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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 SITE DESCRIPTION MSE WALLS AT END BENT I AND END BENT 2 - SITE NO. 5 (STRUCTURE NO. 7) BRIDGE NO. 1246 ON SR 1001 (NORTH CHURCH STREET) (-Y5-) OVER GREENSBORO EASTERN LOOP I-85 BYPASS (-L-)

**RETAINING WALL INVESTIGATION** 

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	22

#### **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 RALEICH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICL ENGINEERING UNIT AT (1991) 707-6800, THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN STIU UNF-PLACEDTEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLI MOISTURE CONDITIONS MOLCATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOL 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 WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPMION 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 THINSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FOM 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.

PERSONNEL

C.R. PASTRANA

**Trigon** Exploration

INVESTIGATED BY <u>ESP</u> Associates, P.A. DRAWN BY \_\_\_\_\_C.R. PASTRANA

CHECKED BY \_\_\_\_\_\_ WEAVER

SUBMITTED BY \_\_\_\_\_ ESP Associates, P.A.

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 D	ESCR	RIPTI	ON				1		GI	RADATION						ROCK DE	SCRIPTION
SOIL IS BE PEN ACCOR	5 CONSIDER ETRATED WI DING TO TH BASED ON	RED UNCO /ITH A C HE STAN	DNSOLIDATE ONTINUOUS DARD PENE SHTO SYST	D, SEMI-CON FLIGHT POW TRATION TES	SOLIDAT VER AUG ST (AASI DESCRIP	ED, OR ER AND HTO T	WEATHERE ) YIELD LE 206, ASTM	D EARTH MA SS THAN 10 D1586), SO INCLUDE T	TERIALS TH 0 BLOWS PI 1 CLASSIFI	iat can Er foot Cation NG:	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	IES A D NDICATE	GOOD REPRESE ES THAT SOIL IXTURE OF UN	NTATION OF PARTIC PARTICLES ARE AL IFORM PARTICLE SI	LE SIZES FI L APPROXIMA ZES OF TWO	ROM FINE TO COARSE. MTELY THE SAME SIZE. OR MORE SIZES.	HARD ROCK ROCK LINE SPT REFUSA BLOWS IN 1	IS NON- INDICATE AL IS PE NON-COAS	COASTAL PLA S THE LEVE NETRATION E STAL PLAIN	NATERIAL THAT L AT WHICH NON-CO Y A SPLIT SPOON S MATERIAL, THE TR	WOULD YIELD SPT REFUSAL IF TEST ASTAL PLAIN MATERIAL WOULD YIELD AMPLER EQUAL TO OR LESS THAN Ø. ANSITION BETWEEN SOIL AND ROCK
CONSIS	TENCY, COLO	OR, TEXT	URE, MOIST	JRE, AASHTO	CLASS	IFICATION RUCTUR	ON, AND OT	HER PERTIN	ENT FACTOR	RS SUCH			ANGULAF	RITY OF GRAI	٧S		REPRESENTE ROCK MATER	ED BY A RIALS AR	ZONE OF WE	ATHERED ROCK. DIVIDED AS FOLLO	ws:
	VERY STIFI	F.GRAY.S	LEGEN	st with inte	e <i>rbedde</i> AASH	TO C	SAND LAYE	RS, HIGHLY PL	ASTIC. A-7-6		THE ANGULARIT	Y OR F	ROUNDNESS OF	SOIL GRAINS IS D	ESIGNATED B	Y THE TERMS:	WEATHERED ROCK (WR)			NON-COASTAL PLA 100 BLOWS PER F	IN MATERIAL THAT WOULD YIELD SPI OOT IF TESTED.
GENERAL		GRANU	LAR MATERIAL	.S	SIL	T-CLAY	MATERIALS	0	rganic mater	IALS				ILAL LUMPUS.		FTC	CRYSTALLIN	νE	22	FINE TO COARSE	GRAIN IGNEOUS AND METAMORPHIC RO
GROUP	A-1	A-3	PA55ING -20	A-2	A-4	A-5	A-6 A-7	A-1, A-2	A-4, A-5	1	ARE USED IN	V DESC	RIPTIONS WHE	N THEY ARE CONSID	ERED OF SI	GNIFICANCE.	ROCK (CR)		L.L.	GNEISS, GABBRO, S	CHIST, ETC.
CLASS.	A-1-a A-1-	-ь	A-2-4 A-2-	5 A-2-6 A-2-	7		A-7-5 A-7-6	A-3	A-6, A-7				COMP	RESSIBILITY				ALLINE		FINE TO COARSE SEDIMENTARY ROO	GRAIN METAMORPHIC AND NON-COASTA K THAT WOULD YEILD SPT REFUSAL
SYMBOL	000000000000000000000000000000000000000				3	47.4					SL IGH MODE	HTLY C	OMPRESSIBLE Y COMPRESSIB	LE	LL < 31 LL = 31 ·	50	COASTAL PL	LAIN		ROCK TYPE INCLU COASTAL PLAIN S	DES PHYLLITE, SLATE, SANDSTONE, ET EDIMENTS CEMENTED INTO ROCK, BUT
% PASSING					•	1			SII T-		HIGH	Y COM	IPRESSIBLE	<u> </u>	LL > 50		SEDIMENTAR (CP)	RY ROCK		SPT REFUSAL. RO SHELL BEDS. ETC.	CK TYPE INCLUDES LIMESTONE, SANDS
*10 *40	50 MX 30 MX 50 M	MX 51 MN						GRANULAR	CLAY	MUCK, PEAT		F	CRANIN AR	GE UF MATER	IAL					WEAT	HERING
•200	15 MX 25 M	MX 10 MX	35 MX 35 M	X 35 MX 35 M	1X 36 MN	36 MN	36 MN 36 M	IN	SUILS		ORGANIC MATERIAL		SOILS			MATERIAL	FRESH	ROCK	FRESH, CRYST	ALS BRIGHT, FEW JOIN	ITS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING #40									e		LITTLE ORGANIC MAT	TER	3 - 5%	5 - 12%	LITTLE	10 - 20%	VERY SUIGHT	T ROCK (	GENERALLY F	LINE. RESH. JOINTS STAINED	SOME JOINTS MAY SHOW THIN CLAY C
LL		- NP	40 MX 41 M	N 40 MX 41 M	N 40 MX	41 MN	40 MX 41 M		ILE OR		MODERATELY ORGANIC HIGHLY ORGANIC		5 - 10% > 10%	12 - 20% > 20%	SOME HIGHLY	20 - 35% 35% AND ABOVE	(V SLI.)	CRYST	ALS ON A BRI	DKEN SPECIMEN FACE	SHINE BRIGHTLY. ROCK RINGS UNDER H
GROUP INDEX	0	10	0	4 MX	8 MX	12 MX	16 MX NO M	Y MOL	ierate Ints of	ORGANIC			GRO	UND WATER			SLIGHT	ROCK	GENERALLY F	RESH. JOINTS STAINED	AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES	STONE FRAG	GS. EINE	CII TV		c11				GANIC	SUILS	$\nabla$	WAT	ER LEVEL IN	BORE HOLE IMMEDIA	TELY AFTER	DRILLING	(SLI.)	1 INCH.	OPEN JOINT	S MAY CONTAIN CLAY	IN GRANITOID ROCKS SOME OCCASIONA
of Major Materials	GRAVEL, ANI SAND	ND SAND	GRAVEL	AND SAND	50	ILS	SOILS				▼	STA	TIC WATER LE	VEL AFTER 24	HOURS		MODERATE	SIGNIF	ICANT PORTIC	NS OF ROCK SHOW D	SCOLORATION AND WEATHERING EFFECT
GEN. RATING			L	,			0.000	FAIR TO	8000		<u> </u>	PER	CHED WATER, S	SATURATED ZONE, OF	WATER BEA	RING STRATA	(MOD.)	GRANIT	TOID ROCKS, M	OST FELDSPARS ARE	DULL AND DISCOLORED, SOME SHOW CLA
AS SUBGRADE				,			FUUR	POOR	FOUR	UNSULTHOLE		SPR	ING OR SEEP					WITH F	RESH ROCK.	HAMMEN BEONS AND	SHOWS SIGNIFICANT LOSS OF STRENGT
		PLOF	A-7-5 SUBGRO	UP IS ≤ LL	- 30 ; PI			IS > LL - 30 			0		MISCELLA		א ב		MODERATELY		OCK EXCEPT (	DUARTZ DISCOLORED (	R STAINED. IN GRANITOID ROCKS, ALL I
			COMPACTNE		RAN	NGE OF	STANDARD		IGE OF UNC	ONFINED							(MOD. SEV.)	AND C	AN BE EXCAV	ATED WITH A GEOLOGI	ST'S PICK. ROCK GIVES "CLUNK" SOUND
PRIMARY	SOIL TYPE	Έ	CONSIST	ENCY	PENET	RATION (N-VA	RESISTENO	се сом	PRESSIVE S (TONS/F1	TRENGTH	L ROADWAY EMB	ANKMEN SCRIPT		DIP & DIP DIR DIP & DIP DIR OF ROCK STRU	ECTION		SEVERE		OCK FYCEPT (	<u>YIELD SPI REFUSAL</u> DUARTZ DISCOLOBED (	IR STAINED, ROCK FARRIC CLEAR AND F
GENER			VERY LC	OSE		<	4									SLOPE INDICATOR	(SEV.)	REDUCI	ED IN STRENC	TH TO STRONG SOIL.	IN GRANITOID ROCKS ALL FELDSPARS
GRANU	LAR		LOOS	ENSE		4 TC 10 TC	010 030		N/A					VST PMT		INSTALLATION		IT SU	ME EXTENT. S	VIELD SPT N VALUES	> 100 BPF
(NON-C	IAL					30 T	0 50 50				THAN ROADWA	Y EMB		AUGER BORING	٩	TEST	VERY	ALL R	OCK EXCEPT	DUARTZ DISCOLORED (	R STAINED. ROCK FABRIC ELEMENTS AF
			VERY S	DFT		<	2		< 0.25		- INFERRED SOI	il BOUR	NDARY -	- CORE BORING	٠	SOUNDING ROD	(V SEV.)	REMAIN	NING. SAPROLI	TE IS AN EXAMPLE C	F ROCK WEATHERED TO A DEGREE THAT
GENER				TIFE		2 T	04		0.25 TO	Ø.5			- <sup>MW</sup>		<u> </u>	TEST BORING		VESTIC	ES OF ORIGIN	NAL ROCK FABRIC REN	IAIN. <u>IF TESTED, WOULD YIELD SPT N I</u>
MATER	IAL		STIF			8 TC	0 15		1 TO 2						Ψ	WITH CORE	COMPLETE	SCATT	ERED CONCEN	TRATIONS. QUARTZ MA	Y BE PRESENT AS DIKES OR STRINGERS
CUHES	SIVE)		HARD	IFF		15 11	030 30		2104	•	TTTTT ALLUVIAL SOI	L BOUN	NDARY Z	INSTALLATION	$\bigcirc$	- SPT N-VALUE		ALSO (	AN EXAMPLE.		
			TE	XTURE	OR G	RAIN	SIZE					F	RECOMMEN	DATION SYMB	OLS			LONNU	T BE SCRATC		NE PICK BREAKING OF HAND SPECIMEN
U.S. STD. S	IEVE SIZE	:		10	40	,	60 20	0 270				ᆘ	NCLASSIFIED E	XCAVATION -		SIFIED EXCAVATION - ABLE, BUT NOT TO BE		SEVER	AL HARD BLO	S OF THE GEOLOGIS	'S PICK.
UPENING (			4.		COAR	Z K	5.25 Ø.0	NE				⊿ ₩	CLASSIFIED E	XCAVATION -	USED I	N THE TOP 3 FEET OF MENT OR BACKFILL	HARD	Can Bi To de	e scratched Tach hand si	BY KNIFE OR PICK O PECIMEN.	NLY WITH DIFFICULTY. HARD HAMMER B
(BLDR	ын ( 1.)	(COB")	GRA (G	VEL R.)	SAN (CSE.	ID SD.)	SA (F	ND SD.)	(SL.)	(CL.)				REVIATIONS			MODERATELY	CAN BE	E SCRATCHED	BY KNIFE OR PICK.	GOUGES OR GROOVES TO 0.25 INCHES D
GRAIN M	IM 305		75	2.0		<u>e</u>	0.25	0.05	0.005	5	AR - AUGER REFUSAL		MED	MEDIUM	VST	VANE SHEAR TEST	HARD	BY MO	DERATE BLOW	S.	IST'S PICK, HAND SPECIMENS CAN BE D
SIZE I	N. 12		3								BT - BORING TERMINATE	נ	MICA.	- MICACEOUS	WEA.	- WEATHERED	MEDIUM	CAN BE	E GROOVED OF	R GOUGED 0.05 INCHE	S DEEP BY FIRM PRESSURE OF KNIFE (
		SOIL	MOIST	URE - (	CORRE	ELAT	ION OF	TERMS	ò		CPT - CONE PENETRATIO	N TEST	r NP - I	NON PLASTIC	γ <sub>σ</sub> -	DRY UNIT WEIGHT		POINT	OF A GEOLOG	SIST'S PICK.	
SOIL (A1	_ MOISTUR	LIMITS	E	FIELD MC	DISTURE	·   ·	GUIDE FOF	R FIELD MO	ISTURE DES	SCRIPTION	DMT - DILATOMETER TES	ŝТ	URG PMT -	PRESSUREMETER TI	ST <u>SA</u>	MPLE ABBREVIATIONS	SOFT	can Bi From	E GROVED OR CHIPS TO SEV	GOUGED READILY BY RAL INCHES IN SIZ	KNIFE OR PICK. CAN BE EXCAVATED IN E BY MODERATE BLOWS OF A PICK POIN
				- SATURA	TED -		USUALLY	LIQUID; VER	Y WET.USU	ALLY	DPT - DYNAMIC PENETRA e - VOID RATIO	TION T	EST SAP SD	SAPROLITIC	S - E SS -	ULK SPLIT SPOON		PIECES	s can be bro	KEN BY FINGER PRES	SURE.
		זאז ו חזו	т	(SAT.)	)	I	FROM BEL	OW THE GR	OUND WATE	R TABLE	F - FINE		SL 1	SILT, SILTY	ST -	SHELBY TUBE	VERY SOF T	CAN BE	e carved wit Re in Thickn	ESS CAN BE BROKEN	CAVATED READILY WITH POINT OF PICK. BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC							SEMISOLIC	REQUIRES	DRYING TO	)	FRAC FRACTURED, FRAC	TURES	TCR -	TRICONE REFUSAL	R5 - RT -	RECOMPACTED TRIAXIAL		FINGEF	RNAIL.		
(PI)			417	- WET -	(W)		ATTAIN OF	TIMUM MOI	STURE		FRAGS FRAGMENTS HI HIGHLY		w - M V - V	OISTURE CONTENT	CBR	CALIFORNIA BEARING	TEDM	FRACT	TURE SP		BEDDING
	- + '''		···								EQ	UIPM	ENT USED	ON SUBJECT	PROJE	CT	VERY WI	l De	MORE	THAN 10 FEET	VERY THICKLY BEDDED
01			ISTURE	- MUIST	- (M)		SULID; AI	UR NEAR L	PTIMUM MU	JISTURE	DRILL UNITS:	ADV	ANCING TOOLS:		HAMMER	TYPE:	WIDE MODERAT	TELY CLO	3 ISE 1	TO 10 FEET	THICKLY BEDDED 1 THINLY BEDDED 0.
5		INKHOL I					REQUIRES		WATER TI	 ו	CME-45C		CLAY BITS		X AUT	OMATIC MANUAL		055	Ø.	16 TO 1 FOOT	VERY THINLY BEDDED 0.0
				- DRY -	(U)		ATTAIN OF	TIMUM MOI	STURE		X CME-55		6" CONTINUOU	S FLIGHT AUGER	CORE SIZ	E:			LE33		THINLY LAMINATED <
	1			PLA	ASTIC	ITY						ㅣ닏	8 HOLLOW A	JGERS	🗆-в _	<b>—</b> -+				INDU	RATION
		_		PLASTI		NDEX (F	<u>21)</u>	<u>[</u>	RY STREND	<u>атн</u>	CME-550	ㅣ닏	HARD FACED	FINGER BITS	□-N _		FOR SEDIME	ENTARY R	OCKS, INDURA	ATION IS THE HARDE	NING OF MATERIAL BY CEMENTING, HE
NO SL	IN PLASTIC	L LASTIC			0-5 6-15				VERY LOW SLIGHT	1	VANE SHEAR TEST		TUNGCARBI	E INSERTS	HAND TO	DLS:	FRIA	BLE		GENTLE BLOW	BY HAMMER DISINTEGRATES SAMPLE.
MC HT	DERATELY	PLAST	IC	2	16-25 6 ОК М	i IORE			MEDIUM					W/ ADVANCER	P09	T HOLE DIGGER	MODE	RATELY	INDURATED	GRAINS CAN E	E SEPARATED FROM SAMPLE WITH ST
				<u>ء</u> ۱		 २						凶		TINC CAR		ID AUGER				BREAKS EASIL	T WHEN HIT WITH HAMMER.
											10					INDING ROD	INDU	RATED		DIFFICULT TO	BREAK WITH HAMMER.
DESCRIP	ODIFIERS	SUCH A	S LIGHT, D	ARK, STREA	KED, ET	C. ARE	USED TO	DESCRIBE	APPEARANCI	E-UKAY). E.			TRICONE 37	STEEL TEETH		E SHEMR IESI	EXTR	REMELY I	NDURATED	SHARP HAMME	R BLOWS REQUIRED TO BREAK SAMPLI
												1 1 1 1								SHITELE DREA	NG HGNUGG UNHING.

#### SHEET NO.

# PROJECT REFERENCE NO.

	TERMS AND DEFINITIONS
D. AN INFERRED SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
FOOT PER 60 IS OFTEN	ADUIFER - A WATER BEARING FORMATION OR STRATA.
	ARENALECUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND, <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING <u>A NITABILE PROPRETION OF CLAY IN THEIR COMPOSITION SUPPLY AS SAUE SLATEFTC</u> .
	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLUDES GRANITE.	SURFACE.
L PLAIN F TESTED.	<u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD TONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINUS UNDER	$\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
AMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ck up to . Feldspar	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
Y. ROCK HAS	PARENT MATERIAL.
AS COMPARED	<u>Flood Plain (FP)</u> - Land Bordering a stream, built of sediments deposited by the stream, <u>Formation (FM,)</u> - A mappable geologic unit that can be recognized and traced in the
DSS OF STRENGTH	FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
ILLY STROCK.	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VIDENT BUT RE KAOLINIZED	ITS LATERAL EXTENT.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
E DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
In small and	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
. SAPROLITE IS	RUCK SECHENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
REQUIRES	$\underline{SAPROLITE\ (SAP.)}$ - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OWS REQUIRED	<u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUGED ROCKS.
EP CAN BE TACHED	$\underline{\text{SLICKENSIDE}}$ - Polished and striated surface that results from friction along a fault or slip plane.
R PICK POINT. BLOWS OF THE	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 WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
FRAGMENTS T. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BL-42: N 870879.9347, E 1766681.5242
4 FEET	FI FVATION: 854.34 FFFT
5 - 4 FEET 6 - 1.5 FEET	
3 - 0.16 FEET 8 - 0.03 FEET	INDIES: F.I.A.D.= FILLED IMMEDIATELY AFTER DRILLING
0.008 FEET	
AT. PRESSURE. ETC.	
EEL PROBE:	
PROBE:	
:	DATE: 8-15-14







20 40	PROJECT REFERENCE NO.	SHEET NO.
FEET	U-2525C	5
VE = 2:1	END BENT 2 (-Y5-) PROPOSED W PROJECTED ALONG -L- AT SKEW ON -Y5- =65 06'45"	VALL PROFILE 72.5'RT DEGREES
$RW\!-\!4$	FND WALL	:
$44\dot{6} + 60$ 72' PT	-L- 446+55.91	
	(2.5 RI	
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(10)		840
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00/0.9 BI		
METAMORPHOSED		
		700
		:
E TAKEN FROM .TIN FILE	PROVIDED BY NCDOT DATED 12	19/2016.
STRATIGRAPHY IS DRAWN T	THROUGH THE BORINGS WITH B	ОТН
ONTO THE PROPOSED WAL	LL PROFILE	
:		<u> </u>

	24004	1 4															
WBS	34821	.1.1	0.1			P 0-25250	, 		Y GL			01		GEOLOGIST Pastrana	a, C.R.	0000	
SILE	DESCR		Site	#5 (Si	tructu	re #7) - Bridg	je No. 12	46 on SR	1001	(North		n Stree	t) (-Y	5-) over I-85 Bypass (-L-)		GROUN	D WIR (π)
BOR	NG NO.	RW-	1		S	TATION 44	7+22		OFF	SET 7	'9 ft LT			ALIGNMENT -L-		0 HR.	N/A
COLI	AR ELE	<b>V.</b> 85	54.2 ft		T(	OTAL DEPT	<b>H</b> 59.8 f	t	NOR	THING	i 870,8	36		<b>EASTING</b> 1,766,791	1	24 HR.	26.6
DRILL	. RIG/HAI	AMER E	FF./DA	TE TR	810055	CME-55 77%	02/22/2016	;			DRILL	NETHOD	) Mu	id Rotary	HAMM	ER TYPE	Automatic
DRIL	LER To	oothma	ın, R.		S	TART DATE	12/09/1	6	COM	P. DAT	<b>FE</b> 12/0	09/16		SURFACE WATER DEF	PTH N/	A	
ELEV	DRIVE ELEV	DEPTH	BLC	W COL	JNT		BLOWS I	PER FOOT			SAMP.			SOIL AND RO	CK DESC	CRIPTION	
(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0 25	5	50	75	100	NO.	/моі	G	ELEV. (ft)			DEPTH (ft)
855		_												-854.2 GROUN	D SURFA	ACE	0.0
	-	_											N N	RE: Red Vory Stiff	SIDUAL		
050	- 850.7 -	- - 3.5				: : :¦:     : : :l:	· · · · ·	· · · · ·	· ·	•••				Red, Very Sun	, Clayey (	SILT (A-3)	
850		-	6	8	9	17		<u> </u>				M		-			
	-	_				· · ¦ ·				•••			<sup>∦</sup> ↓				
845	845.7 -	- 8.5	3	5	6								<u>я к</u> Е	845.4			8.8
	-	-			0	• • 11 · ·						м	8	<ul> <li>Red to Tan Brow Medium Stiff to I</li> </ul>	n to Gree Hard, SIL	enish Brown T (A-4) with	l, 1
	-	-					· · · · ·						s t	Manganese Seams, Clay, an	Some Fi	ne Sand, Tr /lica	race
840	- 840.7	- 13.5 -	3	5	5				· · ·	• •		м	8 L	-			
	-	-					· · · · ·										
005	- 835.7 -	- - 18.5				. <i> </i>     . <i> </i>	· · · · ·	· · · · ·		· ·							
835		-	2	3	3	<b>•</b> 6		<u> </u>				М		-			
	-	_								•••			8				
830	830.7 -	- 23.5	5	3	5		• • • •			•••			F				
	-	-		Ŭ	0	• • • • •							F	-			
	-	-															
825	825.7 -	- 28.5 -	3	5	6				· · ·	•••		м		-			
	-	-				- 17	· · · · · · · ·										
	- 820.7 -	- - 33.5					· · · ·	· · · ·		•••							
820	-	-	4	4	9	•13			+ : :			м		-			
	-	_				\ .				•••							
815	815.7 -	- 38.5	5	q	11		• • • •			•••			See -				
	-	-		Ŭ								IVI	SSF	-			
-	-	-											SF.				
810	810.7 -	- 43.5 -	9	13	30		43			· ·		м	8 L	-			
5	-	-					· · · [·						je te se te				
2	- 805.7 -	- - 48.5						· · · · ·		•••				805.2			49.0
	_	-	21	60	40/0.2		<del>_</del>	<b>+</b>	· <del></del>	100/0.7			MA-	WEATH			
	-	-				$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right  \right $	· · · ·			::			MA.	Greenish Brown 801.5 GRAN		JRPHUSEL K	52.7
800	800.7 -	- 53.5 -	9	12	14				<u> </u>			м	Æ	RES Croonish Brown Via			- <u> </u>
	-	_					26			::			Ł	(A-4) with Ma	anganese	e Seams	JIL I
5	705 7	- 59 5											F	705.5			E0 7
795			23	49	51/0.3								977-	-794.4 WEATH	ERED RO	оск	59.8
	-	-							1	100/0.7			F	Greenish Brown GRAN	METAMO	JRPHOSED K	
	-	-											F	Boring Terminated	at Elevat	tion 794.4 ft	: In
	-	-											F	GRAN	ITIC ROC	CK	-
	-	-											F				
0202	-	-											E	_			
	-	_											F				
	-	_											F				
	-	-											F	-			
	-	-											F				
202	-	-											þ				

#### SHEET 6 OF 22

WBS	3482 <sup>-</sup>	1.1.1			Т	IP U-252	5C	C	COUNT	Y GUILFO	RD			GEOL	.OGIST Pastrana	a, C.R.			WBS	<b>3</b> 3482	1.1.1			TIF	• U-252	5C	COL	ודאנ
SITE	DESCR	RIPTION	I Site	e #5 (S	tructu	re #7) - Br	idge No.	1246	on SR	1001 (Nort	h Churc	h Stre	eet) (-	Y5-) over	I-85 Bypass (-L-)		GROUNE	WTR (ft)	SITE	DESC	RIPTION	Site	#5 (St	ructure	e #7) - Bri	dge No. 1	246 or	ו SR
BOR	ING NO	. EB1-	·B		S	TATION	447+70			OFFSET	85 ft LT			ALIGN	MENT -L-		0 HR.	N/A	BOR	ING NC	<b>).</b> EB1-	В		ST	ATION 4	47+70		
COL	LAR EL	<b>EV.</b> 85	55.8 ft		<b>T</b>	OTAL DEF	<b>PTH</b> 78	.7 ft		NORTHING	<b>3</b> 870,8	313		EAST	ING 1,766,748		24 HR.	26.7	COL	LAR EL	. <b>EV</b> . 85	5.8 ft		ТО	TAL DEP	<b>TH</b> 78.7	ft	
DRIL	RIG/HA	MMER E	FF./DA	TE TE	RI0055	CME-55 77	% 02/22/2	2016			DRILL	METHO	DD N	/lud Rotary		HAMM	ER TYPE	Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE TR	10055 C	CME-55 77	6 02/22/20	16	
DRIL	LER T	oothma	an, R.		S		<b>E</b> 12/1	2/16		COMP. DA	TE 12/	/13/16	) /		ACE WATER DEP	PTH N/	A		DRIL	LER	Foothma	n, R.		ST		E 12/12	/16	
ELEV	ELEV	DEPTH	BLC				BLOV	VS PE	R FOOT	75 100	SAMP.		0		SOIL AND RO	CK DESC	CRIPTION		ELEV	ELEV	DEPTH	BLO		INT		BLOWS	50 PER F	ООТ
(,	(ft)	(,	0.51	0.511	0.511		25	50		100	NO.	/ мо	OI G	ELEV. (ft)	)			DEPTH (ft)	(,	(ft)	(11)	0.511	0.511	0.51		25	50	
																										Ma		_
860		ŧ												F					780	+	+		- — —	+				<del>.</del>
		ŧ												-						777.3	78.5	100/0 2					.	
855	_	<u>+</u>					<u> </u>							_ 855.8	GROUNI	D SURFA		0.0			‡	100/012						
	852.3	- 35					 		· · · · · · · ·						Red, Very Stiff, Silt Organi	ty CLAY ( ics (Root	(A-7-5), Trac s)	e			ŧ							
850		+	8	9	12	1   : : : ; j		••	· · · · · · · ·	· · · · ·		м		F							‡							
000	-	ŧ				<u> </u>								F							ŧ							
	847.3	8.5	4	4	7		·   · · · ·		· · · · ·			м		846.2				9.6			ŧ							
845	· -	ŧ					· · · ·		· · · ·	· · · ·			N N V	-	Reddish Brown to Brown Soft to Verv	Tan Brow Stiff Fine	n to Greenis Sandy Clay	sh /ev			ŧ							
	842.3	13.5				] :/::	.		· · · · ·				N N N V	F	SILT (A-5) with	Mangane	ese Seams	,			ŧ							
840		ŧ	2	3	4		·   · · · ·	••	· · · · ·			w	~ V V	F							ŧ							
	-	Ŧ				1							N N V	F							Ŧ							
	837.3	† 18.5 †	2	1	2							l w	N V	F							Ŧ							
835	-	Ŧ											N N V	F							Ŧ							
	832.3	23.5											N N V	F							Ŧ							
830		Ŧ		2	2	<b>4</b>						W	N N V	E.							Ŧ							
		Ŧ											- N V V	E							Ŧ							
	827.3	<u>28.5</u>	1	5	6	. \ . ●11 .						w	N N V	Ē							Ŧ							
825	-	ł						_					N N V	·							Ŧ							
	822.3	33.5	3	6	7	:::::	.					-	N N V	_  _							ŧ							
820		ŧ		0	'	•13.					SS-2	51% 	N N V								ŧ							
	017.0						.   .		· · · ·				N 7 V 7	- -							ŧ							
12		- 30.5	4	7	11	1   : : : <b>\</b>	 18		· · · ·			w	N N V	<u> </u>							‡							
10/2	-	ŧ											N N N	- 813.2				42.6			‡							
.GDT	812.3	43.5	16	15	18		: Ni I		· · · · ·						Greenish Brown, V	Very Stiff	to Hard, Fin	e <u>42.0</u>			‡							
810	-	ŧ					•33.								Trace Man	ganese S	Beams				‡							
N	807.3	+ + 48.5					. / . /		· · · · · · · ·	· · · · ·				+							ŧ							
0 0 0 805		+	7	9	14	$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \right  \right  $	23	••	· · · · · · · ·	· · · · ·		м									‡							
		ŧ												F							ŧ							
GIN	802.3	53.5	5	11	19				· · · · ·	••••		М		F							ŧ							
× 800		ŧ							· · · ·					F							ŧ							
T SI	797.3	58.5												F							Ŧ							
2 2 795		Ŧ	18	31	48					₩79		D		F							Ŧ							
GEO		Ŧ								ŀ · · ·				793.1				62.7			Ŧ							
525C	792.3	63.5 [	100/0.4	4					· · · ·	100/0.4	•				WEATHE Greenish Brown	ERED RO METAMO	DRPHOSED				Ŧ							
790	-	f							· · · ·						GRANI	ITIC ROC	Ж				Ŧ							
UBLE	787.3	68.5	70	00/0 4			.														Ŧ							
о щ 785		ŧ	0	22/0.1						100/0.6	<b>[</b> ]			-							<u>+</u>							
BOF	700.0	+						i i +	÷ – : – :	$+$ $\div$ $\div$ $\div$ $\div$ $+$				- 783.5	PEG	SIDUAI		72.3			ŧ							
	/82.3	1.5 -	22	21	24	1	.	45				D		- 780.6	Greenish Brown, H	Hard, Fine	e Sandy SIL	T 75.2			ŧ							
z /80	l	L	I	I									1611	4	(	(***)			L	1	1							

GUILFOR	D			GEOLOGIST Pastrana,	C.R.		
1001 (North	Church	Stree	et) (-Y	/5-) over I-85 Bypass (-L-)		GROUN	D WTR (ft)
OFFSET 8	5 ft LT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	870 8	13		EASTING 1.766 748		24 HR.	26 7
	DRILL N	IETHO	D Mi	ud Rotary	HAMME	R TYPE	Automatic
COMP. DAT	E 12/	13/16		SURFACE WATER DEP		4	
	SAMP.	<u> </u>	L				
75 100	NO.	мо	0 G	SOIL AND ROC	K DESC	RIPTION	
· · · · · ·			TA.	WEATHE		CK	
100/0 2			Ha	Greenish Brown M 777.1 GRANITIC RC	DCK (cor	ntinued)	
100/0.2				Boring Terminated a Weathered Rock: GRANIT	at Elevat METAM FIC ROC	ion 777.1 f ORPHOSE K	t In ED
				Equivalent -Y5- S	Sta: 21+	56, 42' RT	
				- -			
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				-			
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WBS	<b>3</b> 482 <sup>-</sup>	1.1.1			Т	TP U-2525	бC	COUNT	Y GUILFO	RD			GEOLOGIST Pastrana,	C.R.		WBS	<b>3</b> 3482 <sup>-</sup>	1.1.1			TIP	• U-2525C	COUNT	ΓY
SITE	DESCR	RIPTION	Site	#5 (St	tructu	ıre #7) - Brio	dge No. 12	46 on SR	1001 (Nort	h Churcl	n Stre	et) (-`	-Y5-) over I-85 Bypass (-L-)	GROUND	WTR (ft)	SITE	DESCR	RIPTION	Site #	<b>≠</b> 5 (Strι	ucture	e #7) - Bridge N	No. 1246 on SF	R
BOR	ING NO	. EB1-	A		S	TATION 4	48+55		OFFSET	85 ft LT			ALIGNMENT -L-	0 HR.	N/A	BOR	ING NO	. EB1-	Ą		ST	ATION 448+5	55	
COL	LAR EL	<b>EV.</b> 85	6.9 ft		Т	OTAL DEP	<b>TH</b> 73.9 ft	t	NORTHING	<b>G</b> 870,7	783		EASTING 1,766,668	24 HR.	Dry	COL	LAR EL	<b>EV</b> . 85	6.9 ft		то	TAL DEPTH	73.9 ft	
DRIL	L RIG/HA	MMER E	FF./DA	TE TR	RI0055	CME-55 77%	6 02/22/2016	j		DRILL N	NETHO	D M	Mud Rotary	HAMMER TYPE A	utomatic	DRIL	L RIG/HA	MMER EI	F./DATE	E TRIO	0055 C	CME-55 77% 02/2	22/2016	
DRIL	LER T	oothma	n, R.		S	TART DAT	E 12/08/1	6	COMP. DA	<b>TE</b> 12/	09/16		SURFACE WATER DEPT	TH N/A		DRIL	LER T	oothma	n, R.		ST	ART DATE 1	2/08/16	
ELEV	DRIVE ELEV	DEPTH	BLC	W COL	JNT	4	BLOWS F	PER FOOT		SAMP.	▼∕		SOIL AND ROC	K DESCRIPTION		ELEV	DRIVE	DEPTH	BLOV		T	BL	OWS PER FOOT	Т
(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0	25 5	50	75 100	NO.	Имо	I G	ELEV. (ft)		DEPTH (ft)	(π)	(ft)	(π)	0.5ft	0.5ft (	0.5ft	0 25	50	_
860		ł											-			_7 <u>80</u> _		┢────			+		Match Line	
		ŧ												SURFACE	0.0			‡						
855		<del> </del>				<u>   </u> ]						$\mathbf{N}$	RES		0.0			‡						
	853.4	+ 3.5												Silly CLAT (A-7-5)			-	‡						
		Ŧ	6	9	11	::: <b>/</b>	20				м							‡						
850		‡				$  \cdots \dot{j}$							840 0		7 9		_	‡						
	848.4	8.5	3	4	7						М	N N	Red to Tan Brown	to Greenish Gray to	<u> </u>			‡						
845		‡				$\left  \right  \stackrel{\cdot}{} \stackrel{\Psi^{11}}{} \stackrel{\cdot}{} \stackrel{\bullet}{} }{} }{} }{} }{} }{} }{} }{} }{} }{} $	· · · · ·		· · · · ·			N N	Fine Sandy Clay	ey SILT (A-5) with	п,			‡						
040	843.4	+										N N	Manganese Se	ams, Trace Mica			-	‡						
		‡	2	3	4	<b>  i i i i i i i</b>		· · · · ·	· · · · ·		w	л V N	·⊢ Note: Rock Fragme	nts from 44.1' to 44.3	3'			‡						
840		‡										N N	₽—				_	‡						
	838.4	18.5	2	3	3						W	N N						‡						
835		‡					· · · · ·		· · · · ·			N N						‡						
000	833.4	+ 23.5										л , , , , , , , , , , , , , , , , , , ,					-	‡						
		‡	2	3	4	<b> </b> : <b>∳</b> ; ∶ :	· · · ·	· · · ·	· · · · ·		w	N N N	ί⊢ ;⊢					‡						
830	-	‡										N N					_	‡						
	828.4	28.5	2	3	4	.     . <u>1</u>	· · · · ·	· · · · ·			<b>W</b>	N V						‡						
925		‡					· · · ·	· · · ·				N N						‡						
023	823.4	+ 33.5										л , , , , , , , , , , , , , , , , , , ,					-	‡						
	0-0.1	+	3	7	10	]   : : <b>)</b> 17	7	· · · ·	· · · · ·	SS-1	47%	л V N	ί⊢ ∳−					‡						
820		‡							· · · ·			N N					_	‡						
	818.4	38.5	1	2	6			· · · ·			W	л . N	ί⊢ •−					‡						
L 815		‡					· · · · ·		· · · · ·			N N						‡						
1013	813.4	+ 43.5										N N					-	‡						
-GD]		‡	6	16	12	$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right  \right $	<b>2</b> 8	· · · · ·	· · · · ·		м	л V N						‡						
810	-	‡					1	· · · ·				<u>4 - </u>	Greenish Brown, V	ery Stiff to Hard, Fine	<u>46.1</u>		-	‡						
n NC	808.4	† 48.5 †	14	14	15	::::					м		- Sandy SILT (A-4) wit - Trac	n wanganese Seams e Mica	5,			‡						
0 0 805		ŧ					<b>4</b> 25 <b>1</b>											‡						
001	803.4	+ - 53.5					-1						)— -				-	‡						
UD		Ŧ	12	14	20		<b>. .</b> 34				м							‡						
N 800		‡					· I. · ·						- 799 1		57.8		_	‡						
L_S]	798.4	58.5	53	47/0.2								11	WEATHE Groonish Brown		0110			‡						
₩ ₩. 795		‡											GRANIT	IC ROCK				‡						
000	793.4	63.5															-	‡						
25C_		‡	100/0.2	1					· 100/0.2									‡						
790 N	-	‡															-	‡						
JBLE	788.4	68.5	100/0.3						100/0.3	<b> </b>								‡						
00 785		‡																‡						
30RE	783.4	73.5					· · · ·						783.0		73.0		-	‡						
DOT		+	100/0.4			1		1	100/0.4			THE C	Boring Terminated a	t Elevation 783.0 ft Ir	n <u>13.9</u>			‡						
NCI		t											GRANIT	VIETAWURPHUSED				t l						

GUILFOF	RD			GEOLOGIST Pastrana	, C.R.		
1001 (North	h Church	n Stree	et) (-Y	/5-) over I-85 Bypass (-L-)		GROUN	D WTR (ft)
OFFSET 8	35 ft LT			ALIGNMENT -L-		0 HR.	N/A
NORTHING	870 7	783		EASTING 1,766,668		24 HR.	Drv
		<b>NETHO</b>	D Mi	ud Rotary	НАММ	RTYPE	Automatic
COMP. DA	TE 12/	09/16		SURFACE WATER DEP	TH N/	A	
	SAMP		L		••••••••••	•	
<b>7</b> 5 100	NO		0	SOIL AND ROO	CK DESC	RIPTION	
1	110.		G				
	+	<u> </u>	- +				
			F	Caved	In at 25.8	3'	
			F	Equivalent -Y5-	Sta: 21+	20, 36' LT	
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WB	<b>3</b> 3482	1.1.1			Т	<b>IP</b> U-252	5C	COUN	TY GUILF	ORD				GEOLOGIST Pastrana, C.F	२.	WB	<b>S</b> 3482 <sup>-</sup>	1.1.1			TI	• U-2525C	;	COUNTY
SITE	E DESCF	RIPTION	Site	#5 (St	ructu	ıre #7) - Br	idge No. 1	246 on S	R 1001 (No	rth Churc	h Stre	eet) (	(-Y5	5-) over I-85 Bypass (-L-)	GROUND WTR (ft)	SIT	E DESCR	RIPTION	Site	#5 (S	tructur	e #7) - Brido	je No. 12	46 on SR
BOF	RING NO	. RW-2	2		s	TATION	449+06		OFFSET	79 ft LT	-			ALIGNMENT -L-	0 HR. N/A	BOF	ring no	. RW-	3		ST	ATION 44	8+32	
COL	LAR EL	<b>EV.</b> 85	6.3 ft		Т	OTAL DEF	<b>TH</b> 58.6	ft	NORTHIN	<b>IG</b> 870,	771			EASTING 1,766,617	24 HR. Dry	COL	LAR EL	<b>EV.</b> 85	52.4 ft		тс	TAL DEPT	H 49.9 ft	t 🔤
DRIL	L RIG/HA	MMER E	FF./DA	TE TR	10055	CME-55 77	% 02/22/20	6	_	DRILL	METHO	OD	Mud	d Rotary HAI	MMER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE TF	RI0055 (	CME-55 77%	02/22/2016	; 
DRI	LER T	oothma	n, R.		S	TART DAT	<b>E</b> 12/05/	16	COMP. D	<b>ATE</b> 12	/05/16	6		SURFACE WATER DEPTH	N/A	DRI	LLER T	oothma	an, R.		ST	ART DATE	12/05/1	6
ELEV	DRIVE ELEV	DEPTH	BLC	W COL	JNT		BLOWS	PER FOC	T	SAMP	. 🔨		5	SOIL AND ROCK DE	ESCRIPTION	ELE\	/ DRIVE ELEV	DEPTH	BLC	W COL	JNT		BLOWS F	PER FOOT
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft		25	50	/5 10	NO.	ИМО	DI G	<u>} </u>	ELEV. (ft)	DEPTH (ft	(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0 2	<u> </u>	30 
860		ł											-			855		ł						
		Ŧ											F.					Ŧ						
855		<b>İ</b>				<u>  · · · </u>								856.3 GROUND SUP RESIDUA	RFACE 0.0	850		Ŧ						
	852.0	+ + 31										1	v v	Red, Very Stiff, Clay	ey SILT (A-5)		849.0	3.4	6	8	11	· · · .		
	002.9	+ 0. <del>1</del>	6	9	10	<b></b> ∳	19 • • • •				м	1	<u>к</u> 1					Ŧ						
850		Ŧ								-1		1				845	844.0	<b>†</b> <sub>84</sub>				· · / ·		
	847.9	8.4	5	6	8							4	<u>۲</u> ۹	848.2Reddish Brown to Greenis	h Brown with Light			+ 0.1	3	4	5	· • 9 · ·		
845		Ŧ	Ũ	Ĵ	Ū	<b>1</b>							F	Gray and Tan Brown, Me SILT (A-4) with Mangane	dium Stiff to Hard, ese Seams. Trace	840		Ŧ				:  : : :		
	842.0	+ + 13.4				· · ·							F	Fine Sand, and T	race Mica		839.0	13.4	2	3	4	.1		
	072.3	+ 10.4	2	3	5						м		F					Ŧ				$\left  \begin{array}{c} \mathbf{\Phi} \\ \mathbf{I} \\$		
840		Ŧ								-1			Ë.			835	834.0	+ + <sub>184</sub>						+
	837.9	18.4	2	2	4								F					+	1	2	1	$\bullet_3 \cdot \cdot \cdot$		
835		Ŧ	_	_		<b>1</b>							F			830		Ŧ				$\left  \begin{array}{c} \mathbf{v} \\		
	832.9	T 23 4											8F				829.0	23.4	3	3	5	$\frac{1}{1}$		
	002.0	- 20	2	2	4						м		F					Ŧ						
830		Ŧ								-1			Ë.			825	824.0	T 28 4				-		+
	827.9	28.4	3	5	7								F				021.0	+	3	3	6	· • 9 · · ·		
825		Ŧ		-									F			820		Ŧ						
	822.0	- 33 /											F				819.0	33.4	3	5	7			
	022.0	- 00.4	3	7	10	-   · · · ∳1	7				м		F					Ŧ				· • • • • •		
820		Ŧ				/				-1			Ë.			815	814.0	T 38 4						+
	817.9	38.4	2	3	4								F					+	3	4	6	· •10 ·		
L1/2 815		Ŧ	_	-									F			810		Ŧ						
11 10	812.9	T 43 4				1							F				809.0	43.4	3	4	10			
T.GD	012.0	-	2	2	4						м		E					Ŧ						
<u>810</u>		Ŧ						+		-1			F			805	804.0	T 48.4						+
Й Г	807.9	48.4	12	15	21						м		E					<u></u>	5	6	10	16	<u> </u>	<u> </u>
0 805	_	ŧ											E					£						
	802.9	53.4					/						Ē					Ŧ						
GIN		1	8	9	8	$\left  \cdot \cdot \mathbf{q} \right $	7				м		Ě					Ŧ						
10 800		Ŧ								-11			E,	798 7	57 6		-	Ŧ						
AL_S	797.9	58.4	100/0.2				+	<u></u>	100/0.	_ 2		<i>41</i>	7	797.7 WEATHERED	ROCK 58.6	1		Ŧ						
RW.		Ŧ											F	GRANITIC R	ROCK			Ŧ						
GEO		Ŧ											E	Boring Terminated at Ele Weathered Rock: MET	AMORPHOSED			Ŧ						
525C		Ŧ											E	GRANITIC R	ROCK			Ŧ						
E U2	-	Ŧ											F	Caved In at	23.2'		-	Ŧ						
UBLE		Ŧ											E					£						
ШDO		£											E					£						
BOR		ŧ											E					ŧ						
DOD		t											F					ŧ						
		+											F					+						



WE	<b>SS</b> 34	4821.	.1.1			Т	IΡU	J-2525	5C		COU	NTY (	GUILFO	RD			C	GEOLOGIST Pastrana	a, C.R.			WBS	<b>S</b> 3482	1.1.1			TI	<b>D</b> -25	25C	С	OUNT
SIT	e de:	SCRI	PTION	Site	e #5 (S	tructu	re #7	7) - Brio	dge N	Vo. 12	46 on	SR 10	01 (Nortl	n Churc	n Stre	et) (-	-Y5-)	over I-85 Bypass (-L-)		GROUNI	D WTR (ft)	SITE	E DESC	RIPTION	Site	#5 (St	ructur	e #7) - E	Bridge No	. 1246	on SR
во	RING	NO.	EB2-	A		s	TATI	<b>ON</b> 4	47+8	35		OF	FSET	80 ft RT			4	LIGNMENT -L-		0 HR.	N/A	BOF	RING NO	<b>).</b> EB2-	-A		ST	ATION	447+85		
co	LLAR	ELE	<b>V.</b> 85	2.2 ft		Т	ΟΤΑ	L DEP	тн	81.4 ft	t	NC	ORTHING	<b>3</b> 870,9	962		E	<b>ASTING</b> 1,766,675		24 HR.	23.4	COL	LAR EL	<b>.EV.</b> 85	52.2 ft		ТС	DTAL DE	<b>PTH</b> 81	.4 ft	
DR	LL RIG	)HAN	IMER E	FF./DA	TE TE	RI0055	CME	-55 77%	6 02/2	22/2016	i			DRILL I	METHO	DD N	Mud F	Rotary	HAMM	ER TYPE	Automatic	DRIL	L RIG/H	MMER E	FF./DA	TE TR	10055 (	CME-55 7	7% 02/22/	2016	
DR	ILLEF	<b>≀</b> To	othma	n, R.		S	TAR	T DATI	E 12	2/07/1	6	cc	omp. Da	<b>TE</b> 12/	07/16		s	URFACE WATER DEP	PTH N/	A		DRII	LLER	Toothma	an, R.		ST	ART DA	<b>TE</b> 12/0	07/16	
ELE		IVE EV	DEPTH	BLC		UNT			BL	OWS F	PER FO	OT		SAMP.	▼∕			SOIL AND RO	CK DESC	CRIPTION		ELEV	, DRIVE	DEPTH	BLO	W COL	JNT		BLO	NS PE	R FOOT
(11)	(1	ft)	(11)	0.5ft	0.5ft	0.5ft	0		25	5	50	/5	100	NO.	Имо	I G	EL	EV. (ft)			DEPTH (ft)	(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	25	50	
855	5		-														F					775					+		N	latch L	_ine
		ŧ															85	2.2 GROUN	D SURFA	ACE	0.0		_//3.0	+ /0.4	100/0.4						
850		Ŧ						•••									-	Red, Very Stiff,	SIDUAL	AY (A-7-5)			770.9	81.3	60/0 1						<u></u>
	84	8.8	3.4	6	0	12		i	1.								F	, - <b>,</b> ,	,, -	( -)				Ŧ	00/0.1						
		ŧ		0	5	12		<b>,</b> •	21 ·	· · ·		.	· · · · ·		M		Ţ							Ŧ							
845	5	‡	-					· / ·	·	· · ·			· · · ·				Ļ							‡							
	84	3.8 +	<u>8.4</u>	3	3	5	11:,	≁ · · ●8 · ·	:	· · · · · ·	· ·	.			м		84	2.6			9.6			‡							
840		‡						1		· · · · · ·	· ·   · ·	· ·   ·	· · · · ·			N N V		Red to Reddish Bro Sandy Clayey SILT	own, Med 「(A-5) wit	lium Stiff, Fi th Mangane	ine se			‡							
040	, 83	8.8	- 13.4					1	1.							N V V	i	Seams,	, Trace M	ica				‡							
		‡		2	3	4		7	:	· · ·		· ·   ·	· · · ·		W	N V V								‡							
835	5	+	-				Li		·	· · ·		.				N N V	Ł							‡							
	83	3.8 +	. 18.4	2	2	3	111	 5 <sup>.</sup>	:	· · · · · ·	· ·   · ·	· ·   ·	· · · ·		w	N V V	ł							‡							
		1						······································	:	· · ·		· ·   ·	· · · · ·			/ V					00.4			‡							
830	) 82	8.8	23.4				lt		1.									Reddish Brown t	to Tan Br	own, Soft to	<u> </u>			ŧ							
		1		WOH	1	2	<b>•</b> 3	3	:	· · ·	· ·	.			W			Medium Stiff, Fine S with Manganese	Sandy Silt e Seams,	y CLAY (A- Trace Mica	7-5)			ŧ							
825	5	1	-				1		·			.												Ŧ							
	82	3.8	28.4	1	2	2	ĺŀ		:		· ·	.	· · · ·		W		ł							Ŧ							
		ł					<b>▼</b> .	4 • • •	.		· ·	•••			66%									ł							
820	)	<u> </u>	-				÷	· · · ·	+								-							Ŧ							
				WOH	1	2		3	.			.		SS-5	80%		F							Ŧ							
815	5	Ŧ	•				Ľ		:			.					F							Ŧ							
	81	3.8	38.4	2	3	4	1										F							Ŧ							
12		Ŧ						•7 · · · \· · ·				.					-							Ŧ							
810	)	‡	-					$\frac{1}{1}$	· ·				· · · ·					9.3			42.9			Ŧ							
BDT	80	0.0 <del> </del> 	43.4	3	6	10	1 :	. • 16	,   -	· · ·		.			м		F	Tan Brown to Gree Very Stiff to Hard.	enish Brov Fine San	wn with Whi Idy SILT (A-	ite, 4)			Ŧ							
01 80!	5	1						· · · · ·		· · · · · ·			· · · · ·				F	with Managese	Seams,	Trace Mica				Ŧ							
	80	3.8	48.4	6	Q	11	11	· ·  ·	1.			.					F							Ŧ							
GPJ		‡					:		19 .	· · · · · ·		.	· · · · ·		M		F							Ŧ							
800 800	)	‡	-						<u>\</u> .	· · ·	· ·		· · · ·				F							‡							
INTL	_/9	ö.ö + +	53.4	7	12	18	1 :	· · · · · ·	<b>)</b> 3	 0		.	· · · ·		м		F							‡							
0 ~ 70	5	‡					:	· · · · · ·	.	 \		•••	· · · ·				F							‡							
SITE	79	3.8	58.4	40	4-		11		1.	- <del>\</del>		.					F							‡							
VAL		‡		10	1/	27	:	· · · · · ·		• • • • •	4 · · · 1 • · ·	· ·   ·	· · · ·		D		F							‡							
<sup>2</sup> 790	)	+	-						·	· · ·	` <b>`</b> ,	· ·   ·					Ł							‡							
Ū Ū	78	8.8 +	63.4	14	34	53	:	· · · · · ·	:	· · · · · ·		: : † :			D		F							‡							
5250		‡					:	· · ·	:	· · ·			· · · · ·				F							‡							
S 785	2 78	3.8	68.4						+-		//						F							+							
OUBL		Ŧ		12	20	24	:	· · ·	:	: :¶4	4 · · ·	.	· · · ·		D		F							ŧ							
а щ 780	)	ł	-						·	· · ŀ	· ·	•••					F							±							
BOF	77	8.8	73.4	13	19	26	$\left  \right $					.	: : : : ]		n		F							ŧ							
DOT		Ŧ							•	<b>P</b> 4		.					Ł							Ŧ							
<u>ک</u> 77	5									<u> </u>							77	5.0			77.2										



