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### STATE OF NORTH CAROLINA

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

### **CONTENTS**

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN 4-5 BORE LOGS SOIL TEST RESULTS

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY PAMLICO

PROJECT DESCRIPTION REPLACE BRIDGE 680078 ON NC 306 FERRY OVER NEUSE RIVER

**INVENTORY** 

STATE PROJECT REFERENCE NO. BR-0173 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.

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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.

T. PARK D. STEWART S. PUGH

INVESTIGATED BY <u>CATLIN</u>

DRAWN BY <u>Y. LIU, PE</u>

CHECKED BY J. LEE STONE, LG SUBMITTED BY J. LEE STONE, LG

DATE NOVEMBER 2024





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

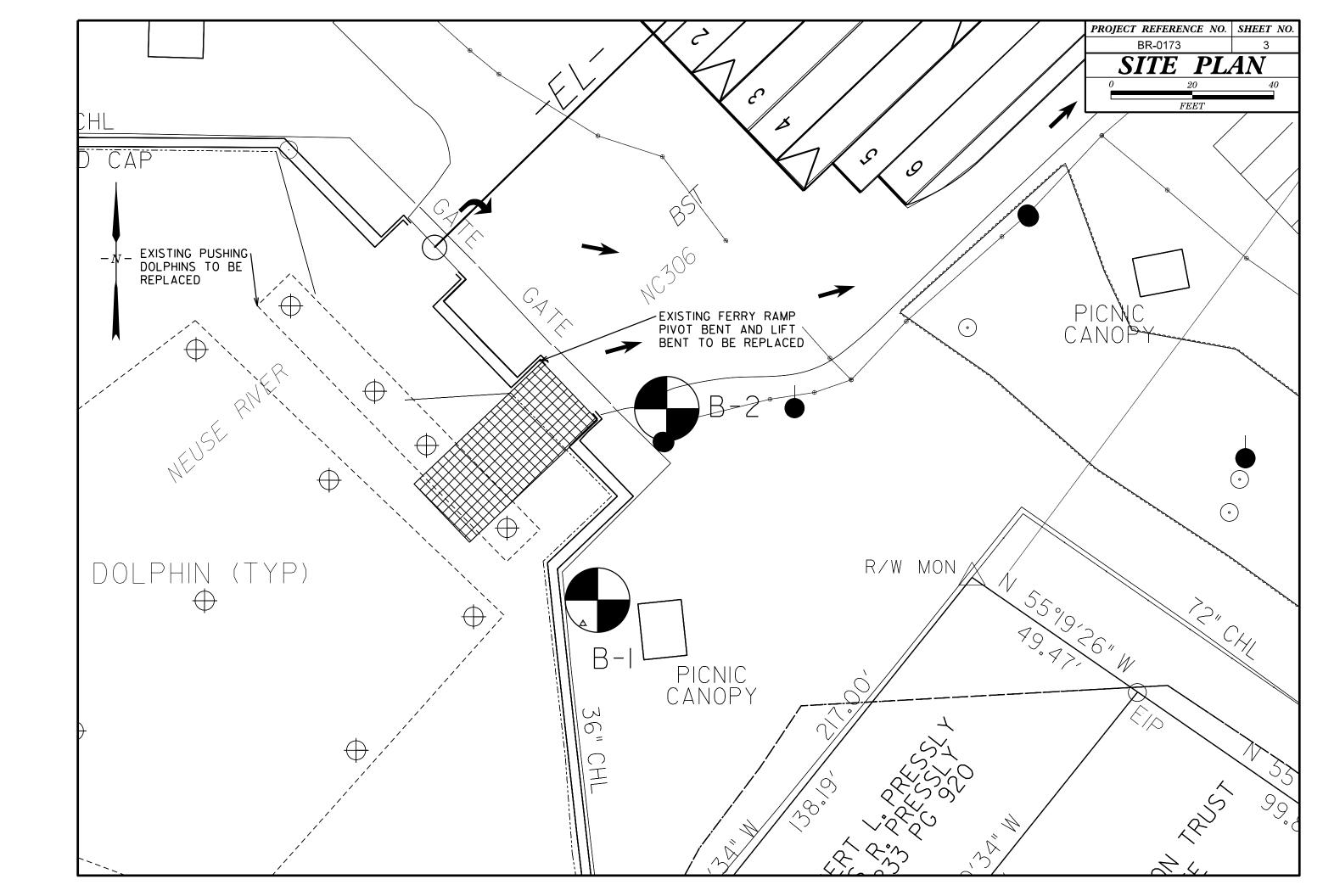
PROJECT REFERENCE NO. SHEET NO. 2

# 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 WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUN			
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.	UNEISS, OHOBRU, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.			
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON-CATSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM			
SYMBOL COOODCOOC	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.			
7. PASSING	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 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   PEAT   SOILS   SOILS   SOILS   SOILS   PEAT   SOILS   SO	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 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,	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.			
CROUP INDEX A A A A WY A MY 12 MY 16 MY NO MY AMOUNTS OF ORGANIC	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 FRACS ORGANIC SUILS	✓ 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 FINE SILIT OR CLAYET SILIT CLAYET MATTER	▼ 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 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	FIELO.			
COMPACTNIESS OF RANGE OF STANDARD RANGE OF UNCONFINED	I∏ 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 <sup>2</sup> )	ROADWAY EMBANKMENT (RE)  PROADWAY EMBANKMENT (RE)  PROADWAY EMBANKMENT (RE)  PROCK STRUCTURES  OF 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 4.4	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	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.			
GRANILAR LOOSE 4 TO 10	SOIL SYMBOL  OPT ONT TEST BORING  INSTALLATION  SECTE 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			
MATERIAL MEDIUM DENSE 10 10 30 N/A	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.			
(NON-COHESIVE) VERY DENSE > 50	THIN KOMDWH I EMBHIAKMENT	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 &lt; 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	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)	TTTTT 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 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	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			
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.	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	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  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.	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	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 GOIDE FOR FIELD HOLSTONE 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	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  LL _ LIOUID LIMIT	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	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
RAINCE ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: Boring elevation data collected with a RTK			
