CONTENTS

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REFERENCE

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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP I-85 BYPASS (-L-)FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNDALE DRIVE PROJECT DESCRIPTION SITE NO. 1, STRUCTURE NO. 1 (BRIDGE NO. 1240) ON SR 2526 (SUMMIT AVE) OVER GREENSBORO EASTERN LOOP I-85 BYPASS (-L-)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	12

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 SOLT TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991) 707-8050. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

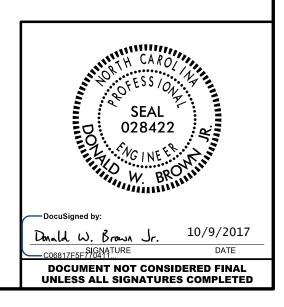
CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUFFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND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

THE BIODER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPHION 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 INVESTIGATIONS TO CONTINNS TO BE ENCOUNTERED. THE GIDDER OR 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: I. 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. 2.

PERSONNEL

C. TANG, EI
CAROLINA DRILLING
J. ANDERSON
J. COLLINS
INVESTIGATED BY <u>C. TANG, EI</u>
DRAWN BY D. BROWN, PE
CHECKED BY
SUBMITTED BY D. BROWN, PE
DATE OCTOBER 2017



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

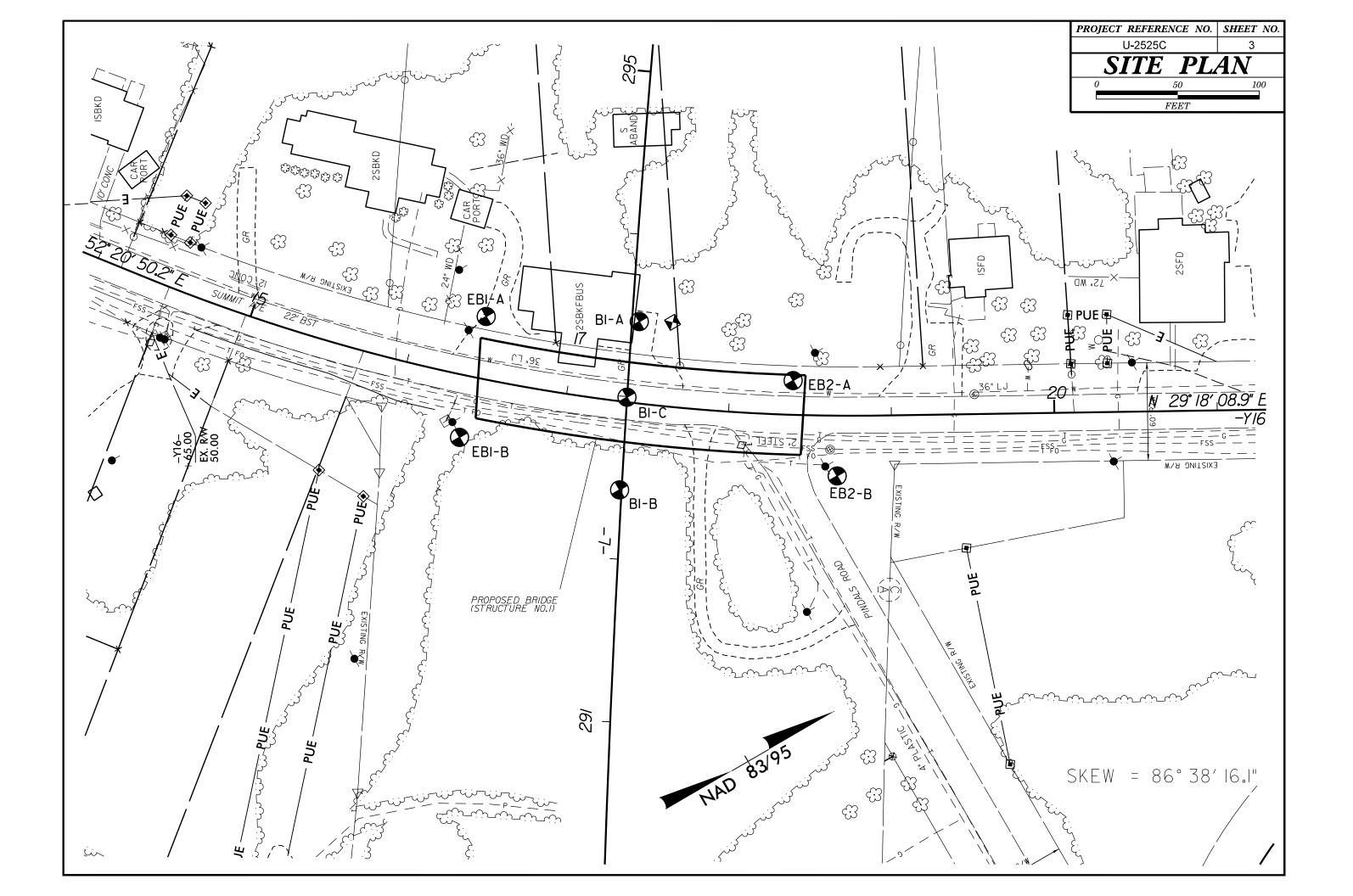
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS						
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD 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 DI586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.						
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.						
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, 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:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS;	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		ROCK (WR)	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT						
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) 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.						
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	RUCK (CR) GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.						
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	POCK (NCP) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.						
SYMBOL	SLIGHTLY COMPRESSIBLE LL < 31 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						
2 PASSING 10 50 MX	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.						
*40 30 MX 50 MX 51 MN SOILS CLAY PEA		WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT 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	GRANULAR SILT - CLAY ORGANIC MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE						
PASSING #40 SOLUS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE						
LL – – – 48 MX 41 MN LITTLE OR PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN 11 MN MODERATE		(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 SOU		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 SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.						
USUAL TYPES STONE FRAGS. FINE STUTY OR CLAVEY STUTY CLAVEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.						
