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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY WILSON

PROJECT DESCRIPTION REPLACE BRIDGE 47 OVER SEABOARD COAST LINE RAILROAD ON US 117

SITE DESCRIPTION STA. 17+37.36 -L-

.5666 Ŕ REFERENCE

STATE PROJECT REFERENCE NO. STATE TOTAL SHEETS NO. N.C. **B-5666** 1 16

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PERSONNEL

C. DRISCOLL

TRIGON EXPLORATION
INVESTIGATED BY C. DRISCOLL
DRAWN BY <u>S. PAPKE</u>
CHECKED BY <u>T. WELLS</u>
SUBMITTED BY
DECEMBED 2010
DATE
KLEINFELDER Bright People. Right Solutions. 422 CALIMORE DARY POOD, SUITE B GREENSBORD, V 27409 NC FRW LICENSE NO, F-1312
SEAL 037998
Thomas R. Wells 1/10/2020
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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 ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.						
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.	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	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:						
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:	\$ <i>1//6</i> \$1//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 NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT					
	MINERALOGICAL COMPOSITION		ARTESIAN - GRUUND 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.		SURFACE.					
	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NUCK (CH) 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-b A-2-4 A-2-5 A-2-6 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOT					
	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	OF SLOPE.					
SYMBOL BODG BODG BODG BODG BODG BODG BODG BODG	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					
X PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.					
10 50 MX GRANULAR CLAY MUCK,	PERCENTAGE OF MATERIAL		DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT					
*40 30 MX 50 MX 51 MN PEAT	GRANULAR SILT - CLAY	WEATHERING	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 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	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,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE					
PT 6 MY NP 18 MY 18 MY 11 MN 11 MN 18 MY 18 MY 11 MN 11 MN LITTLE UR 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	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					
OPCANIC 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 MATOR GRAVELAND 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 <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIG1NAL POSITION AND DISLODGED FROM					
CEN RATING	✓ PW 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		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		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FIELD.					
	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.	J <u>OINT</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 (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.					
VERY LOOSE < 4		(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	SOIL SYMBOL	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.						
GRANULAR MEDIUM DENSE 10 TO 30 N/A		<u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>	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		VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE					
		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	OF AN INTERVENING IMPERVIOUS STRATUM.					
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED SOIL BOUNDARY	V SEV.) REMAINING. SAFROLITE 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>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.					
GENERALLY SUFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0		COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND						
MATERIAL STIFF 8 TO 15 1 TO 2		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		ALSO AN EXAMPLE.	RUCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE					
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		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					
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.					
(PDP.) (COP.) (CP.) SAND SAND SAND (CL.)		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					
(CSE, SD.) (F SD.) (CSE, SD.)	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	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 $\gamma_{ m a}$ - 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.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.					
	$CSE COARSE ORG ORGANIC \gamma_d or tonit weight$		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.					
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	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	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES I INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY					
	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 SEMICOLID. BEOUTRES, DRVING, TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
RANGE S - WEI - (W)	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: BM-2 AT STA.16+58 -L- 140'LT (700,593 N.,					
	HIHIGHLY V-VERY RATIO	TERM SPACING TERM THICKNESS	2,312,543 FT.E)					
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: 125.69 FEET					
UM UPTIMUM MUISTURE	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		CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES: FIAD - FILLED IMMEDIATELY AFTER DRILLING					
- DRY - (D) REQUIRES ADDITIONAL WATER TO		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET						
ATTAIN OPTIMUM MOISTURE	X CME-55	THINLY LAMINATED < 0.008 FEET						
PLASTICITY	8' HOLLOW AUGERS	INDURATION						
	CME-550 HARD FACED FINGER BITS X-N 02	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.						
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC Ø-5 VERY LOW		RUBBING WITH FINGER FREES NUMEROUS GRAINS;						
SLIGHTLY PLASTIC 6-15 SLIGHT		FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.						
MODERATELY PLASTIC 16-25 MEDIUM	X CASING W/ ADVANCER	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;						
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST	MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER.						
COLOR		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;						
		INDURATED DIFFICULT TO BREAK WITH HAMMER.						
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	VANE SHEAR TEST	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;						
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14					
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PROJECT REFERENCE NO.



