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REFERENCE

SHEET NO. - 3

SITE PLAN PROFILE BORE AND CORE LOGS CORE PHOTOGRAPHS SITE PHOTOGRAPHS

TITLE SHEET

LEGEND

**DESCRIPTION** 

#### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY GASTON

PROJECT DESCRIPTION I-85 /US 321 INTERCHANGE **GEOMETRIC SAFETY IMPROVEMENTS** 

SITE DESCRIPTION CULVERT AT STA. 22+34 -Y3-

 $\sim$ 

STATE N.C.

1

#### TOTAL SHEETS 10

### 41153.1.1

#### 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 SOL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919) TO7-6850, THE SUBSURFACE PLANS AND REPORTS, FIELD DOTATION OF DORY DORY AND FOR AND FOR THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORENQLE. THE LABORATORY SAMPLE DATA AND THE IN SITU INN-FLACE)TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MOISTURE CONDITIONS INCLATED 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.

NOTES

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- 2.

PERSONNEL
B. WORLEY, PG
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D. SUTTON
NCDOT GEU HRO
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INVESTIGATED BY B. WORLEY, PG
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CHECKED BY D. DEWEY, PE
Summit Design and Engineering
SUBMITTED BY <u>Services, PLLC</u>
DATE
SEAL 1926
Bralley D. Worley 
SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

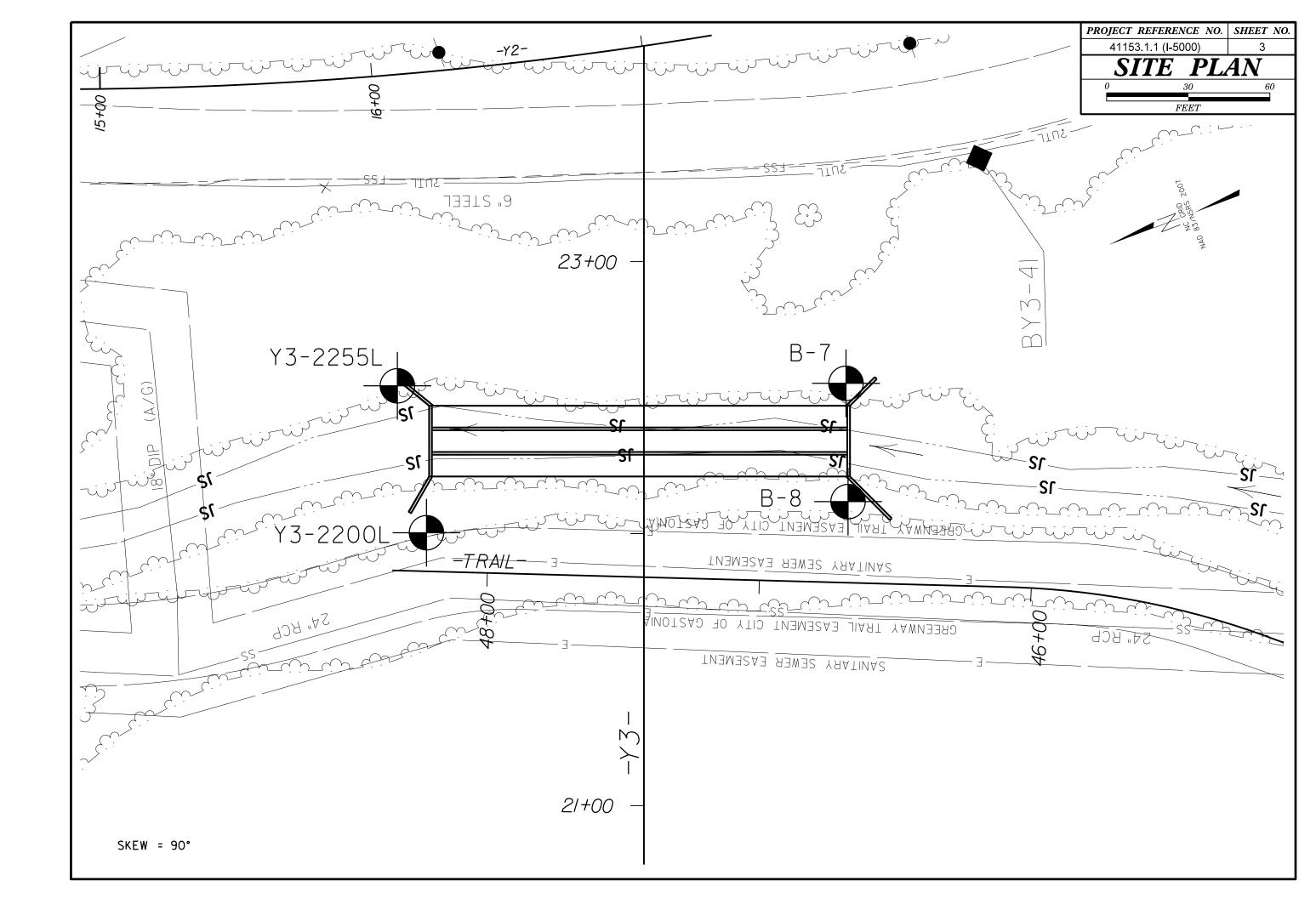
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