OF MAJOR GRAVEL, AND 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 EXCELLENT TO GOOD FAIR TO POOR UNSUIT	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 PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ±PI OF A-7-6 SUBGROUP IS > LL - 30		WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM, FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE						
	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.						
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINE		(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 COMPACINESS ON PENETRATION RESISTENCE COMPRESSIVE STRENGT CONSISTENCY (N-VALUE) (TONS/FT ²)	H	SEVERE ALL ROCK EXCEPT QUARTZ 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.						
GENERALLY VERY LOOSE < 4 DOUBLE 4 TO 10	SOIL SYMBOL SIZE SUPE INDICATOR	(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.						
GRANULAR MEDIUM DENSE 10 TO 30 N/A		IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.						
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50		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 VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	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		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 T0 15 1 T0 2 (COHESIVE) VERY STIFF 15 T0 30 2 T0 4	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	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		ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE. <u>SAPROLITE (SAP.)</u> - 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 DPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO						
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.						
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.						
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL						
	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY γ - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 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 $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY						
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTI	IN 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.						
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - 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 TABL	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 FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.						
PLASTIC SEMISOLID: REQUIRES DRYING TO RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING							
	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: BL-70 - N:872842, E:1780684						
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 860.80 FEET						
SL _ SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: X CME-45C X 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 ATTAIN OPTIMUM MOISTURE		. VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET							
PLASTICITY	CME-55 B* HOLLOW AUGERS CONE SIZE: CONE SIZE:								
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS D-N D-N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.							
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.							
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	CASING W/ ADVANCER	CRAINS CAN BE SEBARATED FROM CAMPLE WITH STEEL BRODE.							
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	MUDERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER.							
COLOR		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.		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;							
		EXTREMELT INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14						

