DocuSign Envelope ID: C7DC980A-7A8A-42BF-8366-A4E47DF3E06C **2513A** REFERENCE

**CONTENTS** 

**DESCRIPTION** 

TITLE SHEET

LEGENDS

PROFILE BORE LOGS

SITE PLAN

SHEET NO.

STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE

PROJECT DESCRIPTION <u>I-40 FROM</u> EAST OF SR 1224 (MONTE VISTA RD) TO PAVEMENT JOINT WEST OF SR 3412 (SAND HILL RD). INCLUDES INITIAL IMPROVEMENTS AT I-40EB TO I-26EB AT US 19/23 (SMOKEY PARK HIGHWAY)

SITE DESCRIPTION <u>RETAINING</u> WALL NO. W602, FROM -Y5RPA- STATION 21+41.06, 17.63'LT TO -Y5RPA-**STATION** 23 + 83.03, 52.43' RT

STATE	STATE PROJECT REFERENCE NO.	NO.	SHEETS
N.C.	I-2513AA	1	5

### **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) 707-6850. 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 BORCHOLE. 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 INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS INCLORDED TO CLIMATIC CONDITIONS INCLOUDING 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 PLAPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE 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 OR FIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

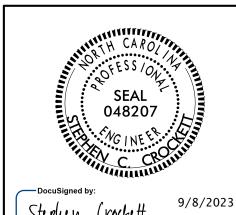
- NOTES:

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

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

GOODNIGHT, D.J. INVESTIGATED BY \_\_FALCON ENG. DRAWN BY \_CROCKETT, S.C. CHECKED BY HUNSBERGER, W.S. SUBMITTED BY \_\_FALCON ENG. DATE \_SEPTEMBER 2023

CG2



Stephen (rockett C5CA5FED48E0435

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I-2513AA

2

TOWN OF HOLLY SPRINGS PROJECT NO.

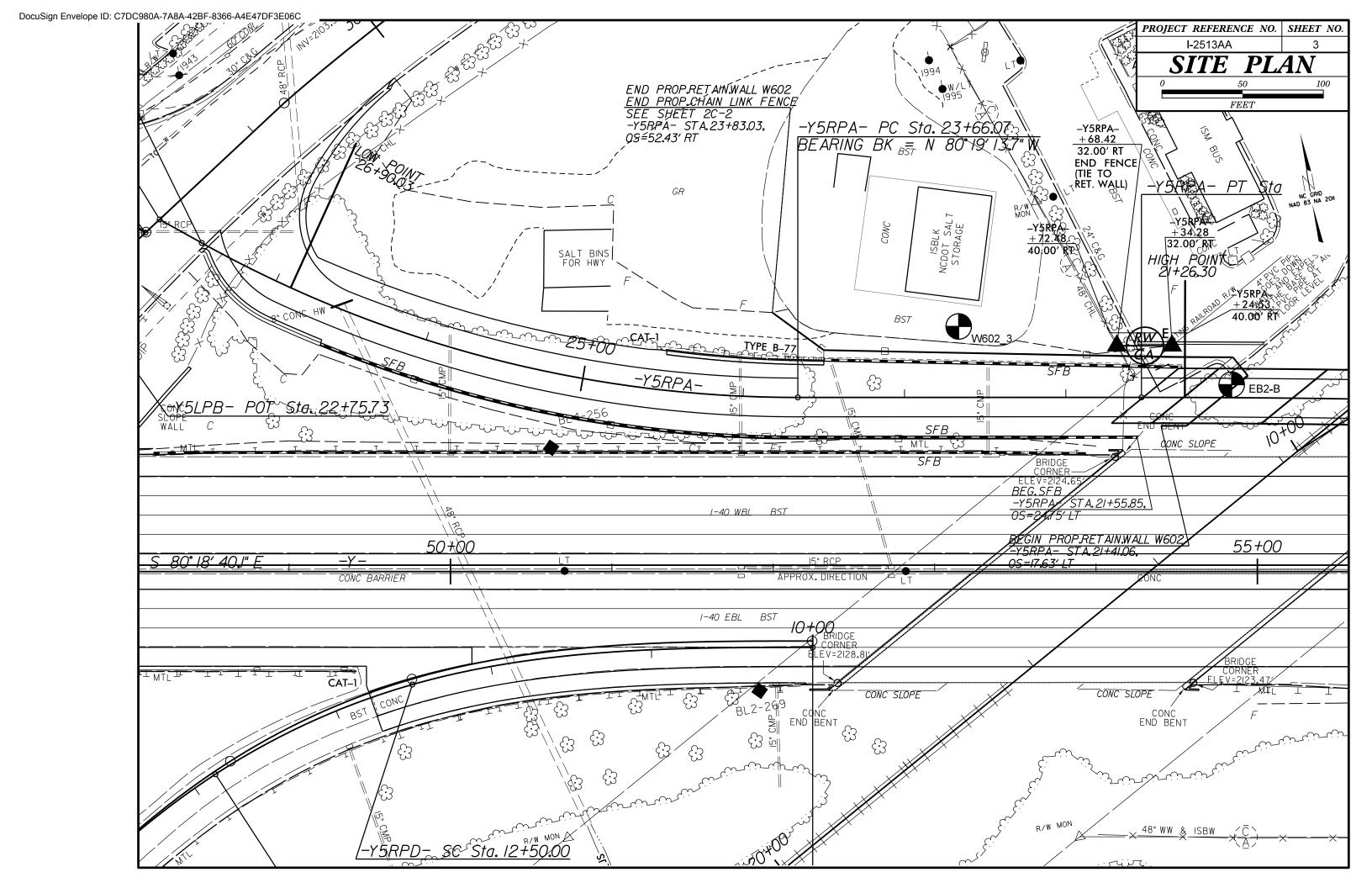
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