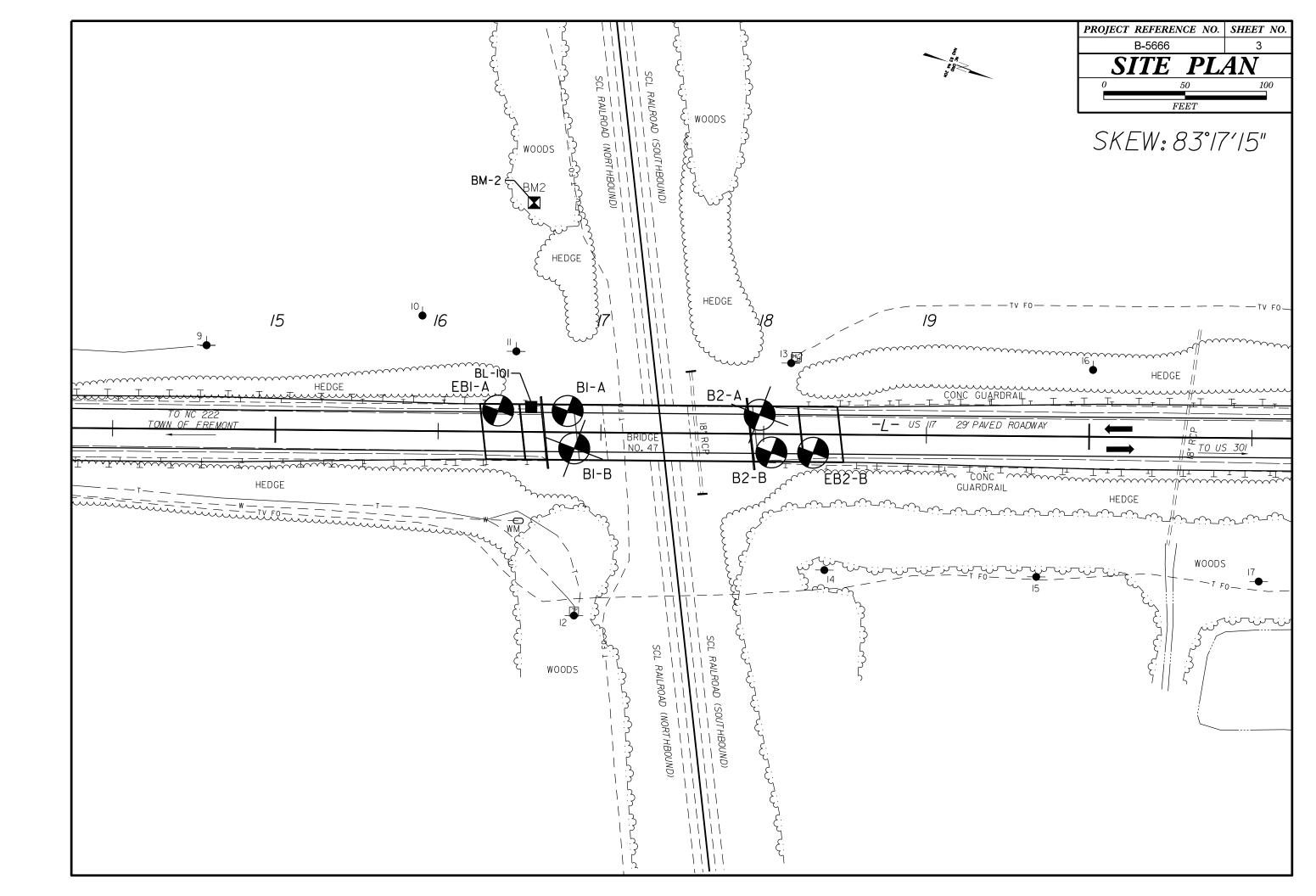
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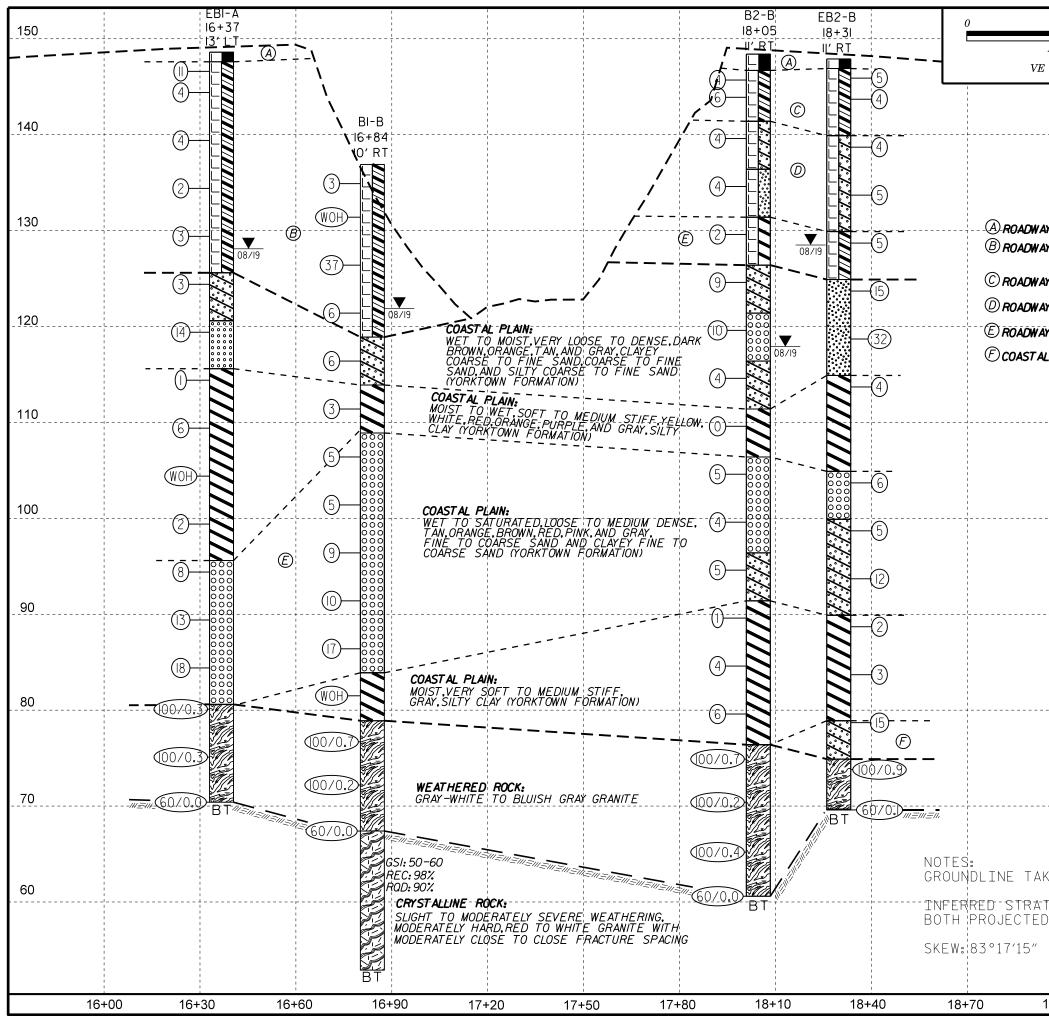
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed	Rock Mass (Marı	nos and Hoek, 2	2000)			AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonical
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonical GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
ഗ STRUCTURE		ן נייביי CREASING SI	1	L U ≥ O ALITY	_	COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A	A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.
disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		70 ⁶⁰				B. Sand- stone with thin inter- siltstone siltstone siltstone
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets BLOCKY/DISTURBED/SEAMY - folded with angular blocks		5	50			layers of siltstone amounts
formed by many intersecting			40	30		C. D. E. and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H .
discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces				20		G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers Thin sandstone layers
LAMINATED/SHEARED - Lack of V blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10	Means deformation after tectonic disturbance

