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REFERENCE

<u>SHEET</u>	<i>NO</i> .
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**DESCRIPTION** 

LEGEND (SOIL & ROCK)

TITLE SHEET

SITE PLAN

BORE LOGS

PROFILE

## STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY PITT

PROJECT DESCRIPTION BRIDGE NO. 15 ON -L-(SR 1565) OVER CHICOD CREEK AT STA. 15+10

# R018. **P**2. R PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-730015	1	7

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNPELACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLI MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLI MOISTURE CONDITIONS MAY YARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTONED 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 DOS NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTROST TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY IMINSELF 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 ACUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

- TES: THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT. BY HAVING REDUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAVES ANY CLAIMS FOR INCREASED COMPENSATION OR STETNISHOR ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. 2.

PERSONNEL

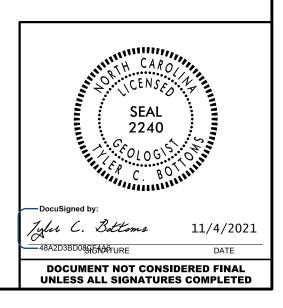
S.N. ZIMARINO

R.E. SMITH

D.G. PINTER

C.M. WALKER

INVESTIGATED BY \_\_\_\_\_. BOTTOMS DRAWN BY \_S.N. ZIMARINO CHECKED BY \_\_\_\_\_\_. D.N. ARGENBRIGHT SUBMITTED BY \_\_\_\_\_\_. ARGENBRIGHT DATE SEPTEMER 2021

