BP8.R010

REFERENCE

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

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STRUCTURE SUBSURFACE INVESTIGATION

COUNTY_	MOORE
PROJECT	DESCRIPTION REPLACE BRIDGE 620127 ON
	1428 (DAN ROAD) OVER BEAR CREEK

STATE PROJECT REFERENCE NO. BP8.R010

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANTE OR GLARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

 1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.

 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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SEPTEMBER 2021

2401 BRENTWOOD ROAD, SUITE 107 RALEIGH, NORTH CAROLINA 27604 NC REGISTERED ENGINEERING FIRM: F-0869 NC REGISTERED GEOLOGIC FIRM: C-367



-DocuSianed by: Zahma Aghazadeh

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UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO.

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (ASSHT) T 206, ASTM DIS861, SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	WEATHERED WISCONSTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD FIELD SPI N VALUES >	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS (1.5.287 PASSING #290) CRGANIC MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) CONTROL OF THE CLASS. (≤ 35% PASSING *200) CONTROL OF THE CLA	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-o A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6 A-7	COMPRESSIBILITY	NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL OCCORDOROGY TO THE STATE OF THE STATE	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
% PASSING SUIT.	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 50 MX GRANULAR CLAY MUCK, *40 30 MX 50 MX 51 MN SOILS COILS COIL	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING =40	TRACE OF ORGANIC MATTER 2 - 3%, 3 - 5%, TRACE 1 - 10%, LITTLE ORGANIC MATTER 3 - 5%, 5 - 12%, LITTLE 10 - 20%.	HAMMER IF CRYSTALLINE.	HORIZONTAL.
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 501L5 WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 12 MX 12 MX 11 MN 11 MN MODERATE DECAME	GROUND WATER	OF A CRYSTALLINE NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INUEX W W W 4 MX 8 MX 12 MX 16 MX NU MX AMUUNIS UF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI,) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND GRAVEL AND SAND SOILS AMERICAN GRAVEL AND SAND SOILS SOLUTION OF SAND SOILS	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 SANU	STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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 WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	- O-M⊶ SPRING OR SEEP	WITH FRESH RUCK. 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 RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCY (N-VALUE) (TONS/FT ²)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL SOIL SYMBOL STATE TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MATERIAI MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER ALICED PORTING ONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50	THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MN MONITORING WELL TEST BORING	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	PIEZOMETER COT NOTIFICADO	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	TTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIF	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND (CL.)	UNDERCOT LEED ACCEPTABLE DEGRADABLE ROCK	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.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.005 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.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 74- DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE CHIEF 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 OUTDE FOR FIELD MOISTORE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL 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 FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	TERM SPACING TERM THICKNESS	BENCH MARK: BMI, RR SPIKE IN BASE OF 18" WALNUT TREE, STA. 10+87.00 -BL-, 112' RT
MOICE (M) COLID AT OD NEAD ODTIMIN MOICEURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	N: 620742, E: 1799701 ELEVATION: 382.24 FEET
OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
- DRT - (U) ATTAIN OPTIMUM MOISTURE	CME-55 CORE SIZE:	THINLY LAMINATED < 0.008 FEET	HAR - HAND AUGER REFUSAL
PLASTICITY	X 8'HOLLOW AUGERS	INDURATION	The same notes see that the same
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS X -N 02	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS:	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST VAN	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	PORTABLE HOIST TRICONE STEEL TEETH X HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
	X DIEDRICH D-50 X TRICONE2 ¹⁵ / ₁₆ TUNGCARB. SOUNDING ROD VANE SHEAR TEST	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	X CORE BIT VANE SHEAR TEST	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

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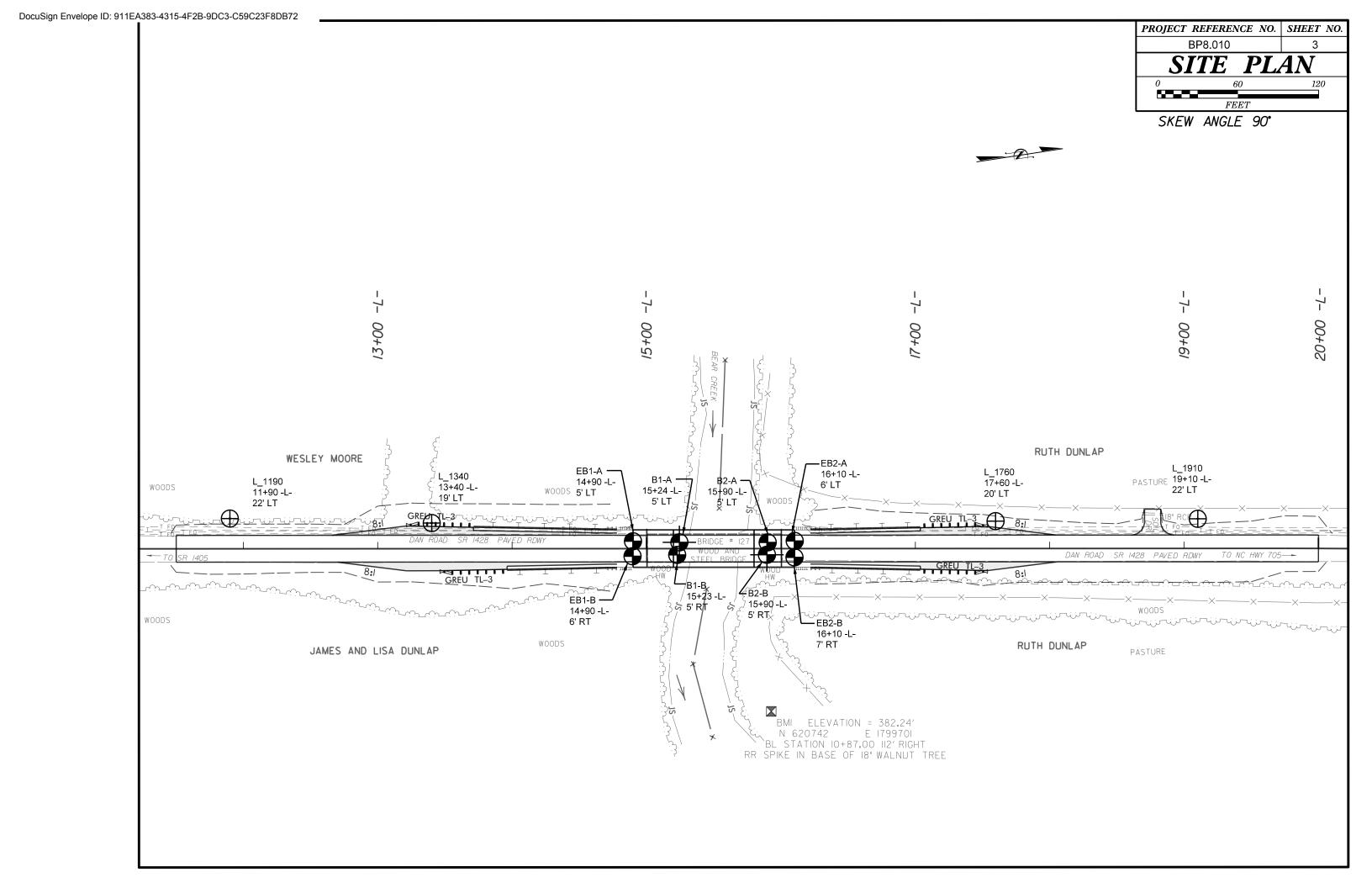
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DATE: 8-19-1

