**CONTENTS** SHEET NO.

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REFERENCE

**DESCRIPTION** 

TITLE SHEET LEGEND SITE PLAN PROFILE CROSS SECTION

BORE LOGS & CORE REPORT WITH CORE PHOTOGRAPHS LABORATORY SUMMARY SHEET FOR

ROCK CORE SAMPLES

STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

**DAVIDSON** COUNTY \_ PROJECT DESCRIPTION REPLACE BRIDGE NO. 42 OVER MUDDY CREEK ON SR 1485 (HAMPTON ROAD)

STATE PROJECT REFERENCE NO. B-5165

#### **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 1991 707-680. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

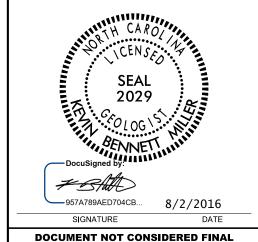
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MEDICATED DESCRIPTIONS AND ASSECTIONS OF THE INVESTIGATION. THE STATEM LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MEDICATED DESCRIPTIONS AND ASSECTIONS AND ASSECTIONS OF THE INVESTIGATION. THE ACCORDING TO CLIMATIC CONDITIONS MEDICATED DESCRIPTIONS AND ASSECTIONS AND ASSECTIONS OF THE ACCORDING TO CLIMATIC CONDITIONS MEDICATED DESCRIPTIONS AND ASSECTIONS AND ASSECTIONS OF THE ACCORDING TO CLIMATIC CONDITIONS MEDICATED DESCRIPTIONS AND ASSECTIONS AND ASSECTIONS OF THE ACCORDING TO CLIMATIC CONDITIONS MEDICATED DESCRIPTIONS AS WELL AS A CALLED NOW CHARTSE CACCORDING 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 OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- 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 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.

	STICKNEY, J. K.
	SMITH, C. L.
	MOORE, M. R.
INVESTIGATED BY	STICKNEY, J. K.
	LEXANDER, M. J.
CHECKED BY	
SUBMITTED BY	
DATE	AUGUST 2016

