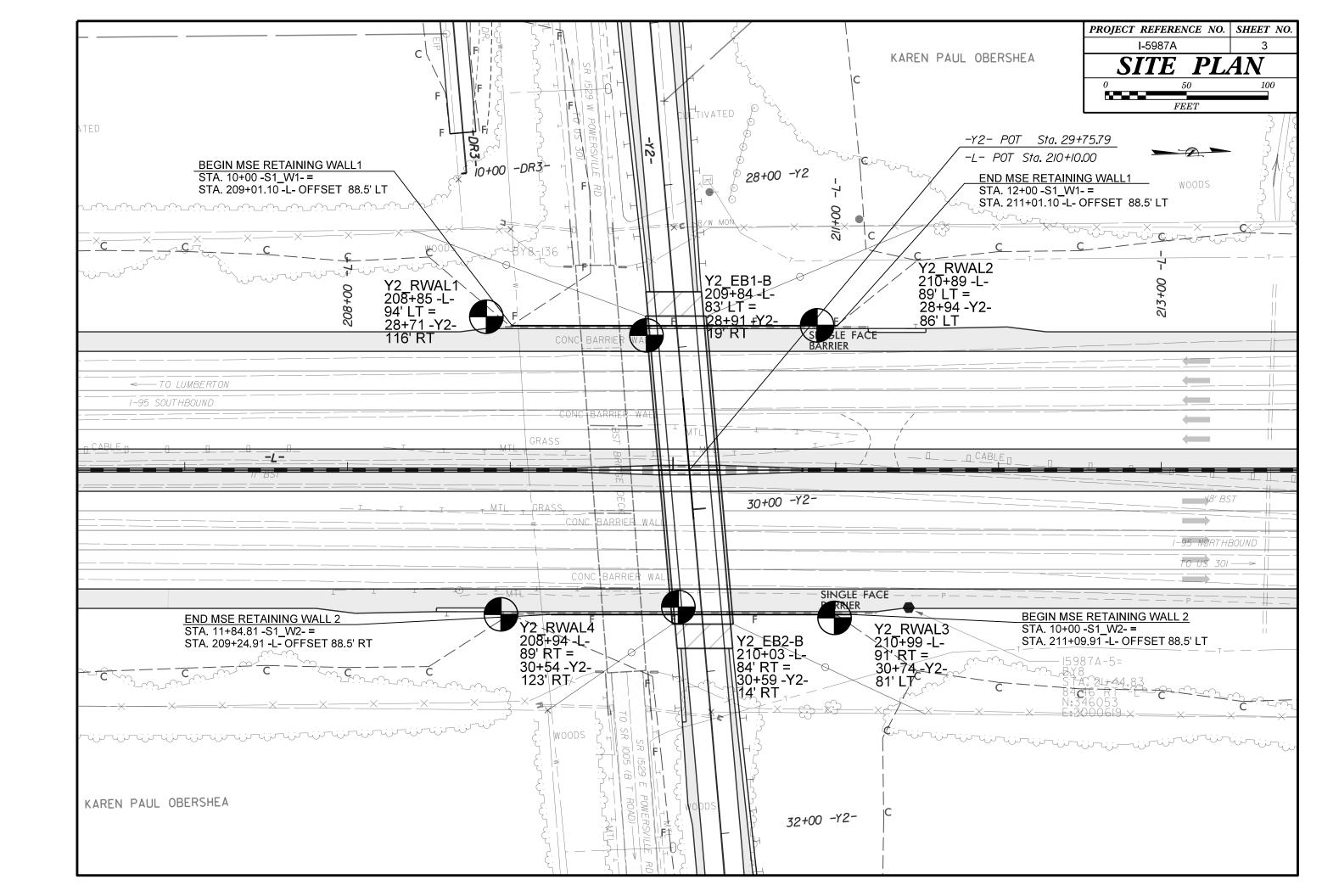
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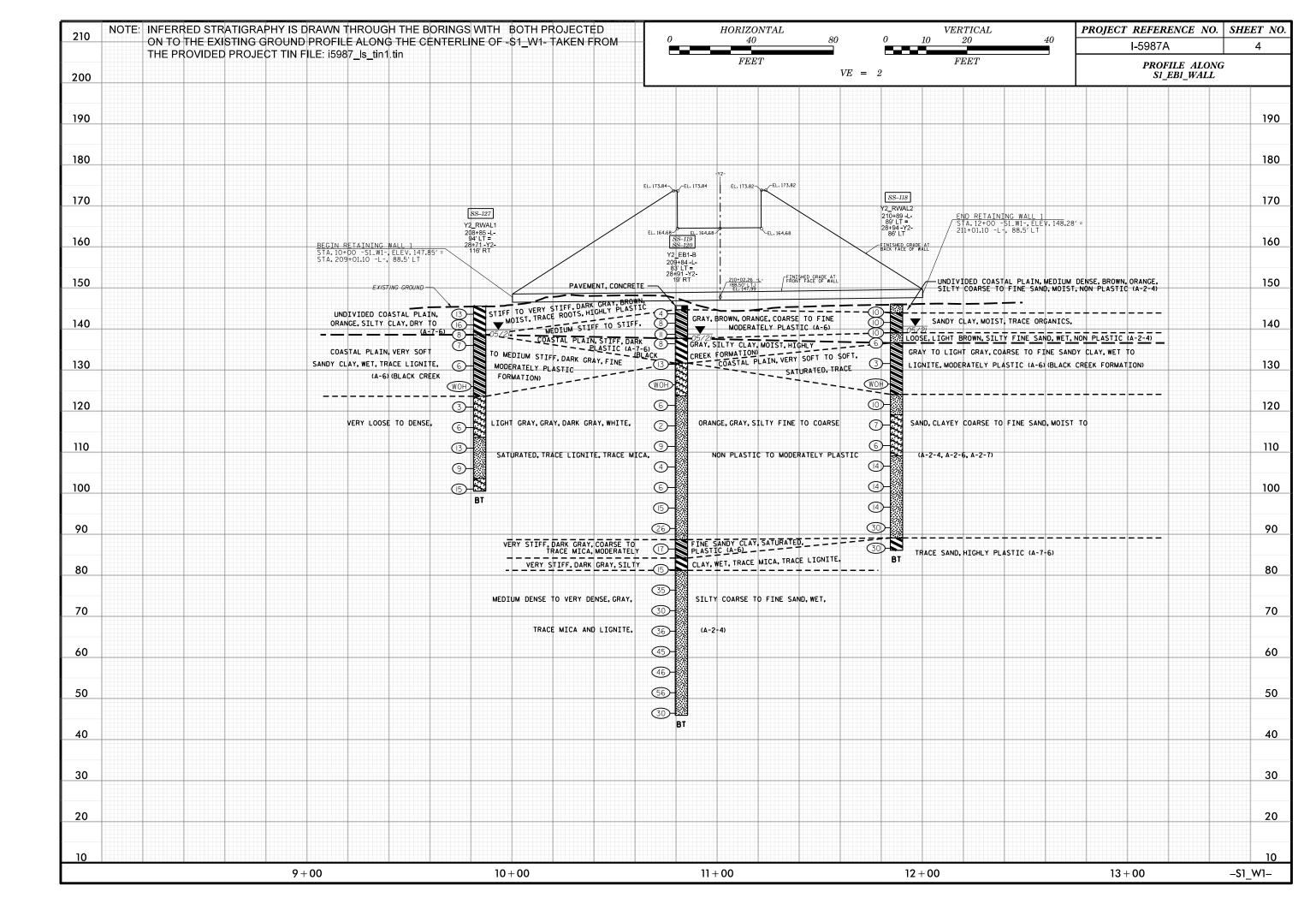
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

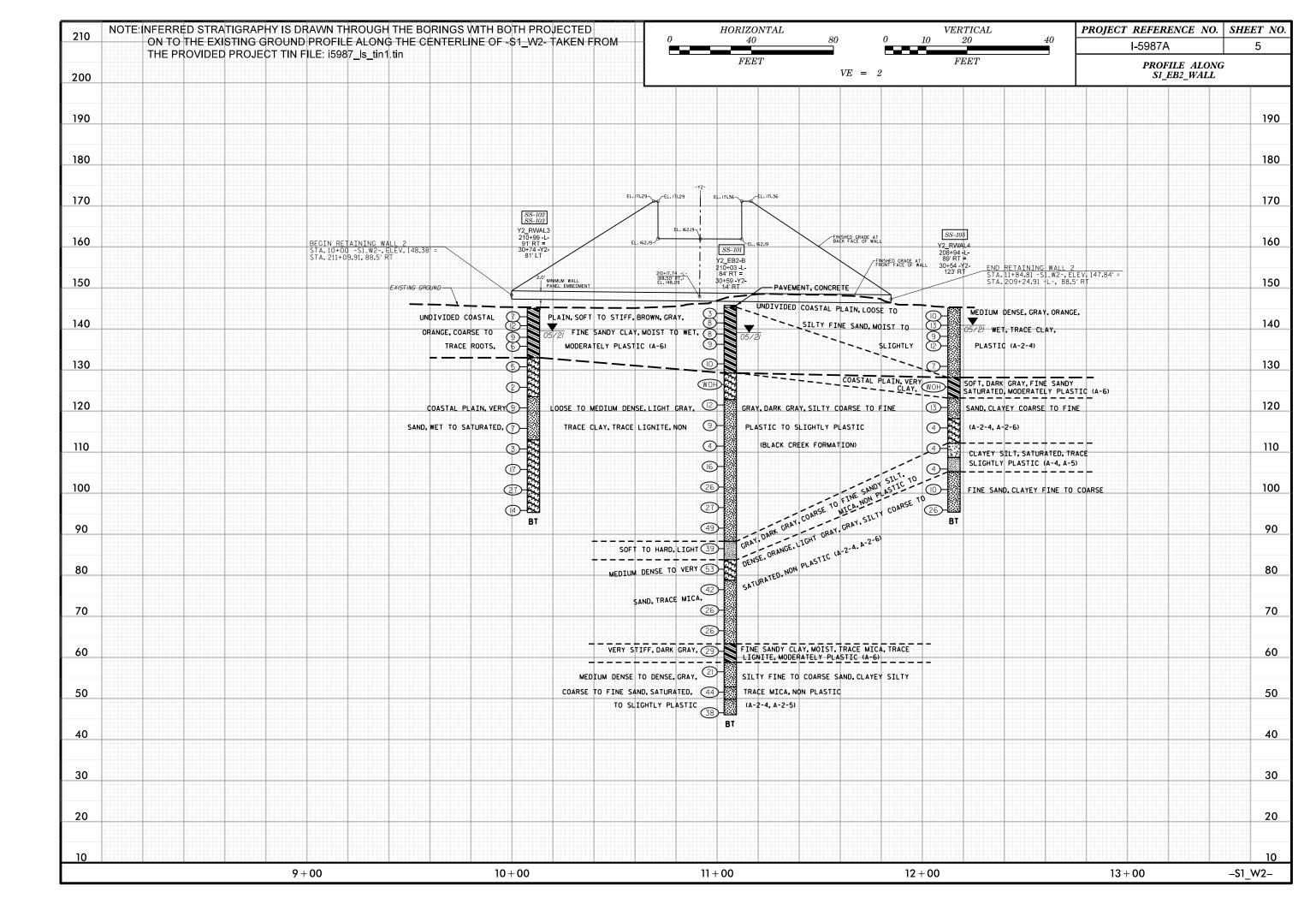
SUBSURFACE INVESTIGATION

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	<u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, <u>SUBANGULAR, SUBROUNDED</u> , OR <u>ROUNDED</u> .	WEATHERED VIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
LLASS. (\$ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-2-6 A-2-7 A-3-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
7 PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
#10 50 MX GRANULAR SILI- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 1 MN 10 MX 11 MN 11 MN MODERATE ORSANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 MX 12 MX 16 MX NU MX AMUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MATOR CRAYEL AND FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR POOR POOR POOR POOR POOR		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	— O-JM► SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONFISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/FT ²)	ROADWAY EMBANKMENT (RE) OF ROCK STRUCTURES ROADWAY EMBANKMENT (RE) OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SPI DMT TEST BORING SLOPE INDICATOR	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER CONF. PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
DENSE 30 TO 50	THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25		(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	TEST BORING MONITORING WELL TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	WITH CORE	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	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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION — SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN. MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	☐ CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
COLL MOISTINE COLLE FIELD MOISTINE	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\hat{\gamma}_d$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	TO DR LESS THAN W.I FOUT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TOR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING TERM SPACING TERM THICKNESS	BENCH MARK: 15987A-5=BY8: STA. 2I+44.83 -L-
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	84.46' RIGHT N: 346,053; E: 2,000,619 ELEVATION: 146.05 FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
PEOLIPES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	CME-55 CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8*HOLLOW AUGERSH	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNG,-CARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2% STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE TUNG,-CARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CURE BIT VANE SHEAR TEST	SHARP HAMMER RIOWS REQUIRED TO RREAK SAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X 31/4" HOLLOW STEM AUGERS	EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	











SHEET 6 OF 11

	ulting Eng							В	ORE L	.OG					
WBS	47533	.1.2			TI	IP I-5987A	<u> </u>	COUNT	Y ROBESC	N			GEOLOGIST DEGON, A. N.		
SITE	DESCRI	IPTION	SITE	1 - A	BUTME	ENT RET. V	VALLS AT	EB1 AND	EB2 OF BR	IDGE OI	N -Y2-	OVE	R -L- (I-95) AT -Y2- STA. 29+75.7	9 GROUNI	WTR (ft)
BORI	NG NO.	Y2_R	RWAL1		S	TATION 2	8+71		OFFSET	116 ft R	Т		ALIGNMENT -Y2-	0 HR.	N/A
COLI	LAR ELE	E V. 14	15.6 ft		T	OTAL DEP	TH 45.1 ft	t	NORTHING	345,8	01		EASTING 2,000,430	24 HR.	5.8
DRILL	. RIG/HAM	IMER EF	F./DAT	E TER	R299 DI	IEDRICH D-50	79% 12/31	/2020		DRILL N	/IETHOI) Mu	ud Rotary HAMN	MER TYPE	Automatic
DRIL	LER T	JRNAG	E, J. F	₹.	S	TART DAT	E 05/18/2	1	COMP. DA	TE 05/	18/21		SURFACE WATER DEPTH N	/A	
ELEV	DRIVE ELEV	DEPTH	'——	W CO		<u> </u>		PER FOOT		SAMP.			SOIL AND ROCK DES	SCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	/MOI	l G	ELEV. (ft)		DEPTH (ft)
150	_	-											_		
	-	ţ											- -		
145	-												- 145.6 GROUND SURI		0.0
140	144.6	1.0	6	8	5		1	: : : :			D		 UNDIVIDED COAST STIFF TO VERY STIFF, 		Υ,
	142.0	3.6	5	8	8	::','*:							BROWN, ORANGE, SILTY MOIST, TRACE ROO		TO
140	- 139.6	6.0		0	°	16				SS-127	19%		PLASTIC (A-7		
	-		3	4	4	. •8					М		- 138.6 - COASTAL PL	AIN	7.0
405	137.0	8.6	3	3	4	- - 					w		 VERY SOFT TO MEDIUN GRAY, FINE SANDY CLAY 		
135	_	<u> </u>											 LIGNITE, MODERATELY (BLACK CREEK FOR 	PLASTIC (A	
	132.0	13.6				j:::							- (BEAGK GKEEKT OF	(WATION)	
130	-	Ŀ	3	3	3	6		ļ			W		- -		
	_	Ł				<i>j</i> : : : :							<u>-</u>		
	127.0	18.6	WOH	WOH	WOH	<u> </u>					Sat.		- -		
125	_	F				1	+	+	 		Jun				22.0
	122.0	23.6				/ : : : :							- 123.6 - VERY LOOSE TO LOOSE		AY, 22.0
120	-122.0	23.0	1	1	2	•3					Sat.		 CLAYEY COARSE TO SATURATED, SLIGHTLY I 	FINE SAND, PLASTIC (A-	2-7)
120	-	-				†	1	: : : :					- -		
	117.0	28.6	2	3	3								<u>-</u>		
115	-	_		3	3	4 6· · ·					Sat.		- 		
	-	<u> </u>				::;;:							- 113.6 - LOOSE TO MEDIUM DE	NSE, GRAY	, 32.0
440	112.0	33.6	5	6	7	13.					w		- WHITE, SILTY COARSE T - WET TO SATURAT		ND,
110	_	<u> </u>				 [<u>-</u>	(/ \ _ \ .)	
	107.0	38.6] : <i>i</i> :::							<u>-</u>		
105	-	E	2	4	5	9		<u> </u>			Sat.		<u>-</u>		
	-	Ł				\							<u>- 103.6</u> <u>MEDIUM DENSE, GRA</u>	V CLAVEV	42.0
105	102.0	43.6	4	7	8		: : : :	: : : :			l w		COARSE TO FINE SA - 100.5 SLIGHTLY PLASTI	AND, WET,	45.1
	-					13		1					Boring Terminated at Elev	ation 100.5 ft	t IN
	-	-											COASTAL PLAIN CLAYEY CREEK FORMA	' SAND (BLA TION)	CK
	-	<u> </u>											- - STA. 208+85 -L-;	94' LT	
	-	F											-	0. 2.	
	-	‡											- -		
	-	<u> </u>											- -		
	-	<u> </u>											<u>-</u>		
	-	_											<u>-</u> -		
	_	-											_ -		
	-	<u> </u>											- -		
] -	F											= -		
	-	F											- -		
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													- -		



Consu	ılting Eng	gineers a	and Scie	entists				В	<u>UKI</u>	<u> </u>	UG							
WBS	47533	3.1.2			TI	IP I-5987A		COUNTY	/ ROB	ESO	N			GEOLOGIS	T DEGON,	A. N.		
SITE	DESCR	IPTION	SITE	1 - ABI	JTMI	ENT RET. WA	LLS AT E	EB1 AND	EB2 OF	BRI	DGE ON	I -Y2-	OVEF	R -L- (I-95) AT	-Y2- STA. 29	9+75.79	GROUND V	VTR (ft)
BORI	NG NO.	Y2_E	B1-B		S	TATION 28+	91		OFFSI	ET ´	19 ft RT			ALIGNMEN	T -Y2-		0 HR.	N/A
COLL	AR ELI	EV. 14	5.7 ft		T	OTAL DEPTH	99.8 ft		NORT	HING	345,89	99		EASTING	2,000,446		24 HR.	6.9
DRILL	RIG/HAM	MER EF	F./DATI	E TER2	99 DI	IEDRICH D-50 7	9% 12/31/	2020			DRILL M	ETHOI) Muc		· ·	HAMME	R TYPE Aut	omatic
	LER T					TART DATE			COMP	DA.	FE 05/1				VATER DEP	1		
	DRIVE	DEPTH	_	W COU				ER FOOT			SAMP.	T /	1 - 1	JOIN ACL I	VAILIVULI	111 18/7	`	
ELEV (ft)	ELEV (ft)	(ft)	0.5ft			0 25		50	75	100	NO.		0		SOIL AND RO	CK DESC		DEDT!! "
	(11)		0.0.0	0.0.1	0.0.1	1					110.	/MO	l G	ELEV. (ft)				DEPTH (f
150		+												-				
		F											l F					
145	-	<u> </u>												145.7	GROUNI			0
140	144.7 -	1.0	2	2	2	1 4						М		_144.7	ROADWAY PAV	EMBANK 'EMENT	MENT	
	142.4	3.3	3	4	4	7									UNDIVIDED (EDIUM STIFF			_
140	139.7 -		"		7	. • 8						M		BRC	WN, ORANG	E, COAR	RSE TO FINE	
		+	3	4	7	. • 11 .						V		OD	SANDY CLAY GANICS, MOI			0
	137.4	8.3	3	4	4	: []:		: : : :	: :	- :	SS-119	19%	1	137.7 UR	· ((A-6)		8.
135	-	‡				.₹8			<u> </u>		00 110	1070			, DARK GRAY	Y, SILTY	CLAY, MOIST	
	400.4	400				$ \cdot,i\cdot $								HIGH	LY PLASTIC (FORI	A-7-6) (B MATION)		<
	132.4	13.3	3	6	7	1\						М		_1 <u>31.7</u>	RY LOOSE T	′		14.
130	-	-							ļ.:				*	- LIGH	T GRAY, ORA	ANGE, GI	RAY, CLAÝEY	,
	127.4 ·	183				;/ : : : :									ARSE TO FIN URATED, MO			
405			WOH	WOH	NOH	0			: :		SS-120	Sat.				A-2-6) E LIGNIT	F	
125	-	<u> </u>				 			+ : :					- 123.7	110.00	L LIOITI	_	22
	122.4	23.3] ,				٠ ٠			-	VERY	LOOSE TO N Y, SILTY COA			K
120	-	F	2	3	3	● 6		: : : :	: :			Sat.	F	GIV	SATURA			
	-	ļ							· ·					=				
	117.4	28.3	1	1	1	[]				: :		Sat.						
115		ţ			•	● 2						Sal.		_				
		<u> </u>																
	112.4	33.3	4	5	4	./		: : : :	: :			Sat.	Į					
110	_	‡				1 7			ļ::					_				
	107.4	383				j:::												
	107.4	30.5	3	2	2	1 4						Sat.						
105	_	t				 			+ : :					=				
	102.4	43.3											 					
100	-	Ŧ	4	3	3	Q 6		: : : :	: :			Sat.	-					
. 55	-	ļ				'\			1					=				
	97.4	48.3	5	6	9	: :/ <u>; :</u>		: : : :	: :	: :		Sat.						
95	-	‡			-	15	· · · ·		<u> </u>			Jal.		_				
		<u> </u>				$: : : \rangle $: :	: :								
	92.4	53.3	7	10	16		26					Sat.	F					
90	_	F					• • • •	ļ	+::					- 00.7				
	87.4 ·	58.3				::::/		: : : :	: :	::					STIFF, DAR			
٠.	- 27 .	1	4	5	12	17		: : : :	: :	: :		Sat.			SANDY CLAY, CA, MODERAT			E
85	-	‡							+ : :					84.2			, ,	61
	82.4	63.3			14	1 ! .								WE	TSTIFF, DAR T, TRACE MIC	CA, HIGH		
80	-	F	4	4	11	15		: : : :	: :			W		81.2		\-7-6)		<u>ر 64</u>
30	-	ļ				\			1					GRA	Y, SILTY COA	ARSE TO	FINE SAND,	
	77.4	68.3	12	17	18	{ : : : : [`	 		: :	: :		w		WET	, TRACE MICA	A AND LI	GNITE (A-2-4)
75	-	ţ	'-	''	.0		. ∳35 .		<u> </u>			٧٧	-	_				
	-	+					·/· · ·						F					
}	72.4	73.3	10	12	18	::::		: : : :	: :			W						
70	-	t					•30		1		1		::::\t					