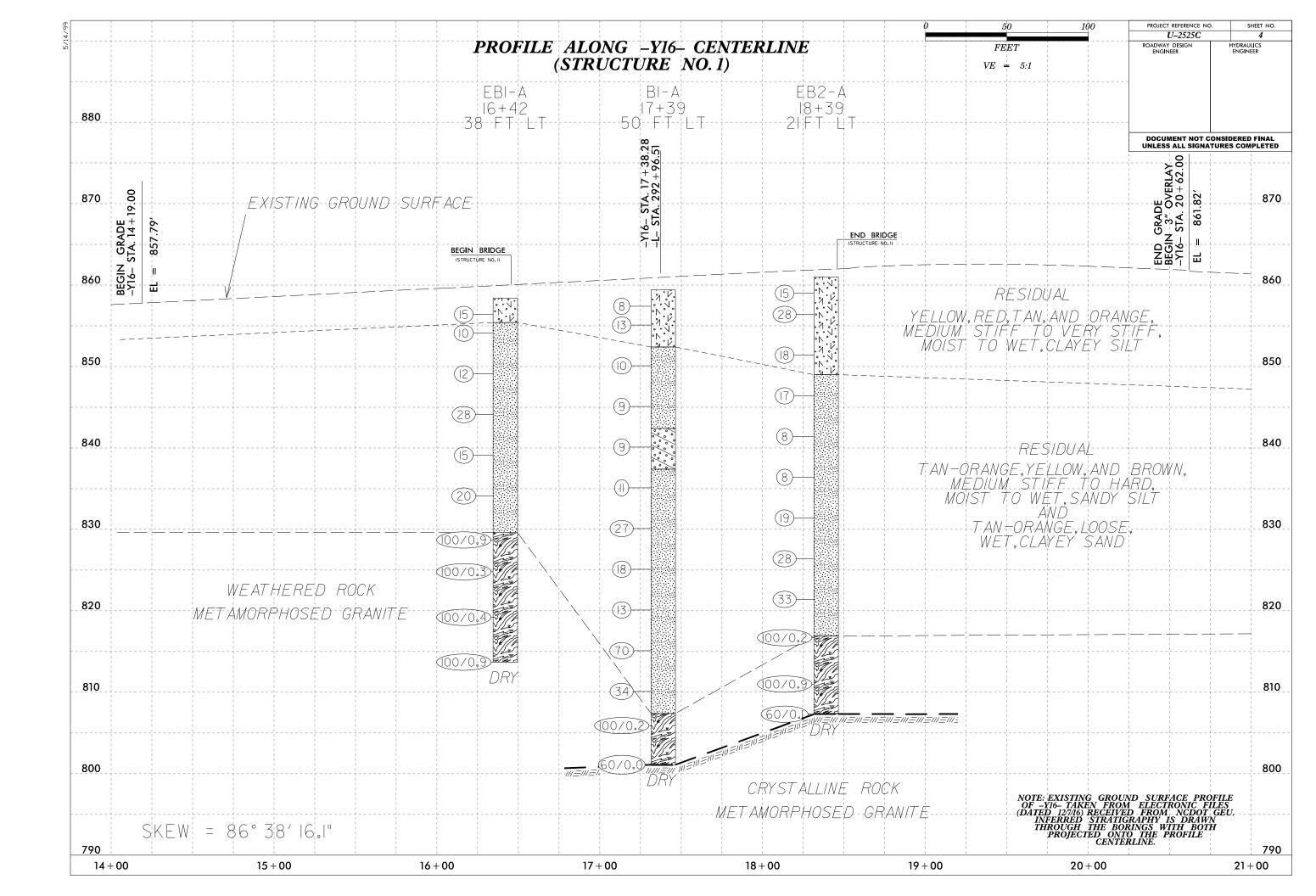
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