			SOIL D	ESCR	IPTION				T		GRADATION		T			ROCK DE	SCRIPTION
							EARTH MATERIALS					LE SIZES FROM FINE TO COARSE.					/OULD YIELD SPT REFUSAL IF TES STAL PLAIN MATERIAL WOULD YIEL
ACCORE	DING TO THE	STANDARD PEI	NETRATION TES	ST (AASH	ITO T 206	S, ASTM DI	586). SOIL CLASSI	ICATION				APPROXIMATELY THE SAME SIZE.	SPT REFUSA	L IS PEN	ETRATION BY A	A SPLIT SPOON SA	MPLER EQUAL TO OR LESS THAN @
							CLUDE THE FOLLON				GULARITY OF GRAIN		REPRESENTE	DBYAZ	ZONE OF WEATH	ERED ROCK.	NSITION BETWEEN SOIL AND ROCK
	AS MINERALOO	SICAL COMPOS	ITION, ANGULAR	RITY, STR	RUCTURE, F	LASTICIT	(,ETC. FOR EXAMPL HIGHLY PLASTIC,A-7-	Ε.	THE ANGULARIT		ESS OF SOIL GRAINS IS DE			IALS ARE	SI MASI MA	VIDED AS FOLLOW	
			ND AND					,	- <u>ANGULAR</u> , <u>SUBAN</u>	GULAR, SUBR	OUNDED, OR ROUNDED.		WEATHERED ROCK (WR)	ł		10N-COASTAL PLA 100 BLOWS PER FO	N MATERIAL THAT WOULD YIELD S DOT IF TESTED.
GENERAL		GRANULAR MATER			CLAY MAT			D14L C		MINER	ALOGICAL COMPOSI	TION			ale -		RAIN IGNEOUS AND METAMORPHIC F
CLASS.	(:	≤ 35% Passing '	200)	-	35% PASSING		ORGANIC MATE	RIALS			OUARTZ, FELDSPAR, MICA, TA		CRYSTALLIN ROCK (CR)	-	LIN LAN V		REFUSAL IF TESTED, ROCK TYPE
GROUP CLASS.	A-1 A-1-a A-1-b	A-3	A-2 2-5 A-2-6 A-2-	A-4	A-5 A-	6 A-7 A-7-5, A-7-6	A-1, A-2 A-4, A-5 A-3 A-6, A-7		HAE USED IN		COMPRESSIBILITY	ERED OF SIGNIFICANCE.	NON-CRYSTA		F	INE TO COARSE (	RAIN METAMORPHIC AND NON-COAS
	00000000000	H-2-4 H	2 3 4 2 6 4 2			A-7-6			SLIG+	HTLY COMPRE		LL < 31	ROCK (NCR)		F	ROCK TYPE INCLUE	C THAT WOULD YEILD SPT REFUSAL ES PHYLLITE, SLATE, SANDSTONE, E
SYMBOL					. 4.7.4.					RATELY COMP LY COMPRESS		LL = 31 - 50 LL > 50	COASTAL PL SEDIMENTAR				DIMENTS CEMENTED INTO ROCK, BU K TYPE INCLUDES LIMESTONE, SAN
% PASSING 10	50 MX						GRANULAR SILT-	MUCK,			ENTAGE OF MATER		(CP)			SHELL BEDS, ETC.	
*40	30 MX 50 MX						SOILS SOILS	PEAT		GR	NULAR SILT - CLAY		1				IERING
*200 MATERIAL	15 MX 25 MX	10 MX 35 MX 35	MX 35 MX 35 M	IX J6 MN	J6 MN J6	MN 36 MN			ORGANIC MATERIAL TRACE OF ORGANIC MA		<u>0ILS</u> <u>SOILS</u> - 3% 3 - 5%	OTHER MATERIAL TRACE 1 - 10%	FRESH		RESH, CRYSTALS		IS MAY SHOW SLIGHT STAINING. ROC
PASSING #40							SOILS WITH		LITTLE ORGANIC MATT	TER 3	- 5% 5 - 12%	LITTLE 10 - 20%	VERY SLIGHT				SOME JOINTS MAY SHOW THIN CLAY
LL PI	- 6 MX		. MN 40 MX 41 M MX 11 MN 11 M				LITTLE OR	HIGHLY	MODERATELY ORGANIC HIGHLY ORGANIC		- 10% 12 - 20% 10% > 20%	SOME 20 - 35% HIGHLY 35% AND ABOVE	(V SLI.)	CRYSTAL	LS ON A BROKEN	N SPECIMEN FACE	SHINE BRIGHTLY. ROCK RINGS UNDER
GROUP INDEX	0	0 0	4 MX	-	12 MX 16	_	MODERATE AMOUNTS OF	ORGANIC			GROUND WATER		SLIGHT		RYSTALLINE NAT		AND DISCOLORATION EXTENDS INTO F
USUAL TYPES	STONE FRAGS.					_	ORGANIC	SOILS	$\nabla$	WATER LE	VEL IN BORE HOLE IMMEDIA	TELY AFTER DRILLING	(SLI.)	1 INCH.	OPEN JOINTS M	AY CONTAIN CLAY.	IN GRANITOID ROCKS SOME OCCASION
OF MAJOR	GRAVEL, AND		y or clayey 'El and sand	SIL		SOILS	MATTER		$\overline{\mathbf{v}}$		ATER LEVEL AFTER 24 H						YSTALLINE ROCKS RING UNDER HAMM
MATERIALS	SAND								 ₽₩		WATER, SATURATED ZONE, OR		MODERATE (MOD.)				SCOLORATION AND WEATHERING EFFEC DULL AND DISCOLORED, SOME SHOW CL
GEN. RATING AS SUBGRADE	6	EXCELLENT TO G	000		FAIR TO PO	OR	FAIR TO POOR	UNSUITABLE				WHICH BEHNING STAFTH		DULL S	ound under ha		HOWS SIGNIFICANT LOSS OF STRENG
	P	1 OF A-7-5 SUB	GROUP IS ≤ LL	· 30 ; PI (	F A-7-6 SL	IBGROUP IS	> LL - 30			SPRING OF	R SEEP		MODERATELY		RESH ROCK.		STAINED. IN GRANITOID ROCKS, ALL
		CON	SISTENC	Y OR	DENSE	ENESS				MISC	CELLANEOUS SYMBO	LS	SEVERE	AND DIS	SCOLORED AND A	MAJORITY SHOW	AOLINIZATION. ROCK SHOWS SEVERE
		COMPACT	NESS OR		GE OF STA		RANGE OF UN				, 25/025 DIR & DIR DIR		(MOD. SEV.)		N BE EXCAVATED TED, WOULD YIEL		T'S PICK. ROCK GIVES CLUNK SOUND
PRIMARY	SOIL TYPE	CONSIS		PENETI	RATION RE (N-VALUE		COMPRESSIVE (TONS/		L ROADWAY EMBA		) 25/025 DIP & DIP DIRE OF ROCK STRUC		SEVERE				R STAINED. ROCK FABRIC CLEAR AND
GENERA		VERY			< 4				SOIL SYMBOL		SPT DPT DMT TEST BOR	ING SLOPE INDICATOR	(SEV.)	REDUCE	D IN STRENGTH	TO STRONG SOIL.	IN GRANITOID ROCKS ALL FELDSPARS
GRANUL	AR	LOC MEDIUM			4 TO 10 10 TO 3		N/A		A A A A A A A A A A A A A A A A A A A		-					D SPT N VALUES 2	TRONG ROCK USUALLY REMAIN. 100 BPF
MATERI (NON-CI	AL DHESIVE)	DEI	ISE		30 TO 5				ARTIFICIAL FI			CONE PENETROMETER	VERY				R STAINED. ROCK FABRIC ELEMENTS
		VERY			> 50								SEVERE (V SEV.)				OIL STATUS, WITH ONLY FRAGMENTS ROCK WEATHERED TO A DEGREE TH
GENERA	ALLY	VERY S0	FT		< 2 2 TO 4		< 0.2 0.25 TC		- INFERRED SOIL	L BUUNDART	$\mathbf{\dot{\mathbf{Y}}}$		i sens				AIN. IF TESTED, WOULD YIELD SPT N
SILT-C		MEDIUM			4 TO 8		Ø.5 TO		INFERRED ROC	K LINE	MWO MONITORING WE	LL - TEST BORING WITH CORE	COMPLETE				T DISCERNIBLE, OR DISCERNIBLE ONLY
MATERI (COHES		ST.			8 TO 19 15 TO 3		1 TO 2 TO		ALLUVIAL SOIL	L BOUNDARY		SPT N-VALUE			RED CONCENTRA N EXAMPLE.	TIONS. QUARIZ MAY	BE PRESENT AS DIKES OR STRINGE
			RD		> 30		> 4									ROCK H	ARDNESS
			EXTURE	UR GI	AIN S	IZE			+		MMENDATION SYMB		VERY HARD	CANNOT	BE SCRATCHED	BY KNIFE OR SHA	RP PICK. BREAKING OF HAND SPECIME
U.S. STD. SI OPENING (M			4 10 4.76 2.00	40 0.42	60 2 0.25	200 5 0.075	270 0.053				SIFIED EXCAVATION - 👎 BLE WASTE	ACCEPTABLE, BUT NOT TO BE				DF THE GEOLOGIST	
				COAR		FINE			SHALLOW		SIFIED EXCAVATION -	USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	HARD		SCRATCHED BY ACH HAND SPECI		LY WITH DIFFICULTY. HARD HAMMER
BOULDE (BLDR.			(GR.)	SAN	D	SAND		CLAY (CL.)			BLE DEGRADABLE ROCK		MODERATELY				DUGES OR GROOVES TO 0.25 INCHES
				(CSE. S		(F SD.	)				ABBREVIATIONS		HARD		TED BY HARD BL ERATE BLOWS.	_OW OF A GEOLOGI	ST'S PICK. HAND SPECIMENS CAN BE
GRAIN MI SIZE IN		75 3	2.0		0.25	)	0.05 0.00	15	AR - AUGER REFUSAL BT - BORING TERMINATED	נ	MED MEDIUM MICA MICACEOUS	VST - VANE SHEAR TEST WEA WEATHERED	MEDIUM			DUGED 0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE
			TURE - (	OBBE			TERMS		CL CLAY CPT - CONE PENETRATION		MOD MODERATELY	2 - UNIT WEIGHT	HARD				EICES 1 INCH MAXIMUM SIZE BY HAR
SOIL	MOISTURE S		FIELD MC						CPT - CONE PENETRATION CSE COARSE	I IESI	NP - NON PLASTIC ORG ORGANIC	$\dot{\gamma}_{ m d}$ - DRY UNIT WEIGHT	SOFT		OF A GEOLOGIST		NIFE OR PICK. CAN BE EXCAVATED I
	TERBERG LIM		DESCRI		601	DEFURF	TELD MOISTURE D	SURIPTION	DMT - DILATOMETER TES		PMT - PRESSUREMETER TE		3011	FROM C	HIPS TO SEVERA	AL INCHES IN SIZE	BY MODERATE BLOWS OF A PICK PO
			- SATURA	TED -	USL	JALLY LIC	UID: VERY WET, US	UALLY	DPT - DYNAMIC PENETRAT e - VOID RATIO	IIUN IESI	SAP SAPROLITIC SD SAND, SANDY	S - BULK SS - SPLIT SPOON				BY FINGER PRESS	
			(SAT.)		FRO	M BELOW	THE GROUND WAT	ER TABLE	F - FINE		SL SILT, SILTY	ST - SHELBY TUBE	VERY SOFT				AVATED READILY WITH POINT OF PIC
PLASTIC		LIMIT			CEN		EQUIRES DRYING		<ul> <li>FOSS FOSSILIFEROUS</li> <li>FRAC FRACTURED, FRACT</li> </ul>	TURES	SLI SLIGHTLY TCR - TRICONE REFUSAL	RS – ROCK RT – RECOMPACTED TRIAXIAL		FINGERN			
RANGE <			- WET -	(W)			MUM MOISTURE	0	FRAGS FRAGMENTS		w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING		FRACT	URE SPAC	ING	BEDDING
(PI) PL	. + PLASTIC	C LIMIT							HI HIGHLY		V - VERY	RATIO	VERY WID	)E		PACING HAN 10 FEET	TERM VERY THICKLY BEDDED
0		MOISTURE	- MOIST	- (M)	SOL	ID; AT OF	R NEAR OPTIMUM N	IOISTURE		1	USED ON SUBJECT		WIDE		3 TO	10 FEET	THICKLY BEDDED
									DRILL UNITS:		BITS	HAMMER TYPE:	MODERAT CLOSE	ELY CLOS		3 FEET TO 1 FOOT	THINLY BEDDED 0 VERY THINLY BEDDED 0
			- DRY -	(D)			DITIONAL WATER	то					VERY CLI	JSE		AN Ø.16 FEET	THICKLY LAMINATED 0.
			_	-		AIN OPTI	MUM MOISTURE		CME-55		NTINUOUS FLIGHT AUGER	CORE SIZE:				THOUS	THINLY LAMINATED
			PLA	STIC	ITY							□ □-в □-н					ATION
	DI 46710		PLASTI		DEX (PI)		DRY STREM		CME-550		FACED FINGER BITS	×-N 02			JUKS, INDURATIO		ING OF MATERIAL BY CEMENTING, F FINGER FREES NUMEROUS GRAINS;
	N PLASTIC IGHTLY PLAS	TIC		0-5 6-15			VERY LO SLIGHT		VANE SHEAR TEST		-CARBIDE INSERTS	HAND TOOLS:	FRIAE	ιLE			BY HAMMER DISINTEGRATES SAMPLI
мо	DERATELY PL	ASTIC	-	16-25			MEDIUN			X CASI		POST HOLE DIGGER	MODE	RATELY T	NDURATED		SEPARATED FROM SAMPLE WITH S
	HLY PLASTI	-		S OR MO			HIGH		PORTABLE HOIST			HAND AUGER	MODE	HILLI I	HOUNHI CD		WHEN HIT WITH HAMMER.
				OLOF					× Diedrich D-50			SOUNDING ROD	INDUF	RATED			FFICULT TO SEPARATE WITH STEEL BREAK WITH HAMMER.
							YELLOW-BROWN, BL				BIT	VANE SHEAR TEST					BLOWS REQUIRED TO BREAK SAMP
м	UDIFIERS SU	CH AS LIGHT	, UARK, STREA	KED, ETO	ARE US	ED TO DE	SCRIBE APPEARAN	UE.		$ \Box -$		[]	EXTR	EMELY IN	DURATED		S ACROSS GRAINS.