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 7 OF 11

								ORE L	<u> </u>				
WBS	47533	.1.2			T	IP I-5987A	COUNT	Y ROBESO	N			GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	SITE	1 - AE	BUTMI	ENT RET. WALLS A	ΓEB1 AND	EB2 OF BRI	DGE ON	1-Y2-	OVER	-L- (I-95) AT -Y2- STA. 29+75.79	GROUND WTR (ft)
BORI	NG NO.	Y2_E	B1-B		S	TATION 28+91		OFFSET 1	9 ft RT			ALIGNMENT -Y2-	0 HR. N/A
COLL	AR ELE	EV. 14	5.7 ft		T	OTAL DEPTH 99.8	ft	NORTHING	345,89	99		EASTING 2,000,446	24 HR. 6.9
DRILL	RIG/HAN	IMER EF	F./DAT	E TER	299 D	IEDRICH D-50 79% 12/	31/2020	l	DRILL N	IETHOD) Mud	I Rotary HAMME	R TYPE Automatic
DRIL	LER T	JRNAG	E. J. F		S	TART DATE 05/13	<u>/</u> 21	COMP. DA				SURFACE WATER DEPTH N/A	1
ELEV	DRIVE	DEPTH		W CO		11	S PER FOOT	l	SAMP.		1 - 1	'	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	МОІ	O G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)
	()									<u>,</u>			<i>32.</i> (ii)
70						Ma	tch Line						
				†				T	†			MEDIUM DENSE TO VER GRAY, SILTY COARSE TO	
	67.4	78.3	8	13	23	-	.			l w		WET, TRACE MICA AND LIC	GNITE (A-2-4)
65	-	-								''	L	(continued)	
	62.4 ⁻	83.3				:::: :::\	.						
60	-		19	22	23] :::: ::::	. 45			w			
- 60	-	-						1				•	
	57.4	88.3	18	22	24		1 : : : :			l w	-		
55	-	_					46			**	L		
	52.4 ⁻	93.3					:						
	52.4	93.3	23	27	29	1 :::: :::	. \ . #56			w	Ŀ	NO LIGNITE	
50	-	-					/	+			<u> </u>	•	
	47.4	98.3	13	10	47	:::: :::/:						TD A OF LIGHT	_
			13	13	17	●30			-	W	::::: <u>[</u>	45.9 TRACE LIGNIT Boring Terminated at Eleva	99.0
	-	-									E	COAŠTAL PLAIN SILTY SA CREEK FORMATI	AND (BLACK
	_	F									l F	STA. 209+84 -L-; 8	
	_	-									l F	. 31A. 203+04 -L-, 0.	3 L1
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	-	-											
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	aiding Eng									UKL						
WBS	47533	3.1.2				ΓIP I	-5987A		COUNT	/ ROB	ESOI	٧			GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	SITE	E 1 - Al	BUTM	1ENT	RET. W	ALLS AT	EB1 AND	EB2 OF	BRI	DGE ON	I -Y2-	OVEF	R -L- (I-95) AT -Y2- STA. 29+75.79	GROUND WTR (ft
BORI	NG NO.	Y2_F	RWAL2	2		STAT	ION 28	3+94		OFFSE	ET 8	6 ft LT			ALIGNMENT -Y2-	0 HR. N//
COLI	LAR ELI	FV 14	16 1 ft		٦,	ΓΩΤΔ	I DEPT	H 60.0 ft		NORTH	HING	346,01	19		EASTING 2,000,634	24 HR. 5.
-				r Trr						NOINT	.			. M.	<u> </u>	
								79% 12/31				DRILL M) IVIU	<u>, , , , , , , , , , , , , , , , , , , </u>	ER TYPE Automatic
DRIL	LER T	URNAG	E, J. F	₹.		STAR	T DATE	05/13/2			. DA	TE 05/1	3/21		SURFACE WATER DEPTH N/	Α
ELEV	DRIVE ELEV	DEPTH	BLC	w co	UNT	41			PER FOOT			SAMP.	lacksquare		SOIL AND ROCK DES	CRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	t 0	2	25 5	50	75	100	NO.	/MOI		ELEV. (ft)	DEPTH (
150																
		‡													-	
	,	‡													CDOUND CLIDE	AOF .
145	145.1	1.0				╁	1								146.1 GROUND SURF. UNDIVIDED COASTA	
	_	Ŧ	6	5	5		10 -						М		143.9 MEDIUM DENSE, BROW SILTY COARSE TO FINE	
	142.6	3.5	5	5	5	-	1				: :	SS-118	13%		\ (A-2-4)	
140	140.1	6.0				╛	• 10					00 110			STIFF, GRAY, ORANGE, FINE SANDY CLAY,	MOIST
		Ŧ	2	4	6	.	10 -						W		- MODERATELY PLAS	TIC (A-6)
	137.6	+ 8.5 +	5	5	1	ز ⊢					: :		l w		LOOSE, LIGHT BROWN SAND, WET (A-	
135		İ					°			· •			''		_ COASTAL PLA	JN .
		 				<i>i</i>									VERY SOFT TO SOFT, GF GRAY, COARSE TO FINE	
	132.6	† 13.5 †	WOH	WOH	3	[<u>[</u>]					: :		l w		WET TO SATURATED, TR	ACE LIGNITE,
130		İ								· •			''		MODERATELY PLASTIC CREEK FORMAT	
		Ŧ				j -										,
	127.6	<u>† 18.5</u> 	WOH	WOH	WOH	┧╏					: :		Sat.			
125		İ								· •			Outi		_	
		 				\									MEDIUM DENSE, DARK (GRAY SILTY 22
	122.6	23.5	4	5	5	$+$ \mid :	\				: :		Sat.		COARSE TO FINE SAND,	SATURATED
120		İ					₱ 10						Outi	<u> </u>	(A-2-4)	
		Ŧ				.	¦							\ \	LOOSE, DARK GRAY, CLA	YEY COARSE 27
	117.6	28.5	2	2	5	+1 ;	1,				: :		Sat.	\sim	TO FINÉ SAND, SATÚRAT	ED, SLIGHTLY
115		t					Υ'						Out.		PLASTIC (A-2-	7)
		Ŧ				.	j								_	
	112.6	33.5	6	3	3	;	1				: :		Sat.	\sim		
110		İ					Y ⁰						Outi		_	
		Ŧ				.	\								MEDIUM DENSE TO DE	NSF GRAY 37
	107.6	+ 38.5 +	4	6	8)				: :		Sat.		SILTY COARSE TO FI	NE SAND,
105		İ				1L:	· • • • • • • • • • • • • • • • • • • •		<u> </u>				•	Ŀ	SATURATED, TRACE N	IICA (A-2-4)
		 				$ \cdot $	·									
	102.6	43.5	5	7	7	$\exists \mid :$	1,,				: :		Sat.			
100		İ				1L:	Y'*		l				•		_	
		 				$ \cdot $	· - ¦ -									
	97.6	+ 48.5 +	6	6	8	┤ │∶	1,,				: :		Sat.			
95		İ				1L:			l				•	Ŀ	_	
		Ŧ				.								-	_	
	92.6	53.5	7	12	18	- ∶					: :		Sat.			
90		t						30		1			Juli	<u> </u>		
		Ŧ				.									89.1 VERY STIFF, DARK GRAY	SILTY CLAY 57
	87.6	58.5	6	9	21	- ∶		1			: :		w		WET, TRACE LIGNITE	AND SAND,
		 				+		Q 30					**		 86.1 HIGHLY PLASTIC (Boring Terminated at Eleva 	(A-7-6) 60.
		+												F	COASTAL PLAIN SILTY C	CLAY (BLACK
		‡													CREEK FORMAT	ION)
		t													STA. 210+89 -L-; 8	39' LT
		Ŧ													=	
		‡														
		+														
	<u>-</u>	‡													-	
		†														
	,	Ŧ												F		
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GEOTECHNICAL BORING REPORT BORE LOG

SHEET 8 OF 11

												KE I							
WBS	/BS 47533.1.2 TIP I-5987A C ITE DESCRIPTION SITE 1 - ABUTMENT RET. WALLS AT EB						COUNT	Y R	OBES	NC	l			GEOLOGIST DEGON, A. N.					
SITE	DESCRI	PTION	SITE	1 - AB	UTME	ENT RE	T. W	ALLS	AT EE	31 AND	EB2	OF BF	RID	GE ON	-Y2-	OVEF	R -L- (I-95) AT -Y2- STA. 29+75.79	GROUN	D WTR (ft)
BORI	NG NO.	Y2_R	WAL3		ST	FATION	30	+74			OF	FSET	8′	1 ft LT			ALIGNMENT -Y2-	0 HR.	N/A
COLL	AR ELE	V . 14	5.0 ft		т	OTAL D	EPT	H 49.	7 ft		NO	RTHIN	G	346,00)7		EASTING 2,000,624	24 HR.	5.5
DRII I	RIG/HAM	MFR FF	F /DATE	TFR2	99 DI	FDRICH	D-50	79% 1	2/31/20	120	1		Т	DRILL M	FTHOD) Mu	<u> </u>	R TYPE	
	LER TU					TART D					CO	MD D		E 05/0		1110	SURFACE WATER DEPTH N/A		ratoriatio
1	DD1\/E		_	w cou			AIL			R FOO		IVIF. DA		SAMP.	V /	1 [SURFACE WATER DEPTH IN/A		
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft		0.5ft	0	2	5	50		75	100		NO.	MOI	0	SOIL AND ROCK DESC ELEV. (ft)	RIPTION	DEPTH (ft)
145	144.0	1.0				Н							+				145.0 GROUND SURFA UNDIVIDED COASTAL		0.0
	1		3	4	3	7					: :				М		MEDIUM STIFF TO STIF ORANGE, COARSE TO FI	F, GRAY,	
140	141.8	- 3.2 -	5	6	6	:/~	12 -			: : :	: :	: : :		SS-102	20%		. CLAY, MOIŚT TO WET, TRA	ACE ROO	
140	139.0	6.0				 - 	-				: :		11		_		_ MODERATELY PLAST	IC (A-6)	
	136.8	- - 8.2	4	5	4				.		. .				М		•		
135	130.0	- 0.2	3	3	3	6			-		: :				W				
133		-									: :		11				-		
	131.8	- - 13.2				. نم [[-		- -						133.0 COASTAL PLAIN	١	12.0
130	131.0	- 13.2	1	2	3	j .			-		: :				Sat.		VERY LOOSE TO LOOSE, [DARK GR	
130		-									: :		11			\searrow	_ CLAYEY FINE SAND, SAT TRACE LIGNITE, SLIGHTL		
	126.8	- - 18.2				<u> </u>					: .						(A-2-6) (BLACK CREEK FC	RMATIO	N)
125	120.0 -	- 10.2	1	1	1	2					: :			SS-103	Sat.	$\overline{}$			
120	1	-				`` .					. .		11			\searrow	 <u>· 123.5</u>		21.5
	121.8	- - 23.2				1			-		. .						LOOSE, DARK GRAY, SILTY		TO
120	121.0	-	3	4	5	. ∳9			-		. .				Sat.	-	FINE SAND, SATURATE	D (A-2-4)	
	1	-											11				<u> </u>		
	116.8	- - 28.2				: :					: :								
115		-	2	3	4				-		- -				Sat.	-	•		
	1	-											11				_		20.0
	111.8	- - 33.2				<i>i</i> . :					: :							ENSE, D	ARK 32.0
110		-	1	1	2	∮ 3 ·			-		- -				Sat.		. GRAY TO LIGHT GRAY, COARSE TO FINE SAND, S		ED
	1	-				1.7.							11				SLIGHTLY PLASTIC (
	106.8	- - 38.2				:\					: :								
105	-	-	6	5	12		• 17		-		- -				Sat.		•		
	7	-					. ,						1						
	101.8	- - 43.2					: :\		:		: :					\searrow			
100		-	8	11	16		'	27 · ·	-		- -				Sat.				
	7	-					/												
	96.8	- - 48.2					. / ./.				: :					\searrow	•		
		-	5	8	6	1	14		-		- -		Ш		Sat.		95.3		49.7
]	-															Boring Terminated at Elevati COASTAL PLAIN CLAYEY S	AND (BLA	
	+	-															CREEK FORMATIO	-	
	4	-															STA. 210+99 -L-; 91	'RT	
	1	-															•		
	+	-														 	•		
	4	-															-		
		-																	
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Cons	ulting Eng	ineers a	and Sci	entists				B	<u>UKE</u>	L	<u>UG</u>			
WBS	47533	.1.2			TI	P I-5987A		COUNTY	' ROBES	108	1			GEOLOGIST DEGON, A. N.
SITE	DESCRI	PTION	SITE	= 1 - AI	BUTMI	ENT RET. W	ALLS AT	EB1 AND	EB2 OF E	BRIE	OGE ON	-Y2-	OVE	R -L- (I-95) AT -Y2- STA. 29+75.79 GROUND WTR (ft
BOR	ING NO.	Y2_E	B2-B		S	TATION 30)+59		OFFSET	1	4 ft RT			ALIGNMENT -Y2- 0 HR. N/A
COLI	LAR ELE	EV . 14	5.8 ft		T	OTAL DEPT	H 99.8 ft		NORTHI	NG	345.91	2		EASTING 2,000,613 24 HR. 6.
				F TFF		EDRICH D-50				Ī	DRILL M	FTHOI	D Mu	
	LER T					TART DATE			COMP. D				D IVIG	SURFACE WATER DEPTH N/A
-	DD1) /E			OW CO				ER FOOT		ΑI 	SAMP.	4/21	11	SURFACE WATER DEPTH IN/A
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft		0.5ft	0 2				00	NO.	MO_	0	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH
150	-	- - -												_ - -
1.15	-	_												145.8 GROUND SURFACE
145	144.8-	- 1.0	3	2	1							М		PAVEMENT CONCRETE
	142.5	3.3	4	4	4	🏋 · · · ·				.				- UNDIVIDED COASTAL PLAIN
140	139.8		4	4	4	. \	: : : :					M		SOFT TO STIFF, BROWN, GRAY, ORANGE, COARSE TO FINE SANDY
	139.8 -	- 6.0 -	3	4	4	. 8				-				CLAY, MOIST, MODERATELY PLASTIC (A-6)
	137.3	8.5	3	3	6					:				- (* °) -
135	<u>-</u>	-				. ¶9				-		М		- -
	132.5	13.3	3	4	6					.				-
130] -		3	4	0	10				-		M		- -
100	_	-				 - !								
	127.5	18.3	WOH	WOH	WOH					:	SS-101	١٨/		VERY LOOSE, LIGHT TO DARK GRAY,
125	-	_	" "	1	***	1 0				-	55-101	W		CLAYEY COARSE TO FINE SAND, WET, TRACE LIGNITE, SLIGHTLY PLASTIC
] -	-				<u> </u>			1					(A-2-6) (BLACK CREEK FORMATION)
	122.5	23.3	4	5	7	. \				:		W		122.8 23 LOOSE TO DENSE, GRAY, SILTY 23
120	-	-			'	•12.				-		vv		- COARSE TO FINE SAND, WET TO - SATURATED, TRACE CLAY (A-2-4)
] -	-												- SATURATED, TRACE CLAT (A-2-4)
	117.5	- 28.3 -	1	2	7	: : : :				:		W		- -
115	_	_				. 🕶 : :				.		vv		<u>-</u> -
	-	-								-				-
	112.5	33.3	1	2	2	1 1 1 1 1 1 1 1 1				:		W		- -
110						 								-
	407.5	-				:\:\::				.				_
	107.5	- 38.3 -	4	7	9	16		: : : :		:		W		- LIGHT GRAY, TRACE MICA
105									: : : :	_				- -
	102.5	- 42.2				: : : '\				:				- -
	102.5	- 40.0	7	12	14	[]	26			-		W	-	-
100	_	_					1		1	4				- -
	97.5	- - 48.3					!:::::			:				- -
	_	-	10	13	14] : : : :	Q 27			:		Sat.		- -
95	-	-				l 			ļ · · · ·	\dashv			-	_
	92.5	- - 53.3					11.5%			:				- -
00		-	13	23	26		: : : : }	49		:		Sat.		<u>-</u> -
90	-	-					 /	: : : :	+ : : : :	\exists				- 002
	87.5	- 58.3	16	19	20		/.			.		_		- 88.3 HARD, DARK GRAY, COARSE TO FINE 57
85] -		16	19	20		■39	: : : :		:		Sat.		SANDY SILT, SATURATED, NON PLASTIC (A-4)
- 00	_						7			-				83.8
	82.5	63.3	20	17	36	::::	: : : : '			:		Cat		VERY DENSE, GRAY, CLAYEY COARSE TO FINE SAND (A-2-6)
80	-	_						P 53		.		Sat.		-
	-	-					/							
	77.5	- 68.3 -	10	21	21	::::	/	: : : :		:		Sat.		MEDIUM DENSE TO DENSE, GRAY, SILTY COARSE TO FINE SAND,
75		_					42	: : : :	: : : :			Jul.		SATURATED (A-2-4)
		L					. /:			.			F	-
	72.5	73.3	9	12	14	::::	7	: : : :		:		Sat.		- -
105 100 95 90 85 75	_	_				<u> </u>	20		1::::			Jat.		_

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 9 OF 11

								<u> </u>	UKE L	.00				
WBS	47533	.1.2			TI	I P I-598	57A	COUNT	robeso	N			GEOLOGIST DEGON, A. N.	
SITE	DESCRI	IPTION	SITE	1 - AE	BUTMI	ENT RET	. WALLS AT	EB1 AND	EB2 OF BRI	DGE ON	1-Y2-	OVER	: -L- (I-95) AT -Y2- STA. 29+75.79	GROUND WTR (ft)
BORI	NG NO.	Y2_E	B2-B		S	TATION	30+59		OFFSET	14 ft RT			ALIGNMENT -Y2-	0 HR. N/A
COLL	AR ELE	E V . 14	5.8 ft		T	OTAL DE	EPTH 99.8 f	1	NORTHING	345.9	12		EASTING 2,000,613	24 HR. 6.7
				F TFR)-50 79% 12/31			DRILL N) Muc	<u> </u>	R TYPE Automatic
									COMP DA	l) iviuc		
DRIL	LER TU				_	TART DA	ATE 05/04/2		COMP. DA		_	1 [SURFACE WATER DEPTH N/A	4
ELEV (ft)	ELEV	DEPTH (ft)	0.5ft	0.5ft	0.5ft	$\left\ \cdot \right\ _{0}$		PER FOOT 50	75 100	SAMP.	'/	0	SOIL AND ROCK DESC	
	(ft)	,	0.511	0.511	0.511	H°		<u> </u>	70 100	INO.	/MOI	G	ELEV. (ft)	DEPTH (ft)
70				├		↓	Mate	h Line			L	ļ. 	MEDIUM DENSE TO DEN	ISE CONV
	67.5 -	- - 78.3				:::							SILTY COARSE TO FIN	IE SAND,
			11	13	13	11 : : :	26				Sat.	<u> </u>	SATURATED (A-2-4) (continued)
65	-	-				 	- j	 	 			-	-	
	62.5 ⁻	83.3] ::::	: \	: : : :					VERY STIFF, DARK GRAY,	FINE SANDY 82.5
	_	ţ	9	13	16	:::	29				М		CLAY, MOIST, TRACE N LIGNITE, MODERATELY P	MICA AND
60	_	-				l 	. /	 	+				58.8	<u>87.0</u>
	57.5	88.3		10	- 4.4		./					-	MEDIUM DENSE, GRAY, CI	LAYEY SILTY
55	_	-	9	10	11		Q 21				Sat.		COARSE TO FINE SAND, S TRACE MICA, SLIGHTLY PL	
- 55	_	-				l 	· \	 	+				-	
	52.5	93.3	44	00	00]							DENSE, GRAY, LIGNITE \	<u> </u>
50	_	-	11	22	22	:::		4			Sat.	I I	COARSE TO FINE SAND, S	SATURATED
50	_	<u> </u>					: : : : : : : : : : : : : : : : : : : :		1				-49.8	96.0 RSE TO FINE
	47.5	98.3	14	17	21		: : : /: :					l iil	SAND, SATURATED	(A-2-4)
			14	17	21	Н.	●38				Sat.		46.0 Boring Terminated at Eleva	99.8 tion 46.0 ft IN
	_	ļ .											COASTAL PLAIN SILTY SA	AND (BLACK
	_	_											CREEK FORMATI	ON)
	-	-										-	STA. 210+03 -L-; 84	4. RT
	_	F										l F	•	
	_	<u> </u>												
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SHEET 10 OF 11

	ulting Eng		and Sci	entists				ORE L				1		
	47533					IP I-5987A		ROBESO				GEOLOGIST DEGON, A. N.	1	
					BUTMI	ENT RET. WALLS AT I	EB1 AND				OVER	R -L- (I-95) AT -Y2- STA. 29+75.7	9 GROUN	ID WTR (ft
BORI	NG NO.	Y2_R	RWAL4		S	TATION 30+54		OFFSET 1	123 ft RT	•		ALIGNMENT -Y2-	0 HR.	N/A
COLL	AR ELE	EV. 14	15.2 ft		T	OTAL DEPTH 49.8 ft		NORTHING	345,80)3		EASTING 2,000,613	24 HR.	4.3
DRILL	RIG/HAN	IMER EF	F./DAT	E TEF	R299 DI	IEDRICH D-50 79% 12/31/	2020		DRILL M	ETHOD) Mud	d Rotary HAMM	MER TYPE	Automatic
DRIL	LER T	JRNAG	€E, J. F	₹.	S	TART DATE 05/05/2	1	COMP. DAT	FE 05/0)5/21		SURFACE WATER DEPTH N	l/A	
LEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT	BLOWS F	PER FOOT		SAMP.	lacksquare	LO	SOIL AND ROCK DE	SCRIPTION	ı
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25 5	50	75 100	NO.	<u>/MOI</u>		ELEV. (ft)	JOINI HON	DEPTH (
150												_		
		-									F			
	-	F									l F			
145	144.2	1.0				 						145.2 GROUND SUR UNDIVIDED COAST		(
		Į	6	5	5	10				М		LOOSE TO MEDIUM DE	ENSE, GRA	
	141.9	3.3	5	7	6	13.					<u> </u>	ORANGE, SILTY FINE SA WET, TRACE ORGAN		
140	139.2	6.0		<u> </u>			 	 			l ::: <u>t</u>	-		
	136.9	[8.3	3	4	5	9				М	-			
35	100.9	- 0.5	10	7	5	12.	: : : :		SS-105	W				
55	-	<u> </u>										-		
	131.9	13.3] :/::: ::::								
30	-	<u> </u>	4	4	3	∳ 7 · · · · · ·				W	<u> </u>	_		
	-	-				$ \cdot $ $ \cdot $ $ \cdot $						128.2		17
	126.9	18.3	I WOH	WOH	WOH	/ : : : : : : : : : : : : : : : :	: : : :			0-4		COASTAL PL VERY SOFT, DARK GRA		NDY
25	_	ļ.	WOII	Two ii	***	0				Sat.		_ CLAY, SATURATED, M	ODERATEI	LY
		‡										PLASTIC (A- 123.2 MEDIUM DENSE, GRAY,		<u>22</u>
	121.9	23.3	4	5	8					Sat.	<u> </u>	TO FINE SAND, SATU	RATED, NO	
120	-	-				1 7 13	 	 			<u> </u>	PLASTIC (A-2	2-4)	
	116.9	28.3										LOOSE, DARK GRAY, CL	AYEY COA	<u>27</u> .RSE
15	-	- 20.0	1	2	2	1 4	: : : :			Sat.		TO FINE SAND, SATURA PLASTIC (A-2		HTLY
	-	ļ											- 0,	
	111.9	33.3									***	112.2 MEDIUM STIFF, LIGHT O	PAV CLAS	<u> 33</u>
10	-	<u> </u>	3	2	2	4				Sat.	1	SILT, SLIGHTLY PLA		161
	-	ŀ									<u> </u>	SOFT, LIGHT GRAY, FIN	E SANDY S	 <u>36</u>
	106.9	38.3	2	2	2					Sat.	₩F	SATURATED, TRACE		
05	-	ļ.	-	-	_	4				Sal.	-	MEDIUM DENSE, LIGHT G	RAY ORA	NGF 40
		†				','						SILTY COARSE TO F	INE SAND,	
	101.9	43.3	3	4	6	1				Sat.	<u> </u>	SATURATED, TRACE PLASTIC (A-2		N
00	-	<u> </u>						1				-		
	96.9	48.3] :::`\\ ::::					<u> </u>			
		<u> </u>	6	11	15	26				Sat.	 - -	95.4		49
	-										E	Boring Terminated at Ele UNDIVIDED COASTAL SAND		
	-	Ė									<u> </u>	STA. 208+94 -L-;	89' RT	
	-	<u> </u>									F			
	-	F									l F			
	_	‡										-		
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LABORATORY TESTING SUMMARY

PROJECT NUMBER:	47533.1.2	TID.	I-5987A	COUNTY:	ROBESON
PROJECT NUMBER:	47333.1.2	TIP:	1-3907 A	COUNTY:	KODESON

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

Comple			Offset	Depth	AASHTO				% by V	Veight		%	%	Passing (sie	ves)		%
Sample No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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 9874 REFERENCE **CONTENTS**

DESCRIPTION

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

PROFILES

BORF LOGS SOIL TEST RESULTS

SHEET NO.