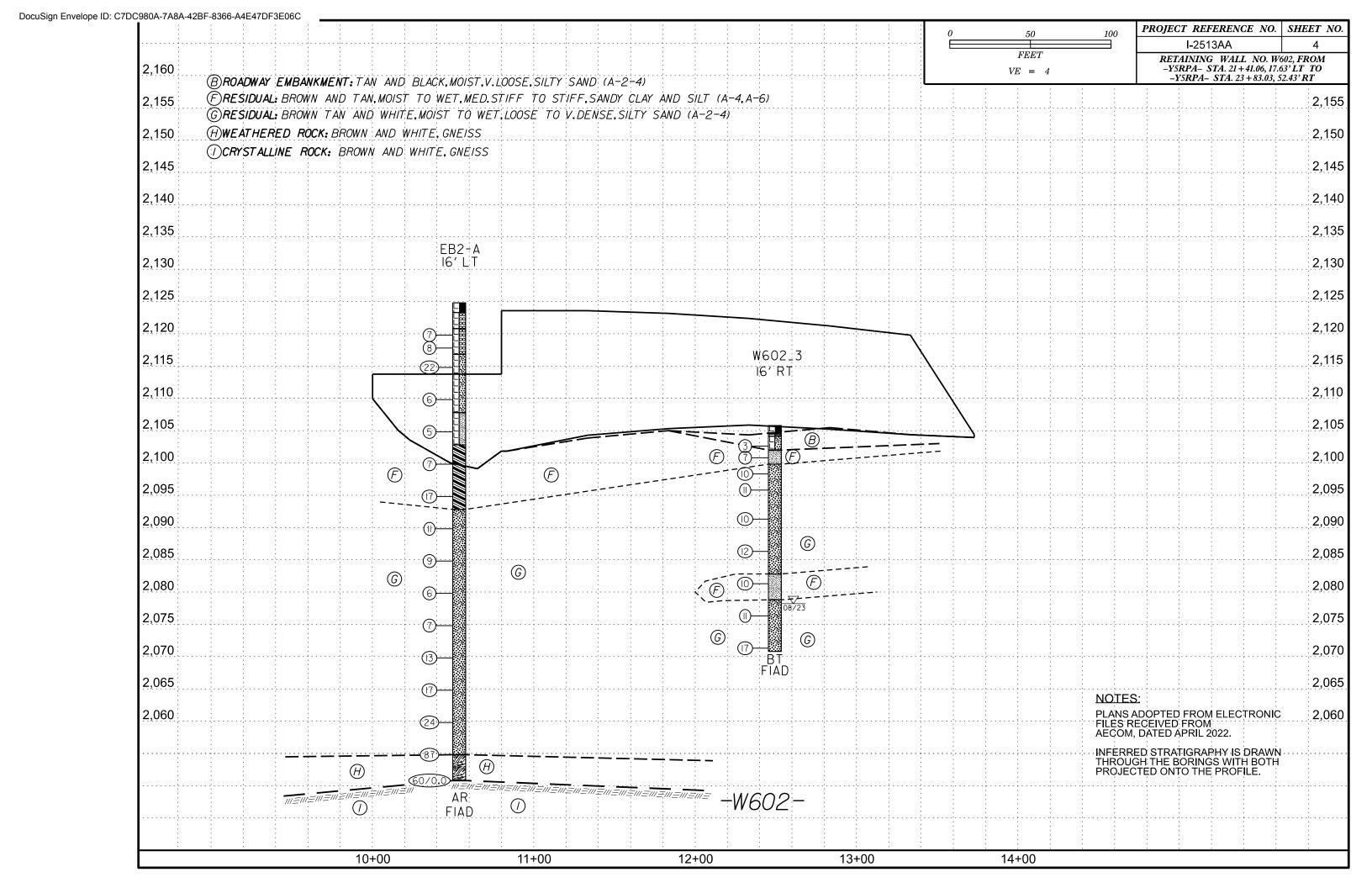
GEOTECHNICAL ENGINEERING UNIT

# SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS					
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.					
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<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.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	AQUIFER - A WATER BEARING FORMATION OR STRATA.					
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAN					
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC. A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAV A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.					
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED VILLE NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL A					
CEMERAL CRANIII AR MATERIAIS SILT-CLAY MATERIAIS	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN ICNEOUS AND METAMORPHIC POCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND					
CLASS. (≤ 35% PASSING *200) CRGANIC MATERIALS  ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK (CR)  WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE.					
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 B-2-6 A-2-7 A-3-4 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM					
000000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR)  SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.					
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED					
7. PASSING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	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					
*40 30 MX 50 MX 51 MN	GRANULAR SILT - CLAY	- WEATHERING	ROCKS OR CUTS MASSIVE ROCK.					
-200 13 PM 23 PM 10 PM 33 PM 33 PM 35 PM 36 PM 36 PM 36 PM 36 PM 36 PM	ORGANIC MATERIAL SOILS 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 SOUS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.					
LL 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN LITTLE OR LITTLE OR LITTLE OR	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.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.					
CROUP INDEX A A A A MY R MY 12 MY IS MY NO MY AMOUNTS OF ORGANIC	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					
USIAL TYPES STONE FRACS ORGANIC	✓ 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 ONE ANOTHER PARALLEL TO THE FRACTURE.					
OF MAJOR GRAYEL, AND SAND GRAYEL AND SAND SAND SAND SAND SAND SAND SAND	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.					
CEN PATING	✓ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.					
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.					
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	- OM→ SPRING OR SEEP	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 (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK,	FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.					
PRIMARY SOIL TYPE COMPACTNESS OR 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					
CONSISTENCY CONSISTENCY (N-VALUE) (TONS/FT <sup>2</sup> )	WITH SOIL DESCRIPTION → OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.					
GENERALLY VERY LOOSE < 4  LOOSE 4 TO 10	SOIL SYMBOL  SOIL SYMBOL  SOIL SYMBOL  SET PMT  SET BORING  SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.					