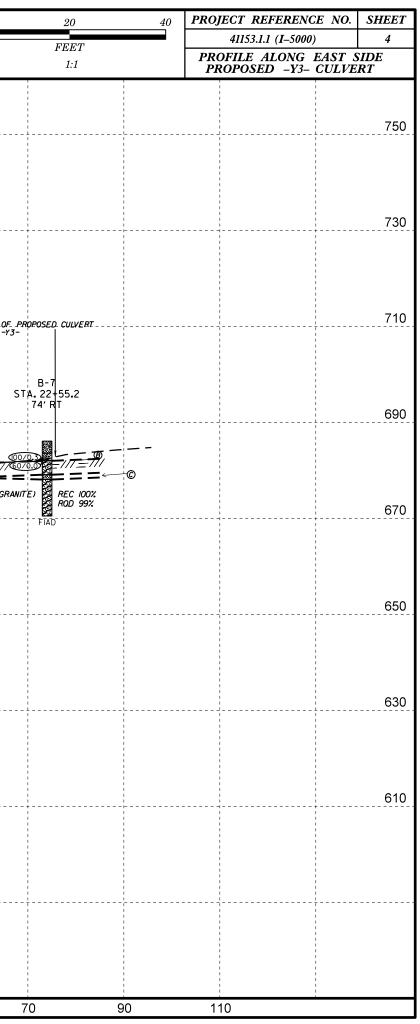
#### PROJECT REFERENCE NO.