4 - 5

6 - 10

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

ROBESON COUNTY _ PROJECT DESCRIPTION <u>I-95 IMPROVEMENTS</u> 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 -Y1A-STA.41+19.02

STATE PROJECT REFERENCE NO I-5987A

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 NDICATED 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 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

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:

Consulting Engineers and Scientists



01/28/2022

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

1–5987A

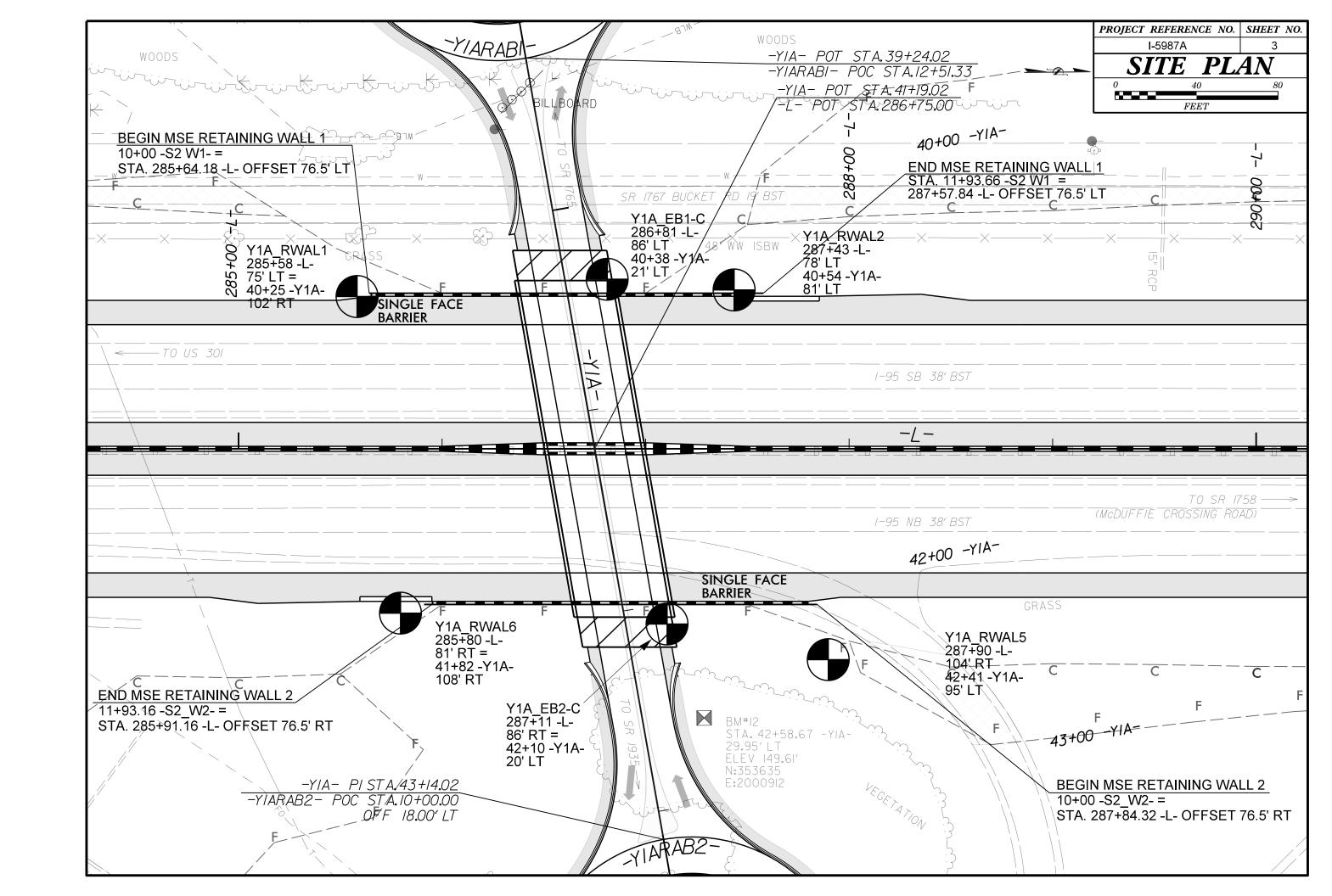
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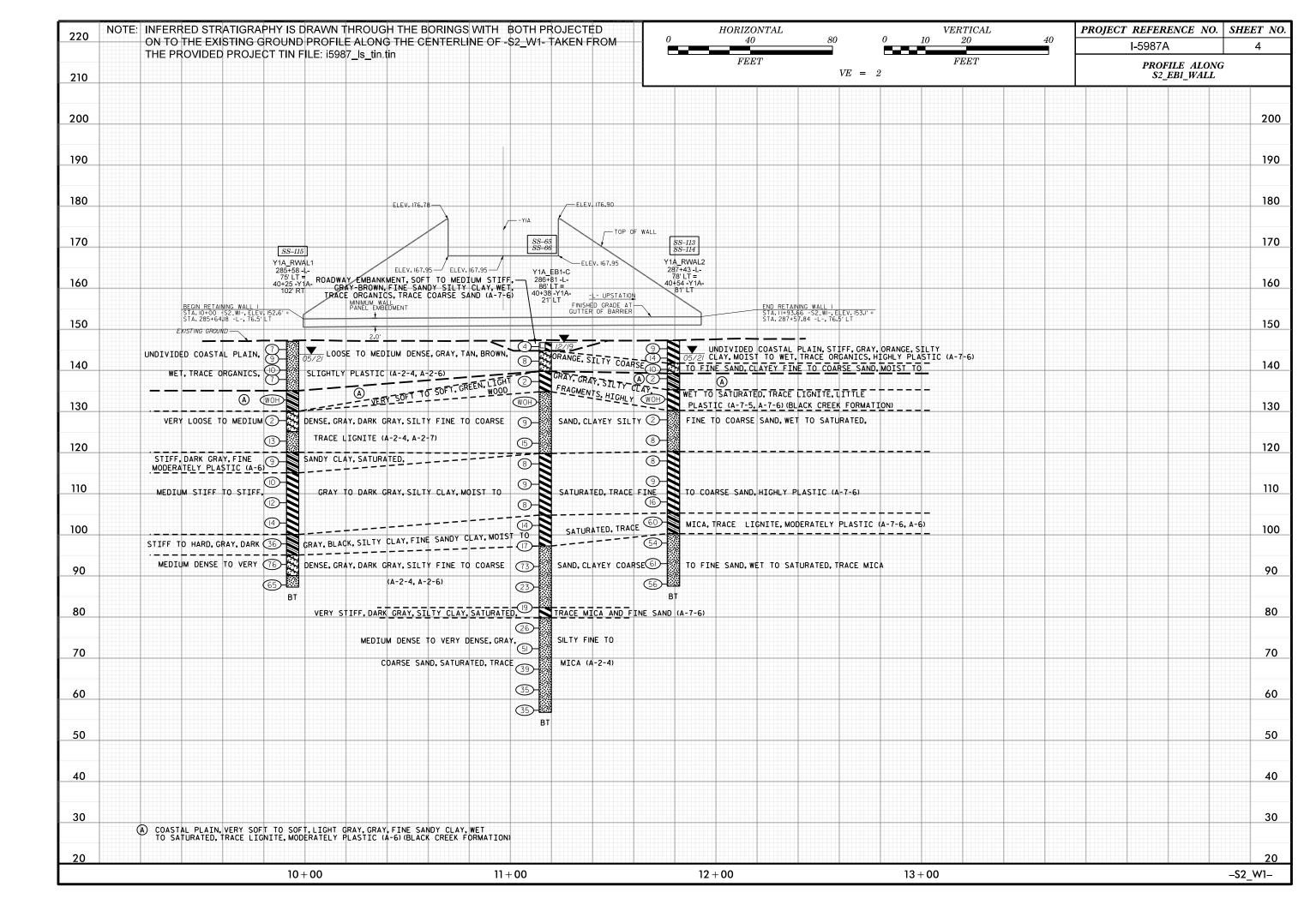
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

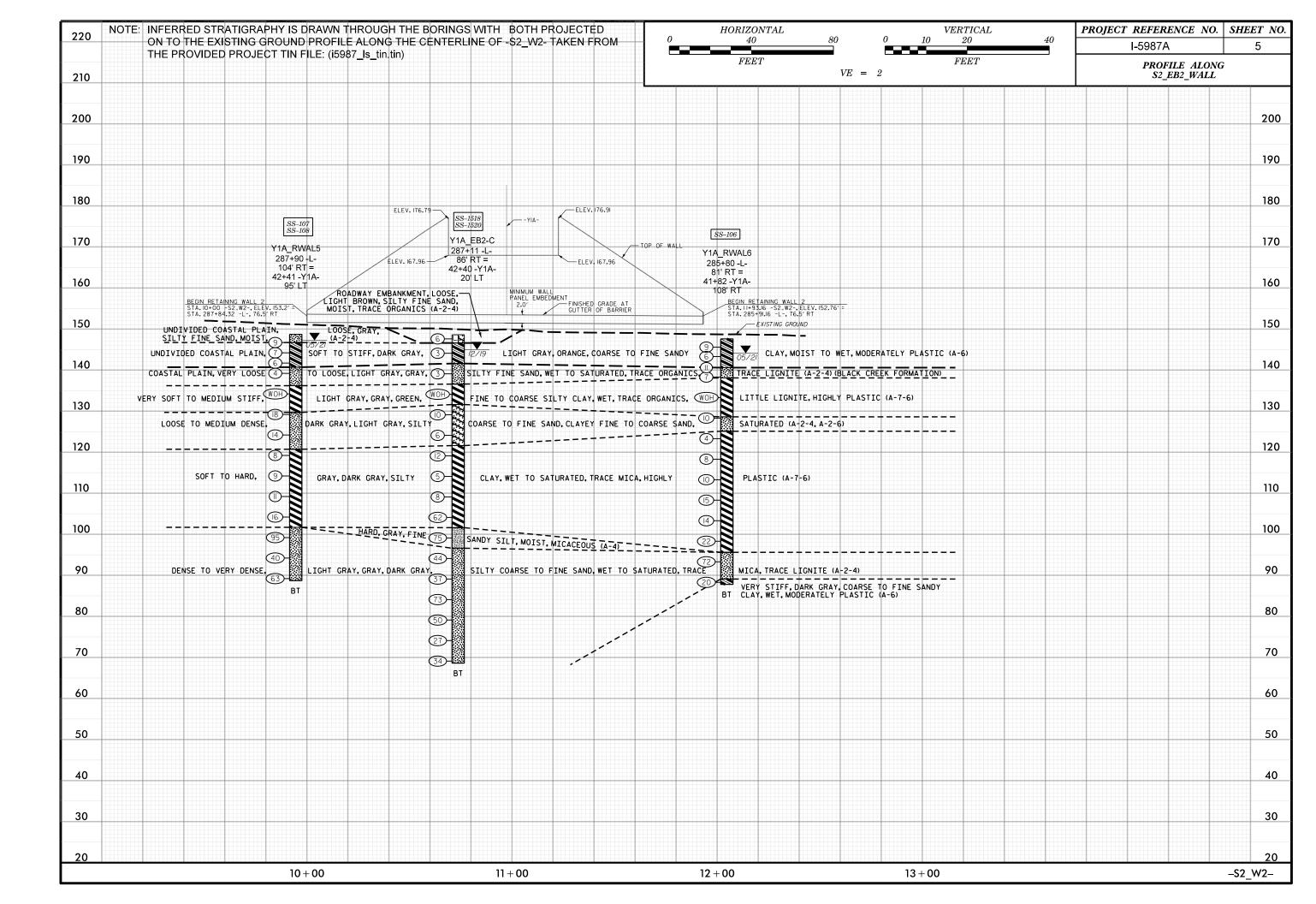
SUBSURFACE INVESTIGATION

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,MOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3-6 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
000000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SEDIMENTARY ROC	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT- SILT- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN SOILS SOILS SOILS PEAT	GRANULAR SILT - CLAY	<u>WEATHERING</u>	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
"2000 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	HORIZONTAL.
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 10 LITTE OP	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 11 MN 11 MN MODERATE ORGANIC	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
BROUP INDEX W W 4 MX B MX 12 MX 16 MX NU MX HINDUNI'S UF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STUNE FRAUS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO COOD FAIR TO POOR POOR POOR UNSUITABLE	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBURALE PUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	<u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT ²)	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SYMBOL SIPT TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LUUSE 4 10 10	N VSI PMI	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER OUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE 2 200	- INTERDED COLL DOLINDARY CORE DODING	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	── INFERRED SOIL BOUNDARY ← CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A ALLUMAN COT POINTARY A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE		RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	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
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY γ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC γ_a - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION OF THE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID: VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID, REQUIRES DRYING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRACT- FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: B.M. #12; BENCH NAIL SET IN BASE OF 18" PINE;
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	129.95' LEFT OF STA. 42+58.67 -YIA-
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N: 353,635; E: 2,000,912 ELEVATION: 149.61 FEET
SL _ SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
- UNY - (U) ATTAIN OPTIMUM MOISTURE	X CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	
PLASTICITY	8 · HOLLOW AUGERS	INDURATION	NOTE: ELEVATIONS OF BORINGS YIA EBI-C AND YIA EB2-C PERFORMED BY F&R INC. OBTAINED FROM PROVIEDE TIN FILE: 15987_Is_+In. tin_DATED: II-I4-2019
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	IN FILE: 1598/_Is_tin.tin DATED: 11-14-2019
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:		
HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TOISONS TUNG CARD	CDAING ARE DISCICULT TO SERARATE WITH SIEEL PRODE.	
	TEDRICH D-50 INCOME - TONG-CARB. SOUNDING ROD	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
0500010T/01/0 MAY 11/0 UDF 001 00 00 00 00 00 00 00 00 00 00 00 00		DIFFICULT TO BREAK WITH HAMMEN.	
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.	X 21/4" HOLLOW STEM AUGERS VANE SHEAR TEST CME-55 X (F&R\$3495) X 31/4" HOLLOW STEM AUGERS	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: SAMPLE BREAKS ACROSS GRAINS.	











SHEET 6 OF 11

THE LOCAL PROPERTY AND ADDRESS OF THE PARTY AN	ulting Eng			Name of Street					В	ORE	L	OG					
WBS	47533	.1.1			TI	IP 1-598	37		COUNT	/ ROBE	102	١			GEOLOGIST DEGON, A. N.		
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BORI	NG NO.	Y1A_	RWAL	_1	S	TATION	40+	+25		OFFSET	Γ 1	02 ft RT	•		ALIGNMENT -Y1A-	0 HR.	N/A
COLL	AR ELE	E V. 14	7.1 ft		T	OTAL DI	EPTH	f 59.8 ft		NORTH	ING	353,46	66		EASTING 2,000,704	24 HR.	3.2
DRILL	. RIG/HAN	IMER EF	F./DAT	E TEF	R299 DI	IEDRICH [)-50 7	79% 12/31/	2020			DRILL M	ETHO) Mu	nd Rotary HAMI	MER TYPE Au	tomatic
DRIL	LER T	JRNAG	E, J. F	₹.	S	TART D	ATE	05/11/21		COMP.	DAT	E 05/1	3/21		SURFACE WATER DEPTH	I/A	
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WBS	47533	3.1.1			TI	P I-598	7		COU	NTY	ROBES	ON			GEOLOGI	ST W. Pesl			
SITE	DESCR	IPTION	SITE	2 - AE	BUTME	ENT RET	. WA	LLS AT	EB1 A	ND E	B2 OF BI	RIDGE O	N -Y1A	- OVE	ER -L- AT -Y1	A- STA. 14+9	92.02	GROUND \	NTR (ft)
BORI	NG NO.	Y1A_	EB1-C	;	S ⁻	TATION	40+	-38		(OFFSET	21 ft LT			ALIGNME	NT -Y1A-		0 HR.	N/A
COLL	AR ELE	EV. 14	16.8 ft		T	OTAL DE	PTH	l 90.0 f	t	ı	NORTHIN	G 353,5	89		EASTING	2,000,696		24 HR.	0.0
DRILL	RIG/HAN	MER EF	F./DAT	E RFC	00074 C	ME-55 80	% 03	/08/2019				DRILL N	ЛЕТНОІ) Mu	d Rotary		HAMM	ER TYPE Au	tomatic
DRIL	LER R	. Smith			S	TART DA	ΛTE	12/10/1	9	(COMP. D	ATE 12/	11/19		SURFACE	WATER DEF	PTH N/	A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	O.5ft	0.5ft		0	25	BLOWS	PER FC 50		5 10	SAMP.	MO	L O I G	ELEV. (ft)	SOIL AND RC	OCK DES	CRIPTION	DEPTH (f
150	-														-				
	146.8 -	0.0	WOH	1	3	<u> </u>			1				V	 	146.8	GROUN ROADWAY	D SURF		0.
145	-	‡	WOH	'	3	4	-		: :				W		- <u>- 144.8</u> _	SOFT TO	MEDIUM	STIFF,	
	143.3	3.5	2	4	4	: : :			: :				l w			RAY-BROWN AY, WET, TR			1
140	-	‡	-			. 9 8 . .1	-		: :				**		: ' <u>-</u> -	COARSE	SAND (A		_
140	- 138.3	8.5				 			: :			1				SE, GRAY-TA	N, SILTY	CLAYEY FIN	
	138.3	8.5	WOH	WOH	2	√	-		: :			SS-65	76%		- !	CREEK	FORMAT	ION) (i
135	-	ŧ							ļ · ·							T, LIGHT GR. LE WOOD, H			
	133.3	13.5	WOLL	MOLL	WOL.	[:::	:		: :							Y LOOSE TO AY, CLAYEY S			K
	-	Ŧ	WOH	WOH	WOH	0	-					SS-66	W			ND, WET TO	SATURA	TED, TRACE	
130	_	Ŧ				\			↓ ∵					F	- -	LIGN	ITE (A-2-	4)	
	128.3	18.5	2	4	5	:\:			: :				Sat.						
125	-	‡				1 . 1 .	-		: :				Joan		=				
125	123.3					 .						11			<u>-</u>				
	123.3	23.5	5	7	8	: : }	15		: :				Sat.		<u>.</u>				
120	-	ł				: :/:	-								- 119.8				<u> 27</u> .
	118.3	28.5] - ; .	•]			- — — <u>—</u> ME	DIUM STIFF T			,
	-	Ŧ	3	4	4	. •8 .	-		: :				М		- 311 -	LTY CLAY, MC COARSE			
115	_	‡				-	-		ļ · ·			41			- -				
	113.3	33.5	2	4	5	:i::							١.,		<u>.</u>				
	-	ţ	-			. 4 9 .							M		-				
110	-	ŧ				 . i	-		+			+1			-				
	108.3	38.5	2	4	4								М						
105	-	Ŧ				: , :	-		: :						- - 104.8				42.
	103.3	43.5				/.	•		: :			11			. — — — <u> </u>	IFF TO VERY			42.
	-		4	6	8	::;	14		: :				М		- G	RAY, SILTY C LIGN	ITE (A-7-0	IST, TRACE 6)	
100	_	‡				 ¦			: :]			- -				
	98.3	48.5	4	6	11				: :				۱		- 97.3				49.
	-	t	-		''		17		: :				M		MED	DIUM DENSE T			K
95	-	ł				l 	-					+1				AY, SILTY FIN TURATED, TF	RACE CLA		
	93.3	53.5	5	28	45	: : :	-			`	 73		Sat.		-	(A-2-4)		
90	-	Ŧ				:::	-		; -	·					- -				
	- 88.3	58.5					-	. , , /	1			11			- ·				
	-	‡	16	17	6] :::	• 23	3	: :				Sat.		- -				
85	_	‡					-		: :			1			- -				
	83.3	63.5	8	9	10	:::	į								- - 823				CA.
	-	ţ	°	9	'0	: : :	1 9		: :				Sat.			RY STIFF, DAF			
80	_	ł					4		+	-		+			= 13.0		ID (A-7-6))	₁ — <u>67</u> .
	78.3	68.5	9	12	14	:::	: /						Sat.			MEDIUM DENS AY, SILTY FIN	E TO VE	RY DENSE,	_
105 100 95 90 85 80 75	-	‡				:::	-	×								SATURATED,			,
7.3	73.3	73.5						//.				11			- •				
	-,	133	13	29	22	[] : : :			51 .				Sat.		<u>.</u> -				
70	-	t					-		/ · ·						-				

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 7 OF 11

									ORE L						
	47533.1.1					IP I-5987			Y ROBESO					ST W. Pesl	1
SITE	DESCRIPTION	ON	SITE	2 - Al	BUTME	ENT RET. W	ALLS AT	EB1 AND	EB2 OF BRI	DGE ON	I -Y1A	- OVE	ER -L- AT -Y	1A- STA. 14+92.02	GROUND WTR (ft)
BORII	NG NO. Y1	IA_E	B1-C		S	TATION 40	+38		OFFSET 2	21 ft LT			ALIGNME	NT -Y1A-	0 HR. N/A
COLL	AR ELEV.	146	3.8 ft		T	OTAL DEPT	H 90.0 ft		NORTHING	353,58	39		EASTING	2,000,696	24 HR. 0.0
DRILL	RIG/HAMMER	REFF	./DATE	RFC	00074 C	ME-55 80% (3/08/2019			DRILL M	ETHOE) Mu	d Rotary	HAMN	MER TYPE Automatic
DRILL	ER R. Sm	nith			S	TART DATE	12/10/1	9	COMP. DA	TE 12/1	1/19		SURFACE	WATER DEPTH N	/A
ELEV (ft)	DRIVE ELEV (ft) DEF	F	BLO 0.5ft	W CO 0.5ft		0 2		PER FOOT 50	75 100	SAMP. NO.	MOI	L O G	ELEV. (ft)	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)
65	68.3 78		4	16	23		Matc	h Line			Sat.		. GF	MEDIUM DENSE TO VE RAY, SILTY FINE TO C SATURATED, TRACE I (continued)	OARSE SAND, MICA (A-2-4)
60	58.3 88	1.5	15	19	16						Sat.		. 56.8		90.0
													– SAN	oring Terminated at Elevid (COASTAL PLAIN) FORMATION SURFICIAL ORGANIC STA. 286+81 -L-;	(BLACK CREEK N) SOIL: 0.0 - 0.2'
	+ + + + + + + + + + + + + + + + + + +												-		