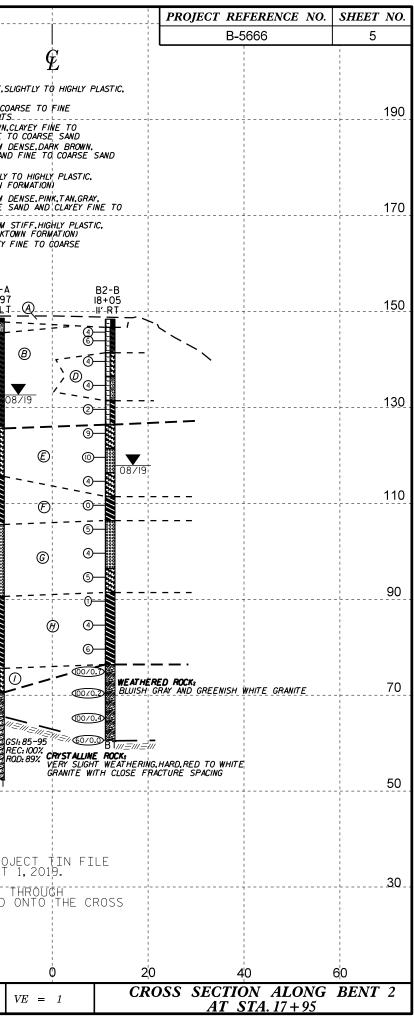
on ue pr 1r,	SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)	VERY GOOD - Very Rough, fresh unweathered surfaces	COOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
	E. Weak siltstone or clayey shale with sandstone layers	70 60	A 50 B 40	С	DE	
formea d/fault deforme forming ructure	ed, siltstone ed g an			30	F 20	
formed forming with p ars of ansform ieces.	a bockets			¢	ŀ	110 1/





$30 \qquad 60$ $FEET$ $E = 3$	B-5666 PROFILE OF BRIL ALONG	
		- -
AY-EMBANKMENT:ASPHALT- AY EMBANKMENT.MOUST TO		
AND ORA	WET.VERY SOFT TO HARL NGE TO BROWN,COARSE TO AY WITH WOOD FRAGMENTS	FINE
	NE TO COARSE SANDY CLA	
TO COARS	SE,ORANGE: TO BROWN,CLA SE SAND TO SILTY FINE TO	D¦COARSE SAND
AND BROW AL PLAIN, MOIST. MEDIUM DE	T TO MEDIUM STIFF.ORAN VN.SILTY CLAY ENSE.BLUISH <u>G</u> RAY.CLAYEY.	
FINE TO COARSE	SAND YORKTOWN FORMAT	ION)
KEN FROM ROADWAY	PLANS RECIEVED C	
	N-THROUGH-THE-BOR	
D ONTO THE PROFIL		TURINA MITILI
19+00 19+30	19+60 1	9+90

- 30 IT SE	CRY	1	CT TIN FILE , 2019.	₩=	90 70 50 	90 70 50 30	NOTES: GROUND B5666_LS_TNL. INFERRED_STR THE BORINGS SECTIONS. SKEW: 83°17'15" 60 4	ATIGRAPHY IS WITH BOTH PRC	OM PRO Augus Drawn Djected
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150						150	SAND		B2 17+
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190 @	WOOD F ROADWAY ENBANKNENT MOIST T CLAYEY COASTAL PLAIN MOIST STIFF TO	AND GRAY, COARSE TO FINE RAGMENTS TO WET, MEDIUM DENSE TO FINE TO COARSE SAND D SOFT, HIGHY PLASTIC, RED	SANDY CLAY WITH LOOSE, DRANGE AND TAN.		190	190	(A) ROADWAY EMBANKME (B) ROADWAY EMBANKME (C) ROADWAY EMBANKME (D) ROADWAY EMBANKME (E) COASTAL PLAIN:MOIST	NT MOIST.MEDIUM STIF TAN TO ORANGE.SAN NT MOIST.LOOSE.BLACK SAND WITH ASPHALT NT MOIST.LOOSE.ORANGE COARSE SAND AND	F TO SOFT DY CLAY TAN,SILTY F_ERAGMEN E TO BROW SILTY FINE



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	NG NO.					TATION 16+37		OFFSET				ALIGNMENT -L-	0 HR. N/A		Ring No.				_	ATION 16+37	t N		
COLI	AR EL	EV. 14	18.6 ft		Т	OTAL DEPTH 78	2 ft	NORTHING				EASTING 2,312,671	24 HR. 20.5	COL	LAR ELE	V . 14	18.6 ft		TOTAL DEPTH 78.2 ft				
				E TRI	0055 C	ME-55 87% 03/21/20	9	_	DRILL N	IETHO	D Mu	Rotary HAMMER TYPE Automatic			DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/21/2019								
DRIL	LER R				S	TART DATE 08/1	3/19	COMP. DA	TE 08/13/19			SURFACE WATER DEPTH N/	A	DRII	DRILLER R. Toothman					START DATE 08/13/19			
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	147.6	1.0	7	4	7							147.6 ROADWAY EMBAN	KMENT1.0		-	_							
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OFFSET 13 ft LT ALIGNMENT -L- 0 HR. N// NORTHING 700,618 EASTING 2,312,671 24 HR. 20. DRILL METHOD Mud Rotary HAMMER TYPE Automatic COMP. DATE 08/13/19 SURFACE WATER DEPTH N/A 75 100 NO. 0 G NO. MOI G SOIL AND ROCK DESCRIPTION SOIL AND ROCK DESCRIPTION	WILSON		GEOLOGIST C. Driscol	l							
NORTHING 700,618 EASTING 2,312,671 24 HR. 20. DRILL METHOD Mud Rotary HAMMER TYPE Automatic COMP. DATE 08/13/19 SURFACE WATER DEPTH N/A 75 100 NO. MOI G NO. MOI G SOIL AND ROCK DESCRIPTION MOI G VEATHERED ROCK Gray-White GRANITE (continued) 70.4 76 Output Figure 100 TEST REFUSAL at Elevation 70.4 ft on CRYSTALLINE ROCK:	road on US 117				GROUN	D WTR (ft)					
DRILL METHOD Mud Rotary HAMMER TYPE Automatic COMP. DATE 08/13/19 SURFACE WATER DEPTH N/A 75 100 NO. 0 SOIL AND ROCK DESCRIPTION 75 100 NO. MOI G WEATHERED ROCK Total 60/0.0 Formation Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 70.4 ft on CRYSTALLINE ROCK:	OFFSET 13 ft	LT	ALIGNMENT -L-		0 HR. N/A						
DRILL METHOD Mud Rotary HAMMER TYPE Automatic COMP. DATE 08/13/19 SURFACE WATER DEPTH N/A 75 100 NO. 0 SOIL AND ROCK DESCRIPTION 75 100 NO. MOI G WEATHERED ROCK Total 60/0.0 Formation Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 70.4 ft on CRYSTALLINE ROCK:	NORTHING 70	0,618	EASTING 2,312,671		24 HR.	20.5					
COMP. DATE 08/13/19 SURFACE WATER DEPTH N/A 75 100 NO. L O SOIL AND ROCK DESCRIPTION 75 100 NO. MOI G SOIL AND ROCK DESCRIPTION WEATHERED ROCK Gray-White GRANITE (continued) 70.4 70.4 76 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 70.4 ft on CRYSTALLINE ROCK:				HAMME							
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WEATHERED ROCK Gray-White GRANITE (continued) 70.4 <	SAI	MP. L				I					
Gray-White GRANITE (continued)		<u>. / MOI G</u>									
PENETRATION TEST REFUSAL at Elevation 70.4 ft on CRYSTALLINE ROCK:			Gray-White GR	ANITE (continued	78.2					
	60/0.0		Boring Terminated PENETRATION Elevation 70.4 ft on 0	TEST R CRYSTA	EFUSAL	RD at					