41153.1.1

150 AN INCODED	TERMS AND DEFINITIONS
TED. AN INFERRED .D SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
0.1 FOOT PER 60 < IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.
	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 A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
PT N VALUES >	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE LEVEL AT
INCLUDES GRANITE,	SURFACE.
TAL 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
TC. T MAY NOT YIELD	OF SLOPE.
DSTONE, 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.
K RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
COATINGS IF OPEN.	HORIZONTAL.
HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
ROCK UP TO NAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
ER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
TS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
LAY. ROCK HAS TH AS COMPARED	PARENT MATERIAL.
IN HS COMPHRED	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
LOSS OF STRENGTH	
) WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT 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
ARE DISCERNIBLE	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
AT ONLY MINOR VALUES < 100 BPF	OF AN INTERVENING IMPERVIOUS STRATUM.
Y IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
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
INS REQUIRES	ROCK.
	<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
BLOWS REQUIRED	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
DETACHED	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
OR PICK POINT. D 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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
INT. SMALL, THIN	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
K. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
CHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: See Notes
THICKNESS 4 FEET	
1.5 - 4 FEET	ELEVATION: FEET
0.16 - 1.5 FEET .03 - 0.16 FEET	NOTES:
008 - 0.03 FEET	Boring collar elevations derived using Geopak and
< 0.008 FEET	Boring collar elevations derived using Geopak and the TIN file (15000_ls_tin (2).tin)
	Borinas Y3-2200L and Y3-2255L were drilled by NCDOT
HEAT, PRESSURE, ETC.	HRO in 2006. The rock core could not be located
Ε.	Borings Y3-2200L and Y3-2255L were drilled by NCDOT HRO in 2006. The rock core could not be located by NCDOT HRO staff. Therefore, there are no core photographs or REC/ROD information for those borings.
STEEL PROBE;	
PROBE:	
LE;	
	DATE: 8-15-14