PERSONNEL



**UNLESS ALL SIGNATURES COMPLETED** 

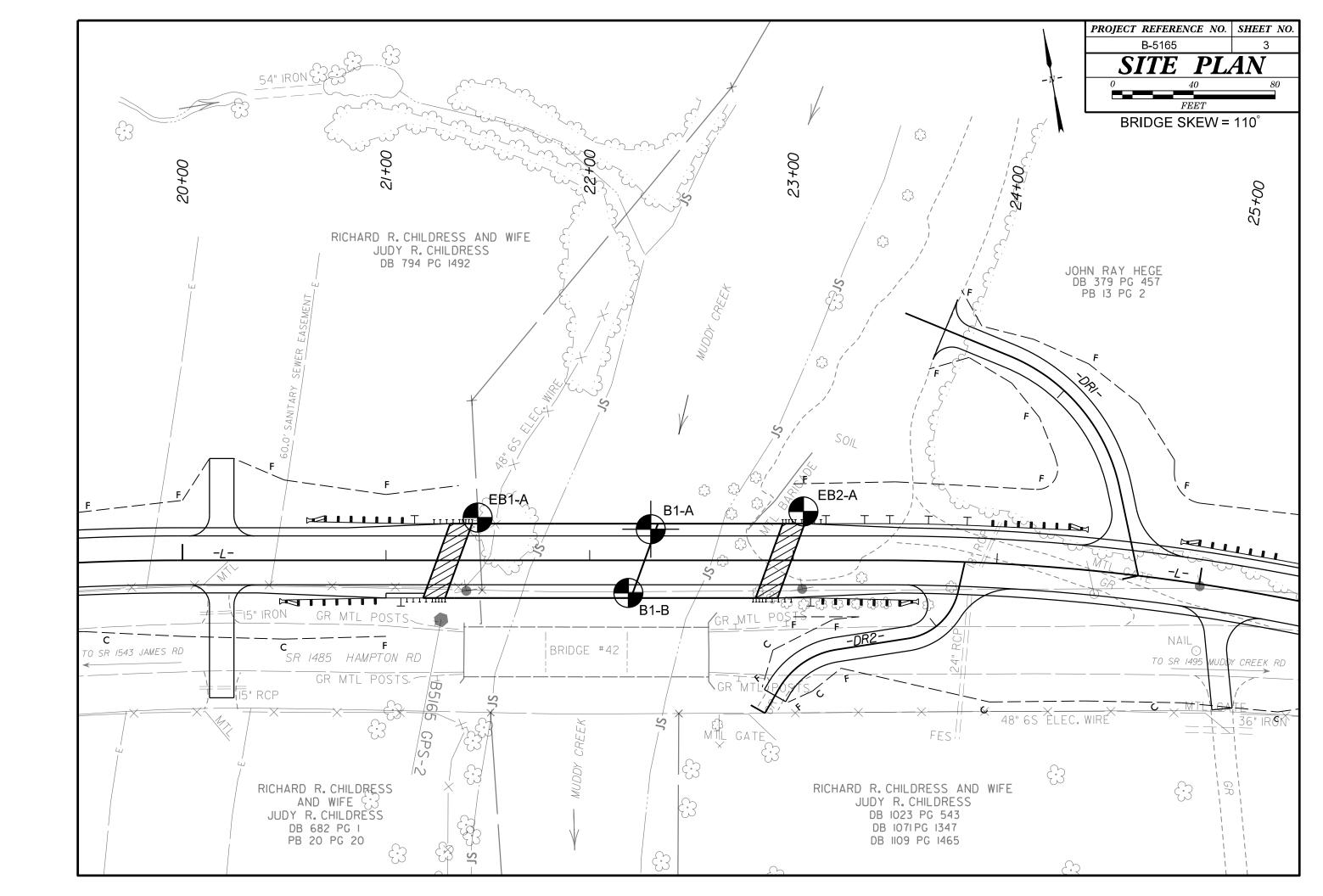
PROJECT REFERENCE NO. SHEET NO. 2