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 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000) AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000) GEOLOGICAL STRENGTH INDEX (GSI) FOR GSI FOR HETEROGENEOUS ROCK MASSES SUCH JOINTED ROCKS (Hoek and Marinos, 2000) faces AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and From the lithology, structure and surface **POOR -** Very smooth, slicken-or highly weathered surfaces soft clay coatings or fillings y weathered surf ngs or fillings nts smooth, occasionally surfaces with compaci fillings with angular conditions of the discontinuities, estimate the average value of GSI. Do not try to surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the planes) be too precise. Quoting a range from 33 to 37 is more realistic than stating that weather position in the box that corresponds to the condition ered of the discontinuities and estimate the average value ther GSI = 35. Note that the table does not of GSI from the contours. Do not attempt to $\bar{\mathsf{be}}$ too eq, apply to structurally controlled failures. Where weak planar structural planes are ighly weat coatings precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the slightly present in an unfavorable orientation SURFACE CONDITIONS (DISCONTINUITIES (Predominantly beddin Hoek-Brown criterion does not apply to structurally with respect to the excavation face, highly coatin agment these will dominate the rock mass controlled failures. Where unfavourably oriented behaviour. The shear strength of surfaces continuous weak planar discontinuities are present, Smooth, ed and in rocks that are prone to deterioration slightly es these will dominate the behaviour of the rock mass. Rough, POOR Slickensided, h with compact or angular fra as a result of changes in moisture - Very sonsided for the formula or formula o 1 70 The strength of some rock masses is reduced by the content will be reduced if water is GOOD rough, presence of groundwater and this can be allowed for G00D there present. When working with rocks in the by a slight shift to the right in the columns for fair, fair to very poor categories, a shift to GOOD -surfaces FAIR - weather GOOD Rough, s surface poor and very poor conditions. Water pressure does the right may be made for wet conditions. VERY | sided with si VERY Water pressure is dealt with by effective VERY FAIR Smoo not change the value of GSI and it is dealt with by stress analysis. using effective stress analysis. STRUCTURE DECREASING SURFACE QUALITY COMPOSITION AND STRUCTURE INTACT OR MASSIVE - intact A. Thick bedded, very blocky sandstone 90 rock specimens or massive in N/A N/A The effect of pelitic coatings on the bedding planes is minimized by the confinement of situ rock with few widely spaced PIECES discontinuities the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally 80 controlled instability. 60 BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three O. Siltstone intersecting discontinuity sets 50 F. Weak C. Sand-60 or silty shale si/tstone stone with stone and С or clayey shale with thin inter siltstone with sandlayers of stone lauers ın sımılar VERY BLOCKY - interlocked, amounts sands tone siltstone 40 50 partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets INTERL C.D.E. and G - may be more or F. Tectonically deformed, BLOCKY/DISTURBED/SEAMY -30 less folded than illustrated but ntensively folded/faulted, folded with angular blocks this does not change the strength. sheared clayey shale or sıltstone formed by many intersecting Tectonic deformation, faulting and with broken and deformed CREASING loss of continuity moves these discontinuity sets. Persistence andstone layers forming an 30 categories to F and H. of bedding planes or schistosity almost chaotic structure 20 DISINTEGRATED - poorly interlocked, heavily broken rock mass 20 H. Tectonically deformed silty with mixture of angular and or clayey shale with or clayey shale forming a 10 rounded rock pieces or without a few very chaotic structure with pockets thin sandstone layers of clay. Thin layers of sandstone are transformed into small rock pieces. 10 LAMINATED/SHEARED - Lack of blockiness due to close spacing N/A N/A → Means deformation after tectonic disturbance of weak schistosity or shear planes