								В	<u>ORE L</u>	UG								
WBS	45621	.1.1			T	IP B-5666		COUNT	WILSON			GEOLOG	IST C. Drisc	oll				
SITE	DESCR	IPTION	I Repl	lace Br	idge 4	7 over Seabo	ard Coast	Line Roal	road on US	117					GROUND	WTR (ft)		
BORI	NG NO.	B1-A			S	TATION 16	+79		OFFSET	13 ft LT		ALIGNME	NT -L-		0 HR. N/			
COLL	AR ELE	EV. 13	37.0 ft		Т	OTAL DEPT	H 65.8 ft		NORTHING	700,6	58	EASTING	2,312,656	2	24 HR.	10.5		
DRILL	RIG/HAN	IMER EF	FF./DAT	E TRI	0055 C	ME-55 87% 0	3/21/2019			DRILL M	ETHOD N	/lud Rotary		HAMMER	RTYPE A	utomatic		
DRIL	LER R	. Tooth	man		S	TART DATE	08/14/1	9	COMP. DA	TE 08/*	14/19	SURFACE	E WATER DEI	PTH N/A				
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLOWS	PER FOOT	-	SAMP.			SOIL AND RO					
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WBS	45621	1.1.1		TIP B-5666 place Bridge 47 over Seaboard Co											GEOLOGIST C. Driscoll					WBS	3 456	21.1.1			TIF	TIP B-5666 COUNTY					
SITE	DESCR	RIPTION	l Rep	lace E	Bridge 4	7 over	Seab	bard Co	oast L	ine Roa	alroad o	on US	117						GROUN	D WTR (ft)	SITE	DESC	RIPTIC	DN F	Repla	ce Bri	dge 47	over Se	aboard C	oast Line	Roalroa
BORI	NG NO.	B1-B			s	TATIC	DN 16	6+84			OFF	SET	10 ft RT	-		ALIGN	MENT -L-		0 HR.	N/A	BOR	RING N	O . B1	-В			ST	ATION	16+84		0
COLL	AR EL	EV. 13	36.9 ft		Т	OTAL	DEPT	H 84	.0 ft		NOR	THING	7 00,6	670		EASTI	NG 2,312,676		24 HR.	15.0	COL	LAR E	LEV.	136.9	9 ft		то	TAL DE	PTH 84	.0 ft	N
DRILL	rig/han	MMER E	F./DA	TE TF	RI0055 C	ME-55	87% C)3/21/20	19				DRILL METHOD Mud R			ud Rotary	Rotary HAMMER TYPE Automatic		DRILI	l Rig/H	AMMER	EFF./I	DATE	TRI0	055 CN	055 CME-55 87% 03/21/2019					
		R. Tooth			S	TART	DATE	08/2	21/19							SURF	SURFACE WATER DEPTH N/A				DRIL		R. Too	thma	In		ST	ART DA	TE 08/2	21/19	C
ELEV	DRIVE ELEV	DEPTH		OW CO						R FOO			SAMP	17			SOIL AND RO	CK DESC	RIPTION		ELEV	DRIV		· · · ·		V COL				WS PER F	
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OUBL	67.4	69.5	60/0.0	5			· · ·		•••	· · ·		60/0.0	•			<u> 67.4 </u>	CRYSTA		<u>ск</u>	<u> </u>		1	‡								
й ш 65	_	‡		-												} 	Red-Whi	ite GRAN	ITE				‡								
T BOI		‡				:	· · ·		•••	· · ·						ł							‡								
NCDOT BORE DOUBLE B5666_GEO_BRDG_GINT GPJ NC_DOT GDT 12/9/19 00 90 90 90 90 90 <	•	‡				:	 			: : :						ł						1	‡								
9 <u>60</u>	_	L	1	-		11		L							<u>~</u>	L						1									