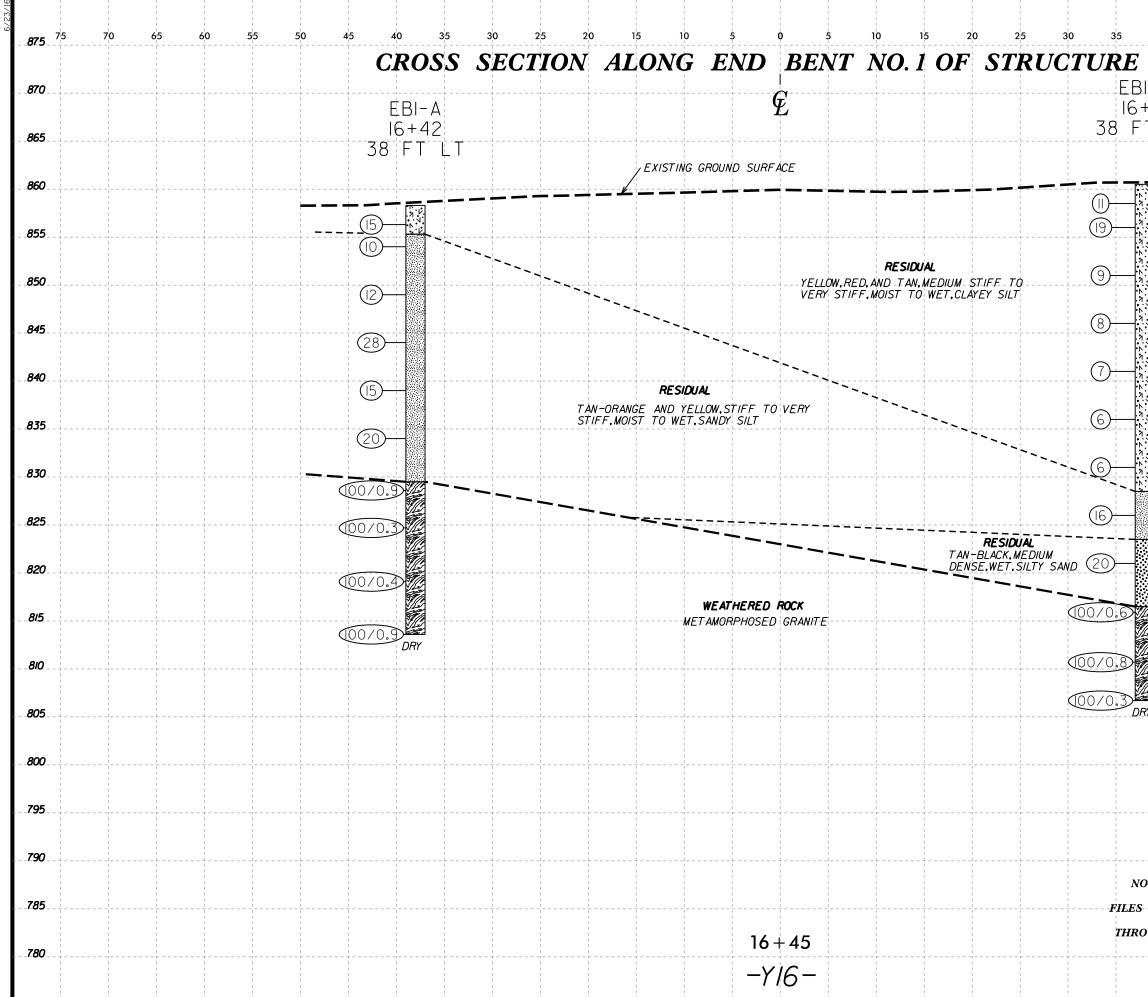
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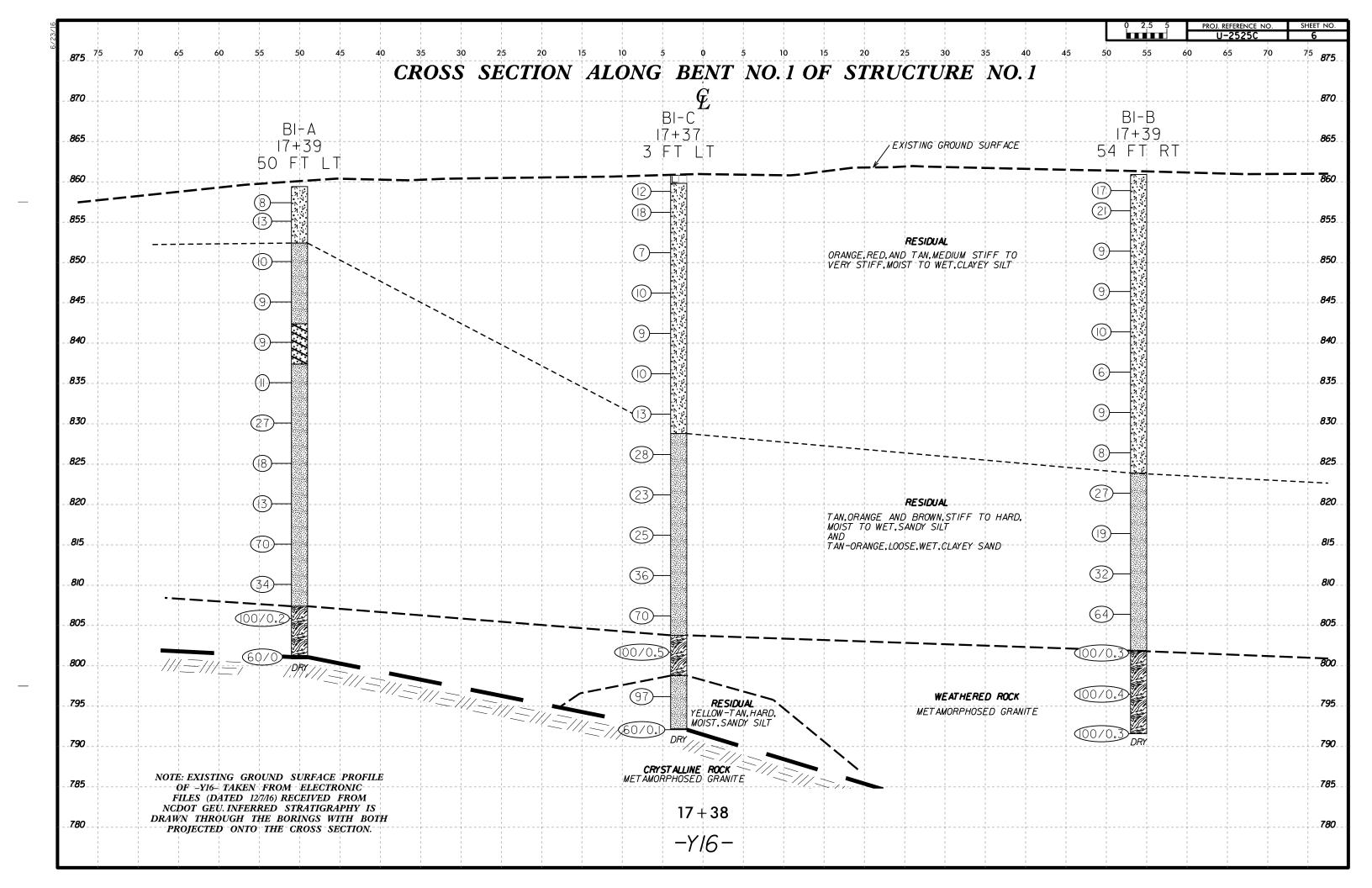