15 + 00

16 + 00

12 + 00

13 + 00

14 + 00

17 + 00

18 + 00

19 + 00

-L-



GEOTECHNICAL BORING REPORT BORE LOG

Consul	lting Eng	ineers a	ind Scie	entists				<u>ORE L</u>	<u>OG</u>			_		
	BP8.R					IP SF-620127		Y MOORE				GEOLOGIST Russek, S.C		
				je 620		n SR 1428 (Dan Road)	over Bear					Т		ID WTR (ft)
	IG NO.				_	TATION 14+90		OFFSET 6				ALIGNMENT -L-	0 HR.	22.3
	AR ELE					OTAL DEPTH 29.4 ft		NORTHING				EASTING 1,799,560	24 HR.	FIAD
				E TER		IEDRICH D-50 95% 02/06			DRILL M) H.S		AMMER TYPE	Automatic
	. ER Tu					TART DATE 05/25/2		COMP. DAT		25/21 I 	1 L 1	SURFACE WATER DEPTH	I N/A	
(ft)	ELEV	DEPTH (ft)	0.5ft	W CO		4	PER FOOT 50	75 100	SAMP.	\ \	0	SOIL AND ROCK	DESCRIPTION	
	(ft)		0.010	0.011	0.010		Ĭ	1	140.	/MOI	G	ELEV. (ft)		DEPTH (
390												ODOLIND C	NUDEACE	
	388.9 -	- 1.0	2	1	2							389.9 GROUND S 388.3 PAVEM	IENT	1.
	-	-	^	'	^				SS-1	34%		- 0.8 ASPHAL - ROADWAY EM	BANKMENT	
385	385.9 -	<u>- 4.0</u> -	2	2	2		<u> </u>		SS-2	26%		SOFT TO MEDIUM: WET, SILTY CLAY GRAV	STIFF, RED,TA (A-7-5), TRAC	.N, E
	383.9 -	- 6.0 -	5	3	2	5			SS-3	21%		GRAV	/ÈL	
380	380.9	9.0	2	1	2	: : : : : : : لم			00.4	040/		380.9	/AI	9.
500	-	-	~	'	~	• 3		1	SS-4	31%		. VERY SOFT TO SO	OFT, GRAY, TA	
	275.0	-										. WET, FINE SANDY S ORGAI		CE
375	375.9 -	- 14.0 -	WOH	WOH	WOH	0				w		-		
	-	-										372.9 RESID		17.
370	370.9	- - 19.0	5	8	8	: : ; : : : : : :				l w		VERY STIFF, TAN, BLACK, WET, FINE T	GRAY, BROWI	
	-	-	ਁ			16		1		**		. SILT (A	A-4)	<u>22</u> .
	365.9	- - 24.0					† 	7 7 7 7 7			100	WEATHERE . (TAN, GRAY, MET		
365		- 24.0	100/0.3					100/0.3				ARGILL		
	-	_										•		
F	360.9 360.5	- 29.0 - 29.4	100/0.3					100/0.3				- 360.5 Boring Terminate	I St. Otrac Land	29.
												Penetration Test Refus ft ON NON CRYS (METAMORPHOS)	TALLINE ROCK	(

GEOTECHNICAL BORING REPORT

SHEET 13 OF 24

													EL	.(OG			_					
WBS							F-620			l			ORE					GEOLOGI	ST Russek,	S.C.			
SITE DI				je 620						over I											┥	ID WTR (1	
BORING								14+90			-+		SET					ALIGNME			0 HR.	Cave	
COLLA									24.0 ft			NOR'	THING	_	620,65				1,799,571	T	24 HR.	FIA	_
DRILL RI				- IER										_) H.S	S. Augers				Automatic	
DRILLE	אוער ד			W CO		TARI	DAI		5/25/2 .OWS			COM	P. DA	_	05/2 SAMP.	5/21	1 🗆 1	SURFACE	WATER DEP	TH N/	A		
	ELEV	DEPTH (ft)	0.5ft	0.5ft				2 <u>5</u>		50		75	100		NO.	V /	0	ELE) / (6)	SOIL AND RO	CK DES	CRIPTION		1 (6)
390	389.0 386.1 384.0	1.0	2 2 2	2 1 3	2 2 3 WOH	-43-	6.								NO.	W W W W	G	— GRA - - - <u>381.5</u> —	0.8' ASPH ROADWAY OFT TO MEDIL AY, WET, SILTY GF ALL ERY SOFT, TAI FINE SANDY S	EMENT ALT, 0.8 EMBAN IM STIFI CLAY (RAVEL LUVIAL N, GRAY SILT (A-4	S' ABC KMENT F, RED, T/ (A-7-5), TF , RED, W 4), TRACE	AN, RACE	0.0 1.6
375	376.1	13.9	WOH	WOH	WOH	•0]								SS-5	W 19%		373.0	OR(SANICS SIDUAL Y, BLAC SANDY	- — — - 	<u> 1</u> FINE	<u>17.0</u> 22.0
			60/0.1										60/0.1	1				- Pen	RAY, METAMOF NON-CRYS (METAMORPH Boring Termin etration Test Re ft ON NON CR (METAMORPH	TALLINE OSED A ated with fusal at YSTALL	ROCK ARGILLITE A Standard Elevation INE ROCK	366.0	244.



GEOTECHNICAL BORING REPORT BORE LOG

WBS	BP8.R	010.1			TI	P SF-620	127	COUNT	Y MOORE				GEOLOGIST Russek	S.C.		
			Brido	e 620			(Dan Road)								GROU	ND WTR (
	NG NO.					TATION 1			OFFSET	5 ft LT			ALIGNMENT -L-		0 HR.	N.
COLL	AR ELE	EV. 37	6.1 ft		т	OTAL DEP	TH 30.9 f	t	NORTHING	620,69	93		EASTING 1,799,566		24 HR.	FIA
				E TER			0 95% 02/06		<u> </u>			D Wa	ash Boring	HAMM	LER TYPE	Automatic
DRILL	ER Tu	ırnage,	J.R.		S	TART DAT	E 05/26/2		COMP. DA				SURFACE WATER DE			
	DRIVE	DEPTH		w col				PER FOOT		SAMP.		1 L]	_			
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	MOI	O I G	SOIL AND RO	JCK DES	CRIPTION	N DEPTH
380	376.1	0.0	WOLL	WOLL	WOLL		· · · · ·	· · · · · ·						ND SURF	ACE	
375 370	372.5 - -	- - - 3.6 -			WOH					SS-6	25%		VERY SOFT, 7 SATURATED, FIR SILT (A-4), 7	NE TO CC	ARSE SA	ANDY
65	367.5 - - - - -	- 8.6 - -	100/0.2						100/0.2	•			GRAY, BROWI	HERED RO N, METAN (GILLITE)	OCK MORPHOS	— — — ·
360	362.5 360.7 -	13.6 - 15.4	100/0.3 60/0.0						100/0.3	•			- - - 360.7	ALLINE R	OCK	
	-		00/0.0							RS-1				ALLINE R		
355		-								RS-2			- - 			
	-	-											- - -			
350	-	[1 : : : :			[- 350.7 - 340.2 NON-CRY	STALLINE	ROCK	
	-												- 349.2 \ (META	A-ARGILLI ALLINE R	TE)	
	-	_											- (META	ALLINE R		
		-								!			345.2 Boring Terminate CRYSTALLINE R	d at Eleva	tion 345.2	2 ft IN