WBS	<b>3</b> 3482 <sup>-</sup>	1.1.1			Т	I <b>P</b> U-252	5C	COUNTY	GUILFO	RD			GEC	LOGIST Pastrana	a, C.R.		WBS	<b>3</b> 3482	1.1.1			TI	<b>P</b> U-2525	iC	COUNTY
SITE	DESCR	RIPTION	I Site	e #5 (S	tructu	re #7) - Bri	dge No. 12	46 on SR	1001 (Nortl	h Churc	h Stre	et) (-	Y5-) ov	er I-85 Bypass (-L-)		GROUND WTR (ft)	SITE	DESCR	RIPTION	Site	#5 (St	tructur	e #7) - Bri	dge No. 12	246 on SR 1
BOF	ING NO	. EB2-	·B		S	TATION 4	147+20		OFFSET	80 ft RT	Г		ALIC	GNMENT -L-		<b>0 HR.</b> N/A	BOR	ING NO	. RW-	4		ST	<b>STATION</b> 446+60		
COL	LAR EL	<b>EV.</b> 85	50.1 ft		T	OTAL DEP	<b>TH</b> 68.3 f	t	NORTHING	<b>3</b> 870,9	985		EAS	<b>TING</b> 1,766,735		24 HR. FIAD	COL	LAR EL	<b>EV.</b> 85	50.4 ft		т	DTAL DEP	<b>TH</b> 49.5 f	t I
DRIL	L RIG/HA	MMER E	FF./DA	TE TF	RI0055	CME-55 77	% 02/22/2016	6		DRILL	METHO	DD N	/lud Rotar	у	HAMME	R TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE TR	10055	CME-55 77%	6 02/22/2016	<u>ð</u>
DRII	LER T	oothma	in, R.		S	TART DAT	<b>E</b> 12/15/1	6	COMP. DA	<b>TE</b> 12/	/15/16	4	SUR	FACE WATER DEP	TH N/A	4	DRIL	LER T	oothma	an, R.		ST	ART DAT	E 12/13/1	6
ELEV	DRIVE ELEV	DEPTH	BLC		JNT		BLOWS	PER FOOT	(	SAMP.	. 🔨			SOIL AND ROO	CK DESC	RIPTION	ELEV	DRIVE	DEPTH	BLC	W COL	JNT		BLOWS	PER FOOT
(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	Имо	I G	ELEV.	(ft)		DEPTH (ft)	(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	25	50 7
855		-											-				855		+						
850		<u> </u>											850.1	GROUNE	D SURFA	CE 0.0	850		<u> </u>						
845		- - - - -												RES Red, Stiff, Sil Note: No sample t undergro	SIDUAL Ity CLAY ( taken due ound utlitio	(A-7-5) e to potential es	845	846.8	- <u>3.6</u> 	5	7	8	· · · · · · · · · · · · · · · · · · ·		
840	842.0	8.1 	3	3	4				· · · · · · · · · · · · · · · · · · ·		м		842.2	Red to Tan Brown, S Sandy Clayey SILT Se	oft to Med (A-5) with eams	dium Stiff, Fine n Manganese	840	841.8	+ 8.6 + + + + +	3	4	6	· · · · · · · · · · · · · · · · · · ·		
835			3	3	3			· · · · ·			М	トイトイン					835	- 0.00.0	+ 13.0 + -	2	4	4	• • • •		· · · · ·
830	832.0	18.1	1	1	2						w	マ マ マ マ マ マ マ マ マ マ マ マ マ マ					830	831.8	- <u>18.6</u>	2	3	4	• • • • • • • • • • • • • • • • • • •		
825	827.0	23.1	1	2	2						w		<u>    827.8                               </u>	Tan Brown to Green Coarse to Fine Sandy Mangan	nish Brown y Silty CL/ nese Sean	22.3 n, Soft to Stiff, AY (A-7-5) with ns	825	826.8	+ - 23.6 - - -	2	2	4			
820	822.0	28.1	2	5	5			· · · · · · · · · · · · · · · · · · ·		SS-6	60%						820	821.8	<u>28.6</u>	3	3	5			
815	817.0	33.1	2	4	6						w						815	816.8	+ 33.6 + + + - - - - - - - - - - - - - - - -	4	6	11		,	
GDT 10/2/17	807.0	43.1	3	5	7	• • • • • • • • • • • • • • • • • • •		· · · · ·			w		- - 8 <u>07.4</u>			<u>42.7</u>	810	806.8	- 30.0 - - - - - 43.6	9	13	19			
100 805 2N 70	802.0	48.1	5	8	9		7	· · · · ·	· · · · · · · · · · · · · · · · · · ·		M			Sandy SILT (A-4) w	vith Manga	anese Seams	805	801.8	- - - - 48.6	75	25/0.1			· · · · ·	
800 g	-	‡	9	15	20		• • 35 •		· · · ·		D		ŀ					-	<b>†</b>	32	68/0.4		1	1	<u> </u>
SITE_7_GINTLO	797.0	- 53.1 -	53	47/0.3			· · · · · · · · · · · · · · · · · · ·						- 798.3 	WEATHE Greenish Brown M GRANI	ERED RO METAMO TIC ROCI	51.8 CK RPHOSED K									
GEO_RWAL_:	792.0	58.1	100/0.4	Ī																					
BLE U2525C	787.0	63.1	28	72/0.4					100/0.9																
NCDOT BORE DOU	- 182.0	<u>+ 68.1</u> + - - -	100/0.2						100/0.2				<u>2</u> 781.8 - - - - -	Boring Terminated ; Weathered Rock: GRANI Equivalent -Y5-	at Elevati METAMO TIC ROCI Sta: 23+2	68.3 0n 781.8 ft In DRPHOSED K 26, 17' RT									



#### SOILS LABORATORY TESTS RESULTS

**WBS NO.:** 34821.1.1

**TIP NO.:** U-2525C

**COUNTY:** Guilford

SITE DESCRIPTION: Site #5, (Structure #7 - Bridge No. 1246 on SR 1001 (North Church Street) (-Y5-) over Greensboro Eastern Loop, I-85 Bypass (-L-)

SAMPLE	Boring	DEPTH	AASHTO	N	L.L	P.I.		% BY V	VEIGHT		% P.	ASSING SI	EVES	%	%
NO.		INTERVAL (ft.)	CLASS				CSE. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-1	EB1-A	33.5-35.0	A-5 (4)	17	51	7	8	51	35	6	99	96	56	47.2	-
SS-2	EB1-B	33.5-35.0	A-5 (2)	13	45	3	13	43	38	6	98	90	58	50.8	-
SS-3	B1-A	38.3-39.8	A-5 (6)	12	41	8	5	42	47	6	100	99	70	31.2	-
SS-4	B1-B	38.3-39.8	A-7-5 (10)	9	50	11	9	30	49	12	99	94	73	38.9	-
SS-5	EB2-A	33.4-34.9	A-7-5 (24)	3	72	16	2	16	57	25	100	99	90	80.3	-
SS-6	EB2-B	28.1-29.6	A-7-5 (14)	10	58	12	7	23	51	19	99	95	79	60.3	-
ST-1	EB2-A1	29.5-31.6	A-7-5 (23)	N/A	67	17	3	16	54	27	100	98	89	65.5	-

Certification No. 121-01-1108

#### SHEET 12 OF 22

#### **Consolidation Test - ASTM D2435** SUMMARY REPORT





Applied Pressure (ksf)

	Before	After	Liquid Limits:	67	Test Date:	1/5/2017
Moisture (%):	65.46	63.56	Plastic Limits:	50		
Dry Density (pcf)	: 61.20	62.20	Plasticity Index (%):	17		
Saturation (%):	100.75	100.36	Specific Gravity:	2.700	Assumed	
Void Ratio:	1.7513	1.6990	Sample Type:	Undisturbed		
C <sub>c</sub>	0.45	-				
C <sub>r</sub>	0.051	-				
P <sub>c</sub> (ksf)	2.95	-				
Soil Classification	<b>h:</b> A-7-5 (Clay	ey Soils)/ MH (	(Elastic Silt)			
Project:	U2525C		Depth:	29.5'-31.6'		
Sample Number:	ST-1		<b>Boring Number:</b>	EB2-A1		
Project: U25	25C					
Client: NCI	TOC					
Location: EB-	2-A1 (29.5'-31.6")					

#### Sheet 13 of 22

#### **Consolidation Test Results** (Sequence 1) Load 0.250 ksf

Project Number: CS34.348

Test Number:

**Test Date:** 1/5/2017

-

Project: U2525C Location: EB-2-A1 (29.5'-31.6") Job Number 34821

ST-1

Sample Number: Boring Number: Depth: Sample Type:

Soil Classification: EB2-A1 A-7-5 (23) (Clayey Soils) 29.5'-31.6' **Remarks:** Undisturbed Undisturbed

Index	Time	Displacement	Settlement	Axial Strain	Void Ratio
muex	Time	(in)	(in)	(%)	
0	00:00:00	0.3528	0.0000	0.0000	1.7513
1	00:00:01	0.3528	0.0000	0.0000	1.7513
2	00:00:02	0.3528	0.0001	0.0085	1.7511
3	00:00:03	0.3528	0.0001	0.0085	1.7511
4	00:00:04	0.3528	0.0001	0.0085	1.7511
5	00:00:05	0.3527	0.0002	0.0170	1.7508
6	00:00:06	0.3527	0.0002	0.0170	1.7508
7	00:00:12	0.3527	0.0002	0.0170	1.7508
8	00:00:15	0.3527	0.0002	0.0170	1.7508
9	00:00:30	0.3526	0.0003	0.0255	1.7506
10	00:01:00	0.3525	0.0003	0.0340	1.7504
11	00:02:00	0.3524	0.0004	0.0425	1.7501
12	00:04:00	0.3523	0.0005	0.0510	1.7499
13	00:08:00	0.3523	0.0005	0.0510	1.7499
14	00:10:00	0.3523	0.0005	0.0510	1.7499
15	00:15:01	0.3523	0.0005	0.0510	1.7499
16	00:30:01	0.3522	0.0007	0.0680	1.7494
17	01:00:03	0.3521	0.0008	0.0765	1.7492
18	02:00:06	0.3519	0.0009	0.0935	1.7487
19	04:00:13	0.3518	0.0010	0.1020	1.7485
20	08:00:26	0.3518	0.0010	0.1020	1.7485
21	12:00:40	0.3519	0.0009	0.0935	1.7487
22	16:00:53	0.3519	0.0009	0.0935	1.7487
23	20:01:06	0.3519	0.0009	0.0935	1.7487
24	23:59:57	0.3518	0.0010	0.1020	1.7485
Tostod By	TS	÷		•	

Project: U2525C **Location:** EB-2-A1 (29.5'-31.6") **Job Numbe** 34821

Sample Number:	ST-1	Soil Classifica
Boring Number:	EB2-A1	A-7-5 (23) (C
Depth:	29.5'-31.6'	<b>Remarks:</b>
Sample Type:	Undisturbe	d Undisturbed

Index	Time	Displacement (in)	Settlement (in)	Axial Strain	Void Ratio
0	00:00:00	0.3518	0.0010	0.1020	1.7485
1	00:00:01	0.3477	0.0052	0.5183	1.7370
2	00:00:02	0.3475	0.0054	0.5353	1.7366
3	00:00:03	0.3474	0.0054	0.5438	1.7363
4	00:00:04	0.3473	0.0055	0.5523	1.7361
5	00:00:05	0.3472	0.0056	0.5607	1.7359
6	00:00:06	0.3472	0.0056	0.5607	1.7359
7	00:00:12	0.3472	0.0057	0.5692	1.7356
8	00:00:15	0.3472	0.0057	0.5692	1.7356
9	00:00:30	0.3470	0.0059	0.5862	1.7352
10	00:01:00	0.3469	0.0059	0.5947	1.7349
11	00:02:00	0.3468	0.0060	0.6032	1.7347
12	00:04:00	0.3468	0.0060	0.6032	1.7347
13	00:08:00	0.3467	0.0061	0.6117	1.7345
14	00:10:00	0.3467	0.0061	0.6117	1.7345
15	00:15:01	0.3466	0.0063	0.6287	1.7340
16	00:30:02	0.3464	0.0065	0.6457	1.7335
17	01:00:03	0.3463	0.0065	0.6542	1.7333
18	02:00:07	0.3462	0.0066	0.6627	1.7331
19	04:00:13	0.3459	0.0070	0.6967	1.7321
20	08:00:26	0.3459	0.0070	0.6967	1.7321
21	12:00:40	0.3459	0.0070	0.6967	1.7321
22	16:00:53	0.3460	0.0069	0.6882	1.7324
23	20:01:06	0.3460	0.0069	0.6882	1.7324
24	23:59:57	0.3459	0.0070	0.6967	1.7321

**Tested By:** 

Tested By: TS

#### **Consolidation Test Results** (Sequence 2) Load 0.500 ksf

#### Project Number: CS34.348

**Test Date:** 1/5/2017 Test Number: -

ation:

Clayey Soils)

Checked By:

#### **Consolidation Test Results** (Sequence 3) Load 1.000 ksf

**Project Number:** CS34.348

**Test Number:** 

**Test Date:** 1/5/2017

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U2525C **Project:** EB-2-A1 (29.5'-31.6") Location: Job Number: 34821

ST-1

EB2-A1

29.5'-31.6'

Undisturbed

Sample Number: **Boring Number:** Depth: Sample Type:

Soil Classification: A-7-5 (23) (Clayey Soils) **Remarks:** Undisturbed

Index	Time	Elapsed Time (min)	Square Root of Time (Vmin)	Displacement (in)	Settlement (in)	Axial Strain (%)	Void Ratio
0	00:00:00	0.00	0.00	0.3459	0.0070	0.6967	1.7321
1	00:00:01	0.02	0.13	0.3397	0.0132	1.3169	1.7151
2	00:00:02	0.03	0.18	0.3393	0.0136	1.3594	1.7139
3	00:00:03	0.05	0.22	0.3391	0.0138	1.3764	1.7134
4	00:00:04	0.07	0.26	0.3390	0.0138	1.3849	1.7132
5	00:00:05	0.08	0.29	0.3390	0.0138	1.3849	1.7132
6	00:00:06	0.10	0.32	0.3389	0.0139	1.3934	1.7129
7	00:00:12	0.20	0.45	0.3387	0.0141	1.4104	1.7125
8	00:00:15	0.25	0.50	0.3387	0.0141	1.4104	1.7125
9	00:00:30	0.50	0.71	0.3386	0.0143	1.4274	1.7120
10	00:01:00	1.00	1.00	0.3384	0.0144	1.4443	1.7115
11	00:02:00	2.00	1.41	0.3383	0.0145	1.4528	1.7113
12	00:04:00	4.00	2.00	0.3381	0.0147	1.4698	1.7108
13	00:08:01	8.02	2.83	0.3379	0.0150	1.4953	1.7101
14	00:10:01	10.02	3.16	0.3379	0.0150	1.4953	1.7101
15	00:15:01	15.02	3.88	0.3378	0.0150	1.5038	1.7099
16	00:30:02	30.03	5.48	0.3377	0.0151	1.5123	1.7097
17	01:00:03	60.05	7.75	0.3376	0.0153	1.5293	1.7092
18	02:00:07	120.12	10.96	0.3372	0.0156	1.5633	1.7083
19	04:00:13	240.22	15.50	0.3369	0.0160	1.5973	1.7073
20	08:00:27	480.45	21.92	0.3366	0.0162	1.6228	1.7066
21	12:00:40	720.67	26.85	0.3364	0.0164	1.6398	1.7062
22	16:00:53	960.88	31.00	0.3364	0.0164	1.6398	1.7062
23	20:01:06	1201.88	34.67	0.3364	0.0164	1.6398	1.7062
24	23:59:57	1439.95	37.95	0.3364	0.0164	1.6398	1.7062
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#### **Consolidation Test Results** (Sequence 3) Load 1.000 ksf



Tested By: TS

#### **Consolidation Test Results** (Sequence 4) Load 2.000 ksf

**Project:** U2525C EB-2-A1 (29.5'-31.6") Location: **Job Number:** 34821

Sample Number: **Boring Number:** Depth: Sample Type:

ST-1 EB2-A1 29.5'-31.6' Undisturbed Soil Classification: A-7-5 (23) (Clayey Soils) **Remarks:** Undisturbed

Project Number: CS34.348

Test Number:

**Test Date:** 1/5/2017

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Index	Time	Elapsed Time (min)	Square Root of Time (Vmin)	Displacement (in)	Settlement (in)	Axial Strain (%)	Void Ratio
0	00:00:00	0.00	0.00	0.3364	0.0164	1.6398	1.7062
1	00:00:01	0.02	0.13	0.3263	0.0265	2.6508	1.6784
2	00:00:02	0.03	0.18	0.3257	0.0272	2.7188	1.6765
3	00:00:03	0.05	0.22	0.3254	0.0274	2.7443	1.6758
4	00:00:04	0.07	0.26	0.3252	0.0276	2.7613	1.6753
5	00:00:05	0.08	0.29	0.3251	0.0278	2.7782	1.6748
6	00:00:06	0.10	0.32	0.3250	0.0279	2.7867	1.6746
7	00:00:12	0.20	0.45	0.3247	0.0281	2.8122	1.6739
8	00:00:15	0.25	0.50	0.3246	0.0282	2.8207	1.6737
9	00:00:30	0.50	0.71	0.3244	0.0285	2.8462	1.6730
10	00:01:00	1.00	1.00	0.3242	0.0286	2.8632	1.6725
11	00:02:00	2.00	1.41	0.3240	0.0289	2.8887	1.6718
12	00:04:00	4.00	2.00	0.3238	0.0291	2.9057	1.6713
13	00:08:00	8.00	2.83	0.3236	0.0292	2.9227	1.6709
14	00:10:00	10.00	3.16	0.3234	0.0294	2.9397	1.6704
15	00:15:00	15.00	3.87	0.3234	0.0295	2.9482	1.6702
16	00:30:01	30.02	5.48	0.3232	0.0297	2.9652	1.6697
17	01:00:03	60.05	7.75	0.3229	0.0300	2.9992	1.6688
18	02:00:06	120.10	10.96	0.3227	0.0302	3.0161	1.6683
19	04:00:13	240.22	15.50	0.3223	0.0305	3.0501	1.6674
20	08:00:26	480.43	21.92	0.3220	0.0308	3.0841	1.6664
21	12:00:39	720.65	26.84	0.3220	0.0308	3.0841	1.6664
22	16:00:53	960.88	31.00	0.3219	0.0309	3.0926	1.6662
23	20:01:06	1201.10	34.66	0.3218	0.0310	3.1011	1.6660
24	23:59:59	1439.98	37.95	0.3219	0.0309	3.0926	1.6662
Tested By	TS						

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Tested By: TS

#### **Consolidation Test Results** (Sequence 4) Load 2.000 ksf

#### **Consolidation Test Results** (Sequence 5) Load 4.000 ksf

**Project:** U2525C EB-2-A1 (29.5'-31.6") Location: **Job Number:** 34821

Sample Number: **Boring Number:** Depth: Sample Type:

ST-1 EB2-A1 29.5'-31.6' Undisturbed Soil Classification: A-7-5 (23) (Clayey Soils) **Remarks:** Undisturbed

Project Number: CS34.348

Test Number:

**Test Date:** 1/5/2017

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Index	Time	Elapsed Time (min)	Square Root of Time √min	Displacement (in)	Settlement (in)	Axial Strain (in)	Void Ratio
0	00:00:00	0.00	0.00	0.3219	0.0309	3.0926	1.6662
1	00:00:01	0.02	0.13	0.3127	0.0401	4.0102	1.6410
2	00:00:02	0.03	0.18	0.3072	0.0456	4.5624	1.6258
3	00:00:03	0.05	0.22	0.3059	0.0469	4.6899	1.6223
4	00:00:04	0.07	0.26	0.3049	0.0479	4.7918	1.6194
5	00:00:05	0.08	0.29	0.3045	0.0483	4.8343	1.6183
6	00:00:06	0.10	0.32	0.3042	0.0487	4.8683	1.6173
7	00:00:12	0.20	0.45	0.3032	0.0496	4.9618	1.6148
8	00:00:15	0.25	0.50	0.3030	0.0499	4.9873	1.6141
9	00:00:30	0.50	0.71	0.3024	0.0505	5.0467	1.6124
10	00:01:00	1.00	1.00	0.3018	0.0511	5.1062	1.6108
11	00:02:00	2.00	1.41	0.3012	0.0517	5.1657	1.6092
12	00:04:00	4.00	2.00	0.3007	0.0522	5.2167	1.6078
13	00:08:00	8.00	2.83	0.3003	0.0526	5.2591	1.6066
14	00:10:00	10.00	3.16	0.3000	0.0528	5.2846	1.6059
15	00:15:00	15.00	3.87	0.2997	0.0532	5.3186	1.6050
16	00:30:01	30.02	5.48	0.2992	0.0536	5.3611	1.6038
17	01:00:03	60.05	7.75	0.2986	0.0542	5.4206	1.6022
18	02:00:06	120.10	10.96	0.2980	0.0549	5.4885	1.6003
19	04:00:13	240.22	15.50	0.2974	0.0555	5.5480	1.5986
20	08:00:26	480.43	21.92	0.2969	0.0559	5.5905	1.5975
21	12:00:39	720.65	26.84	0.2965	0.0563	5.6330	1.5963
22	16:00:53	960.88	31.00	0.2963	0.0565	5.6500	1.5958
23	20:01:06	1201.10	34.66	0.2961	0.0568	5.6754	1.5951
24	23:59:57	1439.95	37.95	0.2957	0.0572	5.7179	1.5940
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#### **Consolidation Test Results** (Sequence 5) Load 4.000 ksf



Tested By: TS

#### **Consolidation Test Results** (Sequence 6) Rebound 1.000 ksf

Project Number: CS34.348

Test Number:

**Test Date:** 1/5/2017

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Project: U2525C Location: EB-2-A1 (29.5'-31.6") Job Number 34821

ST-1

Sample Number: Boring Number: Depth:

Sample Type:

Soil Classification: EB2-A1 A-7-5 (23) (Clayey Soils) 29.5'-31.6' **Remarks:** Undisturbed Undisturbed

Indox	Timo	Displacement	Settlement	Axial Strain	Void Ratio
muex	1 mile	(in)	(in)	(%)	
0	00:00:00	0.2957	0.0572	5.7179	1.5940
1	00:00:01	0.3038	0.0490	4.9023	1.6164
2	00:00:02	0.3043	0.0485	4.8513	1.6178
3	00:00:03	0.3045	0.0483	4.8343	1.6183
4	00:00:04	0.3047	0.0482	4.8173	1.6187
5	00:00:05	0.3047	0.0482	4.8173	1.6187
6	00:00:06	0.3048	0.0481	4.8088	1.6190
7	00:00:12	0.3049	0.0479	4.7918	1.6194
8	00:00:15	0.3050	0.0478	4.7833	1.6197
9	00:00:30	0.3052	0.0477	4.7664	1.6201
10	00:01:00	0.3053	0.0476	4.7579	1.6204
11	00:02:00	0.3054	0.0474	4.7409	1.6209
12	00:04:00	0.3056	0.0472	4.7239	1.6213
13	00:08:00	0.3058	0.0471	4.7069	1.6218
14	00:10:00	0.3057	0.0472	4.7154	1.6216
15	00:15:00	0.3058	0.0471	4.7069	1.6218
16	00:30:01	0.3059	0.0469	4.6899	1.6223
17	01:00:03	0.3059	0.0470	4.6984	1.6220
18	02:00:06	0.3061	0.0467	4.6729	1.6227
19	04:00:13	0.3062	0.0466	4.6644	1.6230
20	08:00:26	0.3062	0.0466	4.6644	1.6230
21	12:00:39	0.3063	0.0466	4.6559	1.6232
22	16:00:53	0.3063	0.0466	4.6559	1.6232
23	20:01:06	0.3065	0.0463	4.6304	1.6239
24	23:59:57	0.3063	0.0466	4.6559	1.6232
Tested Rv.	TS				

Project: U2525C **Location:** EB-2-A1 (29.5'-31.6") **Job Numbe** 34821

Sample Number:	ST-1	Soil Classifica
Boring Number:	EB2-A1	A-7-5 (23) (C
Depth:	29.5'-31.6'	<b>Remarks:</b>
Sample Type:	Undisturbe	d Undisturbed

Index	Time	Displacement	Settlement	Axial Strain	<b>Void Ratio</b>
muex	Tille	(in)	(in)	(%)	
0	00:00:00	0.3063	0.0466	4.6559	1.6232
1	00:00:01	0.3129	0.0399	3.9932	1.6414
2	00:00:02	0.3139	0.0389	3.8912	1.6442
3	00:00:03	0.3146	0.0382	3.8233	1.6461
4	00:00:04	0.3152	0.0376	3.7638	1.6477
5	00:00:05	0.3155	0.0374	3.7383	1.6484
6	00:00:06	0.3156	0.0372	3.7213	1.6489
7	00:00:12	0.3162	0.0366	3.6619	1.6505
8	00:00:15	0.3163	0.0365	3.6534	1.6508
9	00:00:30	0.3167	0.0361	3.6109	1.6519
10	00:01:00	0.3170	0.0359	3.5854	1.6526
11	00:02:00	0.3173	0.0355	3.5514	1.6536
12	00:04:00	0.3177	0.0352	3.5174	1.6545
13	00:08:01	0.3180	0.0348	3.4834	1.6554
14	00:10:01	0.3181	0.0347	3.4749	1.6557
15	00:15:01	0.3182	0.0347	3.4664	1.6559
16	00:30:02	0.3184	0.0344	3.4410	1.6566
17	01:00:03	0.3187	0.0342	3.4155	1.6573
18	02:00:07	0.3189	0.0339	3.3900	1.6580
19	04:00:13	0.3192	0.0336	3.3645	1.6587
20	08:00:27	0.3195	0.0334	3.3390	1.6594
21	12:00:40	0.3196	0.0332	3.3220	1.6599
22	16:00:53	0.3197	0.0331	3.3135	1.6601
23	56:01:06	0.3198	0.0331	3.3050	1.6604
24	23:59:59	0.3199	0.0330	3.2965	1.6606

Tested By: TS

Tested By: TS

#### **Consolidation Test Results** (Sequence 7) Rebound 0.250 ksf

#### Project Number: CS34.348

**Test Date:** 1/5/2017 Test Number: -

ation:

Clayey Soils)

# **Consolidation Test Results**

Project: U2525C Location: EB-2-A1 (29.5'-31.6") 34821 Job Number:

ST-1

EB2-A1

Sample Number: **Boring Number:** Depth: Sample Type:

Soil Classification: A-7-5 (23) (Clayey Soils) 29.5'-31.6' **Remarks:** Undisturbed Undisturbed

Index	Time	Displacement	Settlement	Axial Strain	Void Ratio
muta	Thic	(in)	(in)	(%)	
0	00:00:00	0.3199	0.0330	3.2965	1.6606
1	00:00:01	0.3193	0.0336	3.3560	1.6590
2	00:00:02	0.3193	0.0336	3.3560	1.6590
3	00:00:03	0.3193	0.0336	3.3560	1.6590
4	00:00:04	0.3193	0.0336	3.3560	1.6590
5	00:00:05	0.3193	0.0336	3.3560	1.6590
6	00:00:06	0.3193	0.0336	3.3560	1.6590
7	00:00:12	0.3193	0.0336	3.3560	1.6590
8	00:00:15	0.3193	0.0336	3.3560	1.6590
9	00:00:30	0.3193	0.0336	3.3560	1.6590
10	00:01:00	0.3192	0.0336	3.3645	1.6587
11	00:02:01	0.3192	0.0336	3.3645	1.6587
12	00:04:01	0.3192	0.0336	3.3645	1.6587
13	00:08:01	0.3191	0.0337	3.3730	1.6585
14	00:10:01	0.3190	0.0338	3.3815	1.6583
15	00:15:01	0.3190	0.0338	3.3815	1.6583
16	00:30:02	0.3191	0.0337	3.3730	1.6585
17	01:00:04	0.3190	0.0338	3.3815	1.6583
18	02:00:07	0.3190	0.0338	3.3815	1.6583
19	04:00:14	0.3189	0.0339	3.3900	1.6580
20	08:00:27	0.3189	0.0340	3.3985	1.6578
21	12:00:40	0.3189	0.0340	3.3985	1.6578
22	16:00:53	0.3189	0.0340	3.3985	1.6578
23	20:01:07	0.3189	0.0340	3.3985	1.6578
24	23:59:59	0.3189	0.0340	3.3985	1.6578
Tested By:	TS			<u>_</u>	

Project: U2525C

Location: EB-2-A1 (29.5'-31.6") Job Number:

Sample Number:	ST-1	Soil Classificat
Boring Number:	EB2-A1	A-7-5 (23) (Cla
Depth:	29.5'-31.6'	<b>Remarks:</b>
Sample Type:	Undisturbe	dUndisturbed

Index Time		Displacement	Settlement	<b>Axial Strair</b>	Void Ratio
Index	Ime	(in)	(in)	(%)	
0	00:00:00	0.3189	0.0340	3.3985	1.6578
1	00:00:01	0.3161	0.0368	3.6788	1.6501
2	00:00:02	0.3159	0.0370	3.6958	1.6496
3	00:00:03	0.3158	0.0370	3.7043	1.6494
4	00:00:04	0.3157	0.0371	3.7128	1.6491
5	00:00:05	0.3157	0.0371	3.7128	1.6491
6	00:00:06	0.3157	0.0371	3.7128	1.6491
7	00:00:12	0.3156	0.0372	3.7213	1.6489
8	00:00:15	0.3155	0.0373	3.7298	1.6487
9	00:00:30	0.3155	0.0373	3.7298	1.6487
10	00:01:00	0.3155	0.0374	3.7383	1.6484
11	00:02:01	0.3155	0.0374	3.7383	1.6484
12	00:04:01	0.3154	0.0375	3.7468	1.6482
13	00:08:01	0.3153	0.0376	3.7553	1.6480
14	00:10:01	0.3152	0.0376	3.7638	1.6477
15	00:15:01	0.3152	0.0376	3.7638	1.6477
16	00:30:02	0.3153	0.0376	3.7553	1.6480
17	01:00:04	0.3151	0.0377	3.7723	1.6475
18	02:00:07	0.3150	0.0378	3.7808	1.6473
19	04:00:14	0.3150	0.0379	3.7893	1.6470
20	08:00:27	0.3148	0.0381	3.8063	1.6466
21	12:00:40	0.3148	0.0381	3.8063	1.6466
22	16:00:53	0.3148	0.0381	3.8063	1.6466
23	20:01:07	0.3147	0.0381	3.8148	1.6463
24	23:59:58	0.3146	0.0382	3.8233	1.6461

Tested By: 15

Tested By: TS

#### **Project Number:** CS34.348

**Test Date:** 1/5/2017 Test Number: -

# (Sequence 8) Load 0.500 ksf

#### **Consolidation Test Results** (Sequence 9) Load 1.000 ksf

#### Project Number: CS34.348

**Test Date:** 1/5/2017 Test Number: -

tion:

ayey Soils)

#### **Consolidation Test Results** (Sequence 10) Load 2.000 ksf

Project: U2525C Location: EB-2-A1 (29.5'-31.6") Job Number: 34821

Sample Number: ST-1 **Boring Number:** EB2-A1 Depth:

Sample Type:

Soil Classification: A-7-5 (23) (Clayey Soils) 29.5'-31.6' **Remarks:** Undisturbed Undisturbed

Index	Time	Displacement	Settlement	Axial Strain	Void Ratio
		(111)	(111)	(%)	
0	00:00:00	0.3146	0.0382	3.8233	1.6461
1	00:00:01	0.3085	0.0444	4.4350	1.6293
2	00:00:02	0.3082	0.0447	4.4690	1.6283
3	00:00:03	0.3080	0.0449	4.4860	1.6279
4	00:00:04	0.3079	0.0449	4.4945	1.6276
5	00:00:05	0.3078	0.0450	4.5030	1.6274
6	00:00:06	0.3078	0.0450	4.5030	1.6274
7	00:00:12	0.3076	0.0452	4.5200	1.6269
8	00:00:15	0.3076	0.0452	4.5200	1.6269
9	00:00:30	0.3076	0.0453	4.5285	1.6267
10	00:01:00	0.3075	0.0454	4.5370	1.6265
11	00:02:00	0.3073	0.0455	4.5539	1.6260
12	00:04:01	0.3072	0.0456	4.5624	1.6258
13	00:08:01	0.3071	0.0457	4.5709	1.6255
14	00:10:01	0.3071	0.0457	4.5709	1.6255
15	00:15:01	0.3071	0.0458	4.5794	1.6253
16	00:30:02	0.3070	0.0459	4.5879	1.6251
17	01:00:04	0.3068	0.0460	4.6049	1.6246
18	02:00:07	0.3066	0.0462	4.6219	1.6241
19	04:00:14	0.3066	0.0462	4.6219	1.6241
20	08:00:27	0.3065	0.0463	4.6304	1.6239
21	12:00:40	0.3065	0.0464	4.6389	1.6237
22	16:00:53	0.3065	0.0463	4.6304	1.6239
23	20:01:07	0.3065	0.0464	4.6389	1.6237
24	23:59:57	0.3063	0.0466	4.6559	1.6232
Tested Dru	TC				

Project: U2525C Location: EB-2-A1 (29.5'-31.6") Job Number: 34821

Sample Number:	ST-1	Soil Classifica				
<b>Boring Number:</b>	EB2-A1	A-7-5 (23) (Cl				
Depth:	29.5'-31.6'	<b>Remarks:</b>				
Sample Type:	Undisturbed Undisturbe					

Index	Time	Displacement (in)	Settlement (in)	Axial Strain (%)	Void Ratio
0	00:00:00	0.3063	0.0466	4.6559	1.6232
1	00:00:01	0.2981	0.0547	5.4715	1.6007
2	00:00:02	0.2967	0.0562	5.6160	1.5968
3	00:00:03	0.2963	0.0565	5.6500	1.5958
4	00:00:04	0.2962	0.0567	5.6670	1.5954
5	00:00:05	0.2960	0.0568	5.6839	1.5949
6	00:00:06	0.2959	0.0569	5.6924	1.5947
7	00:00:12	0.2956	0.0573	5.7264	1.5937
8	00:00:15	0.2955	0.0573	5.7349	1.5935
9	00:00:30	0.2952	0.0577	5.7689	1.5926
10	00:01:00	0.2950	0.0579	5.7859	1.5921
11	00:02:00	0.2946	0.0582	5.8199	1.5912
12	00:04:01	0.2944	0.0585	5.8454	1.5905
13	00:08:01	0.2941	0.0587	5.8709	1.5898
14	00:10:01	0.2941	0.0588	5.8794	1.5895
15	00:15:01	0.2939	0.0590	5.8963	1.5891
16	00:30:02	0.2936	0.0592	5.9218	1.5884
17	01:00:04	0.2933	0.0596	5.9558	1.5874
18	02:00:07	0.2929	0.0599	5.9898	1.5865
19	04:00:14	0.2926	0.0602	6.0238	1.5856
20	08:00:27	0.2923	0.0606	6.0578	1.5846
21	12:00:40	0.2920	0.0608	6.0833	1.5839
22	16:00:53	0.2919	0.0609	6.0918	1.5837
23	20:01:07	0.2918	0.0611	6.1088	1.5832
24	23:59:57	0.2916	0.0613	6.1257	1.5827

Tested By: TS

Tested By: TS

#### Project Number: CS34.348

**Test Date:** 1/5/2017 **Test Number:** -

#### **Consolidation Test Results** (Sequence 11) Load 4.000 ksf

#### Project Number: CS34.348

**Test Date:** 1/5/2017 Test Number: -

ation:

Clayey Soils)

#### **Consolidation Test Results** (Sequence 12) Load 8.000 ksf

**Project:** U2525C EB-2-A1 (29.5'-31.6") Location: 34821

Sample Number: ST-1 **Boring Number:** EB2-A1 Depth: 29.5'-31.6' Undisturbed Sample Type:

Job Number:

Soil Classification: A-7-5 (23) (Clayey Soils) **Remarks:** Undisturbed

Project Number: CS34.348

Test Number:

**Test Date:** 1/5/2017

-

Index	Time	Elapsed Time (min)	Square Root of Time (√min)	Displacement (in)	Settlement (in)	Axial Strain (%)	Void Ratio
0	00:00:00	0.00	0.00	0.2916	0.0613	6.1257	1.5827
1	00:00:01	0.02	0.13	0.2724	0.0805	8.0459	1.5299
2	00:00:02	0.03	0.18	0.2647	0.0882	8.8190	1.5086
3	00:00:03	0.05	0.22	0.2588	0.0941	9.4053	1.4925
4	00:00:04	0.07	0.26	0.2566	0.0963	9.6262	1.4864
5	00:00:05	0.08	0.29	0.2551	0.0978	9.7791	1.4822
6	00:00:06	0.10	0.32	0.2537	0.0992	9.9150	1.4785
7	00:00:12	0.20	0.45	0.2505	0.1024	10.2379	1.4696
8	00:00:15	0.25	0.50	0.2497	0.1031	10.3144	1.4675
9	00:00:30	0.50	0.71	0.2477	0.1051	10.5098	1.4621
10	00:01:00	1.00	1.00	0.2465	0.1064	10.6372	1.4586
11	00:02:01	2.02	1.42	0.2462	0.1066	10.6627	1.4579
12	00:04:01	4.02	2.00	0.2461	0.1067	10.6712	1.4577
13	00:08:01	8.02	2.83	0.2460	0.1068	10.6797	1.4575
14	00:10:01	10.02	3.16	0.2460	0.1069	10.6882	1.4572
15	00:15:01	15.02	3.88	0.2460	0.1069	10.6882	1.4572
16	00:30:02	30.03	5.48	0.2458	0.1071	10.7052	1.4568
17	01:00:04	60.07	7.75	0.2457	0.1071	10.7137	1.4565
18	02:00:07	120.12	10.96	0.2455	0.1073	10.7307	1.4561
19	04:00:14	240.23	15.50	0.2455	0.1074	10.7392	1.4558
20	08:00:27	480.45	21.92	0.2454	0.1075	10.7477	1.4556
21	12:00:40	720.67	26.85	0.2453	0.1076	10.7562	1.4554
22	16:00:53	960.88	31.00	0.2453	0.1076	10.7562	1.4554
23	20:01:07	1201.12	34.66	0.2453	0.1076	10.7562	1.4554
24	23:59:58	1439.97	37.95	0.2453	0.1076	10.7562	1.4554
T	70	· · · · · · · · · · · · · · · · · · ·					





Tested By: TS

#### **Consolidation Test Results** (Sequence 12) Load 8.000 ksf



#### SITE PHOTOGRAPHS State Project No. 34821 – TIP No. U-2525C – Site # 5 (Structure # 7) Bridge No. 1246 on SR 1001 (N. Church Street) (-Y5-) over Greensboro Eastern Loop, I-85 Bypass (-L-) - Guilford County, NC





View Looking Downstation Along -L-







#### **CONTENTS**

S

2525C

REFERENCE

HEET NO.	<b>DESCRIPTION</b>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	CROSS SECTIONS
6-12	BORE LOGS, CORE REPORT & CORE PHOTO
13	LABORATORY SAMPLE RESULTS
14	SITE PHOTOGRAPHS

### 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 FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNDALE DRIVE

SITE DESCRIPTION SITE NO. 6 (STRUCTURE NO. 8 AND NO. 9) - BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM STREET (-Y6-)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	14

#### CAUTION NOTICE

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	PERSONNEL
	SCHLEMM, T. S.
	RIGGS, JR., A. F.
	TURNAGE, J. R.
	COGAR, T. E.
INVESTIGATED BY <b>TERR</b>	ACON CONSULTANTS
DRAWN BY	FIELDS, W. D.
CHECKED BY	RIGGS, JR., A. F.
SUBMITTED BY TERR	ACON CONSULTANTS
DATE	OCTOBER 2017
	·
Consulting I 2401 BRENTWO RALEIGH, NOI PHONE: (919) 873 NC REGIST	FOCON Engineers & Scientists DOD ROAD, SUITE 107 RTH CAROLINA 27604 +2211 FAX: (919) 873–9555 FERED FIRM: F-0869
HONOF F	CAROUND ESSION NAME SEAL 4155 GINEER RIGGS
DocuSigned by:	
abner Riggs Jr.	10/9/2017
5228073BBA45482 SIGNATURE	DATE
DOCUMENT NO UNLESS ALL SIG	T CONSIDERED FINAL NATURES COMPLETED

