5986B REFERENCE

STATE OF NORTH CAROLINA

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

CONTENTS

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) 3 - 4 SITE PLAN & PROFILES BORE LOG(S)

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND, HARNETT AND JOHNSTON PROJECT DESCRIPTION I-95 FROM NORTH OF SR 1002 (LONG BRANCH ROAD) (EXIT 71) TO I-40 (EXIT 81)

SITE DESCRIPTION BRIDGE 66 WALLS -76.50'RT OF -L- STA 969+4076.42'LT OF -L- STA 970+77

INVENTORY

STATE PROJECT REFERENCE NO. 15 I-5986B

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 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 METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS INCLORDED TO CLIMATIC CONDITIONS INCLORDED TO CLIMATIC CONDITIONS INCLORDING TO CLIMATIC CONDITIONS INCLORDING 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.

PERSONNEL J. MARLOWE P. GUNNELL E. BLONESHINE M. HAYES T. WHITE K. HARDEE INVESTIGATED BY _S&ME, INC. DRAWN BY _C. CHANDLER CHECKED BY K. HILL SUBMITTED BY S. MITCHELL



9751 SOUTHERN PINE BLVD CHARLOTTE, NC 28273 (704) 523-4726



DATE APRIL 2020

PROJECT REFERENCE NO. SHEET NO.

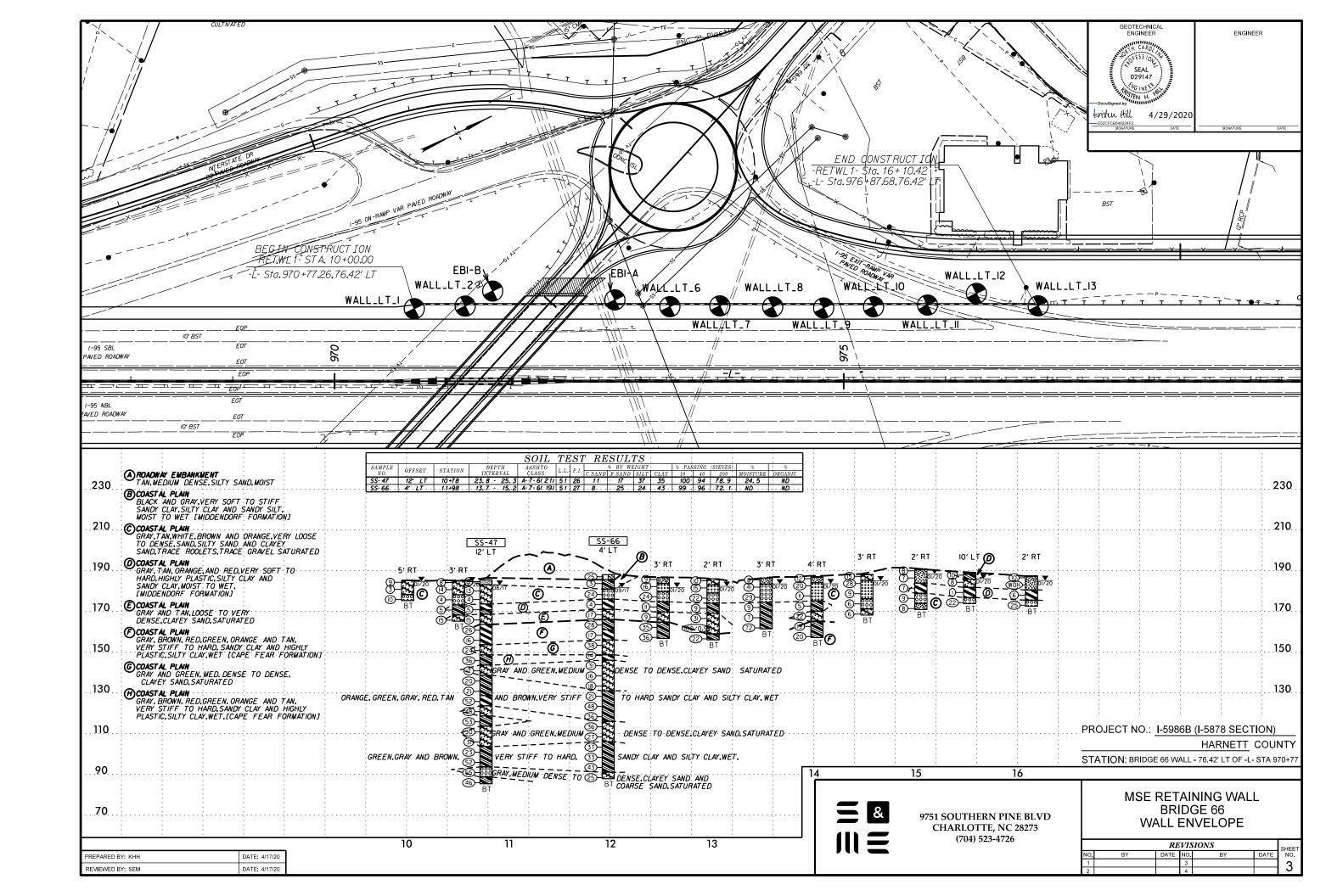
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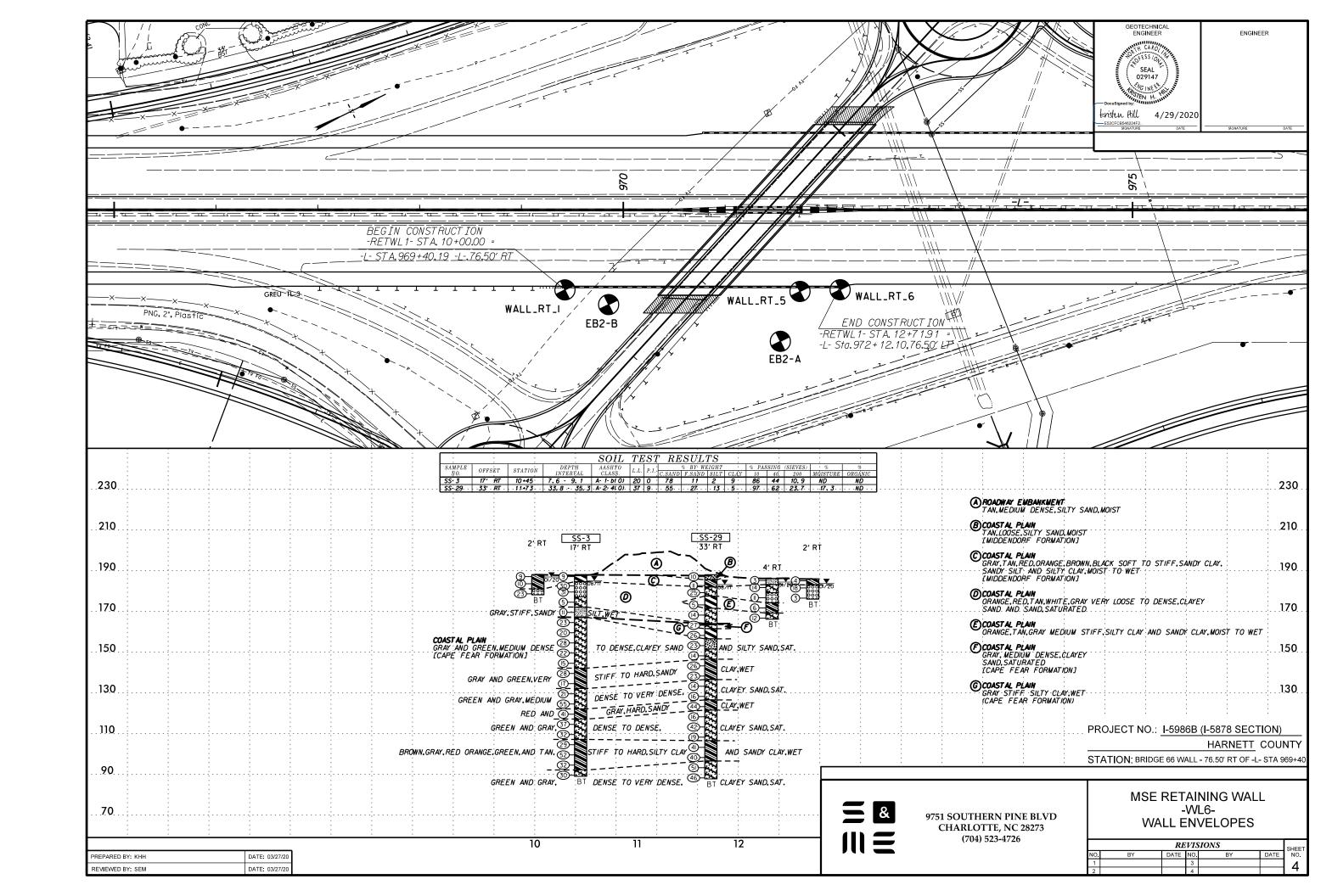
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