GEOTECHNICAL BORING REPORT

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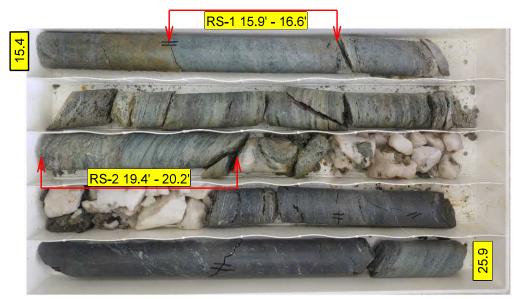
									<u> </u>	<u>:01</u>	RE L	OG					
WBS	BP8.F	2010.1			TIP	SF-62	0127	С	OUNT	Y M	OORE		GEOLOGIS	ST Russek,	S.C.	_	
SITE	DESCR	IPTION	Bridg	ge 620127	on SF	R 1428	(Dan Ro	ad) ove	er Bea	r Cre	ek					GROUI	ND WTR (ft)
BOR	ING NO.	B1-A			STA	ΓΙΟΝ	15+24			OF	FSET 5	5 ft LT	ALIGNME	NT -L-		0 HR.	N/A
COL	LAR ELI	EV. 37	6.1 ft		TOT	AL DE	PTH 30.	9 ft		NO	RTHING	620,693	EASTING	1,799,566		24 HR.	FIAD
				E TER373					21	_		DRILL METHOD Wa					Automatic
-	LER T		J.R.				TE 05/2			СО	MP. DA	FE 05/26/21	SURFACE	WATER DEF	PTH N/	Α	
	E SIZE		<u> </u>	DDILL		AL RUI JN	1 15.5 ft		ATA	١.,							
(ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	L O G	ELEV. (1		DESCRIPTION	AND REMARK	KS		DEPTH (ft)
360.7 360	360.7	15.4	0.5	2:31/0.5	(0.5)	(0.5)		(8.5)	(5.7)		— 360.7			ng @ 15.4 ft LLINE ROCK			15.4
355	360.7	20.9	5.0	3:36/1.0 1:51/1.0 1:36/1.0 1:35/1.0 2:02/1.0 2:57/1.0 4:17/1.0 2:46/1.0	(4.2) 84% (4.1) 82%	(0.5) (100%) (2.7) 54% (2.5) 50%	RS-1 RS-2	85%	(5.7) 57%		- 300.7 	LIGHT GRAY TO WEATHERED, H	O WHITE, SLIC HARD TO MED 'META-	SHTLY WEAT			Υ.
350	350.2		5.0	3:05/1.0 2:36/1.0 1:49/1.0 2:32/1.0 2:38/1.0 2:44/1.0 3:01/1.0	(4.7) 94%	(4.4) 88%		(1.3) (87%) (3.7) 93%	(0.7) 47% (3.2) 80%		350.7 349.2 - - - 345.2	GRAY TO DAF MODERATE WEATHERED, H.	RK GRAY, VER LY INDURATE ARD TO MEDI CRYSTAI (GSI	D TO INTURA UM HARD, ME LLINE ROCK) = 40-45)	THINLY TED, SL	IGHTLY	
												DARK GRAY WEATHERED, H	CRYSTA TO BLACK, S HARD, CRYST (GSI ted at Elevation	LLINE ROCK LIGHTLY TO \ ALLINE ROCK = 40-45)	(META-	VOLCANI	,
	-	-															

CORE PHOTOGRAPHS
BRIDGE 620127 ON SR 1428 (DAN ROAD) OVER BEAR CREEK

BP8.R010

15

B1-A BOX 1 OF 2 15.4 - 25.9 FEET





B1-A BOX 2 OF 2 25.9-30.9 FEET







GEOTECHNICAL BORING REPORT BORE LOG

Consi	ulting Eng	gineers a	nd Scie	entists				В	ORE L	.()G					
WBS	BP8.F	010.1			Т	ΊP	SF-620127	COUNT	Y MOORE					GEOLOGIST Russek, S.C.		
SITE	DESCR	IPTION	Bridg	ge 620	127 or	n S	SR 1428 (Dan Road)	over Bear	r Creek						GROUND WT	R (ft)
BORI	NG NO.	B1-B			S	TA	ATION 15+23		OFFSET	5 f	t RT			ALIGNMENT -L-	0 HR.	N/A
COLI	LAR ELI	EV . 37	5.1 ft		T	01	TAL DEPTH 12.8 ft		NORTHING	;	620,69	90		EASTING 1,799,575	24 HR.	FIAD
DRILL	. RIG/HAN	MER EF	F./DATI	E TEF	R373 D	IED	DRICH D-50 95% 02/06/	2021			RILL M	ETHOD) Wa	ash Boring HAMN	ER TYPE Automa	atic
DRIL	LER T	urnage,	J.R.		S	TA	ART DATE 05/26/2	1	COMP. DA	TE	05/2	26/21		SURFACE WATER DEPTH N	'A	
ELEV	DRIVE ELEV	DEPTH	BLC	w co	UNT			PER FOOT	Γ	,	SAMP.	lacktriangledown	LO	SOIL AND ROCK DES	CRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	Ц	0 25 5	50	75 100		NO.	<u>/MOI</u>		ELEV. (ft)		PTH (
380		-														
375	375.1	0.0	WOH	WOH	WOH	\parallel				+	SS-7	28%	2000)))	375.1 GROUND SURF	ACE	0
	372.3	2.8				▋	0			F		2070		VERY SOFT TO SOFT,		
370		-	1	1	1] }	• · · · · · · · · · · · · · · · · · · ·					W			RGANICS	3.
0.0	-	Ŧ				li								- RESIDUAL - STIFF TO VERY STIFF		
	367.3	7.8	34	64	36/0.3	3	<u> </u>	· · · · ·	· · · · · · · · · · · · · · · · · · ·				Sann	- WHITE, WET, FINE TO CO - 366.8 CLAY, MODERATELY P	DARSE SANDY _ASTIC (A-6)	8.
365	-	‡							100/0.8					WEATHERED R (GRAY, BROWN, METAN		
	362.3	128												ARGILLITE		12.
														Penetration Test Refusal at ft ON NON CRYSTALL (METAMORPHOSED /	INE ROCK	