COMSC	ulting Eng	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ana 001	Ulitioto				D	<u>UKE I</u>	_00				
WBS	47533	3.1.1			1	TIP I-5987		COUNTY	r ROBES	NC			GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	SITE	2 - AB	BUTIV	IENT RET. W	ALLS AT E	B1 AND	EB2 OF BF	RIDGE C	N -Y1 <i>A</i>	- OVE	ER -L- AT -Y1A- STA. 14+92.02	GROUND WTR (ft)
BORI	NG NO.	Y1A	RWAL	2	-	STATION 40	+54		OFFSET	81 ft LT			ALIGNMENT -Y1A-	0 HR. N/A
	LAR ELI				-	OTAL DEPT			NORTHIN				EASTING 2.000,702	24 HR. 3.2
									NORTHIN	1				
						DIEDRICH D-50) Mu	d Rotary HAMMI	ER TYPE Automatic
DRIL	LER T	URNAG	E, J. F	₹.	5	START DATE	05/11/21		COMP. D	ATE 05	/11/21		SURFACE WATER DEPTH N/A	Α
ELEV	DRIVE ELEV	DEPTH	BLC	M COL	JNT		BLOWS F	ER FOOT	-	SAMF	¹. ▼ /		SOIL AND ROCK DESC	CRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	5 5	0	75 100	NO.	/мо	ıĞ	ELEV. (ft)	DEPTH (f
150														
150	-	t										1 5	-	
		<u> </u>				<u> </u>							147.3 GROUND SURF	
145	146.3	1.0	4	4	5			: : : :	: : : :				UNDIVIDED COASTA STIFF, GRAY, ORANGE,	
145	144.0	3.3	<u> </u>						+ : : : :	1			MOIST TO WET, TRACÉ	ORGANICS,
	-	+	5	5	9	14				SS-11	3 22%		HIGHLY PLASTIC (· · · · · · · · · · · · · · · · · · ·
140	141.3	6.0	4	4	6	-{ :: <i>'j</i> :::					l _w		141.8 MEDIUM DENSE, GRAY	
140	139.0	8.3				 10			+ : : : :	11	**		- _{139.3} CLAYEY COARSE TO FINE (A-2-6)	E SAND, WET8.
		-	2	1	1	•2					W		COASTAL PLA	IN
	-	ţ				j : : : : :							SOFT, GRAY, COARSE TO	
135	134.0	13.3						<u> </u>	 			7	CLAY, WET, TRACE MODERATELY PLASTIC (A	
	134.0	10.0	WOH	WOH	WOF	1 1 1 1 1 1 1 1 1 1				SS-11	4 62%		CREEK FORMAT	
	-	t							1 : : : :		7		VERY SOFT, GREENISH (CLAY, SATURATED, TRA	CELIGNITE
130	129.0	[1			1	41			= ^{130.3} -\ HIGHLY PLASTIC (A-7-6) /— 17
	129.0	10.3	WOH	1	1	2					Sat.		VERY LOOSE TO LOOSE, COARSE TO FINE SAND,	
	-	+				1 7						-	TRACE CLAY (A-	
125		Ī				1 7			1	41			-	
	124.0	23.3	3	5	3	-					Sat.			
	-	Į.				. .		: : : :			Joan			
120	_	t				1 1]			120.3	27.
	119.0	28.3	3	3	5					11	0-4		STIFF TO VERY STIFF, GF GRAY, SILTY CLAY, SA	
		ţ	"		J	8					Sat.		HIGHLY PLASTIC (
115	-	+				- !							-	
	114.0	33.3	<u> </u>			 				11			- •	
	-	†	3	4	5	9					Sat.			
110	-	Į.				; ý; ;		: : : :						
110	109.0	38.3							1	11			-	
	-	+	6	8	8	16_					Sat.		-	
405	-	Į.					111	_::::					· _ 105.3	42.
105	104.0	43.3				1			+	11			HARD, GRAY, FINE SAN	NDY CLAY,
			40	60/0.4				: : : :	100/1.0	♦	Sat.		SATURATED, TRAC MODERATELY PLAS	
	-	<u> </u>							1				•	•
100	99.0	L 48.3				· · · · ·		· · · · · ·	- ` 	-			VERY DENSE, GRAY, SILT	Y COARSE TO 47.
		40.5	17	29	25			•54 · ·			Sat.		FINE SAND, SATURATED,	
	-	ł						$ \mathcal{T} \cdot \cdot \cdot $					AND CLAY (A-2	-4)
95		Ī.,,						-/	1	41			-	
	94.0	53.3	12	26	35	 ::::		. 7			Sat.			
	-	+						. [70] .				-	-	
90	_	‡				1			1	<u> </u>			• -	
	89.0	58.3	22	26	30	$+ \cdot \cdot \cdot \cdot$		· <u>j</u> ····			Sat.			50.
	-	!	 			11		56	1	4	Jai.		- 87.5 Boring Terminated at Eleva	59. ation 87.5 ft IN
	-	t										1 1	COAŠTAL PLAIN SILTY S	AND (BLACK
	-	-										1 -	- CREEK FORMAT	ION)
		‡											STA. 287+43 -L-; 7	78' LT
		†										1 +	-	
	_	Ī											- •	
		ł												
		Ī											• •	
	-	t											-	
		+										F		
		‡										1	- -	
		L	l										-	

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 8 OF 11

WBS	47533	.1.1			TI	P I-5987		COUNT	Y ROBE	SO	N			GEOLOGIST DEGON, A. N.	
SITE	DESCRI	PTION	SITE	2 - AE	BUTME	ENT RET. W	/ALLS AT	EB1 AND	EB2 OF	BRI	DGE ON	I -Y1A	A- OVE	ER -L- AT -Y1A- STA. 14+92.02 G	ROUND WTR (ft)
BORI	ING NO.	Y1A_	RWAL	.5	S	TATION 42	2+41		OFFSE	T 9	95 ft LT			ALIGNMENT -Y1A-	0 HR. N/A
COLI	LAR ELE	EV. 14	8.7 ft		TO	OTAL DEPT	TH 60.0 ft	:	NORTH	ING	353,69	96		EASTING 2,000,884 2 4	4 HR. 1.5
DRILL	RIG/HAM	MER EF	F./DAT	E TER	299 DI	EDRICH D-50	79% 12/31	/2020			DRILL M	IETHOI	D Mu	d Rotary HAMMER	TYPE Automatic
DRIL	LER TU	JRNAG	E, J. F	₹.	S	TART DATE	E 05/06/2	1	COMP.	DA	TE 05/0	06/21		SURFACE WATER DEPTH N/A	
ELEV (ft)	ELEV	DEPTH (ft)	BLC 0.5ft	0.5ft				PER FOOT 50		100	SAMP.	V	L	SOIL AND ROCK DESCRI	
. ,	(ft)	. ,	0.510	0.511	0.010		<u> </u>	<u> </u>	.,,		110.	/MO	I G	ELEV. (ft)	DEPTH (ft)
150	_	_												 _ 148.7	E 0.0
	147.7 -	- 1.0	5	6	3					:		V		- UNDIVIDED COASTAL P - 146.7 _ LOOSE, GRAY, SILTY FINE SA	
145	145.2	3.5	4	4	3	7.9				:		l		(A-2-4) MEDIUM STIFF TO STIFF, DA	i
	- 142.7 -	- - 6.0								:		W		COARSE TO FINE SANDY CI TRACE ORGANICS, MODE	LAY, WET,
4.40	_	_	1	3	3	6 : :				:		W		- 140.7 PLASTIC (A-6)	8.0
140	140.2	- 8.5 -	3	3	1	• 4			+	-	SS-107	Sat.		COASTAL PLAIN LOOSE, LIGHT GRAY, SILTY F	FINE SAND,
	-	_				j : : : : :				:				SATURATED, TRACE LIGNI 136.2 (BLACK CREEK FORMA	TE (A-2-4)
135	135.2	13.5	WOH	WOH	WOL					:				VERY SOFT, LIGHT GRAY, S	ILTY CLAY,
	-	_	WOH	WOR	WOH	• 0				:	SS-108	66%		SATURATED, HIGHLY PLAST	TIC (A-7-6)
400	400.0	- 40.5								:				- -	
130	130.2	18.5	4	8	10		3		 			Sat.		<u>129.7</u> <u> MEDIUM DENSE, DARK GRA</u>	AY, SILTY 19.0
	-	_				: : : :				:				- COARSE TO FINÉ SAND, SA - (A-2-4)	
125	125.2	23.5	5	7	7	· · j ·				:				-	
	-	-	5	′	7	14				:		Sat.		•	
	-	_				: <i>!</i> : :		: : : :		:				- - 120.7	28.0
120	120.2	28.5	2	3	5	. 68	 	 	+	_		Sat.		STIFF TO VERY STIFF, DAF SILTY CLAY, WET TO SATI	RK GRAY,
	_													TRACE MICA, HIGHLY PLAS	
115	115.2	33.5								-				- -	
	-	-	2	3	6	. •9				•		Sat.		-	
	_	-				:{::		: : : :	: : :	-				- -	
110	110.2	38.5	4	4	7	. •11 .	 	ļ · · · ·	ļ · · · ·	-		l w		- -	
	-	_				: ५,, :		: : : :						-	
105	105.2	43.5								-				- -	
į	-		5	6	10	•16				•		W		TRACE LIGNITE	
	-	_					17.55	<u> </u>	: : :	-				- 101.7	47.0
100	100.2	48.5	15	40	55					-		l w		DENSE TO VERY DENSE, LIG SILTY COARSE TO FINE SAN	ID, WET TÓ
	-	-						: : : :		·		"		- SATURATED, TRACE MICA	A (A-2-4)
95	95.2	- 53.5		L_						-				• •	
	-	-	18	20	20		•40	1		•		W		- ·	
	-	-					: : : .	\	: : :	:				•	
90	90.2	58.5	12	28	35			63.	1:::	4		Sat.		- - 88.7	60.0
5	-						1	<u> </u>	1	• 1		- Jul.	******	 Boring Terminated at Elevation 	n 88.7 ft IN
	-	-												- UNDIVIDED COASTAL PLA - SAND (BLACK CREEK FOR	
	-	-												STA. 287+90 -L-; 104'	RT
	-	-												•	
	-	_												• -	
	-	-												•	
	-	- -												- -	
	-	-												- •	
	-	-												•	
	_	<u> </u>												-	

									UKE I	<u> </u>				
WBS 4	47533	.1.1			TI	P I-5987		COUNTY	ROBES	ON			GEOLOGIST B. Painter	
SITE DE	ESCR	IPTION	SITE	2 - Al	BUTME	NT RET. W	/ALLS AT	EB1 AND	EB2 OF BF	RIDGE ON	√-Y1A-	OVE	ER -L- AT -Y1A- STA. 14+92.02	GROUND WTR (ft
BORING	G NO.	Y1A_	EB2-C	-	S	TATION 42	2+10		OFFSET	20 ft LT			ALIGNMENT -Y1A-	0 HR. N/
COLLA	R ELE	EV. 14	8.6 ft		T	OTAL DEPT	H 80.0 ft		NORTHIN	3 353,6	17		EASTING 2,000,866	24 HR. 3.
DRILL RI	IG/HAN	IMER EF	F./DAT	E F&F	R3495 (ME-55 82% (03/01/2019			DRILL N	METHOD	Mu	d Rotary HAMM	ER TYPE Automatic
DRILLE	R D.	Tignor			S	TART DATE	12/10/19	9	COMP. DA	TE 12/	10/19		SURFACE WATER DEPTH N	A
	RIVE	DEPTH	BLC	ow co	UNT		BLOWS F	PER FOOT		SAMP.		L	OOII AND DOOK DEG	ODIDTION
/ft\ E	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50	75 100	NO.	MOI	O G	SOIL AND ROCK DES	CRIPTION DEPTH
								•	•					
155														
133		-										ļ	- ,	
	-	-										þ		
150	-	_										Ŀ	=	
_1	148.6	- 0.0	1	2	4	1	T	T	T		N4	15:5	. 148.6 GROUND SURF	
	-	-	'	-	ļ .	│ │ ┎ ^{¶6}			: : : :		M		LOOSE, LIGHT BROWN	, SILTY FINE
145 1	145.1_	3.5	WOH	1	2	1			+	SS-1518	21%		SAND, MOIST, TRACE ORG COASTAL PLA	
	-	-				□ 3 · · ·				55-1510	2170		SOFT, ORANGE-GRA COARSE SANDY CL	AY WFT
140 _1	-					<u> </u>						\Rightarrow	MODERATELY PLASTIC	(A-6) (BLACK /
170 1	140.1_ -	8.5	3	2	1	∮ 3 · · ·				11	Sat.		CREEK FORMAT VERY LOOSE, GRAY, CI	AYÉY SILTY
	-	<u> </u>						: : : :				:::: <u> </u>	FINE SAND, SATURAT 0RGANICS (A-	
135 1	135.1_	13.5	1,,,,			<u> </u>						7	VERY SOFT, LIGHT GR	AY, FINE TO
	-		WOH	WOH	WOH	0				SS-1520	20%		COARSE SANDY SILTY TRACE ORGANICS, HIG	
	-	-						: : : :					(A-7-6)	
130 1	130.1	18.5	2	3	7	1 - 1				-	Cat		LOOSE TO MEDIUM DE GRAY TO LIGHT GRAY,	CLAYEY FINE
	-	-	-		,	. 10 -					Sat.		TO COARSE SAND, SATU BLACK CREEK FOR	
	- 	<u> </u>											. (==:::::==::::	,
125 1	125.1 <u> </u>	23.5	7	4	2	6			 	1	Sat.	\searrow	<u>-</u>	
	-	_											· 121.6	
120 1	120.1	28.5											MEDIUM STIFF TO HARD	, GRAY, FINE
	-		3	5	7	• •12 •]	W	S	SANDY SILTY CLAY, SATURATED (A	
	-	-				:/:::	: : : :	: : : :				J	•	
115 1	115.1_	33.5	WOH	2	3	<u> </u>				41	l [-	
	-		"		"	∮ 5· · ·					W		• •	
	-	_				1						N		
110 1	110.1 -	38.5	3	3	5	. 8	 	 	+ : : : :	1	Sat.	S	_	
	-	ŀ										3		
105 _1	- 105.1	43.5						1::::				S		
	-	F	3	4	58			· 1 62 ·			W	S	- ·	
	-	<u> </u>					: : : :	: : ; ; ;				ン	<u>· 101.6</u>	
100 1	100.1	48.5	17	20	55			· · · · <u>`</u>	J	1	<u>.</u> .		HARD, GRAY, FINE SAND MICACEOUS (A	
	-	<u> </u>	''	20	55			:::;2	● 75 · · ·		M			,
	-	<u> </u>						· / : :					96.6 DENSE TO VERY DEN	SE GRAY — — S
95 9	95.1	53.5	7	19	25			<u> </u>	+ : : : :	-	Sat.	::::F	 CLAYEY SILTY FINE TO C 	OARSE SAND,
	-	F					1] : : : :				:::F	SATURATED, TRACE LIG	INITE (A-2-4)
90	90.1	- 58.5					: : ;i : :	: : : :					•	
	- -	- 50.5	9	15	22		- •37 -	: : : :	1	1	Sat.		- ·	
	-	<u> </u>				: : : :	::::	<u> </u>				***	•	
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	-	E	16	31	42			: : : >	73		Sat.	₩		
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75	75.1	73.5	I	1				1	1	1.1	1	:::1		

GEOTECHNICAL BORING REPORT

SHEET 9 OF 11

		ORE LOG		
WBS 47533.1.1		Y ROBESON	GEOLOGIST B. Painter	r
SITE DESCRIPTION SITE 2 - ABUT	1		T	GROUND WTR (ft)
BORING NO. Y1A_EB2-C	STATION 42+10	OFFSET 20 ft LT	ALIGNMENT -Y1A-	0 HR. N/A
COLLAR ELEV. 148.6 ft	TOTAL DEPTH 80.0 ft	NORTHING 353,617	EASTING 2,000,866	24 HR. 3.6
DRILL RIG/HAMMER EFF./DATE F&R349		DRILL METHOD Mu	T -	ER TYPE Automatic
DRILLER D. Tignor FLEV DRIVE DEPTH BLOW COUNT	START DATE 12/10/19	COMP. DATE 12/10/19	SURFACE WATER DEPTH N/A	4
-;;;	T BLOWS PER FOOT 5ft 0 25 50	75 100 NO. MOI G	SOIL AND ROCK DESC	CRIPTION DEPTH (fi
75	Match Line 6	Sat.	DENSE TO VERY DENSE CLAYEY SILTY FINE TO CONTINUED (Continued) 68.6 Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) STA. 287+11 -L-; 80 Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80) Boring Terminated at Elevans SAND (COASTAL PLAIN) (ENGRAPHION STA. 287+11 -L-; 80)	SE, GRAY, DARSE SAND, INITE (A-2-4) stion 68.6 ft in BLACK CREEK OIL: 0.0 - 0.2'





Terracon GEOTECHNICAL BORING REPORT

SHEET 10 OF 11

	ulting Eng		and Sci	entists					1		RE L				T				
	47533					IP I-59					ROBESO				GEOLOGIST DEGON	,			
									EB1 ANI	_				A- OVE	ER -L- AT -Y1A- STA. 14+	92.02		ND WT	
	NG NO.		-	_6		TATIO				+	FFSET				ALIGNMENT -Y1A-		0 HR.		N/A
	LAR ELI							H 59.8 ft		N	ORTHING	<u> </u>			EASTING 2,000,860	1	24 HR.		3.5
DRILL	. RIG/HAN	MER EF	F./DAT	E TEF	R299 D	IEDRICH	1 D-50	79% 12/31	/2020	_		DRILL	ЛЕТНО	D Mu	d Rotary	HAMI	MER TYPE	Autom	atic
DRIL	LER T	URNAG	E, J. F	₹.	S	TART I	DATE	05/05/2	1	С	OMP. DA		_	/ 	SURFACE WATER DE	PTH N	I/A		
ELEV (ft)	DRIVE ELEV	DEPTH	'——	W CO				BLOWS			400	SAMP	'/	0	SOIL AND RO	CK DE	SCRIPTIO	N	
(11)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	- 2	25	50	75	100	NO.	/MO	I G	ELEV. (ft)			DE	PTH (
150		-												-	-				
	-					Ш.									. 147.6 GROUN				(
145	146.6	1.0	5	5	4		9			-			l		 UNDIVIDED MEDIUM STIFF T 	O STIFI	F, DARK G		
1 10	144.3	3.3	3	3	3										 LIGHT GRAY, O FINE SANDY CI 				
	141.6 -	6.0				ヾ				-					MODERATE	LY PLA	STIC (A-6)		
140	139.3	8.3	3	4	7	_ •	11			-			W		<u>- 140.6</u> LOOSE, GRAY, S	LTY CC	DARSE TO	FINE	
	100.0	0.5	3	5	2	/. •7							w		130.1	WET (A	,		(
	-	‡				: :				-					VERY SOFT TO		1 STIFF, G		
135	134.3	13.3	IWOLI	WOLL	WOH				 	_			1		_ GREEN, SILTY . LIGNITE, HIGH				
		ł	IWOn	WOR	WOR	Q 0			: : :	:	: : : :	SS-106	87%		. (BLACK CRE	EK FO	RMATÌON)	,	
130	_	ł				', .				-					•				
	129.3	18.3	2	4	6		10 .			-			Sat.		- 128.6 - LOOSE, LIGHT (<u> </u>	TTV COA		1
	-	F				: j.		: : : :	: : :	-					 TO FINE SAND, 	WET, I			
125	124.3	23.3							ļ : : :	-						A-2-4) STIFF	GRAY SI	ITY -	_ 2
		-	2	2	2	4 .							Sat.		CLAY, WET TO	SATUR	ATED, TR	ACE	
120	-	‡				: <i>[</i>	: :			-					. MICA, HIGHL	Y PLAS	TIC (A-7-6)	
120	119.3	28.3	3	3	5	 									-				
		<u> </u>	"	"	"	.♠8	3			:			Sat.		•				
115		ł				<u> : </u>				-					•				
	114.3	33.3	4	4	6	1	10 .			-			Sat.						
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110	109.3	38.3					<u>/</u>			-					• -				
	-100.0	1	6	6	9	1 ::	15						Sat.		•				
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105	104.3	43.3	4	5	9	 	 			_			١.,,		-				
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95	94.3	53.3							\	-					- 95.6 - VERY DENSE,				_ 52
		1	27	32	40] ::			: : ` ;	. .●72	2		Sat.		COARSE TO FIN	E SAND A-2-4)), SATURA	TED	
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90	89.3	58.3	9	11	9			<u> </u>		_			١.,,		89.1	5.73Ev	, ,,,,,		58
		_	+ "	''	"		. ●2	0		-			W		87.8 VERY STIFF, DAF	Y, WET	, MODERA	TELY [59
	-	+														STIC (A	-6)		
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		F													CLAY (BLACK (JIN)	
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LABORATORY TESTING SUMMARY

PROJECT NUMBER:	47533.1.2	TIP:_	I-5987A	COUNTY:	ROBESON	
DESCRIPTION:		SITE 2 - ABUTMENT RETAINING W	ALLS AT END BENT 1 AN	ID END BENT 2 OF BRIDGE ON -Y1A- (L	JS 301) OVER -L- (I-95) AT -Y1A- STA. 4	11+19.02

			Offset	Depth	AASHTO				% by V	/eight		%	%	Passing (siev	es)		%
Sample No.	Station	Alignment	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	76 Organic
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		
					1									1			

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number

	Station	Alignment	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L. P.I		% by Weight				%	% Passing (sieves)				%
Sample No.							P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	Organic
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

786 REFERENCE **CONTENTS**

DESCRIPTION

LEGEND (SOIL & ROCK)

SOIL TEST RESULTS

TITLE SHEET

SITE PLAN

PROFILES

BORE LOGS

SHEET NO.