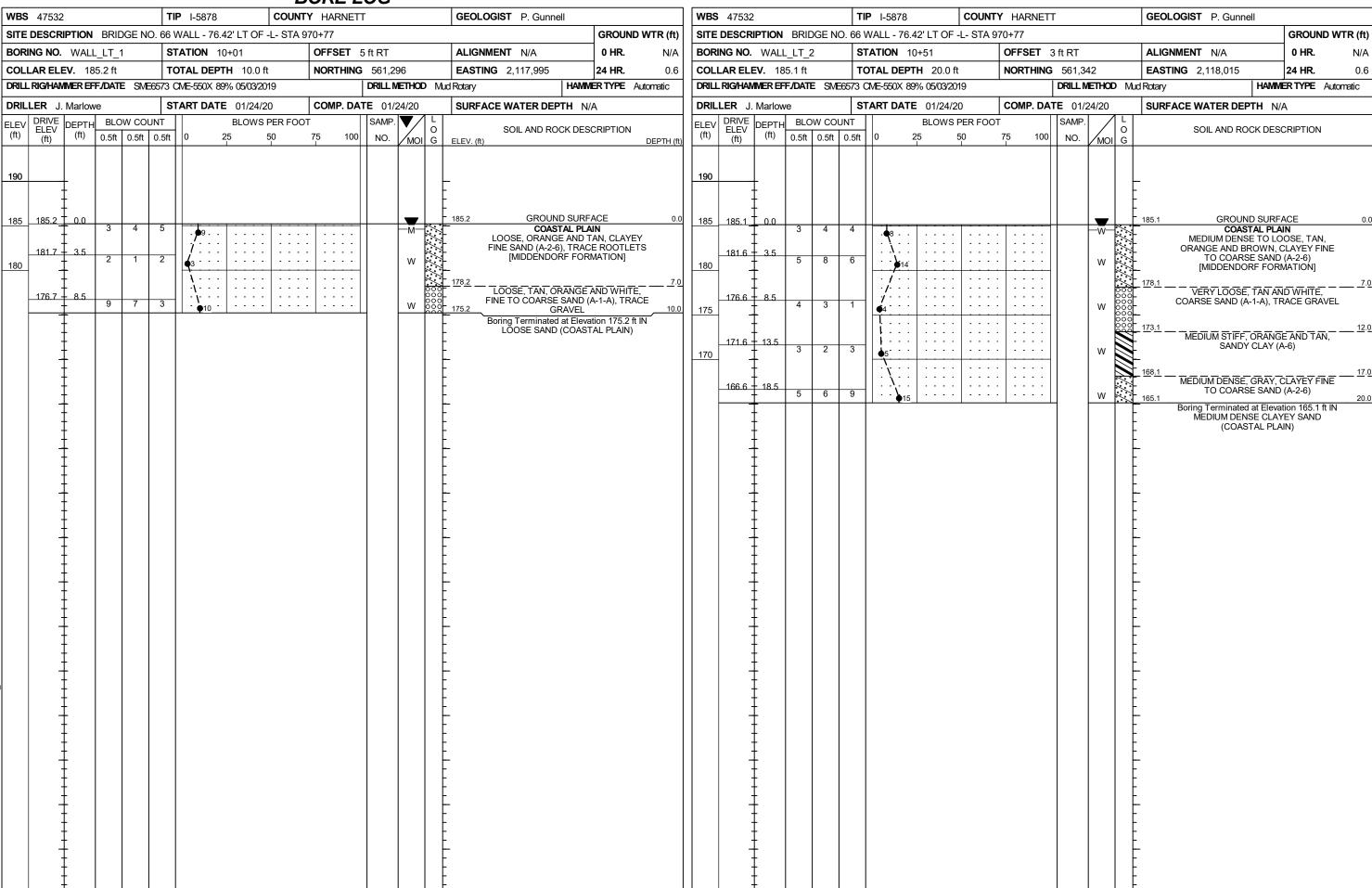
SUBSURFACE INVESTIGATION

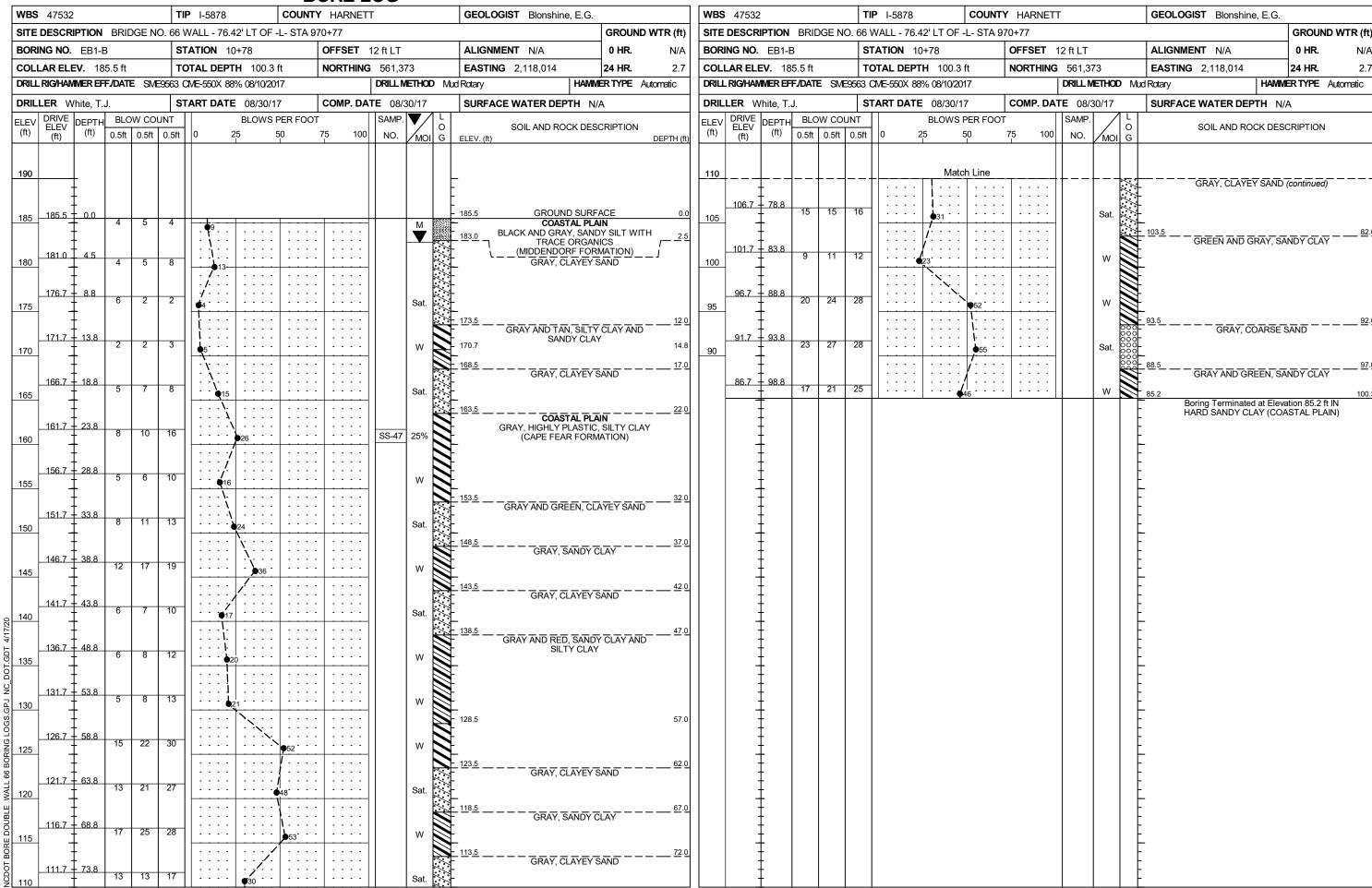
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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	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:	WEATHERED WALLES AND THE THE CONTROL OF THE CONTROL	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.	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. (\$\(\sigma\) 7851NU *200) (> 30% PASSINU *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-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 B-2-6 A-2-7 A-3-4 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 0000 0000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
2. 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 SILT- GRANULAR CLAY MUCK, CLAY	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 SOILS SOILS	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL		ROCKS OR CUTS MASSIVE ROCK.
MATERIAL 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
PASSING *40 SOUS 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. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR LITTLE OR LITTLE OR	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	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.) 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 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
CEN RATING FAIR TO	→ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	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
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.	FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR 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
CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT ²)	₩ITH 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 CONTROL LOOSE	SOIL SYMBOL SOIL SYMBOL SOIL SYMBOL SEPT DOPT DMT 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.	<u>LENS</u> - 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 ANGED PORTUGE 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	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER 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	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	INFERRED ROCK LINE 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	→ 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. 