GEOTECHNICAL BORING REPORT

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						<u>B</u>	ORE L	<u>.OG</u>						
	BP8.R010.1			_	IP SF-620127		Y MOORE				GEOLOGIST Russek, S			
			ge 620		SR 1428 (Dan Road)	over Bear	1				1		GROUND	WTR (ft)
BORI	NG NO. B2-A			S	TATION 15+90		OFFSET 5	ft LT			ALIGNMENT -L-		0 HR.	N/A
COLL	AR ELEV. 37	'6.8 ft		TO	OTAL DEPTH 9.6 ft		NORTHING				EASTING 1,799,576	2	4 HR.	FIAD
DRILL	RIG/HAMMER EF	F./DATE	E TER		IEDRICH D-50 95% 02/06		Г			D Wa	nsh Boring	HAMMER	TYPE Au	tomatic
DRILI	LER Turnage,				TART DATE 05/25/2		COMP. DA			/ 	SURFACE WATER DEP	TH N/A		
ELEV (ft)	DRIVE ELEV (ft) DEPTH (ft)	<u> </u>	0.5ft	UNT 0.5ft	4	PER FOOT 50	75 100	SAMP. NO.	MOI	0 I G	SOIL AND ROC	CK DESCR	RIPTION	DEPTH (fi
380	376.8 + 0.0) SURFAC	CE	0.
375	372.2 4.6	1	2	7	\(\frac{1}{1} \)			SS-8	30% W		- ALL - SOFT TO STIFF, T/ - TO COARSE SANE - ORGANICS, 1	DY SILT (A	-4), TRACI	
370	367.2 9.6	60/0.0					60/0.0		**		367.2 (GRAY, METAMOR		ARGILLITE	
		60/0.0					60/0.0				Boring Termina Penetration Test Ref ft ON NON CRY (METAMORPHO	ated with S fusal at Ele /STALLINE	tandard evation 367 E ROCK	



GEOTECHNICAL BORING REPORT BORE LOG

WBS	BP8.R	010.1			Т	TIP SF-620127		ORE L				GEOLOGIST Russek, S.C	i.
SITE	DESCRI	IPTION	Bridg	je 620	127 oı	n SR 1428 (Dan Road)	over Bear	Creek					GROUND WTR
BORI	NG NO.	B2-B			s	STATION 15+90		OFFSET 5	ft RT			ALIGNMENT -L-	0 HR.
COLI	AR ELE	EV . 37	7.3 ft		Т	OTAL DEPTH 22.1 ft	:	NORTHING	620,75	56		EASTING 1,799,585	24 HR. F
				TER		DIEDRICH D-50 95% 02/06) Wa	1	AMMER TYPE Automa
	LER To					START DATE 05/28/2		COMP. DAT				SURFACE WATER DEPTH	
LEV	DRIVE	DEPTH		w co			PER FOOT		SAMP.	V /	1		
(ft)	ELEV (ft)	(ft)	0.5ft			0 25	50	75 100	NO.	MOI	O I G	SOIL AND ROCK ELEV. (ft)	DESCRIPTION DEP
							•						
380													
	-	F										- ODOLIND O	UDEAOE
	377.3	0.0	WOH	1	1	1	1	1		W	(XXX)	- 377.3 GROUND S - ALLUV	/IAL
375	-	-				Y 2						SOFT, TAN, WET, F (A-4), TRACE ORGANI	FINE SANDY SILT ICS, TRACE WOOD
	372.3	5.0				i <u></u>						372.8 FRAGMI	ENTS
370	-		8	9	13	22			SS-9	16%		 VERY STIFF, TAN, C 	RANGE-BROWN,
570	-	ţ					 				770	$=\frac{369.8}{}$ WET, FINE TO COA (A-4), TRACE ROC	
	367.3	10.0	60/0.1					- 60/0.1			To a	367.2 WEATHERE (GRAY, METAMORPH	D ROCK
365	-	<u> </u>	00/0.1									NON-CRYSTAL	LINE ROCK
	-	<u> </u>						: : : :	RS-3		薑	(METAMORPHOS	ED ARGILLITE)
	-	ŧ						: : : :			薑	<u>.</u>	
360	-	ŀ					 	 	RS-4			- -	
	-	-								1		-	
							: : : :					355.2	
	-	F										Boring Terminated at E NON CRYSTAL	Elevation 355.2 ft IN LINE ROCK
	-	F										(METAMORPHOS	
	-	Ļ										- -	
	-	‡										• •	
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									C	Ol	RE L	.OG						
WBS	BP8.F	R010.1			TIP	SF-62	0127	C	OUNT	Y N	IOORE		GEOLOGIS	ST Russek, S	S.C.			
SITE	DESCR	IPTION	Brido	ge 620127	on SF	R 1428	(Dan Ro	ad) ove	er Bear	r Cre	ek					GROUN	D WTR (ft)
BOR	ING NO.	B2-B			STA	ΓΙΟΝ	15+90			OF	FSET !	5 ft RT	ALIGNMEN	NT -L-		0 HR.	N	/A
COL	LAR ELI	EV. 37	7.3 ft		TOT	AL DE	PTH 22.	1 ft		NO	RTHING	620,756	EASTING	1,799,585		24 HR.	FIA	ſD
DRILI	RIG/HAN	MER EF	F./DAT	E TER373	DIEDE	RICH D-	50 95% 02	2/06/202	21			DRILL METHOD Was	sh Boring		HAMM	ER TYPE	Automatic	
DRIL	LER T	urnage,	J.R.		STAI	RT DA	TE 05/2	8/21		СО	MP. DA	TE 05/28/21	SURFACE	WATER DEP	TH N/	A		
COR	E SIZE	NQ2		L = =			1 12.0 ft		ATA									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	REC. (ft)	ATA RQD (ft) %	LOG	ELEV. (ESCRIPTION	AND REMARK	s		DEPTH	l (ft)
367.2		40.4												ng @ 10.1 ft				
360	367.2 365.2	10.1	2.0 5.0 5.0	2:30/1.0 2:33/1.0 2:11/1.0 2:09/1.0 2:04/1.0 2:24/1.0 2:23/1.0 2:26/1.0 2:33/1.0	(5.0) 100%	(0.4) 20% (4.9) 98% (4.7) 94%	RS-3	(11.4) 95%	(10.0)		367.2	Boring Terminated :	NON-CRYS OHTLY TO MO ERY THINLY T INDURATED (GSI at Elevation 38	TÄLLINE ROCK DERATELY WI O THINLY BED TO INDURATE = 45-50)	EATHER DDED, M D	10DERATE	O TO ELY	22.1
NOTICE OUTPER O																		