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		+								UTHEAST_CORNER_OF_ A.22+47,75.72' RT -Y3
							STA.21+47.00.CL -Y3	- -		
			NORTI STA.2	HEAST CORNER OF PROF 2+47,78.96'LT -Y3-	POSED CULVERT					
690										
		STA. 2	255L 22+55,		- <u>1</u>	     		1     	- L	J
		90'				   				
				Ground Line		CRYSTALLINE RC			<u>+</u> 777 <u>-</u> 7777 <u>-</u> 771-	
670		_ ///	CRYSTALLINE ROCK:	(GRANITE)					CRY	<b>STALLINE ROCK</b> ® (GRAI
		Fh	AD			 		       		 
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		<b>A</b>	LUVIAL GRAY.V.SOFT	TO SOFT.MOIST TO WE	T.SANDY SILT (A-4)					
		®w	EATHERED ROCK: (GRA	WITE						
610		© R	ESIDUAL: BROWN.SILTY	\$AND (A-2-4)		   				     
010	· -	· +	 			 	 	 +		 
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NOTE T		d llas				1 1 1				1 1 1
•NUIE: The the prop	e profile ground osed -Y3- culve ophy was drawn profile.	a line was cut Int, using the Ti Ithrough the Ti	along the east IN file (15000_ls	tern edge of tin (2).tin).		     				     
onto the	profile.	THE C	יוויע <i>s</i> witti D( י			     			     	1 1 1
	<u>:</u> _1	110 -	90	-70	-50 -	<u>.</u> 30 -	: 10 ·	: 10 :	<u>;</u> 30 5	50
		🕶							\	