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	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	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - 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 0.05 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. 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	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.
<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.	
- 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	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 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 ATTAIN OPTIMUM MOISTURE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS FRAGMENTS TCR - TRICONE REFUSAL FRAGS FRAGMENTS F	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: • SEE NOTE
- MOIST - (M) COLID. AT OR NEAR ORTIMIN MOISTING	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	ELEVATION: FEET
OM OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	NOTES:
REQUIRES ADDITIONAL WATER TO	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	• Elevations derived from geopak and the .tin file
- DRY - (D) ATTAIN OPTIMUM MOISTURE	CME-55 6° CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	i5896b_2_ls_tin.tin dated 06/18/18
PLASTICITY	8" HOLLOW AUGERS	INDURATION	-
PLASTICITY INDEX (PI) DRY STRENGTH	X 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 UNGCARBIDE INSERTS	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	CDAING CAN BE CERARATED FROM CAMPLE WITH CIFEL BRORE.	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2 15/16 STEEL TEETH HAND AUGER	MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	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		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X BWJ RODS	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1
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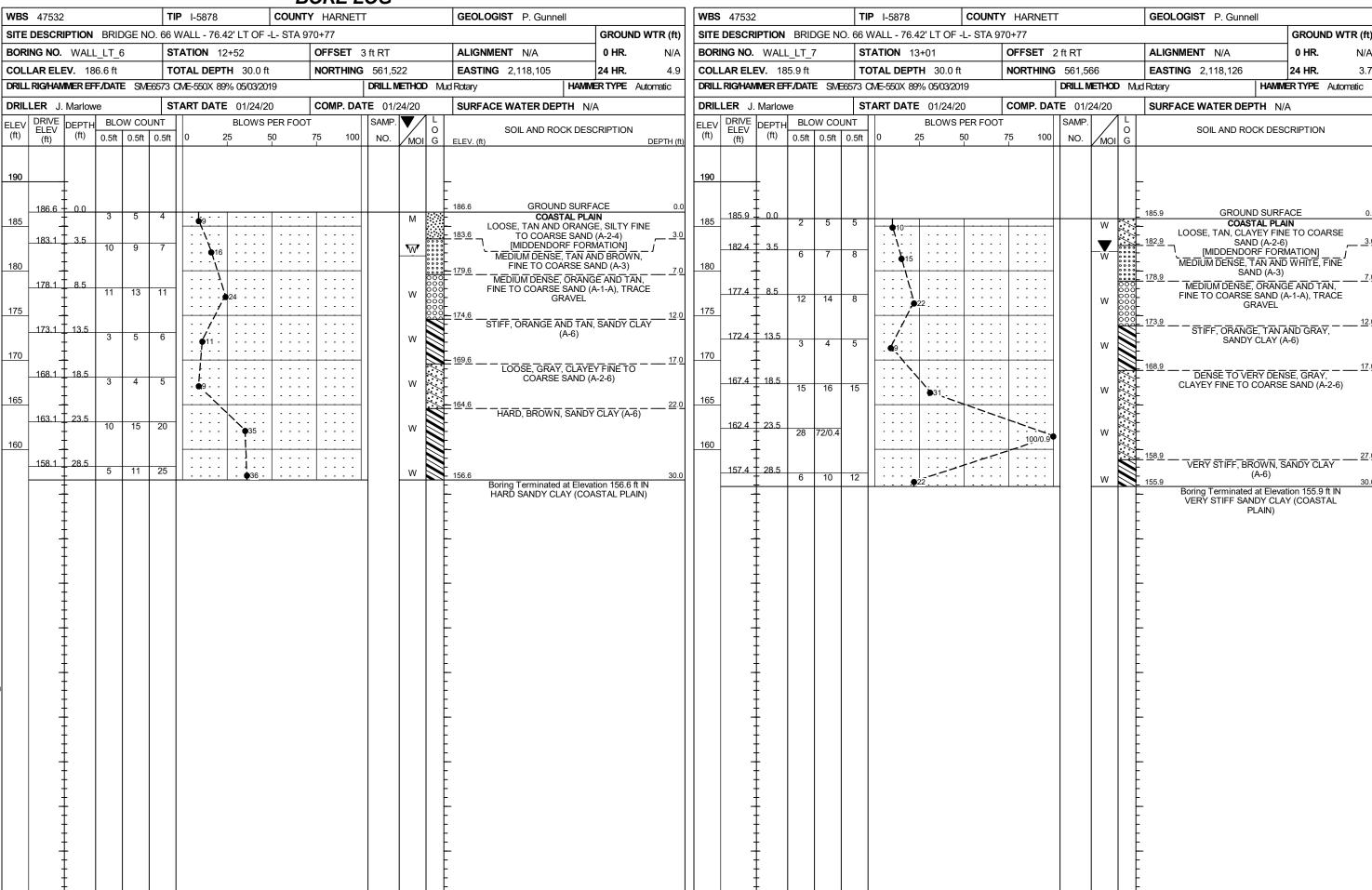