4 - 5

6 - 12

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY ROBESON

PROJECT DESCRIPTION <u>I-95 IMPROVEMENTS</u> 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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
V.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 1991 707-680. 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 NDICATED 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 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

DEGON, A. N. FARMER, B. C. DUGGINS, W. T. TURNAGE, J. R. TANNER, M. L. KELLY, N. S. DAVIS, S. (F&R) PESI, W. (F&R) INVESTIGATED BY __TERRACON CONSULTANTS FIELDS, W. D. DRAWN BY RIGGS, Jr., A. F. CHECKED BY ALEXANDER, M. J. SUBMITTED BY JANUARY 2022 DATE

Prepared in the Office of:



01/28/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

I-5987A

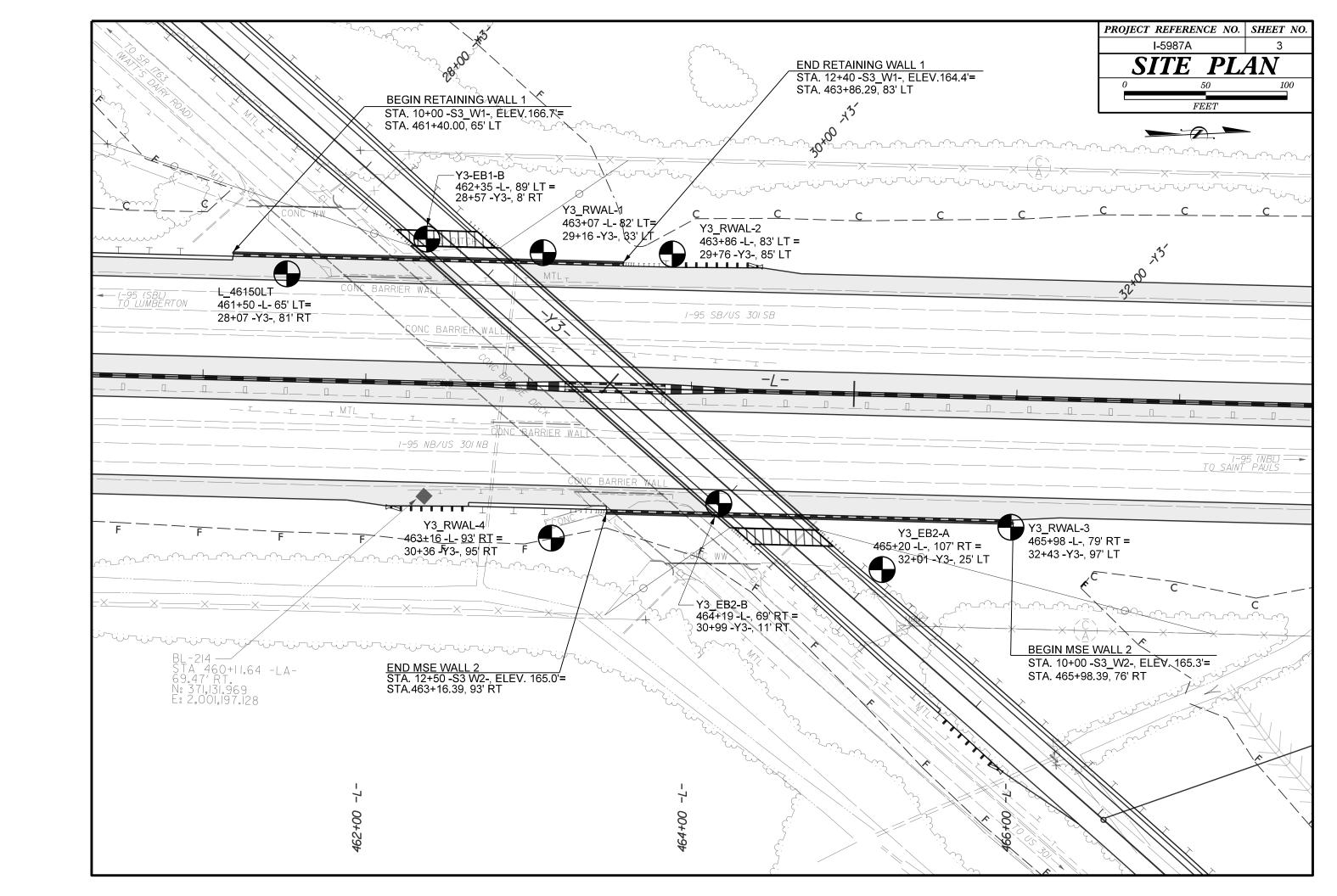
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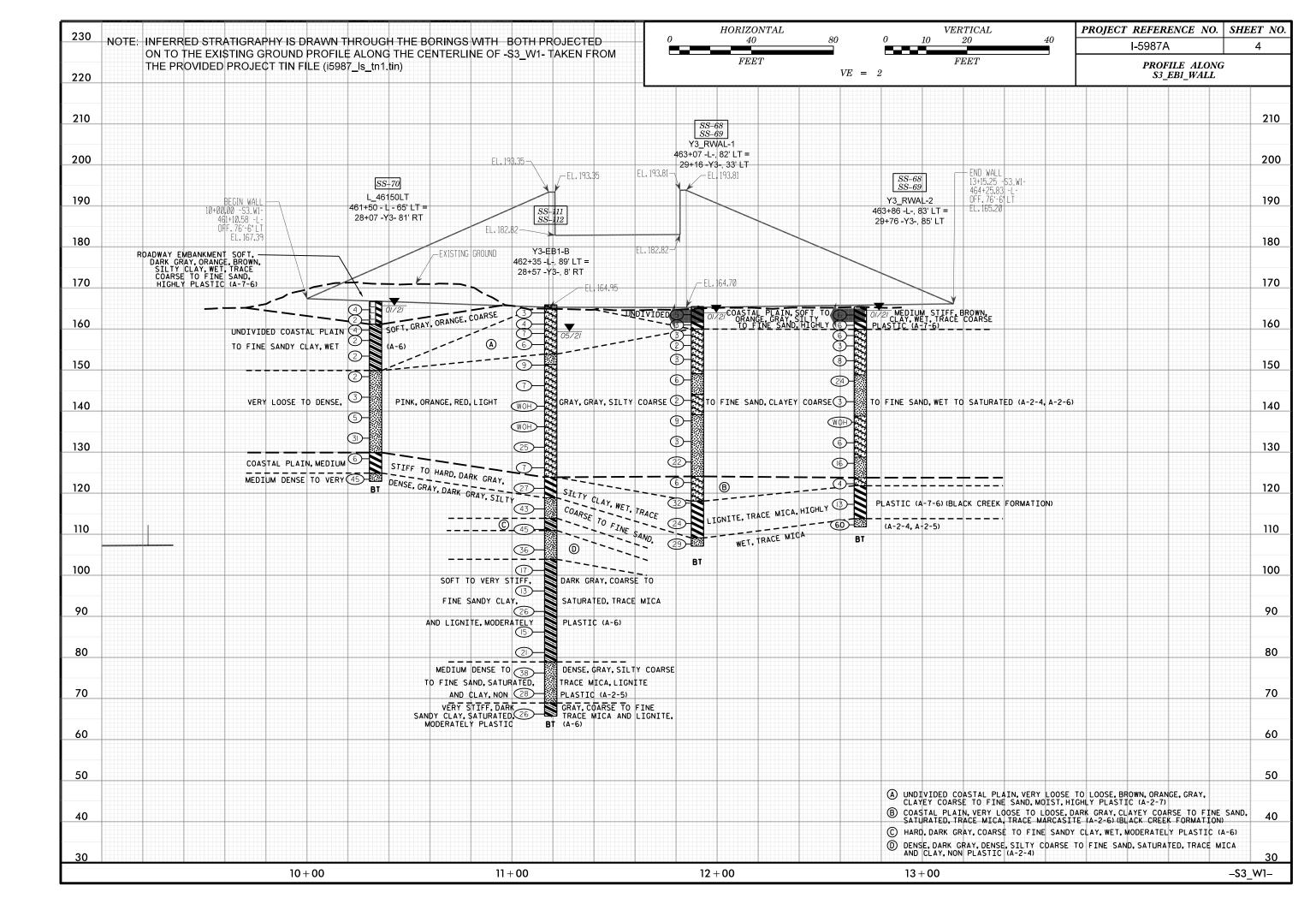
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

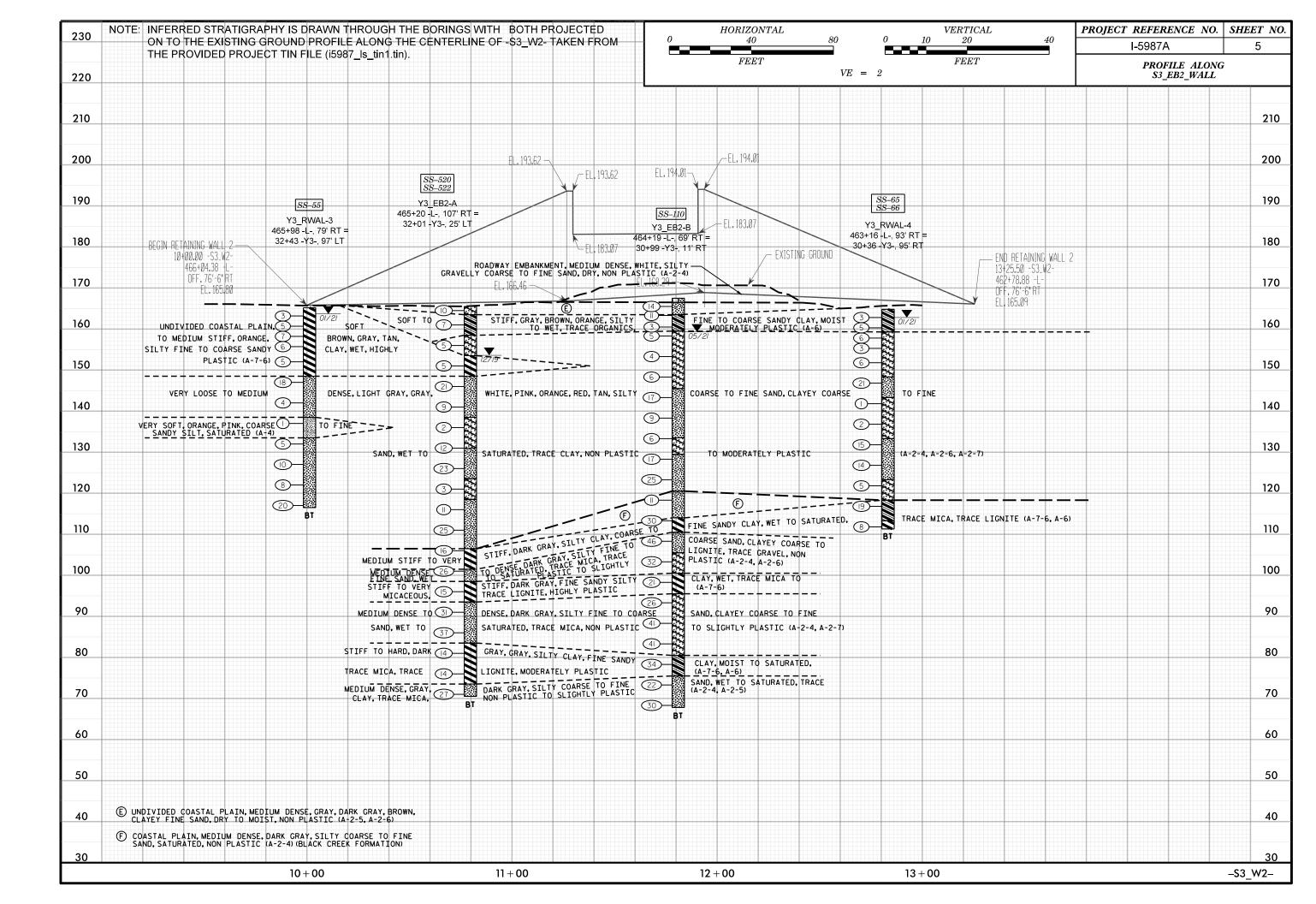
SUBSURFACE INVESTIGATION

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	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.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.		
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:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	<u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.		
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.		
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.		
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT		
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND		
CLASS. (≤ 35% PASSING "200) (> 35% PASSING "200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.		
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM		
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.		
7. PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.		
*10 50 MX GRANULAR SIL1-	PERCENTAGE OF MATERIAL	CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT		
*40 30 MX 50 MX 51 MN SOLS PEAT SOLLS SOLUS SOLU	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.		
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.		
PASSING *40 LL - 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 50ILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE		
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITILE UN HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.		
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOUS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.		
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.		
OF MAJOR GRAVEL, AND MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	▼ STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM		
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.		
AS 20RGHADE LOUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.		
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.		
DANCE OF STANDARD DANCE OF UNICONSTITUT	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.		
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (IV-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO		
VERY LOOSE (4	SPT SPT SLOPE INDICATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.		
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL OPT DMT TEST BORING SECRET INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS		
MATERIAL MEDIUM DENSE 10 TO 30 N/A (NON-COHESIVE) MEDIUM DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.		
VERT DENSE 2 200		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.		
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.		
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	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	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF		
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.		
HARD > 30 > 4 TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT		
		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK,		
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCOT UNSUITABLE WASTE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO		
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.		
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.		
GRAIN MM 305 75 2.0 0.25 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF		
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL		
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS.		
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.		
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL		
(SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.		
PLASTIC CONTROL IN DEGLIDOR DEVINE TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRACT - FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.		
RANGE - WET - (W) SEMISOLID; REGULRES DRYING TO	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: BL-214		
(PI) PL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	69.74' RIGHT OF STA. 460+11.64 -L-		
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N: 371,131.969; E: 2,001,197,128 ELEVATION: 166.15 FEET		
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:		
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6 CONTINUOUS FLIGHT AUGER	. VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	NOTE: ELEVATIONS OF BORING Y3_EB2-A PERFORMED BY F&R Inc.		
PLASTICITY	CME-55 S* HOLLOW AUGERS CURE SIZE:	INDURATION	OBTAINED FROM PROVIDED TIN FILE: i5987_ls_tinl.tin DATED: 11/14/2019		
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.			
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:	CRAINC CAN BE CEDARATED FROM CAMPLE WITH CIFEL BRODE			
HIGHLY PLASTIC 26 OR MORE HIGH	X CME-55 POST HOLE DIGGER X TRICONE 2% STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.			
COLOR	DIEDRICH D-50	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORF BIT VANE SHEAP TEST	DIFFICULT TO BREAK WITH HAMMER,			
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	ACKER RENEGADE THE STEAM LEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			











Terracon GEOTECHNICAL BORING REPORT

SHEET 6 OF 13

WBS	47533.	.1.2			TI	P I-5987A	COU	NTY ROBE	SON				GEOLOGIST FARMER, B. C.		
SITE	DESCRI	PTION	SITE	3 - AI	BUTMI	ENT RET. W	ALLS AT EB1 A	ND EB2 OF	BRIDGE	E ON	-Y3-	OVER	R -L- AT -Y3- STA. 30+40.11	GROUND W	TR (ft
BORI	NG NO.	L_46	150LT		S.	TATION 46	1+50	OFFSE	65 ft	LT			ALIGNMENT -L-	0 HR.	N/A
COLI	AR ELE	V. 16	6.7 ft		T	OTAL DEPTI	H 43.8 ft	NORTH	NG 37	71,05	5		EASTING 2,001,044	24 HR.	1.0
RILL	RIG/HAM	MER EF	F./DAT	E TER	R92-0 A	CKER RENEGA	ADE 86% 02/15/201	9	DRI	ILL ME	ETHOD) Mud	d Rotary HAMI	MER TYPE Autor	natic
DRIL	LER DU	JGGIN	S, W.	T.	S	TART DATE	01/22/21	COMP.	DATE	01/2	2/21		SURFACE WATER DEPTH N	I/A	
LEV	DRIVE	DEPTH	BLC	W CO	UNT		BLOWS PER FO	OT	SA	MP.	V /	L	COIL AND DOOK DE	CODIDTION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	5 50	75 1	00 N	10.	/MOI	O G	SOIL AND ROCK DE-		EPTH
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	1	_										l E			
	165.7	- 1.0							- -	-	•		166.7 GROUND SUR ROADWAY EMBA		(
65	1	-	1	2	2	4			- SS	S-70	W 18%		- SOFT, DARK GRAY, ORA SILTY CLAY, WET, TRAC	NGE, BROWN,	
	163.2	3.5	WOH	WOH	2	2			-		W		FINE SAND, HIGHLY PL		
60	160.7	- 6.0	2	3	1	<u> </u>					W		UNDIVIDED COAST		
	158.2	8.5							-		VV		SOFT, GRAY, ORANGE FINE SANDY CLAY,		
	1	_	1	1	1	\$ 2			-		W				
55	154.4	12.3											-		
	Ŧ	_	1	1	1	2			-		W	**			
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	149.4	17.3	WOH	1	1				\exists		Sat.	-	VERY LOOSE TO DENS		·
	+	-							:				TO FINE SAND, SATUR	ATED, TRACE	
5	144.4	- 22.3							_			<u> </u>	CLAY (A-2-	4)	
		-	2	2	1	3			:		Sat.				
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10	139.4	27.3	4	3	2						Cot		-		
	1	_	'		_	● 5			:		Sat.				
35	134.4	- 32.3										L	_		
	134.4	- 32.3 -	9	16	15	: : : :	31		:		Sat.				
	1	_					<u> </u>		-			_			
30_	129.4	37.3					-' 	 					-129.9 COASTAL PL		3
	-	_	2	2	4	♦ 6			-		W		MEDIUM STIFF, DARK CLAY, WET, TRACE LI	GRAY, SILTY	
25	I I	_				::::			-				(BLACK CREEK FO		4
	124.4	42.3	12	19	26		45				W		DENSE, DARK GRAY, SIL 122.9 FINE SAND, WET, TRAC		 4
	-	-										F	Boring Terminated at Elev	ration 122.9 ft IN	
	4	-										ΙF	COASTAL PLAIN SILTY CREEK FORMA	TION)	
	1	-										l F	STA. 28+07 -Y3-;	81' RT	
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	aiting Line								<u>_</u>	UNL	<u> </u>	00				
WBS	47533	3.1.2			1	ΓIP	I-5987A		COUNT	Y ROBE	SO	N			GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	SITE	3 - Al	BUTM	ΛEΝ	NT RET. W	ALLS AT	EB1 AND	EB2 OF	BRI	DGE ON	I -Y3-	OVE	R -L- AT -Y3- STA. 30+40.11 GRO	OUND WTR (ft
BORI	NG NO.	Ү3-Е	B1-B		5	STA	ATION 28	+57		OFFSE	T 8	3 ft RT			ALIGNMENT -Y3- 0 H	IR. N/A
COLL	AR ELE	EV. 16	55.9 ft		7	τοτ	TAL DEPT	H 100.2	ft	NORTH	IING	371,14	11		EASTING 2,001,040 24 H	IR. 6.5
DRILL	RIG/HAN	MER EF	F./DAT	E TEF	R299 [DIE	DRICH D-50	79% 12/31	/2020			DRILL M	ETHO) Mu	Rotary HAMMER TY	PE Automatic
DRIL	LER T	URNAG	E, J. F	₹.	5	STA	ART DATE	05/10/2	1	COMP.	DA	ΓE 05/1	1/21		SURFACE WATER DEPTH N/A	
ELEV	DRIVE	DEPTH	T	W CO					PER FOOT			SAMP.	V /	11		
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	t	0 2	5 ;	50	75	100	NO.	MOI	O G	SOIL AND ROCK DESCRIPT ELEV. (ft)	TION DEPTH (
	(1.1)					\dagger							/ IVIOI		LLL V. (II)	DEFIII
170		ł												<u> </u>	-	
	-	+														
165	164.9	1.0				+			1						165.9 GROUND SURFACE UNDIVIDED COASTAL PLA	.IN
	104.9	- '	3	2	1	٦i	∮ 3 · · ·				-		М		VERY LOOSE TO LOOSE, BR	OWN,
	162.2	3.7	2	3	1	41	 								ORANGE, GRAY, CLAYEY COA FINE SAND, MOIST, HIGHLY PI	
160	159.9 <u>-</u>	6.0					4				-		M		(A-2-7)	
		-	2	4	3		7				-	SS-111	<u></u> —M−			
	157.2	8.7	3	3	3	+]		: : : :		-		М	//		
155	_	‡					♥ 6			ļ · · ·	-		IVI	<i>**</i> **********************************	- 450.0	
		<u> </u>					:j: : :								LOOSE, LIGHT GRAY, ORANGE	
	152.2	13.7	9	6	3	$\exists 1$. 1				-		Sat.		COARSE TO FINE SAND, SATU NON PLASTIC (A-2-4)	RATED, 14
150	_	-					1			+					- VERY LOOSE TO MEDIUM DE	
	147.2	107					: : : :			: : :	:				ORANGE, RED, GRAY, CLAYE SAND, SATURATED, TRACE	SILT.
	147.2	10./	2	2	5	1	7				-	SS-112	Sat.	/ /	MODERATELY PLASTIC (A-	2-6)
145	-	ŀ					1		 	+	-			//	-	
	142.2	23.7					<i> </i>		: : : :		-					
140	-		WOH	WOH	WOF	╗	0		: : : :	: : :	-		Sat.			
140	-	‡				H			<u> </u>	+ : : :					-	
	137.2	28.7									-			///		
135	-	F	WOH	WOH	WOH	¹ ₫	φ		: : : :	: : :	-		Sat.			
100	-	‡					. \			<u> </u>					=	
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130	-	ł	7	10	15		· · · · · · · · · · · · · · · · · · ·	25			-		Sat.	///		
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ŀ	127.2	38.7	10	4	3	+	: //: :				-		Cot			
125	-	ţ	"	'			Q 7			1 : : :	-		Sat.		_	
	-	ł									:				123.9 COASTAL PLAIN	42
	122.2	43.7	8	12	15	+					-		w		VERY STIFF, DARK GRAY, SAND CLAY, WET, HIGHLY PLASTIC	
120	-	-						\\ \	ļ · · · · ·	<u> </u>	-				 (BLACK CREEK FORMATIC 	
	4470	40.7								: : :					DENSE, DARK GRAY, DENSE,	SILTY
	117.2	48.7	19	20	23			\ .			:		W		COARSE TO FINE SAND, WET PLASTIC (A-2-5)	T, NON
115	-	+						i		$+\cdots$						52
	112.2	[53.7							: : : :	: : :	-				HARD, DARK GRAY, COARSE T SANDY CLAY, WET, MODERA	O FINE
110	-		6	19	26			4	· · · · 5 · · · ·	: : :	-		W		_110.9PLASTIC (A-6)	<u></u>
110	-	‡						/ .		 : : :					DENSE, DARK GRAY, DENSE, COARSE TO FINE SAND, SATU	
	107.2	58.7	<u> </u>	10				: : <i>[</i> ::	: : : :						TRACE MICA AND CLAY, NON F	
105	-	<u> </u>	11	16	20			36			-		Sat.	-	(A-2-4)	
	-	F						<i>/</i> · · · ·		1					103.9	<u> </u>
	102.2	63.7	8	7	10	41	::::/		: : : :	: : :	:		C		SOFT TO VERY STIFF, DARK COARSE TO FINE SANDY C	LAY,
100	-	ţ	°	′	10		· · • 17		<u> </u>	1:	-]		Sat.		SATURATED, TRACE MICA A LIGNITE, MODERATELY PLAST	
	-	+					.				-7				L.C L, MODERVILLE I LAGI	(,,,
}	97.2	68.7	3	5	8	+	: : [: :		: : : :	: : :	-		Sat.			
95	-	‡					• 13-		: : : :	1:::			Jal.		_	
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, }	92.2	73.7	9	11	15	+	\	200			-		Sat.			
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GEOTECHNICAL BORING REPORT BORF LOG

SHEET 7 OF 13

								B	<u>ORE L</u>	<u>UG</u>							
WBS	47533	3.1.2			TI	P I-5987A		COUNTY	ROBESO	N			GEOLOGI	ST DEGON	, A. N.		
SITE	DESCR	IPTION	SITE	3 - AE	BUTME	ENT RET. W	'ALLS AT E	B1 AND			1 -Y3-	OVEF	R -L- AT -Y3	- STA. 30+40	.11	GROUN	ND WTR (f
BORI	NG NO.	Y3-EI	31-B		S	TATION 28	8+57		OFFSET 8	ft RT			ALIGNME			0 HR.	N/
COLI	LAR ELE	EV. 16	5.9 ft		TO	OTAL DEPT	H 100.2 f	t	NORTHING	371,14	41		EASTING	2,001,040		24 HR.	6.
					299 DI	EDRICH D-50	79% 12/31/2	2020		DRILL N) Mu	d Rotary		HAMMI	ER TYPE	Automatic
DRIL	LER TO					ΓART DATE			COMP. DA		11/21	/ 	SURFACE	WATER DEI	PTH N/	A	
(ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	_	0 2	BLOWS P		75 100	SAMP. NO.	MO	O G	ELEV. (ft)	SOIL AND RO	OCK DESC	CRIPTION	N DEPTH
90	· – – –					 	Match	Line			L			OFT TO VERY	OTICE F	<u> </u>	. ~
85	87.2 - - - -	78.7	5	6	9						Sat.			COARSE TO I SATURATED, SNITE, MODER	FINE SAN	IDY CLAY	′,)
80	82.2 - - - -	83.7	6	7	14		1				Sat.		- - <u>78</u> .9	MEDĪŪM DENS	E TO DE	NSE. GRA	
75	77.2 - - - - 72.2 -	88.7 93.7	10	15	23		38-				Sat.		S	SILTY COARS ATURATED, T AND CLAY, NO	SE TO FII RACE MI	NE ŚAND CA, LIGN	, ^r ITE
70	67.2	98.7	7	12	16		♦ 28				Sat.			RY STIFF, DAF SANDY CLAY			
		-	6	13	13		26				Sat.		65.7 N - Bo	MICA AND LIGI PLA: ring Terminate DASTAL PLAIN CREEK	NITE, MO STIC (A-6 d at Eleva	DERATEI i) ation 65.7 CLAY (BL ION)	ft IN
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	-	<u> </u>															