WILSON				GEOLOGIST C. Driscoll			
road on US 1	17					GROUN	ID WTR (ft)
OFFSET 10	0 ft RT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	700,67	70		EASTING 2,312,676		24 HR.	15.0
	DRILL M		Muc	1			Automatic
COMP. DAT				SURFACE WATER DEPT			
	SAMP.		L				
75 100	NO.	моі	O G	SOIL AND ROC	K DESC	RIPTION	
			S	CRYSTAL Red-White GR/	LINE RO	OCK	
					1-	,	
				-			
				52.9 Boring Terminated	at Fleva	tion 52.9	84.0 ft in
			F	CRYSTALLINE	ROCK: (GRANITE	
			F	-			
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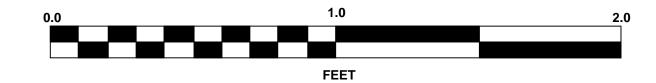
											ELUG				
WBS	45621	1.1.1			TIP	B-566	6	C	OUNT	YW	LSON	GEOLOGIS	ST C. Drisco		
SITE	DESCR	IPTION	Rep	lace Bridg	e 47 o	ver Sea	aboard Co	oast Lir	ne Roa	lroad	on US 117			G	ROUND WTR (f
BORI	NG NO.	B1-B			STA	TION	16+84			OFF	SET 10 ft RT	ALIGNMEN	IT -L-) HR. N//
COLL	AR ELI	EV. 13	86.9 ft		тот	AL DE	PTH 84	.0 ft		NO	THING 700,670	EASTING	2,312,676	24	HR. 15.0
DRILL	RIG/HAN	IMER EF	F./DAT	E TRI005	5 CME-	55 87%	03/21/20	19			DRILL METHOD Mud	Rotary		HAMMER	TYPE Automatic
DRILL	ER R	. Toothr	man		STA	RT DA	TE 08/2	1/19		CO	IP. DATE 08/22/19	SURFACE	WATER DEP	PTH N/A	
CORE	SIZE	NQ2			тот	AL RUI	N 14.5 f	t				•			
LEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	JN RQD	SAMP.	STR REC.	RQD	L O	ח	ESCRIPTION	AND REMARI	KS	
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G	ELEV. (ft)			10	DEPTH
67.4	07.4											Begin Corir	ng @ 69.5 ft		
65	67.4 ·	- 69.5 T	4.5	N=60/0.0 2:30/0.5	(4.5) 100%	(3.9) 87%		(14.2) 98%	(13.0) 90%		67.4 Slight to Moderately	/ Severe Weat	LINE ROCK hering, Moder	ately Hard, F	69 Red-White
	62.9	74.0		N=60/0.0 2:30/0.5 3:30/1.0 2:00/1.0 3:00/1.0 4:30/1.0							GRANITE with	Noderately C	lose to Close	Fracture Spa	acing
Ē		+	5.0	4:30/1.0	(4.8) 96%	(4.2) 84%				Ø		GSI	: 50-60		
60	-	Ŧ		4:30/1.0 4:30/1.0 4:00/1.0 3:00/1.0	3070	0470									
ŀ	57.9	79.0	5.0	2:00/1.0	(4.9)	(4.9)									
55	-	Ŧ	0.0	5:30/1.0 5:15/1.0	98%	(4.9) 98%				Ø					
	52.9	+ 84.0		2:30/1.0 7:00/1.0						R	- 52.9				84
þ		+	1	1.00/1.0							Boring Terminat		n 52.9 ft in CR` ANITE	YSTALLINE	
	-	ŧ									-	GR	ANTE		
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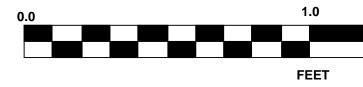
CORE PHOTOGRAPHS