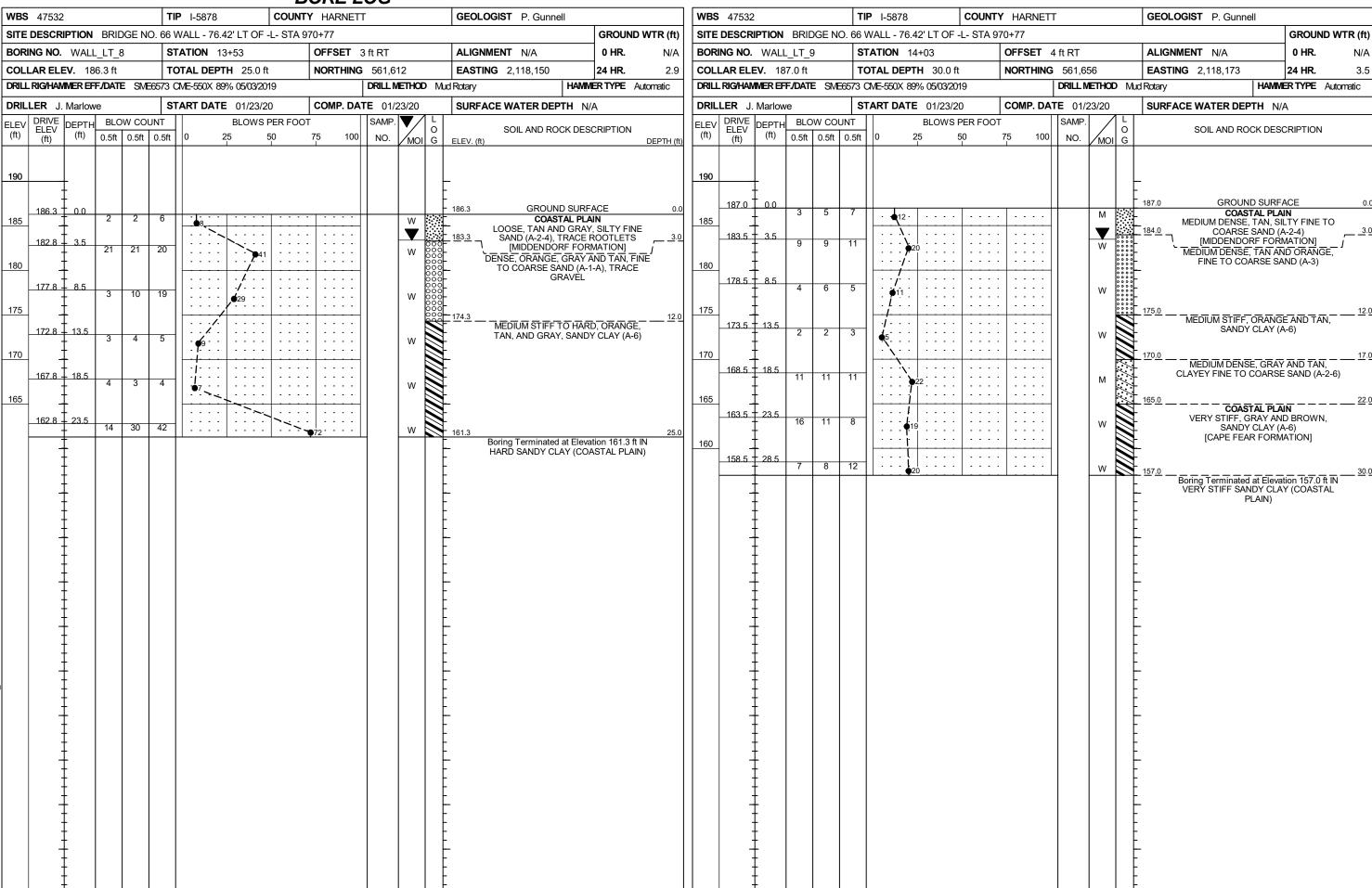


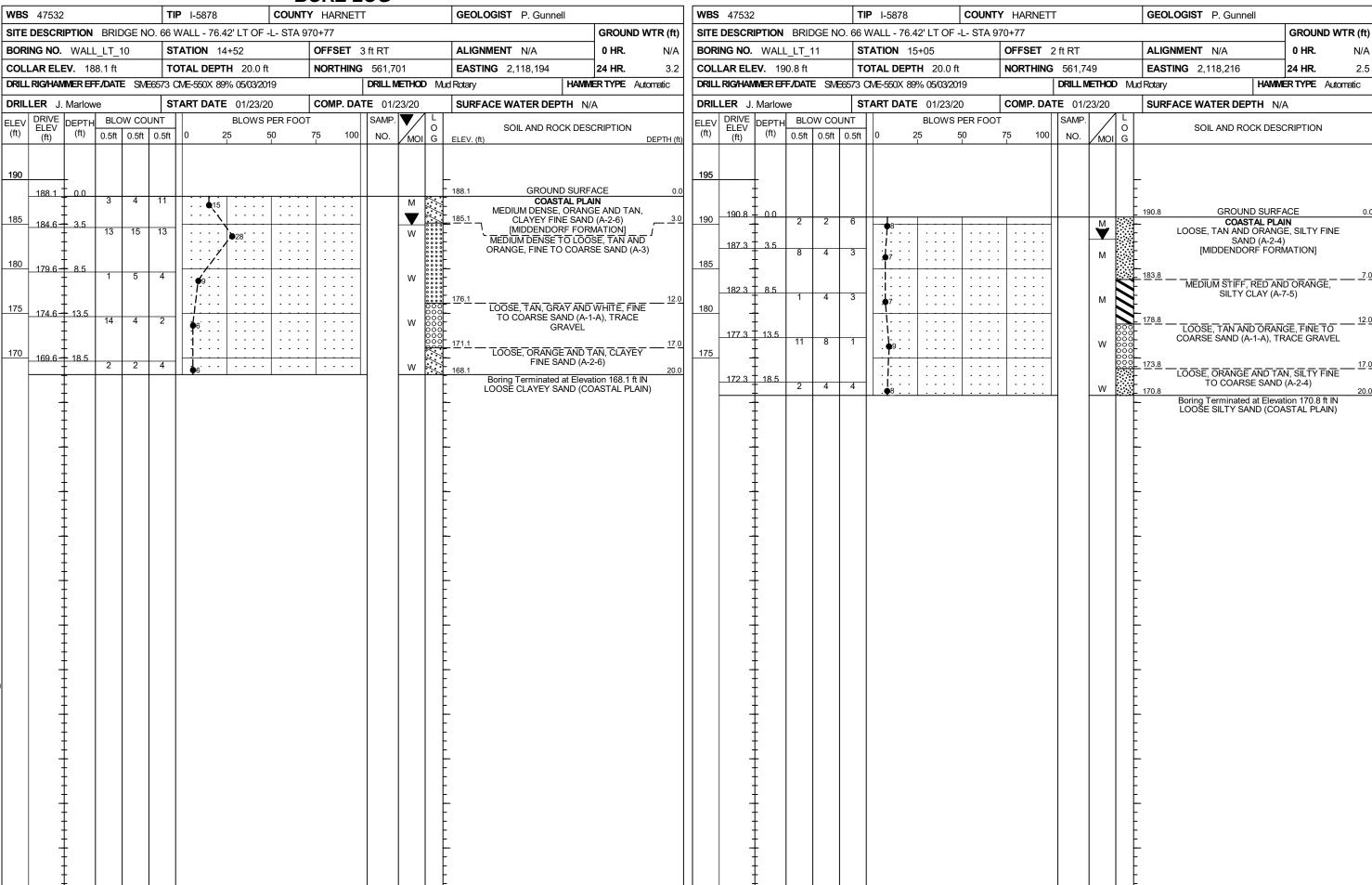




	BURE LUG				
WBS 47532 TIP I	I-5878 COUNTY HARNETT	GEOLOGIST Blonshine, E.G.	WBS 47532	TIP I-5878 COUNTY HARNE	, -
SITE DESCRIPTION BRIDGE NO. 66 WAL		GROUND WTR (ft)	SITE DESCRIPTION BRIDGE NO.	66 WALL - 76.42' LT OF -L- STA 970+77	GROUND WTR (ft)
BORING NO. EB1-A STATI	ION 11+98 OFFSET 4 ft LT	ALIGNMENT N/A 0 HR. N/A	BORING NO. EB1-A	STATION 11+98 OFFSET	4 ft LT ALIGNMENT N/A 0 HR. N/A
COLLAR ELEV. 187.9 ft TOTA	IL DEPTH 100.2 ft NORTHING 561,476	EASTING 2,118,075 24 HR. 6.3	COLLAR ELEV. 187.9 ft	TOTAL DEPTH 100.2 ft NORTHIN	IG 561,476 EASTING 2,118,075 24 HR. 6.3
DRILL RIG/HAMMER EFF./DATE SME9563 CME-	-550X 88% 08/10/2017 DRILL METHOD Mud I	Rotary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF/DATE SME95	63 CME-550X 88% 08/10/2017	DRILL METHOD Mud Rotary HAMMER TYPE Automatic
DRILLER White, T.J. STAR	T DATE 08/31/17 COMP. DATE 08/31/17	SURFACE WATER DEPTH N/A	DRILLER White, T.J.	START DATE 08/31/17 COMP. D.	ATE 08/31/17 SURFACE WATER DEPTH N/A
ELEV DRIVE DEPTH BLOW COUNT	BLOWS PER FOOT SAMP. V L	SOIL AND ROCK DESCRIPTION	ELEV DRIVE DEPTH BLOW COUN	T BLOWS PER FOOT	SAMP. L SOIL AND ROCK DESCRIPTION
(ft) (ft) (ft) 0.5ft 0.5ft 0.5ft 0	25 50 75 100 NO. MOI G E		(ft) (ft) (ft) 0.5ft 0.5ft 0	.5ft 0 25 50 75 10	NO. MOI G
190			110	Match Line	
187.9 1 0.0	F	87.9 GROUND SURFACE 0.0	1092 787 - 1 - 1	14	
	M	ROADWAY EMBANKMENT		• • • • • • • • • • • • • • • • • • • •	105.9