Collec	liting Eng	Jiliceis a	and Scie	51111313				<u>D</u>	UKE	<u></u> '					
WBS	47533	3.1.2			1	TIP 1-5987 <i>P</i>		COUNT	Y ROBE	SON	1			GEOLOGIST FARMER, B. C.	
SITE	DESCR	IPTION	SITE	3 - AE	BUTM	MENT RET. V	VALLS AT	EB1 AND	EB2 OF	BRID	OGE ON	-Y3-	OVE	R -L- AT -Y3- STA. 30+40.11 GRO	UND WTR (ft
BORI	NG NO.	Y3_R	WAL-	1	- (STATION 2	9+16		OFFSE	T 3	3 ft LT			ALIGNMENT -Y3- 0 HF	R. N/A
COLL	AR ELE	EV . 16	55.5 ft		٦,	TOTAL DEP	TH 58.4 f	t	NORTH	ING	371.21	2		EASTING 2,001,051 24 HF	R. 1.5
				F TFD		ACKER RENE					DRILL M) Mu		
									COMP) iviu	, ' 	L Automatic
DKILI	LER D DRIVE		1			START DAT			СОМР.	DAI		2/21	1 . 1	SURFACE WATER DEPTH N/A	
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	0.5ft	t O		PER FOOT 50		100	SAMP. NO.	MOI	0	SOIL AND ROCK DESCRIPTION ELEV. (ft)	ON DEPTH (
170														-	
165	-						T							165.5 GROUND SURFACE	(
	164.5	1.0	3	3	2									 UNDIVIDED COASTAL PLAII SOFT TO MEDIUM STIFF, BRO 	
	162.0	3.5	IWOII	1		_ <i>Ț</i> °::::								ORANGE, SILTY CLAY, WET, TI COARSE TO FINE SAND, HIGI	
160	450.5-	1	WOH	1	2	• 3 · · ·						W		160.0 PLASTIC (A-7-6)	5
-	159.5	6.0	2	2	1	j. 3						W		VERY LOOSE, GRAY, ORANGE, C COARSE TO FINE SAND. WE	
	157.0	8.5	1	1	1	_ T* : : :		: : : :	: : :				\\\	MODERATELY PLASTIC (A-2	
155	-	ţ	'	1	1	• 2 · · ·		1	1			W		_	
	153.6	11.9	3	2	1	_ · · · ·									
	-	Į	"	-	'	3		: : : :	: : :	-		W			
150	-	‡				<u> i : : :</u>	1							-4404	4.0
-	148.6	16.9	1	2	4	- } : : :						0		LOOSE, ORANGE, GRAY, SIL	TY 16
	-	Į	'	-	4	• 6		: : : :	: : :	-		Sat.	· · · ·	COARSE TO FINE SAND, SATUR INTERBEDDED CLAY LAYERS (A	
145	-	‡				1								_	•
	143.6	21.9	1	1	1	$\exists i : : :$						0-4		VERY LOOSE, PINK ORANGE, CI	
	-	F	'	'	'	Q 2	: : : :	: : : :	: : :	-		Sat.		COARSE TO FINE SAND, SATUR (A-2-6)	ATED
140	_	Į.				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1	: : : :		_			\\		26
	138.6	26.9	5	6	3							0-4		VERY LOOSE TO MEDIUM DEN	
	-	-			J	9				-		Sat.		ORANGE, GRAY, SILTY COARS FINE SAND, SATURATED (A-2	
135	_	ţ				'/ · · ·	1							FINE SAND, SATURATED (A-2	(-4)
	133.6	31.9	1	1	2	$\exists \mid t : : :$						0	-		
	-	Į.	'	'	2	3	: : : :	: : : :	: : :	:		Sat.	l I		
130	_	‡				. /								_	
	128.6	36.9	1	10	12	$\exists 1 : : \mathbb{N}$						0-4			
	-	-	~	10	12	: : : 3	22			-		Sat.			
125	_	‡					1	1	1					-4044	44
ļ	123.6	41.9	WOH	3	3	- [; <u>-</u>						Sc.		COASTAL PLAIN	41
	-	+			J	1				-		Sat.		LOOSE, DARK GRAY, CLAYEY CO TO FINE SAND, SATURATED, T	
120	_	Į.						: : : :	1:::				\\\	_ MICA, TRACÉ MARCASITE (A-	2-6)
	118.6	46.9	15	12	20		\\	: : : :	: : :			W		(BLACK CREEK FORMATION	47
	-	+	.		_0		∮ 32			-		vv		VERY STIFF TO HARD, DARK G SILTY CLAY, WET, TRACE LIGI	
115	-	F					<i>i.</i>	ļ : : : :	1:::	_				HIGHLY PLASTIC (A-7-6)	•
	113.6	51.9	6	7	17		<u> </u>	: : : :				W	1		
	-	t					24			:		••			
110	_	-					\	ļ	+						56
-	108.6	<u> 56.9</u>	7	14	15	\dashv \mid \vdots \vdots \vdots	7					W		MEDIUM DENSE, DARK GRAY, S 107.1 COARSE TO FINE SAND, WET, T	SILTY
-	-						<u> </u>							MICA (A-2-4)	RACE 50
	_	+												Boring Terminated at Elevation 107 COASTAL PLAIN SILTY SAND (B	
	-	Į.												COASTAL PLAIN SILTY SAND (B CREEK FORMATION)	LACK
	-	‡												STA. 463+07 -L-; 82' LT	
	_	+											-		
	-	Į.													
	-	‡													
	_	+											-	-	
	-	Į.													
	-	‡													
		L	<u> </u>			_1							LLL		

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 8 OF 13

								-				UG							
WBS	47533	.1.2			TI	P I-5987/	4		COUNT	Y RO	BESO	N			GEOLOGIST	FARMER,	B. C.		
SITE	DESCRI	PTION	SITE	3 - AE	BUTME	ENT RET.	NALLS	AT E	B1 AND	EB2 C	F BRI	DGE ON	1 -Y3-	OVER	-L- AT -Y3- S	TA. 30+40.1	1	GROUND W	/TR (ft)
BORI	NG NO.	Y3_R	WAL-2	2	S	TATION 2	29+76			OFFS	SET 8	35 ft LT			ALIGNMENT	-Y3-		0 HR.	N/A
COLL	AR ELE	V . 16	5.4 ft		Т	OTAL DEP	TH 53	6 ft		NOR	THING	371.29	91		EASTING 2	.001.055		24 HR.	0.9
				TED		CKER RENE			15/2010	11011		DRILL M		D Mud				R TYPE Auto	
									13/2017	2014	D D 4 7			D IVIUU	, , , , , , , , , , , , , , , , , , , 			CITE Aut	malic
DKILI	LER DI	JGGIN				TART DAT					P. DA	TE 01/2	22/21	111	SURFACE W	ATER DEP	IH N/A		
ELEV (ft)	DRIVE ELEV	DEPTH (ft)		W COI					ER FOOT		400	SAMP.	▼/	0	sc	OIL AND ROC	K DESCF	RIPTION	
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	25	50	,	75	100	NO.	<u>/мо</u>	I G	ELEV. (ft)				DEPTH (ft)
170		_												ΙL					
	+	-												 					
	- 1	-												1 -					
165	164.4	- 10				—							V		165.4	GROUND JNDIVIDED C			0.0
-	104.4	- 1.0	3	3	3	6 .						SS-68	17%	N	MEDIU	IM STIFF, GF	RAY, ORA	NGE, SILTY	
-	161.9	3.5	1	3	3					: :			w			, WET, TRAC ND, HIGHLY			
160	159.4	- 60	'			6	ļ			<u> </u>			l vv		159.9			,	5.5
	100.4	-	2	3	3	6 :	: :	: :		: :	::		w			RY LOOSE T NGE, CLAYE			
-	156.9	8.5	1	1	2	$ _{I_{\cdot}}$ \cdots						SS-69	l w		SANE	D, WÉT, MOE		Y PLASTIC	
155	4	-	'	· .	_	93	+			ļ::		33-09	٧٧			(A	-2-6)		
	153.3	12.1	3	4	4	'\ : : :		: :		: :			١.,,						
	+	-	3	"	-	. • 8							W						
150		-				/	+			<u> </u>									46.6
	148.3	17.1	3	7	17	::::		: :		: :			0-4		.148.8VER	TOOSE TO	O MEDIUN	И DENSE,	<u>16.6</u>
	f	-		′	17	: : : ;	24						Sat.			NGE, GRAY, IE SAND, SA			
145	4	-					+			+				I I		IL OAND, OA	TORATE	J (M-2-4)	
	143.3	22.1	1	1	2	/. : :		: :		: :			Sat.						
		-	'	· .	_	∮ 3		: :		: :			Sai.						
140		-				i	+							-	138.8				26.6
•	138.3	27.1	WOH	WOH	WOH		: :	: :					Sat.		VERY	LOOSE TO L			
405	‡	-				T ⁰		: :		: :	::		Jai.			ANGE, LIGH ARSE TO FIN			
135	+	-				\	+ : :			+::						SATURA	TED (A-2-	·6)	
•	133.3	32.1	WOH	1	5	7							l w						
130	- 1	-				7% : :		: :		: :	::								
130						 . \	+ : :			+ : :					128.8				36.6
•	128.3	37.1	9	8	8	\ ●10	3						Sat.	-		M DENSE, O			/
125	- 1	-				: : ; ; :		: :		: :	::			F	COAN		-2-4)	ATOKATED	
.20	123.3	- 121					1::			1::					123.8				41.6
		- + ∠.l	WOH	2	2		: :	: :		: :	::		Sat.		121.8 VERY	COAST LOOSE TO L	AL PLAIN OOSE. D		43.6
120	-	-				:\ :									CLA	YEY COARS	SE TO FIN	IE SAND,	
	118.3	- - _{47 1}					1			: :					1		(NÓITAN		
		- ''-' -	4	5	8	\		: :		: :	: :		w			, DARK GRA` E LIGNITE, T			-
115	+	-				L. : · }	1							1	I KACI		IC (A-7-6)		
	113.3	52.1						>\		T					113.8	DENSE, GRA	√ हा। च √		<u>51.6</u>
[-	15	28	32	: : : :		<u> </u>	60	: :			W		111.8 FINE S	SAND, WET,	TRACE N	/IICA (A-2-4)	53.6
]	_												1 E	Boring	Terminated a	at Elevatio	n 111.8 ft IN	_]
	7	-												F	COAS	CREEK F			
	- 1	-												F		STA. 463+	86 -l -· 83'	'IT	
	į	-														0171. 1001	00 2,00		
	+	-												 					
ı	- 1	-												l F					
		-																	
	+	-												 					
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	<u> </u>	-												1 E					
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Terracon GEOTECHNICAL BORING REPORT

SHEET 9 OF 13

VDS	47533.	1.2			11	P I-5987A	COUNT	Y ROBESO	N			GEOLOGIST FARMER, B. C.		
SITE	DESCRI	PTION	SITE	3 - AE	BUTME	ENT RET. WALLS A	T EB1 AND	EB2 OF BRI	DGE ON	1 -Y3-	OVE	R -L- AT -Y3- STA. 30+40.11	GROUND WTR	R (ft
BORII	NG NO.	Y3_R	WAL-3	3	S1	TATION 32+43		OFFSET 9	97 ft LT			ALIGNMENT -Y3-	0 HR.	N/A
OLL	AR ELE	V. 16	5.2 ft		т	OTAL DEPTH 48.7	ft	NORTHING	371,49	91		EASTING 2,001,233	24 HR.	1.5
RILL	RIG/HAMI	MER EF	F./DATE	E TER	92-0 AC	CKER RENEGADE 86%	02/15/2019	ı	DRILL N	IETHOI	D Mu	d Rotary HAMM	ER TYPE Automa	atic
RILL	LER DU	JGGIN	S, W.	Т.	ST	TART DATE 01/21	/21	COMP. DA	ΓE 01/2	21/21		SURFACE WATER DEPTH N/	A	
LEV	DRIVE	DEPTH	BLO	w col	JNT	BLOW	S PER FOOT		SAMP.	V /		COIL AND DOOK DEC	CDIDTION	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MO	O I G	SOIL AND ROCK DES		PTH (
170		_										_		
	‡											• •		
	1	-										- 165.2 GROUND SURF	ACE	0
165	164.2	1.0	2	2	1					V		UNDIVIDED COASTA	L PLAIN	
	161.7	- - 3.5				 						SOFT TO MEDIUM STIF BROWN, GRAY, SILTY	CLAY, WET,	
160	1500	- 60	2	2	3	5			SS-55	24%		HIGHLY PLASTIC	(A-7-6)	
	159.2	6.0	2	3	4	7				w		•		
	156.7	- 8.5 -	2	3	3					l w		- -		
155	‡	-						 				- ·		
-	153.0	12.2	1	2	3	· · · · · · . · · · . · · · ·				w		• •		
150	‡	-				`\						<u>.</u>		
	148.0	17.2			- 10	::\:: :::						- 148.5 LOOSE TO MEDIUM DEN	SE ORANGE	_ 16
	‡	-	3	8	10	18				Sat.		TAN, RED, SILTY COAR SAND, SATURATED	SE TO FINE	
45	†	-				 : /: : : : :	. 	1				SAND, SATORATEL) (A-2-4)	
-	143.0	22.2	1	1	3	./ 				Sat.		. INTERBEDDED CLAY	LAYERS	
140	1	-				<u> </u>						_		
	138.0	27.2										<u>138.5</u> VERY SOFT, ORANGE, P		_ 20
	-	-	1	0	1	1				Sat.		TO FINE SANDY SILT, SAT		
35	Ŧ	-				1		+				-		0
-	133.0	32.2	1	2	3		.			Sat.		LOOSE TO MEDIUM DEN		_ <u>3</u>
130	Ŧ	-								l oat.		GRAY, WHITE, SILTY COA SAND, SATURATED		
	128.0	37.2				1		1				- ·		
	120.0	- 07.2	2	2	8	• • 10 · · · ·				Sat.		•		
25	- ‡	-										• -		
-	123.0	42.2	3	4	4					Cat		•		
120	‡	-			· ·	8				Sat.		- -		
120	118.0	- 47.2						1				-		
	118.0	- 41.2	6	8	12	20				Sat.		- - 116.5		48
	-	-										 Boring Terminated at Eleva UNDIVIDED COASTAL P 		
	‡	-										CLAY		
	‡	-										STA. 465+98 -L-; 7	79' RT	
	1	-										- ·		
	‡	-										• •		
		-										• -		
	‡	-										• •		
	‡	-										• •		
	$\frac{1}{2}$	-										-		
	7	-												
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	7	-										- ·		
	+	-		1					1	I	1	-		

								D	UKE	<u>L</u> C	JG						
WBS	47533	3.1.2			TI	P I-5987A		COUNTY	ROBE	SON				GEOLOGIST W. Po	esl		
SITE	DESCR	IPTION	SITE	3 - AI	BUTME	NT RET. W	ALLS AT	EB1 AND	EB2 OF E	RIDO	SE ON	-Y3-	OVEF	R -L- AT -Y3- STA. 30+	-40.11	GROUND W	TR (ft)
BORI	NG NO.	Y3_E	B2-A		ST	TATION 32-	+01		OFFSET	25	ft LT			ALIGNMENT -Y3-		0 HR.	N/A
COLL	AR ELE	EV. 16	5.5 ft		т	OTAL DEPTH	d 95.0 ft		NORTHI	NG (371,41	1		EASTING 2,001,25	5	24 HR.	11.9
DRILL	RIG/HAN	MER EF	F./DAT	E F&F	R2175 C	ME-55 84% 0	3/01/2019	•		D	RILL M	ETHOD) Mu	d Rotary	HAM	MER TYPE Autor	matic
DRILI	LER S.	. Davis			SI	TART DATE	12/05/1	9	COMP. I	ATE	12/0	5/19		SURFACE WATER I	DEPTH N	I/A	
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLOWS	PER FOOT		S	SAMP.	$\overline{ullet}/$	L	SOIL AND	BOCK DE	SCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	5 ;	50	75 1	00	NO.	<u>/MOI</u>	- 1	ELEV. (ft)	NOCK DE		EPTH (
170														_			
	-	1															
	1055	0.0												165.5 GRC	OUND SURI	FACE	
165	165.5	0.0	2	3	7	10				#		М		- UNDIVID	ED COAST	AL PLAIN	
	162.0	3.5												FINE TO COAF	RSE SAND,	SILTY CLAYEY MOIST, TRACE	<u></u>
160	-	-	2	3	4	7				. S	S-520	16%			GANICS (A EDIUM STII		
	-	F				1				-						, SILTY FINE TO MOIST, TRACE	<u>, — </u>
	157.0	8.5	2	2	3			: : : :		-		W	///			ELY PLASTIC	ĺ
155	_	F				5			1					, -	-TAN, SÍLT	Y CLAYEY FINE	
	152.0	13.5							: : :	:	•			MEDIUM STIF	F, GRAY-T	NET (A-2-6) AN, SILTY FINE	1
150	-132.0	13.3	2	2	3	5				. s	S-522	25%			SE SANDY (Y PLASTIC	CLAY, WET, (A-7-6)	
	-	Ŧ								\Box				- _ <u>148.5</u>			1
	147.0	18.5	9	8	13	:::::::::::				:		147			TO MEDIUN -GRAY, SIL	M DENSE, .TY FINE SAND,	
145	_	‡								41		W		WET TO	SATURAT	ED (A-2-4)	
	440.0					: : ;/ :				:							
140	142.0	23.5	5	4	5	. 9	: : : :	: : : :		:		Sat.	:::				
140	_	‡				 ; 			: : :	$\exists $				- _ <u>138.5</u>			2
	137.0	28.5	2	1	1	/. : : :				:			///			DIUM DENSE, SILTY CLAYEY	
135	_	‡	_	'	'	6 2 · · ·						Sat.				TED (A-2-6)	
		†								:							
400	132.0	33.5	2	3	9	12.				:		Sat.		131.0		N ODAY OF TY	3
130	_	‡				· · · <u> </u>				$\exists 1$			<u> </u>			N-GRAY, SILTY D, WET (A-2-4)	
	127.0	38.5		10	10					:			<u> </u>				
125	-	‡	5	10	13		23		· · ·			W		_			
	-	-				::/::				:					F ORANG	E-TAN-GRAY,	4
	122.0	43.5	2	2	1	3				-		Sat.		SILTY CLAYEY		COARSE SAND,	
120	-	ţ				7			 	\exists			\sim		OIO(IED ()	(120)	4
	117.0	48.5		<u> </u>		:\: : :				-				ME	DIUM DEN	ISE, , SILTY FINE TO	
115	_	1	3	5	6	- •11 -						W	<u> </u>		ND, WET,	TRACE CLAY	
	-	‡				:::\;				:					(A-2-4)		
	112.0	53.5	5	9	16	: : : <u>;</u> \	25			:		W					
110	_	<u> </u>				 : : :/			 	$\exists 1$				-			
	107.0	58.5						: : : :		:				106.5			5
105	-		12	7	9	• • ● 16		<u> </u>	<u> </u>	_		W		CC	DASTAL PL		3
	-	t								:				WET, TRACE	MICA AND	Y, SILTY CLAY, LIGNITE (A-7-6)	
	102.0	63.5	8	13	13	: : : : \	26			:		W	N	101.5	CREEK FOR	<u> </u>	6-
100	_	Ĺ				/	-20	 	$+\cdots$	$\exists 1$		••	liii F	 FINE TO COA 	RSE SAND	GRAY, SILTY D, WET, TRACE	^
	97.0 _	68.5				:::,;i		: : : :	: : :	-			Ø			AVEL (A-2-4) DARK GRAY,	<u> </u>
95	- VI.U -	T	5	6	9	•15		: : : :	: : :	:		W		FINE SANI		CLAY, WET,	
	-	Ŧ				7				$\exists $				93.5	`		72
-	92.0	73.5	9	13	18	::::}	\ \	: : : :	: : :	:		\^/		COARSE SANI	D, WET, TR	SILTY FINE TO RACE MICA AND	
90	-	t	١	'	'	• • • •	●31		1	-		W	:::: <u> </u>	(CĹAY (Á-2-	4)	