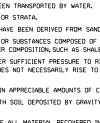


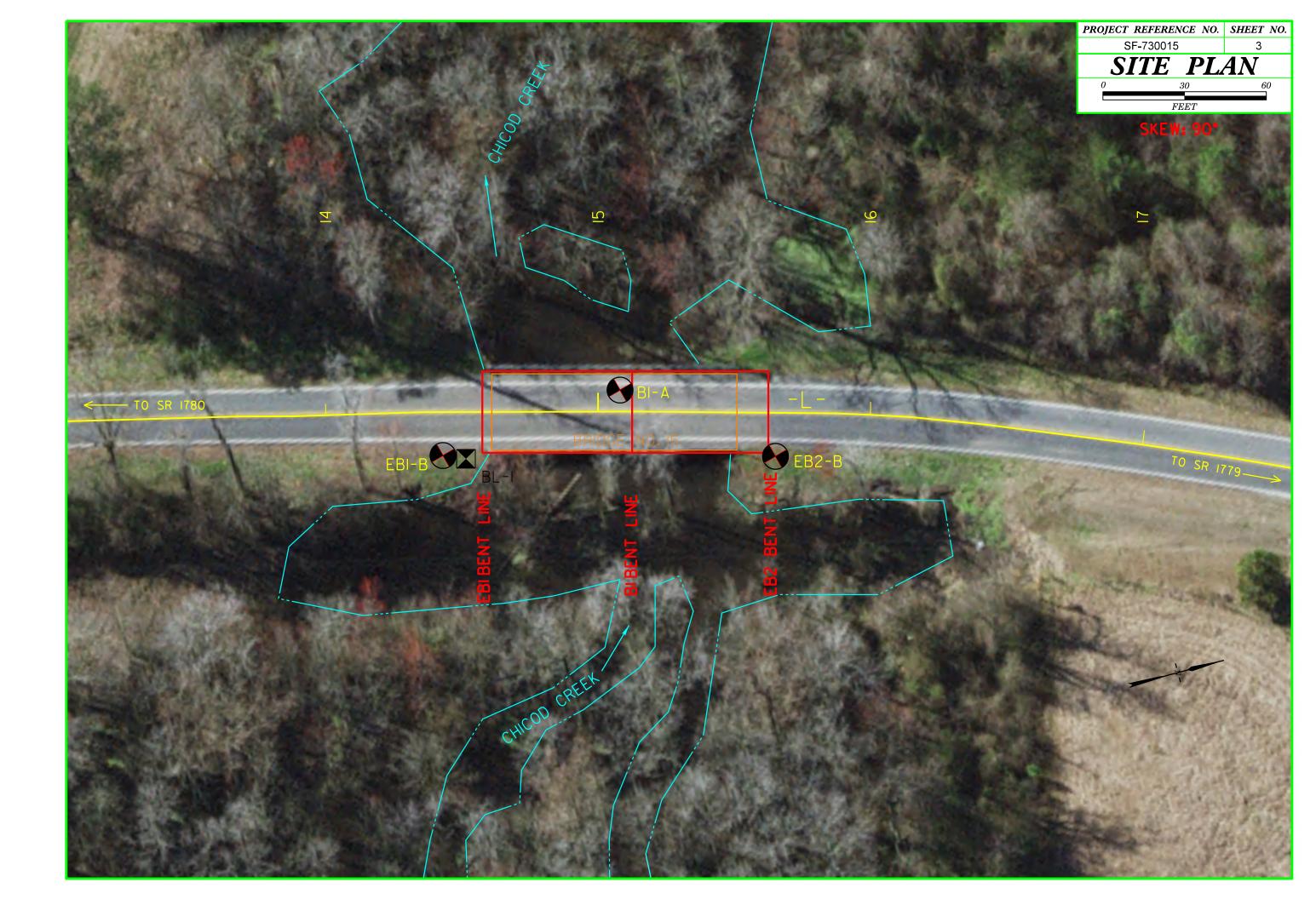
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. 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	ADUIFER - 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		BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,MOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS		CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
LLASS. ( \$ 35% PASSING *200) ( \$ 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	
GROUP         A-1         A-3         A-2         A-4         A-5         A-6         A-7         A-1, A-2         A-4, A-5           CLASS.         A-1-a         A-1-b         A-2-4         A-2-6         A-2-7         4.3         A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
00000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL COCCORDOCOD	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 SEDIMENT	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX *40 30 MX 50 MX 51 MN GRANULAR CLAY PEAT	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
2000 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL 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 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	
LL – – – 40 MX 41 MN LITTLE OR LICHLY	HIGHLY ORGANIC $> 10\%$ $> 20\%$ HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
OPCANIC SUILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING C. C. DODDADC EXCELLENT TO GOOD FAIR TO POOR UNSUITABL	$\underline{\bigtriangledown}$ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
AS SUBGRADE POUR FOUR POUR POUR POUR ONSUTHEL	O→AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS $\leq$ 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	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH CONSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	WITH SOIL DESCRIPTION	SEVERE ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
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.
GPANILAP LOOSE 4 TO 10	SOIL SYMBOL	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50		VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	INFERRED SOIL BOUNDARY CORE BORING • SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5		VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0           MATERIAL         STIFF         8 TO 15         1 TO 2		COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	ALLUVIAL SOIL BOUNDARY A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	INSTALLATION	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION -	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TUP 3 FEEL OF UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SAND SAND (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
		HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	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
	CLCLAY MODMODERATELY $\gamma$ -UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{d}^{-}$ DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC 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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F - FINE         SL SILT, SILTY         ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
	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 RANGE < - WET - (W) SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANCE < - WET - (W) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING	BENCH MARK: BL-I
		TERM         SPACING         TERM         THICKNESS           VERY WIDE         MORE         THAN 10 FEET         VERY THICKLY BEDDED         4 FEET	<u>N: 653895.0000</u>
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	E: 2539093.5720 ELEVATION: 26.03 FEET
SL SHRINKAGE LIMIT	DRILL UNITS:         ADVANCING TOOLS:         HAMMER TYPE;           CME-45C         CLAY BITS         X AUTOMATIC         MANUAL	MODERATELY CLOSE         1 TO 3 FEET         THINLY BEDDED         0.16 - 1.5 FEET           CLOSE         0.16 TO 1 FOOT         VERY THINLY BEDDED         0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO		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	
- UKY - (U) ATTAIN OPTIMUM MOISTURE	CME-55	THINLY LAMINATED < 0.008 FEET	
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		FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT		GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY         PLASTIC         16-25         MEDIUM           HIGHLY         PLASTIC         26         OR         MORE         HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
	PORTABLE HOIST	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		
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14