#### GEOTECHNICAL BORING REPORT CORE LOG

											JREL	00												-				
WBS	41153	.1.1			т	<b>IP</b> I-50	000		COU	NTY	GASTO	1			G	GEOLOGIST Worley, B.				<b>3</b> 41153				_	I-5000			OUN
SITE	DESCR	IPTION	<b>I</b> 1-85	5/US	321 In	nterchar	nge G	eometr	ic Safety	/ Imp	provement	s (Culve	rt @	-Y3-)	)			R (ft)	SITE	DESCR	IPTION	<b>I</b> 1-85	5 / US 32	1 Inter	change	Geomet	ric Sa	afety
BOR	NG NO.	B-7			S	TATIO	N 22	+55		0	OFFSET	74 ft RT			Α	ALIGNMENT -Y3-	0 HR.	N/A	BOF	ring no.	B-7			STA	TION	22+55		
COLI	AR ELE	<b>V.</b> 68	86.1 ft		Т	OTAL [	DEPTH	H 15.6	6 ft	1	NORTHING	<b>5</b> 67,3	355		E	EASTING 1,348,353	<b>24 HR.</b> Ca	aved	COL	LAR ELE	<b>V.</b> 68	86.1 ft		тот	AL DEF	<b>PTH</b> 15.	6 ft	
ORILL	RIG/HAN	MMER E	FF./DA	TE S	UM009	3 DIEDRI	ICH D-5	50 88% 1	1/05/2015			DRILL I	METH	OD	NW Ca	Casing W/SPT & Core HAMM	ER TYPE Automa	atic	DRIL	L RIG/HAN	MMER E	EFF./DA	TE SUM	10093 DII	EDRICH	D-50 88%	11/05/2	2015
DRIL	LER Ba	are, J.			S		DATE	06/01	/16	0	COMP. DA	TE 06/	01/16	3	S	SURFACE WATER DEPTH N/	/A		DRI	LER B	are, J.			STA	RT DA	<b>FE</b> 06/0	1/16	
LEV	DRIVE ELEV	DEPTH	BLO	ow co	UNT			BLOW	S PER FC	от		SAMP.	$\mathbf{V}$	L	T	SOIL AND ROCK DESC			COF	RE SIZE	N/A			тот	AL RUN	<b>N</b> 11.5 f	t	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	5	50	7	5 100	NO.	Имс	DI G	ELE	_EV. (ft)		PTH (ft)	ELEV	, RUN ELEV	DEPTH	RUN	DRILL	REC.	JN RQD	SAMP.	STF REC.	RATA I RO
																			(ft)	(ft)	(ft)	RUN (ft)	RATE (Min/ft)		(ft) %	NO.	(ft) %	(ft %
90																			682									
	-	-													F				680	682.0 680.5 -	- <u>4.1</u> - <u>5.6</u>	1.5	N=60/0.0 3:40/1.0 0:45/0.5	0 (1.4) \ 93%			(2.8) 97%	(2.4
	-	-													F 686	GROUND SURFA	ACE	0.0		-	-	5.0	1:28/1.0	(4.0) 80%	(3.6)		(2.8) 97% (0.0) 0% (7.6) 100%	(0.0
5	-	-													÷–	RESIDUAL Tan, Silty SAND (A	-2-4)				-		1:28/1.0 2:20/1.0 3:41/1.0 4:08/1.0		12%		(0%)	$\frac{0\%}{7}$
	- 682.6 - 682.0 -	- 3.5						· · · ·					D	1	683	WEATHERED RC		2.5 4.1	675	675.5 -	- 10.6 -	5.0	4:08/1.0 5:30/1.0 5:32/1.0	(5.0)	(4.9)		100%	999
0		- 4.1 -	100/0. 60/0.0	3			· · ·	· · · · · ·	·   · · ·   · ·	I	· 100/0.3	<b>'</b>			1-002	(granite)	Г				-		5:32/1.0 3:35/1.0 4:25/1.0	100%	98%			
<u></u>	_	-													679			7.0 8.0		670.5 -	- - 15.6		5:25/1.0 5:44/1.0					
	-	-						· · · · · ·	·   · · ·   · ·		· · · ·					(granite)		0.0		-	-							
5	-	_					•••		· · ·							RESIDUAL Brown, Silty SAND (A	(A-2-4)				-							
	-	_					::	· · ·			· · · ·					CRYSTALLINE RO (granite)	OCK			-	-							
	-	-					•••	· · ·			· · · ·				- 670			15.6			-							
	_	_													E	Boring Terminated at Elevat Crystalline Rock (Gr		10.0		-	-							
	-	_													F	Ciystaiine Rock (Gi	anite)			-	-							
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Ľ	Y	GASTON	I		GEOLOGIS	ST	Wo	rley, E	3.		
n	npro	vements	s (C	Culvert @ -Y3-)						GROUN	ID WTR (ft)
_	OF	FSET	74	ft RT	ALIGNMEN	IT	-Y3	-		0 HR.	N/A
	NO	RTHING		567,355	EASTING	1	,348,	353		24 HR.	Caved
			D	RILL METHOD NW	Casing W/SP1	۶ ٦	Core		HAMM	ER TYPE	Automatic
	СО	MP. DA	ΤE	06/01/16	SURFACE	w	ATEF	R DEP	TH N/	A	
_											
_	L O				ESCRIPTION		JD RF	MARKS			
	Ğ	ELEV. (1	it)		2001	<i>,</i>					DEPTH (ft)
	and the second se				Begin Cori CRYSTAL	nc	<u>@</u> 4	.1 ft			
		682.0		Gray, v. slightly wea					ose-fracti	ured, grani	4.1 ite 7.0
		679.1 678.1	٦		RES Brown, Silty			A 2 1)			7.0
1		-			CRYSTAL	L	NE RO	DCK			
		-		Gray, v. slightly wea	athered to fres	h, I	hard, r	nod. clo	ose-fracti	ured, grani	ite
		-									
_	Ľ	- 670.5		Boring Terminated	at Elevation 6	670	).5 ft Ir	n Crysta	alline Roo	k (Granite	15.6
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WBS 4	41153.	1.1		TIF	<b>I</b> -5000		COL	UNTY	GASTO	N			GEOLOG	GIST Wo	orley, B.			WB	<b>3S</b> 41153.1	.1		TIP	I-500	0	C	OUNT	<b>/</b> GA	STON		GEOI	OGIST W	orley, B.		
SITE DF	ESCRI	PTION	I-85 / US	321 Int	erchange	Geomet	ric Safe				-	-Y3-)	-			GROU	JND WTR (ft)	SIT	E DESCRIP	TION I-8	5 / US 32	21 Inter	change	e Geom	etric Sa	afety Im	prove	ements (Cu	lvert @ -Y3	5-)			GROU	ND WTR (f
BORING	g no.	B-8		ST	ATION 2	22+12		C	OFFSET	75 ft R	Т		ALIGNM	IENT -Y3	3-	0 HR	. N/A	BO	RING NO.	B-8		STA	TION	22+12			OFFS	<b>SET</b> 75 ft	RT	ALIG	NMENT -Y	′3-	0 HR.	N//
COLLA	R ELE	<b>V.</b> 687	.8 ft	тс	TAL DEP	<b>TH</b> 17.	0 ft	N	IORTHIN	<b>IG</b> 567	,370		EASTING	<b>G</b> 1,348,3	,312	24 HR	. Caved	со	LLAR ELEV	. 687.8 f	t	тот	AL DE	<b>PTH</b> 17	7.0 ft		NOR	THING 56	67,370	EAST	<b>ING</b> 1,348	3,312	24 HR.	Cave
RILL RI	IG/HAM	MER EFI	./DATE SU	JM0093	DIEDRICH	D-50 88%	11/05/201	15		DRILL	METH	IOD N	W Casing W/S	SPT & Core	HAI	MMER TYP	E Automatic	DRI	LL RIG/HAMM	IER EFF./D/	ATE SUN	10093 DI	IEDRICH	HD-50 889	% 11/05/	/2015		DRI	LL METHOD	NW Casing	W/SPT & Cor	e HAM	IMER TYPE	Automatic
DRILLE		re, J.		ST	ART DAT	<b>E</b> 05/3 <sup>-</sup>	1/16	C	OMP. D				SURFAC	E WATE	R DEPTH	N/A		DR	ILLER Bar	e, J.		STA	RT DA	<b>TE</b> 05/	/31/16		COM	P. DATE	06/01/16	SURF	ACE WATE	R DEPTH	N/A	
	RIVE ELEV	DEPTH	BLOW CO				/S PER F			SAMF	P.  ▼			SOIL At	ND ROCK DE	ESCRIPTIO	N	со		/A				<b>N</b> 8.5 f										
(ft)	(ft)	(ft)	0.5ft 0.5ft	0.5ft	0	25	50	75	5 100	NO.	<u>/</u> M	OI G	ELEV. (ft)				DEPTH (f	ELE (ft)	V RUN ELEV (ft) D	EPTH RUN (ft) (ft)	DRILL RATE (Min/ft)	REC.	UN RQD (ft) %	SAMP. NO.	REC.	RATA RQD (ft) %	L O G			DESCRIF	TION AND R	EMARKS		
690																		679.	2						- 70	70	<u> </u>			Begir	n Coring @	8 5 ft		
,50													687.8	G	ROUND SUF	DEACE	0.		679.3 +	8.5 2.0	N=60/0.	0 (2.0)	(2.0)		(8.2)	(7.5) 88%	F.	679.3	0	CR	YSTALLINE F	ROCK	nito	8
	1														RESIDUA	AL		11	679.3 677.3 677.3	5.0	2:23/1.0	$\frac{100\%}{(4.7)}$	(4.0)	1	90%				G	ay, iresn, nai	a, moa. ciose	-fractured, grai	nite	
685 6	84.7 +	3.1	4 6	10									- 1	an-brown, s	Silty SAND ( obbles and be	(A-2-4) W/ re oulders	sidual	675	° +		2:47/1.0	) 94%	80%											
	ŧ		4 6		↓ · · • • 16	3			· · · · ·		D		-	(slow	drilling/grind	ling @ 6.5')																		
680 6	‡					$+$ $\div$ $\div$ $\div$			<del></del>	-		977	- 681.3 -	w	VEATHERED	ROCK	6.5		670.8	17.0 1.5	16:10/0.	<u>5</u> 100%	100%		-		-	670.8	Boring Termi	nated at Elev	ation 670.8 ft	In Crystalline F	Rock (Granite	1: e)
6	79.7	8.1	0/0.3						- 100/0.3 60/0.0				681.3 681.3 679.3 670.8		(granite		8.5		1 1								F							
	‡	6	0/0.0		· · · · ·					Ϋ́ΙΙ				(a)	auger refusal RYSTALLINE	@ 8.5')			1 1								Ę							
675	-						·   · ·						-	UN UN	(granite				+								-							
	Ŧ								· · · · ·				-						1								-							
							· · ·		· · · · ·	Ц			670.8	Poring Torn	ninated at Ele	overtion 670	17.0	4	1 ‡								Ē							
	+												- 5	Crys	stalline Rock	(Granite)	0 11 11		1 1								F							
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	+																	NCI																