" " PL L _ PLASTIC LIMIT	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS  VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	GPS system			
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	ELEVATION: FEET			
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE	NOTES:			
- DRY - (D) REOUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	G* CONTINUOUS ELIGHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET				
111111111111111111111111111111111111111	X CME-55   E	THINLY LAMINATED < 0.008 FEET  INDURATION				
PLASTICITY	<b></b>	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				
<u>Plasticity index (PI)</u> <u>Dry strength</u> Non Plastic 0-5 very Low	<b>1</b> □   □ <sup>-</sup>	DIRRING WITH FINGED EDEES NUMEROUS COAINS.				
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNGCARBIDE INSERTS HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
MODERATELY PLASTIC 16-25 MEDIUM	X CASING L 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 215/16 STEEL TEETH HAND AUGER	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	CHARP HAMMER BLOWS REGULTED TO RREAK SAMPLE.				
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHAMP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1			
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#### PROJECT REFERENCE SHEET GEOTECHNICAL BORING REPORT BR-0173 4 **BORE LOG** COUNTY: PAMLICO GEOLOGIST: T. Park GEOLOGIST: T. Park **WBS**: 67173.1.1 **TIP**: BR-0173 **WBS:** 67173.1.1 **TIP:** BR-0173 COUNTY: PAMLICO SITE DESCRIPTION: Bridge 680078 on NC 306 Ferry over the Neuse River **GROUND WTR (ft)** SITE DESCRIPTION: Bridge 680078 on NC 306 Ferry over the Neuse River **GROUND WTR (ft)** STATION: N/A OFFSET: N/A ALIGNMENT: N/A OFFSET: N/A ALIGNMENT: N/A BORING NO.: B-1 0 HR. 3.1 BORING NO.: B-1 STATION: N/A 0 HR. 3.1 **EASTING**: 2,657,190 COLLAR ELEV.: 6.3 ft TOTAL DEPTH: 125.0 ft **NORTHING:** 450,316 COLLAR ELEV.: 6.3 ft TOTAL DEPTH: 125.0 ft **NORTHING:** 450,316 **EASTING:** 2,657,190 24 HR. 5.2 24 HR. 5.2 DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 81.9% 05/07/2024 **DRILL METHOD:** MUD ROTARY **HAMMER TYPE: AUTOMATIC** DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 81.9% 05/07/2024 DRILL METHOD: MUD ROTARY HAMMER TYPE: AUTOMATIC DRILLER: S. Pugh **START DATE:** 10/30/24 COMP. DATE: 10/30/24 SURFACE WATER DEPTH: N/A DRILLER: S. Pugh **START DATE:** 10/30/24 COMP. DATE: 10/30/24 SURFACE WATER DEPTH: N/A ELEV DRIVE DEPTH BLOW COUNT ELEV DRIVE DEPTH BLOW COUNT **BLOWS PER FOOT BLOWS PER FOOT** SAMP # SAMP # SOIL AND ROCK DESCRIPTION SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft RESULT (ft) RESULT 0.5ft 0.5ft 0.5ft 75 100 MOI G (ft) 50 75 100 ELEV. (ft) DEPTH (ft Match Line -70 COASTAL PLAIN *-*72.2 ∓ 78.5 OLIVE GREEN SANDY SILT, SAT GROUND SURFACE ARTIFICIAL FILL -75 BROWN GRAVELLY SAND, MOIST COASTAL PLAIN OLIVE GREEN SILTY F. SAND, SAT V ALLUVIAL BROWN F. SAND, TRACE GRAVEL, SAT. 0.3 -80 SS-01 19% A-3(0) -7.2 <del>|</del> 13.5 *-*87.2 ↓ 93.5 BROWN F. TO CSE. SAND, SAT. 2 2 2 21% A-3(0) A-2-4(0 -10 -90 . . . . . . . . . . ALLUVIAL -92.2 GRAY F. SAND, SAT -95 COASTAL PLAIN -17.2 -97.2 - 103 5 SS-03 GRAY-GREEN SILTY F. SAND, SAT 36% -20 -100 -102.2 <del>|</del> 108.5 42% •13 A-2-4(0 -25 -105 . . . . COASTAL PLAIN -27.2 -107.2 24 34 26 23 GRAY F. SAND, SAT . . . . -30 COASTAL PLAIN $-32.2 \pm 38.5$ <u>-112.2 + 118.5</u> SS-07 GRAY-GREEN SILTY F. SAND, SAT 5 32% A-2-4(0 -35 -115 . . . . . . . . . . . -37.2 -117.2 - 123.5 Boring Terminated at Elevation -118.7 ft in -40 medium dense SAND -42.2 6 -45 -47.2 <del>↓</del> 53.5 . . . . -55 COASTAL PLAIN -57.2 + 63.5SS-04 OLIVE GREEN GRAVELLY SILTY F. SAND, 25% - - - -A-2-4(0) -60 COASTAL PLAIN -62.2 22 35 30 LIGHT TANISH GREEN F. SAND WITH SHELLS, SAT . . . . -67.2 23 20