MATERIAL MEDIUM DENSE 10 TO 30 N/A	RT .	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AFRATION AND LACK OF GOOD DRAINAGE.					
(NON-COHESIVE) DENSE 30 TO 50  VERY DENSE > 50	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT  AUGER BORING  CONE PENETROMETER TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE					
VERY SOFT < 2 < 0.25	INFERRED SOIL BOUNDARY	(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	TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	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 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 ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE					
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4  HARD > 30 > 4	→ → → → → → → ALLUVIAL SOIL BOUNDARY \( \triangle \) PIEZUMETER \( \triangle \) SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.					
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.					
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE ACCEPTABLE, BUT NOT TO BE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES 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	LICED IN THE TOP 2 EEET 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	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS,					
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.					
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF					
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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					
SOIL MOISTURE - CORRELATION OF TERMS	L CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - 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  (ATTERBERG LIMITS) DESCRIPTION	CSE COARSE ORG ORGANIC  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.					
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL					
(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	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.					
PLASTIC PLOUID 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.					
BANGE - WET - (W) SEMISULIDE REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES  TCR - TRICONE REFUSAL  RT - RECOMPACTED TRIAXIAL  W - MOISTURE CONTENT  CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK:ELEVATIONS TAKEN FROM 12513_IS_+nL+in					
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	DATE:04/15/2022					
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: 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		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING					
ATTAIN UPTIMUM MUISTURE	CME-55  CME-55  CME-55  CME-55	THINLY LAMINATED < 0.008 FEET	1					
PLASTICITY	X 8' HOLLOW AUGERS -B	INDURATION  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	1					
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	X CME-550X HARD FACED FINGER BITS -N -N	PURRING WITH FINGER EREES NUMEROUS CRAINS.						
SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNG,-CARBIDE INSERTS HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.						
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;						
	PORTABLE HOIST   TRICONESTEEL TEETH   HAND AUGER	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).	CORE BIT VANE SHEAR TEST	CHARP HAMMER RIGHE REGULTRED TO RREAK SAMPLE.						
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1					