## 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						
SOIL IS O BE PENETH ACCORDIN IS BA CONSISTEN	CONSIDERED RATED WITH NG TO THE ASED ON TH NCY, COLOR,	UNCONSOLIDATI H A CONTINUOUS STANDARD PENE HE AASHTO SYS TEXTURE, MOIST	ED, SEMI-CON FLIGHT POU TRATION TE EM. BASIC ( URE, AASHTO	SOLIDATE /ER AUGE ST (AASH' DESCRIPT) I CLASSIF	D, OR WE R AND YI TO T 200 IONS GEN	ATHERED E IELD LESS 5. ASTM DI IERALLY IN AND OTHE	ARTH MAT THAN 100 586), SOIL CLUDE THE R PERTINE	ERIALS TH BLOWS PE CLASSIFIC E FOLLOWIN NT FACTOR	IAT CAN ER FOOT CATION NG: IS SUCH	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. CAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS					HARD ROCK I ROCK LINE IN SPT REFUSAL BLOWS IN NC REPRESENTEC ROCK MATERI	3 NON-I IDICATE IS PE JN-COAT BY A	COASTAL PLA S THE LEVE NETRATION & STAL PLAIN ZONE OF WE RE TYPICAL	AIN MATERIAL THAT EL AT WHICH NON-C BY A SPLIT SPOON MATERIAL, THE T EATHERED ROCK. Y DIVIDED AS FOUL	WOULD YIELD SPT REFUSAL IF TEST DASTAL PLAIN MATERIAL WOULD YIELD SAMPLER EQUAL TO OR LESS THAN 0. RANSITION BETWEEN SOIL AND ROCK DWS:	
AS V	ERY STIFF.G	GICAL CUMPUSIT	IUN, ANGULAN NST WITH INT.	ERBEDDEC	) FINE SA	WD LAYERS.	HIGHLY PLA	STIC.A-7-6	,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:				WEATHERED	HLS HN	Strate	NON-COASTAL PL	AIN MATERIAL THAT WOULD VIELD SPI		
	SI	OIL LEGEN	ID AND	AASHT	0 CL/	<u>ASSIFI</u>	CATION			- ANGULAR, SUBAN	MI		ICAL COMPOS			ROCK (WR)			100 BLOWS PER	FOOT IF TESTED.
GENERAL CLASS.	(	GRANULAR MATERIA ≤ 35% PASSING ■2	LS 30)	SILT- (> 3!	-Clay Mati 5% Passin(	ERIALS G #200)	ORC	GANIC MATERI	IALS	MINERAL NAM	1ES SU	CH AS QUART	Z, FELDSPAR, MICA, T	TALC, KAOLIN	, ETC.	CRYSTALLINE			FINE TO COARSE	GRAIN IGNEOUS AND METAMORPHIC RC T REFUSAL IF TESTED. ROCK TYPE IN
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	DESCR	RIPTIONS WHE	N THEY ARE CONSID	JERED OF SI	GNIFICANCE.				GNEISS, GABBRO,	SCHIST, ETC. GRAIN METAMORPHIC AND NON-COASTA
SYMBOI OC	A-1-a A-1-b 00000000000000000000000000000000000	A-2-4 A-2	5 A-2-6 A-2	2	<u>_</u>	A-7-6	H-3	H-0, H-7		SLIG⊦		OMPRESSIBLE	RESSIBILITI	LL < 31		ROCK (NCR)			SEDIMENTARY RO ROCK TYPE INCL	ICK THAT WOULD YEILD SPT REFUSAL
% PASSING	000000000000000000000000000000000000000				<u>^::::</u> ^					MODEF HIGHL	RATELY	COMPRESSIB PRESSIBLE	LE	LL = 31 LL > 50	- 50	COASTAL PLA SEDIMENTARY	IN ROCK		_ COASTAL PLAIN _ SPT REFUSAL, R	SEDIMENTS CEMENTED INTO ROCK.BUT OCK TYPE INCLUDES LIMESTONE.SANDS
*10 5i	Ø MX	E1 MN					GRANULAR	SIL 1- CLAY	MUCK,		P	PERCENTA	GE OF MATEF	₹IAL					WEA	
*200 15	5 MX 25 MX	10 MX 35 MX 35 I	1X 35 MX 35 M	1X 36 MN	36 MN 36	MN 36 MN	30123	SOILS		ORGANIC MATERIAL	<u>.</u>	GRANULAR SOILS	SILT - CLAY <u>SOILS</u>	OTHE	R MATERIAL	FRESH	ROCK	FRESH, CRYST	ALS BRIGHT, FEW JO	INTS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING 40 LL PI	_ 6 MX	- 40 MX 41 M NP 10 MX 10 M	IN 40 MX 41 M IX 11 MN 11 M	IN 40 MX IN 10 MX	41 MN 40 10 MX 11 1	MX 41 MN MN 11 MN	SOILS LITTL	WITH E OR	HIGHLY	TRACE OF ORGANIC MA LITTLE ORGANIC MATT MODERATELY ORGANIC HIGHLY ORGANIC	ATTER IER	2 - 3% 3 - 5% 5 - 10% > 10%	3 - 5% 5 - 12% 12 - 20% > 20%	TRACE LITTLE SOME HIGHLY	1 - 10% 10 - 20% 20 - 35% 35% AND ABOVE	VERY SLIGHT (V SLI.)	ROCK I CRYST OF A	R IF CRYSTAI GENERALLY F ALS ON A BR CRYSTALLINE	LLINE. RESH, JOINTS STAINE OKEN SPECIMEN FACI NATURE.	D,SOME JOINTS MAY SHOW THIN CLAY C SHINE BRIGHTLY. ROCK RINGS UNDER H
GROUP INDEX USUAL TYPES ST OF MAJOR C	Ø TONE FRAGS. GRAVEL, AND	Ø Ø	4 MX	8 MX 1 SIL1	12 MX 16 I	MX NO MX	MUDE Amoun Orga Mat	RATE ITS OF ANIC TER	organic Soils		WATE	GRO ER LEVEL IN	UND WATER	ATELY AFTER	R DRILLING	SLIGHT (SLI.)	ROCK ( 1 INCH. CRYST	GENERALLY FI . OPEN JOINT ALS ARE DUL	RESH, JOINTS STAINE S MAY CONTAIN CLA L AND DISCOLORED.	D AND DISCOLORATION EXTENDS INTO RO Y. IN GRANITOID ROCKS SOME OCCASIONA CRYSTALLINE ROCKS RING UNDER HAMMEF
MATERIALS GEN. RATING AS SUBGRADE	Sand	EXCELLENT TO GOO	0	F	FAIR TO PC	JOR	Fair to Poor	POOR	UNSUITABLE	ע <u>רש</u> עפש רעות	PERC	THED WATER LE	SATURATED ZONE, OR	HOURS ₹ WATER BEA	RING STRATA	MODERATE (MOD.)	SIGNIF GRANIT DULL WITH	ICANT PORTIC (OID ROCKS, M SOUND UNDER FRESH ROCK.	ONS OF ROCK SHOW 1 10ST FELDSPARS ARE 1 HAMMER BLOWS ANE	DISCOLORATION AND WEATHERING EFFECT DULL AND DISCOLORED, SOME SHOW CLA SHOWS SIGNIFICANT LOSS OF STRENGTH
	1	PI OF A-7-5 SUBGR	DUP IS ≤ LL	- 30 ; PI OF	A-7-6 SU	JBGROUP IS :	> LL - 30							<u></u>		MODERATELY	ALL R	OCK EXCEPT	QUARTZ DISCOLORED	OR STAINED. IN GRANITOID ROCKS, ALL F
					E OF ST	ANDARD	RANG	E OF UNC	ONFINED			MISCELLA	INEUUS STMBL	<u>JLS</u>		(MOD. SEV.)	AND D. AND C	AN BE EXCAV	ATED WITH A GEOLO	GIST'S PICK. ROCK GIVES "CLUNK" SOUND
GENERAL	OIL TYPE	VERY L		PENETR	ATION RE (N-VALUE		COMPR	RESSIVE S (TONS/FT	TRENGTH	L ROADWAY EMB	ANKMEN SCRIPT		DIP & DIP DIF → OF ROCK STRU SPT OPT OMT TEST BOP	RING	SLOPE INDICATOR	SEVERE (SEV.)	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FAB (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS			OR STAINED. ROCK FABRIC CLEAR AND E . IN GRANITOID ROCKS ALL FELDSPARS & STRING ROCK USUALLY REMAIN.
GRANULA MATERIAL	IR L	MEDIUM	DENSE		10 TO 3	9 10		N/A			ILL (AF	OTHER			CONE PENETROMETER		<u>IF TES</u>	STED, WOULD	YIELD SPT N VALUES	5 > 100 BPF
(NON-COH	HESIVE)	VERY D	E ENSE OF T T		> 50 > 50 < 2 2 TO 4	שי  4		< 0.25 0.25 TO (	0.5	THAN ROADWAY	7 EMBAI L BOUN			•	TEST Sounding Rod	VERY SEVERE (V SEV.)	ALL RO BUT M REMAIN VESTIO	ASS IS EFFER	QUARTZ DISCOLORED CTIVELY REDUCED TO ITE IS AN EXAMPLE NAL ROCK FABRIC RE	OR STAINED. ROCK FABRIC ELEMENTS AP ) SOIL STATUS, WITH ONLY FRAGMENTS OF OF ROCK WEATHERED TO A DEGREE THAT MAIN. <u>IF TESTED, WOULD YIELD SPT N V</u>
SILT-CLA MATERIAL (COHESIV	AY L (E)	MEDIUM STIF VERY S	STIFF F TIFF		4 TO 8 8 TO 11 15 TO 3	3 5 30		0.5 TO 1 1 TO 2 2 TO 4	.0	INFERRED ROC	K LINE L BOUN		) MONITORING WI PIEZOMETER INSTALLATION		_ TEST BORING WITH CORE — SPT N-VALUE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBL SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR S ALSO AN EXAMPLE.			NOT DISCERNIBLE.OR DISCERNIBLE ONLY NAY BE PRESENT AS DIKES OR STRINGERS	
		TE		OR GF	AIN 5	JZE		74		+	F	RECOMMEN	DATION SYMB	JOLS					ROCK	HARDNESS
U.S. STD. SIE	VE SIZE		4 10	40	60	200	270					ICLASSIFIED E	XCAVATION -		SIFIED EXCAVATION -	VERY HARD	CANNO SEVER	T BE SCRATC	HED BY KNIFE OR SH WS OF THE GEOLOGI	HARP PICK. BREAKING OF HAND SPECIMEN ST'S PICK.
OPENING (MM BOULDER		4 IBBLE GBL	76 2.00	0.42 COARS	Ø.25	5 0.075 FINE	0.053	SUT	CLAY			ISUITABLE WA ICLASSIFIED E ICEPTABLE DE	STE L XCAVATION - GRADABLE ROCK	USED I EMBANI	ABLE, BUT NOT TO BE N THE TOP 3 FEET OF (MENT OR BACKFILL	HARD	can Br To de	E SCRATCHED TACH HAND S	BY KNIFE OR PICK PECIMEN.	ONLY WITH DIFFICULTY. HARD HAMMER B
(BLDR.)	(C	COB.) (C	.R.)	SAND (CSE. SI	D.)	SAND (F SD.)		SL.)	(CL.)			ABB			- VANE SHEAD TEST	- MODERATELY HARD	EXCAV	E SCRATCHED ATED BY HAR DERATE BLOV	BY KNIFE OR PICK. D BLOW OF A GEOLO /S.	GOUGES OR GROOVES TO 0.25 INCHES DE GIST'S PICK. HAND SPECIMENS CAN BE D
SIZE IN.	12						TERMS	0.000		HR - HOUER REFUSHL MELL MELL WELL WELL ST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY ∑ - UNIT WEIGHT					MEDIUM HARD	CAN BE	E GROOVED O	R GOUGED 0.05 INCH	ES DEEP BY FIRM PRESSURE OF KNIFE C PEICES 1 INCH MAXIMUM SIZE BY HARD	
SOIL M (ATTE	MOISTURE	SCALE MITS)	FIELD MO DESCRI	JISTURE PTION	GUI	DE FOR F	IELD MOIS	STURE DES	SCRIPTION	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7/3 - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>					SOFT	CAN BI	E GROVED OR CHIPS TO SE	GOUGED READILY BY	Y KNIFE OR PICK. CAN BE EXCAVATED IN ZE BY MODERATE BLOWS OF A PICK POIN	
۔ ۔		LIMIT _	- SATURA (SAT.	TED -	USL FR(	JALLY LIO )M BELOW	UID: VERY THE GRO	WET, USU4 WND WATE	ALLY R TABLE	e - VOID RATIO F - FINE FOSS FOSSILIFEROUS		SD SL SL1	SAND, SANDY SILT, SILTY SLIGHTLY	SS - ST - BS -	SPLIT SPOON SHELBY TUBE ROCK	VERY SOFT	CAN BI	E CARVED WI	TH KNIFE. CAN BE E NESS CAN BE BROKEN	XCAVATED READILY WITH POINT OF PICK. I BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC RANGE <			- WET -	(W)	SEM AT 1	1ISOLID: R	EQUIRES D MUM MOIS	DRYING TO		FRAC FRACTURED, FRAC FRAGS FRAGMENTS	TURES	TCR - <i>w</i> - M	TRICONE REFUSAL DISTURE CONTENT	RT - CBR	RECOMPACTED TRIAXIAL - CALIFORNIA BEARING	F	RAC	TURE SP	ACING	BEDDING
		C LIMIT _								HI HIGHLY					RATIO		-	MOR	SPACING	
OM _ SL _	OPTIMU	M MOISTURE AGE LIMIT _	- MOIST	- (M)	SOL	.ID; AT OR	NEAR OP			DRILL UNITS:		ANCING TOOLS: CLAY BITS	J UN SUBJEC		TYPE: TOMATIC MANUAL	- WIDE MODERATE CLOSE	LY CLC	)SE Ø	3 TO 10 FEET 1 TO 3 FEET .16 TO 1 FOOT	THICKLY BEDDED 1 THINLY BEDDED 0.1 VERY THINLY BEDDED 0.0
			- DRY -	(D)	AT1	IAIN OPTI	MUM MOIS	TURE	J	CME-55		6" CONTINUOU	S FLIGHT AUGER	CORE SI	ZE:	VERY CLO	эE	LESS	IHAN Ø.16 FEET	THICKLY LAMINATED 0.00 THINLY LAMINATED <
			PLA	STICI	TY							8" HOLLOW A	JGERS	🗌 - В _	🗌 -н				INDU	JRATION
NON SL1G	PLASTIC HTLY PLAS	STIC	<u>PLAST</u>	0-5 6-15	<u>)EX (PI)</u>		DR	<u>Y STRENG</u> VERY LOW SLIGHT	<u>тн</u> '	VANE SHEAR TEST		HARD FACED	FINGER BITS DE INSERTS		2 OLS:	FOR SEDIMEN	IARY R .E	UCKS, INDUR	ATION IS THE HARD RUBBING WIT GENTLE BLOV	ENING OF MATERIAL BY CEMENTING,HE H FINGER FREES NUMEROUS GRAINS; V BY HAMMER DISINTEGRATES SAMPLE.
MODE HIGH	ERATELY PL LY PLASTI	LASTIC IC	2	16-25 6 OR MO	RE			MEDIUM HIGH		PORTABLE HOIST			₩/ ADVANCER 25% STEEL TEETH		ST HOLE DIGGER ND AUGER	MODER	ATELY	INDURATED	GRAINS CAN BREAKS EASI	BE SEPARATED FROM SAMPLE WITH ST LY WHEN HIT WITH HAMMER.
			(	JULOR						X D-50 (TER373)		TRICONE	' TUNGCARB.	🗌 so	UNDING ROD	INDUR	<b>ITED</b>		GRAINS ARE DIFFICULT T	DIFFICULT TO SEPARATE WITH STEEL O 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.					E-GRAY). E.			CORE BIT			NE SHEAR TEST	EXTRE	MELY I	NDURATED	SHARP HAMM SAMPLE BRE	ER BLOWS REQUIRED TO BREAK SAMPLE				

#### PROJECT REFERENCE NO.

SHEET NO.

## U-2525C

2

	TERMS AND DEFINITIONS
SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
15 UFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
N VALUES >	A NUTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
CK THAT CLUDES GRANITE,	WHICH II IS ENCOUNTERED, BUT WHICH DUES NUT NECESSARILT RISE TO UR ABOVE THE GROUND SURFACE.
AL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
STONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
RINGS UNDER	<u>DIRE</u> - A TABULAR BUDT OF TONEOUS ROLK THAT CUTS ALROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
NATINGS IF OPEN	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
AMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ick up to L Feldspar	<u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN NY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS LUMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
RE DISCERNIBLE	PERCHED WATER - WATER MAINTAINE ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
UNLY MINUR	OF AN INTERVENING IMPERVIOUS STRATUM.
IN SMALL AND	RESIDUAL (RES./ SUL - SUL FORMED IN PLACE BY THE WEATHERING OF RUCK.
S. SAPROLITE IS	RUCK SEGENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
S REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
LOWS REQUIRED	<u>SILL</u> - AN INTRUSIVE BODY OF IONEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EEP CAN BE ETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. BLOWS OF THE	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 WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO DR LESS THAN 0.1 FOOT PER 60 BLOWS.
	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SECMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
ED READILY BY	THE TUTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. <u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BL-47: N: 870.408: E: L764.474 - 36" REBAR WITH
THICKNESS	ALUMINUM CAP
4 FEET 5 - 4 FFFT	ELEVATION: 784.40 FEET
16 - 1.5 FEET	NOTES
13 - 0.16 FEET 18 - 0.03 FFFT	FIAD - FILLED IMMEDIATELY AFTER DRILLING
0.008 FEET	
AT. PRESSURE ETC	
, I NEUGONE, EIC,	
EEL PROBE:	
PROBE:	
_	
-1	DATE: 8-15-14









١	VBS	34821				Т	P U-25	25C		COUN	NTY C	GUILFOF	RD			GEO	DLOGIST RIGGS, A. F.			WBS	<b>3</b> 34821				ТІ	<b>D</b> -2525	с	COUNT
;	SITE DESCRIPTION SITE NO. 6 (STRUC. #8 & #9) - BRDG.									. NO. 12	247 & ^	1248 ON	I-85 BY	PASS	6 (-L-)	OVER	NORTH ELM ST. (-Y6-)	GROUND V	VTR (ft)	SITE	DESCR	IPTION	SITE	NO. 6	(STRI	JC. #8 & #	9) - BRDG	. NO. 1247
I	BORI	NG NO.	. W-1			S	TATION	469	+85		OF	FSET	106 ft LT	-		ALI	GNMENT -L-	0 HR.	Dry	BOR	RING NO.	. EB1-/	4 (LL)		ST	ATION 4	69+88	
(	OLL	AR ELI	EV. 78	6.1 ft		Т	OTAL D	EPTH	l 16.1 f	t	NC	ORTHING	<b>3</b> 870,3	09		EAS	STING 1,764,571	24 HR.	Dry	COL	LAR ELI	EV. 78	7.2 ft		тс	TAL DEP	<b>TH</b> 13.9 <sup>+</sup>	ft
[	RILL	RIG/HAN	IMER EF	F./DATE	E TER	373 DI	EDRICH D	)-50 92	2% 03/21	/2016			DRILL N	<b>IETHO</b>	DH.	S. Auger	s HA	MER TYPE Aut	omatic	DRIL	L RIG/HAN	IMER EF	F./DATE	E TER	373 DIE	DRICH D-50	) 92% 03/2 <sup>.</sup>	1/2016
I	ORILL	ER T	URNAG	ie, J. F	۶.	S	TART D	ATE	09/29/1	6	CC	omp. Da	TE 09/2	29/16		SUF	RFACE WATER DEPTH	N/A		DRI	LER T	URNAG	ie, J. F	۶.	ST	ART DAT	E 09/29/ <sup>,</sup>	16
E	LEV	DRIVE	DEPTH	BLO	w col	JNT			BLOWS	PER FO	от		SAMP.	$\mathbf{\nabla}$	L			SCRIPTION		ELEV		DEPTH	BLO	W COL	JNT		BLOWS	PER FOOT
	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50	75	100	NO.	Имо	I G	ELEV.	(ft)		DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50
_	790		+													_				790		+						
		-	ŧ													-					-	<u> </u>						_
	785	785.2	0.9													786.1 785.1	GROUND SU	RFACE ANKMENT	0.0	785	786.2	<u>    1.0    </u>	7	10	12		22	
			E	6	8	9		<b>•</b> 17						M			RED-BROWN, S				783.4	3.8	6	24	44		<u> </u>	
	F	782.3	3.8	5	5	10		15					SS-1	18.1		790.6	TAN-BROWN, FINE	SANDY CLAY	5.5		781.7	5.5	0 100/04	24	44			
-	780 -	780.4	<u> </u>	11	24	28				•52				м		- 100.0	TAN AND GRAY, FIN	E SANDY SILT		780		<b>-</b>	100,011				+	
		777.3	8.8		07/0 (						.					776.8			9.3		778.4	<u>8.8</u>	100/0.6					
	775	-	F	33	67/0.4					·		100/0.9			ŢĮ,	-	WEATHERED	ROCK	0.0	775	-	F						
		-	F													-		Dito)			773.4	13.8						
	ŀ	772.3	13.8	100/0.4							.	100/0.4	•			F					-	F	60/0.1					
_	770	770.1	16.0	60/0.1								60/0.1	•		<i>Un</i>	770.1	CRYSTALLIN	ROCK	16.0 16.1		-	F						
		-	Ŧ													F	(META-GAB Boring Terminated )	BRO) vith Standard			-	Ŧ						
		-	ŧ													-	Penetration Test Refusal	at Elevation 770.	0		-	ŧ						
		-	F													-	(META-GAB	BRO)				F						
		-	ŧ													F	0 Hr. Ground Water Ca	ed Dry at 11.0 Ft				ŧ						
		-	F													-	24 Hr. Ground Water Ca	ived Dry at 8.6 Ft.			-	F						
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WBS 34821         TIP U-2525C         COUNTY GUILFORD         GEOLOGIST RIGGS, A. F.	WE	<b>BS</b> 3482	21				TIP	J-2525C		COUNT
SITE DESCRIPTION SITE NO. 6 (STRUC. #8 & #9) - BRDG. NO. 1247 & 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM ST. (-Y6-) GROUND WTR (fr	ft) SIT	TE DESC	RIPTIO	ON SIT	ITE NC	0. 6 (S	TRUC.	#8 & #9) -	- BRDG.	NO. 124
BORING NO. EB1-C         STATION 469+92         OFFSET CL         ALIGNMENT -L-         0 HR.         Dr	ry BC	DRING N	<b>O.</b> EB1	1-B (Rl	RL)		STAT	ION 469-	+82	
COLLAR ELEV.         788.6 ft         TOTAL DEPTH         24.4 ft         NORTHING         870,415         EASTING         1,764,556         24 HR.         Dr	ry CO	OLLAR E	<b>LEV.</b> 7	792.7 f	ft		ΤΟΤΑ	L DEPTH	13.9 ft	
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 92% 03/21/2016 DRILL METHOD H.S. Augers HAMMER TYPE Automatic	DR	ILL RIG/H	ammer e	EFF./DA	ATE 1	TER373	DIEDR	ICH D-50 92	2% 03/21/	2016
DRILLER TURNAGE, J. R. START DATE 09/29/16 COMP. DATE 09/29/16 SURFACE WATER DEPTH N/A	DR	RILLER	TURNA	AGE, J.	J. R.		STAR	T DATE	09/29/10	6
ELEV DRIVE DEPTH BLOW COUNT BLOWS PER FOOT SOIL AND ROCK DESCRIPTION	ELE			тн ві	BLOW (	COUNT	r	E	BLOWSF	PER FOOT
(ft) (ft) 0.5ft 0.5ft 0.5ft 0 25 50 75 100 NO. MOI G ELEV. (ft) DEPTH	(π)	<sup>:)</sup> (ft)	(ft)	0.5	5ft 0.8	.5ft 0.5	5ft 0	25	5	50
790	704	5								
787.8 - 0.8	0.0	<u> </u>	Ŧ							
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	78	5 783 9	9 <u>+</u> 88	3						+
			ŧ	10	0 7	7 8	3	<b>•</b> 15	· · · ·	
775 774 6 14 0 776.1 12 WEATHERED ROCK	2.5 78	0	Ŧ							· · · ·
(META-GABBRO)		778.9	<u>9                                    </u>	8 60/0	0.1		<u> </u>		<u> </u>	_ <u></u>
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764.6 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 764.2 + 24.0 +	4.4		Ŧ							
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Image: Line State     0 Hr. Ground Water Caved Dry at 18.1 Ft.       Image: Line State     24 Hr. Ground Water Caved Dry at 18.1 Ft.			+							
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	WBS	3482	1			ТІ	<b>P</b> U-25250	0	COUNT	Y GUILFOR	D			GEOL	OGIST RIGGS, A	. F.		WBS	<b>3</b> 4821	1			ТІ	P U-2525	С	COUNT
	SITE	DESCR	RIPTION	I SITE	E NO. 6	(STR	UC. #8 & #9	9) - BRDG.	NO. 1247	7 & 1248 ON	I-85 BYI	PASS	(-L-)	OVER N	ORTH ELM ST. (-Y	(6-)	GROUND WTR (ft)	SITE	DESCR		I SITE	NO. 6	6 (STRI	JC. #8 & #	9) - BRDG	. NO. 124
	BOR	ING NC	. W-2			SI	TATION 46	69+80		OFFSET 1	13 ft RT	-		ALIG	NMENT -L-		0 HR. Dry	BOR	ING NO	. W-3			SI	ATION 4	70+96	
ſ	COL	LAR EL	<b>EV.</b> 79	92.9 ft		тс	OTAL DEPT	<b>TH</b> 17.2 ft		NORTHING	870,52	28		EAST	<b>ING</b> 1,764,560		24 HR. Dry	COL	LAR EL	<b>EV.</b> 77	'8.8 ft		тс	TAL DEP	<b>TH</b> 13.0 f	ť
	DRILL	. RIG/HAI	MMER EF	F./DAT	e ter	373 DI	EDRICH D-50	92% 03/21/	2016		DRILL M	IETHOD	D H.S	S. Augers		HAMM	ER TYPE Automatic	DRIL	_ RIG/HAN	MMER EF	F./DATI	e ter	373 DI	EDRICH D-50	92% 03/21	I/2016
	DRIL	LER T	URNAC	GE, J. F	२.	ST		E 09/29/10	6	COMP. DAT	<b>FE</b> 09/2	29/16		SURF	ACE WATER DEP	TH N/	A	DRIL	LER T	URNAG	6E, J. F	۶.	ST	ART DAT	E 09/27/1	16
	LEV	DRIVE	DEPTH	BLC	w col	JNT		BLOWS F	PER FOOT	-	SAMP.	▼/						ELEV	DRIVE	DEPTH	BLC	w col	UNT		BLOWS	PER FOO
	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 5	50	75 100	NO.	Имо	I G	ELEV. (ff		JK DES	DEPTH (ft)	(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50
te double u2525C_GEO.GPU NC_DOT.GDT 10/4/17	ELEV (ft) 795 785 780	DRIVE ELEV (ft) 792.2 789.1 787.2 784.1 7779.1 7775.8	DEPTH (ft) - 0.7 - 3.8 - 5.7 - 8.8 - 13.8 - 13.8 - 17.1 	BLC 0.5ft 11 7 5 4 60/0.1	W         COU           0.5ft         10           5         5           4         6	JNT 0.5ft 8 6 6 5 94/0.4		BLOWS F 25 5 	PER FOOT	75 100	SAMP. NO.	<ul> <li>▶ MOI</li> <li>□</li> <li>□</li> <li>M</li> <li>M</li> <li>35.3</li> </ul>		ELEV. (f	SOIL AND ROO GROUND ARTIFI BROWN-TAFI BROWN-TAFI BROWN-RES RED-ORANGE A C CRYSTAL (META- Boring Termina Penetration Test Re ft IN CRYST (META- 0 Hr. Ground Wate 24 Hr. Ground Wate	SURF CIAL FI FINE SAI IND BRO LAY	CRIPTION         DEPTH (ft)           ACE         0.0           LL         1.7           ANDY SILT         1.7           DWN, SILTY         14.8           DCK         17.1           OCK         17.2           NDY SILT         14.8           DCK         17.1           OCK         17.2           N Standard         17.2           Istandard         17.2           OCK         17.2           OCK         17.2           ON Standard         17.2           Iory at 13.5 Ft.         13.5           J Dry at 13.5 Ft.         13.5	ELEV (ft) 775 770	DRIVE ELEV (ft) 7772.9 7772.9 7772.9 7770.4 7655.8	DEPTH (ft) 3.4 5.9 8.4 13.0	BLC 0.5ft 10 2 44 42 60/0.0	V COU 0.5ft 9 2 56/0.2 55	JNT 0.5ft 9 10 45/0.3		BLOWS 25 3 	PER FOOT
VCDOT BOF			+											-						+ + + +						





	WBS	34821				ТІ	P U-25250	)	COUNT	Y GUILFOR	D			GEOL	OGIST SCHLEN	ИМ, T. S	S.	WB	<b>3</b> 348	21			Т	P U-2525	С	COUNT
	SITE	DESCR		I SITE	NO. 6	(STR	UC. #8 & #9	)) - BRDG.	NO. 124	7 & 1248 ON	I-85 BY	'PASS	(-L-)	OVER NO	ORTH ELM ST. (-	·Y6-)	GROUND WTR (f	) SITE	E DESC	CRIPTION	I SITE	E NO. 6	(STR	JC. #8 & #	9) - BRDG	. NO. 124
	BORI	NG NO	. EB2-	A (LL)		S	TATION 47	71+05		OFFSET	77 ft LT			ALIGN	IMENT -L-		0 HR. Dr	/ BOF	RING N	<b>O.</b> EB2-	С		SI	ATION 4	71+02	
	COLL	AR EL	<b>EV.</b> 77	78.2 ft		т	OTAL DEPT	<b>H</b> 14.6 ft		NORTHING	870,3	31		EASTI	<b>NG</b> 1,764,448		<b>24 HR.</b> 5.	COL	LAR E	<b>LEV.</b> 77	77.3 ft		т	DTAL DEP	<b>TH</b> 16.4 f	t
	DRILL	rig/han	/MER EF	F./DATE	E TER	373 DII	EDRICH D-50	92% 03/21	/2016		DRILL N	NETHO	D H.S	S. Augers		HAMM	IER TYPE Automatic	DRIL	L RIG/H	AMMER EF	F./DAT	E TER	373 DI	EDRICH D-50	92% 03/21	/2016
	DRILI	ER T	URNAG	E, J. R		S	TART DATE	09/27/1	6	COMP. DA	TE 09/	27/16		SURF	ACE WATER DE	PTH N/	/Α	DRI	LER	TURNAG	SE, J. F	२.	ST	ART DAT	E 09/27/1	6
	ELEV	DRIVE ELEV		BLO	W COL	JNT		BLOWS	PER FOO	T	SAMP.				SOIL AND RO	OCK DES	CRIPTION	ELE\	/ DRIV		BLC		JNT		BLOWS	PER FOOT
	(11)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0 2	25 :	50	75 100	NO.	/мо	I G	ELEV. (ft)			DEPTH	ft) (II)	(ft)	(11)	0.5ft	0.5ft	0.5ft	0	25	50
25C_GEO.GPJ_NC_DDT.GDT_10/4/17	775 770 765	TTT.3           777.3           777.8           772.8           769.8           769.8           763.7	DEPT- (ft) 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	4 100/0.3 100/0.3 60/0.1		JNT       0.5ft       5       13       80       23		25	2 PER FOO	T 75 100	7 SS-7 SS-7			ELEV. (ft)	GROUN SOIL AND RC ROADWAY TAN, BROWN, BROWN AND GF COARSE SA WEATH (MET/ Boring Termin Penetration Test R ft IN CRYS (MET/ 0 Hr. Ground Wat	VD SURF / EMBAN / FINE S/ ESIDUAL RAY, CLA AND, SAF IERED R A-GABBF nated with Erusal at STALLINE A-GABBF nated with ter Caved	CRIPTION DEPTH CRIPTION DEPTH DEPTH DEPTH DEPTH CRIPTION DEPTH CRIPTION DEPTH CRIPTION DEPTH CRIPTION	0     7780       0     7775       770     7765       5     765	 	E     DEPTH       3     0.0       5     3.8       9     5.4       5     13.8       0     16.3       -     -    <	4 BLC 0.5ft 6 4 5 9 31 60/0.1	X. DW COU 0.5ft 7 4 4 12 43 43	9 7 18 57/0.3		E 09/2/11 BLOWS 25	PER FOO 50 
NCDOT BORE DUUBLE UZ52:														- - - - - - - - - - - -												





WBS	34821				TI	<b>P</b> U-25	25C	COUNT	Y GUILF	ORE	)			GEOLOGIST SCHLEMM, T. S	i.
SITE	DESCR	IPTION	SITE	NO. 6	6 (STR	UC. #8 8	& #9) - BRDG	6. NO. 124	7 & 1248	ON I	-85 BYI	PASS	(-L-) (	OVER NORTH ELM ST. (-Y6-)	GROUND WTR (ft)
BOR	ING NO.	EB2-	B (RL)		S	TATION	471+15		OFFSE	<b>T</b> 84	4 ft RT			ALIGNMENT -L-	0 HR. N/A
COL	LAR ELE	EV. 77	′8.8 ft		т	OTAL DI	EPTH 15.5	ft	NORTH	ING	870,49	91		EASTING 1,764,429	24 HR. Dry
DRILI	. RIG/HAN	IMER EF	F./DATE	e ter	8373 DI	EDRICH D	)-50 92% 03/2	1/2016			DRILL M	IETHOE	) SP1	Core Boring HAMM	IER TYPE Automatic
DRIL	LER TU	JRNAG	6E, J. F	۲.	S	TART D	<b>ATE</b> 09/28/	16	COMP.	DAT	<b>E</b> 09/2	28/16		SURFACE WATER DEPTH N	Ά
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W CO 0.5ft	UNT 0.5ft	0	BLOWS 25	PER FOO	г 75 <sup>-</sup>	100	SAMP. NO.	моі	L O G	SOIL AND ROCK DES	CRIPTION DEPTH (ft)
DRIL           ELEV           780           775           770           765	LER TU DRIVE ELEV (ft) 7774.9-	JRNAG DEPTH (ft) - 1.0 - 3.9 - 5.4 	E, J. F BLO 0.5ft 4 7 60/0.0	2. W CO 0.5ft 7 8 9	UNT 0.5ft 6 8 13	TART D/ 0	ATE 09/28/ BLOWS 25	16 PER FOO 50	COMP.		E 09/2 SAMP. NO. SS-9	10.4 MOI		SURFACE WATER DEPTH N/ SOIL AND ROCK DES ELEV. (ft) 778.8 GROUND SURF ROADWAY EMBAN LIGHT BROWN, FINE SAN ROCK FRAGME BROWN, GRAY AND LIGH FINE SAND 771.4 WEATHERED R (META-GABBF CRYSTALLINE R (META-GABBF CRYSTALLINE R (META-GABBF CRYSTALLINE ROCK (ME 1) Advanced 2-15/16" Trico Refusal at 8.0 1 2) NW Casing Advance 3) Water used as Dril 24 Hr. Ground Water Cave	A CRIPTION DEPTH (ft) ACE 0.0 IKMENT DY CLAY WITH NTS 3.5 IT TAN, SILTY 7.4 OCK 7.8 RO 8.0 ROCK RO 15.5 ation 763.3 ft IN TA-GABBRO) IN ROILER Bit to FT. d to 7.4 FT. lling Fluid d Dry at 4.4 Ft.
														- - -	

WBS	34821				TIP	U-252	25C	С	OUNT	ΥG	UILFORD	GEOLOGIST SCHLEM	M, T. S.		
SITE	DESCRIF	TION	SITE	E NO. 6 (S		. #8 &	#9) - BRI	DG. NO	D. 124 <sup>-</sup>	7 & 1	248 ON I-85 BYPASS (-L-) C	) VER NORTH ELM ST. (-Y	(6-)	GROUN	ND WTR (ft)
BOR	ING NO.	EB2-E	3 (RL)		STA	ΓΙΟΝ	, 471+15			OF	FSET 84 ft RT	ALIGNMENT -L-	,	0 HR.	N/A
COL		<b>V</b> . 77	'8.8 ft		тот		<b>PTH</b> 15	5 ft		NO	RTHING 870.491	EASTING 1.764.429		24 HR.	Drv
				F TED373			50 02% 03	2/21/201	6				намм		Automatic
					S DILDI			9/16	0	0	MD DATE 00/29/16			_IX 111 L	Automatic
			іс, J. г	<b>\</b> .	TOT		N 754	.0/10			WF. DATE 09/20/10	SURFACE WATER DEP		٩	
COR		NQZ			RI	JN	N 7.51	I STR	ATA						
ELEV (ft)	ELEV (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	Ö G	D ELEV. (ft)	ESCRIPTION AND REMARK	S		DEPTH (ft
770.8	770 0	0.0	-									Begin Coring @ 8.0 ft			
765	770.8	8.0 <u>10.5</u> 15.5	2.5	2:75/1.0 2:50/1.0 0:75/0.5 2:25/1.0 2:75/1.0 2:00/1.0 2:25/1.0 2:25/1.0	(2.5) 100% (5.0) 100%	(2.5) 100% (5.0) 100%		(7.5)	(7.5) 100%		- 770.8 - FRESH, VE 	CRYSTALLINE ROCK RY HARD, DARK GRAY (ME NO FRACTURES	TA-GAB	BRO)	8.0 
	ļŦ										Boring Terminate	ed at Elevation 763.3 ft IN CR` (META-GABBRO)	YSTALL	INE ROCI	<
											1) Advanced 2 2)	-15/16" Tricone Roller Bit to R NW Casing Advanced to 7.4 3) Water used as Drilling Flu	tefusal a FT. id	t 8.0 FT.	
											24 H 	r. Ground Water Caved Dry at	: 4.4 Ft.		
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Project No. 34821 (U-2525C) SITE NO. 6 (STRUCTURE NO. 8 AND NO. 9) - BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM STREET (-Y6-)

## **CORE PHOTOGRAPHS** EB2-B BOX 1: 8.0-15.5 FEET



#### llerracon Consulting Engineers & Scientists

WBS	34821					ТΙ	Ρ	U-	2525	5C				С	JUN	
SITE	DESCR	IPTION	SITE	NO. 6	6 (S	TR	U	C. #	8&‡	¥9)	- E	BRE	DG.	NC	). 12	2
BOR	ING NO.	W-4				S	Г	ATIC	N 4	47 <i>′</i>	1+1	0				
COLI	LAR ELI	<b>EV.</b> 78	1.4 ft			т	0.	TAL	DEF	PT	ł	17.	2 ft			
DRILL	. RIG/HAN	IMER E F	F./DATE	e ter	373	DI	El	DRICI	H D-5	0 9	92%	5 03	8/21	201	6	
DRIL	LER T	JRNAG	E, J. F	R.		S	T/	ART	DAT	E	0	9/2	8/1	6		
ELEV	DRIVE ELEV	DEPTH	BLO	w co	JNT	-					BL	.00	/S F	PER	FOC	2
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.	5ft		0		25	5		;	50		
785		-														
780	780.6 -	- 0.8	5	6		2		•			•	• •	•			-
	-		5	0		,			1 	5			-			
	776.0	54	5	7	6	3			<b>1</b> 3		•			.	• •	
775		- 0.4	4	7	1	1				18				·	· ·	
	772.7 -	8.7	7	5	_	,			. / .	:	:		-	:		
770	-		'	5	<sup>'</sup>				•12	:	•			:		
	-	-							i	_			. <u>.</u>	Ľ.	<u></u>	
	- 767.7	- 13.7	100/0.4							:	:		:	:	: :	
765	764.3	-								•	•			·	•••	



#### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 34821.1.1

TIP: U-2525C

COUNTY: GU

DESCRIPTION: SITE NO. 6 (STRUCTURE NO. 8 AND NO. 9) - BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM STREET (-Y6-)

			<b>0</b> ″	Depth					% by V	Veight		%	%	Passing (siev	es)		0/
Sample No.	Alignment	Station	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
SS-1	-L-	469+85	106 LT	3.8-5.3	A-6 (13)	37	20	10.5	23.6	40.2	25.7	0	100	94	74	18.1	N/D
SS-2	-L-	469+88	74 LT	3.8-5.3	A-4 (0)	28	NP	3.7	18.4	70.3	7.6	0	100	98	86	7.2	N/D
SS-3	-L-	469+92	0'	0.8-2.3	A-7-6 (29)	56	33	5.7	17.9	43.3	33.1	0	100	97	83	30.4	N/D
SS-4	-L-	469+82	87 RT	5.7-7.2	A-7-6 (17)	42	17	1.5	15.2	60.6	22.7	0	100	99	90	16.1	N/D
SS-5	-L-	469+80	113 RT	8.8-10.3	A-7-6 (25)	55	28	3.4	25.2	40.3	31.1	0	100	98	81	35.3	N/D
SS-6	-L-	470+96	107 LT	0.9-2.4	A-6 (6)	29	12	14.7	19.4	41.8	24.1	1	98	89	71	9.6	N/D
SS-7	-L-	471+05	77 LT	8.4-9.9	A-2-6 (0)	30	13	53.0	26.0	13.6	7.4	0	100	60	26	N/A	N/D
SS-8	-L-	471+02	3 RT	5.4-6.9	A-2-4 (0)	27	NP	26.0	22.2	45.4	6.4	43	55	44	32	N/A	N/D
SS-9	-L-	471+15	84 RT	1.0-2.5	A-6 (6)	29	12	9.4	14.1	45.9	30.6	16	82	76	68	10.4	N/D
SS-10	-L-	471+10	112 RT	0.8-2.3	A-7-6 (19)	41	23	7.2	14.4	39.5	38.9	0	98	93	83	16.7	N/D
												-					

NP - NONPLASTIC

#### GUILFORD

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number
#### SITE PHOTOGRAPHS SITE NO. 6 (STRUCTURE NO. 8 AND NO. 9) – BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM STREET (-Y6-)



Photograph No. 1: Right of the I-85 Bypass -L- alignment, looking South along proposed End Bent No. 1



Photograph No. 3: Right of the I-85 Bypass -L- alignment, looking South along proposed End Bent No. 2.





Photograph No. 2: Left of the I-85 Bypass -L- alignment, looking North along the proposed End Bent No. 1

Photograph No. 4: Left of the I-85 Bypass -L- alignment, looking North along proposed End Bent No. 2.

#### **CONTENTS**

2525C

REFERENCE

<u>SHEET NO.</u>	<b>DESCRIPTION</b>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3-4	WALL ENVELOPES AT END BENT 1 AND END BENT 2
5-11	BORE LOGS, CORE LOGS AND CORE PHOTOGRAPHS
12	LABORATORY SUMMARY SHEET

#### 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 FROM US 29 NORTH OF GREENSBORO TO EAST OF LAWNDALE DRIVE

SITE DESCRIPTION MSE WALLS AT END BENT I AND END BENT 2 - SITE NO.6 (STRUCTURE NO.8 AND NO. 9) – BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM STREET (-Y6-)

# 3482] PROIEC

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 SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSIFICACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOL 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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL 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 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 MATERNALS AND COCUMENTS FOR FINAL AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED 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 OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FOM THE ACTUAL CONDENSATION.

- NOTES: I, THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR CUARANTEED 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 REDUCETED 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.

	PERSONNEL
	SCHLEMM, T. S.
	RIGGS, JR., A. F.
	TURNAGE, J. R.
	COGAR, T. E.
INVESTIGATED BY $\underline{TE}$	RRACON CONSULTANTS
DRAWN BY	FIELDS, W. D.
CHECKED BY	RIGGS, JR., A. F.
SUBMITTED BY <u>TE</u>	RRACON CONSULTANTS
DATE	DECEMBER 2017
Consulting 2401 BRE RALEICH NC REGISTEI NC REGISTEI	g Engineers and Scient ists NTWOOD ROAD, SUITE 107 I, NORTH CAROLINA 27604 RED ENGINEERING FIRM: F-0869 FERED GEOLOGIC FIRM: C-367
He Vers	SEAL 14155 F RIGG
DocuSigned by: Abur Kiggs 5228073BBA4F482 SIGNAT	Jr. 12/15/2017 URE DATE
DOCUMENT	NOT CONSIDERED FINAL SIGNATURES COMPLETED

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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOIL C	JESCRI	PTION	1						GI	RADATION		T	ROCK DESCRIPTION				
SOIL IS O BE PENETH ACCORDIN IS BA CONSISTEN	CONSIDERED RATED WITH NG TO THE ASED ON TH NCY, COLOR,	UNCONSOLIDATI H A CONTINUOUS STANDARD PENE HE AASHTO SYS TEXTURE, MOIST	ED, SEMI-CON FLIGHT POU TRATION TE EM. BASIC ( URE, AASHTO	SOLIDATE /ER AUGE ST (AASH' DESCRIPT) I CLASSIF	D, OR WE R AND YI TO T 200 IONS GEN	ATHERED E IELD LESS 5. ASTM DI IERALLY IN AND OTHE	ARTH MAT THAN 100 586), SOIL CLUDE THE R PERTINE	ERIALS TH BLOWS PE CLASSIFIC E FOLLOWIN NT FACTOR	IAT CAN ER FOOT CATION NG: IS SUCH	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	ES A C IDICATE S A MI	GOOD REPRESE IS THAT SOIL IXTURE OF UN	PARTICLES ARE AL PARTICLES ARE AL IFORM PARTICLE SI RITY OF GRAI	LE SIZES F L APPROXIM ZES OF TWO	ROM FINE TO COARSE. ATELY THE SAME SIZE. OR MORE SIZES.	HARD ROCK I ROCK LINE IN SPT REFUSAL BLOWS IN NC REPRESENTEC ROCK MATERI	3 NON-I IDICATE IS PE JN-COAT BY A	COASTAL PLA S THE LEVE NETRATION & STAL PLAIN ZONE OF WE RE TYPICAL	AIN MATERIAL THAT EL AT WHICH NON-C BY A SPLIT SPOON MATERIAL, THE T EATHERED ROCK. Y DIVIDED AS FOUL	WOULD YIELD SPT REFUSAL IF TEST DASTAL PLAIN MATERIAL WOULD YIELD SAMPLER EQUAL TO OR LESS THAN 0. RANSITION BETWEEN SOIL AND ROCK DWS:
AS V	ERY STIFF.G	GICAL CUMPUSIT	IUN, ANGULAN NST WITH INT.	ERBEDDEC	) FINE SA	WD LAYERS.	HIGHLY PLA	STIC.A-7-6	,	THE ANGULARIT	YORR	ROUNDNESS OF	SOIL GRAINS IS D	ESIGNATED E	BY THE TERMS:	WEATHERED	HLS HN	STATIONEL	NON-COASTAL PL	AIN MATERIAL THAT WOULD YIELD SPI
	SI	OIL LEGEN	ID AND	AASHT	0 CL/	<u>ASSIFI</u>	CATION			- ANGULAR, SUBAN	MI		ICAL COMPOS			ROCK (WR)			100 BLOWS PER	FOOT IF TESTED.
GENERAL CLASS.	(	GRANULAR MATERIA ≤ 35% PASSING ■2	LS 30)	SILT- (> 3!	-Clay Mati 5% Passin(	ERIALS G #200)	ORC	GANIC MATERI	IALS	MINERAL NAM	1ES SU	CH AS QUART	Z, FELDSPAR, MICA, T	TALC, KAOLIN	, ETC.	CRYSTALLINE			FINE TO COARSE	GRAIN IGNEOUS AND METAMORPHIC RC T REFUSAL IF TESTED. ROCK TYPE IN
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	DESCR	RIPTIONS WHE	N THEY ARE CONSID	JERED OF SI	GNIFICANCE.				GNEISS, GABBRO,	SCHIST, ETC. GRAIN METAMORPHIC AND NON-COASTA
SYMBOI OC	A-1-a A-1-b	A-2-4 A-2	5 A-2-6 A-2	2	<u>_</u>	A-7-6	H-3	H-0, H-7		SL IGF		OMPRESSIBLE	RESSIBILITI	LL < 31		ROCK (NCR)			SEDIMENTARY RO ROCK TYPE INCL	ICK THAT WOULD YEILD SPT REFUSAL
% PASSING	000000000000000000000000000000000000000				<u>^::::</u> ^					MODEF HIGHL	RATELY	COMPRESSIB PRESSIBLE	LE	LL = 31 LL > 50	- 50	COASTAL PLA SEDIMENTARY	IN ROCK		_ COASTAL PLAIN _ SPT REFUSAL, R	SEDIMENTS CEMENTED INTO ROCK.BUT OCK TYPE INCLUDES LIMESTONE.SANDS
*10 5i	Ø MX	E1 MN					GRANULAR	SIL 1- CLAY	MUCK,		P	PERCENTA	GE OF MATEF	₹IAL					WEA	
*200 15	5 MX 25 MX	10 MX 35 MX 35 I	1X 35 MX 35 M	1X 36 MN	36 MN 36	MN 36 MN	30123	SOILS		ORGANIC MATERIAL	<u>.</u>	GRANULAR SOILS	SILT - CLAY <u>SOILS</u>	OTHE	R MATERIAL	FRESH	ROCK	FRESH, CRYST	ALS BRIGHT, FEW JO	INTS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING #40 LL PI	_ 6 MX	- 40 MX 41 M NP 10 MX 10 M	IN 40 MX 41 M IX 11 MN 11 M	IN 40 MX IN 10 MX	41 MN 40 10 MX 11 1	MX 41 MN MN 11 MN	SOILS LITTL	WITH E OR	HIGHLY	TRACE OF ORGANIC MA LITTLE ORGANIC MATT MODERATELY ORGANIC HIGHLY ORGANIC	ATTER IER	2 - 3% 3 - 5% 5 - 10% > 10%	3 - 5% 5 - 12% 12 - 20% > 20%	TRACE LITTLE SOME HIGHLY	1 - 10% 10 - 20% 20 - 35% 35% AND ABOVE	VERY SLIGHT (V SLI.)	ROCK I CRYST OF A	R IF CRYSTAI GENERALLY F ALS ON A BR CRYSTALLINE	LLINE. RESH, JOINTS STAINE OKEN SPECIMEN FACI NATURE.	D,SOME JOINTS MAY SHOW THIN CLAY C SHINE BRIGHTLY. ROCK RINGS UNDER H
GROUP INDEX USUAL TYPES ST OF MAJOR C	Ø TONE FRAGS. GRAVEL, AND	Ø Ø	4 MX	8 MX 1 SIL1	12 MX 16 I	MX NO MX	MUDE Amoun Orga Mat	RATE ITS OF ANIC TER	organic Soils		WATE	GRO ER LEVEL IN	UND WATER	ATELY AFTER	R DRILLING	SLIGHT (SLI.)	ROCK ( 1 INCH. CRYST	GENERALLY FI . OPEN JOINT ALS ARE DUL	RESH, JOINTS STAINE S MAY CONTAIN CLA L AND DISCOLORED.	D AND DISCOLORATION EXTENDS INTO RO Y. IN GRANITOID ROCKS SOME OCCASIONA CRYSTALLINE ROCKS RING UNDER HAMMEF
MATERIALS GEN. RATING AS SUBGRADE	Sand	EXCELLENT TO GOO	0	F	FAIR TO PC	JOR	Fair to Poor	POOR	UNSUITABLE	ע <u>רש</u> עפש רעות	PERC	THED WATER LE	SATURATED ZONE, OR	HOURS ₹ WATER BEA	RING STRATA	MODERATE (MOD.)	SIGNIF GRANIT DULL WITH	ICANT PORTIC (OID ROCKS, M SOUND UNDER FRESH ROCK.	ONS OF ROCK SHOW 1 10ST FELDSPARS ARE HAMMER BLOWS ANE	DISCOLORATION AND WEATHERING EFFECT DULL AND DISCOLORED, SOME SHOW CLA SHOWS SIGNIFICANT LOSS OF STRENGTH
	1	PI OF A-7-5 SUBGR	DUP IS ≤ LL	- 30 ; PI OF	A-7-6 SU	JBGROUP IS :	> LL - 30							<u></u>		MODERATELY	ALL R	OCK EXCEPT	QUARTZ DISCOLORED	OR STAINED. IN GRANITOID ROCKS, ALL F
					E OF ST	ANDARD	RANG	E OF UNC	ONFINED			MISCELLA	INEUUS STMBL	<u>JLS</u>		(MOD. SEV.)	AND D. AND C	AN BE EXCAV	ATED WITH A GEOLO	GIST'S PICK. ROCK GIVES "CLUNK" SOUND
GENERAL	OIL TYPE	VERY L		PENETR	ATION RE (N-VALUE		COMPR	RESSIVE S (TONS/FT	TRENGTH	L ROADWAY EMB	ANKMEN SCRIPT		DIP & DIP DIF → OF ROCK STRU SPT OPT OMT TEST BOP	RING	SLOPE INDICATOR	SEVERE (SEV.)	ALL R	<u>STED, WOULD</u> OCK EXCEPT ED IN STRENI ME EXTENT.	<u>YIELD SPT REFUSAL</u> OUARTZ DISCOLORED GTH TO STRONG SOIL SOME ERAGMENTS OF	OR STAINED. ROCK FABRIC CLEAR AND E . IN GRANITOID ROCKS ALL FELDSPARS & STRING ROCK USUALLY REMAIN.
GRANULA MATERIAL	IR L	MEDIUM	DENSE		10 TO 3	9 10		N/A			ILL (AF	OTHER			CONE PENETROMETER		<u>IF TES</u>	STED, WOULD	YIELD SPT N VALUES	5 > 100 BPF
(NON-COH	HESIVE)	VERY D	E ENSE OF T T		> 50 > 50 < 2 2 TO 4	שי  4		< 0.25 0.25 TO (	0.5	THAN ROADWAY	7 EMBAI L BOUN			•	TEST Sounding Rod	VERY SEVERE (V SEV.)	ALL RO BUT M REMAIN VESTIO	ASS IS EFFER	QUARTZ DISCOLORED CTIVELY REDUCED TO ITE IS AN EXAMPLE NAL ROCK FABRIC RE	OR STAINED. ROCK FABRIC ELEMENTS AP ) SOIL STATUS, WITH ONLY FRAGMENTS OF OF ROCK WEATHERED TO A DEGREE THAT MAIN. <u>IF TESTED, WOULD YIELD SPT N V</u>
SILT-CLA MATERIAL (COHESIV	AY L (E)	MEDIUM STIF VERY S	STIFF F TIFF		4 TO 8 8 TO 11 15 TO 3	3 5 30		0.5 TO 1 1 TO 2 2 TO 4	.0	INFERRED ROC	K LINE L BOUN		) MONITORING WI PIEZOMETER INSTALLATION		_ TEST BORING WITH CORE — SPT N-VALUE	COMPLETE	ROCK F SCATTI ALSO	REDUCED TO ERED CONCEN AN EXAMPLE.	SOIL. ROCK FABRIC I ITRATIONS. QUARTZ M	NOT DISCERNIBLE.OR DISCERNIBLE ONLY NAY BE PRESENT AS DIKES OR STRINGERS
		TE		OR GF	AIN 5	JZE		74		+	F	RECOMMEN	DATION SYMB	JOLS					ROCK	HARDNESS
U.S. STD. SIE	VE SIZE		4 10	40	60	200	270					ICLASSIFIED E	XCAVATION -		SIFIED EXCAVATION -	VERY HARD	CANNO SEVER	T BE SCRATC	HED BY KNIFE OR SH WS OF THE GEOLOGI	HARP PICK. BREAKING OF HAND SPECIMEN ST'S PICK.
OPENING (MM		4 IBBLE GBL	76 2.00	0.42 COARS	Ø.25	5 0.075 FINE	0.053	SUT	CLAY			ISUITABLE WA ICLASSIFIED E ICEPTABLE DE	STE L XCAVATION - GRADABLE ROCK	USED I EMBANI	ABLE, BUT NOT TO BE N THE TOP 3 FEET OF (MENT OR BACKFILL	HARD	can Br To de	E SCRATCHED TACH HAND S	BY KNIFE OR PICK PECIMEN.	ONLY WITH DIFFICULTY. HARD HAMMER B
(BLDR.)	(C	COB.) (C	.R.)	SAND (CSE. SI	D.)	SAND (F SD.)		SL.)	(CL.)			ABB			- VANE SHEAR TEST	- MODERATELY HARD	EXCAV	E SCRATCHED ATED BY HAR DERATE BLOV	BY KNIFE OR PICK. D BLOW OF A GEOLO /S.	GOUGES OR GROOVES TO 0.25 INCHES DE GIST'S PICK. HAND SPECIMENS CAN BE D
SIZE IN.	12						TERMS	0.000		BT - BORING TERMINATED CL CLAY	)	MICA. MOD	- MICACEOUS MODERATELY	wea.	- WEATHERED UNIT WEIGHT	MEDIUM HARD	CAN BE	E GROOVED O	R GOUGED 0.05 INCH	ES DEEP BY FIRM PRESSURE OF KNIFE C PEICES 1 INCH MAXIMUM SIZE BY HARD
SOIL M (ATTE	MOISTURE	SCALE MITS)	FIELD MO DESCRI	JISTURE PTION	GUI	DE FOR F	IELD MOIS	STURE DES	SCRIPTION	CSE COARSE DMT - DILATOMETER TES		ORG PMT -	ORGANIC PRESSUREMETER TI	رم- EST <u>S</u>		SOFT	CAN BI	E GROVED OR CHIPS TO SE	GOUGED READILY BY	Y KNIFE OR PICK. CAN BE EXCAVATED IN ZE BY MODERATE BLOWS OF A PICK POIN
۔ ۔		LIMIT _	- SATURA (SAT.	TED -	USL FR(	JALLY LIO )M BELOW	UID: VERY THE GRO	WET, USU4 WND WATE	ALLY R TABLE	e - VOID RATIO F - FINE FOSS FOSSILIFEROUS		SD SL SL1	SAND, SANDY SILT, SILTY SLIGHTLY	SS - ST - BS -	SPLIT SPOON SHELBY TUBE ROCK	VERY SOFT	CAN BI	E CARVED WI	TH KNIFE. CAN BE E NESS CAN BE BROKEN	XCAVATED READILY WITH POINT OF PICK. I BY FINGER PRESSURE. CAN BE SCRATCH
PLASTIC RANGE <			- WET -	(W)	SEM AT 1	1ISOLID: R	EQUIRES D MUM MOIS	DRYING TO		FRAC FRACTURED, FRAC FRAGS FRAGMENTS	TURES	TCR - <i>w</i> - M	TRICONE REFUSAL DISTURE CONTENT	RT - CBR	RECOMPACTED TRIAXIAL - CALIFORNIA BEARING	F	RAC	TURE SP	ACING	BEDDING
		C LIMIT _								HI HIGHLY					RATIO		-	MOR	SPACING	
OM _ SL _	OPTIMU	M MOISTURE AGE LIMIT _	- MOIST	- (M)	SOL	.ID; AT OR	NEAR OP			DRILL UNITS:		ANCING TOOLS: CLAY BITS	J UN SUBJEC		TYPE: TOMATIC MANUAL	- WIDE MODERATE CLOSE	LY CLC	)SE Ø	3 TO 10 FEET 1 TO 3 FEET .16 TO 1 FOOT	THICKLY BEDDED 1 THINLY BEDDED 0.1 VERY THINLY BEDDED 0.0
			- DRY -	(D)	AT1	IAIN OPTI	MUM MOIS	TURE	J	CME-55		6" CONTINUOU	S FLIGHT AUGER	CORE SI	ZE:	VERY CLO	эE	LESS	IHAN Ø.16 FEET	THICKLY LAMINATED 0.00 THINLY LAMINATED <
			PLA	STICI	TY							8" HOLLOW A	JGERS	🗌 - В _	🗌 -н				INDU	JRATION
NON SL1G	PLASTIC HTLY PLAS	STIC	<u>PLAST</u>	0-5 6-15	<u>)EX (PI)</u>		DR	<u>Y STRENG</u> VERY LOW SLIGHT	<u>тн</u> '	VANE SHEAR TEST		HARD FACED	FINGER BITS DE INSERTS		2 OLS:	FOR SEDIMEN	IARY R .E	UCKS, INDUR	ATION IS THE HARD RUBBING WIT GENTLE BLOV	ENING OF MATERIAL BY CEMENTING,HE H FINGER FREES NUMEROUS GRAINS; V BY HAMMER DISINTEGRATES SAMPLE.
MODE HIGH	ERATELY PL LY PLASTI	LASTIC IC	2	16-25 6 OR MO	RE			MEDIUM HIGH		PORTABLE HOIST			₩/ ADVANCER 25% STEEL TEETH		ST HOLE DIGGER ND AUGER	MODER	ATELY	INDURATED	GRAINS CAN BREAKS EASI	BE SEPARATED FROM SAMPLE WITH ST LY WHEN HIT WITH HAMMER.
								X D-50 (TER373)		TRICONE	' TUNGCARB.	🗌 so	UNDING ROD	INDUR	<b>ITED</b>		GRAINS ARE DIFFICULT T	DIFFICULT TO SEPARATE WITH STEEL O BREAK WITH HAMMER.		
DESCRIPTI MOD	DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRA MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.							E-GRAY). E.			CORE BIT			NE SHEAR TEST	EXTRE	MELY I	NDURATED	SHARP HAMM SAMPLE BRE	ER BLOWS REQUIRED TO BREAK SAMPLE	

#### PROJECT REFERENCE NO.

SHEET NO.