#### PROJECT REFERENCE SHEET GEOTECHNICAL BORING REPORT BR-0173 5 **BORE LOG** COUNTY: PAMLICO GEOLOGIST: T. Park COUNTY: PAMLICO **WBS**: 67173.1.1 **TIP**: BR-0173 **WBS:** 67173.1.1 **TIP:** BR-0173 GEOLOGIST: T. Park SITE DESCRIPTION: Bridge 680078 on NC 306 Ferry over the Neuse River **GROUND WTR (ft)** SITE DESCRIPTION: Bridge 680078 on NC 306 Ferry over the Neuse River **GROUND WTR (ft)** OFFSET: N/A **BORING NO.:** B-2 STATION: N/A OFFSET: N/A ALIGNMENT: N/A 0 HR. 3.2 BORING NO.: B-2 STATION: N/A ALIGNMENT: N/A 0 HR. 3.2 **EASTING:** 2,657,207 COLLAR ELEV.: 5.5 ft TOTAL DEPTH: 125.0 ft **NORTHING:** 450,363 COLLAR ELEV.: 5.5 ft TOTAL DEPTH: 125.0 ft **NORTHING:** 450,363 24 HR. 4.5 **EASTING:** 2,657,207 24 HR. 4.5 **HAMMER TYPE: AUTOMATIC** DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 81.9% 05/07/2024 DRILL RIG/HAMMER EFF./DATE: CAT4425 CME-55 81.9% 05/07/2024 DRILL METHOD: MUD ROTARY **DRILL METHOD:** MUD ROTARY HAMMER TYPE: AUTOMATIC DRILLER: S. Pugh **START DATE:** 10/29/24 COMP. DATE: 10/29/24 SURFACE WATER DEPTH: N/A DRILLER: S. Pugh **START DATE:** 10/29/24 COMP. DATE: 10/29/24 SURFACE WATER DEPTH: N/A ELEV DRIVE DEPTH BLOW COUNT ELEV DRIVE DEPTH BLOW COUNT **BLOWS PER FOOT BLOWS PER FOOT** SAMP # SAMP # SOIL AND ROCK DESCRIPTION SOIL AND ROCK DESCRIPTION RESULT (ft) RESULT (ft) 0.5ft 0.5ft 0.5ft 0.5ft 0.5ft 0.5ft 75 100 MOI G (ft) 50 75 100 ELEV. (ft) Match Line -70 COASTAL PLAIN <u>-73.0 T 78.5</u> SS-13 OLIVE GREEN SANDY SILTY CLAY, SAT. **GROUND SURFACE** -75 ARTIFICIAL FILL 6% 0.5" TOPSOIL TO TAN-BROWN F. SAND, MOIST COASTAL PLAIN <u>-78.0 I 83.5</u> ALLUVIAL OLIVE GREEN CLAYEY F. SAND, SAT. BROWN F. SAND, MOIST TO SAT. -80 22% -85 SS-14 35% A-2-6(0 -10 -90 . . . . . . COASTAL PLAIN -13.0 T <u>-93.0 I 98.5</u> GRAY-BROWN F. SAND WITH SOME -95 SHELL, SAT. COASTAL PLAIN ::::- -16.<u>5</u> -98.0 I 103.5 -18.0 **⊥** 23.5 GRAYISH GREEN SANDY SILT WITH 34% SHELLS, SAT. -20 -100 <u>-103.0 🏻 108.5</u> -23.0 <u>1</u> 28.5 4 -25 -105 <u>-108.0 🏻 113.5</u> 32 COASTAL PLAIN -30 GRAYISH GREEN F. SAND, SAT. COASTAL PLAIN -113.0 118.5 -33.0 SS-15 COASTAL PLAIN DARK OLIVE GREEN SILTY F. SAND, SAT. 4 36% A-2-4(0) -35 -115 OLIVE GREEN SILTY F. SAND, SAT. . . . . . . . -118.0 T 123.5 -38.0 T 43.5 11 6 -40 Boring Terminated at Elevation -119.5 ft in medium dense SAND 31% -45 -48 0 | 53 5 2 -50 . . . . COASTAL PLAIN DARK OLIVE GREEN GRAVELLY SILTY 22% -60 SAND, SAT. COASTAL PLAIN 67.5 -63 0 | 68 5 30 27 30 TAN F. SAND, SAT. . . . .