### GEOTECHNICAL BORING REPORT BORE LOG

### DESCRIPTION BROWNED OFFICE AND PROVIDED ON PROPERTY AND ASSESSMENT OF THE PROPERTY OF THE PROPERTY AND ASSESSMENT OF THE PROPERTY OF THE	WBS	3416			1-	<b>ΓΙΡ</b> 1-25	13AA		1			MBE			GEOLO	OGIST G	oodnight, D.	J.		w	<b>/BS</b> 341	65.1.2			Т	<b>IP</b> 1-251	I3AA	СО	JNTY BUNC	OMBE			GEC	DLOGIST	Goodnight, D.	J.	
Column   C				<b>I</b> BRIDGE				UE RID					BETWE						IND WTR (ft)				N RE	TAININ							7.63' L	т то					JND WTR (ft
Post			;						<u> </u>				· · · ·				В					S	STATION 22+66								ALIGNMENT -Y5RPA-			. 27.6			
Security	COL	COLLAR ELEV. 2,124.8 ft		-	TOTAL D	EPTH	74.0 ft	t				EASTIN	<b>NG</b> 918,8	62	24 HR.	. FIAD	C					T								<b>EASTING</b> 918,791 <b>24 HR</b> .							
Security	DRIL	DRILL RIG/HAMMER EFF./DATE CG204			 CG20446	Diedrich D	50 87% (	05/10/202	22				Augers	<u> </u>	HAN	MMER TYPE	Automatic	DF	· · · · · · · · · · · · · · · · · · ·				 G20446 D	Diedrich D50	0 87% 05/	10/2022	l	DRI	ILL METH	HOD					Automatic		
10   10   10   10   10   10   10   10										<u> </u>											S	1			COMP.	<del> </del>											
10   10   10   10   10   10   10   10	ELEV		DEPTI	BLOW	COUNT		В	BLOWS	PER FO				<b>V</b> /	16		SOIL A	ND ROCK DI	ESCRIPTIO	N	EL	.EV DRIV	E DEPT	rHBL		OUNT		BLC	WS PER I	OOT	SA				SOIL	AND ROCK D	ESCRIPTIO	)N
2.52 2.733 4 6 3 3 3 6 4 1 2 3 3 4 4 1 2 3 4 4 1 3 4 4	(π)	(ft)	(ft)	0.5ft 0.	5ft 0.5f	t   0	25		50	75	100	NO.	MOI	G	ELEV. (ft)					) (1	ft) (ft)	(ft)	0.5f	ft 0.5f	t 0.5ft	0	25	50	75 1	00 N	10. V	MOI	G				
2.52 2.733 4 6 3 3 3 6 4 1 2 3 3 4 4 1 2 3 4 4 1 3 4 4																																					
## AGESTALE NATIONAL   1   1   1   1   1   1   1   1   1	2125		+			+													0.0	21	10	+											F				
120 2 120 4 1			Ŧ							.					2,123.3				1.t	4		Ŧ											E				
210 2-156 40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2120	2,120	8 4.0	3	3 4	-  L <u>il</u> -									2,120.8	ROA	DWAY EMBA	ANKMENT	4.0	21	05	<u> </u>		_								_					0
210 2-114 - 100 5 7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9		2,118.	8 6.0										-		(	GRAY, LOC	SE, F. TO C	SE. SAND (	(A-1-a)		2,103	.6 2.2	2	1	2					-	١.	. Ē	2.104.	<sup>1</sup> ∕\ AG	GREGATE BAS	SE COURSE	
Section   Sect		2 115	Ţ	-		:•8	:			-			"		2,116.8				SII TY 8.0	7	'	.8 4.0			4	•3 : :	:   : :	: :   :		:	- 1	522	2,102.0	TAN A	ND BLACK, V.	LOOSE, SIL	
March   Marc	2115	- 2,113.	<del>T</del> 3.0	5	7 15	1	22		ļ::::				М		_	SAND (A	-2-4) WITH L	ITTLE GRA	VEL	21	2,099	.3 6.5				1 7							2,099.8	8   SAND( Ti	A-2-4) WITH LI TRACE ORG	TTLE MICA ANICS	AND 1 6