CORE PHOTOGRAPHS
BRIDGE 620127 ON SR 1428 (DAN ROAD) OVER BEAR CREEK

BP8.R010

18

B2-B BOX 1 OF 2 10.1 - 19.1 FEET

B2-B BOX 2 OF 2 19.1 - 22.1 FEET



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GEOTECHNICAL BORING REPORT BORE LOG

Consulting Engineers and Scien	entists	BORE LOG		
WBS BP8.R010.1	TIP SF-620127	COUNTY MOORE	GEOLOGIST Russek, S.C.	
SITE DESCRIPTION Bridge	e 620127 on SR 1428 (Dan Road)	over Bear Creek		GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+10	OFFSET 6 ft LT	ALIGNMENT -L-	0 HR. Caved
COLLAR ELEV. 389.9 ft	TOTAL DEPTH 25.2 ft		EASTING 1,799,578	24 HR. FIAD
	TER373 DIEDRICH D-50 95% 02/06/		_ · · · · · · · · · · · · · · · · · · ·	R TYPE Automatic
DRILLER Turnage, J.R.	START DATE 05/25/2		SURFACE WATER DEPTH N/A	1
55 FLEV P55 11		PER FOOT SAMP. L O NO. MOI G	SOIL AND ROCK DESC ELEV. (ft)	
390 388.9 1.0 4 385.9 4.0 3 380.9 9.0 2 375.9 14.0 6 370.9 19.0 9 365.9 24.0 364.7 25.2 100/0.2 60/0.0 1 1 1 1 1 1 1 1 1	3 2 5 5 6 6 7 7 9 / 0.2 2 7 7 9 / 0.2 2 7 7 9 / 0.2 2 8 7 9 / 0.2 2 8	100/0.7 NO. MOI G M M W SS-10 100/0.7 NO. MOI G	GROUND SURFA 389.9 GROUND SURFA PAVEMENT 0.5' ASPHALT, 0.8' ROADWAY EMBANK MEDIUM STIFF TO STIFF, GRAY, MOIST TO WET, S (A-7-6), TRACE TO SOMI 381.4 ALLUVIAL MEDIUM STIFF, TAN, GRAY SANDY SILT (A-4), TRACE 375.3 RESIDUAL VERY STIFF, TAN, DARK BIFINE TO COARSE SANDY TRACE QUARTZ FRACE (GRAY, METAMORPHOSED 369.9 WEATHERED RO (GRAY, METAMORPHOSED 461.7 Boring Terminated with Penetration Test Refusal at Eft ON NON CRYSTALLIN (METAMORPHOSED AF METAMORPHOSED AF METAMO	MENT RED, TAN, SILTY CLAY E GRAVEL (, WET, FINE ORGANICS 14. ROWN, WET, 'SILT (A-4), GMENTS 20. CK D ARGILLITE) 25. Standard Elevation 364.7 NE ROCK

GEOTECHNICAL BORING REPORT

SHEET 19 OF 24

WRS	BP8.R010.1				IP SF-620127	1	ORE L Y MOORE	UG			GEOLOGIST Russek, S.C.	
		l Bride	ne 620		n SR 1428 (Dan Road)						JEGEOGIGI NUSSER, G.C.	GROUND WTR (f
	ING NO. EB2-		je 620		TATION 16+10	Over bear	OFFSET	7 ft DT			ALIGNMENT -L-	0 HR. Cave
									76			24 HR. FIAI
	LAR ELEV. 38				OTAL DEPTH 20.8 ft		NORTHING			D 11.0	EASTING 1,799,590	
			E IEF				COMP. DA			U H.S		MER TYPE Automatic
	DRIVE DEDTE		W CO		TART DATE 05/25/2	PER FOOT	COMP. DA	SAMP.		11	SURFACE WATER DEPTH N	/A
(ft)	ELEV (ft)	0.5ft		0.5ft	-	50	75 100	NO.	МО	0	SOIL AND ROCK DES	SCRIPTION DEPTH
390											_389.8 GROUND SURF	
	388.8 + 1.0	2	2	5				SS-11	15%		- 388.5 PAVEMENT - 0.5' ASPHALT, 0.6	
385	386.0 3.8	2	3	2]]		ROADWAY EMBAN MEDIUM STIFF, RED, GRA	
00	383.8 + 6.0				∮ 5 ····			SS-12	1		SILTY CLAY (A-7-6), TRA GRAVEL	CÉ TO SOME
	‡	1	1	3	4			SS-13	23%		- GRAVEE - 381.3	
80	381.0 8.8	2	1	3	1			SS-14	21%		ALLUVIAL	
	1										MEDIUM STIFF, GRAY, E WET, FINE SANDY SILT	(A-4), TRACE
	376.0 I 13.8				} : : : : : : :	: : : :					ORGANICS	3
75	+	3	3	4	7	ļ · · · · ·			w		- - - 373.8	1
	‡										RESIDUAL	
70	371.0 18.8	5	60	40/0.1		L::::					- MEDIUM STIFF, TAN, GRA TO COARSE SANDY SILT	Γ (Á-4), TŔACE
10	369.0 20.8	60/0.0		40/0.1			100/0.6	<u> </u>			ROCK FRAGME WEATHERED R	
	‡	00/0.0					00/0.0				· \ (GRAY, METAMORPHOSI	ED ARGILLITE)
											Boring Terminated wit Penetration Test Refusal at	Elevation 369.0
	<u> </u>										ft ON NON CRYSTALI (METAMORPHOSED A	
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GEOTECHNICAL BORING REPORT BORE LOG