185 184.6 3.3		TAN, SILTY SAND 2.5	104 2 + 83 7	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	GRAY AND GREEN, SANDY CLAY
	₹ ::: ::::	BLACK, SANDY CLAY (MIDDENDORF FORMATION)	104.2 + 00.7 12 14 3	23	w
190 + :	· · · · · · · · · · · · · · · · · · ·	80.9	100		
180 179.2 8.7 9 12 12		GRAY, COARSE SAND	99.2 88.7	20	
	24			33	w
175		TAN, HIGHLY PLASTIC, SILTY CLAY	95 1 1		
174.2 13.7	SS-66 W	,	942 T 937 I	25	
		70.9 17.0			
170 169.2 18.7	\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.	TAN, CLAYEY SAND	90 89.2 7 98.7		GRAY, CLAYEY SAND
4 5 12	Sat.		12 13	12	Sat. 87.7 100.2
	: : : ` <u>`</u>	65.922.0			Boring Terminated at Elevation 87.7 ft IN MED. DENSE CLAYEY SAND (COASTAL
165 164.2 23.7		COASTAL PLAIN GRAY, SANDY CLAY AND SILTY CLAY	+		- MED. ĎENSE CLAYEY SAND (COASTAL PLAIN)
7 11 17) 28 W	(CAPE FEAR FORMATION)			
160		60.9 27.0			
159.2 28.7 5 8 9					
		200			
155 154.2 33.7		55.9 GRAY, CLAYEY SAND 32.0			
134.2 33.7 13 18 20	Sat.				
± :			±		
150 149.2 38.7		48.6 39.3			
4 6 8	• 14 W	GRAY, SILTY CLAY			
145		45.9 GRAY, CLAYEY SAND 42.0			
144.2 + 43.7 9 14 17	31 Sat.	GIVAT, CLATET SAIND	‡		
+	•31 Sat. Sat.				
140 120 2 40 7					
139.2					
			±		
134.2 53.7			±		
	• 18				
130		30.9 GRAY, SANDY CLAY 57.0			
129.2 58.7 8 9 12		GRAT, SAINDT CLAY			
9 I	• • • • • • • • • • • • • • • • •				
125			‡		
124.2			±		
119.2 68.7			‡		
8 15 21					
		15.9 72.0			
115		GRAY, CLAYEY SAND			
	Sat.				
\(\frac{1}{2} \Big \qq	$\cdots \mid j \cdots \mid \cdots $				