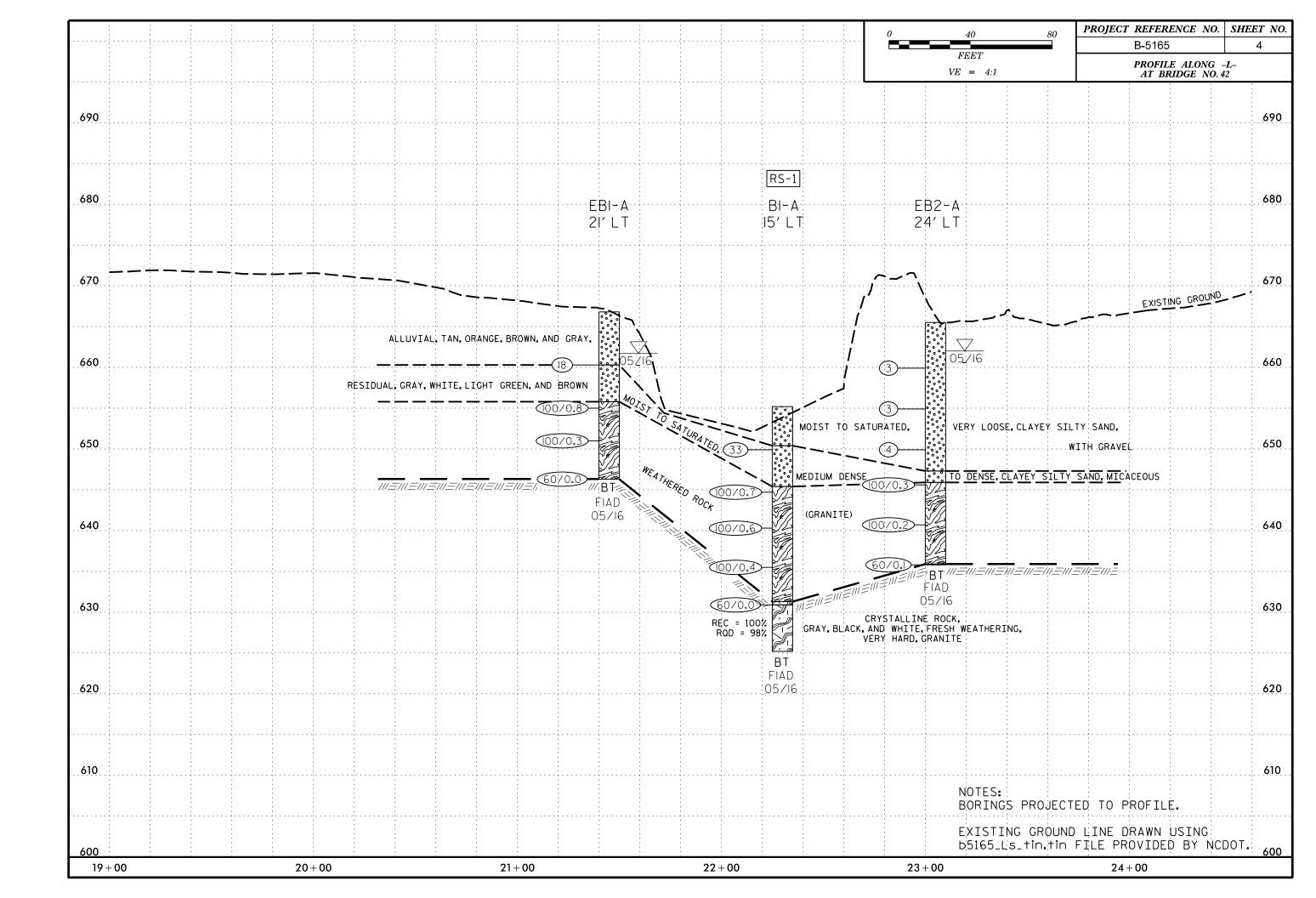
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