#### GEOTECHNICAL BORING REPORT CORE LOG

l I		<u>E LUG</u>										RELUG			
WBS 41153.1.1 TIP I-5		STON	GEOLOGIST Stickney, J. K.		WBS 4	41153.1.1			<b>TIP</b> I-500	0 0	COUNTY	GASTON	GEOLOGIST Stickney, J	. K.	
SITE DESCRIPTION I-85 AND US 321 INT				GROUND WTR (ft)	SITE D	ESCRIPTIC	<b>N</b> 1-85 A	AND US	321 INTER	CHANGE				GROUN	D WTR (ft)
BORING NO. Y3-2200L STATIC			ALIGNMENT -Y3-	0 HR. N/A	BORING	<b>g no.</b> Y3	-2200L		STATION	22+00	0	FFSET 80 ft LT	ALIGNMENT -Y3-	0 HR.	N/A
	DEPTH 19.0 ft NORT		·	24 HR. N/A	COLLA	R ELEV.	688.8 ft		TOTAL DE	<b>PTH</b> 19.0 ft	N	ORTHING 567,519	EASTING 1,348,356	24 HR.	N/A
DRILL RIG/HAMMER EFF./DATE CME-550X		I	Casing W/SPT & Core HAMM	ER TYPE Automatic	DRILL R	IG/HAMMER	EFF./DATI	E CME-	550X			DRILL METHOD	NW Casing W/SPT & Core	IAMMER TYPE	Automatic
	DATE 01/12/06 COMP		SURFACE WATER DEPTH N/	Ά	DRILLE	R Smith,	C. L.		START DA	<b>TE</b> 01/12/06	С	<b>OMP. DATE</b> 01/12/06	SURFACE WATER DEPTI	I N/A	
DRILLER         Smith, C. L.         START           ELEV (ft)         DRIVE ELEV (ft)         DEPTH (ft)         BLOW COUNT 0.5ft         0           690         -         -         -         -           685         -         -         -         -           685         -         0         1         0           680         -         -         -         -           680         -         3         4         2           675         -         -         -         -	BLOWS PER FOOT	100     SAMP.     L     O       100     NO.     MOI     G	-	A CRIPTION DEPTH (ft) ACE 0.0 L OIST CLAYEY BOULDERS 7.7 L FMED. (PI=20) ANDY CLAY DERS 12.2 OCK Y SLIGHTLY 14.0 REC=100% OCK THERED TO 19.0 % RQD=45% 500 GRANITE) EB1-B FROM 3 AVENUE IG CREEK,	DRILLE           CORE \$           ELEV (ft)           676.6           675	ER Smith, SIZE NXV	C. L. /L TH RUN (ft) 1.8 5.0			N 6.8 ft		OMP. DATE 01/12/06 ELEV. (ft) 676.6 674.8 SLI. TO V. SLI 669.8 669.8 Boring Ter NOTE: THIS		I N/A CLOSE FRACTUI CLOSE FRACTU CLOSE FRACTU TALLINE ROCK CT 37870, BULB	DEPTH (f 12.: RE 14.1 RE 19.0