			PRO	FILE	r HRC	UGH BOI	RINGS	PROJE	cted al	ONG
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.10			VERY_SOFT_TO_			GRAY (9- 	SI	UTY 0- 	AND SANDY CL	AY. WET
0			LOOSE TO MEDIUM (	JENSE	∋— ⊙—	GRAY SAND 6-	WIT		SHELL FRAGMEN	NTS. SA
-10			HARD			1MESTONE 66	C = = = = = = = = = = = = = = = = = = =	= - <u></u>	FORMATION )	+ -
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-40	LODSE TO VER SILTY SAND W AND SHELL FR	Y DENSE GREEN VIJH JHIN LIME AGMENTS, SATU	N, TAN, AND GRAY S STONE LAYERS AND JRATED (PEEDEE FOR	FRAGMENTS MATION) @	D D	3- @- &-		(G)	AND SHELL FRAG	MENTS,
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-90	B HARD GRA	Y LIMESTONE, (P	EEDEE FORMATION)			<b>4</b> -				
	© L'OOSE TI S'ILTY S	O VERY DENSE AND WITH THIN	GREEN, TAN, AND GR LIMESTONE LAYERS SATURATED (PEEDEE	AY SAND AND AND FRAGMEN	TS			+ I I I I I I I I I I I I I I		

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## GEOTECHNICAL BORING REPORT BORE LOG