### U-2525C

2

	TERMS AND DEFINITIONS
SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
15 UFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
N VALUES >	A NUTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
CK THAT CLUDES GRANITE,	WHICH II IS ENCOUNTERED, BUT WHICH DUES NUT NECESSARILT RISE TO UR ABOVE THE GROUND SURFACE.
AL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
STONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
RINGS UNDER	<u>DIRE</u> - A TABULAR BUDT OF TONEOUS ROLK THAT CUTS ALROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
NATINGS IF OPEN	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
AMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
ick up to L Feldspar	<u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN NY. ROCK HAS	<u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
ELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	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
VIDENT BUT	ITS LATERAL EXTENT.
ANE KHOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
E DISCERNIBLE	PERCHED WATER - WATER MAINTAINED ARRIVE THE NORMAL CROWNING WATER LEVEL BY THE PRESENCE
ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
ALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND 5. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
LOWS REQUIRED	<u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT.THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EEP CAN BE FTACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
DR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPI) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF I FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL
FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
T. SMALL, THIN	STRAL RENGING OF STRATUM HAD EXPRESSED AS A FEACINING.
HED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	DENICH MADIC, DI - 47, N. 970 409, E. 1764 474 - 70" DEDAD WITH
THICKNESS	ΔΙΙΜΝΙΜ CΔP
4 FEET	ELEVATION: 784.40 FEET
.5 - 4 FEET 16 - 1.5 FEET	
3 - 0.16 FEET	
0.008 FEET	FIAU - FILLEU IMMEDIATELY AFTER DRILLING
AT, PRESSURE, ETC.	
FEL PROBE	
PROBE:	
;	DATE: 8-15-14

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

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

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

			PROJECT REF	BRENCE NO.		SH	EET NO.
			U-25	525C			2A
ecton	ucally Defo	ormed Heterog	geneous Rock	Masses (Marır	nos and	Hoek,	2000)
r Ir,	SURFACE CONDITIONS OF DISCONTINUITIES <sup>(Predominantly bedding planes)</sup>	VERY GOOD - Very Rough, fresh unweathered surfaces	<b>GOOD -</b> Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact	coatings or Tillings With angular fragments	VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
					7	7	7 /
		70 60	A				/ /
	E. Weak siltstone or clayey shale with sandstone layers		50 B 40	с	>/	E	
formed, Vfaulte ale or deforme forming ructure	ed, siltstone ed g an			30	F/ 20		
formed orming with p	' sı/ty a ockets			di di di			10

DATE: 8-19-16







													1	
<b>WBS</b> 34	4821.1.5			TI	P U-252	25C	COUNT	Y GUILFO	RD			GEOLOGIST RIGGS, A. F.		
SITE DES	SCRIPTIO	N SITE	E NO. 6	6 (STR	UC. #8 &	#9) - BRDG	. NO. 1247	7 & 1248 O	N I-85 BY	PASS	(-L-)	OVER NORTH ELM ST. (-Y6-)	GROUND WTR (ft)	
BORING	<b>NO.</b> W-1			S	TATION	23+44		OFFSET	55 ft RT			ALIGNMENT -Y6-	0 HR. Dry	
COLLAR	RELEV. 7	86.1 ft		т	OTAL DE	<b>PTH</b> 16.1 f	ť	NORTHIN	<b>IG</b> 870,3	309		EASTING 1,764,571 24 HR. Dr		
DRILL RIG	G/Hammer e	FF./DAT	e ter	373 DI	EDRICH D-	50 92% 03/2 <sup>-</sup>	1/2016		DRILL	METHO	D H.	S. Augers HAM	MER TYPE Automatic	
DRILLER	R TURNA	GE, J. F	२.	S	TART DA	TE 09/29/2	16	COMP. D	<b>ATE</b> 09/	/29/16		SURFACE WATER DEPTH	I/A	
ELEV DR (ft) CR (ft) CR	RIVE LEV (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	0	BLOWS 25	PER FOOT 50	75 10	0 SAMP NO.	. Мо	L O I G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	
790												-		
785 78	35.2 0.9				····							786.1 GROUND SUR	<u>ACE 0.0</u> NKMENT <u>1.0</u>	
78	32.3 3.8	6	8	9						M		RED-BROWN, SIL	TY CLAY	
780 78	30.4 5.7	5	5	10	•1	5			SS-1	18.1				
	Ţ	11	24	28			<b>•</b> 52			M		- TAN AND GRAT, FINE	SANDT SILT	
_77	7.3 8.8	33	67/0.4				<u></u>	<u> </u>	<b>.</b>		977	<u>776.8</u>	9.3 ROCK	
775	+						<u> </u>					- (META-GABB	RO)	
77	72.3 13.8	100/0										-		
770 77	70 1 1 16.0	100/0.4	1		• • •			100/0.4	<sup>1</sup> T			770.1	16.0	
	*************************	60/0.1						60/0.				CRYSTALLINE (META-GABB Boring Terminated wi Penetration Test Refusal a ft IN CRYSTALLIN (META-GABB 0 Hr. Ground Water Cav 24 Hr. Ground Water Cav 24 Hr. Ground Water Cav	ROCK (	

WBS	34821	.1.5			ТІ	IP U-2525C	
SITE	DESCR	IPTION	SITE	NO. 6	6 (STR	UC. #8 & #9) - BRDG	6. NO. 124
BOR	ING NO.	. EB1-/	A (LL)		S	TATION 23+76	
COL		EV. 78	7.2 ft		т	OTAL DEPTH 13.9	ft
	Image: constraint of the state of			1/2016			
				- <u> </u>	.575 DI		1/2010
DRIL							
ELEV (ft)	ELEV	DEPTH (ft)		0.5ft		BLOWS	50 PER FOU
()	(ft)	(19)	0.51	0.51	0.51		50
790		-					
	-	t i					
	786.2	1.0				<u> </u>   · · · · <sub> </sub>   · · · ·	
785	-	F _	7	10	12	<b>b</b> <sup>1</sup> <sub>22</sub> <b></b>	
	783.4	3.8	6	24	44	: : :   : ```	
	781.7 -	5.5					
780	-	F					
	778.4	8.8	100/0.6			: : : :   : : : :	
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/75	-	Ł.					
	773.4	<u>13.8</u>	60/0.1				
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#### **GEOTECHNICAL BORING REPORT BORE LOG**

#### SHEET 5 OF 12





WEE	0.400	4.5					11.0505	~		00										
WBS	34821	.1.5					U-25250	<u> </u>				GL				<u> </u>		GEOLOGIST RIGGS, A. F.	0001	
SILE	DESCR		SIIE	: NU. 6		STRUC. #8 & #9) - BRDG. NO. 1247						0 1240 UN 1-00 DT PASS (-L-) (								wik (ft)
BOR		. EB1-0			5		TION 24	4+48				UFF	5E1	51 ft R					UHR.	Dry
COL		EV. 78	38.6 ft		Т		AL DEP	FH 24	4.4 ft			NOR	THIN	<b>G</b> 870,	415			EASTING 1,764,556	24 HR.	Dry
DRILL	_ RIG/HAN		F./DATI		13/3 DI	EDR	RICH D-50	92%	03/21/	2016				DRILL	METHO	ענ	H.S	Augers HAMM	ERTYPE /	Automatic
DRIL		URNAG T	iE, J. F	۲. ۱	<u> </u>	TAR	RT DATE	= 09/	/29/16			CON	IP. DA		/29/16	; 7		SURFACE WATER DEPTH N/	A	
ELEV (ft)	ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	0	. :	BLC 25	ows f	PER F	оот	75	100	NO.	<sup>2.</sup> М		5 3	SOIL AND ROCK DESI	CRIPTION	DEPTH (ft)
790	787.8	- 0.8							<u> </u>			1 - 1						788.6 GROUND SURF	ACE	0.0
		-	3	5	8		: • <b>1</b> 3	· ·	 	· ·	· · · ·			SS-3	30.4		3	TAN-BROWN, SILT	Y CLAY	
785	784.6-	4.0	6	7	9		<u></u>	<u>:</u> :	<u>· · ·</u>	<u>.</u> .	<u>.</u>	1:					ł	784.1		4.5
	783.0	5.6	6	11	15		• 16	26 -	· ·	· ·	· ·				M		8±	TAN-BROWN AND GRAY, SILT	, FINE SANI	DY
780		±						<u> </u>	•••		•••						) 	_		
	119.0	1 9.0 1	11	17	23				<b>\</b> 40		• •				D		<u>i</u>			
		ł							<u> </u>	· ·							8	776.1		12.5
775	774.6-	- 14.0	100/0 5														9	_ WEATHERED RO (META-GABBR	O)	
		Ŧ	100/0.2	1								.	100/0.2	Ī			9	· · · ·	- /	
770		Ŧ							•••		•••						9			
	769.6-	<u>+</u> 19.0 T	100/0.5	\$									100/0.5				9	-		
	-	ŧ															9			
765	764.6-	24.0															9	764.2		24.4
		ŧ	100/0.4	1									100/0.4				-	Boring Terminated at Eleva	tion 764.2 ft	
		ŧ															F		Dry of 19 1	C) Et
		ŧ															þ	24 Hr. Ground Water Caved	Dry at 18.1	Ft.
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							E
WBS	34821	1.1.5			TI	IP U-2525C	COUNT
SITE	DESCR		I SITE	NO. 6	6 (STR	UC. #8 & #9) - BRDG	i. NO. 124
BOR	ING NO	. EB1-	B (RL)		S	<b>TATION</b> 25+36	
COL	LAR EL	<b>EV.</b> 79	92.7 ft		т	OTAL DEPTH 13.91	ft
DRILL	_ RIG/HAN	/MER EF	F./DATI	e ter	373 DI	EDRICH D-51 99% 03/0	9/2017
DRIL	LER T	URNAG	BE, J. F	₹.	S	TART DATE 09/29/*	16
ELEV	DRIVE	DEPTH	BLC	w co	UNT	BLOWS	PER FOO
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50
795		ł					
		<u> </u>					
700	791.9	<u> </u>	7	6	6	$ \begin{vmatrix} \cdot \cdot \\ \cdot \\ \bullet \\ 12^{\circ} \end{vmatrix} $	
190	788.9	3.8	L			- · · <del>\</del> + · · · ·	<u> </u>
	787.0	5.7	7	9	12	<b>1 1 1 1 1 1 1 1 1 1</b>	
785		t	6	6	6	• • • 12 · · · · ·	· · ·
	783.9	8.8	10	7	8	<b>\</b>	
		ŧ					
780	778.9	13.8					
		1	60/0.1				
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#### **GEOTECHNICAL BORING REPORT** BORE LOG

#### SHEET 6 OF 12





<b>WBS</b> 34821.1.5						P U-2525	5C	Y GUILFOR	D			GEOLOGIST RIGGS, A. F.			
SITE	DESCRI	PTION	SITE	NO. 6	(STRI	UC. #8 & #	49) - BRDG.	NO. 1247	7 & 1248 ON	I-85 BY	PASS	(-L-)	OVER NORTH ELM ST. (-Y6-)	GROUND WTR (ft)	
BOR	NG NO.	W-2			ST	TATION 2	25+63		OFFSET 7	'1 ft RT		. ,	ALIGNMENT -Y6-	<b>0 HR.</b> Dry	
COLI	AR ELE	<b>V.</b> 79	2.9 ft		тс	OTAL DEP	<b>TH</b> 17.2 ft		NORTHING	870,52	28		EASTING 1,764,560	24 HR. Dry	
DRILL	RIG/HAM	MER E FI	F./DATE	E TER	373 DI	EDRICH D-5	0 92% 03/21	/2016		DRILL N	IETHOE	О Н.S	S. Augers HAMME	R TYPE Automatic	
DRIL	LER TU	JRNAG	E, J. R	R.	SI	FART DAT	E 09/29/1	6	COMP. DAT	<b>FE</b> 09/2	29/16		SURFACE WATER DEPTH N/A	4	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W COU 0.5ft	JNT 0.5ft	0	BLOWS	PER FOOT 50	75 100	SAMP. NO.	мо	L O I G	SOIL AND ROCK DESC	CRIPTION DEPTH (ft)	
795															
790 785 780		0.7	11 7 5 4 9 60/0.1	10 5 5 4 6	8 6 5 94/0.4				· · · · · · · · · · · · · · · · · · ·	SS-5	D M 35.3		792.9 GROUND SURF/ ARTIFICIAL FIL 791.2 BROWN-TAN, FINE SA RESIDUAL RED-ORANGE AND BRC CLAY 778.1 TAN-GRAY, FINE SAN WEATHERED RC 775.8 (META-GABBR Boring Terminated with Penetration Test Refusal at If ft IN CRYSTALLINE (META-GABBR/ 0 Hr. Ground Water Caved 24 Hr. Ground Water Caved 24 Hr. Ground Water Caved	ACE 0.0 L NDY SILT 1.7 WN, SILTY IDY SILT 14.8 CK D) 17.1 OCK 17.2 Standard Elevation 775.7 ROCK O) Dry at 13.5 Ft. Dry at 13.5 Ft.	
	- - - - - - - - - - - - - - - - - - -												- - - - - - -		

WBS	34821.	1.5			TI	P U-2	25250	;		COUN	TY G	UILFOF	RD.			GEOLOGIST SCHLEMM, T. S.	
SITE	DESCRI	PTION	SITE	E NO. 6	6 (STR	UC. #8	3 & #9	) - BR	DG. N	NO. 124	47 & 1	248 ON	l I-85 BY	PASS	(-L-)	OVER NORTH ELM ST. (-Y6-) GROUND WTF	R (ft)
BOR	ING NO.	W-3			S	ΓΑΤΙΟ	<b>N</b> 23	8+45			OF	SET	58 ft LT			ALIGNMENT -Y6- 0 HR.	Dry
COL	LAR ELE	<b>V.</b> 77	'8.8 ft		т	OTAL	DEPT	<b>H</b> 13	.0 ft		NO	RTHING	<b>G</b> 870,3	01		EASTING 1,764,458 24 HR.	4.0
DRILL	. RIG/HAM	MER EF	F./DAT	e ter	373 DI	EDRICH	HD-50	92% 0	3/21/2	016			DRILL N	IETHO	) Н.	S. Augers HAMMER TYPE Automa	atic
DRIL	LER TU	IRNAG	6E, J. F	۲.	S	TART	DATE	09/2	27/16		со	MP. DA	TE 09/2	27/16		SURFACE WATER DEPTH N/A	
EL EV		ЛЕРТН	BLC	w co	UNT			BLO\	NS PE	ER FOC	 )Т		SAMP.		1 L		
(ft)	ELEV	(ft)	0.5ft	0.5ft	0.5ft	0	2	25	50	C	75	100	NO.				
780		-														778.8 GROUND SURFACE	0.0
	777.9	0.9	10	9	9		. .						00.6	0.6			
775	775.4	3.4					1 <sup>18</sup>						33-0	9.0		- 776.3 TAN AND BROWN, FINE SANDT CLAT	2.5
	<del>_</del>	-	2	2	10	. 9	<b>1</b> 2 <b>-</b>								$\mathbb{N}$	DARK GRAY, CLAYEY FINE SAND	4.4
	- //2.9 -	<u>5.9</u>	44	56/0.2								100/0.7				BROWN AND GRAY CLAYEY FINE TO	6.4
770	770.4	8.4	12	55	15/0 3		•••	•••	•••		• •					- COARSE SAND	
	<u>†</u>		72		-0/0.0		::		::		: :	100/0.8				(META-GABBRO)	
	<u>-</u>	40.0					• •									- - 765 9	12.0
	-/65.8 =	-13.0	60/0.0			· ·	••	••	•••		•   •	60/0.0			4777	Boring Terminated with Standard	15.0
	1															- Penetration Test Refusal at Elevation 765.8 - ft ON CRYSTALLINE ROCK	
	1															- (META-GABBRO)	
	+	-														0 Hr. Ground Water Caved Dry at 11.0 Ft.	
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#### **GEOTECHNICAL BORING REPORT** BORF I OG

#### SHEET 7 OF 12



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WBS	<b>3</b> 4821	.1.5			ТІ	P U-252	5C	COUNT	Y GUILF	ORD				GEOLOGIST SCHLEMM, T. S	
SITE	DESCR	IPTION	SITE	NO. 6	6 (STR	UC. #8 & ‡	#9) - BRDG.	NO. 124	7 & 1248 (	DN I-8	35 BYF	PASS (	-L-) C	OVER NORTH ELM ST. (-Y6-)	GROUND WTR (ft)
BOR	ING NO.	EB2-	A (LL)		S	TATION 2	23+76		OFFSET	66 1	ft LT			ALIGNMENT -Y6-	0 HR. Dry
СОГ		<b>V</b> . 77	'8.2 ft		т		<b>PTH</b> 14.6 ft	ł	NORTH	NG 8	370.33	31		<b>EASTING</b> 1,764,448	<b>24 HR</b> . 5.0
				E TER	1 272		0 92% 03/21	/2016					Ης		ER TYPE Automatic
								c	COMP			2/46	11.3.		
		JRINAG	E, J. F	K.	3		E 09/27/1				09/2			SURFACE WATER DEPTH N/	A
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	0.5ft	0	25	50 50	75 1 <sup>-</sup>	00	NO.	MOI	O G	SOIL AND ROCK DESI	CRIPTION DEPTH (tt)
DRIL ELEV (ft) 780 775 770 765	LER TU DRIVE ELEV (ft) 7777.3 7774.8 77774.8 7774.8 7774.8 77774.8 7774.8 7774.8 7774.8 7774.8 7774.9 77747	JRNAG DEPTH (ft) 	E, J. F BLC 0.5ft 4 11 6 26 100/0.3 60/0.1	X. OU 0.5ft 4 12 17 18	ST UNT 0.5ft 5 13 80 23		E 09/27/1 BLOWS 25	6 PER FOOT		DATE S 000 	09/2 SAMP. NO. SS-7	27/16 MOI M L W V V V V V V V V V V V V V V V V V V V		SURFACE WATER DEPTH N/ SOIL AND ROCK DESC ELEV. (ft) 778.2 GROUND SURF ROADWAY EMBAN TAN, BROWN, FINE SA 775.2 RESIDUAL BROWN AND GRAY, CLA COARSE SAND, SAP 767.8 WEATHERED RG (META-GABBR Boring Terminated with Penetration Test Refusal at ft IN CRYSTALLINE (META-GABBR 0 Hr. Ground Water Caved 0 Hr. Ground Water Caved	A CRIPTION DEPTH (ft) ACE 0.0 KMENT NDY CLAY 3.0 YEY FINE TO ROLITIC 10.4 OCK O) 14.5 OCK O) 14.6 OCK O) 16 OCK O) 16 OCK O) 16 OCK O) 16 OCK O) 17 OCK O) 16 OCK O) 16 OCK O) 17 OCK O OCK O OCK O O O O O O O O O O O O O
		-													

	WBS	34821	.1.5			ТІ	P	U-25250	;	COUNT
	SITE	DESCR	IPTION	SITE	NO. 6	6 (STR	U	C. #8 & #9	) - BRDG.	NO. 124
	BOR	ING NO.	EB2-0	С		S	Г	ATION 24	+58	
	COL	LAR ELI	EV. 77	7.3 ft		т	0	TAL DEPT	<b>H</b> 16.4 ft	
	DRILL	. RIG/HAN	IMER EF	F./DATE	E TER	373 DI	E	DRICH D-50	92% 03/21	2016
	DRIL	LER T	URNAG	E. J. R	ξ.	S	Т/	ART DATE	09/27/1	6
		DRIVE	ПЕРТН	BLO	w co	UNT	Γ		BLOWS	PER FOOT
	(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft		0 2	5	50
		(1)					F			1
	700									
	780		F							
		777.3								
	775	-	ł	6	1	8		1. 1. • 15		
		773.5 -	3.8							
		771.9	5.4	4	4	9		<b>•</b> 13		
	770	-	L .	5	4			* •11 *		
		768.5	8.8	0	10	10				
		-	F	9	12	10			<b>Þ</b> 30	
	765	-	ļ.						ļ:::	
		763.5	13.8	31	43	57/03				
		761.0	16.3	0.	.0	01/010				
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#### **GEOTECHNICAL BORING REPORT BORE LOG**

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<b>WBS</b> 3482	1.1.5			TI	P U-252	5C	COUNT	Y GUILF	ORD			GEOLOGIST SCHLEMM, T. S.	
SITE DESCR	RIPTION	I SITE	NO. 6	6 (STRI	UC. #8 & #	#9) - BRDG.	NO. 1247	7 & 1248 (	ON I-85 B	/PASS	(-L-) (	OVER NORTH ELM ST. (-Y6-)	GROUND WTR (ft)
BORING NC	. EB2-l	B (RL)		SI	TATION 2	25+42		OFFSET	65 ft LT			ALIGNMENT -Y6-	0 HR. N/A
COLLAR EL	<b>EV.</b> 77	78.8 ft		т	DTAL DEP	<b>PTH</b> 15.5 ft	t	NORTHI	NG 870,4	191		EASTING 1,764,429	24 HR. Dry
DRILL RIG/HA	MMER EF	F./DATE	E TER	373 DI	EDRICH D-5	0 92% 03/21	/2016		DRILL	METHO	D SP1	Core Boring HAMM	ER TYPE Automatic
DRILLER 1	URNAG	E, J. R	ł.	ST		<b>FE</b> 09/28/1	6	COMP. I	DATE 09	/28/16		SURFACE WATER DEPTH N/	A
ELEV DRIVE (ft) CRIVE ELEV (ft)	DEPTH (ft)	BLO 0.5ft	W CO 0.5ft	UNT 0.5ft	0	BLOWS 25	PER FOOT	75 1 <sup>0</sup>	DO NO.	MO	L O I G	SOIL AND ROCK DESC ELEV. (ft)	CRIPTION DEPTH (ft
780 777.8 775 774.9 773.4	- 1.0 - 3.9 - 5.4	4 7 7 7	7 8 9	6 8 13	· · • 13	6			  	10.4 M M		778.8 GROUND SURF. ROADWAY EMBAN LIGHT BROWN, FINE SAND 775.3 ROCK FRAGME RESIDUAL BROWN, GRAY AND LIGH FINE SAND	ACE 0. KMENT DY CLAY WITH NTS <u>3.</u> IT TAN, SILTY
770 770 765	- 7.8 - 7.8 	60/0.0					· · · · · ·		- - - - - - -			771.4 WEATHERED RC 770.8 WEATHERED RC (META-GABBR (META-GABBR	7. O) 7. O) 8. OCK O)
												763.3 Boring Terminated at Eleva CRYSTALLINE ROCK (ME 1) Advanced 2-15/16" Trico Refusal at 8.0 F 2) NW Casing Advanced 3) Water used as Drill 24 Hr. Ground Water Caved	15. tion 763.3 ft IN TA-GABBRO) ne Roller Bit to T. d to 7.4 FT. ing Fluid d Dry at 4.4 Ft.

					r										
WBS	34821	.1.5			TIP	U-252	5C	C	OUNT	ΥĢ	UILFORD	GEOLOGIST SCHLEM	И, Т. S.		
SITE	DESCRI	PTION	SITE	E NO. 6 (S	TRUC	. #8 &	#9) - BRI	DG. N	O. 124	7&1	248 ON I-85 BYPASS (-L-) O	VER NORTH ELM ST. (-Y	6-)	GROUN	D WTR (ft)
BOR	ING NO.	EB2-E	B (RL)		STA	ΓΙΟΝ	25+42			OF	FSET 65 ft LT	ALIGNMENT -Y6-		0 HR.	N/A
COL	LAR ELE	<b>V.</b> 77	'8.8 ft		тот	AL DE	<b>PTH</b> 15.	.5 ft		NC	RTHING 870,491	EASTING 1,764,429		24 HR.	Dry
DRILL	. RIG/HAM	MER EF	F./DAT	E TER373	3 DIEDF	RICH D-	50 92% 03	3/21/20	16		DRILL METHOD SPT (	Core Boring	HAMME	ER TYPE	Automatic
DRIL	LER TU	JRNAG	ie, J. f	र.	STAF	RT DA	<b>TE</b> 09/2	8/16		СС	MP. DATE 09/28/16	SURFACE WATER DEP	TH N/A	Ą	
COR	E SIZE	NQ2			тоти	AL RU	<b>N</b> 7.5 ft								
ELEV	RUN	DEPTH	RUN		REC.	JN RQD	SAMP.	STF	RATA RQD	L	DE		2		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G	ELEV. (ft)	SCRIFTION AND REMARKS	5		DEPTH (ft)
770.8												Begin Coring @ 8.0 ft			
770	770.8	<u>    8.0</u> •   10  5	2.5	2:75/1.0	(2.5) 100%	(2.5) 100%		(7.5)	(7.5)		_ 770.8 - FRESH, VER	CRYSTALLINE ROCK Y HARD, DARK GRAY (MET	ГА-GAB	BRO)	8.0
	700.0	-	5.0	0:75/0.5	(5.0)	(5.0)				R	-	NO FRACTURES			
765	_	-		2:75/1.0	100%	100%				R	-				
	763.3	15.5		2:25/1.0						P	763.3				15.5
1	-	-									Boring Terminated	at Elevation 763.3 ft IN CR) (META-GABBRO)	STALL	NE ROCK	
1	-	-									1) Advanced 2-1	5/16" Tricone Roller Bit to R	efusal a	t 8.0 FT.	
	-	-									2)	NW Casing Advanced to 7.4 8) Water used as Drilling Flui	FT. d		
	-	-									24 Hr.	Ground Water Caved Dry at	4.4 Ft.		
	4	-									-				
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#### GEOTECHNICAL BORING REPORT CORFIOG

#### SHEET 9 OF 12

Project No. 34821 (U-2525C) SITE NO. 6 (STRUCTURE NO. 8 AND NO. 9) - BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-L-) OVER NORTH ELM STREET (-Y6-)

### **CORE PHOTOGRAPHS** EB2-B BOX 1: 8.0-15.5 FEET



#### **Tierracon** Consulting Engineers & Scientists

#### GEOTECHNICAL BORING REPORT BORE LOG

					-									
WBS	34821	.1.5			ТІ	Ρ	י U-	252	5C			CO	UNT	Y
SITE	DESCR	IPTION	SITE	NO. 6	6 (STR	U	C. #	8&7	#9)	- BR	DG.	NO.	124	7&
BOR	ING NO	. W-4			S	Г/	ΑΤΙΟ	N :	25-	-69				O
COL	LAR EL	<b>EV.</b> 78	1.4 ft		т	<u>.</u>	TAL	DEF	эτι	<b>i</b> 17	'.2 ft			N
DRILL	_ RIG/HAN	/MER EF	F./DATE	E TER	373 DI	EI	DRIC	H D-5	50 9	2% (	3/21/	2016		
DRIL	LER T	URNAG	E. J. R	ξ.	S	Г/	ART	DAT	ΓE	09/	28/16	5		С
FI EV	DRIVE	ПЕРТН	BLO	w co	JNT					BLO	WSF	PER F	001	-
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft		0		25		5	50		75
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765	764.3	T 17.1					·		-			· ·		_
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DOT BORE SINGLE U2525C\_GEO\_BRDG1247-1248\_SITE6.GPJ NC\_DOT.GDT 11/17/17

#### SHEET 11 OF 12



#### LABORATORY TESTING SUMMARY

PROJECT NUMBER: 34821.1.1

TIP: U-2525C

COUNTY: GL

DESCRIPTION: SITE NO. 6 (STRUCTURE NO. 8 AND NO. 9) - BRIDGE NO. 1247 AND 1248 ON I-85 BYPASS (-Y6-) OVER NORTH ELM STREET (-Y6-)

			• "	Depth					% by V	Veight		%	%	Passing (siev	es)		<b>0</b> /
Sample No.	Alignment	Station	(feet)	Interval (feet)	Class.	L.L.	P.I.	Coarse Sand	Fine Sand	Silt	Clay	Retained #4 Sieve	#10	#40	#200	% Moisture	% Organic
SS-1	-Y6-	23+44	55 RT	3.8-5.3	A-6 (13)	37	20	10.5	23.6	40.2	25.7	0	100	94	74	18.1	N/D
SS-2	-Y6-	23+76	52 RT	3.8-5.3	A-4 (0)	28	NP	3.7	18.4	70.3	7.6	0	100	98	86	7.2	N/D
SS-3	-Y6-	24+48	51 RT	0.8-2.3	A-7-6 (29)	56	33	5.7	17.9	43.3	33.1	0	100	97	83	30.4	N/D
SS-4	-Y6-	25+36	67 RT	5.7-7.2	A-7-6 (17)	42	17	1.5	15.2	60.6	22.7	0	100	99	90	16.1	N/D
SS-5	-Y6-	25+63	71 RT	8.8-10.3	A-7-6 (25)	55	28	3.4	25.2	40.3	31.1	0	100	98	81	35.3	N/D
SS-6	-Y6-	23+45	58 LT	0.9-2.4	A-6 (6)	29	12	14.7	19.4	41.8	24.1	1	98	89	71	9.6	N/D
SS-7	-Y6-	23+76	66 LT	8.4-9.9	A-2-6 (0)	30	13	53.0	26.0	13.6	7.4	0	100	60	26	N/A	N/D
SS-8	-Y6-	24+58	59 LT	5.4-6.9	A-2-4 (0)	27	NP	26.0	22.2	45.4	6.4	43	55	44	32	N/A	N/D
SS-9	-Y6-	25+42	65 LT	1.0-2.5	A-6 (6)	29	12	9.4	14.1	45.9	30.6	16	82	76	68	10.4	N/D
SS-10	-Y6-	25+69	57 LT	0.8-2.3	A-7-6 (19)	41	23	7.2	14.4	39.5	38.9	0	98	93	83	16.7	N/D

NP - NONPLASTIC

#### GUILFORD

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203 Certification Number

#### **CONTENTS**

<u>SHEET NO.</u>	<b>DESCRIPTION</b>
I.	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE(S)
5-7	CROSS SECTION(S)
8-13	BORE LOG(S)
14	SOIL TEST RESULTS
15	SITE PHOTOGRAPH(S)

#### 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 SITE DESCRIPTION SITE #7 (STRUCTURE #10), BRIDGE NO. 1249 ON LAKE JEANETTE ROAD (-Y7-) OVER I-85 BYPASS (-L-)

DocuSigned by:

Mahalingam Babiradhan -FC52EEB5B5E6459.

34821 PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	15

#### **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 BORNOSS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (UN-PLACE)TEST DATA CAN BE RELIED ON ONLY TO THE DEOREE OF RELIABILITY INHERENT IN THE STANDARD TEST WETHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS MAY AND 'CONSIDERABLE'S UNCLATED IN THE SUBSURFACE DIVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WAITER LEVELS OR SOLL MOISTURE CONDITIONS MAY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OF 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 DOES NOT MARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MARE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY IMINSELF AS TO CONDITIONS TO BE ENCOUNTERED NO THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL COMPENSATION OR FOR AN THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- 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 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

M. BAHIRADHAN

J. WHITT

C. BUTLER

FROEHLING AND

ROBERTSON

INVESTIGATED BY \_\_\_\_\_\_. WHITT

DRAWN BY <u>C.</u> BUTLER

SUBMITTED BY \_\_\_\_\_\_SCHNABEL\_ENG.

DATE \_\_\_\_\_SEPTEMBER 2017



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

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOIL	DESC	RIPT	ION					T		GR	ADATION			1				ROCK DE	SCRIPTION
SOIL IS C BE PENETH ACCORDIN IS BA	CONSIDERED RATED WITH NG TO THE ASED ON TH	UNCONSOLI H A CONTINU STANDARD I HE AASHTO	DATED, SEMI-C OUS FLIGHT F ENETRATION SYSTEM, BASIC	ONSOLID	ATED, O JGER A ASHTO IPTIONS	IR WEAT IND YIEI T 206. GENEF	HERED E LD LESS ASTM DI RALLY IN	ARTH MAT THAN 100 586), SOIL CLUDE TH	ERIALS TH BLOWS PE CLASSIFI E FOLLOWI	AT CAN R FOOT CATION NG:	WELL GRADED - INDICATE UNIFORMLY GRADED - INI GAP-GRADED - INDICATES	ES A C DICATE S A MI	GOOD REPRESENTS THAT SOIL	NTATION OF PARTIC PARTICLES ARE AL FORM PARTICLE SI	LE SIZES F L APPROXIN ZES OF TWO	ROM FINE TO COARSE. MATELY THE SAME SIZE. ) OR MORE SIZES.	HARD ROCK I ROCK LINE IN SPT REFUSAL BLOWS IN NO	3 NON- IDICATE IS PE IN-COA	COASTAL P ES THE LE' INETRATION	PLAIN M	ATERIAL THAT WHICH NON-COA SPLIT SPOON SO ERIAL, THE TRA	WOULD YIELD SPT REFUSAL IF TEST NSTAL PLAIN MATERIAL WOULD YIELD AMPLER EQUAL TO OR LESS THAN 0.1 ANSITION BETWEEN SOIL AND ROCK
CONSISTEN	MINERALO	GICAL COMP	ISTURE, AASH	ARITY, S	STRUCT	URE, PL	ASTICITY	ETC. FO	NT FACTOR R EXAMPLE,	S SUCH			ANGULAR	SOTU CRAINS IS DI		BY THE TERMS.	ROCK MATERI	ALS AF	RE TYPICAL	LLY DIV	IDED AS FOLLON	VS:
V	ERY STIFF,G	RAY.SILTY CL	Y,MOIST WITH I			VE SAND	) LAYERS.	HIGHLY PLA	STIC.A-7-6		- <u>ANGULAR</u> , <u>SUBAN</u>	GULAR,	SUBROUNDED,	OR <u>ROUNDED</u> .	JIONATED 1	BT THE TENNS:	WEATHERED				N-COASTAL PLA	IN MATERIAL THAT WOULD YIELD SPI
GENERAL	<u> </u>	GRANULAR MA	ERIALS	9 HH3	SILT-CLA	Y MATER	IALS			AL C		MI	INERALOGI	CAL COMPOS	TION				121.2	FII	NE TO COARSE I	GRAIN IGNEOUS AND METAMORPHIC RO
CLASS.	(	≤ 35% PASSIN	•200)	(	> 35% P	ASSING	*200)			HL5 1	MINERAL NAM ARE USED IN	IES SUO	CH AS QUARTZ RIPTIONS WHEN	, FELDSPAR, MICA, T THEY ARE CONSID	ALC.KAOLIN	I, ETC. IGNIFICANCE.	ROCK (CR)		1	WO GN	DULD YIELD SPT WEISS, GABBRO, SI	REFUSAL IF TESTED. ROCK TYPE IN CHIST, ETC.
GROUP CLASS. A	A-1 A-1-a A-1-b	A-3 A-2-4	A-2-5 A-2-6 A	-2-7	4 A-5	) A-6	A-7-5, A-7-6	A-1, A-2 A-3	A-4, A-5 A-6, A-7				COMPR	RESSIBILITY			NON-CRYSTAL	LINE		FIN SE	NE TO COARSE I	GRAIN METAMORPHIC AND NON-COASTA K THAT WOULD YEILD SPT REFUSAL
SYMBOL				8							SLIGH MODEL	TLY CO		F	LL < 31	- 50		- IN	+		OCK TYPE INCLU	DES PHYLLITE, SLATE, SANDSTONE, ETC
% PASSING	000000000000000000000000000000000000000				58			<u></u>	SII T.		HIGHL	Y COM	PRESSIBLE		LL > 50	56	SEDIMENTARY	ROCK		SP	T REFUSAL. ROO	CK TYPE INCLUDES LIMESTONE, SANDS
*10 5i *40 3i	0 MX 0 MX 50 MX	51 MN						GRANULAR SOILS	CLAY	MUCK, PEAT		P	PERCENTAC	<u>GE OF MATER</u>	IAL						WEAT	HERING
*200 IS	5 MX 25 MX	10 MX 35 MX	35 MX 35 MX 3	5 MX 36 M	MN 36 M	1N 36 MN	1 36 MN		SUILS		ORGANIC MATERIAL		SOILS			R MATERIAL	FRESH	ROCK	FRESH, CRYS	STALS B	BRIGHT, FEW JOIN	TS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING *40								CO11 C			LITTLE ORGANIC MATT	ER	2 - 5%	5 - 12%	LITTLE	10 - 20%	VERY SLIGHT	ROCK	GENERALLY	FRESH.	JOINTS STAINED	Some joints may show thin clay c
LL PI	- 6 MX	- 40 MX	41 MN 40 MX 4	1 MN 40 M	41 M	IN 40 MX IX 11 MN	< 41 MN	LITT	E OR	HIGHLY	MODERATELY ORGANIC HIGHLY ORGANIC		5 - 10% > 10%	12 - 20% > 20%	SOME HIGHLY	20 - 35% 35% AND ABOVE	(V SLI.)	CRYST	ALS ON A E	BROKEN	SPECIMEN FACE	SHINE BRIGHTLY. ROCK RINGS UNDER H
GROUP INDEX	0	0 1	4 MX	( 8 M	IX 12 M	IX 16 MX	K NO MX	Mode Amoun	RATE ITS OF	ORGANIC			GROL	JND WATER			SLIGHT	ROCK	GENERALLY	FRESH,	JOINTS STAINED	AND DISCOLORATION EXTENDS INTO RO
USUAL TYPES S	TONE FRAGS.	FINE S	LTY OR CLAYEY		SILTY	CL	AYEY	ORG MAT	ANIC Ter	50125	$\nabla$	WATE	ER LEVEL IN E	BORE HOLE IMMEDIA	TELY AFTE	R DRILLING	(SLI.)	1 INCH CRYST	. OPEN JOIN	INTS MAY	Y CONTAIN CLAY.	IN GRANITOID ROCKS SOME OCCASIONA
MATERIALS	SAND	SAND G	avel and sand		SOILS	so	DILS				<b>▼</b>	STAT	TIC WATER LEV	VEL AFTER 24	HOURS		MODERATE	SIGNIF	ICANT POR	TIONS OF	IF ROCK SHOW DI	SCOLORATION AND WEATHERING EFFECTS
GEN. RATING		EXCELLENT TO	GOOD		FAIR	TO POOR	R	FAIR TO	POOR	UNSUITABLE	<u>.</u> <u> <u> </u> /u>	PERC	CHED WATER, SA	ATURATED ZONE, OR	WATER BE	ARING STRATA	(MOD.)	GRANI1 DULL	FOID ROCKS.	3.MOST F )ER HAM⊵	FELDSPARS ARE I MER BLOWS AND 1	DULL AND DISCOLORED,SOME SHOW CLA SHOWS SIGNIFICANT LOSS OF STRENGTH
AS SUBURAUE		PLOF A-7-5 S	IBGROUP IS ≤ I	L - 30 : F	P1 OF A-	7-6 SUBC	GROUP IS 2	PUUR • LL - 30			- O-M-	SPRI	ING OR SEEP					WITH F	FRESH ROCK	к.	-	
		C	NSISTEN	ICY O	R DE	INSEN	NESS				1		MISCELLA	NEOUS SYMBO	JLS		SEVERE	ALL R	ISCOLORED	AND A 1	MAJORITY SHOW	R STAINED. IN GRANITUID ROCKS, ALL F KAOLINIZATION. ROCK SHOWS SEVERE L
		COMPA	TNESS OR	R	ANGE O	F STAN	IDARD	RAN	E OF UNC	ONF INED			NT (RF) 25/02		FCTION		(MOD. SEV.)	AND C	AN BE EXCA	AVATED	WITH A GEOLOGI	ST'S PICK. ROCK GIVES "CLUNK" SOUND "
	0122	CONS	ISTENCY		(N-	VALUE)		00.1	(TONS/F1	2)	WITH SOIL DES	SCRIPT	ION	OF ROCK STRU	CTURES		SEVERE	ALL R	OCK EXCEP	'T QUART	Z DISCOLORED O	R STAINED. ROCK FABRIC CLEAR AND E
GENERAL	LY	VER	r LOOSE OOSE		4	< 4 TO 10					SOIL SYMBOL			DPT DMT TEST BOP		SLOPE INDICATOR	(SEV.)	TO SO	IN STRE	ENGTH IL	FRAGMENTS OF S	IN GRANITUID RUCKS ALL FELDSPARS A
MATERIAL	к L	MEDI	IM DENSE		10 30	TO 30	1		N/A		ARTIFICIAL FI	LL (AF		AUGER BORING	$\mathbf{\Delta}$	CONE PENETROMETER	VEDV	IF TES	STED, WOULD	<u>D YIELD</u>	SPT N VALUES	<u>&gt; 100 BPF</u>
(NON-COH	NULAR MEDIUM DENSE 10 TO 30 N ERIAL DENSE 30 TO 50 -COHESIVE) VERY DENSE > 50											EMBA		<u> </u>	$\bigcirc$	IESI	SEVERE	BUT M	IASS IS EFF	FECTIVEL	LY REDUCED TO	SOIL STATUS, WITH ONLY FRAGMENTS O
GENERAL	LY	VEF	Y SOFT SOFT		2	< 2 TO 4			< 0.25 0.25 TO	2.5	- INFERRED SOIL	_ BOUN		)- CORE BORING	•	SOUNDING ROD	(V SEV.)	VESTI	NING. SAPRO	IGINAL R	S AN EXAMPLE OF ROCK FABRIC REM	F ROCK WEATHERED TO A DEGREE THAT AIN. <u>IF TESTED, WOULD YIELD SPT N V</u>
SILT-CLA	AY	MEDI	M STIFF		4	TO 8			0.5 TO 1	.0		K LINE	≝ <sup>™</sup> C	) MONITORING WE	:LL - 🗣	H TEST BORING WITH CORE	COMPLETE	ROCK	REDUCED TO	O SOIL.	ROCK FABRIC NO	T DISCERNIBLE, OR DISCERNIBLE ONLY
(COHESIV	'E)	VER	STIFF		15	TO 30			2 TO 4		ALLUVIAL SOIL	L BOUN		PIEZOMETER INSTALLATION	Ċ	)- SPT N-VALUE		ALSO	AN EXAMPLE	.ENTRATIC	IUNS. GUHNIZ MH	T DE FRESENT HS DIKES UN STRINGENS
					GRAI	N SI	ZE		24		<u> </u>	— F	RECOMMEN	DATION SYMB	OLS						ROCK H	ARDNESS
U.S. STD. SIF	VF SIZE		4 16	, <u> </u>	40	60	200	270				7] UN	ICLASSIFIED E>	KCAVATION -	<u></u> हन्जूज्ञ UNCLA	SSIFIED EXCAVATION -	VERY HARD	CANNO	T BE SCRAT	ATCHED B BLOWS OF	BY KNIFE OR SHA F THE GEOLOGIST	RP PICK. BREAKING OF HAND SPECIMEN: 'S PICK.
OPENING (MM	0		4.76 2.0		.42	0.25	0.075	0.053				UN!	ISUITABLE WAS		ACCEP است USED	TABLE,BUT NOT TO BE IN THE TOP 3 FEET OF	HARD	CAN B	E SCRATCH	HED BY K	NIFE OR PICK OF	NLY WITH DIFFICULTY. HARD HAMMER B
BOULDER	со	BBLE	GRAVEL	C04 S4	ARSE AND		F INE SAND		SILT	CLAY			CEPTABLE DEG	RADABLE ROCK	EMBAN	KMENT OR BACKFILL		TO DE	TACH HAND	I SPECIME	NIFE OR PICK G	OUCES OR GROOVES TO 0.25 INCHES OF
(BLDR.)		.0B.)	(GR.)	(CSE	. SD.)		(F SD.)		.SL.)	()			ABBR	REVIATIONS			HARD	EXCAV	ATED BY H	HARD BLO	DW OF A GEOLOGI	ST'S PICK. HAND SPECIMENS CAN BE D
GRAIN MM SIZE IN.	305 12	75 3	2.	0		0.25		0.05	0.005		AR - AUGER REFUSAL BT - BORING TERMINATED	J	MED MICA	MEDIUM MICACEOUS	VST WEA	- VANE SHEAR TEST - WEATHERED	MEDIUM	CAN B	JE GROOVED	.uws. ) OR GOU	JGED 0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE O
	9	OIL MO	STURE -	CORF	RELA	TION	I OF	TERMS			- CL CLAY CPT - CONE PENETRATION	N TEST	MOD NP - N	MODERATELY	$\gamma - \gamma -$	UNIT WEIGHT DRY UNIT WEIGHT	HARD	CAN B	E EXCAVATE	ED IN SM	MALL CHIPS TO I	PEICES 1 INCH MAXIMUM SIZE BY HARD
SOIL N	MOISTURE	SCALE	FIELD	MOISTUR	RE	GUIDE	E FOR F	IELD MOI	STURE DES	CRIPTION	CSE COARSE		ORG	ORGANIC			SOFT	CAN B	E GROVED (	OR GOUG	GED READILY BY	KNIFE OR PICK. CAN BE EXCAVATED IN
	ERBERG LI	MITS	DESU	RIPTION							DPT - DYNAMIC PENETRAT	TION TE	EST SAP	SAPROLITIC	.51 <u>5</u> S -	BULK		FROM PIECE	CHIPS TO S S CAN BE E	SEVERAL BROKEN J	. INCHES IN SIZE BY FINGER PRESS	BY MODERATE BLOWS OF A PICK POIN
			- SATU (SA	IRATED ·	-	USUA FROM	1 BELOW	JID; VERY THE GRO	WET, USU	ALLY R TABLE	e - VOID RATIO F - FINE		SD S SL S	AND, SANDY ILT, SILTY	SS - ST ·	· SPLIT SPOON · SHELBY TUBE	VERY	CAN B	E CARVED	WITH KN	IFE. CAN BE EXC	AVATED READILY WITH POINT OF PICK.
PLASTIC		LIMIT									- FOSS FOSSILIFEROUS	TURES	SLI S	SLIGHTLY	RS ·	ROCK	50F1	FINGE	RE IN THIC	JKNESS L	LAN BE BRUKEN I	BT FINGER PRESSURE, CAN BE SCRATCH
RANGE <			- WET	- (W)		ATTA	IN OPTIM	UUIRES	TURE		FRAGS FRAGMENTS	TONES	w - MC	DISTURE CONTENT	CBR	- CALIFORNIA BEARING	F	RAC	TURE S	SPACIN	NG	BEDDING
" " PLL _	PLASTI	C LIMIT	-									IIPM					VERY WIDE	Ξ	мс	IORE THA	ACING AN 10 FEET	VERY THICKLY BEDDED
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MODE HIGH	RATELY P LY PLASTI	LASTIC		16-2 26 OR	25 MORE				MEDIUM HIGH					•STEFL TEETL		IST HOLE DIGGER	MODER	ATELY	INDURATEC	D	GRAINS CAN B	E SEPARATED FROM SAMPLE WITH ST
				COL	DR									TUNGCARB.		ND AUGER					GRAINS ARE D	IFFICULT TO SEPARATE WITH STEEL
DESCRIPTI	CRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN. RED. YELLOW-BROWN, BLUE-									-GRAY).	└┘ ────		CORE BIT			NE SHEAR TEST	INDURA	ΠED			DIFFICULT TO	BREAK WITH HAMMER.
MOD	SCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRA MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE.															-	EXTRE	MELY I	NDURATED		SHARP HAMMER SAMPLE BREAK	BLOWS REQUIRED TO BREAK SAMPLE S ACROSS GRAINS.