# GEOTECHNICAL BORING REPORT

### CORE LOG

#### GEOTECHNICAL BORING REPORT CORE LOG

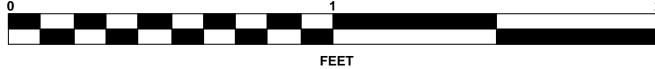
WBS	41153.1.	1		TI	<b>P</b> I-5000	COUNT	Y GASTON			GE	OLOGIST Stickne	ey, J. K.			WBS	41153.1.1			TIP	I-5000		cc
SITE	DESCRIPT	<b>ION</b> I-8	35 AND	US 32	1 INTERCHANGE					,			GROUND WTR (ft	) [	SITE	DESCRIPTIO	<b>N</b> I-85	AND US	321 IN	NTER	HANGE	
BORI	<b>NG NO</b> . Y	/3-2255L		S	<b>FATION</b> 22+55		OFFSET 9	91 ft LT		AL	IGNMENT -Y3-		0 HR. N/A	·  [	BORI	I <b>NG NO</b> . Y3-2	2255L		STAT		22+55	
COLL	AR ELEV.	681.71	ft	т	DTAL DEPTH 10.0 ft		NORTHING	567,5 <sup>-</sup>	10	EA	<b>STING</b> 1,348,411		24 HR. N/A		COLL	AR ELEV. 6	81.7 ft		TOTA		<b>TH</b> 10.	.0 ft
DRILL	RIG/HAMM	ER EFF./D	ATE C	/E-550)	X			DRILL M	ETHOD	NW Casi	ng W/SPT & Core	НАММЕ	<b>R TYPE</b> Automatic	」┞	DRILL	. RIG/HAMMER I	EFF./DA	TE CME-	550X			
DRILL	LER Smit	h, C. L.		S	TART DATE 01/13/00	6	COMP. DAT	<b>E</b> 01/1	3/06	SU	RFACE WATER DE	EPTH N/A	A		DRIL	LER Smith, (	C. L.		STAF		<b>E</b> 01/1	3/06
			LOW COL	JNT	BLOWS F			SAMP.		-	SOIL AND R		RIPTION	7	CORI	E SIZE NXW	L		TOTA		<b>5</b> .6 ft	
(ft)	(ft) (	(ft) 0.5f	ft 0.5ft	0.5ft	0 25 5	0	75 100	NO.	MOI G				DEPTH (1	t)	ELEV	RUN ELEV DEPTH	H RUN	DRILL RATE	RL REC.	JN RQD	SAMP.	STRA REC.
															(ft)	(ft) (ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %
685										L					677.3							
	ŧ									Ł					675	676.7 4 5.0	0.6					
	<u>+</u>				<b>I</b>					_ 681.7		IND SURFA	CE 0		0.0	+	0.0					
680	$\pm$						· · · · · ·				GRAY V. SOFT T	O SOFT MO				671.7 10.0						
	Ŧ									678.0	WEAT	DY SILT (A-4 HERED RO	CK	4		+						
675	Ŧ									676.7	SEV. WEATH.			<sup>2</sup>								
	Ŧ								S	Ŧ	CRYST	ALLINE RO				+						
	‡									671.7		RQD=0%	10.			+						
	+									F	(RUN #2) FRES	ALLINE RO				+						
	‡									F	Boring Terminate	RQD=98%				<u>+</u>						
	‡									F	CRYSTALLIN	NE ROCK (G	BRANITE)			ŧ						
	‡									F	NOTE: THIS BO					±						
	‡									Ę	PROJECT 37 EXTENSION	OVER LONG	G CREEK,			+						
	+									F	GAST	ON COUNT	ΓY			t						
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1	Ŧ									F				NCDOT CORE DOUBLE 15000_GEO_CULV_CULVERTBORINGS.GPJ NC_DOT.GDT 6/22/16		+						
	Ŧ									E				DOT		+						
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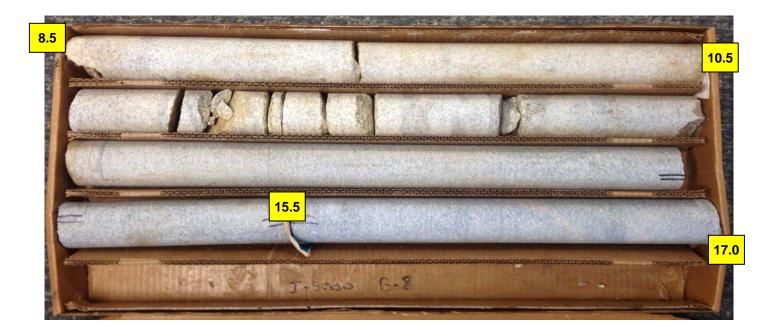
	c			GASTON			GEOLOGIST	Sticknev	J. K.		
ΞE										GROUN	D WTR (ft)
			OF	FSET	91 ft LT		ALIGNMENT	-Y3-		0 HR.	N/A
0.0	ft				<b>5</b> 67,510	)	EASTING 1			24 HR.	N/A
			1		DRILL ME	THOD NW	Casing W/SPT &	Core	HAMM	ER TYPE	Automatic
/13/	/06		со	MP. DA	TE 01/13	/06	SURFACE W	ATER DEP	TH N/	A	
ft											
'. F	STF REC. (ft) %	RATA RQD (ft) %	L O G			D	ESCRIPTION AN	ID REMARKS	3		
	,,,					Co	ntinued from p	revious pa	ge		
T				677.3 676.7	FRESH	i V. Hard C	CRYSTALLI GRANITE WITH V REC=66% I	/. CLOSE FR	ACTURE	E SPACINO	6, <u>4.4</u> 5.0
				- - 671.7	FRESH		CRYSTALLI RANITE WITH MO	NE ROCK DD. CLOSE		E FRACTU	 RE <u>10.0</u>
				-	Borir		PACING, REC=10 ed at Elevation 67 (GRAN	1.7 ft IN CR		NE ROCK	/
				- - -	NOTE AVEN	: THIS BOR	NG WAS EB2-B	FROM PRO	JECT 37 GASTON	870, BULE COUNTY	5
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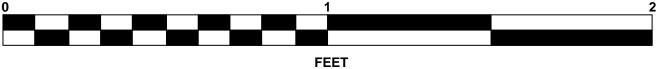
# **CORE PHOTOGRAPHS**

**B-7** BOX 1 and 2: 4.1 - 15.6 FEET **B-8** 









SHEET 9 41153.1.1 (I-5000)/-Y3- Culvert, Gaston County

# BOX 1 of 1: 8.5 - 17.0 FEET

# SITE PHOTOGRAPH

Proposed Culvert At Sta. 22+34 -Y3-



View Facing South (Upstream) Along Tributary L-8 at Proposed –Y3- Culvert Location (*Photo taken from BSR*)

#### **SHEET 10** 41153.1.1 (I-5000) Gaston Co.