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 10 OF 13

									UNL						
NBS	47533	.1.2			TI	P I-5987A		COUNT	/ ROBE	102	N			GEOLOGIST W. Pesl	
SITE	DESCRI	PTION	SITE	3 - AI	BUTME	ENT RET. W	ALLS AT	EB1 AND	EB2 OF	BRII	DGE ON	1 -Y3-	OVE	R -L- AT -Y3- STA. 30+40.11	GROUND WTR (ft
BORIN	NG NO.	Y3_E	B2-A		ST	TATION 32	2+01		OFFSET	Γ 2	5 ft LT			ALIGNMENT -Y3-	0 HR. N/A
COLL	AR ELE	V. 16	5.5 ft		т	OTAL DEPT	TH 95.0 ft		NORTH	NG	371,4	11		EASTING 2,001,255	24 HR. 11.9
RILL	RIG/HAM	MER EF	F./DAT	E F&F	R2175 C	ME-55 84%	03/01/2019				DRILL M	IETHOI	D Mu	d Rotary HAMI	MER TYPE Automatic
DRILL	ER S.	Davis			Sī	TART DATE	E 12/05/1	9	COMP.	DAT	TE 12/0	05/19		SURFACE WATER DEPTH N	I/A
LLV	DRIVE ELEV	DEPTH	BLC	w co	UNT		BLOWS F	PER FOOT			SAMP.	lacksquare		SOIL AND ROCK DE	SCRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50	75 1	00	NO.	/MO		ELEV. (ft)	DEPTH (
90				↓			Matc	h Line		_	L	L	ļ.,.,.ļ	DENSE, DARK GRAY, S	
	27.0						: ; : :			:				COARSE SAND, WET, TR	RACE MICA AND
85	87.0	_ 78.5 -	11	21	16		- 1			:		w		CLAY (A-2-4) (coa	nunuea)
00	7	-					//	: : : :	1	-				- _8 <u>3.</u> 5	82
-	82.0	83.5	5	6	8	:::,?	1::::		: : :	:		М		STIFF, DARK GRAY-GRA MOIST, TRACE MIC	Y, SILTY CLAY, CA (A-7-6)
80	- 1	-				· · • 14			<u> </u>	-		IVI		-	
	77.0	- - 88.5								:					
75		-	4	6	8	14				:		М			
	7	-				/				•				- _ <u>73.5</u>	92
-	72.0	93.5	12	11	16	: : : :\			1	:		w		MEDIUM DENSE, DARK SILTY FINE TO COARSI	E SAND, WET,
-		-					● 27 · · ·			- 1		VV		70.5 TRACE CLAY (A	vation 70.5 ft in
	1	_											F	SAND (COASTAL PLAIN) FORMATIO	(BLACK CREEK
	1	_												Notes:	,
	7	-												1. Surficial Organic S	Soil: 0.0-0.2'
		_												STA. 465+20 -L-;	107' RT
	- 1	_												=	
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Cons	ulting En	gineers a	and Sci	entists			B	ORE L	.OG		
WBS	47533	3.1.2			T	IP I-5987A	COUNT	Y ROBESO	N	GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	SITE	3 - AE	BUTMI	ENT RET. WALLS	AT EB1 AND	EB2 OF BRI	DGE ON -Y3- OVER	R -L- AT -Y3- STA. 30+40.11	GROUND WTR (ft)
BOR	NG NO.	Y3_E	B2-B		S	TATION 30+99		OFFSET	11 ft RT	ALIGNMENT -Y3-	0 HR. N/A
COLI	AR EL	EV . 16	67.5 ft		T	OTAL DEPTH 99	7 ft	NORTHING	371,312	EASTING 2,001,210	24 HR. 8.2
DRILL	RIG/HAN	/MER EF	F./DAT	E TER	299 D	IEDRICH D-50 79% 1	2/31/2020	•	DRILL METHOD Muc	d Rotary HAMN	MER TYPE Automatic
DRIL	LER T	URNAG	E, J. F	₹.	S	TART DATE 05/1	0/21	COMP. DA	TE 05/10/21	SURFACE WATER DEPTH N	/A
ELEV	DRIVE ELEV	DEPTH	BLC	w cou	JNT	BLOV	VS PER FOOT	r	SAMP. L	SOIL AND ROCK DES	SCRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO. MOI G	ELEV. (ft)	DEPTH (f
170		↓								_	
		‡								167.5 GROUND SURF	FACE 0
165	166.5	1.0	27	8	6				D Livit	166.5 ROADWAY EMBAN MEDIUM DENSE, WH	
165	164.3	3.2	6	5	6	- 1 14				GRAVELLY COARSE TO DRY, NON PLASTIC	O FINE SAND,
	161.5	1	"		O	11		.	M	UNDIVIDED COAST	AL PLAIN
160		†	1	2	1	4 3				MEDIUM DENSE, DARK (FINE SAND, DRY TO N	
	159.3	1 8.2	2	2	3	- \		.	SS-110 W	PLASTIC (A-2 NOFT TO STIFF, GRA	<u>'-5)_ </u>
		Ŧ						.		COARSE TO FINESANDY	CLAY, MOIST,
155	154.3	13.2]				i <u>MODERATELY PLAS</u> LOOSE, GRAY, ORANGE	, LIGHT GRAY,
		Ŧ	2	2	2	•4			W [;;;]	CLAYEY COARSE TO FIN MODERATELY PLAS	
150		‡									,
100	149.3	18.2	3	3	3	- 1			W W	-	
		‡				.\					
145	1440	23.2				. \					<u>22</u> . ENSE LIGHT
	144.5	1 23.2	11	11	6	17		.	Sat.	GRAY, WHITE, ORANGE, TO FINE SAND, SATURA	SILTÝ COARSE
		ŧ				::/:: ::		.		CLAY, SLIGHTLY PLAS	
140	139.3	28.2				<u> </u>				-	
		Ŧ	5	6	3	. ♠9			Sat.		
135		Ŧ									
	134.3	33.2	3	3	3	1 1			Sat.	- _1 <u>33.5</u>	34.
	,	‡								LOOSE, LIGHT GRAY, OR COARSE TO FINE SAND	
130	120.3	38.2								SLIGHTLY PLASTIC	` ′ 38.
	120.0	‡ "	10	9	8	17			Sat.	MEDIUM DENSE, WHITE ORANGE, SILTY FIN	
405		‡				: : : \				SATURATED, NON PLA	
125	124.3	43.2	7	11	14	<u> </u>				-	
125 120 115		t	'	11	14	25 .		.	Sat.		
120		<u> </u>				/				120.5 COASTAL PL	47.
	119.3	48.2	3	5	6				Sat.	MEDIUM DENSE, DARK	GRAY, SILTY
		Ŧ								COARSE TO FINE SAND NON PLASTIC (A-2-4) (B	LACK CREEK
115	114.3	53.2								FORMATION 114.0	N) 53.
		‡	4	9	21	30			Sat.	VERY STIFF, DARK GRAY	Y, COARSE TO
110		‡				:::: :`\				110.5 MICA, MODERATELY P	LASTIC (A-7) 57.
	109.3	58.2	12	20	26		X. J			DENSE, DARK GRAY, SIL FINE SAND, TRACE MICA	
I		‡	'-	-			. ●46 . /.		Sat.	(A-2-4)	,
105	4040	±					/ .				AVEV COARSE 62.
	104.3	63.2	6	11	21			.	Sat.	TO FINE SAND, SATURA MICA AND LIGNITE, SLIG	ATED, TRACE
		‡				:::: /::		.		(A-2-7)	HTLY PLASTIC 67.
100	99.3	68.2	<u> </u>			↓ ├ /		+		VERY STIFF, DARK GRA	Y, SILTY FINE
105		Ŧ	7	8	13	21			w \$\frac{1}{2}	SANDY CLAY, WET, TRA LIGNITE, HIGHLY PLAS	
95		Ŧ								95.5	72.
- 55	94.3	73.2	8	12	14	-			W	MEDIUM DENSE TO DE GRAY, CLAYEY COARSE	ENSE, DARK
	•	‡			•					WET TO SATURATED, SLIGHTLY PLASTI	TRACE MICA,
90		<u> </u>						· · · · ·		OLIGITIET LAGIN	- (· · - ·)

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 11 OF 13

WBS	47533	.1.2			TI	P I-5987A		COUNT	Y RO	BESOI	N			GEOLOGIST DEGON, A. N.	
SITE	DESCR	IPTION	SITE	3 - AE	BUTME	NT RET. W	/ALLS AT	EB1 AND	EB2 C)F BRI	DGE ON	N -Y3-	OVE	R -L- AT -Y3- STA. 30+40.11	GROUND WTR (ft)
BOR	ING NO.	Y3_EI	B2-B		_	TATION 30			_		11 ft RT			ALIGNMENT -Y3-	0 HR. N/A
	LAR ELE					OTAL DEPT			NOR.	THING	371,3			EASTING 2,001,210	24 HR. 8.2
						EDRICH D-50							D Mu		MER TYPE Automatic
	LER TO					TART DATE				P. DA	SAMP.	10/21	1 🗆	SURFACE WATER DEPTH N	/A
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	0.5ft	0 2		PER FOOT	75	100	NO.	MO	0	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)
							B.4 - 1 -	. L. L. L							
90	89.3	78.2		18	 23		IVIAIC	ch Line	Τ		<u> </u>	 Sat.	*	MEDIUM DENSE TO DE	
85	-			10	20		\$41 \$1.					Sal.		GRAY, CLAYEY COARSE WET TO SATURATED, SLIGHTLY PLASTIC (A-2	TRACE MICA,
	84.3	83.2	16	21	20		41					Sat.		- - -	
80	79.3	88.2	10	13	21							Sat.		- 80.5 — HARD, DARK GRAY, FINE SATURATED, TRACE LIGNITE, MODERATELY	MICA AND
75	74.3	93.2					/·····							- - 75.5MEDIUM DENSE, GRAY, \$	SILTY COARSE 92.0
70	-	-	12	11	11		22					Sat.		TO FINE SAND, SATUR/ CLAY AND MICA, SLIGH (A-2-5)	
70	69.3	98.2	13	14	16		30			• •		Sat.		- - - 67.8	99.7
														Boring Terminated at Elev COASTAL PLAIN SILTY: CREEK FORMA' STA. 464+19 -L-;	SAND (BLACK TION)





SHEET 12 OF 13

	unung Eng	gineers a	ind Sci	entists			В	<u>ORE L</u>	<u>UG</u>				
WBS	47533	3.1.2			TI	IP I-5987A	COUNTY	ROBESO	N			GEOLOGIST FARMER, B. C.	
SITE	DESCR	IPTION	SITE	3 - AI	BUTME	ENT RET. WALLS AT E	B1 AND	EB2 OF BRI	DGE ON	-Y3- (OVER	R-L- AT-Y3- STA. 30+40.11	GROUND WTR (f
BOR	ING NO.	Y3_R	WAL-	4	S	TATION 30+36		OFFSET 9	5 ft RT			ALIGNMENT -Y3-	0 HR. N/
COL	LAR ELE	EV. 16	4.8 ft		TO	OTAL DEPTH 53.5 ft		NORTHING	371,20	8		EASTING 2,001,226	24 HR. 2
DRILL	RIG/HAN	MER EF	F./DAT	E TER	R92-0 A0	CKER RENEGADE 86% 02	/15/2019		DRILL M	ETHOD	Mud	d Rotary HAMI	MER TYPE Automatic
DRIL	LER D	UGGIN	S, W.	T.	S	TART DATE 01/20/2		COMP. DAT	Γ E 01/2	20/21		SURFACE WATER DEPTH	I/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	O.5ft	0.5ft	_	BLOWS F 0 25 5	PER FOOT	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DE	SCRIPTION DEPTH
165	100.0	10					Г					_164.8 GROUND SUR UNDIVIDED COAST	
160	163.8 -	1	WOH	WOH 2	3	\$\begin{picture}(3 \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			SS-65	20% W		SOFT TO MEDIUM ST ORANGE, FINE TO CO CLAY, WET, MODERAT (A-6)	TIFF, GRAY, ARSE SANDY ELY PLASTIC
155	158.8 - - 156.3	+	2	3	3	6			SS-66	W		VERY LOOSE TO LOOS CLAYEY COARSE TO FIN SLIGHTLY PLASTI	E, GRAY, PINK, NE SAND, WET,
150	152.8	12.0	1	2	4	6				W		-	
145	147.8 - -	17.0 -	8	10	11	21				W		MEDIUM DENSE, ORANG SILTY COARSE TO FINI INTERBEDDED CLAY L	E ŚAND, WET,
140	142.8 - - - -	22.0	1	0	1	1				W		VERY LOOSE, GRAY, O CLAYEY COARSE TO FII (A-2-6)	
135	137.8 - -	27.0	1	1	1	1 · · · · · · · · · · · · · · · · · · ·				W		-	
130	132.8 -	32.0	2	6	9	15				W		MEDIUM DENSE, PINK WHITE, SILTY COARSE WET (A-2-4	ΓΟ FINE SAND,
125	127.8	37.0	6	7	7	14				W		-	
120	122.8	42.0	6	3	2	6 5				W		LOOSE, ORANGE, CLAYI FINE SAND, WET	(A-2-6)
115	117.8 -	47.0	4	7	12	919 · · · · · · · · · · · · · · · · · ·				W		VERY STIFF, DARK GRAFINE SANDY CLAY, WE'CREK FORMA	Y, COARSE TO Γ (A-6) (BLACK TION)
	112.8 -	52.0	2	3	5					W	3	MEDIUM STIFF TO STIFI 111.3 SILTY CLAY, WET, HIG (A-7-6)	, DARK GRAY, — 5
	-	<u> </u>									F	Boring Terminated at Elev COASTAL PLAIN SILTY CREEK FORMA	CLAY (BLACK
	-										- - - - - - - - - - - - - - - - - - -	- STA. 463+16 -L-;	•

LABORATORY TESTING SUMMARY

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

When the state of the

			0554	Depth	AACUTO				% by V	Veight		%	%	% Passing (sieves)			0/
Sample No.	Station	Alignment	Offset (feet)	Interval (feet)	AASHTO Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
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 SS-112	28+57 28+57	-Y3- -Y3-	8 RT	6.0 - 7.5	A-2-7 (4)	52 33	32	48.2 13.8	19.7 56.8	4.4 7.0	27.7 22.4	0	100	69	34 33	22.5	
SS-68	29+76	-Y3-	8 RT 85 LT	18.7 - 20.2 1.0 - 2.5	A-2-6 (1) A-7-6 (8)	43	19 26	34.0	22.1	8.7	35.2	0	99 99	94 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	

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number 5987 REFERENCE

4

STATE OF NORTH CAROLINA

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

CONTENTS

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN PROFILE BORE LOGS 7 - 10

STRUCTURE SUBSURFACE INVESTIGATION

COUNT	Y	ROBESON												
PROJEC	T DES	CRIPTI	ON <u>I-9</u>	5 FROM	M SO	UTH	OF	US	<i>301</i>					
_TO 3	SOUTH	I OF	NC 20	. WIDE	N TO	EIG	HT 1	LANI	E S					
SITE D	ESCRIP	TION 🕹	OISE	WALL	8 RIC	HT (OF –	YIR	<i>PA</i> _					

STATE PROJECT REFERENCE NO. 10 I-5987A

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 1991 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED 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 SATISTY 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.

TURNAGE, J. R. FORTSON, M. L. DEGON, A. N. DEGON, A. N. ALEXANDER, M. J. NASH, A. A.

Prepared in the Office of: Ilettacon **Consulting Engineers and Scientists**

SUBMITTED BY __ALEXANDER, M. J.

NOVEMBER 2021



Matthew J. Alexantder 2/2021 -AC113DDE6101413

SIGNATURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REPERENCE NO. SHEET NO.

1-5987A

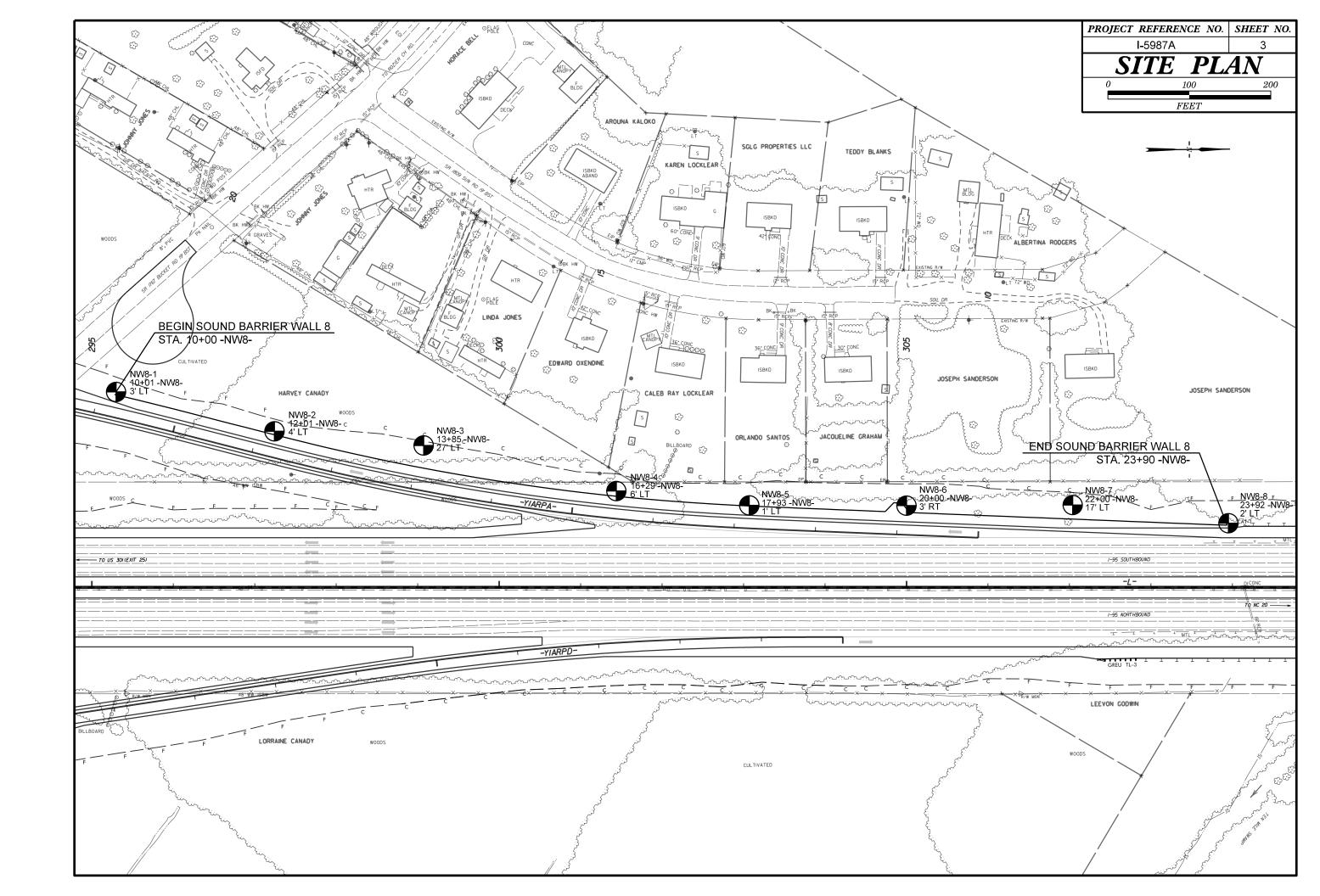
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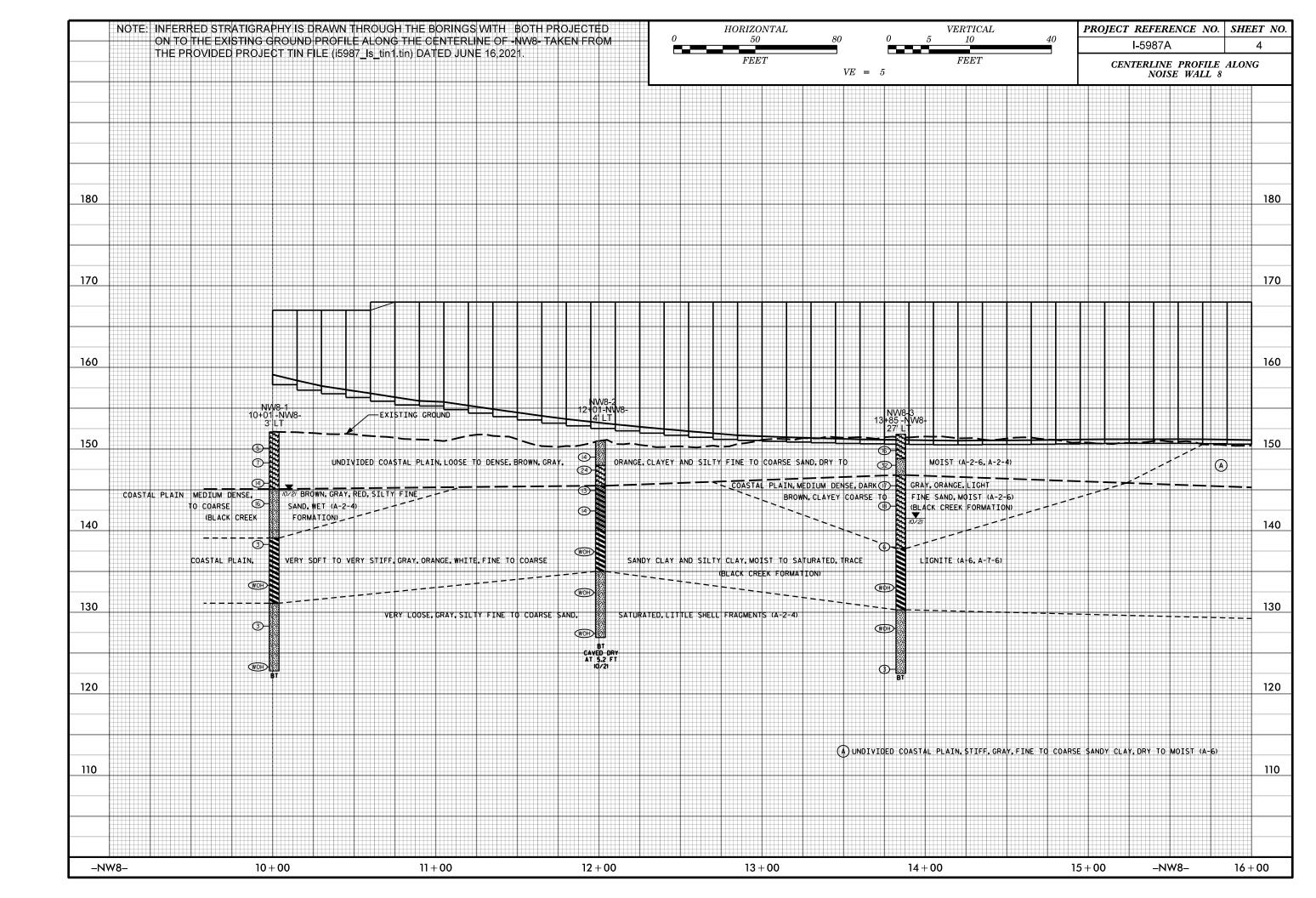
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