B1-B

BOX 2: 79.0 - 84.0 FEET







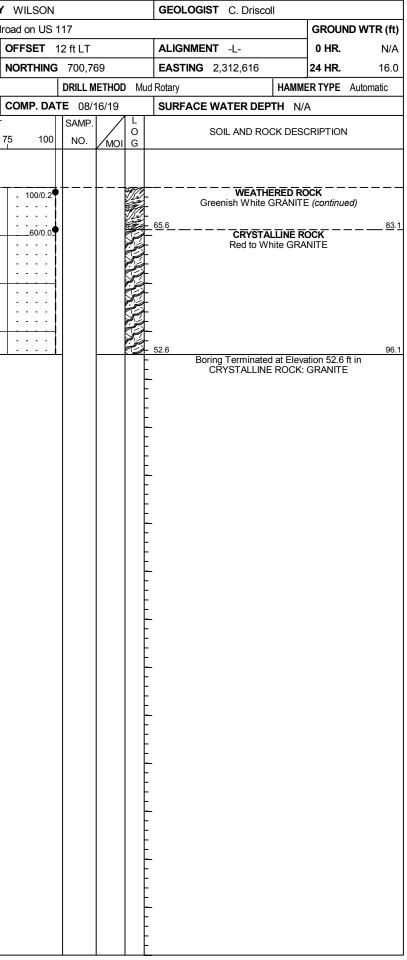
BOX 1: 69.5 - 79.0 FEET

SHEET 10

B1-B



WBS	4562	111			т	P B-	5666						.00			G	EOLOGIST C. Driscoll			WBS	45621	11			ти	P B-5666	6	COUNT	Y
		RIPTION	Repl	ace Br					Coast								0.2.000	GROUND WTR	R (ft)				Repl	ace Br				ast Line Ro	
		B2-A					DN 1						12 ft LT			A	LIGNMENT -L-		N/A			B2-A				ATION			0
COLL	AR EL	EV. 14	8.7 ft					TH 9	6.1 ft		_		7 00,7				ASTING 2,312,616		16.0			EV. 14					PTH 96.1	ft	N
		MMER EF		E TRI							1				OD M			ER TYPE Automa	tic					E TRI			03/21/2019		
		R. Toothr						E 08)	CON	IP. DA	TE 08/			_	JRFACE WATER DEPTH N//	۹				. Toothi					TE 08/15		C
ELEV	DRIVE	DEPTH	BLC	w co	UNT			BLC	DWS F	PER FOC	DT		SAMP							ELEV	DRIVE ELEV	DEPTH	BLC	w co		T	BLOW	S PER FOC	т Т
(ft)	etev (ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25	5	0	75	100	NO.	Им	O DI G	ELE	SOIL AND ROCK DESC		TH (ft)	(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft	0	25	50	75
150		Ļ														L				70		L		L			Ma	atch Line	
	147.7	+ 1.0												-		_ 148 _ 147	.7 GROUND SURF/		0.0 0.8		-	ŧ	10070.2	1				:	:
4.45		ŧ	6	3	2	•	· · ·	· ·	· · · ·	· · ·		· · ·		M		145	Asphalt (0.0-0.8 f 	oot)	3.0	05	65.6	83 1							
145	145.2	<u> </u>	3	1	1	4 2		<u> </u>						М		F	Trace Asphalt Frag	ments		65		-	60/0.0	1					-
		ŧ							•••	· · ·					Ŀ		Highly to Slightly Plastic, Ta Coarse to Fine Sand					ŧ							
140	140.5	8.2	1	2	2						· ·			М	Ŀ					60		ŧ							•
		ŧ		_	_	¶ ⁴	· · ·		••• •••	· · ·					Ŀ	1						ŧ				· · ·			
	135.5	+ 13.2				.			•••						L							ŧ						: : : :	
135	-100.0	+ 1 <u>3.2</u>	2	2	2	 4		<u> </u>						м	. LE					55	-	ŧ							- -
		ŧ				:			•••	· · ·												<u> </u>			+				<u>·</u>
130	130.5	18.2	2	1	3						· ·				Ŀ							ŧ							
		ŧ	-			9 .4	· · ·		••• •••	· · ·				M	Ŀ	1						ŧ							
	125.5	+				<u>i</u> :			· ·							125	.7		23.0			ŧ							
125	125.5	<u> </u>	1	1	2	4 3	· · ·							м	/./	F	COASTAL PLA Slightly Plastic, Gray, Cla				-	ŧ							
		Ŧ					· · ·	· ·	•••	· · ·					/./.		Coarse SAND (Yorktown	Formation)			•	ŧ							
120	120.5	28.2	 WOH	WOH	1	<u> :</u>																Ł							
		Ŧ						· ·	· ·	· · ·				W	///							ŧ							
	1155	1							•••	· · ·	- -					115	7		33.0		•	ŧ							
115	115.5	1 33.2	3	1	1	1 2		<u> </u>						м		E	Moderately to Highly Plast Red, Silty CLAY (Yorktown	ic, Orange to			-	ŧ							
		ŧ							•••	· · ·	- -					ł		in onnation,				Ł							
110	110.5	38.2	4	2	2											Ł						Ł							
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	405 5	1,				}			• •		: :					- 105	7		43.0			Ł							
105	105.5	<u> 43.2</u> 	1	4	4		8							w	000		Orange to Red, Fine to Co (Yorktown Format				-	ŧ							
		ŧ				:			•••						000		(Torikowith oring					Ł							
100	100.5	48.2	2	2	3											È					-	Ł							
100		Ŧ				● 5			•••	· · ·				W								ŧ							
	05.5	1				[·\			• •		- -											Ł							
95	95.5	+ 53.2 T	3	5	5		10							w							-	ŧ							
1		Ŧ				:/			•••						000							Ŧ							
90	90.5	58.2	3	1	1	ļ									000	90.7	, Highly Plastic, Bluish-Gray		<u>58.0</u>		-	Ŧ							
	-	Ŧ		'	'	• 2			•••			· · ·		M		F	(Yorktown Forma	tion)				Ŧ							
85		Ŧ							•••							F						Ŧ							
	85.5	<u>+ 63.2</u> T	WOR	WOR	1			+				· · ·		w		F					-	Ŧ							
80		Ŧ									• •	· · · · · ·				E						Ŧ							
80	80.5	+ - 68.2		WOU	2						- -					F					-	Ŧ							
	-	Ŧ	I NOH	WOH	3	•3			• •					M		F					-	Ŧ							
		Ŧ				:		` `				· · ·				F			72 0		•	Ŧ							
75	75.5	+ 73.2 +	10	23	41	1		···	. ``		-			м		₽ <u><u></u> } }</u>	Bluish Gray, Clayey Fine to	Coarse SAND	<u>73.0</u>		- -	Ŧ							
		Ŧ				.	· · ·		•••	· · †°		· · ·			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		(Yorktown Forma	uon)				Ŧ							
70	70.5	+ + 78.2				:				· · · · · <u> </u> -	· ·	· · ·			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	70.7	, 		<u>78.0</u>		-	ŧ							
10		1	1	I		L				I				-	17	ศ					-	L		I	<u> </u>				



WBS	45621	.1.1			TIP	B-566	6	C	OUNT	YV	/ILSON			GEOLOGI	ST C. Drisco	oll		
SITE	DESCR	IPTION	Repl	ace Bridg	e 47 ov	ver Sea	aboard Co	oast Lir	ne Roa	Iroad	on US	117					GROUND V	VTR (ft)
BORI	ing no.	B2-A			STAT	TION	17+97			OF	FSET	12 ft LT		ALIGNME	NT -L-		0 HR.	N/A
COLI		EV. 14	8.7 ft		тот	AL DE	PTH 96.	1 ft		NO	RTHING	7 00,769		EASTING	2,312,616		24 HR.	16.0
DRILL	. RIG/HAN	IMER EF	F./DAT	E TRI005	5 CME-	55 87%	5 03/21/20 ⁻	19				DRILL MET	HOD Mud	Rotary		HAMME	RTYPE Aut	omatic
DRIL	LER R	. Toothr	man		STA	RT DA	TE 08/1	5/19		co	MP. DA	TE 08/16/	19	SURFACE	WATER DEI	PTH N/A		
	E SIZE				тоти	AL RUI	N 13.0 f	t						1				
ELEV	RUN ELEV	DEPTH	RUN	DRILL		JN RQD	SAMP.	STR REC.	ATA RQD	L								
(ft)	ELEV (ft)	(ft)	(ft)	RATE (Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	0 G	ELEV.	(ft)	D	ESCRIPTION	AND REMAR	KS		DEPTH (ft)
65.6						,,,						,		Begin Cori	ing @ 83.1 ft			
65_6 65	65.6 _	- 83.1	3.0	N=60/0.0	(3.0) 100%	(3.0) 100%		(13.0) 100%	(11.6) 89%	R	- 65.6	Von	light Woot	CRYSTA	LLINE ROCK Red to White (with Close	83.1
	62.6	86.1	50	N=60/0.0 5:15/1.0 5:15/1.0 5:15/1.0	100%			100%	09%	P	-	veryo	signi weat	Fractu	ire Spacing	GRANTE	with Close	
60	-	-	5.0	6:00/1.0 5:15/1.0 4:15/1.0	(5.0) 100%	(4.3) 86%					-			GS	SI: 85-95			
		-		4:15/1.0 6:00/1.0 7:00/1.0							_							
	57.6 -	- 91.1 -	5.0	7:00/1.0 5:15/1.0 5:45/1.0	(5.0)	(4.3)					-							
55	-			5:45/1.0 5:45/1.0	100%	(4.3) 86%					-							
	- 52.6 -	- 96.1		4:00/1.0 3:30/1.0							- - 52.6							96.1
				0.00, 1.0							-	Boring	g Terminat	ed at Elevatio	on 52.6 ft in CR RANITE	YSTALLIN	E ROCK:	
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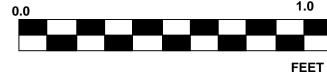
CORE PHOTOGRAPHS