Consulting Engineers a	ind Scientists		В	BORE L	OG				
WBS BP8.R010.1		TIP SF-620127	COUNT	Y MOORE			GEOLOGIST Russel	c, S.C.	
SITE DESCRIPTION	Bridge 62012	27 on SR 1428 (Dan Roa	d) over Bea	ır Creek			•	GROUND	WTR (ft)
BORING NO. L_119		STATION 11+90		OFFSET 2	22 ft LT		ALIGNMENT -L-	0 HR.	Dry
COLLAR ELEV. 40		TOTAL DEPTH 3.0	ft	NORTHING			EASTING 1,799,498		FIAD
DRILL RIG/HAMMER EF	F./DATE N/A	<u> </u>		1	DRILL METHO	D Hand	d Auger	HAMMER TYPE A	utomatic
DRILLER N/A		START DATE 06/04	1/21	COMP. DA	TE 06/04/21		SURFACE WATER DE		
ELEV DRIVE ELEV (ft) DEPTH (ft)		'	S PER FOO	T 75 100	SAMP. NO. MO		SOIL AND R	COCK DESCRIPTION	DEPTH (fi
					S-1 19%		SOFT, RED, W. 401.5 MODERATELY P TRA Boring Terminate RESIDUAL SILT	AY EMBANKMENT ET, SILTY CLAY (A-7-6 LASTIC, TRACE ROO' ICE GRAVEL TY CLAY DUE TO HAN ER REFUSAL	5), TS,3.0

GEOTECHNICAL BORING REPORT

SHEET 20 OF 24

		_						В	<u> POR</u>	<u>EL</u>	<u>OG</u>				
WBS	BP8.R0	010.1			T	ΊP	SF-620127	COUNT	Y MC	ORE				GEOLOGIST Russek, S.C.	•
				ge 620			SR 1428 (Dan R	oad) over Bea	т —					T	GROUND WTR (ft)
	NG NO.						ATION 13+40		+		9 ft LT			ALIGNMENT -L-	0 HR. Dry
	AR ELE					ОТ	TAL DEPTH 6.	O ft	NOR	THING	620,5			EASTING 1,799,524	24 HR. FIAD
	. RIG/HAMI		F./DATE	E N/A) Hai		IER TYPE Automatic	
DRIL	LER N/					TA	ART DATE 06/			P. DAT	TE 06/0		1	SURFACE WATER DEPTH N	′A
ELEV (ft)		DEPTH (ft)	BLO 0.5ft	W CO		$\ $		NS PER FOOT	T 75	100	SAMP.	/	O	SOIL AND ROCK DES	
(,	(ft)	(,	0.511	0.511	0.5ft	$^{\rm H}$	0 25	50	75	100	NO.	/MOI	G	ELEV. (ft)	DEPTH (ft)
395		-												393.9 GROUND SURF	ACE 0.0
	$oxed{1}$					П			- 1		S-2	W 30%		. ROADWAY EMBAN SOFT, TAN, WET, SILTY	
390	$\frac{1}{2}$											1		MODERATELY PLASTIC, DEBRIS, TRACE GRAV	TRACE METAL 3.5
	\exists											W		ROOTS RESIDUAL	6.0
	1					Γ								SOFT TO MEDIUM ST	ΓΙFF, TAN,
	1													RED-BROWN, WET, SILT' SLIGHTLY PLASTIC, S	OME RÔCK
	Ŧ												F	FRAGMENTS, WEATHER ROCK FRAGMENTS AT A	
	Ŧ													FEET Boring Terminated at Eleva	tion 387 9 ft ON
	1												F	RESIDUAL SILTY CLAY D AUGER REFUS	UE TO HAND
	1												F	. AUGENTEI O	JAL
	1	•												-	
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GEOTECHNICAL BORING REPORT BORE LOG

Consulting Engineers and Scientists		ORE LOG		
WBS BP8.R010.1	TIP SF-620127 COUNT	Y MOORE	GEOLOGIST Russek, S.C.	
SITE DESCRIPTION Bridge 620127	on SR 1428 (Dan Road) over Bea	r Creek		GROUND WTR (ft)
BORING NO. L_1760	STATION 17+60	OFFSET 20 ft LT	ALIGNMENT -L-	0 HR . Dry
COLLAR ELEV. 387.7 ft	TOTAL DEPTH 3.0 ft	NORTHING 620,928	EASTING 1,799,586	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD Han	nd Auger HAMME	ER TYPE Automatic
DRILLER N/A	START DATE 06/04/21	COMP. DATE 06/04/21	SURFACE WATER DEPTH N/A	A
	T BLOWS PER FOO 5ft 0 25 50	75 100 SAMP. V L O O NO. MOI G	SOIL AND ROCK DESC	CRIPTION DEPTH (f
385			387.7 GROUND SURFA 386.7 ROADWAY EMBANI SOFT, RED-BROWN, TAN	KMENT 1.0 I, WET, SILTY
385			CLAY (A-7-6), MODERATE RESIDUAL SOFT, TAN, GRAY, WHITE CLAY (A-7-6), MODERATE TRACE TO SOME ROCK F WEATHERED ARGILLITE / FRAGMENTS AT A DEPTH Boring Terminated at Elevati RESIDUAL SILTY CLAY DI AUGER REFUS *2 OFFSETS ATTEMPTEE STATION AND DOWN ST/ HAD REFUSAL AT AN AF DEPTH OF 1.0 FI	ELY PLASTIC E, WET, SILTY ELY PLASTIC, FRAGMENTS, AND QUARTZ H OF 3.0 FEET ion 384.7 ft ON UE TO HAND SAL D, 3 FEET UP ATION, BOTH PROXIMATE