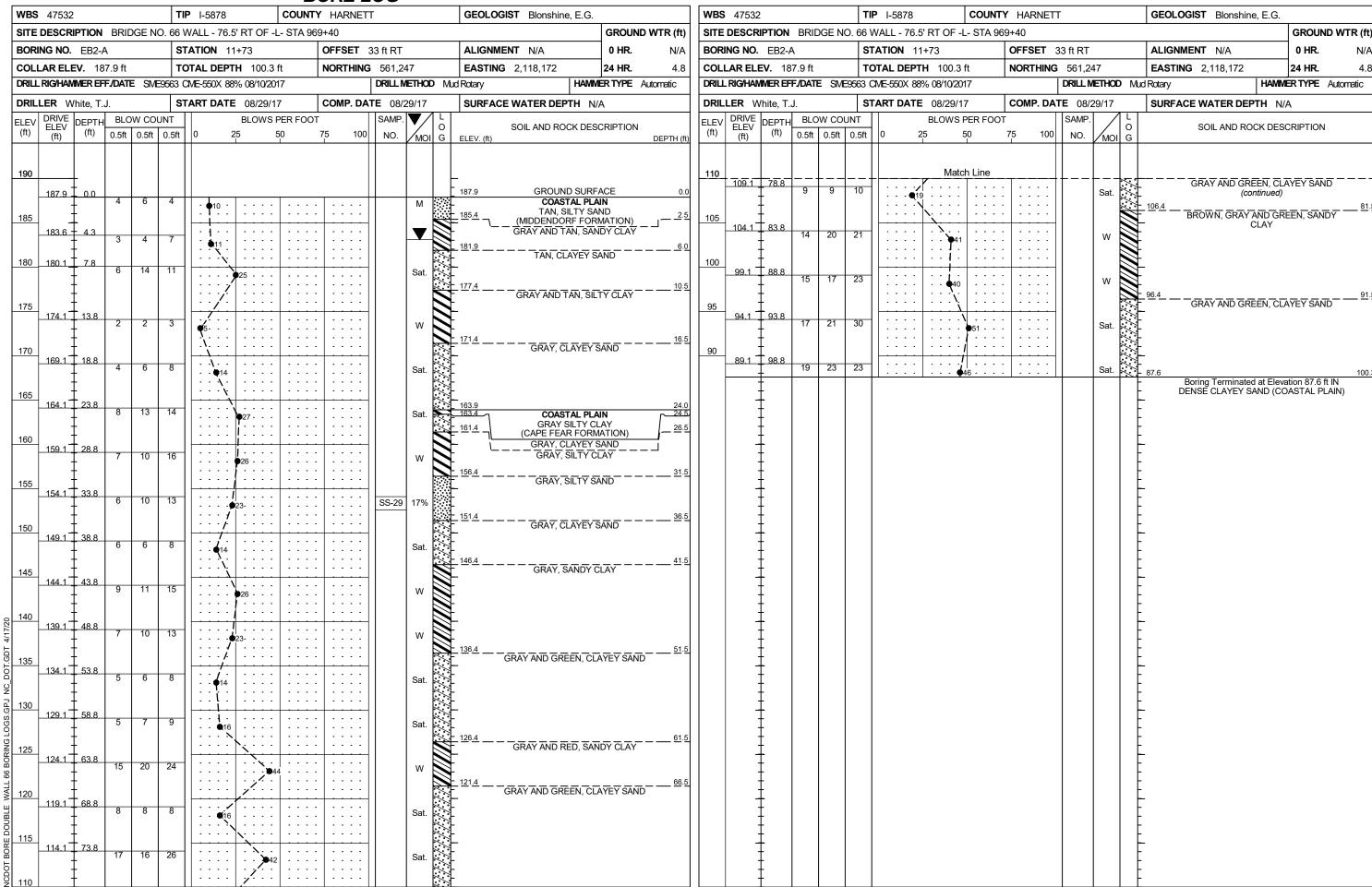




	BORE L						1	
WBS 47532	TIP I-5878 COUNTY HARNETT	T GEOLOGIST P. Gunnell		WBS 47532	TIP I-5878 COUNTY H		GEOLOGIST P. Gunnell	
SITE DESCRIPTION BRIDGE N	O. 66 WALL - 76.42' LT OF -L- STA 970+77		GROUND WTR (ft)	SITE DESCRIPTION BRIDGE NO	O. 66 WALL - 76.42' LT OF -L- STA 970+7	77	GROUND WTR (ft)	
BORING NO. WALL_LT_12	STATION 15+53 OFFSET 1	10 ft LT ALIGNMENT N/A	0 HR . N/A	BORING NO. WALL_LT_13	STATION 16+14 OF	FSET 2 ft RT	ALIGNMENT N/A 0 HR. N/A	
COLLAR ELEV. 188.7 ft	TOTAL DEPTH 15.0 ft NORTHING		24 HR. 2.7	COLLAR ELEV. 187.4 ft			EASTING 2,118,265 24 HR. 2.3	
DRILL RIG/HAMMER EFF./DATE SME	66573 CME-550X 89% 05/03/2019	DRILL METHOD Mud Rotary HAMM	/IER TYPE Automatic	DRILL RIG/HAMMER EFF/DATE SME			d Rotary HAMMER TYPE Automatic	
DRILLER J. Marlowe		SURFACE WATER DEPTH N/	/A	DRILLER J. Marlowe		6+14 OFFSET 2 ft RT ALIGNMENT N/A 0 HR. N/A		
ELEV Cft) DRIVE ELEV (ft) DEPTH BLOW COME (ft) 0.5ft 0.5ft		SAMP. C C SOIL AND ROCK DESI	CRIPTION DEPTH (ft)	ELEV (ft) DEPTH BLOW COL (ft) (ft) 0.5ft 0.5ft	JNT BLOWS PER FOOT 0.5ft 0 25 50 75	400	SOIL AND ROCK DESCRIPTION	
190	6 . • 10 · · · · · · · · · · · · · · · · · ·	M STIFF, TAN AND ORANGE (A-6) [MIDDENDORF FOR LOOSE, TAN, CLAYEY FIN SAND (A-2-6)	AIN E, SANDY CLAY EMATION] JE TO COARSE 3.0 7.0	187.4 0.0 2 5 185 183.9 3.5 WOH WOH	WOH 0		COASTAL PLAIN LOOSE TO VERY LOOSE, TAN AND ORANGE, SILTY FINE SAND (A-2-4)	
180 180.2 8.5 WOH WOH	1 1	M VERY SOFT, TAN, RED, A SILTY CLAY (A-SILTY CLAY (A-DIUM DENSE, ORANG COARSE SAND (A-1-A), TF	AND ORANGE, -7-5) 	180 178.9 8.5 175	3		MEDIUM STIFF, ORANGE AND RED, SILTY CLAY (A-7-5)	
12 11	11 22	W 000 173.7 COARSE SAND (A-1-A), 1F	15.0	173.9 13.5 14 14			GRAV FINE TO COARSE SAND (A_1_A)	
NCDOT BORE DOUBLE WALL 66 BORING LOGS.GPJ NC_DOT.GDT 4/17/20		- MEDIŪM DENSE SAND (CC	JASTAL PLAIN)				Boring Terminated at Elevation 172.4 ft IN	

						_					RE I		j																	1											
WE	3S 47	532				TIP	I-5878		COU	INTY	HARNE	ΙΤ			GEO	LOGIST	P. Gunr	nell				WBS	47532				TIF	P I-5878		C	DUNTY	HARNE	ΙΤ		G	GEOLOGI	ST P. Gu	nnell			