DRILL RIG/HAMMER EFF,/DATE         RF00074 CME-55         92% 10/12/2020         DRILL METHOD         Mud Rotary         HAMMER TYPE         Automatic         DRILL RIG/HAMMER EFF,/DATE         RF00074 CME-55         92% 10/12/2020           DRILL RIG/HAMMER EFF,/DATE         08/19/21         COMP. DATE         08/19/21         SURFACE WATER DEPTH         N/A         DRILL RIG/HAMMER EFF,/DATE         RF00074 CME-55         92% 10/12/2020           DRILL RIG/HAMMER EFF,/DATE         08/19/21         COMP. DATE         08/19/21         SURFACE WATER DEPTH         N/A         DRILLER         Walker, C. M.         START DATE         08/19/21         COMP. DATE         08/19/21						<u> </u>								.00														1_				
DORMENON         ELI-12         TATION         L-4-3         OPTET         Is ATT         Lower         Park         Park <th></th> <th></th> <th></th> <th><b>D</b></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>чтт</th> <th></th> <th></th> <th></th> <th>0</th> <th>JEOLO</th> <th><b>GIST</b> Zimari</th> <th>no, S. N.</th> <th></th> <th>D (6)</th> <th></th> <th></th> <th></th> <th><b>D</b></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>				<b>D</b>									чтт				0	JEOLO	<b>GIST</b> Zimari	no, S. N.		D (6)				<b>D</b>						
COLLAGE BLY: 24-41         TOTAL DEPTH 912-10         Monthead 201000         24-48         27-8         Coll-AB BLY: 37-8         TOTAL DEPTH 912-10         Market           COLLAGE BLY: 34-47         TOTAL DEPTH 912-10					ge No.		-			r Chio	cod Cre	_	FOFT	40.0			<u> </u>					. ,					je No.				Unicod C	
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DBALLER         NUMER C M         ENANT DATE         OPENANT         DIFFACE         NATE													ORTHING						<b>IG</b> 2,539,090													
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00 00 00 00 00 00 00 00 00 00 00 00 00								DATE					omp. Da				8	SURFA	CE WATER D	EPTH N//	4											
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28       0.0       4       3       4       3       4       5       20       5       20       20       5       20 <td>30</td> <td></td> <td>-</td> <td></td> <td>F</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-50</td> <td>-50.6</td> <td>77.0</td> <td></td> <td></td> <td></td> <td></td> <td>Ma</td> <td>atch Line</td> <td></td>	30		-														F						-50	-50.6	77.0					Ma	atch Line	
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224     10     WORLWORL     20     204     70     40 <td>25</td> <td>26.4 T</td> <td>0.0</td> <td>4</td> <td>3</td> <td>3</td> <td>6</td> <td></td> <td></td> <td>• •</td> <td></td> <td>• •</td> <td></td> <td></td> <td></td> <td></td> <td>- 20</td> <td>0.4</td> <td>ROADW</td> <td>AY EMBAN</td> <td>MENT</td> <td>0.0</td> <td>-55</td> <td></td> <td>Ŧ</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	25	26.4 T	0.0	4	3	3	6			• •		• •					- 20	0.4	ROADW	AY EMBAN	MENT	0.0	-55		Ŧ							
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-5       -5.0       32.0       -3       4       5         -10       .10.0       37.0       .50000       .10.1       .10.2       .00000         -15       .15.0       42.0       .50       .27       .24       .50       .50000         -20       .20.0       .47.0       .17       13       .50       .50       .50       .11       .10.1       .00000         -30       .30.6       .57.0       .11       .10		-0.6	27.0	2	3	3	- /.							-										-	ŧ							
-5       -5.6       -30.0       -3       4       5         -10       -10.4       -37.0       -0       -0       -0       -0         -15       -15.8       -20       -0       -0       -0       -0       -0         -15       -15.8       -27       24       -0       -0       -0       -0       -0         -20       -20.6       47.0       17       13       8       -0 <td></td> <td>ł</td> <td></td> <td>-</td> <td>Ű</td> <td>Ű</td> <td><b>●</b>6</td> <td></td> <td></td> <td>•••</td> <td>· · ·</td> <td></td> <td>ł</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		ł		-	Ű	Ű	<b>●</b> 6			•••	· · ·														ł							
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.15       .15.6       .42.0       .35       .27       .24         .20       .20.6       .47.0		ŧ	-	60/0.0						•••		•   •		T		F			GRAY LIN	IESTONE (F	PEEDEE				ŧ							
-16.6     420     36     27     24       -20     -20.6     47.0     17     13     8       -25     -25.6     52.0     -     -       -30     -30.6     57.0     -     -       -30     -30.6     57.0     -     -       -40     -     -     -     -       -45     -45.6     72.0     31     15     12	15	‡	-													H		4.6				41.0			‡							
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#### SHEET 5 OF 7

NT	PITT				GEOLOGIST Zimarino,	S. N.		
reel	(						GROUN	ID WTR (ft)
	OFFSET	16 ft RT			ALIGNMENT -L-		0 HR.	N/A
	NORTHING	653,88	39		EASTING 2,539,090		24 HR.	2.8
		DRILLN		Mud		HAMIME		Automatic
	COMP. DA	TE 08/*	19/21		SURFACE WATER DEPT	TH N/A	4	
		SAMP.		L				
	75 100	NO.	моі	O G	SOIL AND ROC	K DESC	RIPTION	
	T	+		<u> </u>	COAST		N	
	· · · · ·				GRAY, GREEN, A SILTY SAND WITH	LIMEST	ONE LAY	ERS
.``				Ŀ	AND FRAGMEN (con	ITS, SA <sup>-</sup> <i>tinued)</i>	TURATED	)
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	100/0.3			F				
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				F	07.4			00.5
		Ч		-	-67.1 Boring Terminated	at Eleva	tion -67.1	93.5 ft in
				E	Medium Der	nse Silty	Sand	
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## GEOTECHNICAL BORING REPORT BORE LOG