## project reference no.

	TERMS AND DEFINITIONS
ED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
I SPT REFUSAL. 1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEDUS - 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.
IN THEORY	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
OCK THAT ICLUDES GRANITE.	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
AL PLAIN IF TESTED. C.	<u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	$\underline{\text{DIKE}}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	$\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
OATINGS IF OPEN. AMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
DCK UP TO NL FELDSPAR	$\underline{FAULT}$ - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN AY. ROCK HAS	<u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
FELDSPARS DULL	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 STELD
OSS OF STRENGTH	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
VIDENT BUT	ITS LATERAL EXTENT.
ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
F STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
5. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
S REQUIRES	
LOWS REQUIRED	TREATIVELY THIN COMPARED WITH ITS LATERAL EXTENT. THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPI) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB.HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
FRAGMENTS IT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	STRATA ROCK DUALITY DESIGNATION (SROD) - A MEASURE OF ROCK DUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EDUALI TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
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<sup>676</sup> 805	806.0	48.8	2	3	4	-  ·     ·	· · ·	.	· · ·						1	F								Ŧ							
GDT		Ŧ													' 200	×F	802.8				52.0		-	Ŧ							
DOT	801.0	53.8													•••	-	002.0	Gray-Tan Silty Fine SA	ND wit	th Mangane	se <u>52.0</u>			Ŧ							
908 S			2	4	4	1	· · · 8——	·	· · ·		· · ·			М	1		-	Sean	115				-	Ŧ							
.GPJ		ŧ					ľ::::	.	· · · · · ·						••••									Ŧ							
<sup>9</sup> 795	796.0	58.8	2	4	6	4 :	↓ · ·		· · · · · ·		· · ·													ŧ							
22-16-	-	+	2	-	Ŭ		♦10— ·\···							M			-						-	ŧ							
×.		‡				:	Ţ, Ţ		· · · · · ·		· · ·	· · · · ·			•••••	ļ								‡							
2 790		- 63.8	3	6	12	1  <u></u>	·		· · ·	· · ·				М	1		-						-	‡							
Ŭ U		‡						1	· · ·		· · ·	· · · · ·			• • • •		787.8				67.0			‡							
525C	786.0	68.8		- 10			· · ·		· · · · · ·	•	· · ·	· · · · ·						Gray-Tan Silty Fine SAN Fragme	ND witl ents	h Quartz Ro	ock			‡							
З <u>785</u> ш	-	ŧ	8	12	23	$\left \right $		+.`	35			<u> </u>		M	1		-	5					-	‡							
DUBL		ŧ				:	· · ·	.			· · ·	· · · ·			••••									ŧ							
ă щ 780	781.0	73.8	12	23	34			·			 57	· · · ·		М	1		-							ŧ							
BOF		ŧ				:	· · ·	.	· · ·			· · · ·			••••									ŧ							
	776.0	78.8				:	· · ·		· · ·		· · ·	· · · ·			•••••		775 5				70 3			ŧ							
ź 775	L	L	35	65/0.4						<u> </u>			<u> </u>		ŝ	en.					10.0			1	I						



WB	<b>3</b> 3482	1.1.5			T	IP U-2525	5C	COUNT	Y GUILFO	RD			GEOLOGIST Whitt, J			WBS	<b>3</b> 482	1.1.5			TIF	• U-25250	C	COUNTY
SIT	E DESCF	RIPTION	I Site	#7 (S	tructu	re #10), Br	idge No. 1	249 on La	ike Jeanette	Road (	-Y7-) c	over l	I-85 Bypass (-L-)		GROUND WTR (ft)	SITE	DESCR	RIPTION	I Site	e #7 (St	ructure	e #10), Bric	lge No. 12	49 on Lak
BOF	RING NO	. EB1-	B		S	TATION 2	24+20		OFFSET	29 ft RT	•		ALIGNMENT -Y7-		<b>0 HR.</b> 2.3	BOF	NG NO	. EB1-	B		ST	ATION 24	+20	
COL	LAR EL	<b>EV</b> . 85	6.0 ft		Т	OTAL DEP	<b>TH</b> 79.3	ft	NORTHING	<b>3</b> 871,3	378		EASTING 1,759,385		24 HR. Dry	COL	LAR EL	<b>EV.</b> 85	6.0 ft		то	TAL DEPT	<b>H</b> 79.3 ft	i
DRIL	L RIG/HA	MMER E	FF./DA	TE F8	R2175	CME-55 86	5% 02/16/20 <sup>-</sup>	16	1	DRILL	METHO	DD N	Mud Rotary	HAMN	IER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE F&	R2175	CME-55 86%	6 02/16/2016	6
DRI	LLER D	Davis, S			S	TART DAT	E 10/04/	16	COMP. DA	TE 10/	/04/16	6	SURFACE WATER DE	PTH N	//A	DRII	LER D	avis, S			ST	ART DATE	10/04/16	6
ELE\	, DRIVE	DEPTH	BLC	W COL	JNT		BLOWS	PER FOOT		SAMP.			SOIL AND BO	CK DES	CRIPTION	ELEV	DRIVE	DEPTH	BLC	W COL	JNT		BLOWS P	PER FOOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	Имо	) G	ELEV. (ft)	0.11020	DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	5 5	i0
860		Ŧ											_			780	+				+		Match	h Line
		ŧ															777.5	+ + 78.5					· · · · · · · ·	
855	856.0	<u>† 0.0</u>	5	8	a							L Kr	856.0 GROUN		ACE 0.0			<del>+</del> +	53	47/0.3'				<u> </u>
		ŧ		Ŭ	0	• • • • •	7								RAY, CLAYEY		-	ŧ						
	852.5	+ 3.5 +	8	11	14		25			SS-21	М	L	LIGHT ORANGISH	BROWN	AND GRAVEL			ŧ						
850		ŧ					× · · · ·				1	L	849.3 RED. GRAVE	WN, SIL	TJ NDY CLAY 6.7		_	‡						
	847.5	+ - 8.5																ŧ						
845		ŧ	6	7	8	15				SS-22	м		TRA	CE SANI	D			ŧ						
0.0		ŧ											RED AND WHIT		EY SILT WITH		-	ŧ						
	842.5	+ 13.5 +	3	3	5					SS-23	w	N V V V		LE SAN				ŧ						
840		ŧ							· · · ·		1	л V И V V	× ⊢ - − 839.3		16.7		-	ŧ						
	837.5	+ + 18.5											LIGHT ORAN ORANGISH BE	GISH BR	OWN AND			ŧ						
835		ŧ	3	4	5	9.				SS-24	W		STREAKS, SILT	WITH L	ITTLE SAND			ŧ						
	-	ŧ															-	ŧ						
	832.5	+ 23.5 +	3	3	5						w							ŧ						
830		ŧ											*- -				-	ŧ						
	827.5	+ + 28.5											*- *-					ŧ						
825		ŧ	3	3	5	<b>.</b> • 8					W							ŧ						
	-	ŧ											* <del>-</del> *-				-	ŧ						
	822.5	+ 33.5 +	2	2	8					SS-27	w							ŧ						
820		ŧ											- -				-	ŧ						
	817.5	- 38.5											816.8		30.2			Ŧ						
815		Ŧ	2	2	4	<b>●</b> 6 : :					W	Ч Т М	- ORANGISH BROV		RED, CLAYEY			Ŧ						
	1 -	Ŧ										.1.		RAY, SIL	TY FINE TO 41.7		-	Ŧ						
	812.5	<u>+ 43.5</u> +	1	2	3	$    1 \cdots $					w	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	COA	RSE SAN	ND 44.6			Ŧ						
810		Ŧ					+ • • • •	+ • • • •				N 1	ORANGISH BRO	JWN AN AKS, CL/	D RED WITH AYEY SILT <u>46</u> .7		-	Ŧ						
	807.5	48.5			7								LIGHT BROWN W	ITH BLAC	CK AND WHITE Y SILT			Ŧ						
805		Ŧ		4	1						W		AT 58.5': ORANGI	SH BROV	WN AND WHITE			Ī						
11		f											Ł				-	Ē						
9/29/	802.5	<u>T 53.5</u> T	5	7	12		· · · ·   · · · · 19				w		F					Ŧ						
800		Ŧ					\						E				-	Ŧ						
DOT.	797.2	58.8					N						E					Ŧ						
ບ Z 795		Ŧ	9	13	19		<b>9</b> 32 · ·				W		E					Ŧ						
GPJ	700 5	1																ŧ						
525C	/92.5	- 63.5	10	16	21		37				w		Ł					ŧ						
° ⊃ 790		ŧ					+	+					-					ł						
OUBLE	787.5	68.5	15	18	23													ŧ						
ă щ 785		ŧ			20		• • • • • • • • • • • • • • • • • • •						Ł					t						
r BOF	782.5	+ 73 5				::::	:: <b>!</b> -:	+÷÷:-:				477			оск			‡						
	102.0	+ (3.5	41	54	46/0.4'	1							(MET.	AGRANIT	TE)			‡						
z <u>/80</u>	1	1							100/0.9		1	N/L	<u> </u>						1					

#### SHEET 9 OF 15

GUILFOR	D			GEOLOGIST Whitt, J.			
ke Jeanette F	Road (-'	Y7-) o	ver I-8	35 Bypass (-L-)		GROUN	D WTR (ft)
OFFSET 2	9 ft RT			ALIGNMENT -Y7-		0 HR.	2.3
NORTHING	871,3	78		EASTING 1,759,385		24 HR.	Dry
	DRILL N	IETHO	D Mu	d Rotary	HAMME	R TYPE	Automatic
COMP. DAT	E 10/0	04/16		SURFACE WATER DEPT	<b>FH</b> N//	۹	
	SAMP.		L	SOIL AND ROC	K DESC	RIPTION	
75 100	NO.	моі	G				
			Xen a			<u></u>	
				(METAGRANI	TE) (cor	tinued)	70.0
100/0.8			v//=/- -	Boring Terminated a	at Elevati	on 776.7 1	79.3 ît In
				- Weathered Ro	ck (Meta	igranite)	
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W	BS 3	34821	.1.5			Т	IP U-2	25250	;	(	COUN	τγ 🤆	GUILFC	RD				GEOLOGIST Whitt, J.				WBS	<b>3</b> 3482 <sup>-</sup>	1.1.5			ТІ	P U-252	5C	COUNT
Sľ	te de	ESCR	IPTION	Site	#7 (S	tructu	re #10)	, Brid	ge No	. 124	9 on L	ake J	eanette	e Road (	-Y7-)	over	<sup>-</sup> I-8	5 Bypass (-L-)		GROUND	WTR (ft)	SITE	DESCR	RIPTION	Site	e #7 (S	tructur	e #10), Bi	idge No.	1249 on La
BC	ORING	g no.	B1-A			S	TATION	<b>N</b> 25	+46			OF	FSET	8 ft LT				ALIGNMENT -Y7-		0 HR.	Dry	BOR	ING NO	. B1-A	١		ST	ATION	25+46	
CC	OLLA	RELE	<b>EV.</b> 85	5.2 ft		Т		DEPT	<b>H</b> 89	.8 ft		NO	RTHIN	<b>G</b> 871,	504			EASTING 1,759,422		24 HR.	FIAD	COL	LAR EL	<b>EV.</b> 85	55.2 ft		тс	TAL DEF	<b>TH</b> 89.8	ft
DF	ILL R	IG/HAI	MMER E	FF./DA	TE F&	R2175	5 CME-55	5 86%	02/16	2016				DRILL	METH	OD	Muo	d Rotary	HAMN	IER TYPE	Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE F&	&R2175	CME-55 86	3% 02/16/20	016
DF	RILLE	R D	avis, S.			S		DATE	10/0	6/16		со	MP. DA	<b>ATE</b> 10	/06/16	6		SURFACE WATER DEP	TH N	/A		DRIL	LER D	Davis, S	•		ST	ART DAT	<b>E</b> 10/06	/16
ELI		RIVE	DEPTH	BLC		JNT			BLOV	VS PE	R FOO	т		SAMP	. 🔨			SOIL AND RO	CK DES	CRIPTION		ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLOWS	S PER FOOT
(1	.)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0	2	5	50		75	100	NO.	Имс	DI G	-	ELEV. (ft)			DEPTH (ft)	(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0	25	50
86	0		+														┝					780		+					Ma	tch Line
		-	Ŧ														F						776 7	Ŧ						
85	5	-	Ē														F	855.2 GROUN	D SURF.	ACE	0.0	775	_//0./	+ /8.5 +	35	51	49/0.2'			
	8	354.3	0.9	8	6	9		<b>1</b> 15							D	L	Ŧ	ROADWAY ASPH	EMBAN ALT: 0.	<b>KMENT</b> 9'				Ŧ						
	8	- 351.7 -	3.5	8	a	12							· · · · · ·			L	3	REL	), CLAY				771.7	83.5	21	28	42			
85	0	-	F	0		12		· •2	1			· · ·	· · ·		M	L	Ӻ					770		Ŧ		20				•
		-						Ì								L	J						700 7	Ŧ						
84	.5	- 10.7	- 8.5	4	5	6	· · ∮				· · ·		· · · · · ·		м		+	846.1 RES			9.1		/00./	- 88.5	27	60	40/0.3'		· · · · ·	· · · · · ·
		-	F														I	RED WITH BR		ND BLACK	<u><u><u> </u></u></u>		-	Ŧ						
	8	- 341.7 -	13.5	3	2	1							· · · · · ·			N		RED AND ORAN	GISH B					Ŧ						
84	0	_	ŧ	5		-	<b>•</b> 6'	• •			· · ·	·   ·	· · ·			N 1	, ₽	AT 18.5': CLAYE	Y SILT	WITH TRACE	E		-	Ŧ						
		-	F										· · · ·			N 1		AT 23.5': CLAYE	Y SILT V	WITH TRACE	E			Ŧ						
83	5	- 136.7	- 18.5 -	3	4	5	·  ·   · •9	· ·	•••		· · · · · ·		· · · · · ·		w	N 1		ROCK F AT 28.5':	RAGME CLAYE	NTS (SILT				ŧ						
		-	F											1		N 1	v⊨ vF						-	ŧ						
	8	- 331.7 -	- 23.5	1	3	3	: <u> </u> :	•••	•••		· · ·		· · · · · ·			N N	↓  -  -							ŧ						
83	0	_	F	1	5	5	<b>•</b> 6'	•••				·   ·	· · ·			N 1	, ₽						-	ŧ						
		-	÷								· · ·		· · · · · ·			N 1	v ₽							ŧ						
82	5	- <u>-</u>	- 28.5	2	4	5	∶;	· ·	•••		· · · · · ·		· · · · · ·		w	N 1								ŧ						
		-	F											1		N 1	v,⊨ v -						-	Ŧ						
	8	- 321.7 -	- 33.5	2	3	5		•••	•••		· · ·		· · · · · ·			N N	↓  -  -							ŧ						
82	0	-	ŧ	2	5	5	·•**	•••			· · ·	· · ·	· · ·		w	N 1		040.5			~~~~		-	ŧ						
		-	÷								· · ·		· · · · · ·					GRAYISH BROWN	AND RE	DDISH BROV	<u></u> <u>36</u> .7 WN			ŧ						
81	5	- 16.7	- 38.5	2	3	4		•••	•••		· · · · · ·		· · · · · ·		w			WITH BLACK ST TRACE CL	reaks Ay and	, SILT WITH SAND				ŧ						
		-	F											1			F	AT 43.5': GRAY AN BLACK	D LIGHT STREA	<sup>-</sup> BROWN W KS	ITH		-	Ŧ						
	8	- 311.7 -	43.5	2	2	1		•••			· · ·		· · · · · ·					AT 48.5': LIGHT E ST	BROWN REAKS	WITH BLAC	К			Ŧ						
81	0	_	F	2	2	-	<b>•</b> 6	•••				·   ·	· · ·				Ļ	AT 63.5': LIGHT LITTLE SAN	BROWN D. MICA	I, SILT WITH	I		-	ŧ						
		-	105				:``											AT 68.5':	SANDY	SILT				Ŧ						
80	5	- /.aud -	- <del>4</del> 8.5	3	5	8	1   : *	 13 <sup>.</sup>	•••		· · ·	:   :	· · · · · ·		w		F							Ŧ						
4		-	F					۲·		.		.   .		1			F						-	Ŧ						
9/29/	8	- 301.7	53.5	5	7	11							· · · · · ·											Ŧ						
10 80	0	-	F	5	<i>'</i>			·•18				· · ·	· · ·				Ľ						-	Ŧ						
DOT.(	_	-	F					/···																Ŧ						
	5	- 196.	- 58.5	3	3	6	· •/				· · ·		· · · · · ·		w									Ŧ						
GPJ		-	F							.		.   .		1			F						-	Ŧ						
525C.	_7	- 791.7 -	63.5	3	5	12	'	Ϊ, Ϊ			· · ·	.   .	· · · · · ·				F							Ŧ						
<sup>8</sup> − 79	0	_	F	5		, <sup>12</sup>		17				·   ·					F						-	Ŧ						
UBLE		- 706									· · ·	.   .	· · · · · ·				F							Ŧ						
	5	- 1.00	- 00.5	10	14	22	1	•••	· •	6 •	· · ·	.   .	· · · ·		w		F							Ŧ						
BOR		-	F						• •	-				]			F	782 7			72 5		-	Ŧ						
DOT	_7	- 781.7 -	73.5	32	48	52/0 4		· · ·	· · L	÷+	÷ ÷ ÷		· <u></u> -	1		11	7			OCK	12.5			Ŧ						
¥ 78	0	-	Γ	52		, <u>, , , , ,</u>				•			_ 100/0 Q	•			A	(IVIE I A		L)				Ĩ						



WBS	<b>3</b> 3482	1.1.5			Т	P U-2525C		COUNT	Y GUILFO	RD			GEC	DLOGIST Whitt, J.			WBS	34821	1.1.5			TI	P U-2525	C	COUNT
SITE	DESCR	RIPTION	Site	#7 (St	tructu	re #10), Bridg	e No. 12	49 on La	ake Jeanette	e Road (·	-Y7-) c	over I	-85 Byp	bass (-L-)		GROUND WTR (ft)	SITE	DESCR	RIPTION	Site	e #7 (St	tructur	e #10), Bri	dge No. 1	249 on La
BOF	ING NO	. B1-B			S	TATION 25+	59		OFFSET	27 ft RT	-		ALIC	GNMENT -Y7-		0 HR. 3.9	BOR	ING NO	. B1-E	3		ST	ATION 2	5+59	
COL	LAR EL	<b>EV.</b> 85	5.7 ft		Т	OTAL DEPTH	100.0 f	ft	NORTHIN	<b>G</b> 871,4	496		EAS	<b>TING</b> 1,759,458		24 HR. Dry	COL	LAR ELI	<b>EV</b> . 85	55.7 ft		тс	TAL DEP	<b>FH</b> 100.0	) ft
DRIL	l rig/ha	MMER E	FF./DA	TE F8	R2175	CME-55 86%	02/16/2016	6		DRILL	METHO	DD N	lud Rotar	у	НАММ	ER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE F&	R2175	CME-55 86	% 02/16/20	16
DRI	LER D	avis, S.			S	TART DATE	10/03/16	6	COMP. DA	<b>TE</b> 10/	/04/16		SUR	FACE WATER DEP	TH N/	Ά	DRIL	LER D	avis, S	•		ST	ART DAT	<b>=</b> 10/03/	16
ELEV	DRIVE ELEV	DEPTH	BLC	W COL	JNT		BLOWS P	ER FOOT	Г	SAMP.	. 🔨	L		SOIL AND ROC	CK DESC	CRIPTION	ELEV	DRIVE ELEV	DEPTH	BLC		JNT		BLOWS	PER FOOT
(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0 25	5	0	75 100	NO.	МО	I G	ELEV.	(ft)		DEPTH (f	) (π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0	25	50
860		+											_				780		┣───					Mate	ch Line
		Ŧ											-					777.2	+ - - 78.5				:::i		
855	855.7	0.0	3	3	8								- <u>855:7</u>				775		Ŧ	4	12	11		23	
		Ŧ	5	5	0								<del>- 855.0</del> -	ORANGE, CLAY	WITH LI	TTLE SAND		-	Ŧ				,		
	852.2	3.5	6	8	9						$ \square$		-	RES BROWN AND GRAY	<b>SIDUAL</b> Y, CLAY	EY SILT WITH		772.2	83.5	5	6	11		,	
850		Ŧ					· · · ·						-	TRACE SAND	d and G Ge. Cla	GRAVEL	770	-	Ŧ					+	
	847.2	8.5											-	AT 9.5': ORANGIS		WITH BLACK = MOTTLING		767.2	88.5					T	
845		Ŧ	4	5	8	<b>•</b> 13.					М		-				765		Ŧ	41	42	58/0.4'			
		Ŧ											-						Ŧ						
	842.2	13.5	3	4	6						W		-					762.2	93.5	21	79/0.4'				
840		Ŧ					· · · · ·						- 839.0			16.	, 760		Ŧ					+	
	837.2	18.5										- V - V		ORANGISH RED WI	ITH BLA	CK AND GRAY	1	757.2	98.5						
835		Ŧ	2	5	5	. •10 .	· · · · ·				W	л у И У	-	/					<u>†</u>	17	31	55	<u> </u>	<u> </u>	
		Ŧ										~ V _ V	-					-	Ŧ						
	832.2	23.5	2	3	5						W	^ ► _	- - 831.3			24.4	1		Ŧ						
830		Ŧ					· · · ·		· · · · · ·	-			-	LIGHT GRAYISH ANI SANI	ID ORAN DY SILT	IGISH BROWN,		-	Ŧ						
	827.2	+ - 28.5					· · · ·						-			00.		-	ŧ						
825		Ŧ	2	2	4	6	· · · · ·		·   · · · · ·		w	- - -	- 826.6 -	REDDISH BROWN	N WITH	BLACK AND			Ŧ						
		ŧ										N V N V	-	AT 34.2': LIGHT OR	ks, cla Rangish	YEY SILT FBROWN AND			ŧ						
	822.2	33.5	2	2	4		· · · · ·		·   · · · · ·		W	N V N	-	GRAY WITH B AT 38.5': WIT	BLACK S TH TRAC	STREAKS SE SAND		-	ŧ						
820		ŧ					· · · ·		· · · · · ·	-		N V N	-					-	ŧ						
	817.2	+ - - 38.5										N V N	-					-	ŧ						
815		Ŧ	2	1	3		· · · · ·		· · · · · ·		w	N V N	-					-	ŧ						
0.0		ŧ										7 V 1	814.0				7		ŧ						
	812.2	43.5	2	2	2		· · · · ·		·   · · · · ·		W		-	ORANGISH BROW	N, SILT	WITH LITTLE		-	ŧ						
810		ŧ				<b>4</b> · · ·	· · · ·		· · · · · ·	-			-	AT 53.5': SILT V				-	ŧ						
	807.2	+ + 48.5											-	AND ORANGISH E	BROWN	AND BLACK,		-	ŧ						
805		Ŧ	1	2	2	<b>4</b>	· · · · ·		· · · · · ·		w		-	GRAVELLY (ROCH WITH TR	RACE SA			-	ŧ						
4		ŧ											-	TRACE GRAVEL (I	ROCK F	RAGMENTS)			ŧ						
9/29/	802.2	53.5	4	4	6		· · · · ·		·   · · · · ·		W		-	AT 73.5': SILT W AT 78.5': SILT WIT	VITH TR FH TRAC	ACE SAND CE SAND AND		-	ŧ						
800		Ŧ					· · · ·		· · · · · ·	-			-	GRAVEL (ROC	CK FRAC	GMENTS)		-	ŧ						
00T.0	797.2	+ - 58.5											-					-	ŧ						
2 795		Ŧ	2	4	5	9	· · · · ·		·   · · · · ·		w		-					-	ŧ						
GPJ	-	Ŧ				\ .							-						ŧ						
525C.	792.2	63.5	5	10	12		· · · · ·				w		-					-	Ŧ						
či 790 ⊃		Ŧ				<b>/</b> +			·   · · · · ·				-					-	Ŧ						
JBLE	787.2	68.5				$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot f \cdot \\ \cdot \cdot \cdot f \cdot \right  \right  \right $	· · · ·						-					-	Ŧ						
О ш 785		Ŧ	3	5	10		· · · · ·				W		-						Ŧ						
BOR	] -	Ŧ								]			-					-	Ŧ						
DOT	782.2	T 73.5	4	10	10						w		-						Ŧ						
¥ 780		I																	Ľ						



۷	VBS	34821	.1.5			ТІ	IP U-2525C	COUN	TY GUILFO	RD			GEOLOGIST Whitt, J.		WBS	<b>3</b> 4821	.1.5			TI	• U-25250	c (	COUNTY
S	ITE	DESCR	IPTION	Site	#7 (St	tructur	re #10), Bridge No.	1249 on L	ake Jeanette	Road (-	Y7-) o	ver l	85 Bypass (-L-)	GROUND WTR (ft)	SITE	DESCR	IPTION	Site	#7 (St	tructur	e #10), Brio	lge No. 124	9 on Lak
E	ORII	NG NO.	EB2-	A		S	<b>TATION</b> 26+73		OFFSET	8 ft LT			ALIGNMENT -Y7-	0 HR. 1.8	BOR	ING NO.	EB2-	A		ST	ATION 26	6+73	
C	OLL	AR ELE	<b>EV</b> . 85	4.1 ft		Т	OTAL DEPTH 89.	3 ft	NORTHIN	<b>G</b> 871,6	511		EASTING 1,759,489	24 HR. FIAD	COL	LAR ELE	<b>V</b> . 85	4.1 ft		ТС	TAL DEPT	<b>H</b> 89.3 ft	
0	RILL	RIG/HAN	MMER E	FF./DA1	FE F8	R2175	CME-55 86% 02/16/2	016		DRILL	<b>IETHO</b>	DM	ud Rotary HAMM	<b>ER TYPE</b> Automatic	DRILI	L RIG/HAN	IMER EI	FF./DA	TE F&	R2175	CME-55 86%	6 02/16/2016	
0	RILL	ER D	avis, S.			S	TART DATE 10/0	5/16	COMP. DA	<b>TE</b> 10/	05/16	1.1	SURFACE WATER DEPTH N/	/Α	DRIL	LER Da	avis, S.			ST		10/05/16	(
E	LEV	ELEV	DEPTH	BLO		JNT	BLOW	S PER FOC	)T 75 100	SAMP.		Ō	SOIL AND ROCK DESC	CRIPTION	ELEV (ft)	ELEV	DEPTH (ff)	BLC		JNT	0 2	BLOWS PE	R FOOT
	()	(ft)	(,	0.51	0.511	0.511				NO.		G	ELEV. (ft)	DEPTH (ft)	(,	(ft)	(1)	0.511	0.51	0.511			
															776							Match	Lino
-	555	050.0	-						· · · · · · ·				BOADWAY EMBAN	ACE 0.0	//5			_9	- 16-	-14			
			- 0.9	4	5	6		· · · · ·	· · · · · ·	SS-35			ASPHALT: 0.9	<b>NMEN 1</b> 9' 3.0			-				· · · · ·		· · · · ·
8	350	850.6 -	- 3.5 -	6	7	7	· · <b>·</b> . · · · · · · · · · · · · · · · · · ·		· · · · ·	SS-36	D	, ↓ ↓	RESIDUAL		770	770.6	- 83.5 -	11	20	33		· · · ×	 53
		-	-					· · · · ·	· · · · · ·			Х Х Х	- RED AND LIGHT BROWN, AT 9.7': CLAYEY SILT W	CLAYEY SILT VITH LITTLE			-						[.°° [. <u></u>
1	345 -	- 845.6 -	- - 8.5	4	-	-	· ·  · ·   · · · ·	· · · · ·	· · · · · ·			N N V	GRAVEL • AT 11.7': WITH BLACK	STREAKS	765	765.6	- - 88.5	54	40/0.01				
	,10	-	-	4	6	1	13				D	7 V N V	-		100		-	51	49/0.3		· · · · ·	• • • •	
		-							· · · · · ·			7 V N V					-						
8	340	840.6 -	- 13.5	3	5	7	• • • • • • • • • • • • • • • • • • •		· · · · · ·		м	/' \ 				-	-						
		-	-										SILT WITH LITTLE CLAY	AND SAND			-						
8	335 -	835.6 -	18.5	3	5	7							AT 18.5: SILT WITH LIT AT 23.5': RED AND LIGHT I	BROWN WITH			-						
		-	E	Ŭ	0	'	• • 12			55-39	M		AT 43.5': SILT WITH LITTL	KS LE CLAY AND									
		830.6	23.5				:j:: :::						AT 44.7': GRAYISH BR	OWN AND			-						
5	30 -		- 20.0	3	5	6					м		- ORANGISH BROWN, SILI SAND				-						
		-					· <b> </b> · ·   · · ·	· · · · ·	· · · · ·				AT 48.5': WITH BLACK AT 53.5': GRAYISH BR	OWN AND			-						
8	325	825.6 -	- 28.5	3	3	6			· · · · ·		W		ORANGISH BROWN AND BLACK STREAKS, SILT V	WITH LITTLE		-	-						
		-					. ¶. <sup>9</sup>   	· · · · ·	· · · · · ·				. SAND . AT 68.5': SILT	т		-	-						
	20	- 820.6 -	- - 33.5				· <mark> </mark> · · ·   · · ·     · <mark> </mark> · · ·   · · ·	· · · · ·	· · · · · ·				AT 78.5': BROV AT 79.7': LIGHT BROWN	NN NAND DARK			-						
	520		-	3	3	6	9				w		– GRAY, GRAVELLY (ROCK SILT WITH TRACE	FRAGMENTS) SAND			-						
		-	-					· · · · ·	· · · · · · · ·								-						
8	315	815.6 -	- 38.5 -	3	5	7	1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +		· · · · ·		w		_			-	-						
		-	-				::; <sup>::</sup> : :::	· · · · ·	· · · · · ·								-						
8	310 -	810.6 -	- - 43.5		4	6		· · · · ·	· · · · ·							-	-						
		-	-	3	4	0					W		-				-						
		-					.										-						
8	305	805.6 -	- 48.5	3	4	7			· · · · · ·		w		_				-						
		]																					
8	300	800.6	- 53.5	3	4	5					1.07						_						
/12		-		Ĩ		-	· ¶ <sup>9</sup> · · · · ·										-						
9/28		7956 -	- 58.5				:!:: :::	·   · · · .   · · ·	·   · · · · ·								-						
GDT	'95 -		-	2	5	6					w		-				-						
DOT		-						· · · · ·	· · · · · ·								-						
N N	<b>'90</b>	790.6 -	- 63.5 -	7	9	14			· · · · ·		l w		_				-						
C.GP		-						·   · · · ·   · · ·	·   · · · · ·				- -				-						
-2525	/85	- 785.6 -	- - 68.5				]   : : : : <u>  </u> : : :	·   · · · ·   · · ·	·   · · · · · · · · ·								-						
⇒ -' щ	35	-		8	12	16	28				W						-						
OUBL							::::  :::	·   · · · ·   · · ·	·   · · · · · ·								-						
RE D	780	780.6 -	- 73.5	7	10	15		· · · · ·	· · · · · ·		w		_				-						
DT BC		-	-				: : : : <u> </u> : : :										-						
NCDC	75	775.6 -	78.5				$\left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right  \left  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \end{array} \right  \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot $		· · · · ·				- 				-						

SHEET 12 OF 15

INT	<b>Y</b> GUILF	OR	D			GEOLO	GIST Whitt, J.			
ו La	ke Jeanet	te F	Road (-	Y7-) o	ver I-8	35 Bypass	(-L-)		GROUN	ID WTR (ft)
	OFFSET	8	ft LT			ALIGNM	ENT -Y7-		0 HR.	1.8
	NORTHI	NG	871,6	11		EASTIN	<b>G</b> 1,759,489		24 HR.	FIAD
			DRILL N	IETHO	D Mu	d Rotary		HAMM	ER TYPE	Automatic
	COMP. D	AT	<b>E</b> 10/0	05/16		SURFAC	E WATER DEP	TH N/	A	
тос			SAMP.		L				RIPTION	
	75 10	00	NO.	моі	G					
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	+ • • • •			w		-				
					<u> </u>	767.4				<u> </u>
•••						764 8	META	GRANITI	E)	89.3
	100/0.	8'®			-	[	Boring Terminated	at Elevat	ion 764.8	ft In
							weathered R		ayı arınıe)	
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WB	<b>S</b> 3482	1.1.5			Т	IP U-	2525	iC		COU	INTY	GUILFC	ORD				G	GEOL	OGIS	ST V	Vright,	F.	-		WB	<b>3</b> 3482	1.1.5			Т	IP U	-2525	с	COUNT
SIT	E DESCR	RIPTION	I Site	e #7 (S	tructu	re #10	), Bri	dge N	o. 12	249 or	n Lał	ke Jeanett	e Road (	(-Y7-	-) ov	ver I	-85 E	Bypa	ass (-L	-L-)			GRO	JND WTR (ft)	SITE	E DESCI	RIPTIO	N Site	e #7 (S	Structu	ire #1(	)), Brid	dge No. 1	249 on La
BO	ring no	. EB14	1-R		s	ΤΑΤΙΟ	<b>N</b> 2	6+65				OFFSET	25 ft R	Т			A	ALIGN	NMEN	NT -`	Y7-		0 HR	. N/A	BOF	RING NO	<b>).</b> EB1	4-R		s	TATIC	<b>)N</b> 2(	ô+65	
CO	LAR EL	<b>EV.</b> 85	64.6 ft		Т	OTAL	DEP	<b>TH</b> 10	)5.5	ft		NORTHIN	I <b>G</b> 871,	587			E	EASTI	ING	1,75	9,513		24 HR	. FIAD	COL	LAR EL	<b>.EV.</b> 8	54.6 ft		Т	OTAL	DEPT	<b>[H</b> 105.5	5 ft
DRI	L RIG/HA	MMER E	FF./DA	TE SM	/IE275	DIEDR	ICH D	-50 899	6 1/1	5/2016	;		DRILL	MET	HOD	<b>)</b> W	/ash E	Boring	g			HAM	MER TYP	E Automatic	DRIL	L RIG/HA	MMER E	EFF./DA	TE S	ME275	DIEDF	(ICH D-	·50 89% 1/	/15/2016
DR	LLER T	. Willia	ns		S	TART	DATI	E 11/	05/1	5		COMP. D	<b>ATE</b> 11	/06/	15		S	SURF/	ACE	WAT	ER DE	PTH N	I/A		DRI	LER 1	Γ. Willia	ims		s	TART	DATE	<b>11/05</b>	15
ELE	/ DRIVE ELEV	DEPTH	BLC		JNT			BLO	WSF	PER FC	тос		SAMP	P.  ▼		L				SOIL	AND RC	OCK DES	SCRIPTIO	N	ELEV	DRIVE	DEPTH		ow co	UNT	_		BLOWS	PER FOOT
(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0		25	5	50		75 100	NO.		NOI	G	ELE	.EV. (ft)	)					DEPTH (ft	(π)	(ft)	(π)	0.5ft	0.5ft	0.5ft	0		25	50
855		╞───								1		1					854	4.6			GROUN		ACE	0.0	775	+	+	- - <u>-</u> _	+	11	+	<b>•</b> 18	Mat	ch Line
	853.0	1.6	4	6	8				•••						м		-		Re	ed Silty	CLAY v	with Trace	e of Fine	Sand			Ŧ					ΞÌ,		
850	850.6	<del> </del> 4.0		1	6		<b>9</b> 14 <b>/</b> · · ·		•••		•••					9	851	1.1	Rec	d-Tan	Silty CL	AY with L	_ittle Fine	<u>3.5</u> Sand	770	770.6	<del>-</del> 84.0	5		16				
	848.3	+ + 6.3	4	4	0		10								М		848	8.6			= = = =			<u> </u>			Ŧ		9	10		'	25	
		ŧ	3	4	6		10		•••		•••			[	D		-		Red M	d-Tan F Mangar	nese sea	idy SIL I ims start	ing at 17	e Clay feet			Ŧ					· · ·		
845	845.6	+ 9.0 +	3	4	6		0 10			· ·				[	D		-			C	Quartz R	ock at 24	1.3 feet		765		+ 89.0	16	17	42	1  <u>-</u> -		+	59
		ŧ				: [	•••		•••								-										Ŧ							
840	840.6	+ + 14.0			_	: ¦:			•••		· · · ·						-								760	760.6	<u>+ 94.0</u>					· · ·		
0.0		ŧ	3	3	5		3			1				[	D		-										Ŧ	14	24	44				· · · •
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835	835.6	+ 19.0 +	3	4	6	1 - 1	 10 <sup></sup>	· ·	• •	· ·	• •		_	[	D		-								755	755.6	+ 99.0 +	10	20	37	1  <u>-</u> -	· · ·		 • • 57
		ŧ							· ·		· · · ·				5 (A. 1997)		-										ŧ					· · · · · ·		$  I_1 $
830	830.6	+ 24.0			0		1		· · · ·		· · · ·				1000		-								750	750.6	+ 104.0					· · · · · ·		
000		ŧ	3	5	8		•13		::					[	D		_								100	·	<del>†</del>	14	23	40	╞┝──		<u> </u>	63
		‡					<u> </u>		· · · ·		· · · ·				- 11 T		-										‡							
825	825.6	+ 29.0 +	3	5	6			· ·	• •	· ·	• •		_	[	D		-										ŧ							
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820	820.6	+ - 34.0			0	:	•••		· · · ·		· · · ·				1000		-										ŧ							
020		ŧ	3	4	6		10	1						1	D		_										‡							
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815	815.6	+ 39.0 +	3	4	5	┨┝╌┇	9	· ·	• •	· ·			_		м		-										‡							
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810	810.6	+ + 44.0			_		•••		· · · ·		· · · ·				1000		-										ŧ							
010		ŧ	3	3	5		8			1					М		-									-	ŧ							
29/17		‡							 		 						-										Ŧ							
6 805	805.6	+ 49.0 +	3	3	5	·  ·   <b>⊢</b> •∎	 3	· ·	•••	· ·	•••				М		-									.	‡							
DT.GI		Ŧ							· · · ·		· · · ·						-										Ŧ							
ත් ප් 800	800.6	54.0	, ·	A	7	: <b>i</b>	•••		· · · ·		· · · ·						-										Ŧ							
Z G	1 -	Ŧ	3	4			11	1					11	N	М			7.6									Ŧ							
16.G		‡							•••		•••						- <u>/9/</u>	/.0		Orang	ge-Tan S	Silty Fine	SAND wi	th <u>57.0</u>			Ŧ							
795		+ 59.0 +	3	6	9	1	•15	· ·							м		-				Manga	nese Se	ams				Ŧ							
∠ _5		ŧ					1:		· ·		· ·						-										Ŧ							
AD2 790	790.6	<b>†</b> 64.0				::			· · · ·		· · · ·						<u>- 79</u> 1 -	1.0	Tan-E	Brown	Fine Sa	ndy SILT	with Mar	<u>63.0</u> nganese	11		Ŧ							
GEO	1 -	Ŧ	4	'	9		16	1					11	N	М		_			Sea	ams and	Rock Fr	agments				Ŧ							
25C_		<b>†</b>							· · · ·		· · · ·						-										Ŧ							
785 785	785.6	+ 69.0 +	6	8	11	1	· · · ·	9	•••	· ·	•••				м		-									.	‡							
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	780.6	74.0		0	10	::	1		· · · ·		· · · ·						-										Ŧ							
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DOT		ŧ					· • †		· · · ·		· · · ·						-										Ŧ							
2 775	775.6	<u>† 79.0</u>				$\left  \right $	÷ľ		•••	$ $ $\cdot$ $\cdot$	•••						_										t							

GUILFORD		GE	OLOGIST	Wright, F.			
e Jeanette Road (-	Y7-) over	r I-85 B	/pass (-L-)			GROUN	D WTR (ft)
OFFSET 25 ft RT		AL	IGNMENT	-Y7-		0 HR.	N/A
NORTHING 871,5	87	EA	<b>STING</b> 1,7	59,513		24 HR.	FIAD
DRILL N	IETHOD	Wash Bo	oring		HAMME	R TYPE	Automatic
COMP. DATE 11/0	06/15	SU	RFACE WA	TER DEPT	TH N//	4	
SAMP.			SO		K DESC		
75 100 NO.	MOI G	;	001		IV DE00		
	M	Ľ	Tan-Brow Seams	n Fine Sand and Rock Fr	y SILT w agments	ith Manga s <i>(continue</i>	nese ed)
		Ľ			-		
<u> </u>	М	Ŀ					
	N	F					
		F					
3	M	759.6				th Manaa	95.0
			S	eams and R	ock Frag	iments	liese
	M						
	м	749.1					105.5
		-	Boring	erminated a	at Elevati	on 749.1 f	't in
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SITE #7 (STRUCTURE #10), BRIDGE NO. 1249 ON LAKE JEANETTE ROAD (-Y7-) OVER I-8	5 B
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	SOIL TEST RESULTS															
BORING	SAMPLE			DEPTH INTERVAL	AASHTO	LIQUID	PLASTICITY		% BY WEIGHT % PASSING (SIEVES)						%	%
NO.	NO.	STATION	OFFSET	(FEET)	CLASS.	LIMIT	INDEX	GRAVEL	C.SAND	F.SAND	SILT & CLAY	10	40	200	MOISTURE	ORGANIC
EB1-B	SS-21	24+20	29' RT	3.5 - 5.0	A-7-5	73.0	37.0	8.0	10.1	9.9	72.0	92.0	81.9	72.0	24.4	-
EB1-B	SS-22	24+20	29' RT	8.5 - 10.0	A-7-5	46.0	16.0	0.3	9.4	24.2	66.2	99.7	90.4	66.2	25.3	-
EB1-B	SS-23	24+20	29' RT	13.5 - 15.0	A-4	40.0	7.0	0.8	12.4	27.1	59.7	99.3	86.8	59.7	34.6	-
EB1-B	SS-24	24+20	29' RT	18.5 - 20.0	A-4	35.0	6.0	0.1	10.3	30.0	59.7	99.9	89.7	59.7	36.7	-
EB1-B	SS-27	24+20	29' RT	33.5 - 35.0	A-4	34.0	7.0	7.4	9.2	29.0	54.4	92.6	83.5	54.4	36.1	-
EB2-A	SS-35	26+73	8' LT	0.9 - 2.4	A-7-5	55.0	22.0	0.5	1.6	16.9	81.0	99.5	97.9	81.0	29.2	
EB2-A	SS-36	26+73	8' LT	3.5 - 5.0	A-5	45.0	8.0	1.2	2.4	23.5	73.0	98.8	96.4	73.0	21.7	
EB2-A	SS-39	26+73	8' LT	18.5 - 20.0	A-5	50.0	9.0	0.2	3.1	27.8	68.9	99.8	96.7	68.9	39.1	-

SHEET NO. 14 OF 15 U-2525C GUILFORD COUNTY

### BYPASS (-L-)

### SITE PHOTOGRAPHS - SITE #7 (STRUCTURE #10), BRIDGE NO. 1249 ON LAKE JEANETTE ROAD (-Y7-) OVER I-85 BYPASS (-L-)



View looking upstation along proposed bridge alignment



View looking nearly perpendicular to proposed bridge alignment (approximate northwest)

#### SHEET NO. 15 34821.1.5 (U-2525C) GUILFORD COUNTY

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REFERENCE

<u>SHEET NO.</u>	<b>DESCRIPTION</b>
I	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

#### STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY\_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE)

SITE DESCRIPTION CULVERT AT -L- 364+68 AT UNNAMED TRIBUTARY TO REEDY FORK/TOWNSEND LAKE

## N 48. 3 PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	6

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLT TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 1707-6800. 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 BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNI-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTIGE 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 TO TETAILS 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 OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISY 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 CONDENSATION OF FOR ANY EXTENSION OF TIME FOR ANY REASON RESULTING FOR THE ACTUAL CONDITIONS TO BE INCOUNTERED 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.