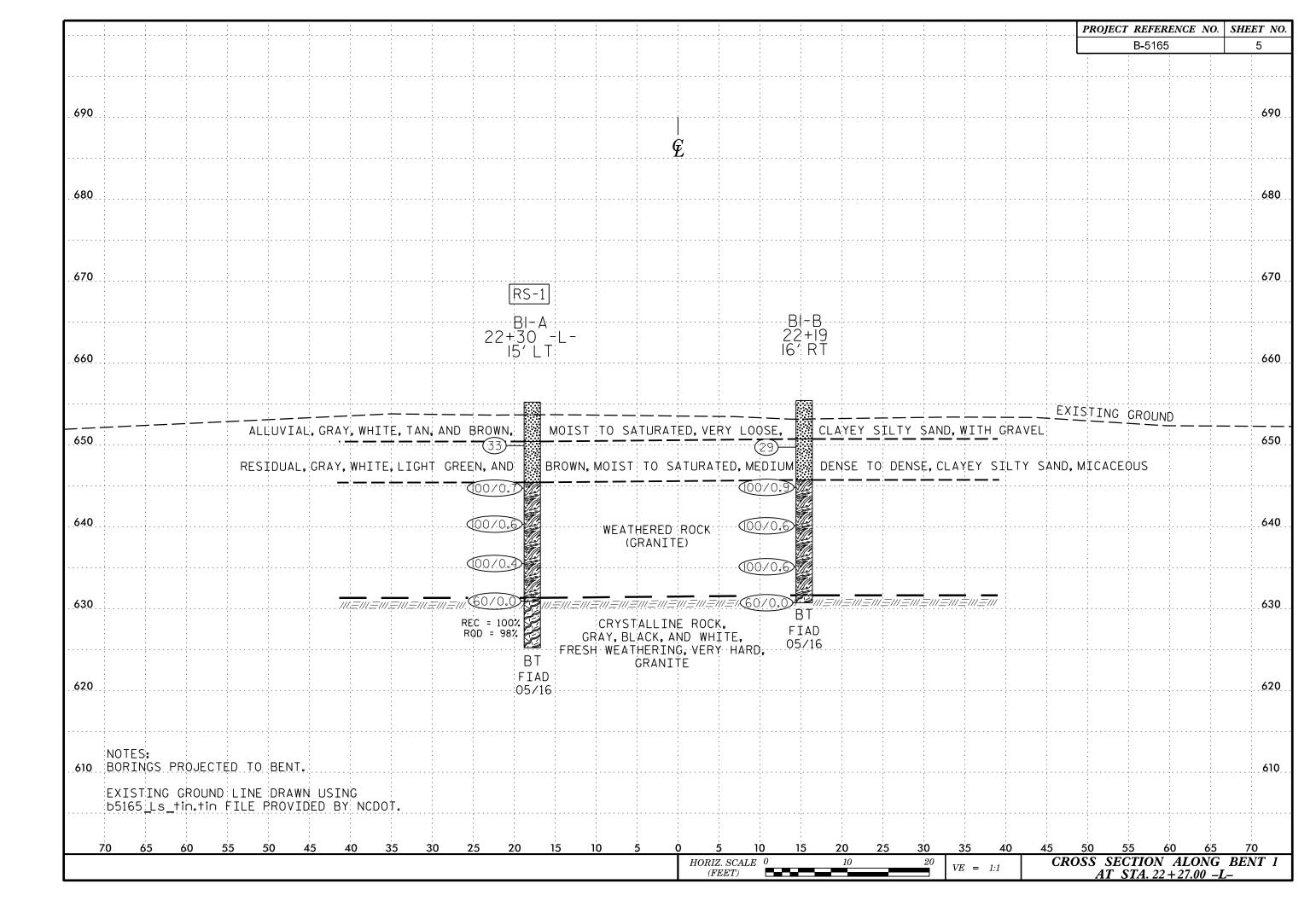
## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  ADUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  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:	WEATHERED WISON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS  CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, CABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY	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 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.  CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
110 50 MX HANULAR CLAY MULK, SOILS CLAY DEAT	PERCENTAGE OF MATERIAL	WEATHERING	<u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
#200   15 MX   25 MX   10 MX   35 MX   35 MX   35 MX   35 MX   36 MN   36 MN   36 MN   36 MN	ORGANIC MATERIAL SOILS 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 PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR HIGHLY PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE ORGANIC	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	OIP 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
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS  USUAL TYPES STONE FRAGS. FINE SHIPTURE	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GRAYEL, AND FINE SILTY OF CLAYEY SILTY CLAYEY MATTER	STATIC WATER LEVEL AFTER _24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	✓ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	-	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 FIELD.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (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 COMPACTNESS OR CONSISTENCY RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
IN-VALUE) (TONS/FT-)	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES  SPT	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT  (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE	SOIL SYMBOL  SOIL SYMBOL  SUPPLIMIT TEST BORING  SLOPE INDICATOR INSTALLATION	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.  MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) 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 OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0           MATERIAL         STIFF         8 TO 15         1 TO 2	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND 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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	TTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
HARD > 30 > 4  TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK.  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 STEEL OF 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 (CLOP) (CD) (CD) (CD) (CD) (CD)	UNDERCUT ACCEPTABLE DEGRADABLE ROCK	TO DETACH HAND SPECIMEN.  MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(CSE. SD.) (F SD.) (SE.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD CAN BE EXCAYATED 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 CHIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION SOIDE FOR TIELE PROPOSALE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
LL _ LIOUID LIMIT	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 / SEMISULID; REQUIRES DRIING TO	FRAC FRACTURED, FRACTURES  TCR - TRICONE REFUSAL  RT - RECOMPACTED TRIAXIAL  # - MOISTURE CONTENT  CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: B5165 GPS-2 (N:799906.8850; E:1597953.9780)
(PI) PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 670.90 FEET
SL SHRINKAGE LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CODE SIZE	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	CME-55   B* HOLLOW AUGERS   CORE SIZE:   -H	INDURATION	NM - NOT MEASURED
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550X HARD FACED FINGER BITS X -N X	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS: FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING W/ ADVANCER HAND TOOLS:  POST HOLE DIGGER	COADIG CAN BE CERADATED FROM CAMPLE WITH CYFEL DROPE	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;  BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE ' TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CORE BIT VANE SHEAR TEST	CHARD HAMMED DI ONE DECITIOED TO DREAK CAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	