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	DESCR		Bride	ae No.													GROUND WTR (ft					Brido	ae No.			565) over (		
	NG NO.			<b>,</b>				-			OFFSET	8 ft LT			ALIGNMENT -L-		0 HR. N/A	´		NG NO.			,		TATION	-		OF
	LAR EL		) 4 ft		_		-		4 ft		NORTHING		58		EASTING 2,539,084		<b>24 HR.</b> N/A			AR EL		4 ft				<b>PTH</b> 101.	4 ft	NO
	.RIG/HAN			E RFO										DN			ERTYPE Automatic						E RFC			% 10/12/202		
	LER W										COMP. DA				SURFACE WATER DEPTH			_		LER V						<b>TE</b> 08/25		со
ELEV				w co						R FOOT		SAMP.						- 1	ELEV	DRIVE			W CO				S PER FO	
(ft)	ELEV (ft)	(ft)	0.5ft	-	0.5ft	0	2		50		75 100	NO.	MO	O I G	SOIL AND ROCK	DESC	CRIPTION DEPTH (		(ft)	ELEV (ft)	(ft)		-	0.5ft	0	25	50	75
															WATER SURFA	CE (0		_		,								
20																			-60							Ma	atch Line	
20	19.4	<u>+ 0.0</u>	WOH	2	2	1.									- 19.4 GROUND S		ACE 0	0.0	00_	-60.5	79.9	20	30	50				
		ŧ				<b>4</b>	· · · ·	· · ·	: :	· · · ·					GRAY SANDY		Υ, WET				‡						·   · · ·   · ·	· / •
15		‡				ļĻ	• •	· · ·	• •						- 14.4		5	.0	-65	-65 5 -	+ + 84.9							
	13.3	6.1	3	4	5	.\.   .\.	· · ·	· · ·	: :						GRAY SAND WITH SI		IN			00.0		5	14	19	1	933	 	· ·   ·
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10	9.5 -	9.9	4	4	7														-70	-70.5	89.9	4	4	4				
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	4.5 -	<u>+</u> 14.9 +	3	2	3	-/- •5														-75.5 -	<del>-</del> 94.9 -	25	100/0.4	4				
		‡				i.		· · ·													ŧ						·   · · ·   · ·	· ·
0	-0.5 -	+ 19.9						· · ·							⊱ }				-80	-80.5 -	+ - 99.9						· · · ·	
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-5	-5.5 -	24.9	100/0.4			<u></u>		 			- 100/0.4				<u>COASTAL</u> -5.8 GREEN, TAN, AND (	<b>. PLAI</b> ! GRAY	IN SAND WITH <sup>25</sup>	.2		-	ŧ							
		ł	100/0	1			•••								LIMESTONE LAYERS	AND I	FRAGMENTS				Ł							
-10		Ŧ							:   :						COASTAL PLAIN SEI	DIMEN	NTARY ROCK				Ŧ							
	-10.5 -	+ 29.9 T	81	46	40						86				GRAY LIMESTO	(XOIT.	) /	.2		-	Ŧ							
		Ŧ						· · ·			- · · · ·				GREEN, TAN, AND G						ŧ							
-15	-15.5 -	- 34.9													LIMESTONE LAYERS	AND I	FRAGMENTS			-	ŧ							
		‡	11	8	12		•20	· · · ·		· · · ·						IN 1 3,	SATURATED				‡							
20		‡					<i>i</i> ::	· · ·	: :						}- 						‡							
-20	-20.5 -	<del>-</del> 39.9	16	4	4	· /	·								<u>-</u>					-	ŧ							
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-25		- - 44.9					· \.								-						t							
	-20.5	1 44.9 1	10	22	7		::]	€29							- -						t l							
		f							-   -	· · · · ·					+						f							
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7010		Ŧ	3	3	3		· ·	· · ·							-						Ŧ							
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-35	-35.5 -	+ 54.9 +	2	27	8			<u>,</u>	-   -						<del>}_</del>					-	‡							
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-40	-40 5 -	- 59.9						/ /							↓ ₩					-	‡							
			32	13	9			22							-						t							
-45		Ŧ							-   -						1						±							
-45	-45.5 -	64.9	10	10	- 25						+				<u> </u>					-	f							
-50		Ŧ	12	18	25				<b>4</b> 3	· · · · ·											Ŧ							
-50		Ŧ					· · · ·								-						Ŧ							
	-50.5 -	+ 69.9 +	15	28	72/0.2		•••		-   -						<del> -</del>  -					-	‡							
		‡					· · · ·	· · ·		· · · ·	- 100/0.7	<b>*</b>			₽ ₽						‡							
-55	-55 5 -	+ + 74.9						· · ·	-   -		/ .				₽ }					-	‡							
2		1	24	38	40	· ·   · ·		· · ·	:   :		•78										‡							
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-60													1		۹						L			L				