SIT	E DES	CRIPT	ION E	BRIDG	SE NO	66 W	ALL - 76.5	5' RT OF	-L- STA										GROU	JND WTI	R (ft)	SITE	DESCRI	PTION	BRID	GE NO	O. 66 V	VALL - 76	5.5' RT (OF -L- S									GROUI	ND WTF	₹ (ft)
ВС	RING	NO. V	VALL_I	RT_1		STA	TION 10	0+03		OF	FFSET	2 ft RT	•		ALIG	NMENT	N/A		0 HR.		N/A	BORIN	NG NO.	WALL	_RT_5	5	ST	ATION ^	12+33		C	FFSET	4 ft RT		A	ALIGNME	NT N/A		0 HR.		N/A
			188.				AL DEPT			NC	ORTHIN					TING 2,	118,069		24 HR.			_	AR ELE					TAL DEP			N	IORTHIN	G 561,3				2,118,17		24 HR.		1.8
DR	ILL RIG	HAMME	R EFF./	DATE	SME6	573 CN	E-550X 89	05/03/2	2019			DRILL	METH	OD Mu	d Rotary			HAM	MER TYPE	E Automa	atic	DRILL	RIG/HAM	MER EFI	-/DATE	SME	6573 C	ME-550X 8	39% 05/0	03/2019				METHOD	Mud Ro	otary		HAN	IMER TYPE	Automa	tic
		J. Ma					RT DATE	01/22	/20	CC	OMP. D			4	SURF	ACE W	ATER DE	EPTH N	N/A				ER J.					ART DAT	E 01/	22/20	C	OMP. D	ATE 01/		s	SURFACE	WATER D	EPTH I	N/A		
(11)	⁾ (1	VE EV t)	PTH (ft) 0		COUI).5ft (0 2	BLOW:	S PER FO	OOT 75	100		P. M	0	ELEV. (i		OIL AND R	OCK DE	SCRIPTIO		PTH (ft)	(11)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	JNT 0.5ft	0	BLO 25	WS PER 50 1	FOOT	5 100	SAMP.	MOI	O G		SOIL AND	ROCK DE	SCRIPTION	N .	
18:		3.0	3.5	3	4	6	9					-	M	000	188.0 - - - - - - - - - - - -	SANDY [N	COA: TAN ORA CLAY (A MIDDENDO	N-6), TRA ORT FOI		rlets] 	0.0	185	186.1 - - - - - - - - - - - - - - - - - - -	0.0	2	2	1 8	4 3					-	N/P W	**	SOF	CC FT, BLACK, I [MIDDEN EDIUM DEN YEY FINE T	ROOTLET DORF FO SE, TAN O COARS	LAIN ILT (A-4), T S RMATION] AND ORAN SE SAND (A	<i></i>	0.0 3.0 7.0
		+ + + + + + + + + + + + + + + + + + + +		9	9	14	· · · · · · •	23					W	000	178.0	Boring	LITT Terminate	LE GRAVed at Elev		.0 ft IN		175	177.6 - - - 172.6 -	· - -	3	3	7	• • • • • • • • • • • • • • • • • • •						W	179 1000 1000 1000 1000 1000 174	CO.	IEDĪUM DEŅ ARSE SAND IEDĪUM STĪ) (A-1-A),	NGE, FINE TRACE GR	AVEL	12.0
		+													- · · ·								167.6	- - 18.5 -	5	6	6			-				W	169	6.1 Boi	ing Termina MEDIUM D	RSE SAN	ID (A-2-6) vation 166.1 AYEY SANI	ft IN	<u>17.0</u> 20.0
NCDOT BORE DOUBLE WALL 66 BORING LOGS.GPJ NC_DOT.GDT 4/17/20																																									