## GEOTECHNICAL BORING REPORT

SHEET 6 OF 10

							В	ORE L	OG				
WBS	42341				TII	P B-5165		Y DAVIDSO				GEOLOGIST Stickney, J. K	
SITE	DESCR	IPTION	I BRI	DGE 1	NO. 42	OVER MUDDY C	REEK ON S	SR 1485 (HA	MPTON	I ROA	D)		GROUND WTR (ft)
BOR	ING NO.	EB1-	-A		ST	<b>ATION</b> 21+45		OFFSET 2	21 ft LT			ALIGNMENT -L-	<b>0 HR.</b> 5.1
COLI	LAR ELE	<b>EV.</b> 66	6.8 ft		TC	TAL DEPTH 20.	5 ft	NORTHING	799,9	04		<b>EASTING</b> 1,598,047	24 HR. FIAD
DRILL	RIG/HAI	MMER E	FF./DA	TE H	O0072	CME-550X 85% 05/2	20/2016		DRILL N	<b>ЛЕТНО</b>	D NV	/ Casing w/ SPT HAN	MER TYPE Automatic
DRIL	LER S	mith, C	. L.		ST	ART DATE 05/1	6/16	COMP. DA	<b>TE</b> 05/	16/16		SURFACE WATER DEPTH	N/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	-	0 25	VS PER FOOT 50	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK DE	SCRIPTION DEPTH (fi
670	-	-									-	666.8 GROUND SUR	FACE 0.
665	- - -	-									-	ALLUVIA TAN, BROWN, AND ORAN	
660	661.3	5.5	5	2	16						+	660.3	6.4
000	656.3	10.5		_								RESIDUA BROWN AND WHITE, ( SAND, WITH SO!	L CLAYEY SILTY ME MICA
655	-	-	8	64	36/0.3			100/0.8				. WEATHERED (GRANITE	
650	651.3	15.5	100/0.3					100/0.3					
	646.3	20.5	60/0.0				I					646.3  Boring Terminated WIT PENETRATION TEST	