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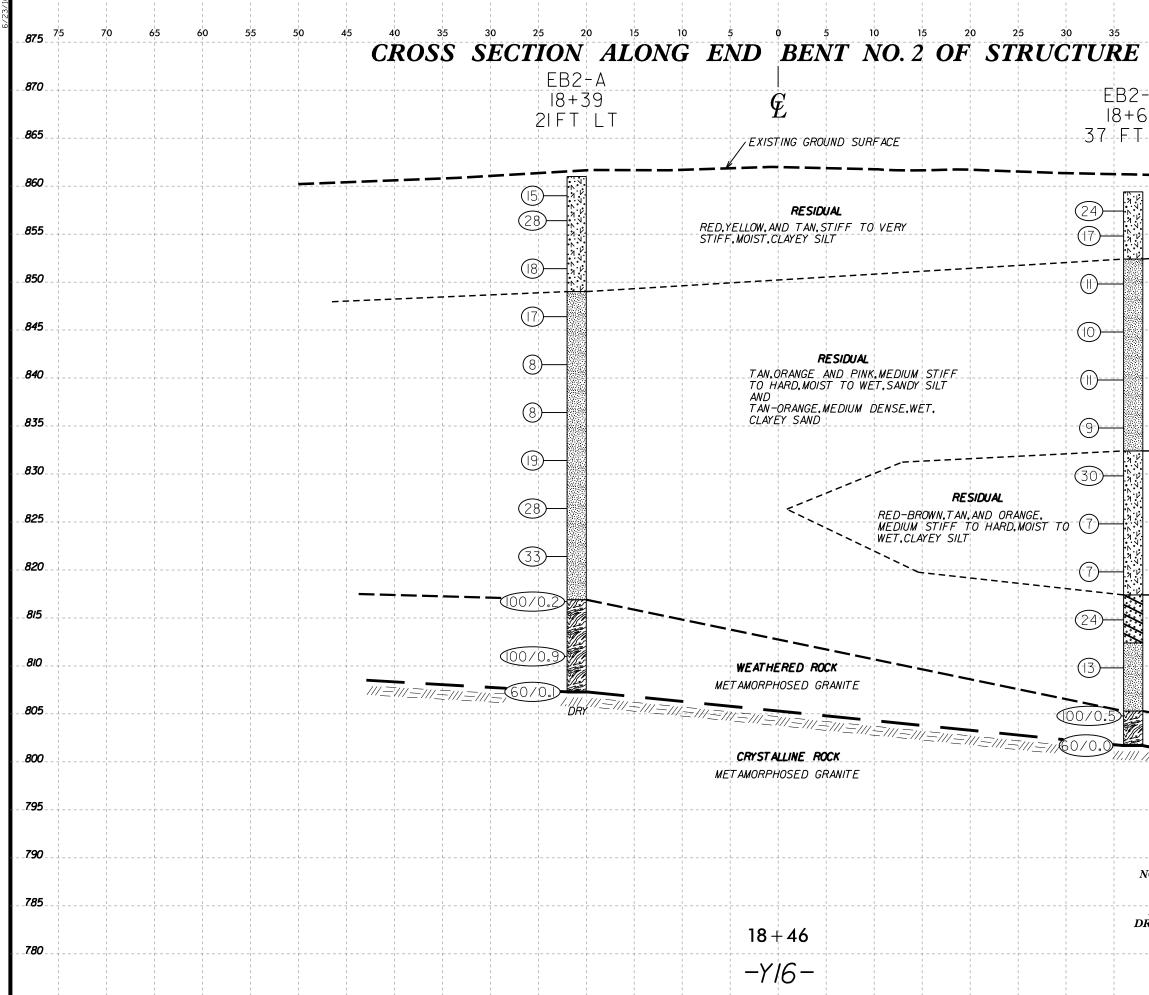