B2-A

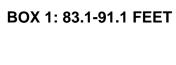
B2-A

FEET





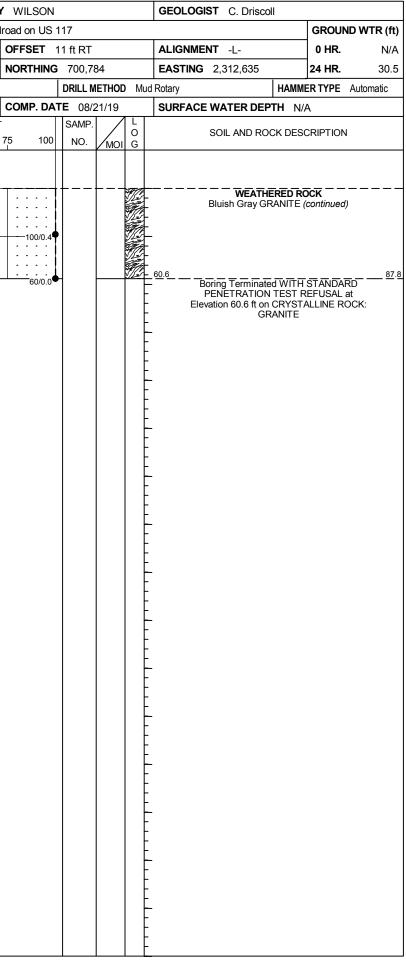




SHEET 13

BOX 2: 91.1-96.1 FEET

WBS	45621	.1.1			ТІ	Р В-{	5666		СС		WILSON				GEOI	OGIST C. Driscoll			WBS	45621	.1.1			TIF	P B-5666	;	COUNT	Y
			Repla	ace Br				oard Co			road on US				1	0.5.000	GROUND WTR	(ft)				Repla	ace Bri		over Seab			
	NG NO.					ΓΑΤΙΟ					OFFSET				ALIG	NMENT -L-	-	N/A		NG NO.					ATION 1			o
	AR ELE		8.4 ft					H 87.	8 ft		NORTHIN				EAST	ING 2,312,635	24 HR. 3	0.5		AR ELE					TAL DEP		ft	N
	RIG/HAN			TRI									METHC	DD M	ud Rotary		_J IER TYPE Automati	ic					TRI0		1E-55 87% (
	LER R							08/2			COMP. D					ACE WATER DEPTH N	/A			LER R					ART DATI		19	c
ELEV	DRIVE ELEV	DEPTH	BLO	w co	UNT			BLOW	/S PER	FOOT		SAMP.							ELEV	DRIVE ELEV	DEPTH	BLO	w cou				PER FOO	т
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	25	50		75 100	NO.	Имс	DI G	ELEV. (f	SOIL AND ROCK DES	DEPT	ΓH (ft)	(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75
150		Ļ																	70							Mat	ch Line	
	-	<u> </u>				- I			• •	· · · ·					- 148.4 -	GROUND SURF ROADWAY EMBAN		0.0		-	_	100/0.2						:
4.45	146.7 -		2	1	3	i .		· · ·	: :	· · ·			м		<u> </u>	Asphalt (0.0-0.8 Concrete (0.8-1.7	foot)	1.7	05	- 65.6 -	82.8							:
145	144.9	3.5	4	3	3	4					<u> </u>		M	L	-	Orange, Fine to Coarse			65	-	_	100/0.4						+
	-	ŧ				Ĩ	· · ·	· · ·	· ·	· · ·				L	- 141.4			7.0		-								
140	140.6	7.8	3	2	2	<u>i</u> .							м	L/~		Orange, Clayey Fine to C	Coarse SAND	<u></u>		60.6 -	- 87.8	60/0.0			<u> </u>			<u>·</u>
	-	ŧ	-			9 4 .		· · ·		· · ·										-								
	- 135.6 -	- 12.8						· · ·	· ·	: : :					<u>136.4</u>	Brown, Silty Fine to Co		<u>12.0</u>		-								
135		- 12.0	3	2	2	4							м		<u>-</u>	Brown, Silty I me to Co	aise sand			-	F							
	-	ŧ						- · · ·	· ·	· · ·					- 131.4			17.0		-								
130	130.6 -	17.8	1	1	1	i							м		<u> </u>	Highly Plastic, Orange,	, Silty CLAY	<u>17</u> .0		-	_							
	-	ł		•		●2 \. :		 	· ·	· · ·					-					-	_							
	125.6 -	- 22.8							: :						126.4			<u>22.0</u>		-								
125		22.0	8	6	3	-	9	· · ·			<u> </u>		м		-	Dark Brown, Clayey Coars	e to Fine SAND			-	E							
	-	Ī												///		(Yorktown Forma	ation)	07.0		-								
120	120.6	27.8	6	5	5	- Ē								000	<u> 121.4 </u>	Gray, Fine to Coarse SA		<u>27.0</u>		-								
	-	Ŧ		5		· /	10							000	F	Formation)				-	F							
	-	Ŧ				<u>'</u> .								000	<u>116.4</u>			32.0		-	F							
115	115.6 -	+ 32.8 	3	2	2	4 -							w	///	-	Pink-Tan, Clayey Coarse (Yorktown Forma	to Fine SAND ation)			-	F							
	-	Ŧ				;···								///	F					-	-							
110	110.6 -	- 37.8				! ::									<u>111.4</u>	Highly Plastic, Red, Silty C	LAY (Yorktown	<u>37.0</u>		-	F							
	-	Ŧ	1	0	0	• 0						1	W		-	Formation)				-	F							
	-	Ŧ				1				· · ·					<u>106.4</u>			<u>42.0</u>		-	F							
105	105.6 -	<u>+ 42.8</u> T	2	3	2	↓··· ●5							Sat.		-	Pink-Tan, Fine to Coarse S Formation)				-	F							
	-	Ŧ				[:				· · ·				000	-					-	-							
100	100.6 -	47.8		•										000	-					-	F							
100	-	Ŧ	2	2	2	•4- •4-							Sat.	000	-					-	-							
	-	ŧ				[[[· · ·				000	- <u>96.4</u> _			<u>52.0</u>		-	-							
<u>95</u>	95.6 -	+ 52.8 T	2	2	3								Sat.	/./.	-	Tan-Gray, Clayey Fine to (Yorktown Forma	Coarse SAND ation)			-	-							
I	-	ŧ								· · · · · ·					F					-	-							
90	- 90.6 -	+ - 57.8				ļ::									<u>- 91.4</u>	Highly Plastic, Gray, Silty C	CLAY (Yorktown	<u>57.0</u>		-	-							
	-	ŧ	1	0	1	•1						11	M		-	Formation)	·			-	-							
	-	ŧ					· · ·	· · · · · ·	: :	· · · · · ·					+					-	-							
85	85.6 -	+ 62.8 +	1	1	3	<u>i</u>							М		F F-					-	-							
	-	ŧ				Т ↓ .	· · ·	· · · · · ·	· · ·	· · · · · ·										-								
80	- 80.6 -	67.8							: :	:::					F					-	_							
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75	75.6	- 72.8 -	45	55/0.2					-+-						Ē	WEATHERED R Bluish Gray GRA	OCK			-	F							
	-	‡				· ·	· · ·	 		· · ·	100/0.7	[]			F	Dialon Oray Oly				-	t							
70	- 70.6	- 77.8							: :	· · ·					F					-	t l							
70	. 0.0	L	I		I			l			100/0.2	9	1	OTH.	L					_	<u> </u>							