#### GEOTECHNICAL BORING REPORT BORE LOG

							D	<u>ORE L</u>	UG				
WBS	42341			TI	<b>P</b> B-5165		COUNT	/ DAVIDS	NC			GEOLOGIST Stickney, J. K.	
SITE	DESCRIPTION	BRI	DGE I	NO. 42	OVER MU	DDY CRE	EK ON S	R 1485 (HA	MPTON	ROAD	)		GROUND WTR (ft)
BORI	<b>NG NO</b> . B1-A			ST	ATION 22	2+30		OFFSET	15 ft LT			ALIGNMENT -L-	<b>0 HR</b> . N/A
COLL	AR ELEV. 65	5.2 ft		т	TAL DEPT	<b>H</b> 30.0 ft		NORTHING	799,9	53		<b>EASTING</b> 1,597,980	<b>24 HR</b> . N/A
DRILL	. RIG/HAMMER EI	FF./DA	TE H	FO0072	CME-550X 8	5% 05/20/2	016		DRILL N	IETHOD	NV	V Casing W/SPT & Core HAMM	ER TYPE Automatic
	LER Smith, C.				ART DATE			COMP. DA	<u> </u>			SURFACE WATER DEPTH 5.	3ft
ELEV (ft)	DRIVE DEPTH (ft)		0.5ft	_		BLOWS F	ER FOOT	75 100	SAMP.		L O G	SOIL AND ROCK DESC	
660											-	-	
655	‡										þ	655.2 GROUND SURFA	ACE 0.
000	+											ALLUVIAL	
650	650.9 4.3	5	15	18		.				М		GRAY, CLAYEY SILTY S GRAVEL 650.4 RESIDUAL	4.6
645	645.9 9.3	22	70	30/0.2			· · · · · · · · · · · · · · · · · · ·	40007		000000000000000000000000000000000000000	- - -	GRAY, WHITE, AND LIG CLAYEY SILTY SAND, M 645.4 WEATHERED RO	IICACEOUS 9.8
640	640.9 14.3	71	29/0.1	-				100/0.7		ע כ אמווע כ אמוועי		(GRANITE)	
635	635.9 19.3	100/0.4	Ī					100/0.4		3014 < 83014 < 8301			
630	630.9 24.3	60/0.0						60/0.0		A SAILES SAILES		631.3 630.9 CRYSTALLINE R	23.9 OCK 24.3
	+	00/0.0							RS-1			(GRANITE)	30.0
	+											Boring Terminated at Elevat CRYSTALLINE ROCK (	tion 625.2 ft IN
	+ + + + + + + + + + + + + + + + + + + +										- - - - - - - - - -	-	
	† † † † † †										-	-	
	† † † † † †										-	-	
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### GEOTECHNICAL BORING REPORT CORE LOG

SHEET 7 OF 10

WRS	42341				TID	B-516	5				DAVIDSO			GEOLOGIST Stickney	, I K		
			I BRI	DGE NO								MPTON ROAI	D)	GLOLOGIST Stickney	, J. IX.	GROUN	ID WTR (ft)
	ING NO.			DOL NO			22+30				FSET 1		<i>D</i> )	ALIGNMENT -L-		0 HR.	N/A
	LAR ELE						PTH 30.	Ω ft		<del></del>		799,953		<b>EASTING</b> 1,597,980		24 HR.	N/A
				TE HFO0						110			n NW	Casing W/SPT & Core	Тнамм		Automatic
	LER S			111 00			TE 05/0		,	CC		E 05/10/16	D 1444	SURFACE WATER DEF	-		Automatic
	E SIZE		,. ∟.		-		N 5.7 ft	3/10			WIF. DAI	<b>L</b> 03/10/10		SURFACE WATER DEF	-тп 5.	JIL	
ELEV	RUN	DEPTH	DUN	DRILL	RI	JN			ATA	L							
(ft)	ELEV (ft)	(ft)	(ft)	RATE (Min/ft)	REC. (ft)	RQD (ft)	SAMP. NO.	REC. (ft)	RQD (ft) %	O G	ELEV. (ft	)	D	ESCRIPTION AND REMARK	S		DEPTH (ft)
630.9	( )				70	70		70	70			/		Begin Coring @ 24.3 ft			<i>32.</i> (ii)
630	630.9 630.2 <del>7</del>	24.3 25.0	0.7 5.0	N=60/0.0 NM/0.7	(0.7) 100%/	(0.7) \100%/		(5.7) 100%	(5.6) 98%		630.9	GRAV BLA	JCK AN	CRYSTALLINE ROCK ND WHITE, FRESH WEATHE	RING V	FRY HARI	24.3
	-	-	5.0	1:34/1.0 1:27/1.0 1:32/1.0 1:34/1.0 1:31/1.0	(5.0)	(4.9)	DC 4	10070	3070			GIVII, BE	tort, Ai	GRANITE	i (ii (O, Vi		,
	625.2	30.0		1:32/1.0 1:34/1.0 1:31/1.0	100%	98%	RS-1				625.2						30.0
	-	F		1.0 1/ 1.0							_	Boring Te	erminate	ed at Elevation 625.2 ft IN CR (GRANITE)	YSTALLI	NE ROCK	
	_	ļ									_			(0.0 2)			
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## **CORE PHOTOGRAPHS**