March   Marc			Ŧ			::,	;/.   :		: : :	.											2 006	Ŧ.	- 1	3	7	. •10				.		И	W.F	TAN ANI	RESIDU	ĀL — — —	
March   Marc	2110	2,110.	8 14.0	1 3	2 4	-  :,/							١							20		.0+ 9.0 +		5	6	1 · 1 · • 11				11		и		1	SILŤ (A-	4)	i
March   Marc	2110	1	‡		4	<b>—</b> 6	.		1				M		2 407 0				47.6		,,,,,	‡				<del>  ;                                 </del>							<b>#</b>	DENS	SE, SILTY SAND	(A-2-4) WI	
200 2.000.8 20 0 4 7 10			‡				: :   :								2,107.8 	BROWN, M	ED. STIFF, S	SANDY SILT	(A-4)	4	2,092	.3 13.5		4	6	: :	:   : :							-	TRACE TO LIT	TLE MIĆA	
200 2.000 2.20	2105	2,105.	8 <u>+ 19.0</u> +	2	2 3	-			: : :				М			WIIHI	RACE GRAV	/EL AND MI	CA	20	90	‡				. ₹10					"	۷'					
2002 2.250 2.250 4 7 10 2 2.250 2.250 4 7 10 2 2.250 2.250 2.250 4 7 10 2 2.250 2.250 2.250 2.250 4 7 10 2 2.250 2			‡			[ ]	: :   :								2,102.8				22.0		2.007	± 10.5	_			: j:											
A SAMOY CLAY (A.6)  2002 2.005.6. 73.0.1 4 7 10  M 2.002.6. 73.0.1 4 8 0 0 1 47  M 2.002.6. 73.0.1 4 7 10  M 2.002.6. 73.0	0.400	2.100.	+ 8+ 24.0			_  :¦:	.									BROWN					,	-3 <u> </u> 10.5		5	7	\ .     . •12	.   2.					И					
200 2.000.8 20.0 4 7 10	2100		+	2	3 4	7-			<del> </del>				М				SANDY CLAY	Y (A-6)		20	185	†				<del>                                   </del>				$\exists \Box$							
2005 2006.6 20.0 4 7 10 200 2006.7 20.0 4 7 10 200 2006.7 20.0 4 5 6 4 5 6 4 5 6 6 5 6 6 5 6 6 6 6 6 6			İ			: \	.														2,082	.3 23.5				11:1:				:			2,082.8	8TAN. S	TIFF. SANDY S	SILT (A-4) W	VITH 23
2002 2008 8 340 4 5 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2095	2,095	8 29.0	4	7 10	<b>`</b>	\ .						M							20	080	+	3	4	6	. •10		-			V	N	<b>#</b>	,	LITTLE M	ICA (TT)	
2000 2000 5 44.0 2 5 3 3 4 7 4 7 4 8 9 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10			Ŧ	'			7 .						l IVI		2 002 8				32 (			Ŧ				1 . 1 .					7	7	2,078.8	8		DENSE O	27
2075 2.075.5 - 30.0 2 4 5 5 6			‡			::/	<i>l</i> . :   :			-					2,032.0				O V.	11	2,077	.3 28.5		4	7	1 : 1 :				-	V	N					
2005 2.005 8 99.0 2 4 5	2090	2,090.	8+ 34.0 +	4	5 6	· · · / <sub>1</sub>	11		: : :				М			DENSE,			II H	20	75	‡								41	'		<u> </u>				
2082 2.056.6 39.0 2 4 5			‡				: :   :														2.072	± 22 5				::';											
2000 2.000.8 - 64.0 2 2 3 3 3	2005	2,085	8+ 39.0			_j :   _	:   :			.											2,072			8	9	1 : : 3	17	-	· · ·   · · ·		V	Ν	2,070.8				35