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| TE DESCRIPTION Bridge No. 1240 on SR2526 (Summit Ave.) | | | t Ave.) ove | er Greensb | oro Easte
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 | | | GROUND WTR (ft) | SITE
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GUILFOR	RD			GEO	GEOLOGIST C.T. Tang, El											
r Greensboi	ro Easte	ern Loo	op I-8	35 Bypa	SS			GROUND WTR (ft)								
OFFSET 3					NMENT	-Y16-		0 HR.	N/A							
NORTHING	872 8	18				,780,677		24 HR.	Dry							
	DRILL N		л м	ud Rotary		,,		ER TYPE	Automatic							
COMP. DAT		14/16	-	· · ·		ATER DEP			/ latornatio							
	SAMP.		L					`								
75 100	NO.	моі	O G		S	DIL AND ROO	CK DESC	RIPTION								
			6													
				-												
				-												
				860.6	0.6 GROUND SURFACE RESIDUAL											
		м	р Л	-	RESIDUAL Red, Tan and Orange, Clayey Silt, with Trace Roots on top 2.5'											
			N N V			Roots	on top 2.	5'								
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100/0.6				-		WEATHE (Metamorpl										
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100/0.8				-												
<u> </u>				806.8					53.8							
100/0.3					Boring	Terminated ered Rock (M	at Elevat	ion 806.8 f	't in							
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	BURE LC					
35 34821.1.1	TIP U-2525C COUNTY GUILFORD	0.		BS 34821.1.1	TIP U-2525C COUNTY	
	1240 on SR2526 (Summit Ave.) over Greensboro				1240 on SR2526 (Summit Ave.) ove	-
DRING NO. B1-A	STATION 17+39 OFFSET 50			DRING NO. B1-B		OF
DLLAR ELEV. 859.4 ft	TOTAL DEPTH 58.3 ft NORTHING			DLLAR ELEV. 860.9 ft		NC
ILL RIG/HAMMER EFF./DATE BRI			MER TYPE Automatic DRI	RILL RIG/HAMMER EFF./DATE BRI	8284 45 Track 89% 02/26/2016	—
RILLER J. Anderson	START DATE 12/13/16 COMP. DATE		J/A DR	RILLER J. Anderson	START DATE 12/14/16	CC
DRIVE ELEV (ft) 0.5ft 0.5ft		SAMP. C L O SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	EV DRIVE ELEV (ft) DEPTH BLOW COUL (ft) 0.5ft 0.5ft		75
858.4 1.0	· · · · · · · · · · · · · · · · · · ·	- 859.4 GROUND SURI		5		
3001 1 2 856.1 3.3 3 5	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	M N Orange, Red and Tan, Clay Roots				
851.1 8.3		N:21 N:1 852.4		857.4 3.5 4 9	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
	⁵	м	855	852 4 7 8 5		-
5 46.1 13.3 5 4 4 7 4 4	5 9 	м	850		5 • • • • • • • • • • • • • • • • • • •	-
0 841.1 18.3 3 4	5 - · · · · · · · · · · · · · · · · · · ·	₩ <u>842.4</u> Tan-Orange, Clayi W	ey Sand <u>17.0</u> 845	<u>847.4 13.5 2 4</u> 5 4	5 	
836.1 23.3		8 <u>37.4</u> Tan, Brown and Yellow, Sar		842.4 18.5 3 4	6 · · · · · · · · · · · · · · · · · · ·	
5 7 3 5			840	<u>837.4 23.5 3 3</u>	<u> </u>	
0 28.3 13 12	15	w E	835			+
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5 15 29	41 ···· ··· ··· ··· ··· ···		820	817.4 7 43.5		
0 48.3 6 13	21	м	815	\neg \mp \mid \mid \mid		+
<u>806.1 53.3</u> 5 100/0.2	· · · · · · · · · · · · · · · · · · ·	WEATHERED F		<u>812.4 + 48.5</u> 7 13 0	19	
801.1 58.3 60/0		801.1 Boring Terminated wit	58.3 h Standard 805	807.4 53.5 11 21	43	
		Penetration Test Refusal ai ft on Crystalline Rock (M Granite)	Elevation 801.1	802.4 58.5 37 100/0.3	· · · · · · · · · · · · · · · · · · ·	
			800	797 4 7 63 5		. .
			795	15		
				792.4 + 68.5 + 45 100/0.3	· · · · · · · · · · · · · · · · · · ·	
		ft on Crystalline Rock (M	etamorphosed 800	0 797.4 63.5 15 792.4 68.5		· · · · · · · · · · · · · · · · · · ·