#### SHEET 6 OF 7

NT	<b>1</b> PITT				GEOLOGIS	<b>T</b> Zimarino,	S. N.		
reel	<							GROUN	ID WTR (ft)
	OFFSET 8	3 ft LT			ALIGNMEN	IT -L-		0 HR.	N/A
	NORTHING	653,9	58		EASTING	2,539,084		24 HR.	N/A
		DRILL N	IETHOD	Mud	Rotary		HAMME	RTYPE	Automatic
	COMP. DAT	<b>FE</b> 08/2	25/21		SURFACE	WATER DEPT	<b>FH</b> 3.3	ft	
тос		SAMP.		L O		SOIL AND ROC		RIPTION	
	75 100	NO.	моі	G					
		L	L						
	<b>.</b> 80 : :				GR	EEN, TAN, AND	) GRAY	SAND W	пн
<u>/</u> .						STONE LAYER SHELL FRAGM	MENTS,		
						(con	tinued)		
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<u>```</u>	+			ŀ					
	100/0.4			ł					
/	1			Ł					
					-82.0				101.4
				F	Bori	ng Terminated Dens	at Eleva e Sand	tion -82.0	ft in
				F					
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#### GEOTECHNICAL BORING REPORT BORE LOG

WPC	BP2.F	2010 1			<b>т</b> і	P SF-73	0015						GEOLOGIST Zimarino, S. N.				WBS BP2.R018.1						TIP SF-730015 COUNTY				
			Rrid	ne No			565) over C							GEO		, J. IN.	GROUND WTR (ft	-			Rride	ne No		-L- (SR 156			
	NG NO.			je no.			-		-	<b>T</b> 16 f					NMENT -L-		0 HR. N/A					je no.		<b>TATION</b> 15	-		
	LAR EL				_		<b>PTH</b> 98.8	ft	_	HING 6		07			<b>TING</b> 2,539,12	22	<b>24 HR.</b> 3.0							OTAL DEPT		+	
				E RFC			6 10/12/2020					/IETHOD	) Mur				ER TYPE Automatic					E RFC		ME-55 92%			
	LER V						<b>FE</b> 08/23/		COMP	DATE					FACE WATER				ILLER V								c
			1	w co				PER FO			AMP.		L		ACE WATER		n	-			1	w co				PER FOO	
ELEV (ft)	DRIVE ELEV (ft)	(ft)	·	0.5ft		0	25	5 <u>0</u>			NO.	моі	0	ELEV. (		ROCK DES	CRIPTION DEPTH (	ELE (ft		(ft)		0.5ft		0 2		50	75
	()										-				it)		DEFIN		(,								
30																		-50							Mate	ch Line	
- 50		ŧ											F	-						77.3							·
	00.4	‡											þ	26.1	GR	OUND SURF	ACE 0			‡	24	30	56	· · · ·		· · · ·	:
25	26.1	<u> </u>	1	4	3									-	ROAD	VAY EMBAN	KMENT	-5		‡				· · · ·	· · · ·	· · ·	-1
	22.8	- 3.3		_		1			: : :						BROWNAN	ID TAN SAND SATURATED	), MOIST TO		-56.2	+ 82.3	12	20	30			50	:
		ŧ	2	2	1	<b>•</b> 3 • • ;			: : :					21.1			5			ţ							
20	- 18.8	+ - 7.3				<u>i</u>								-	GRAY	ALLUVIAL SANDY CLAY	Y, WET	-60	-61.2	+ 87.3					+ • • • •	+	-+
		1	WOH	WOH	3	<b>4</b> 3 · · ·		.	· · ·											1	26	37	63/0.2				:
15	_	ŧ				<u> </u>		· · · ·						15.1				-6	5	±						· · · · ·	
	13.8	12.3	5	6	6	• • •										OASTAL PLA WITH SHELL	<b>IN</b> FRAGMENTS,		-66.2	92.3	5	6	10				•
		Ŧ			-	• • • 12							F		SATURATED	YORKTOWN	FORMATION)			Ŧ							•
10	8.8	T - 17.3						+ • • •					F	-				-70	)	<u>-</u> - 97.3					+	+	
	0.8	+ 17.3 +	5	7	6	• • • 13							F						-/1.2	+ 97.3	5	5	5	· • 10	· · · · ·		
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	3.8	22.3				<u>.</u>							-	-						‡							
		‡	2	3	4	• 7 •	·   · · · ·		· · ·											‡							
0	-	ŧ												_						‡							
	-1.2	27.3	2	2	5	· · · · ·			 											‡							
		ŧ				<b>•••</b> •••			: :											ŧ							
-5	-6.2	+ - 32.3											Ŀ	-6.2			32	3		Ŧ							
	-0.2	+	100/0.:												COASTAL PL	AIN SEDIMEN	NTARY ROCK			Ŧ							
-10		Ŧ								11			Ŧ	10 5		FORMATION	)			Ŧ							
	-11.2	37.3	7	15	17	••••							F	10.5	<u>c</u>	OASTAL PLA	IN	<u>&gt;</u>		Ŧ							
		Ŧ	'		17		• • • • • • • • • • • • • • • • • • •						F		LIMESTONE L	AYERS AND	´SAND WITH FRAGMENTS,			Ŧ							
-15	-	ŧ					· / · · ·						-	-		SATURATED	)			Ŧ							
	-16.2	+ 42.3 +	8	8	16		 	.	· · · · · ·											Ŧ							
-20		ŧ					/ :::													‡							
	-21.2	+ + 47.3				· · /								-						‡				l			
- M		‡	3	4	8	<b>●</b> 12		·   · · ·	· · · ·											‡				l			
-25	_	‡				· · <b>\</b>			· · ·					-						‡				l			
-25 -30 -35 -40	-26.2	<u> </u>	26	9	13			.	· · · ·				÷	-26.2 -26.3			52 52	3		‡							
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-30	-31.2	T - 57.3				/		+						-						$\pm$							
	-J1.Z	<u> </u>	2	5	10	• • • • • • • • • • • • • • • • • • •	5						F							Ŧ				l			
-35		Ŧ																		Ŧ				l			
	-36.2	62.3	4	3	23									-						Ŧ							
1000		Ŧ	*		23		26	.	· · · ·											Ŧ							
	_	‡					/		· · · ·					-						‡				l			
	-41.2	+ 67.3 +	4	7	10	· · · /	; 17	·   · · ·	· · · · · ·											‡				l			
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-45 -50	-46.2	+ - 72.3							\$					-						‡				l			
5		‡	9	19	81/0.1				10	)/0.6				-47.3				4		±				l			
-50		<u>+</u>													GRAY L	IMESTONE (F				<u>+</u>				l			
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#### SHEET 7 OF 7