PERSONNEL

L. BUTLER
T. WILLIAMS
INVESTIGATED BYS&ME, Inc.
DRAWN BY T.T. WALKER, F&R, Inc.
CHECKED BYC.A. YOUNGBLOOD
SUBMITTED BY C.A. YOUNGBLOOD
DATE DECEMBER 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 DE	SCRIPTION
SOIL IS BE PENE ACCORE IS	CONSIDERED TRATED WITH ING TO THE BASED ON TH	UNCONSOLIDA H A CONTINUOL STANDARD PEI HE AASHTO SY	ED, SEMI-CON S FLIGHT PO ETRATION TE STEM. BASIC I	SOLIDATED, O VER AUGER AN ST (AASHTO T DESCRIPTIONS	R WEATHERED ND YIELD LES 206,ASTM D GENERALLY I	EARTH MATERIALS S THAN 100 BLOW 01586). SOIL CLAS NCLUDE THE FOLL	THAT CAN PER FOOT IFICATION DWING:	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	ESA ( IDICATE SA MI	GOOD REPRESENTATION OF PARTI IS THAT SOIL PARTICLES ARE AL XTURE OF UNIFORM PARTICLE SI	CLE SIZES FROM FI L APPROXIMATELY ZES OF TWO OR MC	NE TO COARSE. THE SAME SIZE. RE SIZES.	HARD ROCK ROCK LINE I SPT REFUSA BLOWS IN N	IS NON-COASTAL PL NDICATES THE LEVE L IS PENETRATION I ON-COASTAL PLAIN	AIN MATERIAL THAT W EL AT WHICH NON-COA BY A SPLIT SPOON SA MATERIAL, THE TRA	NOULD YIELD SPT REFUSAL IF TEST STAL PLAIN MATERIAL WOULD YIELI MPLER EQUAL TO OR LESS THAN Ø NSITION BETWEEN SOIL AND ROCK
CONSIST	ENCY, COLOR, IS MINERALO	GICAL COMPOS	TURE, AASHTC TION, ANGULA	CLASSIFICAT RITY, STRUCTU	IION, AND OTHE	ER PERTINENT FAU Y,ETC. FOR EXAM	TORS SUCH			ANGULARITY UF GRAI	NS	TEDMC.	ROCK MATER	IALS ARE TYPICALL	Y DIVIDED AS FOLLOW	/5:
	VERY STIFF.G	RAY.SILTY CLAY.	ND AND	ERBEDDED FIN	E SAND LAYERS	S.HIGHLY PLASTIC.A-	-6	ANGULAR, SUBAN	IGULAR,	SUBROUNDED, OR ROUNDED.	LSIGNATED BT THE	IERMS:	WEATHERED		NON-COASTAL PLAT	N MATERIAL THAT WOULD YIELD SP
GENERAL	5	GRANULAR MATER	ALS		( MATERIALS				M	NERALOGICAL COMPOS	TION		RUCK (WR)	2.2	FINE TO COARSE O	GRAIN IGNEOUS AND METAMORPHIC R
CLASS.	(	$\leq$ 35% Passing	200)	( > 35% Pr	ASSING 200)	ORGANIC M	TERIALS	MINERAL NAM	IES SU	CH AS QUARTZ, FELDSPAR, MICA, "	ALC, KAOLIN, ETC.	NCE	CRYSTALLIN ROCK (CR)		WOULD YIELD SPT	REFUSAL IF TESTED. ROCK TYPE I
GROUP CLASS	A-1	A-3	A-2	A-4 A-5	A-6 A-7 A-7-5	A-1, A-2 A-4, A	-5	HRE USED IN	DESC		ERED OF SIGNIFICE	INCE.	NON-CRYSTA		FINE TO COARSE O	GRAIN METAMORPHIC AND NON-COAST
SYMBOL					A-7:6			SLIG	ITLY C	OMPRESSIBLE	LL < 31		ROCK (NCR)		ROCK TYPE INCLUE	DES PHYLLITE, SLATE, SANDSTONE, ET
% PASSING				<b>×</b>				MUDE HIGHL	Y COM	PRESSIBLE	LL = 31 - 50 LL > 50		SEDIMENTAR		SPT REFUSAL. ROC	K TYPE INCLUDES LIMESTONE, SAND
=10	50 MX	E1 MA				GRANULAR CLA	MUCK,		F	PERCENTAGE OF MATER	IAL		(CP)			HERING
•200	15 MX 25 MX	10 MX 35 MX 35	MX 35 MX 35 I	1X 36 MN 36 M	N 36 MN 36 MN	SOILS		ORGANIC MATERIAL		GRANULAR SILT - CLAY SOILS SOILS	OTHER MATE	RIAL	FRESH	ROCK FRESH, CRYST	ALS BRIGHT, FEW JOIN	TS MAY SHOW SLIGHT STAINING. ROCK
								TRACE OF ORGANIC MA	ATTER TER	2 - 3% 3 - 5% 3 - 5% 5 - 12%	TRACE 1 LITTLE 10	- 10% - 20%		HAMMER IF CRYSTA	LLINE.	
LL	-	- 40 MX 41	MN 40 MX 41 M	N 40 MX 41 MP	40 MX 41 MN	SOILS WITH LITTLE OR		MODERATELY ORGANIC		5 - 10% 12 - 20%	SOME 20	) - 35% 57 AND ABOVE	(V SLI.)	CRYSTALS ON A BR	RESH, JUINTS STAINED,	SUME JUINTS MAY SHOW THIN CLAY SHINE BRIGHTLY. ROCK RINGS UNDER
	6 MX	NP 10 MX 10	MX 11 MN 11 M	N 10 MX 10 M	K 11 MN 11 MN	MODERATE	ORGANIC	India i onomite		GROUND WATER	110121 3.	NA HILD HOUTE	CL LOUIT	OF A CRYSTALLINE	NATURE.	
USUAL TYPES	STONE FRAGS		4 11/2	0 MA 12 M		ORGANIC	SOILS	$\nabla$	WATE	ER LEVEL IN BORE HOLE IMMEDI	TELY AFTER DRILL	ING	(SLI.)	1 INCH. OPEN JOINT	IS MAY CONTAIN CLAY.	IN GRANITOID ROCKS SOME OCCASION
OF MAJOR	GRAVEL, AND	SAND GRAV	el and sand	SOLS	SOILS	MATTER		<b>T</b>	STAT	TIC WATER LEVEL AFTER 24	HOURS		MODERATE	CRYSTALS ARE DUL	L AND DISCOLORED, CR	YSTALLINE ROCKS RING UNDER HAMME
GEN, RATING	JHILD					FAIR TO		P₩_	PERC	CHED WATER, SATURATED ZONE, OF	WATER BEARING S	TRATA	(MOD.)	GRANITOID ROCKS.	MOST FELDSPARS ARE [	DULL AND DISCOLORED, SOME SHOW CL
AS SUBGRADE		EXCELLENT TO G	00	FAIR	to Poor	POOR	UNSUITABLE		SPRI	NG OR SEEP				WITH FRESH ROCK.	R HAMMER BLOWS AND S	HOWS SIGNIFICANT LOSS OF STRENGT
		PLOF A-7-5 SUBO	ROUP IS ≤ LL	- 30 ; PLOF A-7	V-6 SUBGROUP IS	> LL - 30		0.00					MODERATELY	ALL ROCK EXCEPT	QUARTZ DISCOLORED OF	R STAINED. IN GRANITOID ROCKS, ALL
				RANGE OF	STANDARD	RANGE OF	INCONFINED				123		(MOD. SEV.)	AND CAN BE EXCAV	ATED WITH A GEOLOGIS	ST'S PICK. ROCK GIVES "CLUNK" SOUND
PRIMARY	SOIL TYPE	CONSIS	TENCY	PENETRATIC (N-1	N RESISTENCE	COMPRESSIV (TONS	E STRENGTH /FT <sup>2</sup> )	L ROADWAY EMB	ANKMEN	IT (RE) 25/025 DIP & DIP DIP ION FOCK STRU	ECTION CTURES		SEVERE	IF TESTED, WOULD		STAINED BOCK EARDIC CLEAR AND
GENERA		VERY	OOSE		< 4							DPE INDICATOR	(SEV.)	REDUCED IN STREN	GTH TO STRONG SOIL.	IN GRANITOID ROCKS ALL FELDSPARS
GRANUL	AR	LOC MEDIUM	SE DENSE	4 10	TO 10 TO 30	N	A					TALLATION		IT SUME EXTENT.	YIELD SPT N VALUES	100 BPF
(NON-CO	HESIVE)	DEN	SE	30	TO 50 50			THAN ROADWAY	Y EMBA			ST	VERY	ALL ROCK EXCEPT	QUARTZ DISCOLORED OF	R STAINED. ROCK FABRIC ELEMENTS A
		VERY	SOFT		< 2	< (	.25	- INFERRED SOL	L BOUN		• S01	JNDING ROD	(V SEV.)	REMAINING, SAPROL	ITE IS AN EXAMPLE OF	ROCK WEATHERED TO A DEGREE THA
GENERA SILT-C	LLY _AY	SO MEDIUM	STIFF	2	TO 4 TO 8	0.25 0.5	00.5		K LINE			ST BORING		VESTIGES OF ORIGI	NAL ROCK FABRIC REM SOUL BOCK FABRIC NO	AIN. <u>IF TESTED, WOULD YIELD SPT N</u> T DISCERNIBLE OR DISCERNIBLE ONLY
MATERI	AL	ST	FF	8	TO 15	11	2							SCATTERED CONCEN	TRATIONS. QUARTZ MAY	BE PRESENT AS DIKES OR STRINGER
(CONES.	12,	НА	RD		30	>	4	++++++ HELOVIHE SOI	L BUUN	INSTALLATION	<u> </u>	N-VALUE		HESO HIN EXHIPPEE.	воск н	
		Т	EXTURE	OR GRAI	N SIZE				F	RECOMMENDATION SYME	OLS		VERY HARD	CANNOT BE SCRATC	HED BY KNIFE OR SHAL	RP PICK. BREAKING OF HAND SPECIME
U.S. STD. SI	EVE SIZE M)		4 10 4.76 2.00	40 0.42	60 200 0.25 0.075	270 5 0.053				CLASSIFIED EXCAVATION - [ SUITABLE WASTE	K → M UNCLASSIFIED	EXCAVATION - BUT NOT TO BE		SEVERAL HARD BLO	WS OF THE GEOLOGIST	S PICK.
ROUL DE				COARSE	FINE	SILT	CLAX			CLASSIFIED EXCAVATION - CEPTABLE DEGRADABLE BOCK	USED IN THE EMBANKMENT	TOP 3 FEET OF OR BACKFILL	HARU	TO DETACH HAND S	D BY KNIFE OR PICK ON SPECIMEN.	ILY WITH DIFFICULIY. HARD HAMMER I
(BLDR.		:0B.)	GR.)	SAND (CSE, SD.)	SAND (F SD	) (SL.)	(CL.)			ABBREVIATIONS			MODERATELY	CAN BE SCRATCHED	BY KNIFE OR PICK. G	OUGES OR GROOVES TO 0.25 INCHES D
GRAIN M	1 305	75	2.0		0.25	0.05 0.	105	AR - AUGER REFUSAL		MED MEDIUM	VST - VANE	SHEAR TEST	THIND	BY MODERATE BLOW	√S.	ST S FICK. HEND SECTIMENS CHIN DE
SIZE IN	. 12	3						BT - BORING TERMINATED	כ	MICA MICACEOUS MOD MODERATELY	WEAWEAT Ƴ-UNIT W	HERED EIGHT	MEDIUM	CAN BE GROOVED O	R GOUGED 0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE
	S	SOIL MOIS	TURE -	CORRELA	TION OF	TERMS		CPT - CONE PENETRATION	N TEST	NP - NON PLASTIC	Ϋ́d- DRY UM	IT WEIGHT	-	POINT OF A GEOLO	GIST'S PICK.	
SUIL (AT	MUISTURE	SLALE MITS)	DESCRI	PTION	GUIDE FOR	FIELD MOISTURE	DESCRIPTION	DMT - DILATOMETER TES	т	PMT - PRESSUREMETER T	SAMPLE	BBREVIATIONS	SOFT	CAN BE GROVED OR FROM CHIPS TO SE	R GOUGED READILY BY A	KNIFE OR PICK. CAN BE EXCAVATED IN BY MODERATE BLOWS OF A PICK POI
			- SATURA	TED -	USUALLY LI	OUID; VERY WET,	SUALLY	DPT - DYNAMIC PENETRA e - VOID RATIO	TION T	EST SAP SAPROLITIC SD SAND, SANDY	S - BULK SS - SPLIT	SPOON		PIECES CAN BE BR	OKEN BY FINGER PRESS	URE.
LL		LIMIT	(SAT.	r	FROM BELOW	W THE GROUND W	TER TABLE	F - FINE		SL SILT, SILTY	ST - SHELB	Y TUBE	SOFT	OR MORE IN THICK	NESS CAN BE BROKEN E	AVALED READILY WITH POINT OF PICK
PLASTIC			- WET -	0-0	SEMISOLID;	REQUIRES DRYING	то	FRAC FRACTURED, FRAC	TURES	TCR - TRICONE REFUSAL	RT - RECOM	PACTED TRIAXIAL		FINGERNAIL.	40110	
(PI) PL		C LIMIT	- ₩21 -	(₩)	ATTAIN OPT	IMUM MOISTURE		FRAGS FRAGMENTS HI HIGHLY		W - MOISTURE CONTENT V - VERY	CBR - CALIF RATIO	ORNIA BEARING	TERM	FRACTURE SP	SPACING	TERM
			- MOIST	- (M)	501 ID• AT 0	R NEAR OPTIMUM	MOISTURE	EOU	UIPM	ENT USED ON SUBJEC	PROJECT		VERY WID	E MOR	E THAN 10 FEET	VERY THICKLY BEDDED
OM SL		M MOISTURE AGE LIMIT			562151.11.0		HOIDTONE	DRILL UNITS:	ADVA	NCING TOOLS:	HAMMER TYPE:		MODERAT	ELY CLOSE	1 TO 3 FEET	THINLY BEDDED Ø
			- DRY -	ŝ	REQUIRES A	DDITIONAL WATER	то	CME-45C	ㅣ님	CLAY BITS		MANUAL	CLOSE VERY CLO	Ø DSE LESS	.16 TO 1 FOOT 5 THAN 0.16 FEET	VERY THINLY BEDDED 0. THICKLY LAMINATED 0.0
					ATTAIN OPT	IMUM MOISTURE		CME-55	ㅣ님	6 CUNTINUUUS FLIGHT AUGER	CORE SIZE:	<b>—</b>			זאורא ייר	
			PLA	STICITY				CME-550		HARD FACED FINGER RITS		└──" ───	FOR SEDIME	TARY ROCKS. INDUR	ATION IS THE HARDEN	ING OF MATERIAL BY CEMENTING H
NOF	I PLASTIC		PLAST	0-5	(PI)	DRY STR VERY	<u>INGTH</u> .OW			TUNG -CARBIDE INSERTS	└ <u></u> -N		FRIAD	L F	RUBBING WITH	FINGER FREES NUMEROUS GRAINS:
SL1 MO	GHTLY PLAS			6-15 16-25		SLIG	it M	VANE SHEAR TEST			HAND TOOLS:				GENTLE BLOW	BY HAMMER DISINTEGRATES SAMPLE
HIG	HLY PLASTI	С	2	6 OR MORE		HIG		PORTABLE HOIST	日	TRICONE STEEL TEETH		DIGGER	MODE	RATELY INDURATED	GRAINS CAN BE BREAKS EASIL	E SEPARATED FROM SAMPLE WITH S WHEN HIT WITH HAMMER.
				COLOR						TRICONE TUNGCARB.		ROD	INDUR	ATED	GRAINS ARE DI	FFICULT TO SEPARATE WITH STEEL
DESCRIP	TIONS MAY	INCLUDE COLO	R OR COLOR	COMBINATIO	NS (TAN, RED,	YELLOW-BROWN, I	LUE-GRAY).	<u>[X] U-50</u>		CORE BIT		AR TEST			DIFFICULT TO	BREAK WITH HAMMER.
М	DDIFIERS SU	JCH AS LIGHT	DARK, STREA	KED, ETC. ARI	E USED TO D	ESCRIBE APPEAR	NCE.		ΙĒ				EXTR	MELY INDURATED	SHARP HAMMER	BLUWS REQUIRED TO BREAK SAMPL

#### SHEET NO.

## project reference no.

	TERMS AND DEFINITIONS
ED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
T N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
OCK THAT NCLUDES GRANITE.	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE,CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
	$\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN. HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK UP TO AL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
IS. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	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
ARE KAOLINIZED	LENG - A BODY OF COLL OF DOCK THAT THING OUT IN ONE OF MODE DIDECTIONS
	LENS - A BODT OF SULL OR NOCK THAT THINS OUT IN ONE OF MORE DIRECTIONS.
	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
T ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND S. SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - 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 RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BLOWS REQUIRED	<u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF
OR PICK POINT. D BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
N FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. 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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERFECTACE
HED READILY BY	TOPSOIL (IS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BM#5: -L- STATION 365+24.36.174' RT. RR SPIKE IN POPI AR
THICKNESS	N: 874857, E: 1773975
4 FEET	ELEVATION: 761.79 FEET
.16 - 1.5 FEET	NOTES:
03 - 0.16 FEET 08 - 0.03 FEET	
< 0.008 FEET	
EAT, PRESSURE, ETC.	
TEEL PROBE:	
PROBE;	
F.	
	DATE: 8-15-14





WB	<b>S</b> 3482 <sup>2</sup>	1.1.5	_		TI	Р	U-252	5C		COUN	<b>TY</b> G	UILFOR	RD				GEOL	OGIST	Butle	r, L.				W	BS	34821	.1.5		_	ТІ	P U-2	2525C		COU	ΝΤΥ
SIT	E DESCR	RIPTION	Gree	ensboi	ro Eas	sterr	n Loop	From	US 29	) North	of Gre	ensbor	o to Ea	st of	SR 2	2303	8 (Lawn	ndale D	rive)			GROU	ND WTR (1	t) SI	ITE D	ESCR	IPTION	Gre	ensbo	ro Eas	stern Lo	oop Fr	om US	29 Nor	th of
BO	ring no	. CV3-	Ŀ		SI	ΓΑΤ	rion (	363+6	0		OFF	SET 2	210 ft L	Т			ALIGN	MENT	-L-			0 HR.	N/	A B	ORIN	g no.	CV2-	-C		S	ΓΑΤΙΟΙ	<b>N</b> 364	1+50		
CO	LAR EL	<b>EV.</b> 76	9.8 ft		т	OTA	AL DEP	<b>РТН</b> 4	4.9 ft		NOF	RTHING	874,	477			EASTI	I <b>NG</b> 1	,774,14	18	2	24 HR.	1.	3 <b>C</b>	OLLA	R ELE	<b>EV.</b> 76	67.0 ft		т	OTAL C	DEPTH	<b>I</b> 9.0 f	t	
DRI	L RIG/HA	MMER E	FF./DA	TE SN	/E275	DIE	DRICH	D-50 89	9% 1/15	5/2016			DRILL	METH	OD	Was	h Boring	)		н	AMME	ER TYPE	Automatic	D	RILL F	rig/hai	VIMER E	FF./DA	NTE SI	VIE275	DIEDRIC	CHD-50	3 89% 1	/15/2016	j
DRI	LLER T	. Williar	ns		ST	TAR	RT DAT	<b>E</b> 02	2/09/16	5	CON	MP. DA	<b>TE</b> 02	/09/16	3		SURF	ACE W	ATER I	DEPTH	I N/A	٩		D	RILLI	ER T.	Willia	ms		S	TART [	DATE	02/09/	16	
ELE		DEPTH	BLO	w col	JNT			BLO	OWS P	ER FOO	T		SAMP					S	םואם וור	ROCK	DESCI	RIPTION	J	EL	EV		DEPTH	BLC	oo wc	UNT			BLOWS	PER FC	JOT
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25	50	)	75 I	100	NO.	Имс	DI G	E	ELEV. (ft)			ROOK	DLOO		DEPTH	(ft) (f	ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	,	50	7
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	766.2	3.6			-											<del>ا ال</del>	765.7			Organ	ics			- <u>4</u>		766 0	10				$H_{-}$				
765	765.0	4.8	22 60/0.1	78/0.3				+		· <u></u>		100/0.8	H	Sat	97		765.0 764.9	Tan-	Orange	Clayey S	<b>UAL</b> SILT w	ith Trace	e of	.8 70	65		-	3	4	5		<u>,                                     </u>		+	
		Ŧ										00/011				-		Brown	-Orange	Organ Fine Sa	ics andy Sl	ILT with				/63.6 -	- 3.4	4	12	16		$\sum_{i=1}^{n}$			•••
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		ŧ														F			CRYS (Metar	STALLII norphos	<b>NE RO</b> ed Gra	<b>)CK</b> anite)				-	-	6/	33/0.1	1		I			
	-	‡														F		Benetra	oring Ter	rminateo	d with S	Standard	1 764 9			-	-								
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#### SHEET 5

INT	( G	UILFC	R	D			GEOLOGIST Butler, L.								
th o	f Gre	ensbo	orc	to Eas	st of S	R 23	03 (Lav	vndale	Drive)		GROUN	ID WTR (ft)			
	OFF	SET	С	L			ALIC	SNME	NT -L-		0 HR.	N/A			
	NO	RTHIN	G	874.6	86		EAS	TING	1.774.056		24 HR.	2.0			
] }			Ť	DRILL	/IETHO	D V	lash Bori	ng	.,,	HAMM	ER TYPE	Automatic			
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<u>ר</u> חר	50	vir'. DA	1		/	LI	JOR	ACE	WAIER DE	r°in⊓ IN/.	~				
501	75	100		NO		0			SOIL AND RO	OCK DESC	RIPTION				
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• •						л <u>у</u>	764.0	<u> </u>	Fragments	and Mang	janese	<u> </u>			
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•••		100/0.0	ļ	-			758.0		(Metamor	phosed Gr	anite)	9.0			
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WBS	34821	.1.5			<u> </u> TI	P	l	J-2:	525	с -			COUN
SITE	DESCR	IPTION	Gre	ensbo	ro Eas	ste	ern	Lo	op I	-ro	m١	US 2	29 North
BOR	ING NO.	CV4-	R		S	T/	ATI	ON	3	65-	+40	)	
COLI	LAR ELE	<b>V.</b> 75	9.8 ft		T(	0	TAL	- D	EP1	ГН	1;	3.9 f	t
DRILL	RIG/HAI	MMER E	FF./DA	TE SM	/E275	D	IED	RIC	HD	-50	899	% 1/	15/2016
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ELEV		DEPTH	BLC	W COL	JNT					E	BLO	ws	PER FOO
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### **GEOTECHNICAL BORING REPORT** BORE LOG



#### **CONTENTS**

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REFERENCE

SHEET NO.	<b>DESCRIPTION</b>
I	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

#### STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY\_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE)

SITE DESCRIPTION CULVERT AT -L- 382+49 AT UNNAMED TRIBUTARY TO REEDY FORK/TOWNSEND LAKE

STATE	STATE PROJECT REFERENCE NO.	SHEET NQ.	TOTAL SHEETS
N.C.	U–2525C	1	6

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLT TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 1707-6800. 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 BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNI-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTIGE 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 TO TETAILS 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 OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISY 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 CONDENSATION OF FOR ANY EXTENSION OF TIME FOR ANY REASON RESULTING FOR THE ACTUAL CONDITIONS TO BE INCOUNTERED 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.

PERSONNEL

L. BUTLER
T. WILLIAMS
INVESTIGATED BY S&ME, Inc.
DRAWN BY
CHECKED BY C.A. YOUNGBLOOD
SUBMITTED BYC.A. YOUNGBLOOD
DATEDECEMBER 2017


SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

		SOIL C	ESCRIPT	ION			T	GRA	DATION		ROCK DESCRIPTION								
SOIL IS COM BE PENETRA ACCORDING IS BASE	NSIDERED UNCONSOLIDA TED WITH A CONTINUOL TO THE STANDARD PEI ED ON THE AASHTO SY Y COLOR TEXTURE MOI	ED, SEMI-CON S FLIGHT POW ETRATION TES STEM. BASIC [	SOLIDATED, OF ER AUGER AN ST (AASHTO T ESCRIPTIONS	WEATHERED	EARTH MATERIALS S THAN 100 BLOWS 11586). SOIL CLASSI NCLUDE THE FOLLO ER PERIMENT FACT	THAT CAN PER FOOT FICATION WING: ORS SUCH	<u>WELL GRADED</u> - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	'es a c idicate .s a mi	GOOD REPRESENT	ATION OF PARTIC ARTICLES ARE ALL IRM PARTICLE SIZ	LE SIZES FI _ APPROXIMA ES OF TWO	ROM FINE TO COARSE. ATELY THE SAME SIZE. OR MORE SIZES.	HARD ROCK ROCK LINE SPT REFUSA BLOWS IN N REPRESENTE	IS NON- INDICATE NL IS PE NON-COA	COASTAL PLAIN MATER S THE LEVEL AT WHI NETRATION BY A SPLI STAL PLAIN MATERIA ZONE OF WEATHERED	TAL THAT W CH NON-COAS T SPOON SAU , THE TRAM ROCK,	JULD YIELD SPT REFUSAL IF TEST TAL PLAIN MATERIAL WOULD YIELD IPLER EQUAL TO OR LESS THAN Ø ISITION BETWEEN SOIL AND ROCK		
AS M	MINERALOGICAL COMPOS	TION, ANGULAF	ITY, STRUCTU	RE, PLASTICIT	Y, ETC. FOR EXAMPL	.E,	THE ANGULARIT	YORF	ROUNDNESS OF SC	DIL GRAINS IS DE	SIGNATED B	Y THE TERMS:	ROCK MATER	IALS AP	E TYPICALLY DIVIDED	AS FOLLOWS			
VER	SOTI LEGE	ND AND	AASHTO	E SAND LAYERS	CATION	6	ANGULAR, SUBAN	IGULAR,	SUBROUNDED, OR	ROUNDED.			WEATHERED ROCK (WR)		NON-CC	ASTAL PLAIN	MATERIAL THAT WOULD YIELD SP		
GENERAL	GRANULAR MATER	ials	SILT-CLAY	MATERIALS			-	<u></u> MI	INERALOGIC	AL COMPOSI	TION				JIJI FINE T	O COARSE G	AIN IGNEOUS AND METAMORPHIC R		
CLASS.	(≤ 35% PASSING *	200)	( > 35% PA	(SSING = 200)		ININLS	MINERAL NAM		CH AS QUARTZ,F	ELDSPAR, MICA, TA	ALC, KAOLIN,		ROCK (CR)	E	WOULD GNEISS	YIELD SPT	IEFUSAL IF TESTED. ROCK TYPE II HIST.ETC.		
GROUP CLASS. 4-1-	A-1 A-3	A-2 2-5 A-2-6 A-2-	A-4 A-5	A-6 A-7	A-1, A-2 A-4, A-5 A-3 A-6, A-7	5			COMPRE	SSIBILITY			NON-CRYSTA	ILLINE		O COARSE G	AIN METAMORPHIC AND NON-COAST		
SYMBOL 8000	0000000						SLIG⊦	TLY C	OMPRESSIBLE		LL < 31		ROCK (NCR)		ROCK 1	YPE INCLUDE	S PHYLLITE, SLATE, SANDSTONE, ET		
7 PASSING		-	<u>s</u>				Ž MODE⊦ HIGHL	RATELY	PRESSIBLE		LL = 31 · LL > 50	- 50	SEDIMENTAR	AIN Y ROCK		FUSAL. ROCK	TYPE INCLUDES LIMESTONE, SAND		
*10 50 M	мх				GRANULAR SILT- CLAY	MUCK,		F	PERCENTAGE	E OF MATER	IAL		(CP)		SHELL	BEDS, ETC.	FRING		
*40 30 M *200 15 M	MX 50 MX 51 MN MX 25 MX 10 MX 35 MX 35	MX 35 MX 35 M	IX 36 MN 36 MI	1 36 MN 36 MN	SOILS SOILS	PEAT	ORGANIC MATERIAL		GRANULAR SOILS	SILT - CLAY SOILS	OTHER	R MATERIAL	FRESH	BUCK	ERESH, CRYSTALS, BRIGH		S MAY SHOW SUIGHT STAINING, BOCK		
MATERIAL	-						TRACE OF ORGANIC MAL	ATTER	2 - 3%	3 - 5%	TRACE	1 - 10%		HAMME	R IF CRYSTALLINE.				
PASSING #40	40 MX 41	MN 40 MX 41 M	N 40 MX 41 MP	40 MX 41 MN	SOILS WITH		MODERATELY ORGANIC	ER	3 - 5% 5 - 10%	12 - 20%	SOME	20 - 35%	VERY SLIGHT	ROCK	GENERALLY FRESH, JOIN	TS STAINED, S	OME JOINTS MAY SHOW THIN CLAY		
PI	6 MX NP 10 MX 10	MX 11 MN 11 M	N 10 MX 10 MX	11 MN 11 MN	LITTLE OR MODERATE	HIGHLY	HIGHLY ORGANIC		> 10%	> 20%	HIGHLY	35% AND ABOVE	(V SEI./	OFA	CRYSTALLINE NATURE.	INEN INCE 3	The Britiner. Nock Minos Buben		
GROUP INDEX	0 0 0	4 MX	8 MX 12 MX	16 MX NO MX	AMOUNTS OF	SOILS			GROUN	ID WATER			SLIGHT	ROCK	GENERALLY FRESH, JOIN	TS STAINED	ND DISCOLORATION EXTENDS INTO R		
USUAL TYPES STON OF MAJOR GRA	NE FRAGS. AVFL. AND FINE SILT	/ OR CLAYEY	SILTY	CLAYEY	MATTER			WATE	ER LEVEL IN BOP	RE HOLE IMMEDIA	TELY AFTER	DRILLING	(311.)	CRYST	STALLINE ROCKS RING UNDER HAMME				
MATERIALS	SAND SAND GRAV	:L and sand	SOILS	SOILS				STAT	TIC WATER LEVEL	LAFTER <u>24</u> H	IOURS		MODERATE	SIGNIF	ICANT PORTIONS OF RO	COLORATION AND WEATHERING EFFEC			
GEN, RATING	EXCELLENT TO G	JOD	FAIR	to poor	FAIR TO POOR	UNSUITABLE	✓ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA					(MUD.)	DULL	SOUND UNDER HAMMER E	ICL AND DISCULORED, SOME SHOW CL				
H3 JODONHDL	PLOF A-7-5 SUBC	ROUP IS ≤ LL	- 30 : PLOF A-7	-6 SUBGROUP IS	> LL - 30		- 0-00 <del>-</del>	SPRI	ING OR SEEP					WITH F	RESH ROCK.				
	CON	SISTENC	Y OR DE	NSENESS				MISCELLANE	EOUS SYMBO	LS	SEVERE	ALL R	ISCOLORED AND A MAJO	RITY SHOW K	AOLINIZATION. ROCK SHOWS SEVERE				
		NESS OR	RANGE OF		RANGE OF U				AT (PE) 25/025			(MOD. SEV.)	AND C	'S PICK. ROCK GIVES 'CLUNK' SOUND					
PRIMHKT SUIL	CONSIS	TENCY	(N-)	ALUE)	(TONS/	FT <sup>2</sup> )		OF ROCK STRUC	SEVERE	ALL R	OCK EXCEPT QUARTZ DI	SCOLORED OR	STAINED. ROCK FABRIC CLEAR AND						
GENERALLY	Y VERY	_00SE		4			SOIL SYMBOL								ED IN STRENGTH TO ST ME EXTENT. SOME FRAG	RONG SOIL. I MENIS OF SI	I GRANITOID ROCKS ALL FELDSPARS RONG ROCK USUALLY REMAIN.		
GRANULAR MATERIAI	MEDIUM	DENSE	10	TO 30	N/4	à		ILL (AF		ST PMT		CONE PENETROMETER		<u>IF TE</u>	STED, WOULD YIELD SPT	N VALUES >	<u>100 BPF</u>		
(NON-COHES	SIVE) DEM VERY	SE DENSE	30 `	TO 50 50			THAN ROADWAY						VERY	ALL R	OCK EXCEPT QUARTZ DI	SCOLORED OR	STAINED. ROCK FABRIC ELEMENTS A		
	VERY	SOFT		2	< 0.2	25	INFERRED SOI	L BOUN		CORE BORING	•	SOUNDING ROD	(V SEV.)	REMAI	NING. SAPROLITE IS AN	EXAMPLE OF	ROCK WEATHERED TO A DEGREE THA		
GENERALLY SILT-CLAY	Y SO MEDIUM	STIFE	2 4	TO 4 TO 8	0.25 TO 0.5 TO	) 0.5 1.0		K I INF	- <sup>MW</sup>	MONITORING WE	ш 📥	TEST BORING		RUCK	SES OF ORIGINAL ROCK	FABRIC REMA	N. IF TESTED, WOULD YIELD SPI N		
MATERIAL	ST	FF	8 1	10 15	1 TO	2			- 0		<b>Y</b>	WITH CORE		SCATT	ERED CONCENTRATIONS.	QUARTZ MAY	BE PRESENT AS DIKES OR STRINGER		
(CUHESIVE)		30	<del>د</del>	30	2 10	4	ALLUVIAL SOI	L BOUN		INSTALLATION	$\bigcirc$	- SPT N-VALUE		ALSO	AN EXAMPLE.				
	Ť	EXTURE	JR GRAI	N SIZE				F	RECOMMENDA	ATION SYMB	OLS					RULK HA	RUNESS		
U.S. STD. SIEVE	SIZE	4 10	40	60 200	270			ICLASSIFIED EXC	AVATION -		VENT HHO	VERY HARD CANNUT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPEC SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.							
OPENING (MM)		1.76 2.00	0.42	0.25 0.075	5 0.053		SHALLOW T		ICLASSIFIED EXC	AVATION -		N THE TOP 3 FEET OF	HARD	CAN B	E SCRATCHED BY KNIFE	OR PICK ONL	Y WITH DIFFICULTY. HARD HAMMER		
BOULDER	COBBLE G	AVEL	SAND	SAND	) SILT	CLAY			CEPTABLE DEGRA	ADABLE ROCK	EMBANK	MENT UR BACKFILL	MODERATELY	CAN B	E SCRATCHED BY KNIFE	OR PICK. GO	UGES OR GROOVES TO 0.25 INCHES (		
(BEDR.)	(08.)	UN./	(CSE. SD.)	(F SD	.) (32.)	(02.)			ABBRE	VIATIONS			HARD	EXCAV	ATED BY HARD BLOW OF	A GEOLOGIS	I'S PICK. HAND SPECIMENS CAN BE		
GRAIN MM SIZE IN.	305 75 12 3	2.0		0.25	0.05 0.0	25	AR - AUGER REFUSAL BT - BORING TERMINATE(	c	MED ME MICA M	EDIUM IICACEOUS	VST .	- VANE SHEAR TEST - WEATHERED	MEDIUM		E GROOVED OR GOUGED	0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE		
		TURE - 1			TERMS		CL CLAY		MOD MO		2-	UNIT WEIGHT	HARD	CAN B	E EXCAVATED IN SMALL	CHIPS TO PE	ICES 1 INCH MAXIMUM SIZE BY HARD		
SOIL MO	DISTURE SCALE	FIELD MC	JISTURE			ECOLOTION	CSE COARSE	N IESI	ORG OR	IGANIC	/d <sup>-</sup>	DRT UNIT WEIGHT	SOFT	CAN B	F GROVED OR GOUGED F	FADILY BY K	VIEF OR PICK. CAN BE EXCAVATED I		
(ATTER	BERG LIMITS)	DESCRI	'TION	GOIDE FOR I	FIELD MOISTORE D	ESCHIFTION	DMT - DILATOMETER TES	T TION T	PMT - PR FST SAP - SA	RESSUREMETER TE	ST <u>SA</u>	MPLE ABBREVIATIONS		FROM	CHIPS TO SEVERAL INC	HES IN SIZE	BY MODERATE BLOWS OF A PICK POI		
		- SATURA	TED -	USUALLY LI	QUID; VERY WET, US	SUALLY	e - VOID RATIO		SD SAN	ID, SANDY	SS -	SPLIT SPOON	VERY	CAN B	F CARVED WITH KNIFF.	CAN BE EXCA	NE. VATED READILY WITH POINT OF PICK		
ᄔᆮᆂ	LIQUID LIMIT	(SAT.)		FRUM BELUN	W THE GROUND WA	IER TABLE	F - FINE - FOSS FOSSILIFEROUS		SL SIL SLI SL	T, SILTY IGHTLY	ST - RS -	SHELBY TUBE ROCK	SOFT	OR MO	RE IN THICKNESS CAN	BE BROKEN B	FINGER PRESSURE. CAN BE SCRATC		
PLASTIC BANGE <		- WFT -	(W)	SEMISOLID; F	REQUIRES DRYING	то	FRAC FRACTURED, FRAC	TURES	TCR - TR	RICONE REFUSAL	RT -	RECOMPACTED TRIAXIAL			NAIL.				
	PLASTIC LIMIT	ATTAIN OPT	IMUM MOISTURE		HI HIGHLY		W - MUIS V - VERY	STURE CUNTENT	CBR	RATIO	FRACTURE SPACING BED								
		- (M)				EQUIPMENT USED ON SUBJECT PROJECT							VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED						
0M	SHRINKAGE LIMIT		30210, HT 0		IOISTONE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:							WIDE 3 TO 10 FEET THICKLY BEDDED MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED						
		227	(2)	REQUIRES A	DDITIONAL WATER	то	CME-45C							CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.0 VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.00					
		- UKT - I	יט	ATTAIN OPT	IMUM MOISTURE		CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:							THINK CLUSE LESS THIN WID FEET THICKET LAMINATED 0.00					
		PLA	STICITY									_ INDURATION							
		PLASTI	CITY INDEX	(PI)	DRY STREE	NGTH	CME-550		HARD FACED FIN	IGER BITS	□-N _		FOR SEDIME	NTARY R	UUCKS, INDURATION IS	THE HARDEN	NG UF MATERIAL BY CEMENTING, H		
NON PL SLIGHT	NUN PLASTIC 0-5 VERY LUW SLIGHTLY PLASTIC 6-15 SLIGHT						VANE SHEAR TEST	니닏	TUNGCARBIDE	INSERTS	HAND TO	OLS:	FRIA	ЗLE	GEN	NTLE BLOW E	Y HAMMER DISINTEGRATES SAMPLE		
MODERA HTCHLY	MODERATELY PLASTIC         16-25         MEDIUM           HIGHLY PLASTIC         26 OR MORE         HIGH							닏	CASING W	/ ADVANCER	P09	ST HOLE DIGGER	MODE	RATELY	INDURATED GRA	INS CAN BE	SEPARATED FROM SAMPLE WITH S		
	265110				1100			닏		STEEL TEETH		ND AUGER			BRE	AKS EASILY	WHEN HIT WITH HAMMER.		
	COLON						X <u>D-50</u>			UNGCARB.		JNDING ROD	INDUF	RATED	GR4 DIF	FICULT TO E	REAK WITH HAMMER.		
DESCRIPTION	NS MAY INCLUDE COLO FIERS SUCH AS LIGHT	NS (TAN, RED, USED TO N	YELLOW-BROWN, BL ESCRIBE APPEARAN	UE-GRAY). ICE.								EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE							
															500000000000000000000000000000000000000	APLE BREAKS	ACROSS GRAINS		

### PROJECT REFERENCE NO.

U-2525C

sheet NO. 2

	TERMS AND DEFINITIONS
ED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS UFIEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
T N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
OCK THAT NCLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN. HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK UP TO AL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
TS. IN AY. ROCK HAS	<u>FLDAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	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
EVIDENT BUT	ITS LATERAL EXTENT.
ARE KAULINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
RE DISCERNIBLE	PERCHED WATER - WATER MAINTAINED AROVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
T ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND S. SAPROLITE IS	ROCK DUALITY 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 RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
DEEP CAN BE	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
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 WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL
N FRAGMENTS	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. <u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
NT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH HED READILY BY	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: U2525C_LS_TIN_170816.tin 11/09/2017
1HICKNESS 4 FEET	
1.5 - 4 FEET	ELEVATION: N/A FEET
.16 - 1.5 FEET 03 - 0.16 FEET	NOTES:
08 - 0.03 FEET < 0.008 FEET	
EAT, PRESSURE, ETC.	
TEEL PROBE:	
PROBE;	
F:	
	DATE: 8-15-14





WB	<b>S</b> 348	21.1.5			Т	IP U-25	525C		COU	ΝΤΥ	GUILFO	RD			GE	OLOGIST Tiernan,	S.		WB	<b>S</b> 3482	1.1.5			ТІ	P U-252	5C	COUNT	ΓY
SITE	E DESC	RIPTIO	N Gre	ensbo	ro Eas	stern Loc	op Fr	om US	29 Nort	h of G	reensbo	ro to Ea	st of S	SR 2	303 (La	wndale Drive)		GROUND WTR (ft)	SITE	E DESCR	RIPTION	Gre	ensboi	ro Eas	tern Loop	From US	29 North	of
BOF	ring n	<b>0</b> . CV6	-R2		S	TATION	384	4+00		OF	FSET	90 ft LT			AL	GNMENT -L-		<b>0 HR.</b> 4.0	BOF	ring no	. CV5	-C		ST	ATION	382+30		$\perp$
COL	LAR E	<b>LEV.</b> 7	70.4 ft		т	OTAL DE	EPTH	<b>1</b> 21.0	ft	NC	ORTHING	<b>G</b> 873,9	980		EA	<b>STING</b> 1,772,286		24 HR. FIAD	COL	LAR EL	<b>EV.</b> 76	67.3 ft		ТС	)TAL DEP	<b>TH</b> 17.0	ft	
DRIL	L RIG/H	IAMMER	EFF./DA	ATE SI	ME275	DIEDRICH	HD-50	089%1	/15/2016			DRILL	METHO	DD	H.S. Aug	ers	Hamme	ER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE SN	/IE275		)-50 89% 1/ 	15/2016	_
DRI		T. Willia	ims		S		ATE	02/22/	16	CC	omp. Da	TE 02/	22/16	1.	SU	RFACE WATER DEP	TH N/A	4	DRI		. Willia	ms		ST	ART DAT	E 01/29/	16	
ELE∖ (ft)		E DEPTI					25	BLOWS	PER FC	00T 75	100			0		SOIL AND ROO	CK DESC	RIPTION	ELEV (ft)		DEPTH (ft)	BLC		JNT	0	BLOWS	PER FOO	T 7
	(π)		0.51	0.511	0.51						100	NO.	И МО	I G	ELEV	(ft)		DEPTH (ft		(π)		0.51	0.51	0.51		<u> </u>	<u> </u>	
775		$\pm$													F				770		Ŧ							
		ŧ													Ł					700.0	<u> </u>				<b>.</b>	<u> </u>	<u> </u>	<u> </u>
770	760	$\frac{1}{1}$							- · ·						- 770.4	GROUN		CE 0.0	765	/66.3	1.0 1	2	2	3	 5			·
	109.	± 1.0	2	2	2	<b>│</b>				· ·   ·	 		w		767 4	Gray-Brown F	ine Sand	y CLAY		763.8	<u> </u>	4	4	6				:
765	766.	9 <u>3.5</u>	2	2	1		· ·	· · · ·	· ·   · ·	· ·   ·	 		$ -\overline{w} $		765.4	Dark Gray Sil	Ity Coarse	SAND 5.0	760	761.3	<u> </u>	9	9	12				:
765	764.4	1 + 6.0	5	12	23				<u> </u>						-	RES Brown Fine Sandy S	SIDUAL	Trace of Bock	760	758.8	- 8.5		Ű	12			<u> </u>	-
	761.	9 - 8.5						· • • 35 -	· +	· ·   ·	 				- <u>762.4</u>		its and Mi				ŧ	27	26	41	 		· · · ·	<b>6</b> 7
760	_	‡	37	46	31		•••				77 · · ·		D			Gray-Tan Slity Coar Rock Frag	rse SAND gments R	owith Trace of lock	755		ŧ					_ · · · ·	<u> </u>	•
		‡						· · · · ·	· ·   · ·	· ·    ·	· · · ·									753.8	<u>+ 13.5</u> +	36	64/0.2		 			
755		9 <u>  13.5</u>  -	15	30	70/0.3			· · · · ·	· ·   · ·	::  <u> </u>	 • <u></u>			a.	755.9			14.5		750 3	+				· · · ·		· · · ·	:
755	-	‡				<del></del>			<u> </u>							WEATHE (Metamorp	hosed Gra	anite)		- 100.0	+ 11.0	60/0.0						
	751.	9 + 18.5	42	57/0.2				· · · · ·		· ·   ·	· · · ·										‡							
750	749.	5 + 20.9	43	5770.3				· · · ·		· · ·					- 			20.9		-	ŧ							
		Ŧ	60/0.1	_							60/0.1	1			<u>749.4</u>	-/ CRYSTAI (Metamorp	LLINE RC hosed Gra	DCK21.0 anite)	1		‡							
		‡													F	Boring Termina Penetration Test Re	ated with s fusal at F	Standard			‡							
		Ŧ													F	ft in Crystalline Ro	ock (Meta	morphosed		-	ŧ							
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ITY     GUILFORD     GEOLOGIST     Culpepper, A.       o of Greensboro to East of SR 2303 (Lawndale Drive)     GROUND WTR (ft)													
10	f Greensbo	ro to Eas	st of S	R 230	03 (Lawndale	Drive)		GROUN	D WTR (ft)				
	OFFSET	CL			ALIGNMEN	0 HR.	N/A						
	NORTHING	<b>3</b> 874,1	44		<b>EASTING</b> 1,772,386 <b>24 HR.</b>								
		DRILL	METHO	D W	ash Boring		HAMM	ER TYPE	Automatic				
	COMP. DA	<b>TE</b> 01/2	29/16		SURFACE	WATER DEPT	TH N//	Ą					
т	75 100	SAMP.		L O		SOIL AND ROC	K DESC	RIPTION					
	1	110.		G									
					_								
•					767.3	GROUND RES	SURFA	CE	0.0				
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Ļ	100/0.7			477	753.3	WEATHE	RED RO	CK	14.0				
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SITE	DESCR	IPTION	Gre	ro Ea	ast	ern l	Loo	p F	ron	ו US	5 29	) No			
BOR	NG NO.	CV7-	R			ST	ATIC	ON	37	′9+:	35				
COLL		EV. 76	7.1 ft			TO	TAL		PT	H	10.9	$\frac{1}{4}$	-/004/		
DRILL	RIG/HAI		ff./Da	IE SI		5 L			1D-3	30 8	9%	1/15	/2016		
DRIL		. Williar	ns			ST		DA	TE	0	2/19	)/16			
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REFERENCE

SHEET NO.	<b>DESCRIPTION</b>
I	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY\_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE)

SITE DESCRIPTION CULVERT AT -L- 430+93 AT UNNAMED TRIBUTARY TO REEDY FORK/TOWNSEND LAKE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	6

### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLT TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 1707-6800. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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THE BIDDER OR CONTRACTOR IS CAUTIONED THAT TO TETAILS 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 OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERALS AND CONSTRUCTIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISY 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 CONDENSATION OF FOR ANY EXTENSION OF TIME FOR ANY RESOLATION FROM THE ACTUAL CONDITIONS TO BE INCOUNTERED AT HE 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.

PERSONNEL

L. BUTLER
T. WILLIAMS
INVESTIGATED BY S&ME, Inc.
DRAWN BY T.T. WALKER, F&R, Inc.
CHECKED BY C.A. YOUNGBLOOD
SUBMITTED BY C.A. YOUNGBLOOD
DATE DECEMBER 2017



SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION		ROCK DESCRIPTION									
SOIL IS BE PENE ACCORE IS	CONSIDERED TRATED WITH ING TO THE BASED ON TH	UNCONSOLIDA H A CONTINUOL STANDARD PEI HE AASHTO SY	ED, SEMI-CON S FLIGHT PO ETRATION TE STEM. BASIC I	SOLIDATED, O VER AUGER AN ST (AASHTO T DESCRIPTIONS	R WEATHERED ND YIELD LES 206,ASTM D GENERALLY I	EARTH MATERIALS S THAN 100 BLOW 01586). SOIL CLAS NCLUDE THE FOLL	THAT CAN S PER FOOT SIFICATION OWING:	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	ESAC IDICATE SAMI	GOOD REPRESENTATION OF PART S THAT SOIL PARTICLES ARE A XTURE OF UNIFORM PARTICLE S	ICLE SIZES FF BLL APPROXIMA BIZES OF TWO	ROM FINE TO COARSE. ITELY THE SAME SIZE. OR MORE SIZES.	HARD ROCK I ROCK LINE I SPT REFUSA BLOWS IN N	IS NON-COASTAL PLAIM NDICATES THE LEVEL IS PENETRATION BY ON-COASTAL PLAIN M	N MATERIAL THAT N AT WHICH NON-COA A SPLIT SPOON SA ATERIAL, THE TRA	NOULD YIELD SPT REFUSAL IF TEST STAL PLAIN MATERIAL WOULD YIELI MPLER EQUAL TO OR LESS THAN Ø NSITION BETWEEN SOIL AND ROCK					
CONSIST	ENCY, COLOR, IS MINERALO	GICAL COMPOS	TURE, AASHTC TION, ANGULA	CLASSIFICAT RITY, STRUCTU	IION, AND OTHE	ER PERTINENT FAI	PLE,			ANGULARITY UF GRA	INS	Y THE TERMO	- ROCK MATER	IALS ARE TYPICALLY	DIVIDED AS FOLLOW	/5:					
	VERY STIFF.G	RAY.SILTY CLAY.	OIST WITH INT	ERBEDDED FIN	E SAND LAYERS	S.HIGHLY PLASTIC.A-	<b>'-6</b>	ANGULAR, SUBAN	IGULAR,	SUBROUNDED, OR ROUNDED.	DESTONATED B	T THE TERMS:	WEATHERED		NON-COASTAL PLAT	N MATERIAL THAT WOULD YIELD SP					
GENERAL	5		<u>NU ANU</u> Als		( MATERIALS	LATION			MI	NERALOGICAL COMPOS	SITION		RULK (WR)	2.2	FINE TO COARSE (	BAIN IGNEOUS AND METAMORPHIC R					
CLASS.	(	$\leq$ 35% Passing	200)	( > 35% Pr	ASSING 200)	ORGANIC M	TERIALS	MINERAL NAM	AES SU	CH AS QUARTZ, FELDSPAR, MICA,	TALC, KAOLIN,	ETC.	CRYSTALLINE ROCK (CR)		WOULD YIELD SPT	REFUSAL IF TESTED. ROCK TYPE I					
GROUP CLASS	A-1	A-3	A-2	A-4 A-5	A-6 A-7 A-7-5	A-1, A-2 A-4, A-6, A-6, A-6, A-6, A-6, A-6, A-6, A-6	-5	HRE USED IN			IDERED OF SIG	INTETCHINCE.	NON-CRYSTA		FINE TO COARSE (	GRAIN METAMORPHIC AND NON-COAST					
SYMBOL					A-7:6			SLIG	HTLY C	OMPRESSIBLE	LL < 31	50	ROCK (NCR)		ROCK TYPE INCLUE	DES PHYLLITE, SLATE, SANDSTONE, ET					
% PASSING				<b>×</b>				MUDE HIGHL	_Y COM	PRESSIBLE	LL = 31 - LL > 50	50	SEDIMENTARY		SPT REFUSAL. ROO	K TYPE INCLUDES LIMESTONE, SAND					
=10	50 MX	E1 MA				GRANULAR CLA	MUCK,		F	PERCENTAGE OF MATE	rial				WEATI	HERING					
•200	15 MX 25 MX	10 MX 35 MX 35	MX 35 MX 35 I	1X 36 MN 36 M	N 36 MN 36 MN	SOILS	S FEHI	ORGANIC MATERIAL	<u>.</u>	GRANULAR SILT - CLAY SOILS SOILS	OTHER	MATERIAL	FRESH	ROCK FRESH, CRYSTAL	S BRIGHT, FEW JOIN	TS MAY SHOW SLIGHT STAINING. ROCK					
								TRACE OF ORGANIC MA	ATTER TER	2 - 3% 3 - 5% 3 - 5% 5 - 12%	TRACE LITTLE	1 - 10% 10 - 20%		HAMMER IF CRYSTALLINE.							
LL	-	- 40 MX 41	MN 40 MX 41 M	N 40 MX 41 MP	40 MX 41 MN	SOILS WITH LITTLE OR		MODERATELY ORGANIC		5 - 10% 12 - 20%	SOME HIGHLY	20 - 35% 35% AND ABOVE	(V SLI.)	CRYSTALS ON A BROK	EN SPECIMEN FACE	SUME JUINTS MAY SHOW THIN CLAY SHINE BRIGHTLY. ROCK RINGS UNDER					
PI CROUP INDEX	6 MX	NP 10 MX 10	MX 11 MN 11 M	N 10 MX 10 M	K 11 MN 11 MN	MODERATE	ORGANIC	Intellet entelling		GROUND WATER	THOME I	55% HND H00YL		OF A CRYSTALLINE NO	ATURE.	AND DISCOLODATION EXTENDS INTO B					
USUAL TYPES	STONE FRAGS.			0 10 12 10		ORGANIC	SOILS	$\nabla$	WATE	ER LEVEL IN BORE HOLE IMMED	ATELY AFTER	DRILLING	(SLI.)	1 INCH. OPEN JOINTS	MAY CONTAIN CLAY.	IN GRANITOID ROCKS SOME OCCASION					
OF MAJOR	GRAVEL, AND	SAND GRAV	el and sand	SOLS	SOILS	MATTER		<b>T</b>	STAT	TIC WATER LEVEL AFTER 24	HOURS		MODERATE	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER							
GEN, RATING	JHIND					FAIR TO		P₩_	PERC	CHED WATER, SATURATED ZONE, C	R WATER BEAR	RING STRATA	(MOD.)	GRANITOID ROCKS, MOS	T FELDSPARS ARE I	DULL AND DISCOLORED, SOME SHOW CL					
AS SUBGRADE		EXCELLENT TO G	JUU	FAIR	TU PUUR	POOR			SPRI	NG OR SEEP				WITH FRESH ROCK.	AMMER BLUWS AND :	ER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH					
		PLOF A-7-5 SUBO	ROUP IS ≤ LL	- 30 ; PLOF A-7	V-6 SUBGROUP IS	> LL - 30		0.00					MODERATELY	ALL ROCK EXCEPT QU	ARTZ DISCOLORED O	RED OR STAINED. IN GRANITOID ROCKS, ALL I					
				RANGE OF	STANDARD	RANGE OF	JNCONFINED				000	(MOD. SEV.)	AND CAN BE EXCAVAT	ST'S PICK. ROCK GIVES "CLUNK" SOUND							
PRIMARY	SOIL TYPE	CONSIS	TENCY	PENETRATIC (N-1	N RESISTENCE	COMPRESSIV (TONS	E STRENGTH /FT <sup>2</sup> )	L ROADWAY EMB	ANKMEN	IT (RE) 25/025 DIP & DIP DI ION FROCK STR	RECTION		SEVERE	IF TESTED, WOULD YIE	<u>ELD SPT REFUSAL</u>	STAINED BOCK EARDIC CLEAR AND					
GENERA		VERY	OOSE		< 4							SLOPE INDICATOR	(SEV.)	REDUCED IN STRENGT	+ TO STRONG SOIL.	IN GRANITOID ROCKS ALL FELDSPARS					
GRANUL	AR	LOC MEDIUM	SE DENSE	4 10	TO 10 TO 30	N	/A					INSTALLATION		IF TESTED, WOULD YIE	LD SPT N VALUES	100 BPF					
(NON-CO	HESIVE)	DEN	SE	30	TO 50 50			THAN ROADWAY	Y EMBA	NKMENT HAUGER BORIN	G 🙆	TEST	VERY	ALL ROCK EXCEPT OU	ARTZ DISCOLORED O	R STAINED. ROCK FABRIC ELEMENTS A					
		VERY	SOFT		< 2	< 1	.25	- INFERRED SOL	L BOUN	IDARY - CORE BORING	•	SOUNDING ROD	(V SEV.)	REMAINING. SAPROLITE	IS AN EXAMPLE OF	ROCK WEATHERED TO A DEGREE THA					
GENERA SILT-C	LLY _AY	SO MEDIUM	STIFF	2	TO 4 TO 8	0.25 0.5	ro 0.5 10 1.0		CK LINE			TEST BORING	COMPLETE	VESTIGES OF ORIGINA	L ROCK FABRIC REM IL ROCK FABRIC NO	AIN. <u>IF TESTED, WOULD YIELD SPT N</u> T DISCERNIBLE OR DISCERNIBLE ONLY					
MATERI		ST	FF	8	TO 15	11	) 2 0 4				$\Psi$	WITH LURE		SCATTERED CONCENTR	ATIONS. QUARTZ MAY	BE PRESENT AS DIKES OR STRINGER					
(CONES.	12,	НА	RD		30	>	4	TTTTT	L BUUN	INSTALLATION		- SFT N-VHLUE		HESO HIN EXHIPPEE.	воск н						
		Т	EXTURE	OR GRAI	N SIZE				P	RECOMMENDATION SYM	BOLS		VERY HARD	CANNOT BE SCRATCHE	D BY KNIFE OR SHA	RP PICK. BREAKING OF HAND SPECIME					
U.S. STD. SI	EVE SIZE M)		4 10 4.76 2.00	40 0.42	60 200 0.25 0.075	270 5 0.053			⊿ un	CLASSIFIED EXCAVATION - SUITABLE WASTE	ACCEPT	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.									
BOUL DE				COARSE	FINE		CLAX			CLASSIFIED EXCAVATION -	USED IN EMBANK	N THE TOP 3 FEET OF MENT OR BACKFILL	HARD	TO DETACH HAND SPE	Y KNIFE OR PICK OM CIMEN.	ILY WITH DIFFICULTY. HARD HAMMER T					
(BLDR.		OB.)	GR.)	SAND (CSE, SD.)	SAND (F. SD	) (SL.)	(CL.)						MODERATELY	CAN BE SCRATCHED B	Y KNIFE OR PICK. G	DUGES OR GROOVES TO 0.25 INCHES I					
GRAIN M	1 305	75	2.0		0.25	0.05 0	005	AR - AUGER REFUSAL		MED MEDIUM	VST -	VANE SHEAR TEST	. HAND	BY MODERATE BLOWS.		ST S FICK. HEND SECTIMENS CHIN DE					
SIZE IN	. 12	3						BT - BORING TERMINATED	J	MICA MICACEOUS MOD MODERATELY	WEA Ύ-ι	• WEATHERED JNIT WEIGHT	MEDIUM HARD	CAN BE GROOVED OR	GOUGED 0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE					
	5	SOIL MOIS	TURE -	CORRELA	TION OF	TERMS		CPT - CONE PENETRATION	N TEST	NP - NON PLASTIC	Ϋ́d- [	DRY UNIT WEIGHT	-	POINT OF A GEOLOGIS	T'S PICK.						
SUIL (AT	TERBERG LI	SLALE MITS)	DESCRI	PTION	GUIDE FOR	FIELD MOISTURE	DESCRIPTION	DMT - DILATOMETER TES	т	PMT - PRESSUREMETER	TEST <u>SAI</u>	MPLE ABBREVIATIONS	SOFT	CAN BE GROVED OR G FROM CHIPS TO SEVEN	OUGED READILY BY I RAL INCHES IN SIZE	KNIFE OR PICK. CAN BE EXCAVATED IN BY MODERATE BLOWS OF A PICK POI					
			- SATURA	TED -	USUALLY LI	OUID; VERY WET,	JSUALLY	DPT - DYNAMIC PENETRA e - VOID RATIO	TION TE	EST SAP SAPROLITIC SD SAND, SANDY	S - B SS -	ULK SPLIT SPOON		PIECES CAN BE BROKE	N BY FINGER PRESS	URE.					
LL		LIMIT	(SAT.	r	FROM BELOW	W THE GROUND W	ATER TABLE	F - FINE		SL SILT, SILTY SLI - SLIGHTLY	ST -	SHELBY TUBE	SOFT	OR MORE IN THICKNES	S CAN BE BROKEN E	AVALED READILY WITH POINT OF PICK					
PLASTIC	ASTIC							FRAC FRACTURED, FRAC	TURES	TCR - TRICONE REFUSAL	RT -	RECOMPACTED TRIAXIAL	L	FINGERNAIL.							
(PI) PL	PID PLASTIC LIMIT							FRAGS FRAGMENTS HI HIGHLY		W - MOISTURE CONTENT V - VERY	CBR -	CALIFORNIA BEARING RATIO	TERM	-RALIURE SPAL		TERM					
	SOLID; AT OR NEAR OPTIMUM MO							EOU	UIPM	ENT USED ON SUBJEC	T PROJEC	T	VERY WID	E MORE	THAN 10 FEET	VERY THICKLY BEDDED					
OM SL	OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT							DRILL UNITS:	ADVA	NCING TOOLS:	HAMMER 1	TYPE:	MODERATE	LY CLOSE 1	O 3 FEET	THINLY BEDDED Ø					
			- DRY -	(D)	REQUIRES A	DDITIONAL WATER	то	CME-45C		CLAY BITS		OMATIC MANUAL	VERY CLC	ISE LESS T	TO 1 FOOT HAN 0.16 FEET	THICKLY LAMINATED 0.0					
					ATTAIN OPT	IMUM MOISTURE		CME-55		B LUNTINUUUS FLIGHT AUGER	CORE SIZ	E:			INDU						
			PLA	STICITY				CME-550	💾	HARD FACED FINGER RITS		⊔⁺'	FOR SEDIME!	TARY ROCKS. INDURAT	IN IS THE HARDEN	ING OF MATERIAL BY CEMENTING H					
NOF	PLASTICITY INDEX (PI)         DRY STRENGTH           NON PLASTIC         Ø-5         VERY LOW						<u>ENGTH</u> LOW			TUNGCARBIDE INSERTS	<u> </u>		FRIAC	LE	RUBBING WITH	FINGER FREES NUMEROUS GRAINS:					
SL1 MO	SLIGHTLY PLASTIC         6-15         SLIGHT           MODERATELY PLASTIC         16-25         MEDIUM						HT IM	VANE SHEAR TEST	日		HAND TOO	DLS:	I MIHD		GENTLE BLOW	BY HAMMER DISINTEGRATES SAMPLE					
HIGHLY PLASTIC 26 OR MORE HIGH						4	PORTABLE HOIST	IЦ	TRICONE STEEL TEETH		T HOLE DIGGER	MODEF	ATELY INDURATED	GRAINS CAN BE BREAKS EASIL	E SEPARATED FROM SAMPLE WITH S WHEN HIT WITH HAMMER.						
				COLOR						TRICONE TUNGCARB.		NDING ROD	INDUE	ATED	GRAINS ARE DI	FFICULT TO SEPARATE WITH STEEL					
DESCRIP	DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-G									CORE BIT		E SHEAR TEST			DIFFICULT TO	BREAK WITH HAMMER.					
М	DDIFIERS SU	JCH AS LIGHT	DARK, STREA	KED, ETC. ARI	E USED TO D	ESCRIBE APPEAR	NCE.						EXTRE	MELY INDURATED	SHARP HAMMER	BLUWS REQUIRED TO BREAK SAMPL					