42341 (B-5165) BRIDGE NO. 42 OVER MUDDY CREEK ON SR 1485 (HAMPTON ROAD)

**B1-A** 

**BOX 1: 24.3 - 30.0 FEET** 



#### GEOTECHNICAL BORING REPORT BORE LOG

										<u> </u>		<u> </u>	<u>UG</u>				
WBS	42341				TI	I <b>P</b> B-51	65		COL	UNTY	' DA'	VIDS	N			GEOLOGIST Stickney, J. K.	
SITE	DESCRI	IPTION	BRI	DGE N	NO. 42	2 OVER	MUD	DY CR	EEK (	ON SI	R 148	5 (HA	MPTON	ROA	D)		GROUND WTR (ft
BORIN	NG NO.	В1-В			S	TATION	22+	19			OFFS	ET ′	16 ft RT			ALIGNMENT -L-	0 HR. N/A
COLL	AR ELE	<b>V</b> . 65	5.4 ft		T	OTAL DE	PTH	24.7	ft	$\neg$	NORT	HING	799,9	33		<b>EASTING</b> 1,598,063	<b>24 HR</b> . N/A
DRILL	RIG/HAN	MER E	FF./DA	TE HE	00072	CME-550	X 85%	6 05/20/	/2016				DRILL I	ЛЕТНО	D NV	V Casing w/ SPT HAMM	ER TYPE Automatic
DRILL	<b>ER</b> Sr	nith, C	. L.		S	TART DA	ΤE	05/10/	16		COMI	P. DA	<b>TE</b> 05/	10/16		SURFACE WATER DEPTH 4.9	erren
1 51/		DEPTH (ft)		0.5ft	_	0		BLOWS		ООТ	75 	100	SAMP.		L O G	SOIL AND ROCK DESC	
660	-	- -					l				•			<i>y</i> 10101	-	- (II)	<i>5</i> 2
655	1	-														655.4 GROUND SURFA	CE 0.
033	1	-							T		T					- ALLUVIAL GRAY, WHITE, TAN, AN	D BROWN
	1	-				:::	: i	<u>.</u>			: :	: :				CLAYEY SILTY SAND, WI	
650	650.7	- 4.7	13	15	14		.	l						١		650.7 RESIDUAL	4.
		- - -	13	15	14			29						М	-	GRAY, WHITE, LIGHT GRE BROWN, CLAYEY SILT MICACEOUS	Y SAND,
645	645.7	- 9.7 -	41	59/0.4		• • •	-	· · ·\ <u>·</u>	_==	÷ ÷		<u></u>			77	645.7 WEATHERED RO	9. O <b>CK</b>
	1	-				:::	:				1	00/0.9			鰯	(GRANITE)	
	640.7	- - 14.7				:::					: :						
640	J-0./ -	- 14./	68	32/0.1			+		+		1-10	00/0.6	1			-	
	‡	-									: :						
رمد ل	635.7	- - 19.7				: : :					: :	::					
635	$\exists$	_	63	37/0.1			-		+::		10	00/0.6	1			_	
	7	-					$\cdot$				• •	: -				631.6	00
L	630.7	- - 24.7	60/0.0			:::		· · · ·	: :		<u>  : :</u> ,		4		B	631.6 630.7 <b>CRYSTALLINE RO</b> - (GRANITE)	23. 24.
																Boring Terminated WITH PENETRATION TEST RELEVATION 630.7 ft IN CRYST (GRANITE)	EFUSAL at