PROJECT REFERENCE BR-0173

*CE SHEET* 6

# LABORATORY SUMMARY SHEET

### **AASHTO Standard Specifications**

(As modified by NCDOT, Material and Tests Unit, 2000.)

TEST RESULTS															
Proj. Sample Number	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15
Lab Sample Number	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15
Retained #4 Sieve %	6.8	1.9	0.1	4.2	0.1	0.3	0	1.0	0.6	0	0	7.8	0	0.1	0
Passing #10 Sieve %	89.7	93.5	99.8	71.8	99.8	98.4	100	98.0	98.9	100	99.5	64.0	99.9	99.8	100
Passing #40 Sieve %	50	38	99	57	96	96	93	65	64	98	97	49	99	94	94
Passing #200 Sieve %	2	1	15	11	18	24	20	4	1	60	8	10	69	23	19
MINUS NUMBER 10 FRACTION															
SOIL MORTAR - 100%															
Coarse Sand Ret#60 %	92.8	96.0	11.2	27.7	8.1	50.9	63.0	68.8	95.7	6.8	29.5	29.4	2.6	14.3	63.9
Fine Sand Ret#270 %	4.8	2.5	74.9	60.8	75.8	28.0	18.1	28.0	3.1	33.1	62.7	58.5	36.6	63.8	17.2
Silt 0.05 - 0.005mm %	0.8	0.6	5.8	8.6	6.0	9.1	8.8	0.2	0.2	55.9	2.8	8.8	22.6	9.4	8.8
Clay <0.005mm %	1.6	0.9	8.1	2.9	10.1	12.0	10.1	2.9	1.0	4.2	5.0	3.4	38.1	12.6	10.1
Liquid Limit (LL)	NP	NP	NP	NP	31	29	NP	NP	NP	NP	NP	NP	100	38	23
Plasticity Index (PI)	NP	NP	NP	NP	2	8	NP	NP	NP	NP	NP	NP	37	12	4
AASHTO Classification /Group Index	A-3(0)	A-3(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-3(0)	A-3(0)	A-4(0)	A-3(0)	A-2-4(0)	A-7-5(32)	A-2-6(0)	A-2-4(0)
Organic Content %	N/A	N/A	N/A												
Station															
Offset															
Alignment															
Boring Identification	B1	B2	B2	B2	B2	B2	B2	B2	B2						
Depth (FT)	6.0	13.5	23.5	63.5	93.5	108.5	118.5	0.5	8.5	23.5	48.5	63.5	78.5	93.5	118.5
to	7.5	15.0	25.0	65.0	95.0	110.0	120.0	1.5	10.0	25.0	50.0	65.0	80.0	95.0	120.0
Field Moist. Content %	19	21	36	25	44	42	32	6	22	34	31	22	100	35	36
Tested By	MDMASON	MDMASON	MDMASON												
Submitted By	TPARK	TPARK	TPARK												
Date Submitted	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24	11/07/24

NP = Non-Plastic

NEM = Not Enough Material for Analysis

N/A = Not Applicable / Not Analyzed

Muhaul D. Masan Laboratory Manager Report Date: \_\_11/21/2024\_ Laboratory Report Page 1 of 1