### SHEET NO.

# project reference no.

2

	TERMS AND DEFINITIONS
ED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
T N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
OCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DUES NOT NELESSARILY RISE TO UR ABOVE THE GROUND SUBFACE.
NULUDES GRANITE.	
AL PLAIN	COLLIVIUM - ROCK ERAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SUPPE OR AT BOTTOM
IF TESTED.	OF SLOPE.
MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
STONE, CEMENTED	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN. HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
AL FELDSPAR	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSFLY SPACED PARALLE PLANES.
TS. IN	FLIDAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AY. ROCK HAS	PARENT MATERIAL.
H AS COMPARED	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
LOSS OF STRENGTH	FIELD.
WHEN STRUCK.	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
ARE KADLINIZED	ITS LATERAL EXTENT.
ANE KHOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
RE DISCERNIBLE	USUALLY INDICATES FOUR ARRAITION AND LACK OF GOOD DRAINAGE.
DF STRONG ROCK	<u>PERCHED WATER</u> - WATER MAINTAINED ABUVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	Residual (Res.) Sou - Sou Formed in Place by the Weathering of Rock.
IN SMALL AND	ROCK DUALITY DESIGNATION (ROD) - A MEASURE OF ROCK DUALITY DESCRIBED BY TOTAL LENGTH OF
RS. SAPROLITE IS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
NS REQUIRES	
BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BEOWS NEGOINED	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
DEEP CAN BE	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
DETHCHED	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
D BLOWS OF THE	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
N FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
NT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	STRATA RUCK 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
HED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BM #9: RR SPIKE SET IN 20" POPLARL- STA. 431+66.13.
THICKNESS	221.02' RT, N: 871805.51, E: 1768033.527
4 FEET 15 - 4 FEET	ELEVATION: 816.23 FEET
.16 - 1.5 FEET	NOTES.
03 - 0.16 FEET	
< 0.008 FEET	
EAT, PRESSURE, ETC.	
TEEL PROBE:	
PROBE:	
.E:	
	DATE: 8-15-14





50	100	PROJECT	SHEE	IEET NO.				
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TAKEN FROM RATIGRAPHY	1 CSR DGN PR IS DRAWN THR	OVIDED BY	NCDOT . BORING	ратед 09/27/. 's with вот	2017.   'H			
ONTO THE PR	OFILE.		_ 51011(0)					
2:	50	300	3!	50	1			

۷	/BS	34821	.1.5			TIP U-2525C COUNTY C						GUILFC	RD		GEOLOGIST Butler, L. WBS 34821.1.5					.1.5		TIP U-2525C COUNT										
s	SITE DESCRIPTION Greensboro Eastern Loop From US 29 No						lorth of	th of Greensboro to East of SR 2303					3 (Lawn	idale Drive)		GROUN	ID WTR (ft)	s	ITE	DESCR	IPTION	Gre	ensbo	ro Eas	stern Lo	op Fro	om US	29 North o				
В	ORI	NG NO.	CV1	1-L		S	TATION	43	1+60			OFFSET	160 ft L	Т			ALIGN	IMENT -L-		0 HR.	10.0	В	ORI	NG NO.	CV1	2-C		S	TATION	<b>4</b> 31	+27	
C			EV. 78	35.6 ft	<del></del>			DEPTI	<b>1</b> 27.5	5 ft		NORTHIN	G 871,4	481			EASTI	<b>NG</b> 1,768,234		24 HR.	0.8	C			<b>V.</b> 78	34.0 ft	<del></del>			EPTH	27.5	ft
				:FF./DA		410472		0 88%	02/22/	2016						H.S	5. Augers				Automatic					:FF./DA		40472		J 88%	02/22/2	016
	RILL		l ooth I	man		S		DATE	02/02	/16		COMP. DA		/02/10	6 7 T	_	SURF	ACE WATER DEP	TH N/	/A			RILL		. I oothr	man		S		ATE	02/05/	
El (	.EV ft)	ELEV	DEPTH (ft)	0.5ft	0 5ft	0.5ft	-  _0	25	BLOW	5 PER 50	FUUT	75 100	NO					SOIL AND ROC	CK DESC	CRIPTION		EL	_EV ft)	ELEV	DEPTH (ft)	0.5ft	0.5ft	0.5ft	0	25	BLOWS	50
		(11)			0.011	0.011		I				1				<u>'</u>	ELEV. (π)	1			DEPTH (f	t)		(11)			0.011	0.011				1
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7	80 -	- 780.4	5.2	21	64	36/0.3	3   · · <b>·</b>		- <u></u> -	- + -	- <u>- · -</u> -	<u>100/0.8</u>	•		Ĭ.		780.6	RES Grav Silty	Fine SA	AND		0 7	75	775.3	- 8.7		2	3	<b>•</b> 5			
		-	F	32	36	42						•78	1				778.1	WEATHE (Metamorph	RED RO	CK		5			-	3	4	5	. 🖣 9			
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7	75	_	E					<u>.</u>		<u> </u>						E	- 1	Tan-Green S	Tan SI	LT	,"	7	70	770.2	13.8	3	4	5				
		772.4	13.2	100/0 4				· <b>L</b>	· <u></u> ·	- + -	· <u></u> · ·	· · · · · ·			T		772.9	Yellow-Green	Fine Sa	ndy SILT	<u></u>	7		-	-							
7	70	-	Ł					• •				· · · · · · · · · · · · · · · · · · ·	Ĭ		<u></u>			(Metamorph	nosed G	ranite)		7	65	765.3	18.7	5	10	21			· · · ·	
		-	19.2					· ·	· · ·	·   ·	· · · · · ·							Brown-Tan Silty F	ine SAN	ID with Roc	:k			+	-			21			●31 	
7	65		- 10.5	13	31	56	1   : :	· · ·	· · ·	·   · .   .	· · · · · ·	· · · · · · · · · · · · · · · · · · ·		D		-		ragment		1011			60	760.7	- - 23.3						· · · · ·	-+
ť	05	-	+													-	-						00	-	-	65	35/0.1					
		-	ŧ					· · ·	· · · · · ·	.   . .   .	· · · · · ·													756.6	- - 27.4					•••	· · · ·	
7	60	760.3	25.3	100/0.3				• •		· ·	· · ·	100/0.3	•		<i>.</i>		760.3	WEATHE	RED RO	оск	25.	3		-	-	60/0.1	1					
	-	758.2	27.4	60/0.1			<u>                                     </u>	•••		•		60/0.1		-			758.2	(Metamorph CRYSTAL	nosed G	ranite) OCK	27.	4 5/		1	-							
		-	E													E		(Metamorph Boring Termina	nosed G	ranite) Standard				]	-							
		-	E													E	-	Penetration Test Ref	fusal at I	Elevation 7	58.1			]	-							
		-	ł													F		Gra	anite)	amorphose	<u>,</u>			-	-							
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NCL		-	t													F								-								

GUILFOR	D			GEOLOGIST Butler, L.	
f Greensbord	to Eas	t of SI	R 23	03 (Lawndale Drive)	GROUND WTR (ft)
OFFSET C	Ľ			ALIGNMENT -L-	0 HR. 5.5
NORTHING	871,6	36		EASTING 1,768,180	<b>24 HR.</b> 1.0
	DRILL N	ETHO	DН	.S. Augers HAMM	ER TYPE Automatic
	E 02/0	15/16			٨
		5,10	L	SORFACE WATER DEPTH 10/	~
75 100			0	SOIL AND ROCK DESC	RIPTION
· · · · ·	110.		G		
			-	784.0 GROUND SURFA	ACE 0.0
				ALLUVIAL	CLAY 20
		Sat.		Orange-Gray Silty Fine to C	Coarse SAND
		W	N	Gray- Brown Silty CLAY w	<i>i</i> th Trace of4.0
		Sat		Organics	7.0
		Sal.		- 775.5 - 775.5 - 7 Orange SILT with Mar	nganese <u>8.5</u>
		Sat.		- Gray-Tan Fine Sand	ÿ SILT
				-	
		14/		- 	
		vv		- Gray- Orange Fine Sand - Manganese and Trace of M	y SILT with lica and Rock
				- Fragments	
		м		_	
				762.0	22.0
<u> </u>				WEATHERED RC	OCK
100/0.6			10	- (Metanoiphosed Of	anne)
				- - 756.6	27.4
60/0.1				CRYSTALLINE RO (Metamorphosed Gr	CK27.5/
				Boring Terminated with	Standard
				Penetration Test Refusal at E ft in Crystalline Rock (Meta	Elevation 756.5 amorphosed
				Granite)	
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WBS	34821	.1.5			TI	<b>P</b> U-252	5C	C	COUNT	Y GL	JILFO	RD			GEOLOGI	ST Butler, L.			
SITE	DESCR	IPTION	Gre	ensbo	ro Eas	stern Loop	From U	S 29	North c	of Gre	ensbo	o to Ea	st of S	SR 23	03 (Lawndale	e Drive)		GROUN	D WTR (ft)
BOR	NG NO.	CV1	3-R		S		430+60			OFF	SET	145 ft R	T			NT -L-		0 HR.	6.0
		.V. /8	52.6 π FF /DΔ	म नग	210472	CME-850 8	<b>71H</b> 24	$\frac{10}{2}$ ft $\frac{10}{2}$		NOR	THING	5 8/1,/	95 <b>ИFTHC</b>	ח ח	S Augers	1,768,164		24 HR.	1.0 Automatic
		Toothr	n 2 n		<u></u>			5/16		CON		TE 02/	05/16					^	
ELEV	DRIVE	пертн	BLC	w col	JNT		BLOV	VS PE	R FOOT			SAMP.						~	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50		75	100	NO.	мо	O I G	ELEV. (ft)	SOIL AND ROO	CK DESC	CRIPTION	DEPTH (ft)
785		_													_				
	-	-													- 782.6	GROUN	D SURFA	ACE	0.0
780	781.5 -	- 1.1 -	1	2	3		.   .	•	· · · · ·		· · ·		M	N	- (	ALL Gray Fine Sandy	<b>UVIAL</b> CLAY w	ith Trace c	of
100	779.1	3.5	3	3	3										- 779.6	Org	ganics SIDUAL		
	776.6 -	- 6.0	0	10	10						· · ·			N V N	- Ta	an Orange and 0 Trace	Gray Clay e of Mica	vey SILT wi	ith
775	- 	- 8.5	0	10	10		20	•	· · · ·		· · ·		М	N V	- 		Sandy		
	-	-	5	5	8	<b>.</b> 13							м		- ыю	of Mica an	d Manga	inese	Idue
770	-	-				· · ŀ		•							-				
	769.1	13.5	2	7	9		6	:		-	· · ·		м		-				
765	-	-				<b>]</b>   <b> </b>	.   .	•	· · · ·	•	 				-				
765	764.1	18.5	70/0 5	30/0 3		<del>  +</del>   <b>-</b>								477	764.1				18.5
	-	-	10/0.0	00/0.0					· · · · ·		100/0.8 · · ·	•			-	(Metamorph	hosed Gr	ranite)	
760	759.3	- - 23.3					· · · ·	•	· · · ·						-				01.0
		-	64	36/0.2				•	<u></u>	<u> </u>	100/0.7	•			- 758.6 - Boi	ring Terminated	at Elevat	ion 758.6 1	24.0 ft in
	-	-													- vvea -	athered Rock (IM	letamorpi	nosed Gra	nite)
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### **CONTENTS**

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REFERENCE

SHEET NO.	<b>DESCRIPTION</b>								
I	TITLE SHEET								
2	LEGEND (SOIL & ROCK)								
3	SITE PLAN								
4	PROFILE								
5-6	BORE LOGS								

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY\_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE)

SITE DESCRIPTION CULVERT AT -L- 472+13 AT UNNAMED TRIBUTARY TO RICHLAND CREEK/LAKE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	6

### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLT TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 1707-6800. 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 BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNI-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTIGE 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 TO TETAILS 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 OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERALS AND CONSTRUCTIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISY 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 CONDENSATION OF FOR ANY EXTENSION OF TIME FOR ANY RESOLATION FROM THE ACTUAL CONDITIONS TO BE INCOUNTERED AT HE 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.

PERSONNEL

L. BUTLER
T. WILLIAMS
INVESTIGATED BYS&ME, Inc.
DRAWN BY T.T. WALKER, F&R, Inc.
CHECKED BYC.A. YOUNGBLOOD
SUBMITTED BY C.A. YOUNGBLOOD
DATE DECEMBER 2017



SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOIL C	ESCRIPT	ION					GRADATION			ROCK DESCRIPTION					
SOIL IS BE PENE ACCORD IS	CONSIDERED TRATED WITH ING TO THE BASED ON TH	UNCONSOLIDA H A CONTINUOL STANDARD PEI HE AASHTO SY	ED, SEMI-CON S FLIGHT PO ETRATION TE STEM. BASIC I	SOLIDATED, O VER AUGER AU ST (AASHTO DESCRIPTIONS	R WEATHERED ND YIELD LES 206,ASTM D GENERALLY I	EARTH MATERIALS S THAN 100 BLOW 01586). SOIL CLAS NCLUDE THE FOLL	5 THAT CAN 5 PER FOOT 5IFICATION OWING:	WELL GRADED - INDICAT UNIFORMLY GRADED - IN GAP-GRADED - INDICATE	ES A ( IDICATE S A M]	GOOD REPRESENTATION OF PARTIN S THAT SOIL PARTICLES ARE AL XTURE OF UNIFORM PARTICLE SI	LE SIZES FROM L APPROXIMATE ZES OF TWO OR	I FINE TO COARSE. LY THE SAME SIZE. MORE SIZES.	HARD ROCK I ROCK LINE I SPT REFUSAL BLOWS IN N	INU NULK IS NON-COASIAL PLAIN MAIERIAL THAT WOULD YIELD SPT REFUSAL F ICK LINE NOICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YI YT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN LOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND RC PRESENTED BY A ZONE OF WEATHERED ROCK.				
CONSIST 4	ENCY, COLOR, IS MINERALO	GICAL COMPOS	TURE, AASHTC TION, ANGULA	CLASSIFICA RITY, STRUCTU	IION, AND OTHE	ER PERTINENT FAI	PLE,			ANGULARITY UF GRAI	NS		ROCK MATER	TERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:				
	VERY STIFF.G	RAY.SILTY CLAY.	OIST WITH INT	ERBEDDED FIN	E SAND LAYERS	S.HIGHLY PLASTIC.A-	7-6	ANGULAR, SUBAN	IGULAR,	SUBROUNDED, OR ROUNDED.	LOINHIED BT	INE TERMS:	WEATHERED		ON-COASTAL PLAT	N MATERIAL THAT WOULD YIELD SP		
GENERAL	5		<u>NU ANU</u> Als		( MATERIALS	LATION			M	INERALOGICAL COMPOS	TION		RULK (WR)	22	INE TO COARSE O	RAIN IGNEOUS AND METAMORPHIC R		
CLASS.	(	$\leq$ 35% Passing	200)	(>35% P	ASSING #200)	ORGANIC M	TERIALS	MINERAL NAM	IES SU	CH AS QUARTZ, FELDSPAR, MICA, 1	ALC, KAOLIN, ET		CRYSTALLINE ROCK (CR)		OULD YIELD SPT	REFUSAL IF TESTED. ROCK TYPE I		
GROUP CLASS	A-1	A-3	A-2	A-4 A-5	A-6 A-7 A-7-5	A-1, A-2 A-4, A-6, A-6, A-6, A-6, A-6, A-6, A-6, A-6	A-5	HRE USED IN			CRED OF SIGNI	ICHNCE.	NON-CRYSTAL		INE TO COARSE G	RAIN METAMORPHIC AND NON-COAST		
SYMBOL					A-7:6			SLIG	ITLY C	OMPRESSIBLE	LL < 31	-	ROCK (NCR)		OCK TYPE INCLUD	ES PHYLLITE, SLATE, SANDSTONE, ET		
% PASSING				<b>×</b>				MUDE HIGHL	Y COM	PRESSIBLE	LL = 31 - 51 LL > 50	0	SEDIMENTARY		PT REFUSAL. ROC	K TYPE INCLUDES LIMESTONE, SAND		
*10	50 MX	E1 MA				GRANULAR CLA	Y MUCK,		F	PERCENTAGE OF MATER	IAL		(CP)		WEATH	IERING		
=40 =200	15 MX 25 MX	10 MX 35 MX 35	MX 35 MX 35 I	1X 36 MN 36 M	N 36 MN 36 MN	SOILS	S FEHT	ORGANIC MATERIAL		GRANULAR SILT - CLAY SOILS SOILS	OTHER M	ATERIAL	FRESH	ROCK FRESH, CRYSTALS	BRIGHT, FEW JOINT	S MAY SHOW SLIGHT STAINING. ROCK		
MATERIAL								TRACE OF ORGANIC MA	ATTER FER	2 - 3% 3 - 5% 3 - 5% 5 - 12%	TRACE LITTLE	1 - 10% 10 - 20%		HAMMER IF CRYSTALLIN	E.			
LL	-	- 40 MX 41	MN 40 MX 41 M	N 40 MX 41 M	40 MX 41 MN	SOILS WITH LITTLE OR		MODERATELY ORGANIC		5 - 10% 12 - 20%	SOME	20 - 35% 35% AND ABOVE	(V SLI.)	CRYSTALS ON A BROKEN	SPECIMEN FACE S	SUME JUINTS MAY SHOW THIN CLAY SHINE BRIGHTLY. ROCK RINGS UNDER		
PI CROUP INDEX	6 MX	NP 10 MX 10	MX 11 MN 11 M	N 10 MX 10 M	K 11 MN 11 MN	MODERATE	ORGANIC	Intellet entelling		GROUND WATER	THORE I	55% HILD HD07L	CLICHT	OF A CRYSTALLINE NATURE.				
USUAL TYPES	STONE FRAGS.			0 11 12 11		ORGANIC	SOILS	$\nabla$	WAT!	ER LEVEL IN BORE HOLE IMMEDIA	TELY AFTER DE	RILLING	(SLI.)	1 INCH. OPEN JOINTS M	AY CONTAIN CLAY.	IN GRANITOID ROCKS SOME OCCASION		
OF MAJOR	GRAVEL, AND	SAND GRAV	el and sand	SOLS	SOILS	MATTER		<b>T</b>	STA	TIC WATER LEVEL AFTER 24	HOURS		MODERATE	CRYSTALS ARE DULL AN	D DISCOLORED. CR	YSTALLINE ROCKS RING UNDER HAMME		
GEN, RATING	JHILD					FAIR TO	-	P₩_	PERC	CHED WATER, SATURATED ZONE, OF	WATER BEARIN	G STRATA	(MOD.)	GRANITOID ROCKS, MOST	FELDSPARS ARE D	ULL AND DISCOLORED, SOME SHOW CL		
as subgrade		EXCELLENT TO G	JUU	FAIR	TU PUUR	POOR			SPR!	NG OR SEEP				WITH FRESH ROCK.	IMER BLUWS AND S	HUWS SIGNIFICANT LUSS OF STRENGT		
		PLOF A-7-5 SUBO	ROUP IS ≤ LL	- 30 ; PL OF A-3	V-6 SUBGROUP IS	> LL - 30		0.00					MODERATELY	ALL ROCK EXCEPT QUAR	TZ DISCOLORED OF	STAINED. IN GRANITOID ROCKS, ALL		
				RANGE O	STANDARD	RANGE OF	UNCONFINED						(MOD. SEV.)	AND CAN BE EXCAVATED	WITH A GEOLOGIS	T'S PICK. ROCK GIVES "CLUNK" SOUND		
PRIMARY	SOIL TYPE	CONSIS	TENCY	PENETRATIC	N RESISTENCE	COMPRESSIN (TONS	E STRENGTH	L ROADWAY EMB	ANKMEN SCRIPT	ION I OF ROCK STRU	ECTION CTURES		SEVERE	IF TESTED, WOULD YTEL	<u>U SPI REFUSAL</u> IZ DISCOLORED OF			
GENERA		VERY	OOSE		< 4							SLOPE INDICATOR	(SEV.)	REDUCED IN STRENGTH	TO STRONG SOIL.	IN GRANITOID ROCKS ALL FELDSPARS		
GRANUL	GRANULAR LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A					/A		11 I (AE			INSTALLATION		IF TESTED, WOULD YIEL	D SPT N VALUES >	100 BPF			
(NON-CO	MATERIAL DENSE 30 TO 50 (NON-COHESIVE) VERY DENSE > 50						THAN ROADWAY	Y EMBA		۲	TEST	VERY	ALL ROCK EXCEPT QUAR	TZ DISCOLORED OF	STAINED. ROCK FABRIC ELEMENTS A			
	VERY SOFT         < 2         < 0.25					.25	- INFERRED SOL	L BOUN		•	SOUNDING ROD	(V SEV.)	REMAINING. SAPROLITE	IS AN EXAMPLE OF	ROCK WEATHERED TO A DEGREE THA			
GENERA SILT-CI	LLY _AY	SO MEDIUM	STIFF	2	TO 4 TO 8	0.25 0.5	TO 0.5		K LINE			TEST BORING		ROCK REDUCED TO SOL	ROCK FABRIC REMA	AIN. <u>IF TESTED, WOULD YIELD SPT N</u> I DISCERNIBLE, OR DISCERNIBLE ONLY		
MATERI		ST	FF	8	TO 15	11	02				$\overline{\mathbf{\nabla}}$	WITH LURE		SCATTERED CONCENTRAT	IONS. QUARTZ MAY	BE PRESENT AS DIKES OR STRINGER		
(CONES.	12,	НА	RD	,	30	>	4	TTTTT	- 6000	INSTALLATION	0-	SFT N-VHLUE		HESO HIN EXHIPPLE.	BUCK H			
		Т	EXTURE	OR GRAI	N SIZE				F	RECOMMENDATION SYME	OLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPEC						
U.S. STD. SI	EVE SIZE M)		4 10 4.76 2.00	40 0.42	60 200 0.25 0.075	270 5 0.053			⊿ un	CLASSIFIED EXCAVATION -	CCEPTABL	IED EXCAVATION - LE, BUT NOT TO BE		SEVERAL HARD BLOWS O	F THE GEOLOGIST	S PICK.		
BOULDE				COARSE	FINE		CLAX			CLASSIFIED EXCAVATION -	USED IN T EMBANKME	HE TOP 3 FEET OF NT OR BACKFILL	HARD	TO DETACH HAND SPECI	KNIFE OR PICK UN MEN.	LY WITH DIFFICULTY. HARD HAMMER I		
(BLDR.		OB.)	GR.)	SAND (CSE, SD.)	SAND (F. SD	) (SL.)	(CL.)						MODERATELY	CAN BE SCRATCHED BY	KNIFE OR PICK. GO	DUGES OR GROOVES TO 0.25 INCHES I		
GRAIN MM	1 305	75	2.0		0.25	0.05 0	005	AR - AUGER REFUSAL		MED MEDIUM	VST - V	ANE SHEAR TEST		BY MODERATE BLOWS.		ST S TICK. THEND SECTIMENS CHA BE		
SIZE IN	. 12	3						BT - BORING TERMINATED	J	MICA MICACEOUS MOD MODERATELY	₩EA ₩ 2⁄- UNI	EATHERED T WEIGHT	MEDIUM	CAN BE GROOVED OR GO	UGED 0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE FICES 1 INCH MAXIMUM SIZE BY HAR		
	<u></u> S	SOIL MOIS	TURE -	CORRELA	TION OF	TERMS		CPT - CONE PENETRATION	N TEST	NP - NON PLASTIC	Td- DRY	UNIT WEIGHT		POINT OF A GEOLOGIST	S PICK.			
(AT	MUISTURE	SLALE MITS)	DESCRI	PTION	GUIDE FOR	FIELD MOISTURE	DESCRIPTION	DMT - DILATOMETER TES	т	PMT - PRESSUREMETER T	SAMPL	E ABBREVIATIONS	SOFT	CAN BE GROVED OR GOL FROM CHIPS TO SEVERA	IGED READILY BY K L INCHES IN SIZE	NIFE OR PICK. CAN BE EXCAVATED IN BY MODERATE BLOWS OF A PICK POI		
			- SATURA	TED -	USUALLY LI	OUID; VERY WET,	JSUALLY	DPT - DYNAMIC PENETRA e - VOID RATIO	TION TE	EST SAP SAPROLITIC SD SAND, SANDY	S - BUL SS - SPI	K LIT SPOON		PIECES CAN BE BROKEN	BY FINGER PRESS	URE.		
LL		LIMIT	(SAT.	r	FROM BELOW	W THE GROUND W	ATER TABLE	F - FINE		SL SILT, SILTY	ST - SH	ELBY TUBE	SOFT	OR MORE IN THICKNESS	CAN BE BROKEN B	Y FINGER PRESSURE. CAN BE SCRATC		
PLASTIC			- WET -	0-0	SEMISOLID;	REQUIRES DRYING	то	FRAC FRACTURED, FRAC	TURES	TCR - TRICONE REFUSAL	RT - RE	COMPACTED TRIAXIAL	L	FINGERNAIL.				
(PI) PL		C LIMIT	- ₩21 -	(₩)	ATTAIN OPT	IMUM MOISTURE		FRAGS FRAGMENTS HI HIGHLY		w - MOISTURE CONTENT V - VERY	CBR - C	ALIFORNIA BEARING ATIO	TERM	RALIURE SPALI		TERM		
			- MOIST	- (M)	501 ID• AT 0	R NEAR OPTIMUM	MOISTURE	EOU	JIPM	ENT USED ON SUBJEC	PROJECT		VERY WID		IAN 10 FEET	VERY THICKLY BEDDED		
OM SL		M MOISTURE AGE LIMIT			562151.11.0		HOIDTONE	DRILL UNITS:	ADVA	ANCING TOOLS:	HAMMER TYP	'E:	MODERATE	LY CLOSE 1 TO	3 FEET	THINLY BEDDED Ø		
			- DRY -	(D)	REQUIRES A	DDITIONAL WATER	то то	CME-45C	ㅣ님	CLAY BITS			VERY CLC	0.16 SE LESS THA	0 1 FOOT AN 0.16 FEET	VERY THINLY BEDDED 0. THICKLY LAMINATED 0.0		
					ATTAIN OPT	IMUM MOISTURE		CME-55		6 CUNTINUUUS FLIGHT AUGER	CORE SIZE:	<b>—</b>			יייטא			
			PLA	STICITY				CME-550		HARD FACED FINGER RITS		_ LJ-"	FOR SEDIMEN	TARY ROCKS. INDURATIO		ING OF MATERIAL BY CEMENTING H		
NOM	I PLASTIC		PLAST	0-5	(PI)	DRY STF VERY	<u>ENGTH</u> LOW			TUNGCARBIDE INSERTS	└ <u></u> - <sup>N</sup>	_	FRIAD	F	RUBBING WITH	FINGER FREES NUMEROUS GRAINS:		
SLI	GHTLY PLAS			6-15 16-25		SLIG	нт UM	VANE SHEAR TEST	日		HAND TOOLS	:			GENTLE BLOW	BY HAMMER DISINTEGRATES SAMPLE		
HIG	HLY PLASTI	C	2	6 OR MORE		HIG	н	PORTABLE HOIST	IН	TRICONE STEEL TEETH		HOLE DIGGER	MODEF	ATELY INDURATED	GRAINS CAN BE BREAKS EASILY	SEPARATED FROM SAMPLE WITH S		
				COLOR						TRICONE TUNGCARB.		ING ROD	INDUR	TED	GRAINS ARE DI	FFICULT TO SEPARATE WITH STEEL		
DESCRIP	TIONS MAY	INCLUDE COLO	R OR COLOR	COMBINATIO	NS (TAN, RED,	YELLOW-BROWN,	BLUE-GRAY).			CORE BIT		SHEAR TEST			DIFFICULT TO	BREAK WITH HAMMER.		
M	DDIFIERS SU	JCH AS LIGHT	DARK, STREA	KED, ETC. AR	E USED TO D	ESCRIBE APPEAR	ANCE.		ΙĒ				EXTRE	MELY INDURATED	SHARP HAMMER	BLUWS REQUIRED TO BREAK SAMPL		

# project reference no.

	TERMS AND DEFINITIONS
ED. AN INFERRED D SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS UFIEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
YT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
OCK THAT NCLUDES GRANITE.	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED. IC.	<u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
I MAY NOT YIELD STONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
NINGS UNDER	$\underline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
COATINGS IF OPEN. HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK UP TO AL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
TS. IN AY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
H AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	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
EVIDENT BUT	ITS LATERAL EXTENT.
ARE KAULINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
RE DISCERNIBLE	USUALLY INDICATES YOUR AERALIUM AND LACK OF GUUD DRAINAGE.
T ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND RS. SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - 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 RUN AND EXPRESSED AS A PERCENTAGE.
	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
NS REQUIRES	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 THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
	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
BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
N FRAGMENTS NT. SMALL, THIN	<u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH	<u>STRATA ROCK QUALITY DESIGNATION (SRQD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: U2525C LS TIN 17086.tin 11/09/2017
THICKNESS	
4 FEET 1.5 - 4 FFFT	ELEVATION: N/A FEET
.16 - 1.5 FEET	NOTES:
03 - 0.16 FEET 108 - 0.03 FEET	
< 0.008 FEET	
EAT, PRESSURE, ETC.	
TEEL PROBE:	
PROBE:	
F.	
- <b>-</b> +	DATE: 8-15-14





50 100	PROJECT	REFERENCE NO.	SHEET NO.
		U-2525C	4
VE = 5:1	CULV CRO	TERT PROFILE ALON SS SECTION AT 472	NG -L- +13.00
		SKEW=64 DEGREE	S
	•	       	
ngments, Trace Organics, W	lood, and C	Gravel	
			760
st to Dry, Fine Sanay			
			750
     	   	     	740
			730
TAKEN FROM CSR DGN PR	ROVIDED BY	NCDOT DATED 09/27	2017.
KATIGRAPHY IS DRAWN THE	ισφ <i>GH THE</i>	BOKINGS WITH BOT	н
200	250	300	350

	WBS	3482	21.1.5			·	TIP	U-25250	C	COUNT	Y GUILFO	RD			GEOLOGIST Wrigh	ıt, F.			WBS	<b>3</b> 482	1.1.5			ТІ	I <b>P</b> U-2	2525C		COUNT
Ī	SITE	DESC	RIPTIC	NG	reensl	oro Ea	aste	ern Loop F	rom US 2	9 North	of Greensbo	oro to Ea	ist of S	SR 23	03 (Lawndale Drive)		GROUND	WTR (ft)	SITE	DESCR	IPTION	Gre	ensbo	ro Eas	stern Lo	pop Fror	n US 2	9 North
	BORI	NG NG	<b>)</b> . CV	27-L		:	STA	ATION 22	2+93		OFFSET	65 ft LT			ALIGNMENT -Y6-		0 HR.	20.5	BOR	ING NO	. CV1	4-L		S	TATION	<b>N</b> 471+	41	
	COLI	AR EI	<b>.EV</b> . 7	780.0	ft	·	тот	TAL DEPT	<b>H</b> 23.0 f	t	NORTHIN	<b>G</b> 870,	250		EASTING 1,764,45	5	24 HR.	5.6	COL	LAR EL	EV. 77	76.0 ft		т		DEPTH	6.2 ft	
	DRILL	RIG/H	AMMER	EFF./C	DATE	SME27	5 D	IEDRICH D-	50 89% 1/1	15/2016	•	DRILL	METHO	DD ⊢	I.S. Augers	HAM	MERTYPE A	utomatic	DRIL	l rig/ha	MMER E	FF./DA	ATE SI	VIE275	DIEDRIG	CH D-50	89% 1/1	5/2016
	DRIL	LER	T. Willi	ams		;	STA	ART DATE	02/02/1	6	COMP. D	<b>ATE</b> 02	/02/16	6	SURFACE WATER		N/A		DRIL	LER T	. Willia	ms		S	TART D	DATE (	2/03/1	6
	ELEV	DRIVE	DEPT	н в	LOW C	OUNT			BLOWS I	PER FOOT	Г	SAMP	. 🔨	L	SOIL AND	ROCK DE	SCRIPTION		ELEV	DRIVE	DEPTH	BLC	oo wc	UNT		В	LOWS F	PER FOO
	(ft)	(ft)	(ft)	0.5	ft 0.5	ft 0.5f	ft	0 2	25 5	50	75 100	) NO.	Имо	) G	ELEV. (ft)			DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	5	50 
DRE DOUBLE U2525C_GEO_CULV4_L47213_5162016.GPJ NC_DDT.GDT 11/16/17	ELEV (ft) 780 770 765 760		DEPT (ft)	H B 0.5	- 9 - 9 - 5 - 6 - 14 - 19 0	Image: constraint of the second se			BLOWS	2ER FOOT 50		SAMP NO.			SOIL AND ELEV. (ft) 780.0 GRC 780.0 GRC AR Brown Silty CLA 771.5 777.0 Tre 777.0 Tre 777.0 Brown Tan-Gray Fine S 757.0 Boring Ter Penetration Tes ft on Crystallit	ROCK DES	FACE FACE FILL th Rip-Rap k Fragments an rics CLAY with Manganes th Standard t Elevation 757.1 etamorphosed	DEPTH (ft) 0.0 5.5 d 9.0 -10.0 - e 23.0 0	ELEV (ft) 775 7770	ELEV (ft) 7775.0 7772.6 769.8 769.8	DEPTH (ft)	0.5ft	0.5ft 1 38 0 1 1 38 0 1 1 1 1 1 1 1 1 1	0.5ft				
CDOT BORE DC															- 						+ + + +							



VIBS 3421.1.5         TIP U-22000         COUNTY CULCE-NU         GEOLOGIST Wright F.         Will BE SERVICE         Will BE SERVICE         Countries of the service of	Г																											-	
STIE DESCRIPTION       Generations       Generations<	╞	WBS	3482	1.1.5			TI	P U-2525	5C	COUN	TY GUILFC	RD			GEC	DLOGIS	T Wrigh	nt, F.			WBS	<b>5</b> 3482	1.1.5				P U-2525	С - :	COUNT
LUCKING MD. CY15-G         STATION 471-72         OFFSET CL.         ALIGAMENT -L.         UBB 5. Cover ID000000000000000000000000000000000000	Ļ	SITE	DESCI	RIPTION	Gre	ensbo	ro Eas	tern Loop	From US	29 North	of Greensbo	oro to Ea	ast of S	SR 23	303 (Lav	wndale	Drive)		GROU	JND WTR (ft)	SITE		RIPTION	Gre	ensbo	ro Eas	tern Loop	-rom US 2	29 North c
COLLAR ELV. 773.81         TOTAL DEPTH 6111         INORTHING 5/70.00         EASTING 1/76.877         PAMARE TVF AUTOL         COLLAR ELV. 772.31           DRUL REVMERTS SEE EVANCE 3023 // 10         SUBLEMEND 532.00         MAMER TVF AUTOL         DOLLAR ELV. 772.31         DOLLAR ELV. 772.31           DRUL REVMERTS SEE EVANCE 3023 // 10         SUBLEX SUBJECT 10         SUBFACE WATER DEPTH NA         DULI REVMERTS SEE         DULI REVMERTS SEE <td></td> <td>BOR</td> <td>ING NC</td> <td>. CV1</td> <td>5-C</td> <td></td> <td>S1</td> <td>TATION 4</td> <td>171+72</td> <td></td> <td>OFFSET</td> <td>CL</td> <td></td> <td></td> <td></td> <td>GNMEN</td> <td>T -L-</td> <td></td> <td> 0 HR</td> <td>. 5.3 Caved</td> <td>BOF</td> <td>Ring No</td> <td>. CV1</td> <td>6-R</td> <td></td> <td>ST</td> <td>TATION 4</td> <td>72+68</td> <td></td>		BOR	ING NC	. CV1	5-C		S1	TATION 4	171+72		OFFSET	CL				GNMEN	T -L-		0 HR	. 5.3 Caved	BOF	Ring No	. CV1	6-R		ST	TATION 4	72+68	
LikeLing         Direction         Direction <th< td=""><td></td><td></td><td></td><td>EV. 77</td><td>73.8 ft</td><td><b>T</b> 01</td><td>т</td><td></td><td><b>TH</b> 6.1 f</td><td>t</td><td>NORTHIN</td><td>G 870,</td><td>404</td><td></td><td></td><td>STING</td><td>1,764,37</td><td>7</td><td>24 HR</td><td>. 1.8</td><td>COL</td><td></td><td>EV. 77</td><td>72.3 ft</td><td></td><td></td><td></td><td><b>FH</b> 34.0 f</td><td>t</td></th<>				EV. 77	73.8 ft	<b>T</b> 01	т		<b>TH</b> 6.1 f	t	NORTHIN	G 870,	404			STING	1,764,37	7	24 HR	. 1.8	COL		EV. 77	72.3 ft				<b>FH</b> 34.0 f	t
UNITED         TWATE DATE CONSIDE         COMPLEX TO MERCON         SUMPLEX TO MERCON         CENTRAL CALLER         CHAILER         CHAILER <td></td> <td>DRILL</td> <td>- RIG/H/</td> <td></td> <td>:FF./DA</td> <td>IE SP</td> <td>/1E2/5</td> <td>DIEDRICHL</td> <td>J-50 89% 1</td> <td>/15/2016</td> <td></td> <td>DRILL</td> <td>METHO</td> <td></td> <td>H.S. Auge</td> <td>ərs</td> <td></td> <td>HAI</td> <td></td> <td>E Automatic</td> <td>DRIL</td> <td>L RIG/HA</td> <td></td> <td>:FF./DA</td> <td>AIE SI</td> <td>VIE275 I</td> <td>DIEDRICH D</td> <td>-50 89% 1/</td> <td>15/2016</td>		DRILL	- RIG/H/		:FF./DA	IE SP	/1E2/5	DIEDRICHL	J-50 89% 1	/15/2016		DRILL	METHO		H.S. Auge	ərs		HAI		E Automatic	DRIL	L RIG/HA		:FF./DA	AIE SI	VIE275 I	DIEDRICH D	-50 89% 1/	15/2016
LEUK BCPTH.         BLOWS PERFORM         Diameter         BLOWS PERFORM         Diameter		DRIL		. Willia	ms		S		E 02/03/	/16	COMP. DA	<b>TE</b> 02	/03/16	) / _		RFACE	WATER D	DEPTH	N/A		DRII		. Willia	ms		ST		E 02/04/1	6
No.     Dial	I	ELEV	ELEV	DEPTH	BLC			0	BLOWS	50 PER FOC	0T 75 100		. 🗸	Ő		\$	SOIL AND	ROCK DE	ESCRIPTIO	N	ELEV (ft)	ELEV	DEPTH			JNT	0	BLOWS	PER FOOT 50
TZB         L0         0         8         1/2	F	()	(ft)	()	0.51	0.51	0.511	0	1		100	NO.	/ мо	OI G	ELEV.	(ft)				DEPTH (ft)	()	(ft)	()	0.51	0.511	0.51	0	1	
	.E U2525C_GEO_CULV4_L_47213_5162016.GPJ NC_DOT.GDT 11/16/17	ELEV (ft) 775 770	DRIVE ELEV (ft) 7772.8 7770.2 767.7	DEPTH (ft) - 1.0 - 3.6 - 6.1 	BLC 0.5ft 5 8 60/0.0	0.5ft 8 34	JNT 0.5ft 12 66/0.2		BLOWS	S PER FOC	75 100	SAMP NO.			ELEV.	(ft) Brown	GRC GRC Gray-Ti WEA (Metar Boring Ter son Crystallir	ROCK DE ALLUVIA CLAY wii and Woo RESIDUA an Silty Fi THERED norphosed minated w t Refusal te Rock (f Diorite)	ESCRIPTIO	DEPTH (ft)	ELEV (ft) 775 765 760 755 750 745 740	, DRIVE ELEV (ft) 771.2 768.6 766.0 763.6 763.6 753.6 753.6 748.6 748.6 748.6	DEPTH (ft) 1.1 3.7 6.3 8.7 13.7 18.7 23.7 28.7 33.7 28.7 3.3 4 4 4 4 4 4 4 4 4 4 4 4 4	BLC       0.5ft       3       2       3       3       3       3       3       3       3       3       3       3       3       3       3       3       3       7       100/0.3	DW COU 0.5ft 3 3 5 11 11 5 19 24	JNT 0.5ft 4 2 4 6 15 9 35 76/0.3		BLOWS	PER FOOT 50 
	DOT BORE DOUBLE U2525		- - -																			-							



### **CONTENTS**

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52.

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REFERENCE

<u>SHEET NO.</u>	<b>DESCRIPTION</b>									
I	TITLE SHEET									
2	LEGEND (SOIL & ROCK)									
3	SITE PLAN									
4	PROFILE									
5-6	BORE LOGS									

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE) SITE DESCRIPTION CULVERT AT -L- 493+43 OVER UT TO RICHLAND CREEK/LAKE

# 3482] PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	6

### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991 707-6850, THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOCS, ROCK CORES AND SOLI TEST DATA A RE 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 (IN-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE 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 OF CONTRACTOR IS CALIFORMUM AND MIDIL AS DUTILS AND UNDER THE UNDER THE CONTRACTOR IS CALIFORED TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN NOTATION ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN NOTOMETURATION PLANS AND DOCUMENTS FOR FINAL DESIGN NOTOMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTION FLORE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CALIFONED 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 ACULAL 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 HAIVING 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.

PERSONNEL

L. BUTLER
T. WILLIAMS
INVESTIGATED BYS&ME, Inc.
DRAWN BY T.T. WALKER, F&R, Inc.
CHECKED BYC.M. BRUINSMA
SUBMITTED BY C.M. BRUINSMA
DATE DECEMBER 2017
<u> </u>



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	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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.	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:	<u>OHI ONADED</u> INDICATES A MIXIONE OF ONLI ON A MATCHE SIZES OF TWO ON MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MUISTURE, AASHTU CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH 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:		A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION		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 OPENALIC 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
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	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-7-5 A-3 A-6, A-7		NON-CRYSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL SCOOL	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPIT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
4 PRSSING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BI TOTHE LENGTH OF CORE NON HIND EXTRESSED AS A FERCENTHOE.
*40 30 MX 50 MX 51 MN SOILS CLAY PEAT	GRANII AR SUIT - CLAY	WEATHERING	DIKE - A TABULAR BODT OF IGNEOUS ROCK THAT COTS ACROSS THE STRUCTURE OF ADJACENT
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL	IRACE OF ORGANIC MATTER 2 - 3% 3 - 5% IRACE 1 - 10%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN 11 MN	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF	GROUND WATER		FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE EDAGS		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAVEL, AND SULTY OR CLAYEY SILTY CLAYEY MATTER		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND GRAVEL AND SAND SUILS SUILS	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 FYCELLENT TO GOOD FAIR TO BOOD FAIR TO BOOD UNCUTABLE	$\underline{\nabla}$ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MUU,) UKANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EACELLENT TO DOUD PHIN TO FOUN POOR FOUN UNSUTHBLE		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	FIELU.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	III 25/025	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH		IF TESTED, WOULD TIELD STITHETUSHL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
		SEVERE ALL RUCK EXCEPT QUARTZ DISCOLURED OR STAINED, RUCK FABRIC CLEAR AND EVIDENT BUT	IIS LAIERAL EXTENI.
GENERALLY LODSE 4 TO 10	SOIL SYMBOL	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
(NON-COHESIVE) DENSE 30 TO 50	THAN ROADWAY EMBANKMENT THAN ROADWAY EMBANKMENT	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POUR ARATION AND LACK OF GOOD DRAINAGE.
VERY DENSE > 50		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		VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	
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	RESIDURE (RES.) SUIL - SUIL FORMED IN FLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2		SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK GUALITY DESIGNATION (RUD) - A MEASURE OF ROCK GUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
		ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
TEXTURE OR GRAIN SIZE		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW STILL WASTEL WASTEL USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	
(BLDR.) (COB.) (GR.) SANU SANU (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - PULISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
		HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIEF OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
	- CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT	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
SUIL MUISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{\rm d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TRATA DOCK OUN ITY DECIDINATION (CDOD) A MEASURE OF DOCK OUN ITY DECORDED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIEF 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
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	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.
	FUSS FUSSILIFERUUS SEL SEIGHTEY RS - RUCK F FRAC - FRACTURED FRACTURES TOR - TRICONE REFUSAL RT - RECOMPACTED TRIAVIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE C - WET - (W) SEMISOLIU; REQUIRES DRYING TO	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK, Boring elevations taken from U2525c is tin file
	HIHIGHLY V-VERY RATIO	TERM SPACING TERM THICKNESS	dated 4/2/2014
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: N/A FEET
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY REDDED 0.16 - 15 FEET	
		CLOSE Ø.16 TO 1 FOOT VERY THINLY BEDDED Ø.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	
		THINLY LAMINATED < 0.008 FEET	FIAU - FILLEU IMMEUIATELY AFTER DRILLING
PLASTICITY		INDUKATIUN	
PLASTICITY INDEX (PI) DRY STRENGTH	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		GENILE BLUW BY HAMMER DISINIEGRATES SAMPLE.	
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
		BREAKS EASILY WHEN HIT WITH HAMMER.	
LULUK		INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).		UIFFILULI IU BMEAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SHIFTLE DIERKS HURUSS UNHINS.	DATE: 8-13-14

### PROJECT REFERENCE NO.



2





W	BS :	34821	.1.5			TI	P U-252	25C		COUNT	Y GUILFOI	RD			GEC	LOGIST Wright,	F.		WBS	34821	.1.5			TI	P U-252	5C	COUNTY
Sľ	re di	ESCRI	PTION	Gree	nsbord	Easte	stern Loop From US 29 North of Greensboro to East of SR 2303 (Lav						awndale Drive) GROUND WTR (ft)					DESCR	IPTION	Gree	) Easte	stern Loop From US 29 North of Gi					
BC	RING	g no.	CV17	-L		S	TATION	494+4	5		OFFSET	180 ft L1	Г		ALIC	NMENT -L-		<b>0 HR.</b> 4.1	BOR	ing no.	CV18	-C		ST		493+40	
CC	DLLA	RELE	<b>V</b> . 74	6.9 ft		т	OTAL DE	PTH 9	9.7 ft		NORTHING	<b>3</b> 870,4	70		EAS	<b>TING</b> 1,762,079		<b>24 HR.</b> 3.4	COL	LAR ELE	<b>EV.</b> 75	0.2 ft		т	DTAL DEF	<b>TH</b> 18.6 f	t
DR	ILL RI	IG/HAM	MER EF	F./DATE	SUN	10093 D	DIEDRICH D	0-50 88%	6 11/05/2	015	1	DRILL	<b>NETHO</b>	DH.	S. Augers		HAMM	MER TYPE Automatic	DRILI	RIG/HAM	IMER EF	F./DATI	E SUN	10093 D	IEDRICH D-	50 88% 11/05	5/2015
DF	RILLE	R J.	Bare			S	FART DA	<b>TE</b> 01	1/21/16		COMP. DA	<b>TE</b> 01/	21/16		SUR	FACE WATER DE	EPTH N	/A	DRIL	LER J.	Bare			ST		E 01/21/1	6
ELE (ff			DEPTH	BLO		JNT	0	BL	OWS PE	ER FOO	T 100	SAMP.				SOIL AND R	OCK DES	SCRIPTION	ELEV	DRIVE	DEPTH	BLC		JNT		BLOWS	PER FOOT
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GUILFOR	D			GEOLOGIST Wright, F.						
eensboro to	East of \$	SR 230	03 (L	awndale Drive)	GROUND WTR (ft)					
OFFSET 1	60 ft RT	-		ALIGNMENT -L-	<b>0 HR.</b> 1.6					
NORTHING	870 7	50		EASTING 1.762.360	24 HR. FIAD					
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### **CONTENTS**

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REFERENCE

<u>SHEET NO.</u>	<b>DESCRIPTION</b>
I	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOGS

### STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE) SITE DESCRIPTION <u>CULVERT</u> AT -Y6RPD- 25+62 AT UNNAMED TRIBUTARY AT RICHLAND CREEK/LAKE

# 3482] PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	6

### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) TOT-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAIL

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 (IN-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE 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 OF CONTRACTOR IS CALIFORMUM AND MIDIL AS DUTILS AND UNDER THE UNDER THE CONTRACTOR IS CALIFORED TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN NOTATION ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN NOTOMETURATION PLANS AND DOCUMENTS FOR FINAL DESIGN NOTOMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPHION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTION FLORE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CALIFONED 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 ACULAL 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 HAIVING 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.