2075. 2070. 2.070.8 54.0 3 5 8	2005	1	‡	2   '	4   5	9							M									‡											-	Boring Te	erminated at Ele RESIDUAL: (	vation 2,070 A-2-4)	0.8 ft in
2075. 2070. 2.070.8 54.0 3 5 8			‡			: :	: :   :			.												‡											ţ				
2075. 2070. 2.070.8 54.0 3 5 8	2080	2,080	8+ 44.0	2	3 3	-  <u>  j</u>	-		ļ · · ·				l <sub>M</sub>	Ŀ								<u></u>											Ł				
2075. 2070. 2.070.8 54.0 3 5 8			<u>†</u>			] T°.	: :   :															<u>†</u>											E				
2075. 2070. 2.070.8 54.0 3 5 8		2 075	8 4an			[] <u>i</u> ·	.			-												<u>†</u>											E				
2,070 2,070 8 54.0 3 5 6 113 M M 2,065.8 59.0 5 7 10 M M M 2,065.8 69.0 8 11 76 BROWN AND WHITE, GNEISS BROWN AND WHITE, GNEISS BROWN AND WHITE, GNEISS PROWN AND WHITE, GNEISS BROWN AND WHITE, GNEISS PROWN AND WHITE, GNEIS	2075	-,,,,,,	+	2	2 5	7			+				М	₩.E								+											F				
2070 2070 8 54 0 3 5 8			Ŧ				. [ ] :			.				i F								Ŧ											F				
2065 2.066.8 59.0 5 7 10	g 2070	2,070	8 54.0	3	5 2	' '							,,	<b>:::</b>								Ŧ											F				
2065 2.066.8 59.0 5 7 10	/8/6	1	Ŧ			1 1	13						IVI									Ŧ											F				
2060 2,060.8 64.0 8 10 14	GD.		‡			:::	$l:\mid$ :		: : :													Ŧ											F				
2060 2,060.8 64.0 8 10 14 24 M  2055 2,055.8 69.0 8 11 76  2050 BROWN AND WHITE, GNEISS  2,050.8 74.0 BORING Terminated WITH STANDARD PENETRATION TEST REFUSAL at PENE	2065	2,065.	8 <del>+</del> 59.0 +	5	7 10	1	17			-   -			М									‡											F				
2050   2050   8   10   14   24	S <sub>_</sub>		‡				:   ;		: : :													‡											ļ.				
N	GP. 3060	2,060	8+ 64.0				: []:															‡											ļ.				
2,055.8= 69.0 8 11 76	2060	1	†	8 1	0   14		24		<del> </del>				M									†											-				
N	3AA		‡				:   :	`. <u>`</u> .	\ <u>-::</u> :	:   :												‡											E				
##	2055	2,055.	8 69.0	8 1	1 76	$+$ $\mid \cdot \cdot \cdot$	-	 ———		``\			N/I		0.054.0				=-			<u></u>											Ł				
2,050 8 74 0	щ		İ				: :   -				.₩ <u>81</u>		"	9677A	<u>4,U04.3</u>							İ											Ł				
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,050.8 ft on CR: GNEISS		2.050	8 740				. [ ]								2.050 8	BROV	N AND WHI	IIE, GNEISS				Ŧ											E				
Blevation 2,050.8 ft on CR: GNEISS	JRE [		<del>T (40</del>	60/0.0		T	1 -			- 1 -	60/0.0	7		F	_,000.0	Boring Te	erminated WI	TH STAND	ARD	11		Ŧ											F				
$ec{ ilde{ ilde{y}}}$   $ec{ ilde{ ilde{ ilde{ ilde{ ilde{y}}}}}$   $ec{ ilde{ ilde{ ilde{y}}}}$   $ec{ ilde{ ilde{y}}}$   $ec{ ilde{y}}$   $ec$	OT BC		Ŧ											F								Ŧ											F				
	NCDC		Ŧ											F								Ŧ											F				