WBS 47532	TIP 1-5878 COUNTY HARNI			WBS 47532	TIP I-5878 COUN	TY HARNETT	GEOLOGIST Blonshine, E.G.
	. 66 WALL - 76.5' RT OF -L- STA 969+40	GEOLOGIST Bionsnine, E.C.	GROUND WTR (ft)		O. 66 WALL - 76.5' RT OF -L- STA		GROUND WTR (ft)
BORING NO. EB2-B		17 ft RT ALIGNMENT N/A	0 HR. N/A	BORING NO. EB2-B	STATION 10+45	OFFSET 17 ft RT	ALIGNMENT N/A 0 HR. N/A
COLLAR ELEV. 188.0 ft		NG 561,140 EASTING 2,118,101	24 HR. 3.0	COLLAR ELEV. 188.0 ft	TOTAL DEPTH 99.1 ft	NORTHING 561,140	EASTING 2,118,101 24 HR. 3.0
DRILL RIG/HAMMER EFF/DATE SMESS			MMERTYPE Automatic	DRILL RIG/HAMMER EFF./DATE SME		DRILL METHOD N	
DRILLER White, T.J.		DATE 08/28/17 SURFACE WATER DEPTH		DRILLER White, T.J.	START DATE 08/28/17	COMP. DATE 08/28/17	SURFACE WATER DEPTH N/A
		SAMP V L	·				<u> </u>
ELEV CHI	0.5ft 0 25 50 75 1	00 NO. MOI G ELEV. (ft) SOIL AND ROCK DI	ESCRIPTION DEPTH (ft)	ELEV CHI	0.5ft 0 25 50	75 100 NO. MOI G	
	5		PLAIN	110 12 11	Match Line 21		GRAY AND GREEN, CLAYEY SAND (continued) BROWN, GRAY AND RED, SANDY CLAY
185		184.5 (MIDDENDORF FC		105 105.4 + 82.6 9 12	17 29		
183.4 7 4.6	16	-	ARSE SAIND				
180.4 7.6 10 16	15	SS-3 Sat. 0000		100 100.4 87.6	27	· · · · · · · · · · · · · · · · · · ·	
		- 177.0 TAN, CLAYEY	7 SAND 11.0				
175 175.4 12.6 2 1	4 \$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Sat.		95 95.4 † 92.6 14 15	17 32		-
170 170.4 17.6	./· · · · · · · · · · · · · · · · · · ·	.		90.4 + 97.6			92.0 96.0 96.0 96.0
170 170.4 17.0 4 5	6	1	RMATION)	90 90.4 7 97.6 14 15	15 \$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Sat.	
165 165.4 22.6 6 9	14	- IBT.0 — GRAY AND GREEN, O	CLAYEY SAND 21.0				DENSE CLAYEY SAND (COASTAL PLAIN)
	□ □ · · · · · □ □ · · · · □ · · · · · ·	.					
160 160.4 27.6 6 8	12 20	Sat.					<u>-</u>
155 155.4 7 32.6		-					E
7 10	18						F
150 150.4 7 37.6							-
150 150.4 7 37.6 8 11	11 922	Sat.					-
	:::/ :::: :::: ::::						-
145 145.4 142.6 6 6	9 \$15	Sat.					F
							‡
140 140.4 7.6 9 13	15	GRAY AND GREEN,	OAND I CLAT				F
<u> </u>							E
135 135.4 52.6 7 7	10	·					_
135 135.4 52.6 7 7	17	W 1230	50.0				
2 + 130.4 T 57.6 10 10 10 10 10 10 10 10 10 10 10 10 10		I I I GRAY AND GREEN (CLAYEY SAND				‡
130 130.4 57.6 6 10 125 125.4 62.6 14 24	11 21	Sat.					F
							E
125 125.4 7 62.6 14 24	31 55	Sat.					-
		122.0 GRAY, SAND	<u> </u>				‡
120 120.4 67.6	20 41	GRAT, SAND	. 554	‡			F
		117.0	71.0				E
115 115 4 72 6 16 16	21	. GRAY AND GREEN, (CLAYEY SAND				F
							‡
110 110.4 77.6							E



	E	BORE LOG		
NBS 47532	TIP I-5878 COUNT	Y HARNETT	GEOLOGIST P. Gunnell	
SITE DESCRIPTION BRIDGE N	O. 66 WALL - 76.5' RT OF -L- STA 9	69+40		GROUND WTR (ft)
BORING NO. WALL_RT_6	STATION 12+73	OFFSET 2 ft RT	ALIGNMENT N/A	0 HR . N/A
COLLAR ELEV. 185.9 ft	TOTAL DEPTH 10.0 ft	NORTHING 561,350	EASTING 2,118,189	24 HR. 2.3
DRILL RIG/HAMMER EFF/DATE SM	56573 CIVIE-550X 89% 05/03/2019	DRILL METHOD Muc	d Rotary HAMMI	ER TYPE Automatic
ORILLER J. Marlowe	START DATE 01/22/20	COMP. DATE 01/22/20	SURFACE WATER DEPTH N//	4
LEV CO (ft) DEPTH BLOW CO (ft) 0.5ft 0.5ft	JNT BLOWS PER FOC 0.5ft 0 25 50	T SAMP. V L O NO. MOI G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft
190			-	
185.9 0.0 3 2	2 4		185.9 GROUND SURFA COASTAL PLAI SOFT, BROWN AND ORA	IN
182.4 7 3.5 9	9 18 10 10 10 10 10 10 10	M 000	CLAY (A-6) [MIDDENDORF FORM MEDIUM DENSE TO VEI	MATION] $= \int_{-\infty}^{\infty} \frac{3!}{100}$
177.4 8.5 3 1	2 3		ORANGE AND WHITE, FIN SAND (A-1-A), TRACE	
#			Boring Terminated at Elevat VERY LOOSE SAND (COA	tion 175.9 ft IN
1 1 1			-	
‡				
‡			-	
‡				
‡			-	
1 1			-	
‡			-	
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			-	
1 1			-	
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SHEET 15