PERSONNEL

L. BUTLER
T. WILLIAMS
INVESTIGATED BY S&ME, Inc.
DRAWN BY T.T. WALKER, F&R, Inc.
CHECKED BYC.M. BRUINSMA
SUBMITTED BYC.M. BRUINSMA
DATE DECEMBER 2017



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	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
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. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PERTRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	ADUIFER - 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.	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:	RUCK MATERIALS ARE TYPICALLY DIVIDED AS FULLOWS:	ARCILLACEOUS - 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) 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	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC.	CRYSTALLINE	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.	ROCK (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-7-5 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO CUARSE GRAIN METAMORPHIC AND NUN-COASTAL FEBRIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL DOCOGROUPOR	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN CLAY PEAT		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 36 MN 36 MN 36 MN 36 MN	ORGANIC MATERIAL     SOILS     OTHER MATERIAL     TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
PASSING #40 SOULS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL – – 40 MX 41 MN LITTLE OR PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR	MUDERATELY URGANIC $5 - 10\%$ $12 - 20\%$ SUME $20 - 35\%$ HIGHLY ORGANIC> 10\%> 20\%HIGHLY35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STORE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO UNE ANDTHER PARALLEL TO THE FRACTORE.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 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 EVELLENT TO COOD EALP TO POOP FAIR TO POOP UNSUITABLE	E PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
AS SUBGRADE	- O-M- SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM,
		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FIELD.
COMPACTNESS OF RANGE OF STANDARD RANGE OF UNCONFINED		(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE) 2000 DIP & DIP DIRECTION WITH SOIL DESCRIPTION	I <u>F TESTEU, WUULD TIELD SPT HEFUSHL</u> SEVERE ALL ROCK EXCEPT OLIARTZ DISCOLORED OR STAINED, ROCK EARRIC CLEAR AND EVIDENT RUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GENERALLY 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.
GRANULAR LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A		ID SUME EXTENT. SUME FRAMMENTS OF STRUMD RUCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50 (NON-COHESIVE) VERY DENSE 50		VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
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.
MATERIAL STIFF 8 TO 15 1 TO 2		SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
(CUHESIVE) VERY STIFF IS TO 30 2 TO 4 HARD > 30 > 4	INSTALLATION SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS		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		SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
0PENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEEL 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 SILT CLAY (BLDR.) (CDB.) (GR.) SAND SAND (SL.) (CL.)		MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE, SD.) (F SD.) (F SD.)		HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.
ט אואיזט איז איזע אואיזט גע גע איזע אואיזט איז גע אואיזט גע	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 I FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	- CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma$ - 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 GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
	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.	IUTAL LENGTH UP STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASHRE 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 - SHFLRY TURE	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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERFENTACE.
	- FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE C + WET - (W) SEMISOLID; REQUIRES DRYING TO	FRAGS FRAGMENTS ILK - IKILUNE KEFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: BORING ELEVATIONS TAKEN FROM 112525C IS TIN FILF
	HI HICHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	DATED 4/2/2014
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	RILL UNITS: ADVANCING TODIS: HAMMER TYPE.	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: N/A FEET
SL SHRINKAGE LIMIT		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	6° CONTINUOUS FLIGHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
ΡΙΔΟΤΙΓΙΤΥ		INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	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 CRAINS;	
MODERATELY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE	
HIGHLY PLASTIC 26 OR MORE HIGH		MODERATELY INDURATED BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR		INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY),			
HUDIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. AKE USED TO DESCRIBE APPEARANCE.		EXTMEMELY INUUHATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14

### PROJECT REFERENCE NO.



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_ 800_		-		<u>C1_Y6RP1</u> 25 + 60 43' LT	9				<u>C2_Y6RPD</u> 25+48 4' RT			
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		(		<u>vīai: (3</u>	oft to Medium	<u>Ground Surface</u> Stiff, Moist to So Stiff to Hard G		Sandy_SILI_JA-4	-, />, )- <u>    </u> -		with Trace Roc	
_ 7_60_					49/1.0 60/0.1 Crysto	//////////////////////////////////////		Rock: 00/0.5 7//// (00/0.1	BT (10/0.3) A/ BT (18/0.2) 60/0.1	<u></u>		V//// rystalline <sup>-</sup> Rock: {
_ 750_												
7.40_												
_ 730_										· 		
720	(A) Alluv	<b>ial:</b> Soft to Mediu	um Stiff, Brown,	Moist, Sandy CL	AY (A-6)							
	(B) Alluv	<b>idi:</b> Loose to Med Sand and Sil	ium Dense, Light ty SAND (A-I-b,	Brown-Gray, Mo A-2-4) with Tro	st to Saturated ce Gravel and	l. Cobbles						GROUNDLINE INFERRED ST
		-70 -	-60 -	50 -4	40	-30 -2	20 -	10 0	1	0 2	20 3	PROJECTED Ø



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SITE DESCRIPTION     CULVERT AT 25+62 - Y6RPD- OVER UNNAMED TRIBUTARY TO RICHLAND CREEK/LAKE     GR								t) :	SITE DESCRIPTION CULVERT AT 25+62 -Y6RPD- OVER UNNAMED							 											
BO	RING	<b>NO.</b> C1	Y6RPD	)	S	TATION 2	25+60		OFFSET 4	13 ft LT			ALIGNMENT -Y6RPD-		0 HR. 3		BORING NO. C2_Y6RPD					ST	STATION 25+48				OF
со	LLAR	ELEV.	767.6 ft		т	OTAL DEP	<b>TH</b> 7.1 ft		NORTHING	870,8	79		EASTING 1,764,164		24 HR. N/		COLLAR ELEV. 766.0 ft					т	TAL DE	PTH 4	1.4 ft		N
DRI	LL RIG	HAMMER I	FF./DAT	E N/A						DRILL N	<b>NETHO</b>	D R	od Sounding/Hand Auger	НАММ	ER TYPE Automatic	٦ [-	DRILL	RIG/HAN	/MER EI	FF./DAT	E N/A						<u>.</u>
DR	ILLER	N/A			S	TART DAT	<b>E</b> 11/13/1 <sup>-</sup>	7	COMP. DAT	<b>FE</b> 11/	13/17		SURFACE WATER DEP	TH N/	A		DRILLER N/A START DATE 11/13								1/13/17		C
ELE			HBLC	ow co	UNT		BLOWS F	PER FOOT		SAMP.					CRIPTION	E	LEV	DRIVE	DEPTH	BLC	ow co	UNT		BLC	OWS PE	R FOO	T
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	76	56 + 20	N/A	4	4	• • • • •					Sat.	<u> </u>	766.1 SIL	T (A-4)		.5	+	766.0	0.0	N/A	4	4	+	<u> </u>			
765	5 76	46 + 30	N/A	10	13		<b></b>							SAND (A	-2-4) WITH Γ	2.5	765	765.0	1.0	N/A	18	19					-
	76	$36 \pm 40$	N/A	30	30						M		- TRACE	BIDUAL	EL		-	764.0	2.0	N/A	45	45			<b>●</b> 37 <u>-</u>		
	76	2.6 5.0	N/A	32	33						w		GRAY TO TAN, M CLAYEY SANDY SI	ED. STII LT (A-4)	FF TO HARD, ) WITH TRACE			763.0 762.7	3.0	100/0.3	3						-+-
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T١	GUILFOR	D.			GEOLOGIST Dungan, F. M.	
D	TRIBUTARY	TO RIC	HLAN	ID CF	REEK/LAKE	GROUND WTR (ft)
	OFFSET 4	l ft RT			ALIGNMENT -Y6RPD-	0 HR. N/A
	NORTHING	870,83	33		EASTING 1,764,178	24 HR. N/A
		DRILL M	ETHOD	Ro	d Sounding HAMM	ER TYPE Automatic
	COMP. DAT	ΓE 11/	13/17			A
 TC		SAMP.		L		
•	75 100	NO.		0 G	SOIL AND ROCK DES	CRIPTION
	75 100		Sat. M		SOIL AND ROCK DES	ACE 0.0 DSE, SILTY, 1.0 HARD, SANDY 3.0 DCK 4.3 OCK 4.3 OCK 4.4 (DIORITE) Dod sounding s at C1 and C3.

WBS	34821	.1.5			T	ΠP	U	-252	5C			COUN
SITE	DESCR	IPTION	CUL	VERT	AT 25	5+6	52 - <b>`</b>	Y6R	PD-	OVE	ER U	NNAM
BORI	NG NO.	C3_Y	6RPD		S	ST/	ATIC	DN	25+	68		
COLI	LAR ELE	<b>EV.</b> 76	7.7 ft		Т	0	TAL	DE	PTH	4.	9 ft	
DRILL	. RIG/HAN	IMER EF	F./DATI	E N/A								
DRIL	LER N	/A			S	ST/	ART	DA	TE	11/	13/1	7
ELEV	DRIVE	DEPTH	BLC	W CO	UNT	Τ				BLO	WSF	PER FO
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft		0		25		Ę	50
770												
		Γ										
	-	T										
	767.7 -	<u> </u>	N/A	1	1	+	<u> </u>					T
	766.7	1.0	N/A	2	2	+	¢ż	•••	•	•••	• •	• •
765	765.7 -	2.0	N/A	6	7	-	<b>6</b> 4	• •	•	•••		• •
, 00	764.7	3.0	N/A	24	24	-	- <b>`</b>	013	<u>,</u>		• •	+ • •
	763.7	4.0	N/A	100/0.5			•	•••	•	. ~	<b>-</b> -	48 <u> </u>
		4.8	N/A	100/0.3		+	•	<u></u>	•		• •	<u> </u>
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### **CONTENTS** SHEET NO.

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4-5

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REFER

**DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN AND PROFILE BORE LOGS SOIL TEST RESULTS

### STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY \_GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM US 29 NORTH OF GREENSBORO TO SR 2303 (LAWNDALE DRIVE) SITE DESCRIPTION <u>RETAINING</u> WALL NO. 1 -Y6RPD-STATION 22+74.50 TO 24+45.00

# 3482] PROJEC

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–2525C	1	6

### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991 707-6850, THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOCS, ROCK CORES AND SOLI TEST DATA A RE 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 (IN-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL 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 CAUTIONED THAT DETAILS SHOWN ON THE UBSURFACE 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 WADE, NOR THE INTERPRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS 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 ANN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONTENS 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.

PERSONNEL
M. L. HARTMAN
A. KINTNER, GIT
R. CLARKE
D. PINTER
INVESTIGATED BYM. L. HARTMAN
DRAWN BY C. BRUINSMA, LG
CHECKED BY C. YOUNGBLOOD, LG
CINEMITTED BY C. YOUNGBLOOD, LG
DATE JANUARY 2018



SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Control Contro Control Control Control Control Control Control Control Control Co																							
					SOIL D	ESCR	IPTION							GR	RADATION						ROC	K DES	CRIPTION
	SOIL IS	CONSIDERE		NSOLIDATED	SEMI-CONS		D, OR WE	ATHERED	EARTH MAT	ERIALS TH	AT CAN	WELL GRADED - INDICAT	ES A G	SOOD REPRESEN	NTATION OF PARTIC	LE SIZES F	ROM FINE TO COARSE.	HARD ROCK I ROCK LINE IN	S NON-I	COASTAL PL	AIN MATERIAL	THAT WO	JLD YIELD SPT REFUSAL IF TESTE AL PLAIN MATERIAL WOULD YIELD
	ACCORD	ING TO THE	E STANE	ARD PENET	ATION TES	T (AASH	TO T 206	ASTM D	586). SOIL	CLASSIFIC	CATION	GAP-GRADED - INDICATE	S A MI	S THAT SUIL	FORM PARTICLE SI	L APPROXIM	OR MORE SIZES.	SPT REFUSAL	IS PE	NETRATION I	BY A SPLIT S	POON SAM	PLER EQUAL TO OR LESS THAN 0.1
	CONSIST	ENCY, COLOF	R, TEXTU	IRE, MOISTUP	E, AASHTO	CLASSI	IUNS GEN	AND OTHE	R PERTINE	NT FACTOR	NG: IS SUCH			ANGULAR	ITY OF GRAIN	١S		REPRESENTED	BYA	ZONE OF WE	ATHERED ROC	CK.	STITION DETWEEN SOIE HAD NOCK
	A	IS MINERALO	OGICAL . <i>GRAY.SIL</i>	COMPOSITIO TY CLAY,MOIST	I, ANGULARI	ITY, STR RBEDDEL	UCTURE, P D FINE SA	LASTICIT ND LAYERS	,ETC. FOF <i>HIGHLY PLA</i>	R EXAMPLE, STIC, A-7-6		THE ANGULARIT	Y OR R	OUNDNESS OF	SOIL GRAINS IS DE	SIGNATED E	Y THE TERMS:		ALS AR	E TYPICALL	A DIVIDED AS	FULLUWS:	
		9	SOIL	LEGEND	AND 6	ASHT	TO CLA	ASSIFI	CATION			ANGULAR, SUBAN	GULAR,	SUBROUNDED,	OR ROUNDED.	TION		ROCK (WR)			100 BLOWS	S PER FOO	T IF TESTED.
	GENERAL		GRANUL	AR MATERIALS		SILT	-CLAY MATE	ERIALS	ORC	GANIC MATERI	ALS			CRYSTALLINE		P.P.	FINE TO C	OARSE GR	AIN IGNEOUS AND METAMORPHIC RO				
	CEH55.	A-1	A-3	-H551NG -2007	2	A-4	A-5 A-	6 A-7	A-1 A-2	0-4 0-5		ARE USED IN	I DESCR	RIPTIONS WHEN	N THEY ARE CONSID	ERED OF SI	GNIFICANCE.	ROCK (CR)		XX	GNEISS, GA	BBRO, SCH	ST, ETC.
Image:	CLASS.	A-1-a A-1-b	)	A-2-4 A-2-5	A-2-6 A-2-7	7		A-7-5, A-7 <u>-</u> 6	A-3	A-6, A-7				COMPF	RESSIBILITY			NON-CRYSTAL	LINE		FINE TO C SEDIMENTA	OARSE GRA	AIN METAMORPHIC AND NON-COASTA THAT WOULD YEILD SPT REFUSAL
NAME         Image: District Profession:         Image: Distrin Profession:         Image: District Profe	SYMBOL		000									SLIGH MODE!	ITLY CO RATELY	OMPRESSIBLE COMPRESSIBL	F	LL < 31 LL = 31	- 50	COASTAL PLA	IN		ROCK TYPE	E INCLUDES	S PHYLLITE, SLATE, SANDSTONE, ETC MENTS CEMENTED INTO ROCK, BUT
	% Passing	38888668886	9	-020-00-02-04	76.7676.77					CII T-		HIGHL	Y COMF	PRESSIBLE		LL > 50		SEDIMENTARY	ROCK		SPT REFUS	SAL. ROCK	TYPE INCLUDES LIMESTONE, SANDS
1         1	=10 =40	50 MX	1 51 MN						GRANULAR SOTUS	CLAY	MUCK.		<u> </u>	PERCENTAC	<u>GE OF MATER</u>	IAL						WEATHE	RING
	*200	15 MX 25 MX	X 10 MX	35 MX 35 MX	35 MX 35 M)	X 36 MN	36 MN 36 I	MN 36 MN		SOILS		ORGANIC MATERIAL		GRANULAR SOILS	SILT - CLAY SOILS	OTHE	R MATERIAL	FRESH	ROCK F	RESH, CRYST	ALS BRIGHT, FI	EW JOINTS	MAY SHOW SLIGHT STAINING. ROCK
Image: Normal and interport of the second	MATERIAL											TRACE OF ORGANIC MA	ATTER FER	2 - 3% 3 - 5%	3 - 5% 5 - 12%	TRACE LITTLE	1 - 10% 10 - 20%		HAMME	R IF CRYSTA	LLINE.		
B         B<         B         B         B	LL	-	-	40 MX 41 MN	40 MX 41 MM	40 MX	41 MN 40	MX 41 MN	SOILS	WITH F OR				5 - 10%	12 - 20%	SOME	20 - 35%	(V SLI.)	CRYST	SENERALLY F	OKEN SPECIME	N FACE SH	INE JUINTS MAY SHUW THIN CLAY C INE BRIGHTLY, ROCK RINGS UNDER H
	PI	6 MX	NP	10 MX 10 MX	11 MN 11 MN	10 MX	10 MX 11 M	4N 11 MN	MODE	RATE	HIGHLY	HIGHLY URGANIC		, III/		HIGHL T	35% AND ABUVE	4	OFAC	CRYSTALLINE	NATURE.		
	GROUP INDEX	0	0	0	4 MX	8 MX	12 MX 16 M	MX NO MX	AMOUN ORG4	ts of Anic	SOILS							SLIGHT (SLI.)	ROCK ( 1 INCH.	GENERALLY F	RESH, JOINTS S S MAY CONTAI	STAINED AN IN CLAY. IN	ID DISCOLORATION EXTENDS INTO RO GRANITOID ROCKS SOME OCCASIONA
Name         Autom         Autom <th< td=""><td>OF MAJOR</td><td>GRAVEL, AND</td><td></td><td>SILTY OR</td><td>CLAYEY</td><td>SIL</td><td>TY (</td><td></td><td>MAT</td><td>TER</td><td></td><td></td><td>CTAT</td><td>TR LEVEL IN E</td><td>BURE HULE IMMEDIA</td><td></td><td>DRILLING</td><td></td><td>CRYST</td><td>ALS ARE DUL</td><td>L AND DISCOL</td><td>ORED. CRYS</td><td>TALLINE ROCKS RING UNDER HAMMER</td></th<>	OF MAJOR	GRAVEL, AND		SILTY OR	CLAYEY	SIL	TY (		MAT	TER			CTAT	TR LEVEL IN E	BURE HULE IMMEDIA		DRILLING		CRYST	ALS ARE DUL	L AND DISCOL	ORED. CRYS	TALLINE ROCKS RING UNDER HAMMER
Data is to base         Preduct in the local base         Preduct in the local base         Distance         Distan	MATERIALS	SAND	3440			301		3011.3					STAT.	IL WATER LEV	ATURATER 24 I	NATER REA		MODERATE (MOD.)	SIGNIF	ICANT PORTI	ONS OF ROCK S 10ST FELDSPAR	SHOW DISCO RS ARE DUI	DLORATION AND WEATHERING EFFECT:
Total and allow of a list of white and allow of a list of all of al	GEN, RATING AS SUBGRADE		EXCELL	ENT TO GOOD			Fair to Po	OR	FAIR TO POOR	POOR	UNSUITABLE		PERU	HED WATER, SP	ATURATED ZUNE, UR	WATER BEA	RING STRATA		DULL	SOUND UNDER	HAMMER BLOW	WS AND SHO	DWS SIGNIFICANT LOSS OF STRENGTH
CONSISTENCY OF DENSITIES         MISSEL ADDRESS         MISSEL ADDRESS         Constraints         Con			PI OF A	-7-5 SUBGROUF	' IS ≤ LL -	30;PIC	F A-7-6 SU	BGROUP IS	> LL - 30				SPRIN	NG OR SEEP						RESH RUCK.			STAINED IN GRANITOID ROCKS ALL F
Prevent Dit, Tre         Operating of the second processing of t				CONSI	STENCY	/ OR	DENSE	ENESS	_				<u> </u>	MISCELLA	NEOUS SYMBO	ILS		SEVERE	AND DI	ISCOLORED A	ND A MAJORITI	Y SHOW KA	DLINIZATION. ROCK SHOWS SEVERE L
Image: Normal Act, Proc.         Construction         C	PRIMARY		c	OMPACTNES	SOR	RAN	GE OF STA	NDARD	RANG	E OF UNC	ONFINED			IT (RF) 25/02		FCTION		(MOD. SEV.)	AND CA	AN BE EXCAV S <i>TED, WOULD</i>	ATED WITH A I YIELD SPT REF	GEOLOGIST' <u>FUSAL</u>	S PICK. ROCK GIVES "CLUNK" SOUND
CONTRACT         Weit Loss         Control         Contro         Control         Control				CONSISTEN	CY		(N-VALUE	])	00.00	(TONS/FT	-2)	WITH SOIL DE	SCRIPTI	ION	OF ROCK STRU	TURES		SEVERE	ALL RO	ОСК ЕХСЕРТ	QUARTZ DISCO	LORED OR	STAINED. ROCK FABRIC CLEAR AND E
Image: Note of the public bines         Init to 36         N/4           Image: Note of the public bines         10 to 36         10 to 36 <td>GENERA</td> <td>LLY</td> <td></td> <td>VERY LOO</td> <td>3E</td> <td></td> <td>&lt; 4 4 TO 10</td> <td>2</td> <td></td> <td></td> <td></td> <td>SOIL SYMBOL</td> <td></td> <td></td> <td>OPT DAT TEST BOP</td> <td></td> <td>SLOPE INDICATOR</td> <td>(SEV.)</td> <td>REDUCE</td> <td>ED IN STREN ME EXTENT. 1</td> <td>GTH TO STRON SOME FRAGMEN</td> <td>G SOIL. IN NTS OF STR</td> <td>GRANITOID ROCKS ALL FELDSPARS 4 ONG ROCK USUALLY REMAIN.</td>	GENERA	LLY		VERY LOO	3E		< 4 4 TO 10	2				SOIL SYMBOL			OPT DAT TEST BOP		SLOPE INDICATOR	(SEV.)	REDUCE	ED IN STREN ME EXTENT. 1	GTH TO STRON SOME FRAGMEN	G SOIL. IN NTS OF STR	GRANITOID ROCKS ALL FELDSPARS 4 ONG ROCK USUALLY REMAIN.
Image: Description         Construction         Constru	GRANUL	AR Al		MEDIUM DE	NSE		10 TO 3	Ø		N/A			ILL (AF)	) OTHER (	VSI PMI	Ā	CONE PENETROMETER		IF TES	STED, WOULD	YIELD SPT N	VALUES > 1	00 BPF
Casesult         Very sort         C.2         C.2.         C.2. <thc.2.< th=""> <thc.2.< th="">         C.2.</thc.2.<></thc.2.<>	(NON-CO	HESIVE)		DENSE VERY DEN	SE		30 TO 5 > 50	0				THAN ROADWAY	r Emban		J AUGER BURING	$\mathbf{\Theta}$	TEST	VERY	ALL RO	OCK EXCEPT	QUARTZ DISCO	LORED OR S	STAINED. ROCK FABRIC ELEMENTS AF
Concentrative Minimum         Product         2 To 4 minimum         4 and 5 To 5 minimum				VERY SOF	т		< 2		-	< 0.25		INFERRED SOI	L BOUN	DARY -	- CORE BORING	•	SOUNDING ROD	(V SEV.)	REMAIN	ING. SAPROL	ITE IS AN EXA	AMPLE OF F	OCK WEATHERED TO A DEGREE THAT
NATURE         STIFF         8 TO 15         TO 2         WITH CORE         WITH CORE         WITH CORE         Schemating         WITH CORE         Schemating         WITH CORE         Schemating         Sc	GENERAL SILT-CL			SOFT MEDIUM ST	IFF		2 TO 4			0.25 TO 0	0.5 .0		K I INF	MW MW	) MONITORING WE	ш 📥	TEST BORING		POCK F	ES UF URIGI	NAL RUCK FAB	SRIC REMAIN	N. <u>IF TESTED, WOULD YTELD SPT N V</u> DISCERNIBLE OR DISCERNIBLE ONLY
Unitset         Instruction         Construction	MATERIA	AL		STIFF			8 TO 15	5		1 TO 2					PIEZOMETER	$\Psi$	WITH CORE	COMPECTE	SCATTE	ERED CONCEN	TRATIONS. QUA	ARTZ MAY E	BE PRESENT AS DIKES OR STRINGERS
TEXTURE OR GRAIN SIZE         PECOMMENDATION SYMBOLS           LS.SITL.SERV.51ZE         4.8         48         48         28         278         2.00         64.2         28.00         57.0         2.00         64.2         28.00         57.0         2.00         64.2         28.00         57.0         2.00         64.2         28.00         57.0         2.00         64.2         28.00         57.0         2.0         64.2         28.00         57.0         2.0         64.2         28.00         57.0         2.0         64.2         64.0         57.0         2.0         64.2         64.0         57.0         2.0         64.2         64.0         57.0         64.0	(COHESI	VE)		VERY STI	۲ (		> 30	Ø		2104		ALLUVIAL SOIL		DARY 🛆	INSTALLATION	$\bigcirc$	- SPT N-VALUE		ALSO 4	AN EXAMPLE.			
LS. STUE SIZE       4       10       44       68       280       278         VERLING RMP       47       2.08       0.42       62.07       0.00				TEX	TURE	DR GF	RAIN S	IZE					R	ECOMMEN	DATION SYMB	OLS			C 4111/0			JUK HAI	TUNESS
OPENING GMM         4.76         2.88         0.42         0.25         0.875         0.06333           DOLLOGE (GB)L (	U.S. STD. SI	EVE SIZE		4	10	40	60	200	270					CLASSIFIED E>	XCAVATION -		SIFIED EXCAVATION -	VERT HHRU	SEVER	AL HARD BLO	WS OF THE GE	OLOGIST'S	PICK. BREAKING OF MAND SPECIMEN
BUBLICER (BLDB)         CORACE (CBL)         orace (CBL)         Corace (CBL	OPENING (M	M)		4.76	2.00	0.42	0.25	0.075	0.053					SUITABLE WAS	XCAVATION -	USED I	N THE TOP 3 FEET OF	HARD	CAN BE	SCRATCHED	BY KNIFE OR	PICK ONLY	WITH DIFFICULTY. HARD HAMMER B
IBUILD         LUB         LUB<	BOULDE	R CO	OBBLE	GRAV	3L	COARS SAN(	SE D	F INE SAND	9	SILT	CLAY			CEPTABLE DEG	GRADABLE ROCK	EMBANK	MENT OR BACKFILL		TO DE	F SCRATCHED	BY KNIEF OR		GES OR GROOVES TO 0 25 INCHES OF
GRAIN MM         385         75         2.8         8.25         8.85         8.86         RED. MED. MED. MED. MED. MED. MED. MED. M	(BLDR.)	) (	(COB.)	GR.	<u> </u>	(CSE. S	;D.)	(F SD		SL.)	(CL.)			ABBR	REVIATIONS			HARD	EXCAVE	ATED BY HAR	D BLOW OF A	GEOLOGIST	'S PICK. HAND SPECIMENS CAN BE D
NN       NN <th< td=""><td>GRAIN MM</td><td>1 305</td><td></td><td>75 3</td><td>2.0</td><td></td><td>0.25</td><td>i .</td><td>0.05</td><td>0.005</td><td></td><td>AR - AUGER REFUSAL BT - BORING TERMINATED</td><td>ı</td><td>MED</td><td>MEDIUM</td><td>VST WEA</td><td>- VANE SHEAR TEST - WEATHERED</td><td>MEDIUM</td><td>BY MOL</td><td>CROOVED O</td><td>IS. P. COLICED 10 10</td><td></td><td>EED BY EIDM DESSURE OF VNIEE O</td></th<>	GRAIN MM	1 305		75 3	2.0		0.25	i .	0.05	0.005		AR - AUGER REFUSAL BT - BORING TERMINATED	ı	MED	MEDIUM	VST WEA	- VANE SHEAR TEST - WEATHERED	MEDIUM	BY MOL	CROOVED O	IS. P. COLICED 10 10		EED BY EIDM DESSURE OF VNIEE O
SOIL MOISTURE         OWN PLASTIC         7/2 - ORV UNIT WEIGHT         7/2 - ORV UNIT WEIGHT         POINT OR A CERLOSITS PICK.           SOIL MOISTURE         FIELD MOISTURE         GESCRIPTION         QUIDE FOR FIELD MOISTURE         DESCRIPTION         QUIDE FOR FIELD MOISTURE DESCRIPTION         POINT OR A CERLOSITS PICK.         POINT OR A CERLOSITS PICK.           VIEL         - SATURATED - USIALLY LUDIOU VERY KET, USIALTY         USIALLY LUDIOU VERY KET, USIALTY         POINT OR A CERLOSITS PICK.         Sample addressite for the Sample addressite	5120 10	. 12	011	MOICT					TEDMO			- CL CLAY		MOD	MODERATELY	2-	UNIT WEIGHT	HARD	CAN BE	E EXCAVATED	IN SMALL CH	IPS TO PEI	CES 1 INCH MAXIMUM SIZE BY HARD
Catteragers       Curve       OPT       OULCTOR       Curve       OPT       OULCTOR       OPT	SOIL	MOISTURE	SCALE	MUISIC	FIELD MO	ISTURE			IERM5			CPT - CONE PENETRATION CSE COARSE	I TEST	NP - N ORG	ION PLASTIC ORGANIC	∽	DRY UNIT WEIGHT	COLT	POINT	OF A GEOLO	GIST'S PICK.		
Concent and the concent a	(AT1	TERBERG L	IMITS)		DESCRIP	TION	GUI	DE FOR F	FIELD MOIS	STURE DES	SCRIPTION	DMT - DILATOMETER TES	T	PMT -	PRESSUREMETER TE	ST <u>SA</u>	MPLE ABBREVIATIONS	50F1	FROM	CHIPS TO SE	VERAL INCHES	IN SIZE B	Y MODERATE BLOWS OF A PICK POIN
Image: constraint or straint or str					- SATURA	TED -	USU	ALLY LI	UID: VERY	WET, USU4	ALLY	e - VOID RATIO	TION TE	SD S	SAND, SANDY	S - E SS -	SPLIT SPOON	VEDY	PIECES	CAN BE BRI	OKEN BY FINGE	ER PRESSUF	E.
PLASTIC       - WET - (W)       SEMISOLID; REQUIRES DRVING TO ATTAIN OPTIMUM MOISTURE       FINAL: FRACUENTS       TRAINE FUNAL:       RTACLERES       TRACLERES	I		דו או ה		(SAT.)		FRO	M BELOW	THE GRO	UND WATE	R TABLE	F - FINE		SL S	SILT, SILTY	ST -	SHELBY TUBE	SOFT	OR MOR	RE IN THICK	NESS CAN BE E	BROKEN BY	FINGER PRESSURE. CAN BE SCRATCH
HANGE - WEI - W       - WEI - W       ATTAIN OPTIMUM MOISTURE       FRAGS. FRAGMENTS       W - MOISTURE CONTENT       CBR - CALIFORIA BEARING       FRACTURE SPACING       BEDI         (P1)       PLASTIC LIMIT       - MOISTURE       - MOISTURE       - WEY WIDE       - MOISTURE       - MOISTURE       - MOISTURE       - CRR - CALIFORIA BEARING       FRACTURE SPACING       BEDI         0M       OPTIMUM MOISTURE       - MOISTURE       <	PLASTIC		5 21011				SEM	1ISOLID: F	EQUIRES (	ORYING TO		FRAC FRACTURED, FRAC	TURES	TCR -	TRICONE REFUSAL	RS - RT -	RECOMPACTED TRIAXIAL		FINGER	NAIL.			
PLL       PLSTIC LIMIT       - MOIST	(PI)	DI AGT		-	- WET - (	W)	ATT	AIN OPTI	MUM MOIS	TURE		FRAGS FRAGMENTS		w - MC	DISTURE CONTENT	CBR	- CALIFORNIA BEARING	F	RACI	FURE SP	ACING		BEDDING
OM       OPTIMUM MOISTURE       - MOIST - (M)       SOLID; AT OR NEAR OPTIMUM MOISTURE       - MOIST - (M)       SOLID; AT OR NEAR OPTIMUM MOISTURE       THICKLY BEDDED       THICKLY BEDDED       MODERATELY CLOSE       3 TO 10 FEET       THICKLY BEDDED         SL       SHRINKAGE LIMIT       - DRY - (D)       REDUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE       OR -45C       CLAY BITS       AUTOMATIC       MANUAL       MODERATELY CLOSE       0.16 TO 1 FOOT       VERY CLOSE       0.6 TO 1 FOOT       VERY THINLY BEDDED         DESCRIPTIONS MAY INCLUDE COLOR OR COUBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       DRY STREAKEL       CORE BIT       -N       -       MODERATELY INDURATED       MODERATELY INDURATED       THICKLY BEDDED         DESCRIPTIONS MAY INCLUDE COLOR OR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       DRY STREAMENCE.       OR SUNDING ROD       OR SUNDING ROD       MODERATELY INDURATED       SHAPP HAMMER DISTREAMENCE.       THICKLY BEDDED       MODERATELY INDURATED       GRAINS ARE DET       THICKLY BEDDED         DESCRIPTIONS MAY INCLUDE COLOR OR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       DRY STREAMEN       DRY STREAMENCE.       CORE BIT       MODERATELY INDURATED       GRAINS ARE DET       MODERATELY INDURATED       GRAINS ARE DET ON DESCRIBE APPEARANCE.		+ PLASI	IC LIM.											INT USED		PROJEC		VERY WIDE		MOR	E THAN 10 FE	ЕТ	VERY THICKLY BEDDED
SL       SHRINKAGE LIMIT	OM		им мот	STURE	- MOIST -	- (M)	SOL	ID; AT OF	R NEAR OP	TIMUM MO	ISTURE	DRILL UNITS:	ADVA	NCING TOOLS:	0.1 00000201	HAMMER	TYPE:	WIDE		3	TO 10 FEET		THICKLY BEDDED 1
- DRY - (D)       REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE       -       -       VERY CLOSE       LESS THAN 0.16 FEET       THICKLY LAMINATED THICKLY LAMINATED         - DRY - (D)       REDURES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE       -	SL		KAGE L	IMIT								CME-45C		CLAY BITS		X AU	TOMATIC MANUAL	CLOSE		0 0	.16 TO 1 FOOT	.	VERY THINLY BEDDED 0.0
PLASTICITY       PLASTICITY       INDURATION         PLASTICITY       0-5       VERY LOW         0-5       VERY LOW         SLIGHT       0-5       VERY LOW         SLIGHT       0-5       VERY LOW         SLIGHT       0-55       VERY LOW         SLIGHT       0-55       VERY LOW         SLIGHT       0-55       VERY LOW         MODERATELY PLASTIC       6-15       SLIGHT         MODERATELY PLASTIC       16-25       MEDIUM         MODERATELY PLASTIC       16-25       MEDIUM         PORTABLE HOIST       TRICONE       'STELL TEETH         HIGHLY PLASTIC       26 OR MORE       HIGH       PORTABLE HOIST         DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       ORTABLE HOIST       TRICONE       'STELL TEETH         MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.       ORTABLE APPEARANCE.       ORTABLE APPEARANCE.       ORTABLE APPEARANCE.					- DRY - (1	D)	REG ATT	UIRES AU AIN OPTI	DITIONAL MUM MOIS	WATER TO TURE	)			6" CONTINUOUS	5 FLIGHT AUGER			VERY CLO	6E	LESS	THAN 0.16 F	EET	THICKLY LAMINATED 0.00 THINLY LAMINATED <
PLASTICITY INDEX (PI)       DRY STRENGTH       CME-550       HARD FACED FINGER BITS       -N       FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMEN         NON PLASTIC       0-5       VERY LOW       1       TUNGCARBIDE INSERTS       -N       FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMEN         MODERATELY PLASTIC       6-15       SLIGHT       1       VANE SHEAR TEST       CASING       W/ ADVANCER       POST HOLE DIGGER       FRIABLE       GENITE BLOW BY HAMMER DISINTEGRATES TO DOST         MODERATELY PLASTIC       16-25       MEDIUM       PORTABLE HOIST       TRICONE       STEEL TEETH       POST HOLE DIGGER       MODERATELY INDURATED       GRAINS CAN BE SEPARATED FROM SAMPLE         DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       PORTABLE HOIST       TRICONE       STELL TEETH       HAND AUGER       INDURATED       GRAINS ARE DIFFICULT TO SEPARATE WITH HAMMER.         MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.       CORE BIT       CORE BIT       VANE SHEAR TEST       SOUNDING ROD       INDURATED       SHARP HAMMER BLOWS REQUIRED TO BREAK	L					STIC	TY						X	8 HOLLOW AU	IGERS	П-в	П-н					INDURA	TION
NON PLASTIC       0-5       VERY LOW       Induced and the processing approximations (tan, RED, YELLOW-BROWN, BLUE-GRAY).       Induced approximation and the processing approximate approximate.       RUBBING WITH FINGER FREES NUMEROUS GR         NON PLASTIC       6-15       SLIGHT       Vane SHEAR TEST       Induced approximate approx					PLASTI		DEX (PI)		DR	Y STRENG	тн	СМЕ-550		HARD FACED F	FINGER BITS			FOR SEDIMEN	TARY R	OCKS, INDUR	ATION IS THE	HARDENIN	G OF MATERIAL BY CEMENTING, HE
SLIGHT       PLASTIC       6-15       SLIGHT       VANE SHEAR TEST       AND TOOLS:       GENTLE BLUW BT HAMMER UISINIEURALIST         MODERATELY PLASTIC       16-25       MEDIUM       PORTABLE HOIST       CASING       W/ ADVANCER       POST HOLE DIGGER       MODERATELY INDURATED       GRAINS CAN BE SEPARATED FROM SAMPLE         MIGHLY PLASTIC       26 OR MORE       HIGH       PORTABLE HOIST       TRICONE       STEEL TEETH       HAND AUGER       MODERATELY INDURATED       GRAINS ARE DIFFICULT TO SEPARATE PRANTER.       GRAINS ARE DIFFICULT TO SEPARATE WITH HAMMER.         DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       CORE BIT       CORE BIT       VANE SHEAR TEST       ORABLE APPEARANCE.       SUNDING ROD       INDURATED       GRAINS ARE DIFFICULT TO BREAK WITH HAMMER.	NON	PLASTIC			<u>. 245110</u>	0-5			<u></u>	VERY LOW				TUNGCARBIDE	E INSERTS			FRIABL	E		RUBBIN		NGER FREES NUMEROUS GRAINS;
HIGHLY PLASTIC 26 OR MORE HIGH OPORTABLE HOIST TRICONE STEEL TEETH HAND AUGER GRAINS CAR BE SEARCH WITH HAMMER. COLOR  COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). 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.	SLI MOD	GHTLY PLA DERATELY F	ASTIC PLASTI	:		6-15 16-25				SLIGHT MEDIUM		VANE SHEAR TEST		CASING	W/ ADVANCER		OLS:				CDAILE		CERARATER EROM CAMPLE VITE OF
COLOR       Initial roduction         DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).       Initial roduction         Descriptions May Include Color or Color or Color or Color Combinations (Tan, RED, YELLOW-BROWN, BLUE-GRAY).       Initial roduction         MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.       Initial roduction	HIG	HLY PLAST			26	OR MC	RE			HIGH		PORTABLE HOIST		TRICONE	• STEEL TEETH		N AUGER	MODER	ATELY	INDURATED	BREAKS	S EASILY	WHEN HIT WITH HAMMER.
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).					<u> </u>	OLOR									TUNGCARB.		JNDING ROD	INDURA	TED		GRAINS	ARE DIFF	ICULT TO SEPARATE WITH STEEL
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	DESCRIPT	TIONS MAY	INCLU	DE COLOR C	R COLOR	COMBIN	ATIONS (T	AN, RED.	YELLOW-BR	ROWN, BLUE	E-GRAY).			CORE BIT			NE SHEAR TEST				DIFFIC	ULT TO BF	EAK WITH HAMMER.
	мс	DDIFIERS S	SUCH AS	LIGHT, DA	R, STREAK	ED. ETC	ARE US	ED TO DE	SCRIBE A	PPEARANCE								EXTRE	MELY I	NDURATED	SHARP SAMPLE	HAMMER B E BREAKS	LOWS REQUIRED TO BREAK SAMPLE ACROSS GRAINS.

### PROJECT REFERENCE NO.



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IS OFTEN ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  $\frac{\text{Argillaceous}}{\text{A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.}$ N VALUES > ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND CK THAT SURFACE. CLUDES GRANITE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. AL PLAIN IF TESTED. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. MAY NOT YIELD 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. STONE, CEMENTED DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT BOCKS OR CUTS MASSIVE ROCK. RINGS UNDER  $\underline{\text{DIP}}$  - The angle at which a stratum or any planar feature is inclined from the horizontal. OATINGS IF OPEN. <u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. AMMER BLOWS IF FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE ICK UP TO SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FELDSPAR BLOWS. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  $\underline{\mathsf{FLOAT}}$  - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. . IN Y. ROCK HAS AS COMPARED 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 FIELD. FELDSPARS DULL OSS OF STRENGTH WHEN STRUCK. 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 ITS LATERAL EXTENT. VIDENT BUT ARE KAOLINIZED LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. RE DISCERNIBLE PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. ONLY MINOR ALUES < 100 BPF RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. IN SMALL AND 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 S. SAPROLITE IS RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. S REQUIRES <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO LOWS REQUIRED THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT EEP CAN BE OR SLIP PLANE. ETACHED 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 OR PICK POINT. WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL BLOWS OF THE TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. FRAGMENTS IT. SMALL, THIN 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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. PIECES 1 INCH ED READILY BY TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: BORING ELEVATIONS TAKEN FROM U2525C\_LS\_TIN FILE THICKNESS DATED 11/22/2017 4 FEET 1.5 - 4 FEET ELEVATION: N/A FEET 16 - 1.5 FEET NOTES: 13 - 0.16 FEET 18 - 0.03 FEET FIAD - FILLED IMMEDIATELY AFTER DRILLING 0.008 FEET AT. PRESSURE, ETC. TEEL PROBE: PROBE:



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WB	<b>S</b> 34821	1.1.5			ТІ	P U-25250	С	COUNT	<b>Y</b> GUILFO	RD			GEO	DLOGIST Hartman,	, M. L.		WBS	<b>3</b> 3482 <sup>-</sup>	1.1.5			TIF	<b>D</b> -25250	;	COUNTY	
SIT	E DESCR	IPTION	Reta	ining V	Vall No	D. 1, -Y6RPI	D-, Station	22+74.50	To 24+45.0	0						GROUND WTR (ft)	SITE	DESCR	RIPTION	Reta	aining V	Vall No	. 1, -Y6RPE	D-, Station	22+74.50	
BOF	ring no.	RW-1			S	TATION 2	2+92		OFFSET	15 ft LT			ALI	GNMENT -Y6RPD-		0 HR. Dry	BOF	RING NO.	. RW-2	2		ST	ATION 23	3+27		
COL	LAR EL	<b>EV.</b> 80	4.3 ft		т	OTAL DEPT	<b>TH</b> 29.3 f	t	NORTHING	<b>3</b> 870,7	750		EAS	<b>STING</b> 1,763,935		24 HR. FIAD	COL	COLLAR ELEV.         801.8 ft         TOTAL DEPTH         30.1 ft								
DRIL	L RIG/HAM	/MER EF	F./DATE	E RFC	0074 C	ME-55 86%	11/17/2017		DRILL METHOD H.S			.S. Auger	s	ER TYPE Automatic	DRIL	L RIG/HAI	MMER EF	F./DAT	E RFC	00074 CI	ME-55 86% 1	1/17/2017	•			
DRI	LLER C	larke, R	-		S		E 12/14/1	7	COMP. DA	<b>TE</b> 12/	/14/17	,	SUF	SURFACE WATER DEPTH N/A					Pinter, D	. G.	ST	ART DATE	12/15/1	7		
ELE	/ DRIVE ELEV	DEPTH	BLO	W CO	JNT		BLOWS	PER FOOT	-	SAMP				SOIL AND RO	CK DES	CRIPTION	ELEV	, DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLOWS I	PER FOOT	
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SI	TE DE	SCRI	IPTION	Reta	iining V	Vall No	o. 1, -	Y6RP	PD-,	Statio	n 22	2+74.5	0 To	24+45.0	0				•		GROUND WTR (ft)	SIT	E DESCI	RIPTION	Reta	aining V	Vall No	. 1, -Y6F	≀PD-, St	ation 2	22+74.50
В	ORING	NO.	RW-3	3		S	ТАТЮ	ON 2	23+9	92			O	FFSET	33 ft LT				ALIGNMENT -Y6RPD-		0 HR. Dry	BO	ring no	<b>).</b> RW-4	4		ST	ATION	24+65		
C	OLLAF	R ELE	<b>EV.</b> 79	95.5 ft		Т	OTAL	. DEP	тн	34.7	ft		N	ORTHING	870,	789			EASTING 1,764,026		24 HR. FIAD	со	LLAR EL	<b>.EV.</b> 78	38.1 ft		т	)TAL DE	<b>PTH</b> 2	4.5 ft	
DF	ILL RIC	g/ham	IMER EF	F./DAT	E RFC	00074 C	CME-55	5 86%	11/1	17/2017	7				DRILL	METH	OD	H.S	6. Augers	HAMM	<b>ER TYPE</b> Automatic	DRI	L RIG/HA	MMER EF	F./DAT	E RFC	00074 CI	ME-55 86	% 11/17/2	2017	
D	RILLE	<b>R</b> Pi	nter, D	G.		S	TART	DAT	E	12/15/	/17		C	omp. Da	<b>TE</b> 12	/15/17	7		SURFACE WATER DEP	TH N/	Ά	DRI	LLER	Pinter, D	. G.		ST	ART DA	<b>TE</b> 12	/15/17	,
EL		RIVE LEV		BLC					В	BLOWS	S PE	R FOC	от 		SAMF	P. <b>▼</b> ∕			SOIL AND ROO	CK DES	CRIPTION	ELE	DRIVE		BLC		UNT		BLC	WS P	ER FOOT
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GUILFORD	GEOLOGIST Hartman, M. L.	
Го 24+45.00		GROUND WTR (ft)
OFFSET 22 ft LT	ALIGNMENT -Y6RPD-	0 HR. Dry
NORTHING 870,813	EASTING 1,764,094	24 HR. FIAD
DRILL METHOD HS	Augers HAMN	IER TYPE Automatic
COMP DATE 12/15/17		/Δ
75 100 NO NO C	SOIL AND ROCK DES	CRIPTION
	788.1 GROUND SURF RESIDUAL	ACE 0.0
	Light brown-orange silty cla	ay (A-7-5), trace
		a
	775.8	12.3
	RESIDUAL	$\frac{12.5}{13.7}$
	Grey, black, and white sa	Indy Silt (A-4), 7
	Brown, grey, orange, and	black silty clay
	(A-7-5) with trace mica a	nd trace rock
	766.8	21.3
· · · · ·	RESIDUAL	- — — — — — — — — — — — — — — — — — — —
SS-15 M	763.6 trace mica	24.5
	Boring Terminated at Elevi sandy silt (resid	lual)
	Top 0.5' tops	pil
F		
F		
F		

	SOIL TEST RESULTS														
SAMPLE			DEPTH	AASHTO				% BY V	VEIGHT		% PAS	SING (S	SIEVES)	%	%
NO.	OFFSET	STATION	INTERVAL	CLASS.	L.L.	P.I.	C.SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-10	28' LT	22+75	9.2-10.2	A-7-5(17)	55	15	6.3	15.8	33.3	44.6	100	97	84	-	-
SS-11	28' LT	23+25	4.1-5.1	A-7-5(24)	58	20	2.8	12.2	36.4	48.6	100	98	92	-	-
SS-12	28' LT	23+25	14.1-15.1	A-7-5(14)	51	12	2.4	21.5	39.6	36.5	100	99	86	-	-
SS-13	28' LT	23+25	24.1-25.1	A-4(0)	•	•	2.0	33.4	46.3	18.2	100	99	81	-	-
SS-15	27' LT	24+50	23.5-24.5	A-4(0)	•	•	17.0	42.6	30.3	10.1	99	89	56	-	-