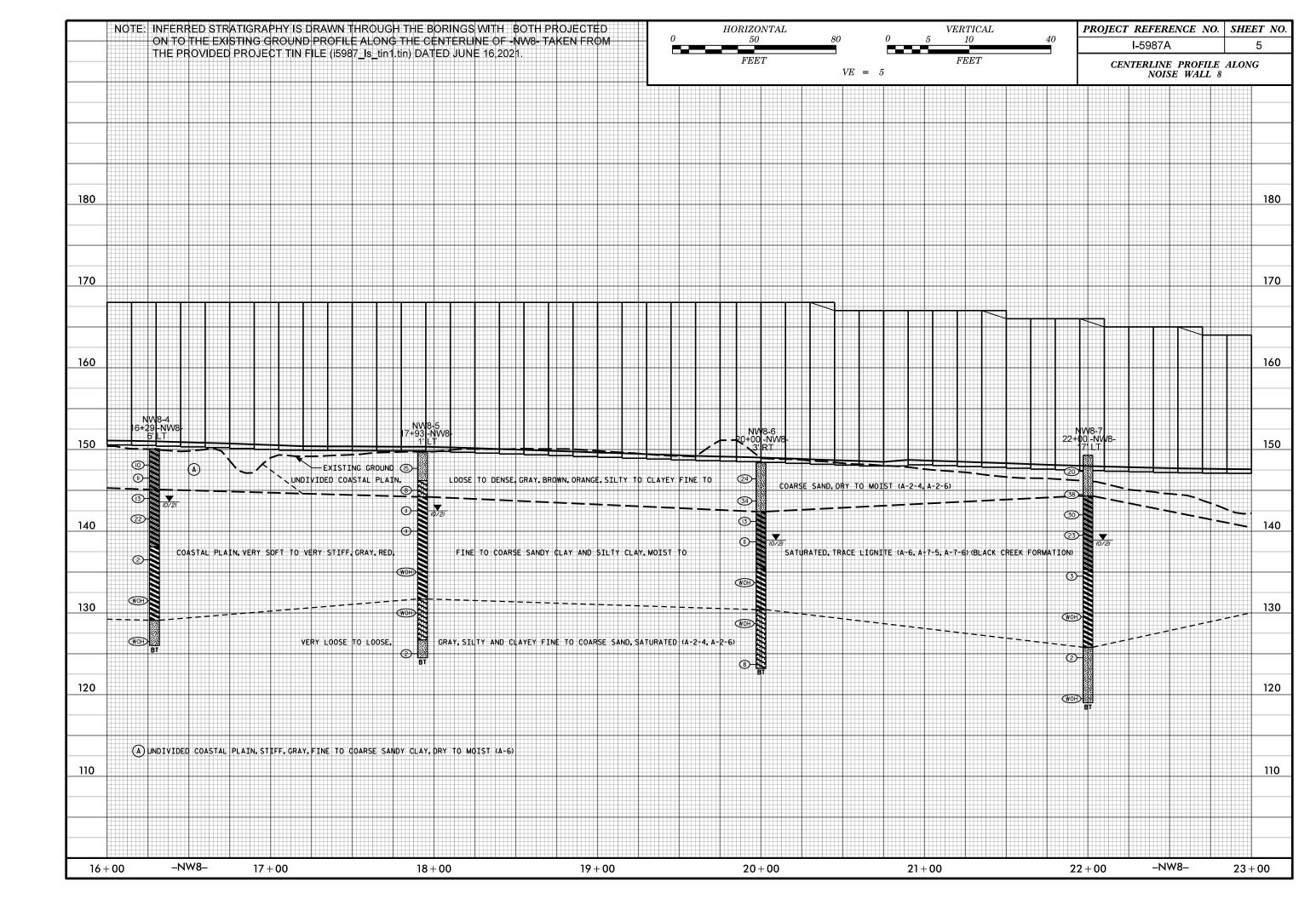
SUBSURFACE INVESTIGATION

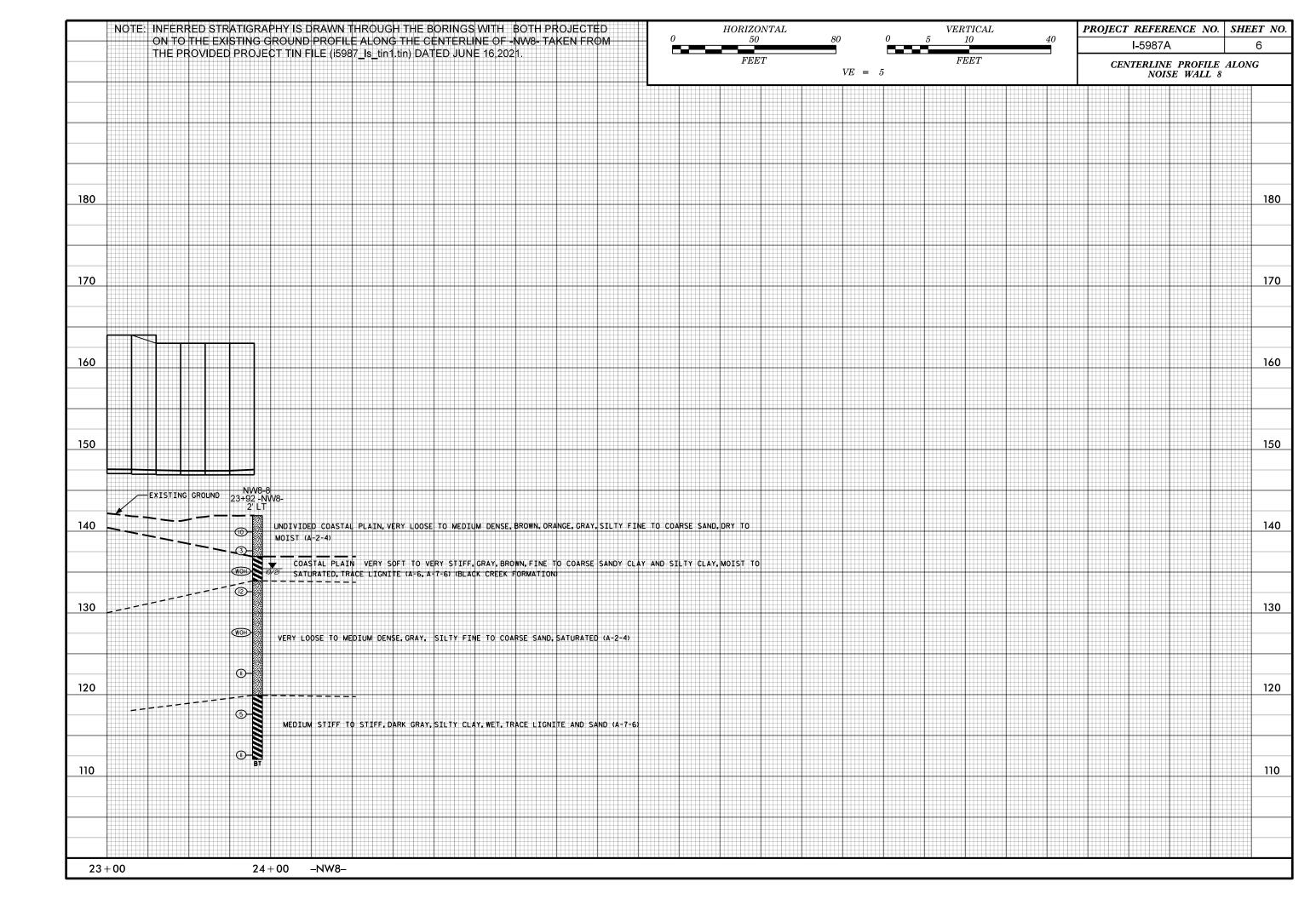
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 (AASSHTO T 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - 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	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. ADUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	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
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	WEATHERED WAS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CH) GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPIT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 d0000 SYMBOL 0000 SYMBOL	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK STATE SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*18 58 MX GRANULAR SILT- MUCK, CLAY PEAT	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR HIGHLY PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE RECAME	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	<u>DIP DIRECTION (DIP AZIMUTH)</u> - 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
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NU MX AMUUNIS DE SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS SOILS SOILS	▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
CEN PATING	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELOSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBURADE PURK	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
DANCE OF STANDARD DANCE OF UNCONFINED		(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY (N-VALUE) COMPRESSIVE STRENGTH (NOVALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) ROADWAY EMBANKMENT (RE) POR ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
VERY LOOSE (4	SPT SI CI OPE MURICATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GENERALLY LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A	SOIL SYMBOL OPT OMT TEST BORING INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY DENSE > 50 VERY SOFT < 2	INFERRED SOIL BOUNDARY	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	MN - TEST DODING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	INFERRED ROCK LINE MONITORING WELL WITH CORE	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	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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY SPT N-VALUE	ALSO AN EXAMPLE. ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAV	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
ROULDER CORRE CHAVEL COARSE FINE CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	BY MODERATE BLOWS.	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
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CPT - CONE PENETRATION TEST NP - NON PLASTIC γ_d - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	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.
LL _ LIOUID LIMIT	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
BANGE / SEMISULID; REQUIRES DRIING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS ω - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: TOP OF BORING ELEVATIONS DETERMINED USING PROJECT
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	TIN FILE (15987_1s_tin1.tin) DATED 6/15/2021.
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: N/A FEET
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CODE SIZE	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
PLASTICITY	CME-55 8*HOLLOW AUGERS CURE 512E:	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS: POST HOLE DIGGER	COADIG CAN BE CERADATED FROM CAMPLE WITH CYFEL DROPE	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	X DIEDRICH D-50 TRICONE TRICONE SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.	
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.	CORE BIT WANE SHEAR TEST	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
The state of the s		SAMPLE BREAKS ACROSS GRAINS.	











Consulting Engineers and Scientists	BORE LOG						
WBS 47533.1.2 TIP I-598	87A COUNTY ROBESON	GEOLOGIST DEGON, A.		WBS 47533.1.2	TIP I-5987A CO	UNTY ROBESON	GEOLOGIST DEGON, A.
SITE DESCRIPTION I-5987A NOISE WALL 8	3		GROUND WTR (ft)	SITE DESCRIPTION I-5987A	NOISE WALL 8		GROUND WTR (ft)
BORING NO. NW8-1 STATION	10+01 OFFSET 3 ft LT	ALIGNMENT NW8	0 HR. N/A	BORING NO. NW8-2	STATION 12+01	OFFSET 4 ft LT	ALIGNMENT NW8 0 HR. N/A
	EPTH 29.3 ft NORTHING 354,439		24 HR. 7.2	COLLAR ELEV. 151.0 ft	TOTAL DEPTH 24.1 ft	NORTHING 354,633	EASTING 2,000,597 24 HR. Caved
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH			MMER TYPE Automatic		TER373 DIEDRICH D-50 95% 02/06/20	- 	· ·
DDIV/E	ATE 10/21/21 COMP. DATE 10/21 BLOWS PER FOOT SAMP. \[\]		N/A	DRILLER TURNAGE, J. R.	START DATE 10/21/21	COMP. DATE 10/21/21	SURFACE WATER DEPTH N/A
(ft) ELEV (ft) 0.5ft 0.5ft 0.5ft 0		O SOIL AND ROCK DE	ESCRIPTION DEPTH (ft)	ELEV CRIP (ft) DEPTH BLOW CRIP (ft) 0.5ft 0.5ft		FOOT SAMP. O NO. MOI G	
155 150 149.3 2.8 3 3 2 149.3 2.8 3 3 4 146.8 5.3 4 6 8		T 152.1 GROUND SUF UNDIVIDED COAS LOOSE TO MEDIUM DE GRAY, ORANGE, CLA COARSE SAND, MO	TAL PLAIN ENSE, BROWN, AYEY FINE TO	150 150.0 1.0 6 7 148.4 2.6 6 7 145.9 5.1 11 11	7	D	151.0 GROUND SURFACE 0.0 UNDIVIDED COASTAL PLAIN MEDIUM DENSE, GRAY, BROWN, 148.0 ORANGE, SILTY FINE TO COARSE SAND, DRY (A-2-4)
145 144.3 7.8 8 8 8 8 140 139.3 12.8 1 1 2 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8	16	MEDIUM DENSE, BROW SILTY FINE TO COARS (A-2-4) (BLACK CREEK VERY SOFT TO SOFT, DA	VN, GRAY, RED, SE SAND, WET (FORMATION) ARK GRAY, SILTY	145 6 6 143.4 7.6 5 6 140 138.4 12.6 WOH WO	8 V	M W	MEDIUM DENSE, GRAY, BROWN, ORANGE, CLAYEY FINE TO COARSE SAND, MOIST (A-2-6) COASTAL PLAIN STIFF, GRAY, ORANGE, WHITE, FINE TO COARSE SANDY CLAY, MOIST TO WET (A-6) (BLACK CREEK FORMATION) VERY SOFT, GRAY, SILTY CLAY,
135 134.3 17.8 WOH WOH WOH 130 129.3 129.8 130 129.3 129.8		at. CLAY, WET TO SATUR LIGNITE, HIGHLY PL VERY LOOSE, GRAY, SII FINE SAND, SATURA	ASTIC (A-7-6) LTY COARSE TO 21.0	135 133.4 - 17.6 WOH WO	он woн •0	Sat. Sat.	SATURATED, TRACE LIGNIITE, HIGHLY PLASTIC (A-7-6) VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED, LITTLE SHELL FRAGMENTS (A-2-4)
125 124.3 27.8 WOH WOH WOH WOH WOH WOH WOH WOH WOH WOH		at. 122.8 Boring Terminated at Ele COASTAL PLAIN SILTY CREEK FORM	29.3 vation 122.8 ft IN SAND (BLACK	128.4		Sat.	126.9 24.1 Boring Terminated at Elevation 126.9 ft IN COASTAL PLAIN CLAYEY SAND (BLACK CREEK FORMATION) CAVED DRY AT 5.2' CAVED DRY AT 5.2



Cor	sulting	Engineer	s and So	ientists				В	ORE	LOG																		
WE	S 47	533.1.2			TI	P 1-5987/	4	COUNT	Y ROBES	ON			GEOLOGIST DEGON, A.			WE	3S 47533.1.2		TIP	I-5987A	С	OUNTY ROB	ESON			G	GEOLOGIST DEGON,	Α.
SIT	E DES	CRIPTIC	ON 1-5	987A N	OISE	WALL 8								GRO	UND WTR (ft)	SIT	TE DESCRIPTION	I-5987A N	OISE W	ALL 8								GROUND WTR (
во	RING I	10. NV	V8-3		ST	ATION 1	3+85		OFFSET	27 ft LT	-		ALIGNMENT NW8	0 HR	R. N/A	ВО	PRING NO. NW8-	4	STA	TION 16+	⊦ 29	OFFSE	T 6 ft L	Т		Δ	ALIGNMENT NW8	0 HR. N/
co	LLAR	ELEV.	151.8 f	t	TC	TAL DEP	TH 29.3	ft	NORTHIN	I G 354,	816		EASTING 2,000,616	24 HR	R. 10.3	co	DLLAR ELEV. 150).1 ft	тот	AL DEPTH	1 24.1 ft	NORTI	HING 35	5,052		E	EASTING 2,000,674	24 HR. 6
DRI	LL RIG/	HAMMER	EFF./D	ATE T	ER373 [DIEDRICH D	-50 95% 02	2/06/2021		DRILL	METHO	DD M	flud Rotary HAI	MMER TYP	PE Automatic	DRI	ILL RIG/HAMMER EF	F./DATE TE	R373 DIE	DRICH D-50	95% 02/06/	2021	DRIL	L MET	HOD	Mud R	Rotary	HAMMER TYPE Automatic
DR		TURN				ART DAT	E 10/21/2		COMP. D				SURFACE WATER DEPTH	N/A		DR	RILLER TURNAGI			RT DATE			DATE		21	_ s	SURFACE WATER DEPT	TH N/A
(ft)	(ft	V /f+\	TH BL 0.5ft	OW CC		0		PER FOOT	Г 75 100	SAMP NO.		101	SOIL AND ROCK DI	ESCRIPTIC	ON DEPTH (ft	ELE (ft)) ELEV (ft)	BLOW COU 0.5ft 0.5ft		0 25	BLOWS PER 50	75 75	100 NO	- 1 /	MOI (O G	SOIL AND ROC	K DESCRIPTION
150		8 = 1.0 0 2.8	3		10 20	16	32			_	D D	``\`	151.8 GROUND SUI - UNDIVIDED COAS MEDUIM DENSE, BF - 148.8 ORANGE, CLAYEY CC SAND, DRY (TAL PLAII ROWN, GR DARSE TO (A-2-6)	AY, FINE 3.0	150	0 149.1 147.5 + 2.6	6 6	4	. 10 .	::::		-			150	UNDIVIDED C STIFF, GRAY, FINE	SURFACE OASTAL PLAIN TO COARSE SANDY
145	5	5 = 5.3	6	8	9	· · · · · · · · · · · · · · · · · · ·	7				M		146.8 DENSE, WHITE, LIGHT E SILTY FINE TO COAR (A-2-4) COASTAL F MEDIUM DENSE, DANK LIGHT BROWN, CLAY	ROWN, OI SE SAND, PLAIN GRAY, OR	DRY J RANGE,	145	+	2 4 3 5 8 11	8	111				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	M ▼ M	145	STIFF TO VERY ST COARSE SANDY	O MOIST (A-6) AL PLAIN IFF, GRAY, FINE TO CLAY, MOIST (A-6) K FORMATION)
140	_139	.0 12.8	3 4	3	3	6					w		FINE SAND, MOIST (A-2- FORMATIVE 137.8 VERY SOFT TO ME GREEN-GRAY, SILTY SATURATED, TRACE L	6) (BLACK ON) DIUM STIF CLAY, WE	CREEK 14.0 FF, ET TO	140	137.5 - 12.6	2 1	1	· / · · · · · · · · · · · · · · · · · ·				Sa	at.	138	8.1 VERY SOFT, LIGH SILTY CLAY, SAT	HT TO DARK GRAY, — — 1 FURATED, HIGHLY C (A-7-5)
130)	0 17.8	WOH		WOH	• · · · · · · · · · · · · · · · · · · ·					Sat.		- PLASTIC (A - - - - 130.3 VERY LOOSE, DARK	7-6) 	<u>21.5</u> LTY	130		WOH WOH	WOH O	0				Sa	at.	129		2
125	5	.0 27.8	WOH	WOH	WOH 1	0					Sat.		COARSE TO FINE SAN (A-2-4)	ID, SATUR			127.5 + 22.6	WOH WOH	WOH O	0			.	Sa	at.	120	COARSE TO FINE (A-Boring Terminated a COASTAL PLAIN S	ARK GRAY, SILTY SAND, SATURATED -2-4) at Elevation 126.0 ft IN SILTY SAND (BLACK
VCDOT BORE DOUBLE 15987A_GEO_SBW_NW8.GPJ NC_DOT.GDT 11/8/21		+ + + + + + + + + + + + + + + + + + + +				• • • • • • • • • • • • • • • • • • • •					Sat.		- 122.5 - Boring Terminated at Ele COASTAL PLAIN SILT' CREEK FORM	Y SAND (BI													CREEK FO	DRMATION) `



Consulting Engineers and Scientists	BORE L								
WBS 47533.1.2 TIP I-	5987A COUNTY ROBESO	N GEOLOGIST DEGON, A.		WBS 47533.1.2	TIP 1-59	987A COUNTY F	ROBESON	GEOLOGIST DEGON, A.	_
SITE DESCRIPTION 1-5987A NOISE WAL	_L 8		GROUND WTR (ft)	SITE DESCRIPTION	I-5987A NOISE WALL	_ 8			GROUND WTR (ft)
BORING NO. NW8-5 STATIO	ON 17+93 OFFSET 1	ft LT ALIGNMENT NW8	0 HR. N/A	BORING NO. NW8-6	STATION	N 20+00 OF	FSET 3 ft RT	ALIGNMENT NW8	0 HR. N/A
COLLAR ELEV. 149.7 ft TOTAL	DEPTH 25.2 ft NORTHING	355,215 EASTING 2,000,693	24 HR. 7.2	COLLAR ELEV. 148	.4 ft TOTAL [DEPTH 25.2 ft NC	ORTHING 355,408	EASTING 2,000,695	24 HR. 9.5
DRILL RIG/HAMMER EFF./DATE TER373 DIEDR	RICH D-50 95% 02/06/2021	DRILL METHOD Mud Rotary HAN	MMER TYPE Automatic	DRILL RIG/HAMMER EFF	F./DATE TER373 DIEDRIC	CH D-50 95% 02/06/2021	DRILL METHOD	Mud Rotary HAM	MER TYPE Automatic
DRILLER TURNAGE, J. R. START	COMP. DAT	SURFACE WATER DEPTH	N/A	DRILLER TURNAGE	Ξ, J. R. START Γ	DATE 10/20/21 CC	OMP. DATE 10/20/21	SURFACE WATER DEPTH	N/A
DRILL RIG/HAMMER EFF./DATE TER373 DIEDR DRILLER TURNAGE, J. R. START ELEV (ft) DRIVE (ft) DEPTH (ft) BLOW COUNT (0.5ft) 0.5ft 0.5ft 0 150 148.7 + 1.0 12 8 7 1.0 12 8 7 1.0	RICH D-50 95% 02/06/2021 F DATE 10/20/21 COMP. DAT	DRILL METHOD Mud Rotary HAN	MMER TYPE Automatic N/A ESCRIPTION DEPTH (ft) RFACE 0.0 STAL PLAIN (, SILTY FINE TO OIST (A-2-4) FINE TO COARSE (A-2-6) CA-2-6) CA-2-6) CAPACE TO LITTLE HIGHLY PLASTIC K FORMATION) AY, CLAYEY FINE TURATED, TRACE -2-7) GRAY, SILTY D, SATURATED, E LIGNITE (A-2-4) Evation 124.5 fi IN Y SAND (BLACK	DRILL RIG/HAMMER EFF DRILLER TURNAGE ELEV DRIVE ELEV (ft)	F./DATE TER373 DIEDRIC E, J. R. START E BLOW COUNT 0.5ft 0.5ft 0.5ft 0 12 13 11 17 22 12	CH D-50 95% 02/06/2021 DATE 10/20/21 CC BLOWS PER FOOT 25 50 75 24	DRILL METHOD	Mud Rotary HAM SURFACE WATER DEPTH SOIL AND ROCK DE	MER TYPE Automatic N/A SCRIPTION FACE 0.0 FAL PLAIN INSE, BROWN, COARSE SAND, (A-2-4) AIN ARSE TO FINE () (BLACK CREEK N) TY, SILTY CLAY, IIGHLY PLASTIC GRAY, CLAYEY D, SATURATED 25.2 ration 123.2 ft IN Y SAND (BLACK
4CDOT BORE DOUBLE 15987A_GEO_SBW_NW8.GPJ NC_DOT.GDT 11/8/21									



Consulting Engineers and Scientists	<u>P</u>	ORE LUG					
WBS 47533.1.2	TIP I-5987A COUNT	TY ROBESON GEO	OLOGIST DEGON, A.	WBS 47533.1.2	TIP I-5987A COUN	TY ROBESON	GEOLOGIST DEGON, A.
SITE DESCRIPTION 1-5987A NO	DISE WALL 8		GROUND WTR (ft)	SITE DESCRIPTION I-5987A N	NOISE WALL 8		GROUND WTR (I
BORING NO. NW8-7	STATION 22+00	OFFSET 17 ft LT ALI	IGNMENT NW8 0 HR. N/A	BORING NO. NW8-8	STATION 23+92	OFFSET 2 ft LT	ALIGNMENT NW8 0 HR. N/
COLLAR ELEV. 149.3 ft	TOTAL DEPTH 30.3 ft	NORTHING 355,612 EAS	STING 2,000,696 24 HR. 10.4	COLLAR ELEV. 141.9 ft	TOTAL DEPTH 29.8 ft	NORTHING 355,803	EASTING 2,000,720 24 HR. 6.
DRILL RIG/HAMMER EFF./DATE TER	R373 DIEDRICH D-50 95% 02/06/2021	DRILL METHOD Mud Rota	ary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TE	ER373 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 SUF	RFACE WATER DEPTH N/A	DRILLER TURNAGE, J. R.	START DATE 10/20/21	COMP. DATE 10/20/21	SURFACE WATER DEPTH N/A
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		T SAMP. V L O NO. MOI G ELEV.	SOIL AND ROCK DESCRIPTION	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	 	OT SAMP. L O NO. MOI G	
148.3 1.0 10 11 145.5 3.8 17 20 143.0 6.3 10 15 140.5 8.8	9	MO S ELEV. —149.3 —144.3 M —135.3 W —135.3	GROUND SURFACE 0.0 UNDIVIDED COASTAL PLAIN MEDIUM DENSE TO DENSE, BROWN, RED-BROWN, SILTY FINE TO COARSE SAND. DRY TO MOIST (A-2-4)	145 140 140 140 138.6 - 3.3 135 136.1 - 5.8 WOH WOH 133.6 - 8.3 3 5 130 128.6 - 13.3 WOH WOH 125 123.6 - 18.3 4 6	4	D M Sat. Sat. Sat.	GROUND SURFACE UNDIVIDED COASTAL PLAIN VERY LOOSE TO LOOSE, BROWN, ORANGE, GRAY, SILTY FINE TO COARSE SAND, DRY TO MOIST (A-2-4) TOASTAL PLAIN VERY SOFT, DARK GRAY, SILTY CLAY, WET, HIGHLY PLASTIC (A-7-6) (BLACK CREEK FORMATION) VERY LOOSE TO MEDIUM DENSE, GRAY TO DARK GRAY, SILTY FINE TO COARSE SAND, SATURATED (A-2-4)
125	1	Sat. 125.8	VERY LOOSE, DARK GRAY, SILTY COARSE TO FINE SAND, SATURATED (A-2-4)	120 118.6 = 23.3 1 2	3 45		119.9 MEDIUM STIFF TO STIFF, DARK GRAY, SILTY CLAY, WET, TRACE LIGNITE AND SAND, HIGHLY PLASTIC (A-7-6)
			Boring Terminated at Elevation 119.0 ft IN COASTAL PLAIN SILTY SAND (BLACK CREEK FORMATION)	113.6 - 28.3	6		Boring Terminated at Elevation 112.1 ft IN COASTAL PLAIN SILTY CLAY (BLACK CREEK FORMATION) CREEK FORMATION COASTAL PLAIN SILTY CLAY (BLACK CREEK FORMATION)