GUILFORD	GEOLOGIST C.T. Tang, El									
er Greensboro Eastern Loop I-85	5 Bypass	GROUND WTR (ft)								
OFFSET 54 ft RT	ALIGNMENT -Y16-	0 HR. N/A								
NORTHING 872,886	EASTING 1,780,754	24 HR. Dry								
DRILL METHOD Mud	Rotary HAMM	ER TYPE Automatic								
COMP. DATE 12/14/16	SURFACE WATER DEPTH N/	A								
SAMP L										
75 100 NO. MOI G	SOIL AND ROCK DESC	CRIPTION								
	860.9 GROUND SURFA									
	Red, Tan, and Orange, Cla Trace Roots on To	ayey Silt, with p 2.5'								
· · · · М [/ · ·										
W N N										
	823.9 Tan, Sandy Sil	<u> </u>								
	Tan, Sanuy Sh	ll i								
:::: w =										
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+										
	801.9	59.0								
. 100/0.3	WEATHERED RC (Metamorphosed G	DCK								
	(metanoipriosed of									
· 100/0.4										
100/0.3	791.6 Boring Terminated at Eleva	69.3 tion 791.6 ft in								
	Weathered Rock (Metamorp	hosed Granite)								

							B	ORE L	UG									
WBS	34821.1	1.1			TI	IP U-2525C	COUNTY	GUILFO	RD		GEOLOGI	ST C.T. Tar	ng, El					
SITE D	ESCRIP	PTION	l Brid	lge No	. 1240) on SR2526 (Summit	Ave.) ove	er Greensbo	oro Easte	rn Loop I	-85 Bypass		GF	ROUND	WTR (ft			
BORIN	g no.	B1-C	;		S	TATION 17+37		OFFSET	3 ft LT		ALIGNME	NT -Y16-	0	HR.	N/A			
COLLA	R ELEV	/. 86	60.8 ft		т	OTAL DEPTH 68.7 f	t	NORTHING	6 872,9 ⁻	18	EASTING	1,780,707	24	HR.	FIAD			
DRILL R	RIG/HAMN	MER E	FF./DA	TE BF	RI8284 4	45 Track 89% 02/26/2016			DRILL M	ethod	Mud Rotary		HAMMER 1	YPE A	utomatic			
DRILLE	ER J. A	Ander	son		S	TART DATE 12/20/1	6	COMP. DA	TE 12/2	0/16	SURFACE	WATER DEF	PTH N/A					
	DRIVE ELEV D	EPTH	<u> </u>	w col	JNT	BLOWS	PER FOOT		SAMP.			SOIL AND RO	CK DESCRIP	TION				
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50 I	75 100	NO.	MOI G	ELEV. (ft)				DEPTH (
865											-							
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8	852.2 T	8.6								N N	Ē							
850	Ī		3	3	4	4 7				M N	j_							
	Ŧ										j.							
	847.2 T	13.6	4	5	5					M								
845	+							<u> </u>										
_8	842.2	18.6	3	4	F	. - .				N N								
840	1			4	5	. • 9				M	į.							
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	837.2 T	23.6	3	4	6	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	· · · · ·			M								
835	+																	
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830	+				-										0			
8	827.2	33.6									<u> </u>	Brown and	Tan, Sandy S	Silt	<u> </u>			
825			9	12	16	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$				М								
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800		50.0	100/0.5				· · · · ·	100/0.5	•			(Metamorp	hosed Granit	e)				
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	Ŧ											Boring Termin	ated with Star	ndard	 1			
	‡											t in Crystalline F	lock (Metamo		. 1			
											t	G	ranite)					