	45621						-5666				JNTY	WILSON				GEO	DLOGIST C. Driscoll	1			4 5621					P B-5666		COUNT	
				ace Br						Line		oad on US						GROUND	```				-	lace Bi			board Coast	Line Roa	-
		. EB2-6			_		DN 1					OFFSET				-		0 HR.	N/A		ING NO.					TATION 1			0
		EV. 14							78.3 ft			NORTHING	1				TING 2,312,626	24 HR.	19.4								PTH 78.3 ft	[N
			-	EIRI												ud Rotar		IER TYPE AU	Itomatic				-	EIRI			03/21/2019	0	C
	001/5	R. Toothr	1				DATI		8/19/1 .OWS			COMP. DA	SAMP.			506	FACE WATER DEPTH N/	A						ow co			E 08/19/1	9 PER FOOT	
ELEV (ft)	ELEV (ft)	DEPTH (ft)	' 	0.5ft		0		25		50		75 100		17	O I G	ELEV.	SOIL AND ROCK DES	CRIPTION	DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft		0.5ft	0			75
	(1)																(ii)		DEF III (II)		(14)					-			
150																				70							Mato	h Line	
		Ŧ														147.9	GROUND SURF	ACE	0.0		69.7	78.2	60/0.1	<u>+</u>				T	
	146.9	1.0	5	3	2	HT.					· ·			м	H	146.9	ROADWAY EMBAN Asphalt (0.0-1.0	KMENT	1.0			Ŧ							
145	144.7-	- 3.2	3	2	2							· · · · ·				-	Brown, Coarse to Fine S	Sandy CLAY			-	Ŧ							
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140	139.7-	I 82									•••					139.9			8.0			Ŧ							
	139.7-	<u> </u>	1	2	2	4		-						М		E	Orange, Clayey Fine to C	Coarse SAND				Ŧ							
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135	134.7-	13.2	2	2	3								-	м		-					-	ł							
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130	129.7-	+ 18.2								· ·									18.0			ŧ							
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120	119.7-	+ 28.2					· · · ·	<u>`\</u>								L	(Yorktown Forma	ation)				ŧ							
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115	114.7-	- 33.2	3	2	2		<u>/</u>	<u> </u>		· ·				м		<u>114.9</u>	Highly Plastic, Purple-Gra	ay, Silty CLAY	<u>33.0</u>		-	ŧ							
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<u>100</u>	99.7 -	+ + 48.2						-		· ·					000	99.9			<u>48</u> .0		· ·	ŧ							
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2 2 3	94.7 -	+ 53.2 +	1	4	8		• • • 12 ·							w		-					-	ŧ							
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	84.7 -	+ 63.2 +	WOH	1	2	- • -								w		-					-	ŧ							
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80	79.7 -	+ - 68.2			1-	↓ -` `	<u>````</u>									-			00.0		-	‡							
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75		‡						:	· · · · · ·	· ·		· · · · ·			/~/~ /~/~	-	(Yorktown Forma	ation)	70.0			‡							
2 13	74.7 -	+ 73.2 +	30	70/0.4		11	·	+				100/0.9	i			7 <u>4.9</u>	WEATHERED R		<u> </u>		-	‡							
75		‡					· · · · · ·	-	· · · · · ·						Ĩ.	F	Bluish Gray GRA	INITE				ŧ							
70		t				<u> </u>		·					!!		411	t						t							

road on US 117				GROUN	ND WTR (ft)
OFFSET 11 ft RT		ALIGNMENT -L-		0 HR.	N/A
NORTHING 700,808		EASTING 2,312,626		24 HR.	19.4
DRILL METHO	D Mu	d Rotary	HAMME	RTYPE	Automatic
COMP. DATE 08/20/19		SURFACE WATER DEP	TH N/A	1	
75 100 NO. MO	LOG	SOIL AND ROC	K DESC	RIPTION	1
		69.7 Boring Terminated PENETRATION Elevation 69.6 ft in C GR/ <u>Other Samples:</u> ST-1 (35.0 - 37.0) ST-2 (37.0 - 38.5)	ay GRAN D WITH S TEST RI	IITE STANDAI EFUSAL	at

SITE PHOTOGRAPHS

REPLACE BRIDGE 47 OVER SEABOARD COAST LINE RAILROAD; STA. 17+37.36 -L-



Looking North along -L- from End Bent No. 1

SHEET 16 WBS: 45621.1.1, TIP: B-5666 WILSON COUNTY