#### GEOTECHNICAL BORING REPORT BORE LOG

SHEET 9 OF 10

										30	<u>KE</u>	L	<u>UG</u>			
WBS	42341				TI	<b>P</b> B-5	165		COUN	ITY	DAVID	SC	ON			GEOLOGIST Stickney, J. K.
SITE	DESCR	IPTION	<b>I</b> BRI	DGE N	NO. 42	OVER	MUD	DY CRI	EEK ON	I SR	1485 (H	ΙΑΙ	MPTON	ROA	D)	GROUND WTR (ft)
BOR	ING NO.	EB2	-A		S	TATION	23+	-05		OI	FFSET	2	4 ft LT			ALIGNMENT -L- 0 HR. 3.5
COLI	LAR ELE	<b>EV.</b> 66	65.5 ft		TO	OTAL D	EPTH	29.7 f	ŧ	N	ORTHII	NG	799,9	28		<b>EASTING</b> 1,598,138 <b>24 HR.</b> FIAD
DRILL	RIG/HAI	MMER E	FF./DA	TE HE									DRILL N	IETHO	D NV	V Casing w/ SPT HAMMER TYPE Automatic
DRIL	LER S	mith, C	. L.		S	TART D	ATE	05/06/1	16	C	OMP. D	Α1	Γ <b>E</b> 05/0			SURFACE WATER DEPTH N/A
ELEV	DRIVE	DEPTH	1	OW COL				BLOWS		 DT		Т	SAMP.	<b>V</b> /	1	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50	75	10	00	NO.	MOI	0 G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (f
670																
0.0	-	ļ														<b>-</b> :
	-	<u> </u>														
665	-					-				_		+			-	- 665.5 GROUND SURFACE 0 ALLUVIAL
	-	-				:::								$\nabla$		TAN AND ORANGE TO GRAY AND WHITE, CLAYEY SILTY SAND, WITH GRAVEL
	660.9	4.6				¦:::								-		CEATET SIETT SAND, WITH GIVAVEE
660	_	-	1	1	2	<b>4</b> 3			<del> </del>	_		$\exists$		М	Ŀ	_
	-	+					. :		: : :						liii.F	
655	655.9	9.6	1	1	2					:						
555	-	ţ	'		_	3 .			<u> </u>			7		М		<b>-</b>
	-	‡					: :		: : :	:						
650	650.9	14.6	1	2	2	<u>  i</u>	: :		1 : : :					W		_
	-	ł				-4,	· · [			$\cdot \mid$						-
	645.9	19.6				::`									F	647.3 18. 645.9 <b>RESIDUAL</b> 19.
645	045.9 -	19.6	100/0.3	3							100/0.	3				GRAY AND WHITE, CLAYEY SILTY SAND, MICACEOUS
	-	‡														WEATHERED ROCK
	640.9	24.6										1				(GRANITE)
640	_	ŀ	100/0.2	1		<u> </u>			+		100/0.	2				-
	-	F							: : :	:						
	635.9	29.6	60/0.1			: :		<u></u>	1 : : :		60/0	1				635.9 29. _635.8 \ CRYSTALLINE ROCK \ _29.
	-	‡	00/0.1	1							00/0.					(GRANITE)
	-	‡														Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at
	_	t													ΙĿ	Elevation 635.8 ft IN CRYSTALLINE ROCK (GRANITE)
	-	ł													ΙĿ	(OIVANITE)
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## LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

WBS: 42341 TIP: B-5165

**COUNTY: DAVIDSON** 

BRIDGE NO. 42 OVER MUDDY CREEK ON SR 1485 (HAMPTON ROAD)

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD (%)	Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (KSI)	Remarks
RS-1	B1-A	27.6 - 30.1	GRANITE	PPg	100	3.4	1.87	166.5	9.25	GSI=95-98