									_		JRE		G			_,																		
														IST C	.T. Tan	g, El			-	3482					'IP U		COUNTY							
SITE	DESCR	RIPTION	Bric	dge No	o. 1240) on SR2	2526 (Summ	it Ave.)) ovei	r Green	sboro	Easte	ern Lo	oop l	-85 Byp	ass				GROUND	WTR (ft)	SITE	DESC	RIPTIO	N Bri	dge N	o. 124	o. 1240 on SR2526 (Summit A					
BOR	NG NO). EB2-	-A		S	TATION	18+3	39			OFFSE	F 21	ft LT			ALI	GNME	ENT -Y	' 16-		0 HR.	N/A	BOR	ING NO) . EB2	2-B		S	TATIO	DN 18	8+67			OF
COLI	AR EL	. EV. 86	61.0 ft		Т	OTAL DI	EPTH	53.7	ft		NORTH	ING	873,0	12		EAS	TING	i 1,780	0,750		24 HR.	Dry	COL	LAR EI	. EV . 8	59.4 ft	t	Г	OTAL	DEPT	TH 57.	.7 ft		NC
DRILL	. RIG/HA	MMER E	FF./DA	TE B	RI8284	45 Track 8	39% 02/	/26/2016	6			D	RILL N	NETHC	DD	Mud Rota	Iud Rotary HAMMER TYPE Automatic					Automatic	DRIL	L RIG/H	AMMER	EFF./D/	ATE E	3RI8284	45 Tra	:k 89%	02/26/20)16		
DRIL	LER J	J. Ander	son		S	TART D	ATE	12/13/	16		COMP.	DATE	12/1	13/16	i	SUF	FACE		ER DEP	TH N//	A		DRIL	LER	J. Ande	rson		5	TART	DATE	E 12/1	4/16		С
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	OW CC 0.5ft	UNT 0.5ft	0	25 	BLOWS	PER FC		75 1 I		amp. No.	мо	L O I G		(ft)	SOIL A	AND RO	CK DESC	RIPTION	DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPT (ft)		OW C0	DUNT	0	2	BLOW 25	VS PER 50		75 I
865		+														-							860	858.4	 		- 10				<u>.</u>	· ·	· · · ·	Т
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860	860.0	<u> 1.0</u> +	2	7	8		15							м	N 1		١	Yellow an	nd Red, 0	SIDUAL Clayey Silt	t, with Trace		855	-	+	4	7	10] <u> -</u> -		<u> </u>			+
	857.4	+ <u>3.6</u>	5	9	19			 28		•••	· · · ·	•		м	N 1 1 1				F	Roots				850.8	+					 			· · · · · ·	
855	-	Ŧ								· · · ·	· · · ·				N 1								850	000.0	<u>+ 0.0</u>	3	5	6	1 <u>-</u>	•11	+		· · · ·	+
	852.4	<u>+ 8.6</u>	3	7	11			 		· · · ·	· · · ·			м	7 	½ .⊦									‡						· · · · · ·	· · ·	· · · · · ·	
850	-	ŧ					. V .10	· · · ·		•••					N N	- 						12.0	845	845.8	<u>+ 13.6</u> +	3	4	6	┨┝╌	• · ·	+	• •		+
	847.4	13.6	5	7	10			 			· · · · · · · · · · · · · · · · · · ·	·					— <u>–</u> т	an, Orar T	nge and Frace Ro	Black, Sa ck Fragme	ndy Silt, with ents				Ī								· · · · · · · · · · · · · · · · · · ·	
845	-	+					•17	· · · ·	• • •	• •				W		-							840	840.8	<u>+ 18.6</u> +	4	4	7	- -́-	J ∳11—	· · ·	• •		\downarrow
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	832.4	28.6														F									Ŧ									
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000	-	†									· · · ·					-							020	-	Ŧ		3	4	•	7	<u> </u>			T
005	827.4	<u>+ 33.6</u> _	9	11	17			 28		•••	· · · ·	•		w		F								820.8	J 38.6				. . .	· · · · · · ·			· · · · · · ·	
825	-	+						<u></u>				-				-							820	-	‡	2	3	4		, \	<u> </u>			T
	822.4	<u>+ 38.6</u> _	14	17	16			• 33		· · · ·	· · · · · · · · · · · · · · · · · · ·	•		w										815.8	+ 43.6					Ň.			· · · ·	
820	-	Ŧ														-							815		+	5	8	16			24			+
	817.4	+ 43.6 +	62	100/0.	2		.	· · · · ·		<u> </u>	 				Hereiter	<u>816.9</u>						<u> </u>		010.0	‡					::/: ::/:	· · · · · ·	· · ·	· · · · · ·	
815	-	Ŧ						· · · · ·										(M	letamorp	hosed Gra	anite)		810	810.8	<u>+ 48.6</u> +	4	5	8	1 <u>-</u>	- 6 13	+	· ·		+
	812.4	48.6	24	40	60/0.4		.	 		• •	· · · ·	·													‡						 	· ·	· · ·	
810	-	‡						· · · ·	· · ·		100/	-											805	805.8	<u>+ 53.6</u> +	39	100			· [·	· <u> </u>		+
	807.4	53.6	60/0.1								<u> </u>	· 11			<i>M</i>	807.4	~ -		DVetA			<u>- 53.6</u> 53.7		801 7	57.7					· · · ·			· · · · · · ·	
	-	+	00/0.1	1							00/	0.1				_	<u> </u>	(M	letamorp	hosed Grated with	anite)				+	60/0.0	0							
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810		ŧ														F		it in Crys	G	ranite)	amorphosed				ŧ									
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GUILFOF	RD			GEOLOGIST C.T. Tang	GEOLOGIST C.T. Tang, El		
er Greensboro Eastern Loop I-85				35 Bypass	GROUND WT	GROUND WTR (ft)	
OFFSET 37 ft RT				ALIGNMENT -Y16-	0 HR.	N/A	
NORTHING	873,0	07		EASTING 1,780,814	24 HR.	34.1	
	DRILL N	IETHO	D M	ud Rotary	HAMMER TYPE Autom	atic	
COMP. DATE 12/14/16 SURFACE WATER DEPTH N/A							
	SAMP.	7	L	-			
75 100	NO.	мог	O G	SOIL AND ROCK DESCRIPTION			
-							
· · · ·					SURFACE	0.0	
		м		Red and Tan, Clayey Silt			
		м		_			
			N 1 V	- 952 4		7.0	
				- 852.4 Tan-Pink and Tan-	Orange, Sandy Silt	7.0	
+		м		-			
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			N	Red-Brown, Tan and	Orange, Clayey Silt, d Quartz Fragments		
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			$\langle \rangle$	Tan-Orange	Clayey Sand		
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		w		ian, Si	andy Silt		
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╪╧╧╧┥			977	- 805.3 - WEATHEI	RED ROCK	54.1	
				(Metamorph	osed Granite)		
60/0.0					ed with Standard	57.7	
				 Penetration Test Refu 	Isal at Elevation 801.7 ck (Metamorphosed		
					nite)		
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PHOTOGRAPH #1: VIEW OF -YI6- LOOKING NORTH FROM NEAR CENTER OF PROPOSED BRIDGE.

PHOTOGRAPH 2: VIEW OF -YIG- LOOKING SOUTH FROM NEAR CENTER OF PROPOSED BRIDGE.