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 21 OF 24

														<u>OG</u>				
WBS	BP8.R010.1			TI	P	SF-620	0127	7	С	OUN	ITY	MOC	DRE				GEOLOGIST Russek, S.C.	
	DESCRIPTION		je 6201	127 on	SR	1428	(Dar	n Road	d) ov	er Be	ar C	reek					GROU	ND WTR (ft)
BOR	ING NO. L_191	10		S	ΓΑΤ	ION	19+1	10			_ c	OFFS	ET 2	22 ft LT			ALIGNMENT -L- 0 HR.	Dry
COL	LAR ELEV. 39	6.1 ft		т	ATC	L DEF	PTH	3.8 f	t		l l	ORT	HING	621,0	77		EASTING 1,799,607 24 HR.	FIAD
DRILI	RIG/HAMMER EF	F./DATI	N/A											DRILL N	1ETHOE) Ha	and Auger HAMMER TYPE	Automatic
DRIL	LER N/A			S	ΓAR	T DAT	ΤE	06/04	/21		C	OMP	. DA	FE 06/0	04/21		SURFACE WATER DEPTH N/A	
ELEV (ft)	DRIVE ELEV (ft) DEPTH (ft)	0.5ft	W COL	JNT 0.5ft	0		25 25	BLOWS	50		OT 7:	5	100	SAMP.	MOI	OG	SOIL AND ROCK DESCRIPTIO	N DEPTH (ft
395	-				-				· .					S-4	W W 21%		396.1 GROUND SURFACE 395.1 ROADWAY EMBANKMENT SOFT, RED-BROWN, WET, SILTY (A-7-6), MODERATELY PLASTIC, T ROOTS RESIDUAL	
																		OOTS, ENTS, EK FEET

LABORATORY TESTING SUMMARY

PROJECT NUMBER: BP8.R010	TIP:	BP8.R010	COUNTY:	Moore

DESCRIPTION: Bridge 620127 on SR 1428 (Dan Road) over Bear Creek

	Station		Offset (feet)	Depth	446::=6				% by V	/eight		%	% Passing (sieves)				
Sample No.		Alignment		Interval (feet)	AASHTO Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
S-1	L-1190	L		1.5-2.5	A-7-6 (6)	41	14	14.4	11.9	42.7	31.0	25	71	64	54	19.4	
S-2	L-1340	L		1.0-20.	A-7-5 (16)	53	22	10.4	9.8	41.4	38.4	11	85	79	70	29.7	
SS-1	EB1-A	L		1.0-2.5	-	-	-	-	-	-	-	-	-	-	-	34.0	
SS-2	EB1-A	L		4.0-5.5	-	-	-	-	-	-	-	-	-	-	-	25.7	-
SS-3	EB1-A	L		6.0-7.5	-	-	ı	-	-	-	-	-	-	-	-	20.6	1
SS-4	EB1-A	L		9.0-10.5	A-4 (9)	32	9	0.6	5.3	72.6	21.5	0	100	100	97	30.6	-
SS-5	EB1-B	L		18.9-20.4	A-4 (4)	26	7	4.7	23.1	48.7	23.5	0	100	98	79	19.4	
SS-6	B1-A	L		3.6-5.1	A-4 (0)	21	4	31.3	26.3	29.8	12.6	0	100	89	46	25.1	
SS-7	B1-B	L		0-1.5	A-4 (6)	30	9	4.0	10.5	60.4	25.1	5	91	88	82	27.6	
SS-8	B2-A	L		0-1.5	A-4 (9)	32	9	1.0	7.3	64.0	27.7	0	100	100	95	29.8	
SS-9	B2-B	L		5.0-6.5	A-4 (0)	27	8	31.9	25.8	26.0	16.3	11	86	74	40	15.9	
SS-10	EB2-A	L		9.0-10.5	A-4 (5)	28	7	2.5	15.9	57.6	24.0	0	100	99	87	25.7	
SS-11	EB2-B	L		1.0-2.5	-	-	-	-	-	-	-	-	-	-	-	14.6	
SS-12	EB2-B	L		3.8-5.3	-	-	-	-	-	-	-	-	-	-	-	13.6	
SS-13	EB2-B	L		6.0-7.5	A-7-6 (17)	43	19	7.1	7.9	46.3	38.7	1	98	93	86	23.3	
SS-14	EB2-B	L		8.8-10.3	-	-	-	-	-	-	-	-	-	-	-	20.7	
S-3	L-1760	L		1.0-2.0	A-7-6 (12)	43	23	10.1	11.7	41.8	36.4	18	75	70	62	19.1	
S-4	L-1910	L		2.0-2.5	A-6 (10)	36	22	12.7	10.9	40.7	35.7	12	74	67	59	21.2	
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NP - NON-PLASTIC

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

SHEET 23 OF 24

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: BR8.R010

F.A. NO.: N/A COUNTY: Moore

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit		Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Remarks
RS-1	B1-A	15.9'-16.6'	Crystalline Rock, Meta-Volcanic		54	3.88	1.97	166.6	13230	
RS-2	B1-A	19.4'-20.2'	Crystalline Rock, Meta-Volcanic		54	3.66	1.97	165.7	9240	
RS-3	B2-B	12.1'-13.9'	Non Crystalline Rock, Metamorphosed Argillite	CZve	98	3.93	1.97	172.4	5670	
RS-4	B2-B	17.1'-18.8'	Non Crystalline Rock, Metamorphosed Argillite	CZve	94	3.33	1.97	171.9	6450	

PROJECT REFERENCE NO. SHEET NO.
BP8.R010 24

BRIDGE 620127 ON SR 1428 (DAN ROAD) OVER BEAR CREEK



SOUTHEAST OF BRIDGE DOWN STATION TOWARD END BENT 1



LOOKING NORTH FROM END BENT 1 TOWARD END BENT 2